# Proficy Plant Applications 2022

Web Client Help

We want to hear from you. If you have any comments, questions, or suggestions about our documentation, send them to the following email address:

doc@ge.com

# Contents

# Chapter 1. Introduction

## About Online and Offline Web Help

Plant Applications Web Client help system comes with multiple formats. Below are the help formats:

- **Offline Web Help**: This help is integrated with in the Plant Applications Web Client. When using the Plant Applications Web Client, at any given point, you can select the ⊘ icon located at the top-right corner to access the offline web helps. Selecting ⊘ opens the help in the default web browser.
- **Online Web Help**: This help can be access through GE documentation weblink. Select the Proficy Plant Applications link under then **Proficy Manufacturing Execution Systems** section. GE recommends you to use the Online Web help to stay updated with the latest Plant Applications Web Client help. **Online Web Help** provides with the latest updates, any missed information in offline help, or defect fixes.
- **PDFs**: All the help documents are available in PDF format that you can use to print a physical copy.

## About Plant Applications Web Client

Plant Applications Web Client acts as a container of the applications for managing work orders as described in the following table.

| Application | Description |
| --- | --- |
| Unit Operations | Displays a list of operations associated with a work order. You can track the progress of completion of an operation, access reference documents, provide data for quality variables, specify consumption of BOM items, and create a defect. |
| Non Conformance | Displays a list of nonconformities raised as defects on serial numbers or material lots. The application includes details for each defect and enables you to select a disposition plan for each defect or access a record of the disposition plan taken on each defect. |
| Work Order Manager | Displays the status, progress, and priority of work orders. You can also modify a work order and its plan, access the work order, history, defects, and |

| Application | Description |
|---|---|
| | manage the planned dates of a work order, if required. |
| Route Editor | Displays the routes used to manufacture a product. You can create routes, add operations to the route, assign BOM items, equipment, documents, and properties to the operations, and release a route for use in a work order. |
| Work Queue | Displays a list of operations that are ready or in progress. You can add operations to the queue, track the progress of completion of an operation, access reference documents, provide data for quality variables, specify consumption of BOM items, and create a defect. You can clock on, complete, record completed quantity, and/or raise defects on multiple serials/lots at the same time. |
| Time Booking | Enables an operator or supervisor to view labor records (timesheet), add missing time records, and modify the applied time of a previously submitted record. |
| Property Definition | Displays a list of property definitions tailored to the requirements of your business. The application also displays the property groups and categories to which a property definition belongs. |
| Security | Displays a list of applications to which the logged-in user has access. |
| Configuration | Enables a system integrator to perform the following tasks in the Unit Operations and Work Queue applications:<br><br>• Show or hide the tabs.<br>• Add and configure custom tabs.<br>• Integrate external applications and services. |

| Application | Description |
|---|---|
| Approval Cockpit | Enables an administrator to configure, execute, and track approval workflows for action events. |
| Downtime | Displays the list of KPIs and downtime events for the machines assigned to the operator. |
| OEE Dashboard | Displays an overview of the OEE, Quality, Performance, and Availability KPIs. Additional information about each KPI is displayed as Pareto and Waterfall charts. |
| Reports | Displays KPI reports and production status of the plant by department, line, and unit. It also provides information about Planned vs. Actuals for each KPI. |
| My Machines | Enables an operator to subscribe and monitor the required machines for downtime events. |
| Analysis | Plots historical and live charts to visualize time series data available in Plant Applications and Historian. Displays information for production batches in the form of a Gantt chart. |
| OEE Aggregation Store | Calculates and stores OEE data in a database so that it is quickly accessible. The OEE data can be calculated at the site level. The OEE data can be refreshed at a configured interval. |
| Activities | Displays the activities planned within the duration of a shift. You can add an activity for an event within the shift duration, and then any user can perform the activity within the shift duration. |
| Process Orders | Monitors the progress of the process orders. Active process orders track actual production and quantities against process orders, and display remaining quantities, planned quantities, planned start times, and planned end times. |

| Application | Description |
|---|---|
| Alarms | Triggers alarm notifications based on rules configured in Plant Applications Administrator. |
| Waste | Enables an operator or supervisor to create records for a waste event and associate it with a production event. |
| Receiving Inspection | Enables a material engineer or a quality engineer to receive material lots from an ERP application, perform an inspection on the material lot samples, and submit the inspection results. If a serial/lot is defective, a non-conformance can be created and disposed before submitting the inspection results. |
| BOM Editor | Enables you to create and maintain BOM Formulations. |
| Genealogy | Allows you to trace or track the real-time details of any serial/lot such as current status, location, initial and current quantities, what raw materials the serial/lot consumed, where the serial/lot was used, what triggered its execution, and how did it come to be manufactured in the MES |

# Recommended Browser and Minimum Resolution

Recommended Browser:

- Google Chrome v85.0 or later
- Safari v13.1 or later

> ✏️ **Note:**
>
> When you use an invalid or self-signed SSL certificate and access Plant Applications using https, the loading time is high because the static assets files are not cached in the Chrome browser. You should have a valid certificate so that the browser can cache the files and the loading time is reduced.This is a Chrome browser issue. For more

> 🖊 information, refer https://bugs.chromium.org/p/chromium/issues/detail?id=110649#c8 and https://helpx.adobe.com/experience-manager/kb/cache-problems-on-chrome-with-SSL-certificate-errors.html

Recommended Minimum Resolution:

- **Desktop**: For all Applications: 1366 x 768
- **HP tablet**: For Operator applications: 1920 x 1280
- **iPad**: For Operator applications: 2048 x 1536

# User Roles

The following table describes the user roles for each application in the Plant Applications Web Client.

| Application | User Roles Description |
|---|---|
| Unit Operations | Enables operators to clock on the operations, perform the operations, specify the consumption of BOM items, provide data for quality variables, and mark the operations complete. Operators can also create a defect if a part is defective, which appears in Non Conformance. <br><br> 🖊 **Note:** <br> While the Unit Operations application provides a list of serial numbers on which you can perform an operation using a selected piece of equipment, the Work Queue module provides a list of operations that are available for you to work on (regardless of the piece of equipment required to perform the operation). |
| Non Conformance | Enables quality engineers to access the record of non-conformities raised as defects on serial numbers or material lots and decide the disposition plan for a defect. |

| Application | User Roles Description |
|---|---|
| Work Order Manager | Enables supervisors to monitor the status and progress of work orders and manage the priority of a work order if required. |
| Route Editor | Enables supervisors to create routes and define the product line, material, BOM formulation, operations, BOM items, equipment, documents, and properties used in each route. |
| Work Queue | Enables operators to view a list of operations in their work queue, add additional operations, clock on the operations, perform the operations, specify the consumption of BOM items, provide data for quality variables, and mark the operations complete. Operators can also create a defect if a part is defective, which appears in Non Conformance.<br><br>**✎ Note:**<br>While the Unit Operations application provides a list of serials/lots on which you can perform an operation using a selected piece of equipment, the Work Queue module provides a list of operations that are available for you to work on (regardless of the piece of equipment required to perform the operation). |
| Time Booking | Enables an operator or supervisor to view labor records (timesheet), add missing time records, and modify the applied time of a previously submitted record. |
| Property Definition | Enables supervisors to create the property definitions, and then link these properties to a specific property group and property category. |
| Security | Enables Administrators to add groups to an application, provide access to an application for users |

| Application | User Roles Description |
|---|---|
| | to access the application, and remove access to a privilege sets. |
| Approval Cockpit | Enables an administrator to configure, execute, and track approval workflows for action events. |
| Configuration | Enables a system integrator to perform the following tasks in the Unit Operations and Work Queue applications:<br><br>• Show or hide the tabs.<br>• Add and configure custom tabs.<br>• Integrate external applications and services. |
| Downtime | Enables operators to add, modify, copy, delete, split, and merge downtime events for the selected machines. |
| OEE Dashboard and Reports | Enables supervisors, process engineers, maintenance engineers, and operation leaders to enhance the capability of Plant Applications data to monitor quality, performance, availability, and overall equipment effectiveness of plant equipment. |
| My Machines | Enables operators to select the required machines, from the assigned machines, for which they want to view the downtime events. |
| Analysis | Enables operators, supervisors, and process engineers to analyze time series data and live issues, and to quickly troubleshoot issues and make improvements. Process engineers can also analyze the production batches and golden batches information. |
| Activities | Enables operators and supervisors to perform, complete, release, and skip an activity associated with an event. |

| Application | User Roles Description |
|---|---|
| Process Orders | Enables operators and supervisors to monitor the progress of the process orders, and specify the consumption of BOM items. |
| Alarms | Enables supervisors to receive alarm notifications based on rules configured in Plant Applications Administrator. |
| Waste | Enables an operator or supervisor to create records for a waste event and associate it with a production event. |
| Receiving Inspection | Enables a material engineer or a quality engineer to receive material lots from an ERP application, perform an inspection on the material lot samples, and submit the inspection results. If a serial/lot is defective, a non-conformance can be created and disposed before submitting the inspection results. |
| BOM Editor | Enables an operator or supervisor to create and maintain BOM formulations. |
| Genealogy | Enables an operator or supervisor you to trace or track the real-time details of any serial/lot. |

## Access Plant Applications Web Client

1. In a web browser, enter the URL in the following format: `https://<hostname>:<port>`; where *<hostname>* is the host name or IP address of the server on which you installed the Plant Applications Web Client, and *<port>* is the port number you used to install the server. The **Welcome** page appears.
2. Enter your user name and password, and then select **Sign in**.

The applications available within the Plant Applications Web Client appear.

## Common Tasks

This topic provides a list of common tasks that you can perform using Plant Applications Web Client.

## Add or Remove Columns

When you access an application, by default, a few columns appear. You can remove some of these columns or add new ones. To do so, select [icon].

- To add a column, select the corresponding check box.
- To remove a column, clear the corresponding check box.

## Resize Grid Columns

You can resize a grid's column as needed. To resize the column, you can use the vertical bifurcations that appear on the columns. When you resize a column, the additional space is taken from the last column on the grid, such that the subsequent columns visibility is clear.

To resize the column, select the column's bifurcation and drag it to the width as needed.
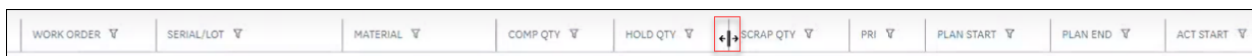


## Group Records

You can group records based on the values that appear in a column. To do so, drag the column heading to the page heading. For example, in Work Order Manager, if you want to group work orders based on the material, drag the MATERIAL column heading to the page heading. A list of work orders for each material appears.

## Filter/Search Records

You can filter records based on a single search parameter or multiple search parameters.

- To filter the grid data based on an entry of one or more columns, select [icon] on the column(s) and then select an entry or entries from the list. The data is filtered only on the client side and displayed on the grid.

- To search for an entry in the grid, use the search bar [icon] on the grid. This option will perform a text search on the data available on the grid and display the data that match with the text typed in the search box.

- To filter the records based on the parameters such as SERIAL/LOT, WORK ORDER, MATERIAL FAMILY, WORK ORDER STATUS, or MATERIAL), select the GOTO search icon [icon] in the main navigation bar, and then enter the search criteria. The data is filtered on server side and displayed on the grid.

> **Note:**
>
> The filter selection is persisted for a user for the following applications:
>
> - Work Queue
> - Work Order Manager
> - Unit Operations
> - Activities
> - Process Order

## Reset Grid to Default

If you have made any changes to the grid of an application, you can reset the grid of an application to default by selecting **Reset Grid to Default** option from settings ⚙.

## Clear the Applied Filter

You can clear the applied filters and view all the records that are available in the grid.

To clear the applied filters, select ⏚.

## E-Signature Authentication Icon

When the Performer session is active, as a **Performer**, you can see the 🔓 icon is activated in the Activities, Work Queue, and Unit Operations application pages. If you need to leave your workstation for a brief period, you can select the 🔓 to ensure that any additional changes will require performer authentication. This helps prevent unauthorized changes.

## Add or Modify Autolog Variables Values in Offline Mode

In the Activities application, if you are in the process of adding or modifying the values of the autolog variables, and the system goes offline, you can continue to add or modify the value of the variables. However, the autolog sheet is updated only when the connectivity is restored.

> **Note:**
>
> When the system is offline, you will not have access to the rest of the Plant Applications Web Client.

# Chapter 2. Unit Operations

## Overview

### About the Unit Operations Application

As an operator, you can use the Unit Operations application in the Plant Applications Web Client to access the operations associated with a work order. Each row in the **Unit Operations** page represents an operation to be performed or has been completed. By default, the Unit Operations application contains the operations of the **Machine** that you select.

You can perform the following tasks in the Unit Operations application:

- Access an operation *(on page 33)*.
- Clock on an operation *(on page 46)*.
- Clock off an operation *(on page 47)*.
- Add a Comment *(on page 49)*
- Access a list of BOM parts associated with a serial or lot *(on page 54)*.
- Specify the consumption of BOM parts during production *(on page 55)*.
- Create a lot *(on page 63)*.
- Specify a Quality Variable *(on page 67)*
- Provide the Completed Quantity for an Operation *(on page 68)*
- Mark an Operation Complete *(on page 71)*
- Skip an Operation *(on page 74)*
- Create a non-conformance *(on page 74)*.

### About Work Orders and Operations

A work order is a request to manufacture a certain quantity of products in a given time. It contains information on the model, route, and quantity of a product that must be manufactured. Work orders are either created in Route Editor or imported into Plant Applications using the Enterprise Resource Planning (ERP) scheduler and import services.

Work orders are grouped by product and are assigned to a specific production line for manufacturing.

A work order comprises the job details and operations. To manufacture each type of product, a sequence of tasks must be performed. Each task or a set of tasks is called an operation. An operation in a work order is an executable job performed on a Production Unit of a Production Line. Operations can be defined either in the route using the Route Editor module or in the work order that you import from an ERP system.

When all the operations are completed, the status of the work order changes to Completed in the Work Order Manager application.

> ✎ **Note:**
>
> If BOM parts are configured for an operation and marked as mandatory, the operation is marked complete only if the BOM parts are consumed. Similarly, if quality variables are configured for an operation, the operation is marked complete only if values for the quality variables are provided.

## Operation Status Indicators

The status of an operation indicates the progress of work for the operation.

In the Unit Operations module, the status of an operation is automatically determined and displayed with a color-coded indicator. The following table provides a list of status indicators defined for an operation.

| Status | Status Indicator | Description |
|---|---|---|
| Ready | ⏱ | Indicates that the serial/lot is available for you to perform the operation. |
| Clocked on by you | 👤 | Indicates that the serial/lot is currently clocked on only by you for the operation. |
| Clocked on by another user | 👤 | Indicates that the serial/lot is currently clocked on by another user for the operation, but is not clocked on by you. |
| Clocked on by other users | 👥 | Indicates that the serial/lot is currently clocked on by multiple users for the operation, but is not clocked on by you. |
| Clocked on by you and other users | 👥 | Indicates that the serial/lot is currently clocked on by you and other users for the operation. |
| Clocked on by other users in the past | ⏱ | Indicates that work for the serial/lot has begun, but the serial/lot is currently not clocked on for the operation. |

| Status | Status Indicator | Description |
|---|---|---|
| On hold |  | Indicates that the operation is in the On Hold status. This status indicator appears when a defect has been created for the serial/lot for the operation. After the defect is closed, the status of the operation is modified to the original status and the operation appears in the **Open** page. |
| Complete |  | Indicates that the operation is in the Complete status. This status indicator appears when an operation, the quality variables associated with the operation, and the mandatory BOM items associated with the operation are completed for the serial/lot.<br><br>**Note:** Defining quality variables and BOM items for an operation are optional. However, if they are defined, they must be completed for all the serials/lots in the operation. |
| Skipped |  | Indicates that the operation is in the Skipped status. |
| Excluded |  | Indicates that the operation is excluded from a mutually exclusive operations set. |

# Accessing an Operation

## Access an Operation

As an operator, you can access the operations in the Released (that is, Ready or In Progress), on Hold, and Completed statuses associated with a machine in the Non Conformance application.

1. In the **Unit Operations** page, in the **Machines** box, select the machine on which the operation is performed.

> **ⓘ Tip:**
> If the machine that you want to select appears in the workspace heading, you can select that button instead of using the **Machines** box.

The **Open** workspace appears, displaying a list of open operations in a table with an ascending sort applied in the **PRIORITY** and **MODIFIED ON** columns (the field values of the operations with highest priority and the latest modified date appear first in the table). The machines that you have selected appear in the workspace heading. The number of operations that appear in a page depends on the resolution of your computer screen. The following table provides information on each column in the table.

> **✎ Note:**
> You will not be able to view an operation that has been excluded from the mutually exclusive operations set.

| Column | Description |
|---|---|
| **STATUS** | The status *(on page 31)* of the serial/lot at the operation. |
| **SERIAL/LOT** | The unique identifier of the serial/lot associated with the work order. |
| **WORK ORDER** | The unique identifier of the work order. |
| **PRI** | The priority assigned to the work order. |
| **MATERIAL** | The material number of the serials/lots in the work order. |
| **MATERIAL DESC** | The description of the material of the serials/lots in the work order. |
| **MATERIAL FAMILY** | The material family of the serials/lots in the work order. |
| **OPERATION** | The name of the operation. |

| Column | Description |
|---|---|
| **OPERATION DESC** | The description of the operation. |
| **MODIFIED ON** | The date and time when a serial/lot is clocked on first for the operation. |
| **USER(S)** | The name of the user who is currently clocked on to the serials/lots in the operation. If multiple users are clocked on currently, the number of users appears in this column for that operation. Select *<number_of_- users>* to access the list of names of the users who are working on the operation. |
| **OPT** | Indicates that the operation is **Optional** by displaying OPT against the operation. |
| **ON/OFF** | Contains buttons to clock on *(on page 46)* or clock off *(on page 47)* the serial/lot for the operation. These buttons are disabled for an operation that does not require clocking on. |

> **Tip:**
> You can perform the following tasks:
> - Access the operations that are on hold or complete by selecting **On Hold** or **Complete**, respectively. When you select **Complete**, by default, the list of operations completed in the past seven days appears. You can, however, specify a different date range.
> - Manually refresh the list of operations by selecting ⟳.
> - Add or remove columns from the table by selecting ▤.
> - Filter the list of operations by selecting ▽ in a column heading.
> - Search for an operation in the queue using the **Search** box.
> - To access an operation using a barcode, select ▣ for an option and scan for the barcode specific to the option. Use your device's front camera only for Barcode/ QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes.
> - In iPad, you can use ▣ only in the Safari browser.

2. If you want to access the details of an operation, select the operation.

The workspace for the operation appears. The left pane contains a list of serial/lots available at the machine on which you are performing the operation (or a list of search results if you have searched for a serial/lot). The following table provides information on each section in the workspace.

| Section | Description |
| --- | --- |
| **Documents** | Contains the documents associated with the operation. These documents can be instruction manuals or technical publications associated with the operation. They have been added to the corresponding route using Route Editor or the ERP system. |
| **BOM** | Contains a list of BOM items to be consumed for each lot during the operation. For information, refer to About BOM Items *(on page 52)*. |
| **Quality** | Contains a list of quality variables for which you can enter values while performing the operation. For information, refer to Access the Quality Variables of an Operation *(on page 39)*. |
| **NCR** | Contains a list of defects created for the serial/lot at the operation. For information, refer to About Creating a Non-Conformance *(on page 74)*. |
| **Properties** | Contains a list of properties associated with the route, operation, or material. A property is an additional attribute that is assigned to a route, an operation, or a material to produce a product. Properties are assigned values in the following ways:<br>• Properties for routes and operations are assigned values in Route Editor.<br>• Properties for materials are assigned values in an ERP system. These materials are imported to Plant Applications using import services. |

| Section | Description |
|---------|-------------|
|  | In Unit Operations, you can view values of properties assigned to the following types of records:<br>• Route: Properties assigned to a route are applicable to all the operations in the route (for example, ERP project number).<br>• Operation: Properties assigned to an operation are applicable only to that operation (for example, process capability index of the operation).<br>• Material: Properties assigned to a material are applicable to all the routes that are associated with the material (for example, material grade). |

> **Note:**
>
> **Documents**, **BOM**, **Quality**, **NCR**, **Properties**, and **History** are standard tabs. You can show or hide them using the Configuration Management application. You can also rearrange the order of the tab display.

## Search for an Operation

1. In the main navigation bar, select $\mathcal{Q}$.

   A window containing a list of search options appears.
2. Provide values in any of the available boxes as described in the following table.

| Box | Description |
|-----|-------------|
| **SERIAL/LOT** | Enter a serial/lot number to access the associated operations. |
| **WORK ORDER** | Enter a work order number to access the associated operations. |
| **MATERIAL FAMILY** | Select the material family of the serial/lot. |
| **MATERIAL** | Select the material of the serial/lot. The options in this box are filtered based on the value in the **MATERIAL FAMILY** box. |
| **EQUIPMENT** | Select the machine that is used to perform the operation. |

| Box | Description |
|---|---|
| **STATUS** | Select the status of the operation. |
| **Clocked On** | Select the check box to access the operations that are clocked on by you. |

> **ⓘ Tip:**
>
> To search for an operation using a barcode, select 📷 for an option, and scan for the barcode specific to the option.
> - Use your device's camera for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes.
> - In iPad, you can use 📷 only in the Safari browser.
>
>   You can switch between the following two options:
>   - Front Camera
>   - Back Camera

3. Select 🔽 for a field to filter the operations.

The operations based on the specified search criteria appear.

> **ⓘ Tip:**
>
> To clear the results and perform new search, select **Clear Results**.

## Access BOM Items

An operation contains a list of BOM items necessary to perform the operation. As an operator, you can access the **BOM** section to specify the consumption of the BOM items for a product.

1. Select the operation whose BOM items you want to access.
2. Select **BOM**.

   The **BOM** section appears, displaying the BOM items associated with the selected operation.

   The number of the BOM tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on the serial/lot.

   In Unit Operations, the number of the **BOM** tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on the serial/lot. In Work Queue, the number

on the **BOM** tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on all the serials/lots that you have clocked on for the operation. The following table provides information on each column in the table.

| Column | Description |
| --- | --- |
| **ORDER** | The recommended order of consumption of the BOM item in an operation. |
| **MATERIAL** | The material number of the BOM item. |
| **MATERIAL DESC** | The material description of the BOM item. |
| **REQ QTY** | The planned quantity of the BOM items required for the completion of the serial/lot for the operation. |
| **CONSUMED QTY** | The actual quantity of the BOM items consumed during the production. |
| **UOM** | The unit of measure (UOM) of the BOM item. |
| **SERIAL/ LOT#** | The serial/lot of the raw material that was consumed. |
| **LOWER QTY** | The lower tolerance quantity of the BOM item that can be consumed. |
| **UPPER QTY** | The upper tolerance quantity of the BOM item that can be consumed. |
| **SCRAP FACTOR** | The Percentage of this BOM item that is expected to be lost during production of the formulation. For example, if 100 units of Product XYZ is required with a scrap factor of 1%, then you should have a 101 units on hand when preparing to produce the product. |
| **STORAGE UNIT** | Unit currently storing the selected product. |

3. In the **BOM** section, select an item.

    The page containing the item details and consumption history appears.

## Access Documents

You can access the documents that are related to a route. The documents can be instruction manuals or technical publications, which may be required to perform the operation. They have been added to the operation or the associated route using the Route Editor application or the ERP system.

1. Access the operation whose documents you want to access.
2. Select **Documents**.

   A list of documents associated with the operation or the associated route appear.
3. Select the document that you want to access.

   The document appears in the workspace.

> **ⓘ Tip:**
> You can rotate the document.

## Access the Quality Variables of an Operation

Quality variables include details about the data that are collected while performing an operation. These variables are defined in Plant Applications Administrator. The values that you provide for these variables help verify that the parameters that are critical to the quality and manufacturing processes are within the acceptable limits. You can use this data to review the performance of a production line and production unit and compare the quality of the products produced in each unit with projections for an operation.

For example, suppose you have been assigned the testing operation in a motor manufacturing unit. Quality variables can include the torque and rpm of the motor shaft. When you test each motor, you must enter the torque and rpm values for the corresponding serial number. A quality supervisor can then verify that the torque and rpm fall within the acceptable range.

1. Access the operation whose quality variables you want to access.
2. Select **Quality**.

   The **Quality** section appears, displaying a list of quality variables defined for the operation, and values for these variables for the serial/lot selected in the left pane. These variables are grouped based on the quality variable group. In Unit Operations, the number on the **Quality** tab indicates the total number of mandatory quality variables for the serial/lot that still require a value. In Work Queue, the number on the **Quality** tab indicates the total number of mandatory quality variables for all the serials/lots that you have clocked on for the operation and that still require a value. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **VARIABLE NAME** | The name of the variable. |
| **SPEC** | The value of the variable. You can enter a value only if you have clocked on the serial/lot. If an acceptable range has been defined for the variable, after you enter a value, the box in this |

| Column | Description |
|---|---|
|  | column displays a color, indicating whether the value is within the acceptable range. |
| **CHART** | Contains a chart that plots the lower and upper limits for the variable and the value that you have entered in the **SPEC** column. The CHART column appears only in the Box Whisker view. |

> **ⓘ Tip:**
> - By default, all the quality variables appear. If you want to access only mandatory variables, select **Mandatory Variables** in the drop-down list box.
> - If you want to view the lowest, highest, lower quartile, upper quartile, and median values for each variable, select ⊞. If you want to view the same values plotted on a chart, select ⬈.

3. In the left pane, select the serial/lot whose variable values you want to access.

   The **Quality** section displays the quality variables for the selected serial/lot.

## Access a Non-Conformance

1. Access the operation performed on the serial/lot whose non-conformance you want to access.
2. Select **NCR**.

   The **NCR** section appears, displaying a list of non-conformances for the serial/lot selected in the left pane.
3. In the left pane, select the serial/lot whose non-conformance you want to access.

   A list of non-conformances for the serial/lot that occurred at the operation appears. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **STATUS** | The status of the non-conformance. |
| **SERIAL/LOT** | The unique identifier of the serial/lot. |
| **OP** | The operation during which the non-conformance has been created. |

| Column | Description |
|---|---|
| **DISP** | The disposition method *(on page 88)* chosen for the serial/lot. |
| **MATERIAL** | The material of the serial/lot. |
| **MATERIAL FAMILY** | The material family of the serial/lot. |
| **MATERIAL DESC** | The material description of the serial/lot. |
| **CTP/REWORK OP** | • For a Rework disposition method, this field contains the operation during which rework must be performed on the serial/lot.<br>• For a Continue-to-Process (CTP) disposition method, this field contains the operation until which you can continue to work with the serial/lot.<br>• For a disposition method other than CTP or Rework, this column is blank. |
| **ACTIONS** | Contains the following buttons:<br>• 👁: Select this button to access the non-conformance details *(on page 84)*.<br>• 🕐: Select this button to access the defect history *(on page 83)*. |

## Access the Properties of an Operation

A property is an additional attribute that is assigned to a route, an operation, or a material to produce a product. Properties are created in Property Definition and assigned values in the following ways:

- Properties for routes and operations are assigned values in Route Editor.
- Properties for materials are assigned values in an ERP system. These materials are imported to Plant Applications using import services.

1. Access the operation for which you want to access the properties.
2. Select **Properties**.

The properties assigned to the operation, route, or material appear. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| LEVEL | The level at which the property has been defined - operation, route, or material.<br>• If a property has been defined at the route or material level, the value in this column is **All Operations**.<br>• If a property has been defined at the operation level, the value in this column is **Operation**. |
| CATEGORY | The category to which the property group belongs. |
| GROUP | The group to which the property belongs. |
| NAME | The name of the property. |
| VALUE | The value of the property. |
| UOM | The units of measure of the property. |
| DATA TYPE | The data type of the property value. |

## Access the History of an Operation

As an operator, you can access the events associated with an operation. An event is created each time the status of a serial/lot, operation, or the work order is changed.

1. Access the operation whose history you want to access.
2. Select **History**.

   The **History** section appears, displaying the events associated with the operation and the serial/lot selected in the left pane. The events appear in the descending order of their timestamps (based on the **TIME STAMP** column). The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| ACTION | The action performed on the serial/lot. |
| SERIAL/LOT | The unique identifier for the serial/lot on which the action was performed. |

| Column | Description |
|---|---|
| **OPERATION** | The name of the operation for which the action was performed. |
| **USER(S)** | The name of the user who performed the action specified in the **ACTION** column. |
| **TIME STAMP** | The date and time when the action was performed. |

> **(i) Tip:**
>
> To export the data to a .csv file, select ⬇. The data for the columns that appear in the table are exported into a .csv file. If the data contains unicode characters, to access the data in a Microsoft Excel worksheet:
>
> a. Access a blank worksheet.
> b. Go to **Data > From text/CSV**, and select the .csv file.
> c. Select the file origin: **65001:Unicode (UTF-8)**.
> d. Load the data.
>
> This process is a requirement for Microsoft Excel.

## Actions Recorded in the Work Order History

The following table provides a list of actions that appear in the **History** section of a work order.

| Action | Description |
|---|---|
| Work Order Created | Indicates that the work order is created. |
| Work Order Ready | Indicates that the work order is ready for you to begin work on at least one serial/lot. |
| Work Order Started | Indicates that the work has begun on at least one serial/lot in the work order. This happens when at least one serial/lot in the work order has been clocked on for an operation. |
| Work Order Completed | Indicates that all the operations in the work order are completed for all the serials/lots in the work order. |

| Action | Description |
|---|---|
| Work Order Cancelled | Indicates that the work order is cancelled. |
| Work Order Planned Date Change | Indicates that the planned start and end dates of the work order have been changed. |
| Work Order Priority Change | Indicates that the priority for the work order has been changed. |
| Serial No Created | Indicates that an ID has been created for a serial/lot in the work order. |
| Serial/Lot Started | Indicates that work has begun on a serial/lot for the work order. This happens when the serial/lot has been clocked on for the first operation. |
| Serial/Lot Hold | Indicates that the serial/lot is on hold. This happens when a non-conformance is created on the serial/lot. |
| Serial/Lot Scrapped | Indicates that the serial/lot has been scrapped. This happens when a non-conformance is created on the serial/lot and the disposition method specified for the serial/lot is Scrap. |
| Serial/Lot Completed | Indicates that work on the serial/lot has been completed. This happens when all the operations defined in the associated route are completed for the serial/lot. |
| Serial/Lot Identifier Change | Indicates that the name of a serial/lot has been changed. |
| Operation Ready | Indicates that an operation is ready for you to begin work on the specified serial/lot. |
| Operation Started | Indicates that work for an operation for the specified serial/lot has begun. |
| Serial/Lot Clock On | Indicates that a serial/lot has been clocked on for an operation by an operator. |
| Serial/Lot Clocked Off | Indicates that a serial/lot has been clocked off for an operation by an operator. |

| Action | Description |
|---|---|
| Operation Hold | Indicates that work for an operation is on hold for a serial/lot. This happens when a non-conformance has been created on the serial/lot for the operation. |
| Operation Released | Indicates that an operation is released for the serial/lot. This happens when the serial/lot has been disposed to release the operation hold. |
| Operation Cancelled | Indicates that an operation is cancelled for the serial/lot. This happens when the serial/lot is scrapped at the operation. |
| Operation Completed | Indicates that an operation is completed for the serial/lot. |
| Operation Skipped | Indicates that an operation is skipped for the serial/lot. |
| Hold Released | Indicates that hold is released on an operation. This happens when the serial/lot on which a non-conformance has been created has been disposed. |
| Order Segments Changed | Indicates that the sequence of an operation in the work order has been changed. This happens when operations have been added or removed (for example, the disposition for a defective serial/lot is s et to rework). |
| Serial/Lot Split | Indicates that a serial/lot has been split up. This happens when a non-conformance has been created for some of the items in the lot. |
| Serial/Lot Planned Quantity Change | Indicates that the planned quantity of a serial/lot has changed. This happens when items have been added to the planned quantity of the lot or some of the items in the lot have been scrapped. |
| Quantity Completed | Indicates that completed quantity has been specified for a serial/lot for an operation using Unit Operations or Work Queue. |

# Clocking on an Operation

## About Clocking on Serials/Lots for an Operation

When an operation is created in Route Editor or the ERP system, if it is specified that the operation requires clocking on, you must clock on the serial/lot on which you want to work. It indicates that the you are ready to accept the work and perform the operation.

Operations are planned for execution in one or more production units during production. You can, however, clock on serials/lots for an operation only in one production unit.

A clock-on process on an operation locks the operation for a production unit. As an operator, you can clock on serials/lots for an operation in the Ready status to indicate that you are ready to accept the work and perform the operation. After you clock on, the following actions take place:

- The operation is no longer available in the other production units.
- A timer is enabled to monitor the time you spent on the completion of an operation. The time you spent on an operation is visible only to you. The completion time of an operation may differ from one operator to another.
- A clock-on status indicator *(on page 31)* appears for the operation.

You can clock on multiple serials/lots at the same time. In addition, multiple users can clock on a single serial/lot.

> ✏️ **Note:**
> If an operation does not require clocking on (as defined in Route Editor or the ERP system), you cannot clock on serials/lots for the operation.

## Clock on Serials/Lots for an Operation

You can clock on serials/lots for an operation only if the operation requires clocking on (as defined in Route Editor or the ERP system).

- If you do not have the permission to perform this task, request your administrator to provide the permission using Security.
- Ensure that the operation is in Ready or In Progress status.

1. In the **Unit Operations** page, in the **Machines** drop-down list box, select a machine.
   The **Open** workspace appears.

> **ⓘ Tip:**
>
> You can use the **USER(S)** column to access the IDs of the users who have currently clocked on the operation.

2. Select an operation in the Ready or In Progress status.

   The workspace for the operation appears.

3. **Optional:** Select ⌄ to view the details of the operation.

4. **Optional:** If required, update the labor type from the drop-down list box containing the labor types.

> **✎ Note:**
>
> By default, the default labor type for the operation is selected.

5. Select the **ON** button to enable the clock-on process on the operation.

> **✎ Note:**
>
> The **ON** button is enabled only if the operation requires clocking on (as defined in Route Editor or the ERP system).

The selected serial/lot is clocked on for the operation, and the status of the operation is changed to In Progress. A timer appears in the operation details section to track the time taken to complete the operation.

# Clocking off an Operation

## About Clocking off Serials/Lots for an Operation

If you want to stop working on an operation for some time, you can clock off the serials/lots, and then clock on again when you resume working on them. It provides visibility to the supervisor on the progress of work for the operation. The timer in the page displaying operation details stops tracking the time when you clock off and resumes tracking only when you clock on again.

The following conditions apply when you clock off serial/lot:

- You can clock off only the serials/lots that you have clocked on.
- When you complete an operation, the serial/lot is clocked off automatically.
- You can clock on or clock off serials/lots only if the operation requires clocking on (as defined in Route Editor or the ERP system).

## Clock off a Serial/Lot for an Operation

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

1. In the **Unit Operations** page, in the **Machines** box, select the machine that is used to perform the operation.
   The **Open** workspace appears, displaying a list of operations for the selected machine.
2. In the row containing the operation for which you want to clock off serials/lots, and then select **OFF**.

> ✏️ **Note:**
> The **OFF** button is enabled only if you have clocked on the serials/lots in the operation.

The serials/lots are clocked off.

# Adding a Comment

## About Adding a Comment

While working on a serial/lot, you can add a comment on the serial/lot or the work order to provide any additional information.

You can view the comment added to a serial/lot regardless of the operation you are performing on the serial/lot. For example, if you have added a comment to a serial/lot while performing the first operation, the comment also appears when you access the serial/lot for any subsequent operations. Similarly, when you add a comment to a work order, it appears when you access any of the serials/lots for the work order. For this reason, when you add a comment, it is a good practice to provide the details of the operation for which the comment is applicable.

If a work order or serial/lot contains comments, when you access an operation, the comments button

(🗨) appears with a blue dot (🗨). If you select that button, the number of comments for the work order or serial/lot appears on the **Work Order** or **Serial/lot** tabs, respectively.

You can add an image, video, or attach the following document types to a comment:

- Microsoft Word (DOC/DOCX)
- Microsoft Power Point Presentation (PPT/PPTX)
- Microsoft Excel (XLS/XLSX)

- Text document
- PDF

Only images and videos can be attached inline within the Comment rich text editor along with the textual data. The other document types are uploaded to the comment as non-inline attachments.

## Add a Comment

You can compose comments with images, videos, and documents that support your comment.

Add images/videos to a comment using the camera/video option or upload them as attachments. You can copy paste images using clipboard, or drag and drop them into the rich text editor. You can also preview the image, video, and pdf file types.

1. Access the operation associated with the serial or lot or the work order for which you want to add a comment.

2. In the heading, select 　.
   A window appears, displaying a list of comments for the work order. These comments are arranged in the reverse order of creation (that is, the latest comment appears first).

3. Depending on whether you want to add a comment to the work order or serial/lot, select the appropriate tab.

4. In the **ADD COMMENT** box, enter the comment.

   > **ⓘ Tip:**
   > If needed, you can apply formatting, change the alignment of the comment, or insert a link in the comment.

   You can add inline images by copy pasting from a clipboard to the comment rich text editor.

   The maximum character limit for plain text is 7000 characters. The file size for images/videos should not exceed 25MB.

5. **Optional:** Attach documents *(on page 50)* and add images *(on page 51)*/videos *(on page 51)* to a comment.

6. Select **Add**.

The comment is added.

> **ⓘ Tip:**
>
> To modify a comment, select 🖉 and to delete a comment that you have added, select ✕. If
> you do not have the permission to perform this task, request your administrator to provide the
> permission using Security.
> The following conditions apply when you modify or delete a comment:
>
> - You can modify or delete comments added by others only if you have the permission to
>   moderate comments. Otherwise, you can modify or delete only the comments that you
>   have added.
> - After you modify a comment and save your changes, you cannot view the original text.
> - After you delete a comment, you cannot restore it.

## Upload Documents to a Comment

You can attach documents that support your comment.

Except for images and videos, all the other documents are attached as non-inline.

Ensure that the document that you want to upload is available on the Plant Applications server.

1. Select 📎 .

   The **Upload Document** window appears.
2. In the **FILE NAME/URL** box, enter the file path, or browse to select the document to upload.
3. Select **Upload**.

   If the document is an image/video, a preview of the file appears in the comment rich text editor
   along with its filename label.

   The document is inserted into the comment.
4. **Optional:** To modify the uploaded image, select the image preview to open the image in an edit
   mode.
   a. Use the image editing options to resize or modify the image.
   b. Select **Save**.

   > **✎ Note:**
   >
   > Images added to the comment from a URL cannot be modified. To delete uploaded
   > images/videos, delete the file preview or its filename label from the editor.

## Add Images to a Comment

You can add images that support your comment.

A comment can have multiple images. You can add images to a comment by uploading them as documents *(on page 50)*, or taking a screenshot using the camera icon. The comments editor supports JPEG, PNG, GIF, ICO, and WebP image formats.

1. Select .

   > **Note:**
   > If a message appears, asking you to allow access to the camera, select **Allow**.

   A screen appears in camera mode.
2. Point the camera to the subject, and select the shutter icon to capture a still image.
   A preview of the image appears in the comment rich text editor along with its filename label, and simultaneously saved to the database.
3. **Optional:** To modify the captured image, select the image preview to open the image in an edit mode.
   a. Use the image editing options to resize or modify the image.
   b. Select **Save**.
   To delete saved images from a comment, delete the image preview or its filename label in the editor.

## Add Videos to a Comment

You can add videos that support your comment.

Videos are streamed only when you play them. You can add videos to a comment by uploading them as documents *(on page 50)*, or use the video option to record a live video and save. The comments editor supports MP4, MOV, and WebM video formats.

1. Select .

   > **Note:**
   > If a message appears, asking you to allow access to the camera, select **Allow**.

   A screen appears to record the video.
2. Use the shutter icon to capture the video.

A preview of the recorded video appears in the comment rich text editor along with its filename label, and simultaneously saved to the database. You cannot modify videos in the comment editor.

To delete saved videos from a comment, delete the video preview or its filename label in the editor.

# Adding a Lot to an In-progress Work Order

## Adding a Lot to an In-progress Work Order

To add a lot to a work order, all of the following conditions must be met:

- The behavior **Allow addition of material lots to a work order in progress** is set for the route (see Create a Route Revision *(on page 210)*).
- The work order is in progress.
- The work order is for a serialized product.
- You have the permission to add lots to in-progress work orders running on the specified line (see About the Security Application *(on page 287)*)

1. Select the work order to modify.
2. Click ╋. This will bring up the **Add Lots to Work Order** dialog.
3. Enter the number of additional lots in **NO OF LOTS TO ADD**. This will add rows as required to the **ENTER SERIAL/LOT#** table.
4. Click ⬇ to auto-populate the remaining **SERIAL/LOT#** and **GENERATED SERIAL/LOT#**.
5. Click **ADD LOTS**.

Added lots will be appended to the bottom of the list. There is no need to enter anything in the **SERIAL/LOT#** field; the Auto Populate function looks after this.

# Consuming a Lot

## About BOM Items

The bill of materials (BOM) is a list of formulation items required to manufacture a product. Consuming a BOM item represents the process of utilizing a BOM item within an operation. The BOM items required to complete an operation are defined in Route Editor or in the ERP system, along with details on whether consuming a BOM item is mandatory to complete the operation.

Using Unit Operations, you can perform the following tasks:

- Access a list of BOM items associated with an operation.
- View the total number of mandatory BOM items to be consumed for all the serials/lots that you have clocked on for an operation. This number appears on the **BOM** tab when you access an operation.
- Specify the quantity of BOM items that have been consumed for each serial/lot. If an operation requires clocking on (as defined in Route Editor or the ERP system), you can complete an operation only if all the mandatory BOM items for each serial/lot in the operation are consumed. If, however, the operation does not require clocking on, you can complete the operation even if the mandatory BOM items are not consumed.

To consume a serial/lot during production, you must perform the following steps:

1. Access a BOM item *(on page 54)* to view the consumption history. You can use the consumption history of a BOM part within an operation to compare the required quantity with the consumed quantity of the BOM part.
2. Consume a lot *(on page 55)* during production.
3. Create a lot *(on page 63)*, in case, the BOM part does not exist.

The color of a row in the table indicates the requirement type and the consumption status of a BOM part as described in the following table.

| Color | Description |
|---|---|
| Pink | Indicates that the BOM part is mandatory to complete an operation. When you select a mandatory BOM part, the page containing the part details and consumption history displays the **MANDATORY** label. To complete an operation, you must consume all the mandatory BOM parts in the operation.<br><br>📝 **Note:**<br>The **BOM** tab in the Unit Operations application displays the quantity of mandatory BOM parts required to complete an operation when the following conditions are true: |

| Color | Description |
|---|---|
| | 📝   • The required BOM parts are not consumed for an operation.<br>• The quantity of BOM parts consumed is less than the lower quantity (if set), else the required quantity of the BOM parts. |
| White | Indicates that the BOM part is not mandatory to complete an operation.<br><br>📝 **Note:**<br>These BOM parts are supplementary for an operation. |
| Blue | Indicates that consuming the BOM part is mandatory and the BOM part is consumed while executing an operation during production.<br><br>📝 **Note:**<br>The BOM part row turns blue when the consumed quantity of the BOM part is greater than or equal to the lower quantity (if set), else the required quantity of the BOM parts for that operation. |

## Access a BOM Part

An operation contains a list of parts necessary to execute an operation. As an operator, you can access the **BOM** section in Unit Operations to consume the BOM parts for a product.

1. Select the operation whose BOM parts you want to access.
2. Select **BOM**.
   The **BOM** section appears, displaying the BOM parts associated with the selected operation. The following table provide information on each column in the table.

| Column | Description |
|---|---|
| ORDER | The recommended order of consumption of the BOM item in an operation. |
| MATERIAL | The material number of the BOM item. |
| MATERIAL DESC | The material description of the BOM item. |
| REQ QTY | The planned quantity of the BOM items required for the completion of the serial/lot for the operation. |
| CONSUMED QTY | The actual quantity of the BOM items consumed during the production. |
| UOM | The unit of measure (UOM) of the BOM item. |
| SERIAL/ LOT# | The serial/lot of the raw material that was consumed. |
| LOWER QTY | The lower tolerance quantity of the BOM item that can be consumed. |
| UPPER QTY | The upper tolerance quantity of the BOM item that can be consumed. |
| SCRAP FACTOR | The Percentage of this BOM item that is expected to be lost during production of the formulation. For example, if 100 units of Product XYZ is required with a scrap factor of 1%, then you should have a 101 units on hand when preparing to produce the product. |
| STORAGE UNIT | Unit currently storing the selected product. |

3. In the **BOM** section, select a part.

   The page containing the part details and consumption history appears.

## Specify Consumption of BOM Items for an Operation

Consuming a lot represents the process of utilizing a BOM item within an operation. As an operator, you can access the **BOM** section in the Unit Operations application to consume the lots while executing an operation.

You can consume serial/lot in the following two methods as needed:

- **Consume exact serial/lot number** :If you already know the exact serial/lot that needs to be consumed, you can enter that serial/ lot and the quantity to consume, and then consume.

> **Note:**
>
> If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming an Exact Serial/Lot Number *(on page 59)*.

- **Search for a lot and consume (Partial search)**: If you do not know the exact serial/lot that needs to be consumed and/or if you want to consume from multiple serials/lots of a same BOM item, you can search for the complete or the partial name of the serial/lot. The serials/lots that match the searched string will be listed, and you can enter the quantity to consume for all those serials/lots as needed, and then consume.

> **Note:**
>
> If the lot number that you have entered does not exist in Plant Applications, a window appears, asking you whether you want to create the lot number. If that happens, enter the quantity to create and consume, and then select **Yes**. For more information, refer to Create a Lot *(on page 63)*.

> **Note:**
>
> If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming Serial/Lot using Partial Search *(on page 62)*.

- To consume a lot, you must have the **Consume raw material** permission. If you do not have the permission to perform this task, request your administrator to provide the permission using Security. For more information, refer to Create a Role *(on page 291)*.
- Clock on the operation *(on page 46)* for which you want to specify BOM consumption.

1. Log in to Plant Applications Web Client.
2. Select **Unit Operations**.
3. In the **Machines** drop-down list box, select a machine.

   The **Open** page appears, displaying a list of operations associated with the selected machine.
4. In the **Open** page, select an operation, and then select the **BOM** tab.

   The **BOM** section appears, displaying the BOM items associated with the selected operation.
5. In the **BOM** section, select a BOM item.

The page containing the selected BOM item details appears.

> **ℹ️ Tip:**
> You can access the consumption history of the BOM items in the **Consumption History** section.

6. Search for a **Serial/Lot#**:

   - If you already know the exact serial/lot that needs to be consumed, in the **SCAN SERIAL/LOT#** box, enter the exact serial/lot of the BOM item.
   - If you do not know the exact serial/lot that needs to be consumed and/or if you want to consume from multiple serials/lots of a same BOM item, in the **SCAN SERIAL/LOT#**, enter the complete or the partial **Serial/Lot#** of the BOM item that you want to consume, and then select 🔍.

   > **✏️ Note:**
   > If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in .

   - If you want to search for a serial/lot by using a barcode, select 📷, and then scan the barcode of the serial/lot associated with the BOM item. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes. In iPad, you can use 📷 only in the Safari browser.

   > **✏️ Note:**
   > - The search result of the **SCAN SERIAL/LOT#** box is not case-sensitive.
   > - For an exact serial/lot search and consumption, the Available: <quantity_of_parts> message displays the quantity of BOM items available in the lot for consumption. If the required quantity of the BOM items specified in the REQUIRED QTY box is less than or equal to the quantity available in the lot, the Available: <quantity_of_parts> message appears in grey, else the message appears in red.

If you entered a specific serial/lot, you can enter the quantity to consume, and then select **Consume** as mentioned in the steps 7 and 8.

> **Note:**
>
> If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming an Exact Serial/Lot Number *(on page 59)*.

If you searched for multiple serials/lots for a BOM item, a list of serials/lots appears.

The following table provides information on each column in the **Consumption History** section.

| Column | Description |
| --- | --- |
| **SERIAL/LOT#** | The serial/lot of the raw material. If you have searched for a serial/lot with a partial name, all the serials/lots that match the partial name appear. |
| **AVAILABLE QTY** | The available quantity of the serial/lot. |
| **QTY TO CONSUME** | Box to enter the quantity of consumption of the BOM item. |
| **STORAGE UNIT** | The unit currently storing the selected product. |
| **DATE/TIME** | Storage date/time of the serial/lot. By default, the date/time results are sorted in chronological order. |

7. In the **QTY TO CONSUME** box, enter the quantity of consumption of the BOM item.
   - If you entered the exact serial/lot, then enter the quantity to consume in the **QTY TO CONSUME** box for that serial/lot number.
   - If you searched for multiple serials/lots for a BOM item, in the **Consumption History** section, in the **QTY TO CONSUME** boxes next to the serial/lot numbers, enter the quantity to consume as needed.

> **Note:**
>
> If the lot number that you have entered does not exist in Plant Applications, a window appears, asking you whether you want to create the lot number. If that happens, enter the

> quantity to create and consume, and then select **Yes**. For more information, refer to Create a Lot *(on page 63)*.

8. Select **Consume**.

   An entry for the consumption of the material is added to the table in the **Consumption History** section. In case you consume more than one lot for an operation, the number of entries in the **Consumption History** section depends on the number of lots that are consumed. After an entry is created in the **Consumption History** section, you cannot cancel the consumption of the BOM item. If there are any issues in the **Consumption History** section, contact your Administrator.

9. **Optional:** Select the <part number> links in the page displaying BOM item details to navigate to the previous and next BOM items in a sequential order of the BOM items.

10. **Optional:** In the **JUMP TO BOM ITEM** box, specify the part number that you want to locate and then press Enter. You must enter the complete part number in the search box and the Unit Operations application displays only the BOM item that contains the search text. Alternatively, to search for a BOM item by using a barcode, select 📷, and then scan for the barcode of the BOM item. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes. In iPad, you can use 📷 only in the Safari browser.
    The page containing the selected BOM item details appears.

The BOM items are consumed in the selected operation, and the quantity of the material consumed appears in the **CONSUMED QTY** box in the **BOM** section.

## Error Messages while Consuming an Exact Serial/Lot Number

This section describes the error messages that you might see while you try to consume an exact serial/lot number. For more information on consuming serial/lot, refer to the section Specify Consumption of BOM Items for an Operation *(on page 55)*.

| Informational Message Name | Message Condition | Corrective Actions |
|---|---|---|
| Cannot consume more than what is currently available. Current Quantity is *<value>* | The available quantity in the serial/lot is less than the quantity specified in the **QTY TO CONSUME** box. | • Consume the available current quantity from the existing serial/lot, and then consume the remain- |

| Informational Message Name | Message Condition | Corrective Actions |
|---|---|---|
| | | ing required quantity from another serial/lot.<br>• Consume from another serial/lot that contains the quantity as needed. |
| Unit of measure of the serial/lot does not match unit of measure for required quantity. Cannot consume this serial/lot: \<Serial/lot name\> | UOM of the BOM Material does not match the UOM of serial/lot that you are trying to consume from. | • Consume from a different serial/lot that has the correct UOM that matches the UOM for the required quantity.<br>• If you are a Plant Apps administrator, you can configure the UOM of the serial/lot in BOM Editor. |
| This serial/lot is currently not available. Production status = *\<status\>*, Current quantity = *\<value\>*, Inventory = *\<No\>* | The Inventory flag is **NO** for the production status of the serial/lot that you are trying to consume from. | • Consume from a different serial/lot.<br>• If you are a Plant Apps administrator, you can configure the Inventory flag as **Yes** for the production status of the serial/lot, using **Production Status Editor** in **Plant Applications Administrator**> **Global Configuration**. |
| This serial/lot is currently not available on a valid location. Production status = *\<status\>* , Current quantity = *\<value\>*, Inventory = *\<No\>* | In case of process manufacturing system, the serial/lot that you are trying to consume is created on an invalid storage unit (the unit is not attached to BOM Material).<br><br>✏️ **Note:**<br>In case of a process manufacturing system, | You must consume from the serial/lot that is created on a valid storage unit. |

| Informational Message Name | Message Condition | Corrective Actions |
|---|---|---|
| | for a BOM Material, a valid unit is the storage unit configured in the BOM formulation.<br><br>In case of a discrete manufacturing system, as there is no storage unit restriction, you will not get this error message. Instead, you can consume from the serial/lot. | |
| This serial/lot is currently not available. Production status = *<status>*, Current quantity = *<value>*, Inventory = *<Yes/No>*, Not a valid status on the location | In case of a process manufacturing system, the production status of the serial/lot that you are trying to consume is not listed in the valid status list for the raw material input configuration.<br><br>In case of a discrete manufacturing system, as there is no storage unit restriction, you will not get this error message. Instead, you can consume from the serial/lot. | • Consume from a different serial/lot.<br>• If you are a Plant Apps administrator, you can do any of the following:<br>   ◦ Add the required status to the valid status list, using **Unit Properties Configuration** in **Plant Applications Administrator > Plant Model**.<br>   ◦ Configure the status of the serial/lot to one of the valid statuses using **Production Status Editor** in **Plant Applications Administrator> Global Configuration**. |

# Error Messages while Consuming Serial/Lot using Partial Search

This section describes the different error messages that you might see while you do a complete or partial string search and try to consume a single serial/lot or multiple serials/lots. For more information on consuming serial/lot, refer to the sectionSpecify Consumption of BOM Items for an Operation *(on page 55)*.

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| No Results Found | The serial/lot that you searched is not found due to any of the following reasons:<br><br>• The serials/lots that match the string searched are not available. However, you can create the required serial/lot. For more information, refer to Create a Lot *(on page 63)*.<br>• The material of the searched lot is different from the BOM material that is being searched for.<br>• In case of the process manufacturing system, the searched serials/lots do not belong to the defined valid unit for the process order. For a BOM Material, a valid unit is the storage unit configured in the BOM formulation.<br><br>**Note:**<br>In case of a discrete manufacturing system, there is no valid stor- | • Try to consume from a different serial/lot. |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| | age unit restriction. If the serials/lots are not there in a storage unit, it will fetch the BOM Materials that have the same UOM from all the other units.<br><br>• The searched serials/lots are not available for consumption, either based on the status or the quantity. | |
| Unit of measure of the serial/lot does not match unit of measure for required quantity. Cannot show serial/lot(s) : <Names of all the lots that has UOM miss-match> | UOM of the BOM Material does not match the UOM of the searched serial/lot. | • Consume from a different serial/lot that has the correct UOM that matches the UOM of the searched serial/lot.<br>• If you are a Plant Apps administrator, you can configure the UOM of the lot in BOM Editor. |

## Create a Lot

As an operator, you can create a lot in the BOM section if the lot is not available for consumption while executing an operation.

- To create a lot, you must have the **Create raw material lots** permission. If you do not have the permission to perform this task, request your administrator to provide the permission using Security. For more information, refer to Create a Role *(on page 291)*.
- You must clock on an operation to consume or create a lot. If the operation is not clocked on, the **SCAN SERIAL/LOT#** box is not enabled.

1. Log in to Plant Applications Web Client.
2. Select **Unit Operations**.
3. In the **Machines** drop-down list box, select a machine.

   The **Open** page appears, displaying a list of operations associated with the selected machine.
4. Select an operation, and then select the **BOM** tab.

   The **BOM** section appears, displaying the BOM items associated with the selected operation.
5. Select a BOM item.

   The page containing the selected BOM item details appears.

   > **ⓘ Tip:**
   >
   > You can access the consumption history of the BOM items in the **Consumption History** section.

6. While consuming a lot, enter the lot number of the BOM item you want to consume in the **SCAN SERIAL/LOT#** box.
7. In the **QTY TO CONSUME** box, enter the quantity of the BOM items you want to consume in the operation.
8. Select **Consume**.

   A message appears, indicating that the lot number you entered was not found in the Plant Applications database and if you want to create a lot.
9. In the **EQUIPMENT** drop-down list box, select an equipment on which you want to consume the lot.

   > **🖊 Note:**
   >
   > A list of equipment or units appears based on your product and equipment configuration, the unit of measure (UOM) of the BOM item, and the equipment. Based on these conditions, you can do one of the following:
   >    • Select one of the equipment if more than one equipment is available in the Plant Applications database.
   >    • By default, an equipment appears in the **EQUIPMENT** drop-down list box if there is only one equipment available in the Plant Applications database.
   >    • Create a lot on your current equipment if there is no equipment available in the Plant Applications database that matches with these conditions. However, you can create a lot on your current equipment only when the UOMs of your equipment and BOM item match.
   > Else, an error message appears, indicating that the unit of measure (UOM) of the equipment does not match with the UOM of the BOM item. For more information on the

> 📝 error messages that you might see while creating a lot, refer to the section Error Messages while Creating a Lot *(on page 65)*.

10. In the **QTY TO CREATE** box, enter the quantity of the BOM items that you want to consume on the lot.
11. Select **Yes**.

A lot is created in the Plant Applications database and the quantity of BOM items specified are consumed from the lot created.

## Error Messages while Creating a Lot

This section describes the different error messages that you might see while you create a lot during serial/lot consumption. For more information on creating a serial/lot, refer to the section Create a Lot *(on page 63)*.

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| Complete is the system default for lot creation but Inventory = *<No>* | The Inventory flag is **NO** for the **Complete** production status. | • Kindly contact your Plant Apps administrator.<br>• If you are the Plant Apps administrator, you must configure the Inventory flag to **YES** for the **Complete** production status using **Production Status Editor** in **Plant Applications Administrator> Global Configuration**. |
| Complete is not a valid status on this location, therefore lot cannot be created here | The unit on which you are creating the serial/lot belongs to the raw material input configuration, and for that unit, **Complete** is not available in the list of valid statuses in the **Raw Material Input** configuration. | • You must create the serial/lot on a different unit.<br>• If you are a Plant Apps administrator, you must add **Complete** to the list of valid statuses using **Raw Material Inputs** configu- |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| | | ration in **Plant Applications Administrator**, for that unit. |

# Completing an Operation

## About Completing an Operation

Completing an operation involves completing all the activities or jobs associated with the operation. To complete an operation, you must perform the following tasks:

To complete an operation that requires clocking on, perform the following steps for all the serials/lots in the work order:

1. Clock on the operation *(on page 46)*.
2. Perform the operation on each serial/lot that you have clocked on.
3. Specify the consumption of BOM items required to complete the operation *(on page 55)*. Only if all the mandatory BOM items have been consumed for all the serials/lots in the work order, you can mark the operation complete.
4. Provide data for quality variables *(on page 67)* that have been defined for the operation in Plant Applications Administrator. Only if values for all the mandatory quality variables have been specified for all the serials/lots in the work order, you can mark the operation complete.
5. If needed, create a non-conformance for any defective serials/lots.
6. If needed, provide a comment *(on page 48)* on the serials/lots or work order.
7. Provide the completed quantity *(on page 68)* for each serial/lot on which you have completed the operation.

To complete an operation that does not require clocking on, you can mark the operation complete *(on page 71)* directly.

> **Note:**
> When an operation is clocked on by multiple operators and an operator completes the operation, the operation is marked complete for all the operators.

After all the operations are completed on all the serials/lots in the work order, the work order is marked complete in Plant Applications Web Client. You can view the completion status of the work order in Work Order Manager.

## Specify a Quality Variable

- If you do not have the permission to perform this task, request your administrator to provide the permission using Security.
- for which you want to provide data for quality variables.

Quality variables include details about the data that you must collect while performing an operation. These variables are defined in Plant Applications Administrator. The values that you provide for these variables help verify that the parameters that are critical to the quality and manufacturing processes are within the acceptable limits. You can use this data to review the performance of a production line and production unit and compare the quality of the products produced in each unit with projections for an operation.

For example, suppose you have been assigned the testing operation in a motor manufacturing unit. Quality variables can include the torque and rpm of the motor shaft. When you test each motor, you must enter the torque and rpm values for the corresponding serial number. A quality supervisor can then verify that the torque and rpm fall within the acceptable range.

1. In the **Unit Operations** page, in the **Machines** drop-down list box, select a machine.
   The **Open** page appears, displaying a list of operations for the selected machine.
2. In the respective application page, select an operation in progress.
   The **Documents** section appears, displaying the documents associated with the operation. You can refer to the documents that appear in the **Documents** section for instructions or any other reference material.
3. Select **Quality**.
   The **Quality** page appears, displaying the variables defined for the selected operation.

   > **(i) Tip:**
   > - By default, all the quality variables appear. If you want to access only mandatory variables, select **Mandatory Variables** in the drop-down list box.
   > - If you want to view the lowest, highest, lower quartile, upper quartile, and median values for each variable, select ⊞. If you want to view the same values plotted on a chart, select ⌁.

4. For each variable, enter data in the **SPEC** column.

> **ⓘ Tip:**
>
> If you want to plot the value on a chart, select ⬕.

If acceptable limits have been specified for the variable, the box in the **SPEC** column displays a color, indicating whether the value that you have entered is within the acceptable range.

> **✎ Note:**
>
> If the variable has electronic signature enabled, an **Electronic Signature** window appears whenever you insert or edit a test value for a variable. The ⬕ icon near the text box indicates that the variable is entitled to electronic signature for any modifications. For more information about electronic signature, refer Modify the Value of an Electronic Signature Autolog Variable *(on page 439)*.

5. Repeat steps 3 and 4 for each serial number in the operation.

The data for the quality variables is saved.

If a part contains a defect, create a non-conformance *(on page 74)*. Otherwise, complete the operation *(on page 68)*.

## Provide the Completed Quantity for an Operation

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

Perform the following steps for the lot for which you want to mark the operation complete:

1. Specify the consumption of all the mandatory BOM items *(on page 55)*.
2. Provide data for all the mandatory quality variables *(on page 67)*.

After you perform an operation on a lot, you can provide the quantity of the lot on which you have performed the operation.

You can provide the completed quantity only if the following conditions are satisfied:

- The product is non-serialized.
- The operation requires clocking on (as defined in Route Editor or the ERP system).
- You have specified the BOM consumption for all the mandatory BOM items for the quantity of the lot that you want to mark complete. For example, in a lot of eight items, if you have performed the

operation on two items, you must specify the BOM consumption for the two items. The quantity of the consumed BOM items must be greater than or equal to the required quantity to perform the operation.

- You have provided data for all the mandatory quality variables for the lot that you want to mark complete.
- The lot is clocked on by you.

1. Access the operation for which you want to provide completed quantity.

2. Select ⦿.

> ✏️ **Note:**
>
> The ⦿ button appears only if the lot is clocked on by you.

The **RECORD QUANTITY** window appears.

3. Enter the quantity of the lot for which you have completed the operation. The quantity that you enter must be less than or equal to the available quantity. If threshold values are defined for the lot, you must enter the quantity that satisfies the threshold range.
A lot configured with threshold limits allows the operator to deviate from a planned quantity, and complete with more or less quantity based on the actual execution of the lot. A threshold range is configured for the product to identify the maximum and minimum allowed quantity to record in a lot to complete it.

> ✏️ **Note:**
>
> **Record quantity** is populated by default, when
>
> `default.record.quantity.to.remaining.quantity` is set to true. If false, you must manually enter the outstanding quantity available for a serial/lot. This application service variable is set during Plant Applications installation.
>
> If you have installed Enterprise Plant Applications Web Client, these parameters are available in the following file:
>
> ```
> <installation_path>/PlantApplicationsDocker/plantapps-web-docker/mnt/configfiles/operator-app-service
> /prod/<version>/operator-app-service-prod.properties
> ```
>
> After you change the values of parameters, run the following Docker commands to restart the Operator app service:
> - `sudo docker service scale PAOperatorappservice_operatorappservice=0`
> - `sudo docker service scale PAOperatorappservice_operatorappservice=1`

> ✏️ If you have installed Standard Plant Applications Web Client, these parameters are
> available in the following file:
>
> ```
> C:\Program Files\GE
>
>  Digital\PlantApplicationsWebClient\config-repo\operator-app-service\prod\<version>\operator-app-serv
>
> ice-prod.properties
> ```
>
> After you change the values of parameters, restart the Operator app service.

4. Select **Record**.

> ℹ️ **Tip:**
> If you also want to clock off the lot, select **Rec + Clock Off**.

5. Select any of these options:

| Button | Description |
| --- | --- |
| **Rec + Complete** | Appears only when the threshold values are configured for the lot.<br>• Records the actual quantity entered by the operator and completes the lot, provided the actual quantity is within the defined thresholds. |
| **Rec + Clock Off** | • If threshold values are configured for the lot, records the entered quantity and the operator is clocked off the lot.<br>• If threshold values are not configured, and<br>  ◦ the recorded quantity is less than the planned quantity, then the quantity is recorded, and the operator is clocked off the lot.<br>  ◦ the recorded quantity is equal to the planned quantity, then the lot is completed, and the operator is clocked off the lot. |

| Button | Description |
|---|---|
| **Record** | • If threshold values are configured for the lot, records the quantity entered by the operator.<br>• If threshold values are not configured, and<br>    ◦ the recorded quantity is less than the planned quantity, then only records the quantity.<br>    ◦ the recorded quantity is equal to the planned quantity, then records and completes the lot. |

If the completed quantity of the lot is equal to the planned quantity, the operation is marked complete for the lot.

## Mark an Operation Complete

- If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

- For a non-serialized product, if the operation that you want to mark complete requires clocking on,

For an operation that requires clocking on, if the completed quantity of a serial/lot is equal to the planned quantity for the work order, the operation is automatically marked complete for the serial/lot. If, however, the operation does not require clocking on, if you have performed the operation on the serial/lot, you must mark the operation complete. It is then removed from the list in the **Open** page and appears in the **Complete** page.

> **Note:**
> For a non-serialized lot, when an operation is a clocking operation and the material is configured with over and under production thresholds, the auto-complete feature is not triggered. In these cases, you must record a quantity and specify when they have completed the work. Completion is validated to ensure the quantity recorded is aligned to the over and under production thresholds based on the initial planned quantity of the serial/lot.

After all the operations on all the serials/lots in a work order are marked complete, the work order is marked complete in Plant Applications. You can view the completion status of the work order in Work Order Manager *(on page 130)*.

> **Note:**
>
> Even if a part is over or under claimed at an operation, the X of Y quantity, Y is always based on the initial planned quantity, that is, it does not fluctuate based on manufactured/created/recorded quantity at previous operations. However, X can vary based on over or under quantity at the operation.
>
> For example, Lot A is set for an initial planned quantity of 10. Now, at operation-1, the operator claims 9 of 10 quantity and completes the operation. In the Work Queue application, the operation-1 is complete with 9 of 10. However, for the next operation (operation-2), Lot A produces 10 quantity based on the initial planned quantity (and not as previous manufactured/created/recorded quantity of 9 at operation-1). In the Work Order Manager application, the work order can be completed with 9 of 10.

1. Select the operation that you want to mark complete.
2. In the left pane, select the serial/lot for which you want to mark the operation complete, and then select ✓.

   > **Note:**
   >
   > The ✓ button appears only if the completed quantity of the serial/lot equals the planned quantity for the work order or if the operation does not require clocking on.

   > **Tip:**
   >
   > You can search for a serial/lot by entering a value in the search box or by scanning for the bar code using the 📷 icon, and then selecting the check boxes from the filtered list that appears.

   For a lot with thresholds, the **RECORD QUANTITY** window appears.

3. Select **Rec + Complete**.

   You do not have to enter a quantity.

If the operation is marked complete for all the serials/lots in the work order, the operation no longer appears in the **Open** page. It appears in the **Complete** page until all the operations for all the serials/lots in the work order are marked complete.

# Skipping an Operation

## About Skipping an Operation

As an operator, you can see the **OPT** flag on any optional operation. You can skip an operation that is in Ready state and is configured as Optional. However, you cannot skip all operations that are set to Optional. There are two types of skip actions that can be performed on an optional operation.

- **Implicit Skip**: You cannot skip these operations using the **Skip** button even if you have the permission. In this case, you can see that the operation is Optional, however, you cannot see the **Skip** button. You can only skip these operations by starting the next operation.

  For example, Let's assume you have operations OPT10, OPT20, and OPT30 that are sequential and optional. If you have selected OPT10 and you cannot see the **Skip** button for this, it implies that you can only skip this operation by starting OPT20. When you start OPT20, OPT10 is implicitly skipped and OPT20 moves into **In progress**. OPT30 changes state to **not ready**. OPT 30 cannot be started until OPT20 is **complete**.

- **Explicit Skip**: You can skip these optional operations that are in **Ready** state by using the **Skip** button. When you select an operation that is configured for explicit skip, you can see the **Skip** button. Additionally, you can also perform implicit skip on this operation by starting the next operation.

> **Note:**
>
> - Once an operation is skipped, explicitly or implicitly, it is considered completed. Skipped operations are in queues with completed operations.
> - When you have a Work Order with a single optional operation that has only one seria/lot, you cannot skip this optional operation. If you try to skip this operation, a **Unprocessable Entity** error message appears.

## Skip an Operation

- If you do not have the permission to perform this task, a message appears, stating the same. In such case, request your administrator to provide the permission using **Security**.
- You can only skip an operation that is configured as Optional. You can specify an operation as optional using **Route Editor**.
- Ensure that the optional operation is in **Ready** status.

1. In the **Unit Operations** page, in the **Machines** drop-down list box, select a machine.
   The **Open** workspace appears.
2. Select an optional operation in the **Ready** status.
   The workspace for the selected optional operation appears.

   > ✎ **Note:**
   > You can identify an operation as optional using the **OPT** column. You can add the **OPT** column using ▤ .

3. Select ⌄ to view the details of the operation.
4. Select the **Skip** button to skip the operation.

   > ✎ **Note:**
   > The **Skip** button is visible only if the operation is in **Ready** status and configured for explicit skip.

The operation is skipped and is removed from the list of operations in the left panel.

# Creating a Non-Conformance

## About Creating a Non-Conformance

A non-conformance occurs when a serial/lot contains a defect (that is, it does not meet the specification or requirement of a process, system, internal policies and procedures, customer requirements, or regulatory body). Each non-conformance can be related to multiple defects.

You can create a non-conformance for the following types of products:

- Serialized: You can create a non-conformance for multiple serialized products at the same time. Defects that are created as part of a non-conformance appear in Non Conformance *(on page 78)*, where they can be disposed.
- Non-serialized: You can create a non-conformance only for a single lot at a time. If only some quantity of the lot is defective, you can specify the quantity of the defective pieces. The lot is then split into sublots. This will allow you to continue working on the non-defective quantity, while the defective quantity is disposed using Non Conformance *(on page 78)*.

The following conditions apply when you create a non-conformance:

- You can create a non-conformance on a serial/lot only if you are clocked on to the serial/lot.
- You can create a non-conformance only on the available quantity of a lot (that is, the quantity for which the operation is not yet complete).
- The defective serial/lot and the operation are changed to the On Hold status. Depending on the configuration, you are clocked off the serial/lot and the operation.
- You can complete the operation on the serial/lot only after the serial/lot is disposed in Non Conformance.

## Create a Non-Conformance

1. Access the operation during which you want to create a non-conformance.
2. In the left pane, select the serial/lot for which you want to create a non-conformance.
3. Select **NCR**.

   A list of non-conformances created for the serial/lot selected in the left pane appears.
4. In the workspace, select **Create Non Conformance**.

   > **Note:**
   > The **Create Non Conformance** button is enabled only if you select a serial/lot that you have currently clocked on.

   The **Create Non Conformance** window appears.
5. Provide values as specified in the following table.

| Box or Section | Description |
| --- | --- |
| **SUMMARY** | Enter a summary for the non-conformance. A value is required. |

| Box or Section | Description |
|---|---|
| **AFFECTED QUANTITY** | • For a serialized product, this box is disabled and populated with the value 1.<br>• For a non-serialized product, enter the quantity of the lot that contains the defect. A value is required.<br><br>**Note:**<br>The value in this box must be less than or equal to the quantity of the lot for which the operation is not complete. |
| **NON CONFORMANCE TYPE** | This box is disabled and populated with the value **Manufacturing Defect**. |
| **DEFECT TYPE** | Select the type of the defect associated with the non-conformance. A value is required. |
| **DEFECT REASON** | Select **Select Reason**, specify the hierarchical set of reasons for the non-conformance, and then select **Apply**.<br><br>**Note:**<br>The reasons that appear in the **Select Reasons** window are pre-defined in Plant Applications Administrator, and appear based on the value in the **NON CONFORMANCE TYPE** box. If you want to modify the list of reasons, contact your administrator. |
| **FULL DESCRIPTION** | Enter the full description of the non-conformance. |

6. Select **Submit**.

A non-conformance is created for the serial or the defective pieces of the lot, and appears in Non Conformance *(on page 78)*.

- For a serialized product, depending on the configuration, you are clocked off the serial and the operation. You can complete the operation on the serial only after it is disposed *(on page 88)*.
- For a non-serialized product, if the affected quantity is less than the available quantity of the lot, the lot is split into two sublots:
    - One lot contains the defective pieces. This lot is changed to the On Hold status, and the non-conformance for this lot appears in Non Conformance. This lot is numbered in the following format: <original lot number>-2. You can complete the operation on this lot only after it is disposed.
    - The other lot contains the remaining pieces. This lot is in the In Progress status. It is numbered in the following format: <original lot number>-1. If none of the pieces in this lot is defective, you can continue working on this lot. If, however, some of the pieces in this lot are defective, you can split this lot further by creating a non-conformance again.
    - The original lot is changed to the Cancelled status, and no longer appears in Unit Operations. Values of the quality variables, BOM consumption, and the completed quantity of this lot are copied to the sublot that contains the non-defective pieces.

# Chapter 3. Non Conformance

## Overview

### About Non Conformance

A non-conformance occurs when a serial/lot contains a defect (that is, it does not meet the specification or requirement of a process, system, internal policies and procedures, customer requirements, or regulatory body). Each non-conformance can be related to multiple defects.

A defect for a non-conformance is created in Unit Operations, Work Queue, and/or Receiving Inspection. It then appears in Non Conformance, where you can perform the following tasks:

- Access the defects associated with a non-conformance.
- Create a disposition plan.
- Dispose defects.
- Maintain a record of non-conformances and corrective actions taken to address them.

> ✏ **Note:**
> After a non-conformance is created, the associated serial/lot and operation are placed on hold, and the operators working on that serial/lot are clocked off by default. However, this behavior can be changed to keep the operator clocked on.

### About Status Indicators

A status indicator is a color-coded icon that provides the status of a defect. The status of a defect depends on the status and method of disposition *(on page 88)* specified for the serial/lot. The following table provides information on the status indicators of a defect created on a serialized or a non-serialized product.

| Status | Status Indicator | Description for a Serialized Product | Description for a Non-Serialized Product |
|---|---|---|---|
| Submitted |  | Indicates that the defect is submitted for disposition. This status indicator appears when the defect is not yet disposed. | Indicates that the defect is submitted for disposition. This status indicator appears when the defect is not yet disposed. |

| Status | Status Indicator | Description for a Serialized Product | Description for a Non-Serialized Product |
|---|---|---|---|
| Active | | Indicates that the disposition method is MRB, Rework, or Continue to process (CTP). | Indicates that one of the disposition methods for the lot is MRB, Rework, or CTP. |
| Planned | | Indicates that the disposition method is Rework or CTP and the serial/lot has reached the operation specified in the **USE UNTIL/REWORK OPERATION** box. | Indicates that one of the disposition methods for the lot is Rework or CTP and the serial/lot has reached the operation specified in the **USE UNTIL/REWORK OPERATION** box. |
| Not a defect | | Indicates that the defect is considered invalid. This status indicator appears when the disposition method is Clear. | Indicates that the defect is considered invalid. This status indicator appears when the only disposition method for the lot is Clear (that is, no other disposition methods have been specified for the lot). |
| Closed | | Indicates that the disposition method for the defect is Use as is or Scrap. | Indicates that the disposition methods for the lot include Use as is and Scrap, but do not include MRB, Rework, or CTP. |

# Accessing a Defect

## About Accessing Defects

Defects for a non-conformance are created in the Unit Operations *(on page 74)*, Work Queue *(on page 74)*, and Receiving Inspection *(on page 550)* applications. These defects then appear in the Non Conformance application.

Using Non Conformance, you can:

- Access defects associated with a non-conformance. *(on page 80)*
- Dispose defects. *(on page 88)*

## Access a Defect

1. In the **Non Conformance** page, select **Show all Open**.

   A list of all the defects, grouped by the associated non-conformance, appears in the workspace.

   The following table provides the description of the columns in the table. Click  to select the columns to display in the table.

| Column | Description |
|---|---|
| **STATUS** | The status *(on page 78)* of the defect. |
| **SERIAL/ LOT#** | The serial/lot number of the defective part. You can select the link in this column to search for all the defects associated with the serial/lot. |
| **PLAN** | The disposition plan *(on page 104)* created for the defect. You can select the link in this column to search for defects associated with the disposition plan. For a defect in the Submitted state, the value in this column is blank. |
| **OP** | The operation during which the defect was created. |
| **MATERIAL** | The material of the defective part. You can select the link in this column to search for defects associated with the material. |
| **MATERIAL FAMILY** | The material family associated with the defective serial/lot. |
| **AFFECTED QUANTI- TY** | The quantity of the defective items in the serial/lot. For a serialized product, the value in this column is always 1. |
| **MATERIAL DESC** | The description of the material of the defective serial/lot. |
| **RECEIVER NUMBER** | The name of the receiver material lot. This field is populated when a defect is created on material lot(s) in the Receiving Inspection app. |
| **DISP** | The method of disposition performed on the defective serial/lot. For a defect in the Submitted status, the value in this column is blank. |

| Column | Description |
|---|---|
| CTP/RE-WORK OP | The operation until which a defective serial/lot can be processed before disposing the defect. This is applicable only if the disposition method for the defect is Continue-to-Process (CTP). During the operation specified in this column, the defect must be disposed. |
| NC | The unique identifier automatically generated by the application when the non-conformance was created. |
| WORK OR-DER | The name of the discrete work order. |
| DEFECT REASON <number> | The hierarchy of reasons identified for the defect. |
| UNIT | The name of the equipment or unit. For defects created in discrete apps, the unit is associated with the operation the defect is created on. For defects created in Receiving Inspection, the unit is associated with the material lot it is based on. |
| ACTION REASON <number> | The hierarchy of actions identified for the defect. |
| DEFECT MODIFIED BY | The last user who modified the defect. |
| DEFECT MODIFIED ON | The date and time the defect was last modified. |
| DEFECT ID | The unique identifier automatically generated by the application when the non-conformance was created. |
| SUMMA-RY | The brief description of the defect/non-conformance that was entered when the non-conformance was created. |
| ACTIONS | The actions you can perform on the serial/lot. Contains the following buttons: |

| Column | Description |
|---|---|
| | • ⚖: Select this button to dispose the defect. This button is enabled only for a defect in the Submitted status.<br><br>• ✎: Select this button to modify the non-conformance details *(on page 87)*. This button is enabled only for a defect in the Submitted status.<br><br>• ⋮: Select this button, and then select **Remove from Plan** to remove the defect from a disposition plan. |

2. If you want to search for a defect, in the **Enter a Serial/Lot, NCR, WO, Plan, Material, Material Family** box, enter any of the following details to search for the associated defects:

   • Serial/lot number

   • Non-conformance number

   • Work order number

   • Plan number

   • Material

   • Material Family

   The entry is added to the left pane. A list of defects associated with the entry that you have entered appears in the workspace in the descending order of the created date or modified date. If you search for a defect using a material or material code, the list of defects are categorized as open and closed.

3. Select the defect that you want to access.

   The **General** section appears in the workspace, displaying the defect information. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **NC Type** | The type of the non-conformance associated with the defect. |
| **Summary** | The summary of the defect. |
| **Defect Reasons** | The hierarchical list of reasons for the defect. |
| **Material** | The material of the defective serial/lot. |
| **Created by** | The user who created the defect. |
| **Defect Type** | The type of the defect. |
| **Qty** | The quantity of the defective serials/lots. |

| Column | Description |
|---|---|
| **Material Family** | The material family associated with the defective serial/lot. |
| **Created on** | The date and time at which the defect was created. |

> **Tip:**
> You can select the **Dispositions** and **History** tabs to access the dispositions *(on page 88)* and history *(on page 83)* of the defect, respectively.

Dispose the defect *(on page 88)*.

## Access the Defect History

1. Access the defect *(on page 80)* whose history you want to access.
2. Select **History**.

   The **History** section appears. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **STATUS** | The status *(on page 78)* of the defect. |
| **DEFECT MODIFIED ON** | The date and time at which the defect was modified. |
| **SERIAL/ LOT#** | The serial/lot number associated with the defective part. |
| **PLAN** | The disposition plan for the defect. You can select the link in this column to search for all the defects associated with the plan. |
| **OP** | The operation during which the defect was created. |
| **DISP** | The disposition method *(on page 88)* for the defect. |
| **CTP/RE-WORK OP** | The operation until which the defective serial/lot can be processed before disposing the defect. This is applicable only if the disposition method for the defect is Continue-to-Process (CTP). During the operation specified in this column, the defect must be disposed. |

| Column | Description |
|---|---|
| **MATERIAL** | The material of the defective serial/lot. |
| **QTY** | The quantity of the defective serials/lots. |
| **MATERIAL FAMILY** | The material family of the defective serial/lot. |
| **MATERIAL DESC** | The description of the defective serial/lot. |
| **VIEW** | Contains the ◉ button that allows you to access the hierarchical reasons and actions on the defect. |

# Managing Non-Conformances

## About Managing Non-Conformances

A non-conformance is created in Unit Operations *(on page 74)*, Work Queue *(on page 74)* and/or Receiving Inspection *(on page 550)*. It then appears in Non Conformance, where you can perform the following tasks:

- Access a Non-Conformance *(on page 84)*.
- Modify a Non-Conformance *(on page 87)*.

You can then dispose the defects associated with the non-conformance.

## Access a Non-Conformance

1. In the **Non Conformance** page, select **Show all Open**.

   A list of all the defects, grouped by the associated non-conformance, appears in the workspace.

   The following table provides the description of the columns in the table. Click ▤ to select the columns to display in the table.

| Column | Description |
|---|---|
| **STATUS** | The status *(on page 78)* of the defect. |
| **SERIAL/ LOT#** | The serial/lot number of the defective part. You can select the link in this column to search for all the defects associated with the serial/lot. |

| Column | Description |
| --- | --- |
| **PLAN** | The disposition plan *(on page 104)* created for the defect. You can select the link in this column to search for defects associated with the disposition plan. For a defect in the Submitted state, the value in this column is blank. |
| **OP** | The operation during which the defect was created. |
| **MATERIAL** | The material of the defective part. You can select the link in this column to search for defects associated with the material. |
| **MATERIAL FAMILY** | The material family associated with the defective serial/lot. |
| **AFFECTED QUANTI-TY** | The quantity of the defective serials/lots for the non-conformance. For a serialized product, the value in this column is always 1. |
| **MATERIAL DESC** | The description of the material of the defective serial/lot. |
| **RECEIVER NUMBER** | The name of the receiver material lot. This field is populated when a defect is created on material lot(s) in the Receiving Inspection app. |
| **DISP** | The method of disposition performed on the defective serial/lot. For a defect in the Submitted status, the value in this column is blank. |
| **CTP/RE-WORK OP** | The operation until which a defective serial/lot can be processed before disposing the defect. This is applicable only if the disposition method for the defect is Continue-to-Process (CTP). During the operation specified in this column, the defect must be disposed. |
| **NC** | The unique identifier automatically generated by the application when the non-conformance was created. |
| **WORK OR-DER** | The name of the discrete work order. |
| **DEFECT REASON \<number>** | The hierarchy of reasons identified for the defect. |
| **UNIT** | The name of the equipment or unit. For defects created in discrete apps, the unit is associated with the operation the defect is created on. For defects created in Receiving Inspection, the unit is associated with the material lot it is based on. |

| Column | Description |
|---|---|
| ACTION REASON <number> | The hierarchy of actions identified for the defect. |
| DEFECT MODIFIED BY | The last user who modified the defect. |
| DEFECT MODIFIED ON | The date and time the defect was last modified. |
| DEFECT ID | The unique identifier automatically generated by the application when the non-conformance was created. |
| SUMMA-RY | The brief description of the defect/non-conformance that was entered when the non-conformance was created. |
| ACTIONS | The actions you can perform on the serial/lot. Contains the following buttons:<br><br>• 🔨: Select this button to dispose *(on page 88)* the defect. This button is enabled only for a defect in the Submitted status.<br><br>• ✏: Select this button to modify the non-conformance details *(on page 87)*. This button is enabled only for a defect in the Submitted status.<br><br>• ⋮: Select this button, and then select **Remove from Plan** to remove the defect from a disposition plan. |

2. If you want to access the defects for a non-conformance, select the link for the non-conformance. Alternatively, in the **Enter a Serial/Lot, NCR, WO, Plan, Material, Material Family** box, enter any of the following details associated with the non-conformance:

- Serial/lot number
- Non-conformance number
- Work order number
- Plan number
- Material
- Material Family

The entry is added to the left pane. A list of defects associated with the non-conformance or with the entry that you have entered appears in the workspace in the descending order of the created date or modified date. If you search for a defect using a material or material family, the list of defects are categorized as open and closed.

## Modify a Non-Conformance

1. Access the non-conformance *(on page 84)* that you want to modify.

2. In the row containing one of the defects of the non-conformance, select ✎.

   The **Edit Non Conformance** window appears.

3. Provide values as specified in the following table.

| Box | Description |
| --- | --- |
| **SUMMARY** | Enter the summary of the non-conformance. A value is required. |
| **NON CONFORMANCE TYPE** | This box is disabled and populated with the value **Manufacturing Defect**. |
| **DEFECT TYPE** | Select the type of the defect associated with the non-conformance. A value is required. |
| **DEFECT REASON** | Select **Select Reason**, specify the hierarchical set of reasons for the non-conformance, and then select **Apply**. <br><br> **Note:** <br> The reasons that appear in the **Select Reasons** window are pre-defined in Plant Applications Administrator, and appear based on the value in the **NON CONFORMANCE TYPE** box. If you want to modify the list of reasons, contact your administrator. |
| **FULL DESCRIPTION** | Enter the full description of the non-conformance. |

4. Select **Submit**.

   The non-conformance is modified.

# Disposing a Defect Created from Work Queue and Operator Apps

## About Disposing a Defect

A disposition is an action taken to resolve a non-conformance. The disposition method you select for a defect in Non Conformance determines the disposition plan for the defect.

A disposition plan includes the disposition, a description of the corrective actions to be taken (by using a hierarchy of actions), and any additional instructions to be followed to address the non-conformity. You configure the hierarchy of the disposition actions in Plant Applications Administrator, and then run a script file to link the hierarchy of the disposition actions for selection in Non Conformance.

The following table describes the available disposition methods.

| Disposition | Effect |
| --- | --- |
| **USE AS IS** | The serial/lot is acceptable for being used as is. |
| **Continue to process (CTP)** | The serial/lot can undergo operations up to the specified CTP operation, at which point the defect can be addressed. <br><br> 📝 **Note:** <br> When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default. |
| **CLEAR** | The serial/lot does not require any corrective action and is not considered defective. |
| **SCRAP** | The serial/lot cannot be used and must be scrapped. |
| **REWORK** | The serial/lot can be used after performing rework during a specified operation. |

| Disposition | Effect |
|---|---|
| | **Note:** In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. |
| **MRB** | The serial/lot must undergo review by the material review board before disposing it. |

Using Non Conformance, you can dispose the following types of products:

- Serialized: These products contain a unique identifier per piece (for example, a motor used in a pump). You can dispose a single defect or multiple defects for a serialized product at the same time.
- Non-Serialized: These products contain a unique identifier for a bunch of pieces (for example, a packet of screws). When you dispose a non-serialized product, you can select a different disposition method for different pieces in the same lot. You cannot dispose multiple defects for non-serialized products at the same time.

## Access Dispositions

1. In the **Non Conformance** page, in the left pane, select the serial/lot, non-conformance number, work order number, plan number, or material for which you want to access dispositions.
   A list of non-conformances associated with the selected item appears in the workspace, along with defects created for each non-conformance.
2. Select a defect associated with the non-conformance whose dispositions you want to access.
   The defect information appears in the **General** section.
3. Select **Dispositions**.
   A list of dispositions for the associated non-conformance appears, sorted in the descending order of the date of creation or modification. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **DISPOSITION MOD ON** | The date and time at which the disposition has been created or modified. |
| **DISPOSITION MOD BY** | The user who created or modified the disposition. |

| Column | Description |
|---|---|
| PLAN | The plan associated with the disposition. You can select the link in this column to search for all non-conformances associated with the plan. |
| SERIAL/LOT# | The material lot number or serial number that contains the defect. You can select the link in this column to search for all non-conformances associated with the serial/lot. |
| WORK ORDER | The work order associated with the serial/lot. You can select the link in this column to search for all non-conformances associated with the work order. |
| OP | The operation during which the defect has been identified. |
| QTY | The number of defective pieces in the serial/lot. |
| DISP | The type of the disposition method. |
| ACTION REASON 1 | The first level of action to dispose the defect. |
| VIEW | Select 👁 to access additional details of the defect. |

## Dispose a Single Defect for a Serialized Product

Ensure that you have configured the required disposition action reason tree in Plant Applications Administrator, and then linked the disposition action reason tree for selection in Non Conformance by using the appropriate script file.

This topic describes how to dispose a single defect for a serialized product. You can also:

- Dispose multiple defects at the same time *(on page 105)* for a serialized product.

> ✎ **Note:**
> You cannot dispose multiple defects at the same time for a non-serialized product.

- Dispose a single defect for a non-serialized product *(on page 96)*.

The following conditions apply when you dispose a defect for a serialized product:

- If a defect has been added to a plan, you cannot dispose it separately; you can only dispose all the defects in the plan together.
- If a defect has already been disposed using one of the following methods, you cannot dispose it again:
  - Clear
  - Use as is
  - Scrap

1. Access the defect that you want to dispose *(on page 80)*.

> ✎ **Note:**
>
> You can dispose a defect only if it is in the Submitted status, which is indicated by .

2. In the row containing the defect, select .

   The **Disposition Plan** window appears.

3. Provide values as specified in the following table.

| Box | Description |
| --- | --- |
| **SERIAL/LOT#** | This section contains the lot number and the quantity of defective pieces in the lot. Select the lot. <br><br> ⓘ **Tip:** <br> To access the non-conformance number, the name of the user who created the non-conformance, and the date and time at which the non-conformance has been created, click . |
| **DISPOSITIONS** | Select an option as described in the following table. |

| Box | Description |
|---|---|

| Option | Description |
|---|---|
| **CLEAR** | Select this option if the defects raised for the non-conformance are not considered as defects. |
| **Continue to process (CTP)** | Select this option if you want to allow work on the serials/lots, and then select the operation until which you can continue the work, in the**USE UNTIL/REWORK OPERATION** dropdown list box. When you do so, the status of the operation during which the defect was raised changes from on hold to in progress, and the operation that you select in the **USE UNTIL/REWORK OPERATION** box changes to On Hold.<br><br>**Note:**<br>If the operation at which the non-conformance has been created on the serial/lot is the last operation in the route, you cannot select this disposition method.<br><br>**Note:**<br>When a non conformance is disposed as CTP to a mutually exclusive operation, then all the operations in that mutually exclusive set will go on hold by default. |

| Box | Description | | |
|---|---|---|---|
| | **Option** | **Description** | |
| | **SCRAP** | Select this option if you want to discard the defective serials/lots. | |
| | **USE AS IS** | Select this option to use the serials/lots in the operations as they are. | |
| | **RE-WORK** | Select this option to rework on the serials/lots, and then select the operation during which the serials/lots should be reworked, in the **USE UNTIL/REWORK OPERATION** box.<br><br> **Note:**<br> In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. | |
| | **MRB** | Select **MRB** to indicate that the defects must be reviewed by the material board, thus deferring the disposition to a later date. This will allow the quality team in your organization to determine the correct disposition method. | |
| **USE UNTIL OPERATION** | This box appears only for the following disposition methods:<br>• Rework<br><br> **Note:**<br> In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. | | |

| Box | Description |
|---|---|
| | • Continue to process<br><br>**Note:**<br>When a non conformance is disposed as CTP to a mutually exclusive operation, then all the operations in that mutually exclusive set will go on hold by default.<br><br>Select the operation until which the serial/lot can be processed. A value is required. After the serial/lot reaches the operation that you have specified, it must be disposed again. |
| **SELECT DISPOSITION ACTION REASON** | Select a corrective disposition action reason and the associated subreasons, as applicable.<br><br>**Tip:**<br>In the**Search** box, enter a disposition action reason to search for, and then select the reason from the reasons list. |
| **ADDITIONAL INFORMATION** | Enter any relevant information, such as a URL, contact details of the supplier, or any information that is helpful to perform the root cause analysis of the non-conformance. |

4. Select **Submit**.

The following actions take place based on the disposition method that you have selected.

| Disposition Type | Result |
|---|---|
| **Clear** | • The status of the defect is set to Not a Defect, indicated by ⊖. <br><br> • The hold on the serial/lot is released. |
| **CTP (Continue to process)** | • The status of the defect is Active, indicated by 🔧. When the defect is in the Active status, the current serial/lot will be released from hold. <br><br> • When the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot will be placed on hold. The defect status is changed to Planned, indicated by 📅. <br><br> > 📝 **Note:** <br> > When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default. |
| **Scrap** | • The status of the defect is set to Closed, indicated by ⊘. <br> • The hold on the serial/lot is released. |
| **Use as is** | • The status of the defect is set to Closed, indicated by ⊘. <br> • The hold on the serial/lot is released. |

| Disposition Type | Result |
|---|---|
| **Rework** | • The status of the defect is set to Active, indicated by 🔧. After completion of the rework operation, the status is changed to Planned, indicated by 📅.<br>• The serial/lot continues to be on hold. The hold is released after the completion of rework.<br><br>📝 **Note:**<br>In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. |
| **MRB** | • The status of the defect is set to Active, indicated by 🔧.<br>• The serial/lot continues to be on hold. |

## Dispose a Single Defect for a Non-Serialized Product

Ensure that you have configured the required disposition action reason tree in Plant Applications Administrator, and then linked the disposition action reason tree for selection in Non Conformance by using the appropriate script file.

When you dispose a non-serialized product, you can select a different disposition method for different pieces in the same lot. For example, suppose in a packet of 50 screws, 20 must be scrapped and 30 can be used as is. You can split the lot into two sublots, and specify the disposition method as Scrap for a quantity of 20 screws and Use as is for the remaining 30 screws.

This topic describes how to dispose a single defect for a non-serialized product. You can also:

> 📝 **Note:**
> You cannot dispose multiple defects at the same time for a non-serialized product.

1. Access the defect that you want to dispose *(on page 80)*.

> ✎ **Note:**
>
> You can dispose a defect only if it is in the Submitted status, which is indicated by 🔲.

2. In the row containing the defect, select ⚖.

   The **Dispositions** window appears.

3. Provide values as specified in the following table.

| Box or Section | Description |
|---|---|
| **SL/LOT** | This section contains the lot number and the quantity of defective pieces in the lot. Select the lot. <br><br> ℹ **Tip:** <br> To access the non-conformance number, the name of the user who created the non-conformance, and the date and time at which the non-conformance has been created, click ❯ . |
| **DISPOSITIONS** | For each disposition method that you want to specify for the items in the lot, select an option as described in the following table, and then enter the quantity. <br><br> <table><tr><th>Option</th><th>Description</th></tr><tr><td>CLEAR</td><td>Select this option if the defects raised for the non-conformance are not considered as defects.</td></tr><tr><td>CTP (Con-tin-</td><td>Select this option if you want to allow work on the lot, and then select the operation until which you can continue the work, in the**USE UN-**</td></tr></table> |

| Box or Section | Description |
|---|---|

| Option | Description |
|---|---|
| ue to process) | **TIL/REWORK OPERATION** drop-down list box. When you do so, the status of the operation during which the defect was raised changes from on hold to in progress, and the operation that you select in the **USE UNTIL/REWORK OPERATION** box changes to On Hold. <br><br> 📝 **Note:** <br> If the operation at which the non-conformance has been created on the serial/lot is the last operation in the route, you cannot select this disposition method. <br><br> 📝 **Note:** <br> When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default. |
| SCRAP | Select this option if you want to discard the defective serials/lots. |
| USE AS IS | Select this option to use the serials/lots in the operations as they are. |
| RE-WORK | Select this option to rework on the serials/lots, and then select the operation during which the serials/lots |

| Box or Section | Description |
|---|---|

| Option | Description |
|---|---|
| | should be reworked on, in the **USE UNTIL/REWORK OPERATION** box. <br><br> **Note:** <br> In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. |
| **MRB** | Select **MRB** to indicate that the defects must be reviewed by the material board, thus deferring the disposition to a later date. This will allow the quality team in your organization to determine the correct disposition method. |

Repeat this step for all the disposition methods that you want to use for the lot.

For example, suppose in a packet of 50 screws, 20 must be scrapped and 30 can be used as is. In that case:

a. In the **Dispositions** box, select **Scrap**, and then enter 20.

b. In the **Dispositions** box, select **Use as is**, and then enter 30.

Each time you select a disposition, the affected quantity is updated with the remaining quantity that must be disposed. The sum of the quantity that you have entered for each disposition method for a lot must be equal to the available quantity for the lot (that is, the affected quantity must be zero).

| Box or Section | Description |
|---|---|
| **USE UNTIL OPERATION** | This box appears only for the following disposition methods:<br><br>• Rework<br><br>> ✏️ **Note:**<br>> In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear.<br><br>• Continue to process<br><br>> ✏️ **Note:**<br>> When a non conformance is disposed as CTP to a mutually exclusive operation, then all the operations in that mutually exclusive set will go on hold by default.<br><br>Select the operation until which the serial/lot can be processed. A value is required. After the serial/lot reaches the operation that you have specified, it must be disposed again. |
| **SELECT DISPOSITION ACTION REASON** | For each disposition that you have specified in the **Dispositions** box, select the corrective disposition action reason and the associated sub-reasons, as applicable.<br><br>> ⓘ **Tip:**<br>> In the **Search** box, enter a disposition action reason to search for, and then select the reason from the reasons list. |

| Box or Section | Description |
| --- | --- |
| **ADDITIONAL INFORMATION** | Enter any relevant information, such as a URL, contact details of the supplier, or any information that is helpful to perform the root cause analysis of the non-conformance. |

4. Select**Submit**.

> **Note:**
> The **Submit** button is enabled only if the following conditions are satisfied:
> - You have selected a disposition method for all the defective items in the lot (that is, the affected quantity is zero).
> - For the disposition methods Rework and Continue to process, you have selected an operation in the **USE UNTIL/REWORK OPERATION** box.

A disposition plan is created for the lot. The following actions take place based on the disposition method that you have selected.

| Disposition Type | Result |
| --- | --- |
| **Clear** | If this is the only disposition method specified for the lot: <br><br> • The status of the defect is set to Not a Defect, indicated by . <br> • The hold on the serial/lot is released. <br><br> If the disposition methods also include Use as is or Scrap (but do not include MRB, Continue to Process, or Rework): <br><br> • The status of the defect is set to Closed, indicated by . <br> • The hold on the serial/lot is released. <br><br> If the disposition methods also include MRB, CTP, or Rework: |

| Disposition Type | Result |
|---|---|
| | • The status of the defect is Active, indicated by ⬦. When the defect is in the Active status, the hold on the serial/lot is released.<br><br>• In the case of CTP or Rework, when the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot will be placed on hold. The defect status is changed to Planned, indicated by ⬦. |
| **Continue to process (CTP)** | • The status of the defect is Active, indicated by ⬦. When the defect is in the Active status, the hold on the serial/lot is released.<br><br>• When the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot will be placed on hold. The defect status is changed to Planned, indicated by ⬦.<br><br>> ✏️ **Note:**<br>> When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default. |
| **Use as is** | If the disposition methods for the lot do not include MRB, Rework, or CTP:<br><br>• The status of the defect is set to Closed, indicated by ⬦.<br>• The hold on the serial/lot is released.<br><br>If the disposition methods for the lot include MRB, Rework, or CTP: |

| Disposition Type | Result |
|---|---|
|  | • The status of the defect is Active, indicated by . When the defect is in the Active status, the hold on the serial/lot is released.<br>• In the case of Rework or CTP, when the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot is placed on hold. The defect status is changed to Planned, indicated by . |
| **Scrap** | If the disposition methods for the lot do not include MRB, Rework, or CTP:<br><br>• The status of the defect is set to Closed, indicated by .<br>• The hold on the serial/lot is released.<br><br>If the disposition methods for the lot include MRB, Rework, or CTP:<br><br>• The status of the defect is Active, indicated by . When the defect is in the Active status, the current serial/lot will be released from hold.<br>• In the case of Rework or CTP, when the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot will be placed on hold. The defect status is changed to Planned, indicated by . |
| **Rework** | • The status of the defect is set to Active, indicated by . After completion of the rework operation, the status is changed to Planned, indicated by .<br>• The serial/lot continues to be on hold. The hold is released after the completion of rework. |

| Disposition Type | Result |
|---|---|
|  | > **Note:** > In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. |
| **MRB** | • The status of the defect is set to Active, indicated by . <br> • The serial/lot continues to be on hold. |

## Add Defects to a Disposition Plan

If the disposition method and reasons for multiple defects are the same, you can dispose them at the same time. To do so:

1. Add the defects to a new or existing disposition plan.
2. Dispose the defects.

You cannot add a defect to a plan if:

- The defect is created for a non-serialized product.
- The defect is already added to a plan.

1. Access a non-conformance by performing one of the following tasks:
   - If the non-conformance appears in the workspace or in the left pane, select the link.
   - Enter the non-conformance number in the **Search** box that appears in the left pane or in the workspace.

   All the defects associated with the non-conformance appear in the workspace.
2. Select the check box corresponding to each defect that you want to add to a plan.

   > **Note:**
   > The check box appears only if the defect is for a serialized product and if the defect is not added to a plan.

   > **Tip:**
   > To select all the defects for a non-conformance, select the check box in the heading column.

3. Select ≡· .

   The **Create a Plan or add to an existing Plan** window appears, displaying a list of plans.
4. If you want to add the defects to an existing plan, select the plan, and then select **Apply**.

   The selected defects are added to the plan.

> **ⓘ Tip:**
> You can search for an existing plan using the **Search** box.

5. If you want to add the defects to a new plan, select **Add to a New Plan**, and then select **Apply**.

   A plan is created with a system-generated name, and the selected defects are added to the plan.
6. Repeat steps 1 through 5 to add defects from other non-conformances to the plan.

## Dispose Multiple Defects for a Serialized Product

1. Ensure that you have configured the required disposition action reason tree in Plant Applications Administrator, and then linked the disposition action reason tree for selection in Non Conformance by using the appropriate script file.
2. Add all the defects that you want to dispose to a plan *(on page 104)*.

This topic describes how to dispose multiple defects at the same time for a serialized product. You can also dispose a single defect for a serialized *(on page 90)* or non-serialized *(on page 96)* product.

> **✎ Note:**
> You cannot dispose multiple defects at the same time for a non-serialized product.

1. Search for the plan by performing one of the following steps:
   - If the plan appears in the workspace or in the left pane, select the link.
   - Enter the plan number in the **Search** box that appears in the left pane or in the workspace.

   A list of defects added to the plan appear in the workspace.
2. Select ⚖ .

   The **Disposition** window appears, displaying a list of serials/lots corresponding to the defects in the plan. The check boxes for all the serials/lots in the list are selected and disabled.
3. Provide values as specified in the following table.

| Box | Description |
|---|---|
| **Dispositions** | Select an option as described in the following table. |

| Option | Description |
|---|---|
| **CLEAR** | Select this option if the defects raised for the non-conformance are not considered as defects. |
| **(CTP) Continue to process** | Select this option if you want to allow work on the serials/lots, and then select the operation until which you can continue the work, in the**USE UNTIL/REWORK OPERATION** box. When you do so, the status of the operation during which the defect was raised changes from on hold to in progress, and the operation that you select in the **USE UNTIL/REWORK OPERATION** box changes to On Hold. <br><br> **Note:** If the operation at which the non-conformance has been created on the serial/lot is the last operation in the route, you cannot select this disposition method. <br><br> **Note:** When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in |

| Box | Description | | |
|---|---|---|---|
| | **Option** | **Description** | |
| | | 📝 that mutually exclusive set will go on hold by default. | |
| | SCRAP | Select this option if you want to discard the defective serials/lots. | |
| | USE AS IS | Select this option to use the serials/lots in the operations as they are. | |
| | SCRAP | Select this option to discard the serials/lots. | |
| | RE-WORK | Select this option to rework on the serials/lots, and then select the operation during which the serials/lots should be reworked, in the **USE UNTIL/REWORK OPERATION** box. 📝 **Note:** In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. | |
| | MRB | Select this option to indicate that the defects must be reviewed by the material board, thus deferring the disposition to a later date. This will allow the quality team in your organization to determine the correct disposition method. | |
| | A value is required. | | |
| **USE UNTIL/REWORK OPERATION** | This box appears only for the following disposition methods: | | |

| Box | Description |
|---|---|
| | • Rework<br><br>**Note:**<br>In the list of operations to be re-worked, the excluded operations from the mutually exclusive set will not appear.<br><br>• Continue to process<br><br>**Note:**<br>When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default.<br><br>Select the operation until which the serial/lot can be processed. A value is required. After the serial/lot reaches the operation that you have specified, it must be disposed again. |
| **DEFECT REASON** | Select a corrective disposition action reason and the associated subreasons, as applicable.<br><br>**Tip:**<br>In the **Search** box, enter a disposition action reason to search for, and then select the reason from the reasons list. |
| **ADDITIONAL INFORMATION** | Enter any relevant information, such as a URL, contact details of the supplier, or any informa- |

| Box | Description |
|---|---|
|  | tion that is helpful to perform the root cause analysis of the non-conformance. |

4. Select **Submit**.

The following actions take place for each defect based on the disposition method that you have selected.

| Disposition Type | Result |
|---|---|
| **Clear** | • The status of the defect is set to Not a Defect, indicated by ⊝ .<br><br>• The hold on the serial/lot is released. |
| **Continue to process (CTP)** | • The status of the defect is Active, indicated by 🔧 . When the defect is in the Active status, the current serial/lot will be released from hold.<br><br>• When the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot will be placed on hold. The defect status is changed to Planned, indicated by 📅 .<br><br>> ✏️ **Note:**<br>> When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default. |
| **Use as is** | • The status of the defect is set to Closed, indicated by ⊘ .<br>• The hold on the serial/lot is released. |
| **Scrap** | • The status of the defect is set to Closed, indicated by ⊘ .<br>• The hold on the serial/lot is released. |

| Disposition Type | Result |
|---|---|
| **Rework** | <ul><li>The status of the defect is set to Active, indicated by . After completion of the rework operation, the status is changed to Planned, indicated by .</li><li>The serial/lot continues to be on hold. The hold is released after the completion of rework.</li></ul> **Note:** In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. |
| **MRB** | <ul><li>The status of the defect is set to Active, indicated by .</li><li>The serial/lot continues to be on hold.</li></ul> |

## Modify the Continue-to-Process (CTP) Disposition Method

A Continue-to-Process (CTP) disposition method implies that the serial/lot can undergo operations up to the specified CTP operation, at which point the defect can be addressed. As a quality engineer, you can modify the following CTP disposition details:

- The operation until which the serial/lot can be processed.
- The disposition method, which can be changed from CTP to any of the other disposition methods such as, Clear, Scrap, Rework or Use as is.
- The disposition action reasons.
- Additional information related to the disposition.

The following conditions apply when you modify a CTP disposition method:

- When the you select the CTP disposition method for a plan, all the defects in the plan are moved to the Active status.
- You can modify the CTP disposition method only if all the defects in the plan are in the Active status. If at least one of the serials/lots completes the CTP operation (that is, the defect moves to the Submitted status), you cannot modify the CTP disposition method.

- You can dispose the plan if all the serials/lots complete the CTP operation (that is, all the defects are moved to the Submitted status).
- When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default.

1. Search for the plan that is associated with the defect by performing one of the following steps:
   - If the plan appears in the left pane or workspace, select the link.
   - Enter the plan number in the **Enter a Serial/Lot, NCR, WO, Plan, Material, Material Family** box. When you dispose multiple defects, the plan number is added or selected by you when you create a plan. When you dispose a single defect, the plan number is generated when you submit the disposition method.

2. Select .

   The **Disposition** window appears, displaying a list of serials/lots corresponding to the defects in the plan. The check boxes for all the serials/lots in the list are selected and disabled.

3. Modify values as specified in the following table.

| Box | Description |
| --- | --- |
| **Dispositions** | This box contains the value **Continue to process**. If you want to continue with the CTP disposition method, but want to specify a different CTP operation or reasons, do not modify this value. If, however, you want to specify a different disposition method, select an option as described in the following table.<br><br>table:<br><table><tr><th>Option</th><th>Description</th></tr><tr><td>**Clear**</td><td>Select this option if the defect raised for the serial/lot is not considered a defect.</td></tr><tr><td>**Use as is**</td><td>Select this option to use the serial/lot in the operations as it is.</td></tr><tr><td>**Scrap**</td><td>Select this option to discard the serial/lot.</td></tr></table> |

| Box | Description | |
|---|---|---|
| | **Option** | **Description** |
| | **Rework** | Select this option to rework on the non-conforming part, and then select the operation on which the defective pieces should be re-worked, in the **USE UNTIL/REWORK OP-ERATION** box. <br><br> 📝 **Note:** <br> In the list of operations to be reworked, the exclud-ed operations from the mu-tually exclu-sive set will not appear. |
| | **MRB** | Select **MRB** to indi-cate that the defect must be reviewed by the material board, thus deferring the disposition to a lat-er date. This will al-low the quality team in your organization to determine the correct disposition method. |

| Box | Description |
|---|---|
| **USE UNTIL/REWORK OPERATION** | Select the operation until which the serial/lot can be processed. This box appears only for the following disposition methods:<br><br>• Rework<br><br>> **Note:**<br>> In the list of operations to be re-worked, the excluded operations from the mutually exclusive set will not appear.<br><br>• Continue to process<br><br>> **Note:**<br>> When a non conformance is dis-posed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default. |
| **SELECT DISPOSITION ACTION REASON** | Select the hierarchy of reasons for the disposition action. |
| **ADDITIONAL INFORMATION** | Enter any relevant information, such as a URL, contact details of the supplier, or any information that is helpful to perform the root cause analysis of the non-conformance. |

4. Select**Submit**.

The following actions take place based on the disposition method that you have selected.

| Disposition Type | Result for a Serialized Product | Result for a Non-Serialized Product |
|---|---|---|
| **Clear** | • The status of the defect is set to Not a Defect, indicated by  .<br>• The hold on the serial/lot is released. | If this is the only disposition method specified for the lot:<br><br>    • The status of the defect is set to Not a Defect, indicated by  .<br>    • The hold on the serial/lot is released.<br><br>If the disposition methods also include Use as is or Scrap (but do not include MRB, Continue to Process, or Rework):<br><br>    • The status of the defect is set to Closed, indicated by  .<br>    • The hold on the serial/lot is released.<br><br>If the disposition methods also include MRB, CTP, or Rework:<br><br>    • The status of the defect is Active, indicated by  . When the defect |

| Disposition Type | Result for a Serialized Product | Result for a Non-Serialized Product |
|---|---|---|
| | | is in the Active status, the hold on the serial/lot is released.<br>• In the case of CTP or Rework, when the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot will be placed on hold. The defect status is changed to Planned, indicated by . |
| **Continue to process (CTP)** | • The status of the defect is Active, indicated by . When the defect is in the Active status, the current serial/lot will be released from hold.<br>• When the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot will be placed on hold. The defect status is changed to Planned, indicated by . | • The status of the defect is Active, indicated by . When the defect is in the Active status, the hold on the serial/lot is released.<br>• When the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot will be |

| Disposition Type | Result for a Serialized Product | Result for a Non-Serialized Product |
| --- | --- | --- |
| | | placed on hold. The defect status is changed to Planned, indicated by  . <br><br> **Note:** When a non conformance is disposed as CTP to an operation in a mutually exclusive set, then all the operations in that mutually exclusive set will go on hold by default. |
| **Use as is** | • The status of the defect is set to Closed, indicated by  . <br>• The hold on the serial/lot is released. | If the disposition methods for the lot do not include MRB, Rework, or CTP: <br><br> • The status of the defect is set to Closed, indicated by  . <br>• The hold on the serial/lot is released. |

| Disposition Type | Result for a Serialized Product | Result for a Non-Serialized Product |
|---|---|---|
| | | If the disposition methods for the lot include MRB, Rework, or CTP:<br><br>• The status of the defect is Active, indicated by [icon]. When the defect is in the Active status, the hold on the serial/lot is released.<br>• In the case of Rework or CTP, when the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot is placed on hold. The defect status is changed to Planned, indicated by [icon]. |
| **Scrap** | • The status of the defect is set to Closed, indicated by [icon].<br>• The hold on the serial/lot is released. | If the disposition methods for the lot do not include MRB, Rework, or CTP: |

| Disposition Type | Result for a Serialized Product | Result for a Non-Serialized Product |
|---|---|---|
| | | • The status of the defect is set to Closed, indicated by .<br>• The hold on the serial/lot is released.<br><br>If the disposition methods for the lot include MRB, Rework, or CTP:<br><br>• The status of the defect is Active, indicated by . When the defect is in the Active status, the hold on the serial/lot is released.<br>• In the case of Rework or CTP, when the operation specified in the **USE UNTIL/REWORK OPERATION** box is reached, the serial/lot is placed on hold. The defect status is changed to Planned, indicated by . |

| Disposition Type | Result for a Serialized Product | Result for a Non-Serialized Product |
|---|---|---|
| **Rework** | • The status of the defect is set to Active, indicated by ![wrench icon]. After completion of the rework operation, the status is changed to Planned, indicated by ![calendar icon]. <br><br> • The serial/lot continues to be on hold. The hold is released after the completion of rework. | • The status of the defect is set to Active, indicated by ![wrench icon]. After completion of the rework operation, the status is changed to Planned, indicated by ![calendar icon]. <br><br> • The serial/lot continues to be on hold. The hold is released after the completion of rework. <br><br> ✎ **Note:** <br> In the list of operations to be reworked, the excluded operations from the mutually exclusive set will not appear. |

| Disposition Type | Result for a Serialized Product | Result for a Non-Serialized Product |
|---|---|---|
| MRB | • The status of the defect is set to Active, indicated by .<br>• The serial/lot continues to be on hold. | • The status of the defect is set to Active, indicated by .<br>• The serial/lot continues to be on hold. |

# Disposing a Defect Created from Receiving Inspection App

## About Disposing a Defect

A disposition is an action taken to resolve a non-conformance. The disposition method you select for a defect in Non Conformance determines the disposition plan for the defect.

A disposition plan includes the disposition, a description of the corrective actions to be taken (by using a hierarchy of actions), and any additional instructions to be followed to address the non-conformity. You configure the hierarchy of the disposition actions in Plant Applications Administrator, and then run a script file to link the hierarchy of the disposition actions for selection in Non Conformance.

The following table describes the available disposition methods.

| Disposition | Effect |
|---|---|
| SCRAP | The serial/lot cannot be used and must be scrapped. |
| MRB | The serial/lot must undergo review by the material review board before disposing it. |
| RISK RELEASE | The serial/lot if consumed as part of the manufacturing process, the consumer is notified that the selected part is dispositioned as risk release. The final quality inspectors ensure that the parts are still acceptable as per the quality standards. |
| ACCEPT | The serial/lot is acceptable to be used as is. |

| Disposition | Effect |
|---|---|
| **Return to Vendor (RTV)** | Physically discarded but sent back to the vendor who supplied the lot. This will create associated actions on other systems such as an ERP for further actions. |
| **Destroyed in Test (DIT)** | The serial/lot is not fit for consumption since it may have been used for destructive testing. This serial/lot may be discarded. |

Using Non Conformance, you can dispose the following types of products:

- Serialized: These products contain a unique identifier per piece (for example, a motor used in a pump). You can dispose a single defect or multiple defects for a serialized product at the same time.
- Non-Serialized: These products contain a unique identifier for a bunch of pieces (for example, a packet of screws). When you dispose a non-serialized product, you can select a different disposition method for different pieces in the same lot. You cannot dispose multiple defects for non-serialized products at the same time.

## Access Dispositions

1. In the **Non Conformance** page, in the left pane, select the serial/lot, non-conformance number, work order number, plan number, or material for which you want to access dispositions.
   A list of non-conformances associated with the selected item appears in the workspace, along with defects created for each non-conformance.
2. Select a defect associated with the non-conformance whose dispositions you want to access.
   The defect information appears in the **General** section.
3. Select **Dispositions**.
   A list of dispositions for the associated non-conformance appears, sorted in the descending order of the date of creation or modification. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **DISPOSITION MOD ON** | The date and time at which the disposition has been created or modified. |

| Column | Description |
|---|---|
| **DISPOSITION MOD BY** | The user who created or modified the disposition. |
| **PLAN** | The plan associated with the disposition. You can select the link in this column to search for all non-conformances associated with the plan. |
| **SERIAL/LOT#** | The material lot number or serial number that contains the defect. You can select the link in this column to search for all non-conformances associated with the serial/lot. |
| **WORK ORDER** | The work order associated with the serial/lot. You can select the link in this column to search for all non-conformances associated with the work order. |
| **RECEIVER NUMBER** | The Receiver number associated with the serial/lot in case the Non-conformance is created through a receiver. You can select the link in this column to search for all non-conformances associated with the receiver. |
| **OP** | The operation during which the defect has been identified. |
| **QTY** | The number of defective pieces in the serial/lot. |
| **DISP** | The type of the disposition method. |
| **ACTION REASON 1** | The first level of action to dispose the defect. |
| **VIEW** | Select 👁 to access additional details of the defect. |

## Dispose a Single Defect for a Serialized Product

Ensure that you have configured the required disposition action reason tree in Plant Applications Administrator, and then linked the disposition action reason tree for selection in Non Conformance by using the appropriate script file.

This topic describes how to dispose a single defect for a serialized product.

> **Note:**
>
> In Plant Applications 2022, you cannot dispose multiple defects created from Receiving Inspection for any product.

You can also:

The following conditions apply when you dispose a defect for a serialized product:

- If a defect has been added to a plan, you cannot dispose it separately; you can only dispose all the defects in the plan together.
- If a defect has already been disposed using one of the following methods, you cannot dispose it again:
    - SCRAP
    - RTV
    - DIT
    - RISK RELEASE

1.

   > **Note:**
   >
   > You can dispose a defect only if it is in the Submitted status, which is indicated by ![icon].

2. In the row containing the defect, select ![icon].

   The **Disposition Plan** window appears.

3. Provide values as specified in the following table.

| Box | Description |
|---|---|
| **SERIAL/LOT#** | This section contains the lot number and the quantity of defective pieces in the lot. Select the lot. <br><br> > **Tip:** <br> > To access the non-conformance number, the name of the user who created |

| Box | Description |
|---|---|
| | ⓘ the non-conformance, and the date and time at which the non-conformance has been created, click ❯ . |
| **DISPOSITIONS** | Select an option as described in the following table. |

| Option | Description |
|---|---|
| **AC-CEPT** | Select this option if the defects raised for the non-conformance are not considered as defects. |
| **SCRAP** | Select this option if you want to discard the defective serials/lots. |
| **MRB** | Select this option to indicate that the defects must be reviewed by the material board, thus deferring the disposition to a later date. This will allow the quality team in your organization to determine the correct disposition method. |
| **RTV** | Select this option if the identified lots have to be returned to the vendor who supplied these lots, but need to be discarded from your system |
| **DIT** | Select this option if the lots have been used to do any form of destructive testing and are unusable for consumption. |
| **RISK RE-LEASE** | Select this option if there is a known defect but the business has taken a decision to count it as a valid lots for inventory at risk. |

| Box | Description |
| --- | --- |
| **SELECT DISPOSITION ACTION REASON** | Select a corrective disposition action reason and the associated subreasons, as applicable. <br><br> ⓘ **Tip:** <br> In the**Search** box, enter a disposition action reason to search for, and then select the reason from the reasons list. |
| **ADDITIONAL INFORMATION** | Enter any relevant information, such as a URL, contact details of the supplier, or any information that is helpful to perform the root cause analysis of the non-conformance. |

4. Select **Submit**.

The following actions take place based on the disposition method that you have selected.

| Disposition Type | Result |
| --- | --- |
| **ACCEPT** | • • The status of the defect is set to Closed, indicated by ⊘ . |
| **SCRAP** | • The status of the defect is set to Closed, indicated by ⊘ . <br> • The hold on the serial/lot is released. |
| **RTV** | • The status of the defect is set to Closed, indicated by ⊘ . <br> • The hold on the serial/lot is released. |
| **DIT** | • The status of the defect is set to Closed, indicated by ⊘ . <br> • The hold on the serial/lot is released. |
| **MRB** | • The status of the defect is set to Active, indicated by 🔧 . <br> • The serial/lot continues to be on hold. |
| **RISK RELEASE** | • The status of the defect is set to Closed, indicated by ⊘ . <br> • The hold on the serial/lot is released. |

## Dispose a Single Defect for a Non-Serialized Product

Ensure that you have configured the required disposition action reason tree in Plant Applications Administrator, and then linked the disposition action reason tree for selection in Non Conformance by using the appropriate script file.

When you dispose a non-serialized product, you can select a different disposition method for different pieces in the same lot. For example, suppose in a packet of 50 screws, 20 must be scrapped and 30 can be used as is. You can split the lot into two sublots, and specify the disposition method as SCRAP for a quantity of 20 screws and ACCEPT is for the remaining 30 screws.

This topic describes how to dispose a single defect for a non-serialized product. You can also:

- Dispose a Single Defect for a Serialized Product *(on page 122)*.

> **Note:**
>
> In Plant Applications 2022, you cannot dispose multiple defects created from Receiving Inspection for any product.

1. Access the defect that you want to dispose *(on page 80)*.

   > **Note:**
   >
   > You can dispose a defect only if it is in the Submitted status, which is indicated by 🗎.

2. In the row containing the defect, select ⚖.

   The **Dispositions** window appears.
3. Provide values as specified in the following table.

| Box or Section | Description |
|---|---|
| **SL/LOT** | This section contains the lot number and the quantity of defective pieces in the lot. Select the lot. |
| | > **Tip:** <br> > To access the non-conformance number, the name of the user who created the non-conformance, and the date and |

| Box or Section | Description |
|---|---|
| | ⓘ time at which the non-conformance has been created, click ❯ . |
| **DISPOSITIONS** | For each disposition method that you want to specify for the items in the lot, select an option as described in the following table, and then enter the quantity. |

| Option | Description |
|---|---|
| **AC-CEPT** | Select this option if the defects raised for the non-conformance are not considered as defects. |
| **SCRAP** | Select this option if you want to discard the defective serials/lots. |
| **MRB** | Select this option to indicate that the defects must be reviewed by the material board, thus deferring the disposition to a later date. This will allow the quality team in your organization to determine the correct disposition method. |
| **RTV** | Select this option if the identified lots have to be returned to the vendor who supplied these lots, but need to be discarded from your system |
| **DIT** | Select this option if the lots have been used to do any form of destructive testing and are unusable for consumption. |
| **RISK RE-LEASE** | Select this option if there is a known defect but the business has taken a decision to count it as a valid lots for inventory at risk. |

| Box or Section | Description |
|---|---|
| | Repeat this step for all the disposition methods that you want to use for the lot. |
| | For example, suppose in a packet of 50 screws, 20 must be scrapped and 30 can be used as is. In that case: |
| |     a. In the **Dispositions** box, select **SCRAP**, and then enter 20. |
| |     b. In the **Dispositions** box, select **ACCEPT**, and then enter 30. |
| | Each time you select a disposition, the affected quantity is updated with the remaining quantity that must be disposed. The sum of the quantity that you have entered for each disposition method for a lot must be equal to the available quantity for the lot (that is, the affected quantity must be zero). |
| **SELECT DISPOSITION ACTION REASON** | For each disposition that you have specified in the **Dispositions** box, select the corrective disposition action reason and the associated sub-reasons, as applicable. |
| | **ⓘ Tip:** In the **Search** box, enter a disposition action reason to search for, and then select the reason from the reasons list. |
| **ADDITIONAL INFORMATION** | Enter any relevant information, such as a URL, contact details of the supplier, or any information that is helpful to perform the root cause analysis of the non-conformance. |

4. Select **Submit**.

> **Note:**
>
> The **Submit** button is enabled only if the following conditions are satisfied:
> - You have selected a disposition method for all the defective items in the lot (that is, the affected quantity is zero).

A disposition plan is created for the lot. The following actions take place based on the disposition method that you have selected.

| Disposition Type | Result |
|---|---|
| **ACCEPT** | • The status of the defect is set to Closed, indicated by . |
| **SCRAP** | • The status of the defect is set to Closed, indicated by .<br>• The hold on the serial/lot is released. |
| **RTV** | • The status of the defect is set to Closed, indicated by .<br>• The hold on the serial/lot is released. |
| **DIT** | • The status of the defect is set to Closed, indicated by .<br>• The hold on the serial/lot is released. |
| **MRB** | • The status of the defect is set to Active, indicated by .<br>• The serial/lot continues to be on hold. |
| **RISK RELEASE** | • The status of the defect is set to Closed, indicated by .<br>• The hold on the serial/lot is released. |

# Chapter 4. Work Order Manager

## About Work Order Manager

### About Work Order Manager

As a supervisor, you can use Work Order Manager to manage work orders. Each row in the **Work Order Manager** page represents a work order or an operation. You can perform the following tasks in Work Order Manager:

- Access a work order and its details *(on page 134)*.
- Search for a work order *(on page 136)*.
- Create a work order *(on page 152)*.
- Prioritize a work order *(on page 172)*.
- Modify the planned dates of a work order *(on page 156)*.
- Cancel a work order *(on page 173)*.

### About Work Orders, Operations, and Serials/Lots

A work order is a request to manufacture a certain quantity of products. It contains information on the model, route, and quantity of a product that must be manufactured. Work orders are created for a specific product and must be completed on a production line.

Work orders are created in Plant Applications from the following sources:

- ERP System: You can import work orders from an ERP system to Plant Applications using the import services.

> 📝 **Note:**
> For information on the import services, refer to the Plant Applications ERP Integration Guide.

- Route Editor: You can create work orders manually using Route Editor.
- Work Order Manager: You can create work orders manually using Work Order Manager.

These work orders then appear in Work Order Manager.

To manufacture each type of product, a sequence of tasks must be performed. Each task or a set of tasks is called an operation. An operation is an executable job performed on a production unit of a production

line. Operations can be defined either in the route using Route Editor or in the work order that you import from an ERP system.

## About Status Indicators

A status indicator is a color-coded icon that provides the status of a work order, operation, or a serial/lot. The progress of work of all the serials/lots and operations indicates the overall status of a work order. The following table provides information on the status indicators for a serial/lot, operation, and a work order.

> **Note:**
> During production, the status of an operation may differ as follows:
>
> - When a serial/lot is on hold, the status of the operation associated with that serial/lot can be In Progress.
> - When a serial/lot is scrapped, the operation in which the serial/lot is scrapped along with all subsequent operations that were configured to be performed on the serial/lot is Cancelled.

**Table 1. Status Indicators of a Work Order**

| Status | Status Indicator | Description for a Serial/Lot | Description for an Operation | Description for a Work Order |
|---|---|---|---|---|
| Not Ready | | Not applicable | Indicates that none of the serials/lots are available for you to begin the operation. | Not applicable |
| Ready | | Indicates that no operation has been performed on the serial/lot yet, and the serial/lot is ready for you to perform the opera- tion. | Indicates that you can begin work for the operation. | Indicates that you can begin work for the work order. |
| In Progress | | Indicates that work has begun on the | Indicates that work for the operation | Indicates that work has begun for at |

**Table 1. Status Indicators of a Work Order  (continued)**

| Status | Status Indicator | Description for a Serial/Lot | Description for an Operation | Description for a Work Order |
|---|---|---|---|---|
| | | serial/lot (that is, the serial/lot is clocked on or was clocked on in the past). | has begun on at least one serial/lot (that is, at least one serial/lot is clocked on for the operation or was clocked on the past). | least one serial/lot in the work order (that is, at least one serial/lot in the work order is clocked on or was clocked on in the past). |
| On Hold | ◻ | Indicates that a defect has been created for the serial/lot. After the defect is closed, the status is changed to the previous status. | Indicates that the operation is on hold. For example, if the disposition method specified for a defect is Continue to Process (CTP), and the defect is re-evaluated during a future operation, that future operation is on hold. When the serial/lot is ready for that future operation, the operation status is Ready or In Progress, and the serial/lot status is On Hold. | Not applicable |
| Cancelled | ⊠ | Not applicable | Indicates that the operation is in the Cancelled status. For example, when a serial/lot is | Indicates that the work order is cancelled. |

**Table 1. Status Indicators of a Work Order  (continued)**

| Status | Status Indicator | Description for a Serial/Lot | Description for an Operation | Description for a Work Order |
|--------|-----------------|------------------------------|------------------------------|------------------------------|
| | | | scrapped or split, the status of the current operation on the serial/lot is changed to Cancelled. | |
| Scrapped | | Indicates that the serial/lot has been scrapped. | Not applicable | Not applicable |
| Split | | Indicates that the lot has been split up. This happens when a non-conformance has been created on some of the items in the lot. | Not applicable | Not applicable |
| Completed | | Indicates that all operations for the serial/lot are completed. | Indicates that the operation is completed for all serials/lots. | Indicates that all the operations associated with all the serials/lots in the work order are completed. |

# Accessing a Work Order

## About Accessing a Work Order

Using Work Order Manager, you can access work orders and operations in the released, on hold, or completed state. You can also access the following details of a work order:

- Status of the serials/lots *(on page 138)* in the work order, along with the current operation being performed on each of them.
- Summary *(on page 140)*

- A list of clocked on and clocked off operations *(on page 142)*
- A list of BOM items *(on page 144)* for each serial/lot in the work order, along with the required and consumed quantities
- History *(on page 146)*
- A list of non-conformances *(on page 150)* created for serials/lots in the work order
- A list of properties *(on page 151)*

## Access a Work Order

As a supervisor, you can access work orders in the Released (that is, Ready or In Progress), On Hold, and Completed statuses associated with a production line or material family.

1. In the **Work Order Manager** page, depending on the status of the work order that you want to access, select one of the following tabs:
   - **Released**
   - **On hold**
   - **Completed**
2. In the **Property** box, select one of the following properties by which you want to filter the work orders.
   - **Production Line**
   - **Material Family**

   Depending on your selection in the **Property** box, the adjacent drop-down list box contains the list of production lines or material families.
3. Select the production lines or material families based on which you want to filter the work orders.

   > **Note:**
   > If you select a single production line or material family, the name of the selected line or family appears in the drop-down list box. If you select more than one line or family, the quantity of the selected lines or families appears (for example, 2 selected).

   A list of work orders associated with the selected production lines or material families appears. If you have accessed a work order in the released state, the work orders in the In Progress status appear first with an ascending sort applied in the **ACT START** column, followed by those in the Ready status with an ascending sort applied in the **PRI** column and then the **PLAN START** column (that is, the oldest work orders appear first in the table). The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| STATUS | The status of the work order. |
| WORK ORDER | The unique identifier of the work order. |
| SERIAL/ LOT | The quantity of serials/lots created in the work order.<br><br>**Note:**<br>• If the planned quantity of serials/lots in the **COMP QTY** column is greater than one, the **SERIAL/LOT** column displays the quantity of serials/lots associated with the work order. Select the link in this column to access a list of serials/lots and the statuses of each serial/lot associated with the work order. For more information, refer to the About Status Indicators *(on page 131)* topic.<br>• The value in the **SERIAL/LOT** column does not include the number of serials/lots that are in the Cancelled status. |
| MATERIAL | The name of the material associated with the work order. |
| COMP QTY | The total quantity of items completed out of the total number of items in the serials/lots planned in the work order. The value in this column appears in the following format: <completed quantity> of <available quantity to be completed>. For example, suppose 5 lots are planned for a work order, and each lot contains 10 items. If 10 items from the first lot and 5 items from the second lot are completed, the value in this column is 15 of 50. |
| HOLD QTY | The quantity of serials/lots that are on hold in the work order. |
| SCRAP QTY | The quantity of serials/lots scrapped in the work order. |
| PRI | The priority of the work order. For instructions on how to prioritize a work order, refer to the Prioritize a Work Order *(on page 172)* topic. |
| PLAN START | The date and time when the work order was planned to begin. The date and time appear in the following format: mm/dd hh:mm (for example, 03/27 10:58). |
| PLAN END | The date and time when the work order was planned to end. The date and time appear in the following format: mm/dd hh:mm. |

| Column | Description |
|---|---|
| ACT START | The actual start date and time of the work order. The date and time appear in the following format: mm/dd hh:mm. |
| ACT END | The actual end date and time of the work order. This column contains a value only for a work order in the Completed status. The date and time appear in the following format: mm/dd hh:mm. |
| ACTIONS | Contains the ✕ button to allow you to cancel the work order. This button is enabled only for a work order that is in the Ready status. |

> 📝 **Note:**
>
> The number of work orders that appear in a page depends on the resolution of your computer screen.

> ℹ️ **Tip:**
>
> By default, the list is grouped by the work order. If you want to sort the list by operations, select **By Operations**.

4. Select the work order that you want to access.

   The page for the work order appears, displaying a list of serials/lots for the work order.

Access the Work Order Status .

## Search for a Work Order

1. In the **Work Order Manager** page, select 🔍 in the main navigation bar.

   A window containing a list of search options appears.
2. Provide the search criteria as described in the following table.

| Box | Description |
|---|---|
| SERIAL/LOT | Enter a serial/lot number to access the associated work orders. You must enter the complete serial/lot number. |
| WORK ORDER | Enter a work order number to access the details of the work order. You must enter the complete work order number. |

| Box | Description |
|-----|-------------|
| **MATERIAL FAMILY** | Select the material family used for the serials/lots in the work order. If you select a value in this box, options in the **MATERIAL** box are filtered accordingly. |
| **MATERIAL** | Select the material used for the serials/lots in the work order. This box contains a list of materials that belong to the material family you have selected. |
| **WORK ORDER STATUS** | Select the status of the work order that you want to access. |

> **ⓘ Tip:**
>
> To search for a work order using a barcode, select 📷 for an option, and scan for the barcode specific to the option.
> - Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes.
> - In iPad, you can use 📷 only in the Safari browser.

A list of work orders based on the search criteria appear.

> **ⓘ Tip:**
>
> To clear the results and perform a new search, select **Clear Results**.

## Access a List of Operations

As a supervisor, you can access operations in the Ready, In Progress, On Hold, and Completed statuses associated with a production line or material family.

1. In the **Work Order Manager** page, select one of the following tabs:
   - **Released**: Select this tab if you want to access a list of operations that are ready or in progress.
   - **On hold**: Select this tab if you want to access a list of operations that are on hold.
   - **Completed**: Select this tab if you want to access a list of operations that are completed.
2. Select **By Operations**.

A list of operations in the status that you have selected appears. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| STATUS | The status of the operation. |
| OPER- ATION | The name of the operation. |
| SERIAL/ LOT | The serial/lot number on which the operation is being performed. |
| WORK OR- DER | The work order for which the operation is performed on serials/lots. |
| MATERIAL FAMILY | The material family associated with the material. |
| MATERIAL | The name of the material associated with the work order. |
| COMP QTY | The quantity of serials/lots completed or produced out of the total quantity of se- rials/lots on which the operation must be performed. The value in this column ap- pears in the following format: <completed quantity> of <planned quantity> (for exam- ple, 2 of 5). |
| PRI | The priority of the work order. For instructions on how to prioritize a work order, refer to the Prioritize a Work Order *(on page 172)* topic. |
| UNIT | The production unit on which the operation is performed. |
| STARTED ON | The date and time when the operation has begun. The date and time appear in the following format: mm/dd hh:mm (for example, 03/27 10:58). For an operation in the Ready status, the value in this column is blank. |
| READY ON | The date and time when the operation was ready. The date and time appear in the following format: mm/dd hh:mm. |
| OPT | Indicates that the operaton is **Optional** by displaying OPT against the operation. |

## Access a Serial/Lot Status

Access the work order *(on page 134)* whose status you want to view.

The page for the work order appears, displaying the **Current Status** section, which contains the current operation being performed on each serial/lot in the work order and the status of each serial/lot at the

current operation. The **All Serials/Lots** section displays a list of serials/lots in the work order, along with the status of each serial/lot. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **STATUS** | The color-coded status indicator of the serial/lot. For more information, refer to the About Status Indicators *(on page 131)* topic. |
| **SERIAL/LOT** | The unique identifier of the serial/lot. |
| **CURRENT OP** | The name of the operation that is being performed on the serial/lot. |
| **SEQUENCE NUMBER** | The sequence in which the operation is performed. |
| **USER(S)** | The names of the users who are currently working on the operation. |
| **COMP QTY** | The quantity of serials/lots completed or produced out of the total quantity of serials/lots planned in the serial/lot. The value in this column appears in the following format: <completed quantity> of <planned quantity> (for example, 2 of 5). |
| **SKIPPED** | The number of serials/lots that are skipped. |
| **CURRENT UNIT** | The name of the unit where the serial/lot is being produced. |
| **DESCRIPTION** | The unit description. |
| **OPT** | Indicates that the operaton is **Optional** by displaying OPT against the operation. |

> **ℹ Tip:**
>
>   - By default, the current status for all the serials/lots appears in the **Current Status** section. If you want to access the status for a single serial/lot, select the serial/lot in the **All Serial/ Lots** section.
>   - To modify the names of the serials/lots in the table, select ✏, modify the names, and then select **Save**.
>
> > **✏ Note:**
> > To perform this action, you must be granted the permission using Security.

> **ℹ Tip:**
>
> To export the data to a .csv file, select ⤓. The data for the columns that appear in the table are exported into a .csv file. If the data contains unicode characters, to access the data in a Microsoft Excel worksheet:
>
>   a. Access a blank worksheet.
>   b. Go to **Data > From text/CSV**, and select the .csv file.
>   c. Select the file origin: **65001:Unicode (UTF-8)**.
>   d. Load the data.
>
> This process is a requirement for Microsoft Excel.

# Access the Work Order Summary

As a supervisor, you can access the summary of serials/lots and operations associated with a work order in the Ready, In Progress, and Completed statuses. You can also view the users who worked on the operations and the time taken to complete each operation.

1. Access the work order *(on page 134)* whose summary you want to view.
   The page for the work order appears, displaying the **Current Status** section. The **All Serials/Lots** section displays a list of serials/lots in the work order, along with the status of each serial/lot.
2. Select **Summary**.
   The **Summary** section appears, displaying a list of serials/lots in the work order. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **STATUS** | The status of the serial/lot at each operation. For information, refer to the About Status Indicators *(on page 131)* topic. |
| **SERIAL/LOT** | The unique identifier of the serial/lot. |
| **OPERATION** | The name of the operation. |
| **STARTED TIME** | The start date and time of the operation. This value appears in the following format: mm/dd hh:mm. If an operation is cancelled for a serial/lot, the value in this column is blank. |
| **COMP QTY** | The quantity of serials/lots completed or produced out of the total quantity of serials/lots planned in the serial/lot. The value in this column appears in the following format: <completed quantity> of <planned quantity> (for example, 2 of 5). |
| **COMPLETED TIME** | The end date and time of the operation. This value appears in the following format: mm/dd hh:mm. If an operation is not yet completed, the value in this column is blank. |
| **SKIPPED** | The number of serials/lots that are skipped. |
| **OPT** | Indicates that the operaton is **Optional** by displaying OPT against the operation. |
| **COMPLETED BY** | The name of the user who worked on the operation. If an operation is not yet completed, the value in this column is blank. |
| **SEQUENCE NUMBER** | The sequence number of the operation defined in Route Editor. |
| **DURATION** | The duration for which the operation was performed on the serial/lot. The value in this column is calculated as the difference between values in the **STARTED TIME** and **COMPLETED TIME** |

| Column | Description |
|---|---|
| | columns. This value appears in the following format: hh:mm:ss<br><br>• For an operation in the ready status, the value in this column is blank.<br>• For an operation in progress, the value in this column is updated continuously.<br>• For an operation in the completed status, the value in this column is static (no longer updated). |
| **UNIT** | The production unit on which the operation is performed. |

> **ⓘ Tip:**
>
> To export the data to a .csv file, select ⤓ . The data for the columns that appear in the table are exported into a .csv file. If the data contains unicode characters, to access the data in a Microsoft Excel worksheet:
>
> a. Access a blank worksheet.
> b. Go to **Data > From text/CSV**, and select the .csv file.
> c. Select the file origin: **65001:Unicode (UTF-8)**.
> d. Load the data.
>
> This process is a requirement for Microsoft Excel.

## Access the Clocked-on Records

As a supervisor, you can perform the following tasks in the **Clocked on** section:

• Access a list of records that indicate the clocked-on or clocked-off status of operations and the operators working on them.
• View the time each serial/lot was clocked on for an operation by an operator for an uninterrupted duration. For example, if an operator clocks on serial A at 9am, clocks off at 10am, and then clocks on again at 10.15am, two records appear in the list. If another operator clocks on the same serial/lot for the same operation, another record appears in the list.
• Clock off a serial/lot for an operation on behalf of an operator.

1. Access the work order *(on page 134)* for which you want to view the clocked on and clocked off operations.

   The page for the work order appears, displaying the **Current Status** section.

2. Select **Clocked on**.

   The **Clocked on** section appears, displaying a list of records. A record is created each time an operator clocks on a serial/lot for an operation. If the operator clocks off and clocks on the serial/lot again, another record is created. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **USER(S)** | The names of the users who worked on the operation. |
| **SERIAL/LOT** | The unique identifier of the serial/lot on which the operation is performed. |
| **OPERATION** | The name of the operation being performed. |
| **CLOCKED ON** | The date and time when the operator clocked on the serial/lot for the operation. The value in this column appears in the following format: mm/dd hh:mm |
| **CLOCKED OFF** | The date and time when the operator clocked off the serial number for that operation. The value in this column appears in the following format: mm/dd hh:mm |
| **DURATION** | The uninterrupted duration for which an operator has clocked on the serial/lot for an operation.<br><br>✏️ **Note:**<br>If the operator clocks off and clocks on again, another record is created for the new session.<br><br>The value in this column appears in the following format: hh:mm:ss<br>• For a clocked-on operation, the value in this column is updated continuously.<br>• For a clocked-off operation, the value in this column is static (not updated). |

| Column | Description |
|---|---|
| **LABOR TYPE** | The labor type of the operator who clocked on the serial/lot. The possible values for labor type are defined in Route Editor and Work Queue. |
| **ACTIONS** | Contains a toggle to allow you to clock off the serial/lot *(on page 172)* for the operation on behalf of an operator. |

> **ⓘ Tip:**
>
> By default, the records for all the serials/lots appear in the **Clocked On** section. If you want to access the records for a single serial/lot, select the serial/lot in the **All Serial/Lots** section.

> **ⓘ Tip:**
>
> To export the data to a .csv file, select ⤓. The data for the columns that appear in the table are exported into a .csv file. If the data contains unicode characters, to access the data in a Microsoft Excel worksheet:
>   a. Access a blank worksheet.
>   b. Go to **Data > From text/CSV**, and select the .csv file.
>   c. Select the file origin: **65001:Unicode (UTF-8)**.
>   d. Load the data.
> This process is a requirement for Microsoft Excel.

## Access BOM Items

A Bill of Material (BOM) contains BOM formulations that define a list of items and the quantity of each BOM item needed to produce a product. BOM items are defined and associated with BOM formulations in Plant Applications. Using Plant Applications Web Client, you can manage BOM items as follows:

1. In Route Editor, you can link BOM formulations to a route, and then link BOM items to operations.
2. In Work Queue and Unit Operations, you can specify the consumption of BOM items for each serial/lot.
3. In Work Order Manager, you can view the required and consumed quantity of each BOM item for each serial/lot.

1. whose BOM items you want to view.

   The page for the work order appears, displaying the **Current Status** section. The **All Serials/Lots** section displays a list of serials/lots in the work order, along with the status of each serial/lot.

2. In the left pane, select the serial/lot for which you want to access the BOM items.

3. Select **BOM**.

   A list of BOM items associated with the serial/lot appears. The following table provides information on the columns in the table.

> ✏️ **Note:**
>
> The list of BOM items appears only if you select a serial/lot in the left pane. If **All Serials/ Lots** is selected, the list of BOM items does not appear.

> ℹ️ **Tip:**
>
> You can search for a BOM item by entering the part number in the **Search part here** box or by scanning the bar code of the part number.

| Column | Description |
| --- | --- |
| **ORDER** | The order in which the BOM items may be consumed.<br><br> ✏️ **Note:**<br> For multiple lots, you can select the row to expand and see individual details such as SERIAL/LOT, CONSUMED QTY, USERNAME, and DATE/TIME in a new table. |
| **MATERIAL** | The material number of the BOM item. |
| **MATERIAL DESC** | The material description of the BOM item. |
| **REQ QTY** | The planned quantity of the BOM items required for the completion of the serial/lot for the operation. |
| **CONSUMED QTY** | The actual quantity of the BOM items consumed during the production. |

| Column | Description |
|---|---|
| **UOM** | The unit of measure (UOM) of the BOM item. |
| **SERIAL/LOT#** | The serial/lot of the raw material that was consumed. |
| **LOWER QTY** | The minimum quantity, measured in the selected engineering units, of the formulation item that must be used in the formulation. |
| **UPPER QTY** | The maximum quantity, measured in the selected engineering units, of the formulation item that can be used in the formulation. |
| **SCRAP FACTOR** | The Percentage of this formulation item that is expected to be lost during production of the formulation. For example, if 100 units of Product XYZ are required with a scrap factor of 1%, then you should have 101 units on hand when preparing to produce the product. |
| **STORAGE UNIT** | Unit currently storing the selected product. |

## Access the Work Order History

As a supervisor, you can access the events associated with a work order. An event is created each time an action is taken for the work order (for example, a work order is created, a serial/lot is put on hold, or a serial/lot is clocked on).

1. Access the work order *(on page 134)* whose history you want to access.

   The page for the work order appears, displaying the **Current Status** section.
2. Select **History**.

   The **History** section appears, displaying the events associated with the work order. The events appear in descending order of their time stamps (based on the **TIME STAMP** column). The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **ACTION** | The action *(on page 43)* performed on the serial/lot. |
| **SERIAL/LOT** | The unique identifier of the lot or serial number for which the action was performed. |

| Column | Description |
|---|---|
| **OPERATION** | The name of the operation for which the action was performed. |
| **USER(S)** | The name of the user who performed the action specified in the **ACTION** column. If the action is performed automatically, this column contains the name of the user who triggered the action. For example, if a defect has been created for a serial/lot, the status of the serial/lot is automatically changed to On Hold. In this case, the value in the **USER(S)** column contains the name of the user who created the defect. |
| **TIME STAMP** | The date and time when the action was performed. If multiple actions are performed at the same time, they contain the same value in this column. For example, if the last operation for all the serials/lots in a work order is completed, the value in this column for the actions **Operation Completed** and **Serial/Lot Completed** will be the same. |

> **ⓘ Tip:**
>
> To export the data to a .csv file, select ⤓ . The data for the columns that appear in the table are exported into a .csv file. If the data contains unicode characters, to access the data in a Microsoft Excel worksheet:
>
>     a. Access a blank worksheet.
>     b. Go to **Data > From text/CSV**, and select the .csv file.
>     c. Select the file origin: **65001:Unicode (UTF-8)**.
>     d. Load the data.
>
> This process is a requirement for Microsoft Excel.

## Actions Recorded in the Work Order History

The following table provides a list of actions that appear in the **History** section of a work order.

| Action | Description |
|---|---|
| Work Order Created | Indicates that the work order is created. |

| Action | Description |
|---|---|
| Work Order Ready | Indicates that the work order is ready for you to begin work on at least one serial/lot. |
| Work Order Started | Indicates that the work has begun on at least one serial/lot in the work order. This happens when at least one serial/lot in the work order has been clocked on for an operation. |
| Work Order Completed | Indicates that all the operations in the work order are completed for all the serials/lots in the work order. |
| Work Order Cancelled | Indicates that the work order is cancelled. |
| Work Order Planned Date Change | Indicates that the planned start and end dates of the work order have been changed. |
| Work Order Priority Change | Indicates that the priority for the work order has been changed. |
| Serial No Created | Indicates that an ID has been created for a serial/lot in the work order. |
| Serial/Lot Started | Indicates that work has begun on a serial/lot for the work order. This happens when the serial/lot has been clocked on for the first operation. |
| Serial/Lot Hold | Indicates that the serial/lot is on hold. This happens when a non-conformance is created on the serial/lot. |
| Serial/Lot Scrapped | Indicates that the serial/lot has been scrapped. This happens when a non-conformance is created on the serial/lot and the disposition method specified for the serial/lot is Scrap. |
| Serial/Lot Completed | Indicates that work on the serial/lot has been completed. This happens when all the operations defined in the associated route are completed for the serial/lot. |

| Action | Description |
|---|---|
| Serial/Lot Identifier Change | Indicates that the name of a serial/lot has been changed. |
| Operation Ready | Indicates that an operation is ready for you to begin work on the specified serial/lot. |
| Operation Started | Indicates that work for an operation for the specified serial/lot has begun. |
| Serial/Lot Clock On | Indicates that a serial/lot has been clocked on for an operation by an operator. |
| Serial/Lot Clocked Off | Indicates that a serial/lot has been clocked off for an operation by an operator. |
| Operation Hold | Indicates that work for an operation is on hold for a serial/lot. This happens when a non-conformance has been created on the serial/lot for the operation. |
| Operation Released | Indicates that an operation is released for the serial/lot. This happens when the serial/lot has been disposed to release the operation hold. |
| Operation Cancelled | Indicates that an operation is cancelled for the serial/lot. This happens when the serial/lot is scrapped at the operation. |
| Operation Completed | Indicates that an operation is completed for the serial/lot. |
| Operation Skipped | Indicates that an operation is skipped for the serial/lot. |
| Hold Released | Indicates that hold is released on an operation. This happens when the serial/lot on which a non-conformance has been created has been disposed. |
| Order Segments Changed | Indicates that the sequence of an operation in the work order has been changed. This happens when operations have been added or removed (for exam- |

| Action | Description |
|---|---|
| | ple, the disposition for a defective serial/lot is s et to rework). |
| Serial/Lot Split | Indicates that a serial/lot has been split up. This happens when a non-conformance has been created for some of the items in the lot. |
| Serial/Lot Planned Quantity Change | Indicates that the planned quantity of a serial/lot has changed. This happens when items have been added to the planned quantity of the lot or some of the items in the lot have been scrapped. |
| Quantity Completed | Indicates that completed quantity has been specified for a serial/lot for an operation using Unit Operations or Work Queue. |

## Access the Non-Conformance Details of a Work Order

As a supervisor, you can access the defects created on a serial/lot when the materials produced do not conform to specifications within the manufacturing process. After an operator creates a defect during an operation in the Non Conformance or the Work Queue application, the status of the associated serial/lot and operation is set to on hold, and the operators working on that serial/lot are clocked off (Depending on the configuration in Plant Applications Administrator, the serial/lot may still remain clocked on.). You can then access the defect details in the **NCR** section.

1. Access the work order *(on page 134)* whose non-conformance details you want to access.
2. Select **NCR**.
   The **NCR** section appears, displaying a list of non-conformances created on each defective serial/lot in the work order. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **STATUS** | The status of the defect for which a non-conformance has been created. |
| **SERIAL/LOT#** | The serial/lot number for which the non-conformance has been created. |
| **OP** | The operation during which the non-conformance has been created. |

| Column | Description |
|---|---|
| **DISP** | The disposition method *(on page 88)* imple-mented on the serial/lot. If the serial/lot is yet to be disposed, the value in this column is blank. |
| **MATERIAL** | The material of the serial/lot. |
| **MATERIAL FAMILY** | The material family associated with the materi-al. |
| **MATERIAL DESC** | The description of the material. |
| **CTP/REWORK OP** | The operation until which the serial/lot can be processed if the disposition method is Continue to Process (CTP). |
| **ACTIONS** | Contains the following buttons: <br> • 👁 : Select this button to access the non-conformance details. <br> • 🕐 : Select this button to access the de-fect history. |

## Access Properties

A property is an additional attribute that is assigned to a route, an operation, or a material to produce a product. Properties are created in Property Definition and assigned values in the following ways:

- Properties for routes and operations are assigned values in Route Editor.
- Properties for materials are assigned values in an ERP system. These materials are imported to Plant Applications using import services.

The **Properties** section in Work Order Manager contains a list of properties defined for a work order and/or the associated material and operations.

1. Access the work order *(on page 134)* whose properties you want to access.
2. Select **Properties**.
   The **Properties** section appears, displaying a list of properties assigned to the work order, along with properties assigned to the associated operations or material. The following table provides information on each column in the table.

| Column | Description |
|---|---|
| LEVEL | The level at which the property has been defined. This column contains one of the following values:<br><br>    • Material<br>    • All Operations<br>    • <Operation name> |
| CATEGORY | The category of the property as defined in Property Definition. |
| GROUP | The group to which the property belongs. |
| NAME | The name of the property. |
| VALUE | The value of the property. |
| DATA TYPE | The data type of the property. |
| UOM | The units of measure of the property. |

# Creating a Work Order

## About Creating a Work Order

A work order is a request to manufacture certain quantity of a product in a given time. It contains information about the product, the quantity to be manufactured, the planned start time and end time, a list of serials/lots, and the route that must be used to manufacture the product.

Work orders are created in Plant Applications from the following sources:

- ERP System: You can import work orders from an ERP system to Plant Applications using the import services.
- Route Editor: You can create work orders manually using Route Editor.
- Work Order Manager: You can create work orders manually using Work Order Manager.

You can create a work order only for a released route.

## Create a Work Order

If you do not have the permission to perform this task, request your administrator to provide the permission using Security. Refer to Create a Role *(on page 291)*.

1. In the **Work Order Manager** page, select ＋.

   The **Create Work Order** window appears, displaying the **General** section.

2. In the **CHOOSE MATERIAL** box, select the product for which you want to create a work order.

3. Provide values as specified in the following table.

| Box | Description |
|---|---|
| **MATERIAL** | Select the material for which you want to create the work order. |
| **ROUTE** | This box contains a list of released routes for the material that you have selected. All the revisions of a route, if any, appear in this box, indicated by R[< revision number>] at the end of the route name. Select the route for which you want to create a work order. |
| **WORK ORDER** | You must enter a value in this box. Enter a unique name for the work order that does not exceed 100 characters. If a work order with the same name exists:<br><br>• If the work order is ready, a message appears asking you to confirm if you want to delete it and replace it with the one you are creating.<br>• If the work order is in progress, you cannot create this work order. |
| **NO OF LOTS** | Enter the number of serial/lots this work order is to create. The value in this box must not exceed 100. The value in this box determines the number of rows in the **ENTER SERIAL/LOT#** table. |
| **PRIORITY** | Enter the priority in which the work order must be completed.<br><br>• 1 = highest priority<br>• 0, -, or blank = lowest priority |
| **WORK ORDER PLANNED QUANTITY** | Enter the quantity of product to be manufactured as part of the work order. |

| Box | Description |
|---|---|
| **PLAN START** | Enter the planned date and time to begin work on the work order. By default, this box is populated with the current date and time. |
| **PLAN END** | Enter the planned date and time to complete the work on the work order. By default, this box is populated with the date and time that is 24 hours from the current date and time. |
| **SERIAL/LOT# PREFIX** | Enter the prefix for each serial/lot to be manufactured. The value in this box helps identify the serials/lots that belong to the same work order. |
| **ENTER SERIAL/LOT#** | A table with as many rows as the value entered in **NO OF LOTS**. Each row contains the following fields:<br><br>    • **SEQ**<br>    • **SERIAL/LOT#**<br>    • **GENERATED SERIAL/LOT#**<br>    • **QUANTITY**<br><br>All rows must be completed, either manually, or by using the Auto Populate feature (see the note below). |
| **SEQ** | The row number, starting from 1. |
| **SERIAL/LOT#** | Enter a unique value for each serial/lot. |
| **GENERATED SERIAL/LOT#** | Identifies the serial/lot that will be assigned to each product in the work order. This box is disabled and populated with a combination of the values in the **SERIAL/LOT# PREFIX** and **SERIAL/LOT#** boxes. |
| **QUANTITY** | The number of items for each serial/lot. |

> ✏️ **Note:**
> You can automatically populate the rows in the table with the Auto Populate feature. To use Auto Populate you must manually populate **SEQ** (row) 1:

> - Enter a unique identifier in the **SERIAL/LOT#** field. Press the tab key to populate the rest of the row with a **GENERATED SERIAL/LOT#** and **QUANTITY**.
> - Click the Auto Populate icon. Auto Populate will fill in the remaining rows/lots, incrementing the **SERIAL/LOT#** and **GENERATED SERIAL/LOT#** in each subsequent row by one based on the character(s) specified in **SEQ 1** (e.g., A, B, C, etc.; 01, 02, 03, etc.). The value in the **QUANTITY** field will be duplicated for each row.
> - To change the format/values of the **SERIAL/LOT#** and **GENERATED SERIAL/LOT#** fields, change the value in either of the **SERIAL/LOT# PREFIX** or **SERIAL/LOT#** fields and click Auto Populate.

4. Select the **Properties** tab.

   The **Properties** section appears, displaying the properties defined for the route and operations that you selected in the **General** section. The following table provides information on each column in the table.

| Column | Description |
|--------|-------------|
| **LEVEL** | The level at which the property has been defined. This column contains one of the following values: <br>• All Operations <br>• \<Operation name\> |
| **CATEGORY** | The category of the property as defined in Property Definition. |
| **GROUP** | The group to which the property belongs. |
| **NAME** | The name of the property. |
| **VALUE** | The value of the property. You can add a value or modify an existing value in this column. |
| **DATA TYPE** | The data type of the property. |
| **UOM** | The units of measure of the property. |

5. Select **Create**.

The work order is created.

# Modifying a Work Order

## About Modifying a Work Order

The following tasks require additional permissions (See About the Security Application *(on page 287)*)

in order to execute them (and are accessed by clicking ✎ ):

- **Change the work order plan**: You can change the planned start and end dates and the priority of a
  work order.
- **Cancel a lot:** You can cancel lots from work orders only if they have not yet started.
- **Add lots to a work order**: You can add a lot to a work order if all of the following conditions are met:
  - The behavior **Allow addition of material lots to a work order in progress** is set for the route.
  - The work order is in progress and for a serialized product.
  - The work order is not started.
  - You have the permission to add lots to in-progress work orders running on the specified line
    or add lots to not started work orders running on a specific line.

- **Edit a work order**: Modify the work order execution.
  - **Add an operation:** You add an operation to the serials/lots for which the next operation is
    not ready. To add an operation:
    1. Create an operation.
    2. Assign a sequence number to the operation such that the number lies between the
       sequence numbers of the previous and next operations, and it is greater than the
       latest ready operation. If, however, you want to perform this operation at the same
       time as another operation, provide the same sequence number as that operation.

       All the serials/lots in the work order are added to the operation.

    3. If you do not want to the operation to be perform on a serial/lot, remove it from the
       operation.
  - **Remove an operation:** You can remove an operation if it is no longer required to complete
    the work order. However, you can remove the operation only if it is not ready.
  - **Remove an operation for a serial/lot:** You can remove an operation for a serial/lot if it is no
    longer required to complete the work order for that serial/lot. However, you can remove the
    operation only if the serial/lot is not ready for the operation.
  - **Modify an operation:** You can modify the details of an operation such as the name,
    description, behavior, and so on. You can modify an operation only if it is ready or not
    started. You can modify the sequence number of an operation only if the operation is not
    ready. And, the sequence number must be greater than or equal to the sequence number of
    the latest in-progress operation in the work order.

- **Replace an operation:** You can replace an operation with a new one by removing serials/lots from the operation and adding them to the new operation. You can, however, replace an operation only for serials/lots for which the operation is not started.
- **Change BOM assignments of an operation:** You can change the BOM assignment of an operation only if the operation is not started.
- **Add a property group or change a property value:** You can add a property group or change the value of a property in an operation only if the operation is not yet started.
- **Change the documents attached to an operation:** You can upload a document to the document store, or attach or remove a document from an operation that is not started.

**Replacing an operation**

Suppose a work order has the following operations:

- Turning
- Drilling
- Assembling
- Painting
- Testing
- Packaging

For two of the lots, you want to perform endurance testing instead of the normal testing operation. In that case, before the testing operation is started on the two lots:

1. Create the endurance testing operation such that the sequence number is the less than or equal to that of the testing operation (and greater than that of the painting operation), and save the changes to the work order. All the lots in the work order are added to the operation.
2. Except for the two lots on which you want to perform endurance testing, remove all the lots from the endurance testing operation.
3. Remove the two lots from the testing operation.

## Change the Work Order Plan

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

This topic describes how to modify a work order's details such as planned start and end dates and priority.

1. Access the work order *(on page 134)* whose plan you want to modify.

2. In the upper-right corner of the page, select ✎, and then select **Edit work order plan**.
   The **Edit Work Order Plan** window appears.

3. As needed, modify the planned start and end dates and priority of the work order.

4. Select **Update**.
   The changes made to the work order are saved.

## Add or Remove Operations from a Work Order

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

You can only add an operation after the latest ready or in-progress operation. You can only remove an operation that is not ready.

1. Access the work order *(on page 134)* that you want to modify.

2. In the upper-right corner of the page, select ✎, and then select **Edit workorder**.
   The **Edit <work order>** page appears, displaying a list of operations in the work order.

3. If you want to add an operation, in the left section, select ✛ . , and provide values as specified in the following table.
   A blank row appears in the **Overview** section.

4. In the **Overview** section, provide values as specified in the following table.

> **ⓘ Tip:**
>
> You can also copy an operation by selecting ⧉.

| Column | Description |
| --- | --- |
| SEQ | Enter the sequence number of the operation such that the number lies between the two operations between which you want to add the operation. If, however, the operation must be performed at the same time as another operation, provide the same sequence number as that operation. <br><br> > **✎ Note:** <br> > You can add an operation only after the latest ready or in-progress operation. |
| NAME | Enter a unique name for the operation that does not exceed 100 characters. |

| Column | Description |
| --- | --- |
| | > 📝 **Note:**<br>> The name must be unique among all operations in the route. |
| DESCRIP-<br>TION | Enter a description for the operation that does not exceed 1000 characters. |
| EQUIP-<br>MENT | Select the equipment that is used to perform the operation. You can select multiple pieces of equipment for the same operation, and you can select the same piece of equipment for multiple operations.<br><br>When you select multiple pieces of equipment, the selected number appears. You can select the drop-down list box to view the selected pieces of equipment.<br><br>> ℹ️ **Tip:**<br>> You can also select the equipment used in an operation from the **Resources** section. |

5. Select **Attributes**. In the **Attributes** section, provide values as specified in the following table.

| Column | Description |
| --- | --- |
| NAME | The name for the operation. |
| BE-<br>HAVIOR | Select the behavior of the operation. The following options are available:<br>• **Non Clocking**: Select this option if the operation does not require a manual clocking on. If you select this option, you can mark an operation complete even if serials/lots are not clocked on, mandatory BOM items are not consumed, or values for mandatory quality variables are not specified.<br>• **Clocking**: Select this option if the operation requires manual clocking on and clocking off. By default, **Clocking** is selected for an operation. |
| DE-<br>FAULT<br>LABOR | Select the default labor type. A value is required if the operation requires clocking. You can choose from the list of values that you selected in the **LABOR TYPES** column.<br><br>When an operator clocks on a serial/lot number using the Work Queue or Unit Operations application, by default, the labor type that you select in this column is selected. The operator can, however, choose a different one from the ones that you selected in the **LABOR TYPES** column. |

| Column | Description |
|---|---|
|  | > **Note:** > > If the behavior of the operation is set to Non Clocking, this field is disabled. |
| **LABOR TYPES** | Select the labor type for the operation. A value is required if the operation required clocking. > **Note:** > > If the behavior of the operation is set to **Non Clocking**, this field is disabled. |
| **OP-TIONAL** | Switch the toggle to specify this operation as optional. |

6. If you want to remove an operation that is not ready, in the left pane containing the list of operations, select ✕.

7. Select **Save**.

   The changes made to the work order are saved.

## Add a Lot to an In-Progress Work Order

To add a lot to a work order, all of the following conditions must be met:

- The behavior **Allow addition of material lots to a work order in progress** is set for the route (see Create a Route Revision *(on page 210)*).
- The work order is in progress.
- The work order is for a serialized product.
- You have the permission to add lots to in-progress work orders running on the specified line (see About the Security Application *(on page 287)*)

1. Select the work order to modify.

2. Click 🖉.

3. Click **Add Lots to Work Order**. This will bring up the **Add Lots to Work Order** dialog.

4. Enter the number of additional lots in **NO OF LOTS TO ADD**. This will add rows as required to the **ENTER SERIAL/LOT#** table.

5. Click ⬇ to generate the remaining **SERIAL/LOT#** and **GENERATED SERIAL/LOT#**.

6. Click **ADD LOTS**.

   Added lots will be appended to the bottom of the list. There is no need to enter anything in the **SERIAL/LOT#** field; the Auto Populate function looks after this.

## Cancel a Lot from a Work Order

Only lots that have not been started can be cancelled from a work order.

1. Access the work order *(on page 134)* from which you wish to cancel a lot. The work order's lots are listed in the **All Serial/Lots** column.
2. Click the ✕ for the lot(s) you wish to cancel.

## Remove an Operation for a Serial/Lot

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

You can remove an operation for a serial/lot only if the serial/lot is not ready for that operation.

1. Access the work order *(on page 134)* associated with the serial/lot for which you want to remove an operation.
2. In the upper-right corner of the page, select ✎, and then select **Edit workorder**.
   The **Edit <work order>** page appears, displaying a list of operations in the work order.
3. Select **Lot Status**.
   The **Lot Status** section appears, displaying a list of operations, along with their status for each serial/lot in the work order.
4. Select the operation that you want to remove.
5. In the row containing the serial/lot for which you want to remove the operation, select ✕.
6. Select **Save**.
   The changes made to the work order are saved.

## Modify an Operation

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

You can modify an operation only if it is ready or not started. You can modify the sequence number of an operation only if the operation is not ready. And, the sequence number must be greater than or equal to the sequence number of the latest in-progress operation in the work order.

1. Access the work order *(on page 134)* that you want to modify.

2. In the upper-right corner of the page, select ✎, and then select **Edit workorder**.

   The **Edit <work order>** page appears, displaying a list of operations in the work order.

3. For the operation that you want to modify, in the **Overview** section, provide values as specified in the following table.

| Column | Description |
| --- | --- |
| **SEQ** | Enter the sequence number of the operation such that the number lies between the two operations between which you want to add the operation. If, however, the operation must be performed at the same time as another operation, provide the same sequence number as that operation. |
| **NAME** | Enter a unique name for the operation that does not exceed 100 characters.<br><br>✎ **Note:**<br>The name must be unique among all operations in the route. |
| **DESCRIPTION** | Enter a description for the operation that does not exceed 1000 characters. |
| **EQUIPMENT** | Select the equipment that is used to perform the operation. You can select multiple pieces of equipment for the same operation, and you can select the same piece of equipment for multiple operations.<br><br>When you select multiple pieces of equipment, the selected number appears. You can select the drop-down list box to view the selected pieces of equipment.<br><br>ⓘ **Tip:**<br>You can also select the equipment used in an operation from the **Resources** section. |

4. Select **Attributes**. In the **Attributes** section, provide values as specified in the following table.

| Column | Description |
| --- | --- |
| **NAME** | The name for the operation. |
| **BEHAVIOR** | Select the behavior of the operation. The following options are available: |

| Column | Description |
|---|---|
| | • **Non Clocking**: Select this option if the operation does not require a manual clocking on. If you select this option, you can mark an operation complete even if serials/lots are not clocked on, mandatory BOM items are not consumed, or values for mandatory quality variables are not specified.<br>• **Clocking**: Select this option if the operation requires manual clocking on and clocking off. By default, **Clocking** is selected for an operation. |
| DE-FAULT LABOR | Select the default labor type. A value is required if the operation requires clocking. You can choose from the list of values that you selected in the **LABOR TYPES** column.<br><br>When an operator clocks on a serial/lot number using the Work Queue or Unit Operations application, by default, the labor type that you select in this column is selected. The operator can, however, choose a different one from the ones that you selected in the **LABOR TYPES** column.<br><br>**Note:**<br>If the behavior of the operation is set to Non Clocking, this field is disabled. |
| LABOR TYPES | Select the labor type for the operation. A value is required if the operation required clocking.<br><br>**Note:**<br>If the behavior of the operation is set to **Non Clocking**, this field is disabled. |
| OP-TIONAL | Switch the toggle to specify this operation as optional.<br><br>**Note:**<br>If you have set all operations as optional, you must at least complete one optional operation to execute the work order. |

5. Select **Save**.

The changes made to the work order are saved.

## Change the BOM Assignments of an Operation

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

You can change the BOM assignment of an operation only if the operation is not started.

1. Access the work order *(on page 134)* that you want to modify.

2. In the upper-right corner of the page, select ✎, and then select **Edit workorder**.
   The **Edit <work order name>** page appears, displaying a list of operations in the work order.

3. Select **BOM**.
   The **BOM** workspace appears, displaying a list of BOM items in the **PRODUCT DESCRIPTION** column. The **SEQUENCE**, **PRODUCT CODE**, **QT PER**, and **UOM** columns are populated with the sequence number of the BOM item, the product code, the quantity needed per operation, and the units of measure of the associated BOM formulation, respectively. You cannot modify these values.

4. In the **OPERATION** column, select the operation that you want to link to the BOM items. You can only select an operation that is not started. If the behavior of an operation is set to Non Clocking, the operation does not appear in the list.

5. Select **Save**.
   The changes made to the work order are saved.

## Cancel a Lot from a Work Order

Only lots that have not been started can be cancelled from a work order.

1. Access the work order *(on page 134)* from which you wish to cancel a lot. The work order's lots are listed in the **All Serial/Lots** column.

2. Click the ✕ for the lot(s) you wish to cancel.

## Change the Property Groups or Values of a Work Order

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

You can add a property group or modify the values of properties in a work order only if the corresponding operations are ready or not started.

1. Access the work order *(on page 134)* that you want to modify.

2. In the upper-right corner of the page, select ✎, and then select **Edit workorder**.
   The **Edit <work order>** page appears, displaying a list of operations in the work order.

3. Select **Properties**.
   The **Properties** workspace appears, displaying a list of property groups assigned to the route appears.

4. If you want to enter or modify the value of a property:

   a. Expand the group that contains the property whose value you want to enter or modify.
      A list of properties in the group appears.

   b. Enter or modify the value in the **VALUE** column for each property for which you want to
      provide a value. The following conditions apply when you provide a value for a property:
      - If a property has been specified as mandatory in the Property Definition application,
        you must provide a value for the property.
      - The value must be of the same data type as specified in the **DATA TYPE** column.

5. If you want to assign a property group to an operation or all operations in the work order:

   a. If you want to assign a property group to an operation, select the operation. If you want to
      assign a property group to all operations in the work order, select **ALL OPERATIONS**.

      > ✏️ **Note:**
      > You can select an operation only if it is not started. You can select **ALL
      > OPERATIONS** only if at least one of the operations is not started.

   b. Select ✛.
      The **Assign Property Group(s)** window appears, displaying the property groups that have
      group definitions.

   c. Select the check boxes corresponding to the property groups that you want to assign.

      > ⓘ **Tip:**
      > If you want to assign all the property groups, select the check box in the heading.

   d. Select **Assign**.

6. Select **Save**.
   The changes made to the work order are saved.

## Change the Documents in a Work Order

If you do not have the permission to perform this task, request your administrator to provide the
permission using Security.

You can upload a document to the document store, or attach or remove a document from an operation or all operations in the work order. When you upload a document, it is stored in a document store application named Apache CouchDB. The following conditions apply when you upload a document or attach a document:

- You can use documents of the PDF format only.
- The maximum file size allowed is 25 MB.
- You can attach a document to an operation only if the operation is not started.
- You can attach a document to all the operations in the work order if at least one of the operations is not started.

1. Access the work order *(on page 134)* that you want to modify.
2. In the upper-right corner of the page, select ✎, and then select **Edit workorder**.

   The **Edit <work order name>** page appears, displaying a list of operations in the work order.
3. Select **Documents**.

   The **Documents** workspace appears, displaying a list of documents associated with the work order.
4. If you want to upload a document to the document store:

   a. Select ⬆.

   The **Upload document** window appears.

   b. Provide values as specified in the following table, and then select **Upload**.

| Box | Description |
|---|---|
| **FILE NAME / URL** | Identifies the URL or path to the document. The URL must use the HTTPS protocol.<br><br>ⓘ **Tip:**<br>If the document is stored in the local machine or in a network location accessible from the local machine, you can select **Browse** to go to the path. |
| **NAME** | Identifies the name of the document. Enter a unique value that does not exceed 100 characters.<br><br>⚠ **Important:**<br>If a document with the same name exists, a new version of the same document is created, and is assigned the product line, material, and |

| Box | Description |
|---|---|
| | ⚠ equipment of the original document. Therefore, you must ensure that the document name is unique among all the documents stored in the Plant Applications file store. |
| **EN-GINEERING REVISION #** | Identifies the revision number of the document as specified in your organization. For example, if the document that you want to upload is a design document of revision number 15, enter 15. <br><br> ✎ **Note:** <br> The engineering revision number is different from the revision number maintained in the document store. |
| **DESCRIP-TION** | Identifies the description of the document. You must enter a value. |

> ✎ **Note:**
>
> You can also upload a new version of a document *(on page 204)*.

The document is uploaded to the document store.

5. If you want to attach a document to an operation or all operations in the work order:

   a. If you want to attach the document to all the operations, select **ALL OPERATIONS**. If you want to attach the document to a single operation, select the operation. You can, however, select an operation only if it is not started.

   b. Select ➕.

   The **Attach Documents and/or URLs** window appears, displaying a list of documents that are available.

   > ⓘ **Tip:**
   > - You can preview a document by selecting the link in the **FILE/URL** column.
   > - By default, the latest version of each document appears in the list. If you want to attach a previous version of a document, in the row containing the document, select ⬈.

   c. In each row containing the document that you want to attach, select the check box.

> **ⓘ Tip:**
> You can select all the documents in the list by selecting the check box in the column heading.

    d. Select **Attach**.

    The document is attached to the operation or all operations in the work order.

# Adding a Comment

## About Adding a Comment

While working on a serial/lot, you can add a comment on the serial/lot or the work order to provide any additional information.

You can view the comment added to a serial/lot regardless of the operation you are performing on the serial/lot. For example, if you have added a comment to a serial/lot while performing the first operation, the comment also appears when you access the serial/lot for any subsequent operations. Similarly, when you add a comment to a work order, it appears when you access any of the serials/lots for the work order. For this reason, when you add a comment, it is a good practice to provide the details of the operation for which the comment is applicable.

If a work order or serial/lot contains comments, when you access an operation, the comments button (🗩) appears with a blue dot (🗩). If you select that button, the number of comments for the work order or serial/lot appears on the **Work Order** or **Serial/lot** tabs, respectively.

You can add an image, video, or attach the following document types to a comment:

- Microsoft Word (DOC/DOCX)
- Microsoft Power Point Presentation (PPT/PPTX)
- Microsoft Excel (XLS/XLSX)
- Text document
- PDF

Only images and videos can be attached inline within the Comment rich text editor along with the textual data. The other document types are uploaded to the comment as non-inline attachments.

## Add a Comment

You can compose comments with images, videos, and documents that support your comment.

Add images/videos to a comment using the camera/video option or upload them as attachments. You can copy paste images using clipboard, or drag and drop them into the rich text editor. You can also preview the image, video, and pdf file types.

1. Access the operation associated with the serial or lot or the work order for which you want to add a comment.

2. In the heading, select  .

   A window appears, displaying a list of comments for the work order. These comments are arranged in the reverse order of creation (that is, the latest comment appears first).

3. Depending on whether you want to add a comment to the work order or serial/lot, select the appropriate tab.

4. In the **ADD COMMENT** box, enter the comment.

   > *i* **Tip:**
   >
   > If needed, you can apply formatting, change the alignment of the comment, or insert a link in the comment.

   You can add inline images by copy pasting from a clipboard to the comment rich text editor.

   The maximum character limit for plain text is 7000 characters. The file size for images/videos should not exceed 25MB.

5. **Optional:** Attach documents *(on page 50)* and add images *(on page 51)*/videos *(on page 51)* to a comment.

6. Select **Add**.

The comment is added.

> *i* **Tip:**
>
> To modify a comment, select ✎ and to delete a comment that you have added, select ✕. If you do not have the permission to perform this task, request your administrator to provide the permission using Security.
> The following conditions apply when you modify or delete a comment:

> ⓘ
> - You can modify or delete comments added by others only if you have the permission to moderate comments. Otherwise, you can modify or delete only the comments that you have added.
> - After you modify a comment and save your changes, you cannot view the original text.
> - After you delete a comment, you cannot restore it.

## Upload Documents to a Comment

You can attach documents that support your comment.

Except for images and videos, all the other documents are attached as non-inline.

Ensure that the document that you want to upload is available on the Plant Applications server.

1. Select 📎 .

   The **Upload Document** window appears.
2. In the **FILE NAME/URL** box, enter the file path, or browse to select the document to upload.
3. Select **Upload**.

   If the document is an image/video, a preview of the file appears in the comment rich text editor along with its filename label.

   The document is inserted into the comment.
4. **Optional:**  To modify the uploaded image, select the image preview to open the image in an edit mode.

   a. Use the image editing options to resize or modify the image.

   b. Select **Save**.

> ✎ **Note:**
> Images added to the comment from a URL cannot be modified. To delete uploaded images/videos, delete the file preview or its filename label from the editor.

## Add Images to a Comment

You can add images that support your comment.

A comment can have multiple images. You can add images to a comment by uploading them as documents *(on page 50)*, or taking a screenshot using the camera icon. The comments editor supports JPEG, PNG, GIF, ICO, and WebP image formats.

1. Select ⬜.

> **Note:**
>
> If a message appears, asking you to allow access to the camera, select **Allow**.

   A screen appears in camera mode.

2. Point the camera to the subject, and select the shutter icon to capture a still image.
   A preview of the image appears in the comment rich text editor along with its filename label, and simultaneously saved to the database.

3. **Optional:** To modify the captured image, select the image preview to open the image in an edit mode.
   a. Use the image editing options to resize or modify the image.
   b. Select **Save**.

   To delete saved images from a comment, delete the image preview or its filename label in the editor.

## Add Videos to a Comment

You can add videos that support your comment.

Videos are streamed only when you play them. You can add videos to a comment by uploading them as documents , or use the video option to record a live video and save. The comments editor supports MP4, MOV, and WebM video formats.

1. Select ⬜.

> **Note:**
>
> If a message appears, asking you to allow access to the camera, select **Allow**.

   A screen appears to record the video.

2. Use the shutter icon to capture the video.
   A preview of the recorded video appears in the comment rich text editor along with its filename label, and simultaneously saved to the database. You cannot modify videos in the comment editor.

   To delete saved videos from a comment, delete the video preview or its filename label in the editor.

# Prioritizing a Work Order

## About Prioritizing a Work Order

Priority is the order in which a work order must be completed. When you assign a priority to a work order, the work order with the highest priority is completed first on a production line. The following conditions apply when you prioritize a work order:

- 1 denotes the highest priority, and 0 denotes the lowest priority.
- You can prioritize a work order in the Ready or the In Progress status.
- You cannot prioritize a work order in the Completed status.

## Prioritize a Work Order

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

1. In the **Work Order Manager** page, depending on the status of the work order that you want to prioritize, select one of the following tabs:
   - **Released**
   - **On hold**
2. In the row containing the work order that you want to prioritize, in the **Priority** box, enter the priority of the work order.

   > ✎ **Note:**
   >
   > You cannot leave the **Priority** box blank. If you do not want to specify a priority, enter 0.

   > ⓘ **Tip:**
   >
   > You can also specify the priority by accessing the work order details and selecting ✎.

The priority is set for the work order.

# Clocking Off a Serial/Lot

## About Clocking Off a Serial/Lot

As a supervisor, you can clock off a serial/lot for an operation on behalf of an operator (in cases such as the operator has forgotten to clock off the serial/lot). This will help capture the time the operator spent on performing the operation on the serial/lot more accurately.

## Clock Off a Serial/Lot

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

1. Access the work order *(on page 134)* for which you want to clock off a serial/lot.

   The page for the work order appears, displaying the **Current Status** section.
2. Select **Clocked On**.

   The **Clocked On** section appears, displaying a list of clocked on or clocked off records for the work order.
3. In the row containing the combination of the operator, serial/lot, and the operation that you want to clock off, in the **ACTIONS** column, switch the toggle.

   > ✎ **Note:**
   > The toggle in the **ACTIONS** column is enabled only if the serial/lot is currently clocked on by the operator.

# Cancelling a Work Order

## About Cancelling a Work Order

You can cancel a work order when you no longer need it. When you cancel a work order, the work order is removed from the Work Order Manager, Unit Operations, and Work Queue applications. The following conditions apply when you cancel a work order:

- You can cancel a work order only in the Ready status.
- You cannot cancel a work order in the In Progress or Completed status.

## Cancel a Work Order

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

1. In the **Work Order Manager** page, depending on the status of the work order that you want to cancel, select one of the following tabs:
   - **Released**
   - **On hold**
2. In the row containing the work order that you want to cancel, select ✕ .

> ✏️ **Note:**
>
> The ✕ button is enabled only if the work order is in the Ready status.

A message appears, asking you to confirm that you want to cancel the work order.

3. Select **Yes**.

The work order is cancelled.

# Manually Completing a Work Order

## About Manually Completing a Work Order

You manually complete a work order when the behavior **Require work order to be completed manually** has been set for the work order and all lots for the work order have been completed.

To do this, you must have the required permission (**Manually complete a work order**) set in **Work Order Management**.

## Manually Completing a Work Order

1. Within the **Work Order Manager** app, navigate to the **Released** tab.

2. Work orders with a blue check mark icon ✓ in the **COMP/REC** column are ready to be manually completed. The icon is also available when you click a work order to view its details.

3. Click the icon to mark the work order as completed. The work order will be moved from the **Released** tab to the **Completed** tab.

# Chapter 5. Route Editor

## Overview

### About the Route Editor Application

As a supervisor, you can use Route Editor to manage routes in Plant Applications.

A route defines the process and operations required to manufacture a product. It specifies a list of operations you must perform on the components, and the order in which you must perform these operations.

A route contains the following components:

- Operations *(on page 176)*: An operation is the main work segment in a route. An operation is a sequence of tasks that you must perform to manufacture the product.
- Bill of materials (BOMs) *(on page 178)*: A BOM contains BOM formulations that define a list of items and the quantity of each BOM item needed to produce a product.
- Properties *(on page 179)*: A property is an additional attribute that is assigned to a route or an operation to produce a product.
- Documents *(on page 179)*: A document is a reference material used to perform an operation (for example, standard operating procedure, circuit diagram).

Using Route Editor, you can:

- Define the end-to-end workflow of using a route, which includes the sequence of operations for manufacturing a product.
- Create a work order.
- Release the route for use in a work order.
- Maintain the revision history of each released route.
- Define the bill of material (BOM) items that are required for each operation in a route.
- Link reference documents such as standard operating procedures, circuit diagrams, and other documents required to perform each operation.
- Assign properties to a route or an operation, and modify their default values.
- Create, copy, modify, release, archive, revise, and delete a route.
- Create mutually exclusive operations or make two existing operations mutually exclusive.

### About Routes

A route defines the process and operations to manufacture a product. It also specifies the order in which you must perform these operations.

A route contains the following components:

- Operations: The main work segment in a route. An operation is a sequence of tasks that you must perform to manufacture the product.
- BOM: A list of materials used in an operation, along with the quantity that is required for each item. BOM formulations and BOM items are defined in Plant Applications. Each operation is linked to a BOM item.
- Documents: Reference materials used to perform an operation (for example, standard operating procedure, circuit diagram).

**Routes in a Motor Manufacturing Unit**

Suppose you want to create routes for a motor manufacturing unit. This involves manufacturing the following components and assembling them:

- Shell
- Stator
- Rotor
- Endshields

In this case, you will create the following routes:

- Shell: Includes welding sheets of metal into cylindrical shape. In addition, the route includes reference documents, which contains latest diagrams of the steel rods and information on how to weld them.
- Stator: Includes assembling windings with the shells, and turning them to accommodate endshields.
- Rotor: Includes injecting the shaft, and verifying the load balance of the rotor.
- Endshields: Includes turning and drilling the endshields so that they can be fixed to the stator.
- Assembly: Includes assembling the stator, rotor, and enshields to produce the final product. This route can also include painting, testing, and packaging the product.

## About Operations

An operation consists of tasks that you perform while producing a product (for example, drilling, turning, and painting). When you define a route, you define a set of operations that must be performed to complete the route. Each operation is associated with one or more pieces of equipment that are defined in Plant Applications.

You can also specify whether the operation requires clocking on. For example, if clocking on and clocking off is already tracked in an ERP system, it is not required to clock on again using Plant Applications Web

Client. In that case, when creating an operation for a route, you can specify that the operation does not clocking on.

Using Route Editor, in addition to creating an operation, you can copy, modify, and delete an operation.

**Operations in a Motor Assembly Route**

Suppose you want to create a route for assembling the parts of a motor. The following tasks are involved in completing the route:

- Shell turning
- Stator and endshield assembling
- Rotor and endshield assembling
- Testing
- Painting
- Powder coating (a mutually exclusive operation for painting)
- Packaging

For each of these tasks, you will create an operation and associate it with one or more pieces of equipment as follows.

| Operation | Equipment |
|---|---|
| Shell turning | The lathe machine |
| Stator and endshield assembling | The pneumatic bolt tightener |
| Rotor and endshield assembling | The pneumatic bolt tightener |
| Testing | • The testing workstation<br>• The weighing machine |
| Painting | The spray paint workstation<br><br>✎ **Note:**<br>Both painting and powder coating are mutually exclusive operations. |
| Powder coating | The powder coating workstation |

| Operation | Equipment |
|---|---|
| | 📝 **Note:** <br> Both painting and powder coating are mutually exclusive operations. |
| Packaging | • The packaging machine <br> • The labelling machine |

## About Mutually Exclusive Operation

Mutually exclusive operations are the operations that need to be performed alternatively (so, if two different operations have the same sequence number, only one of the operations marked as mutually exclusive need to be performed). For example, consider a motor that needs to be coated, and you have the following two operations: spray painting and powder coating; so, if you select to perform the powder coating operation, you need not perform the spray painting operation.

In Route Editor, you can select the required operations with same sequence number (priority) as mutually exclusive. If you perform one operation, then the other operation need not be performed. For example, if you select operation A and operation B as mutually exclusive, then, if the operation A is performed, the operation B will be excluded.

Examples:

- A motor that undergoes coating can be either powder coated, or spray painted. In this case, you can mark both the operations with the same sequence number and mark them as mutually exclusive.
- A part that requires welding can either be done in-house, or can be outsourced to an external vendor. In this case, you can mark the in-house welding and the outsourced welding operations with the same sequence number and tag them as mutually exclusive. Additionally, you can also mark the outsourced operation as a Non-clocking operation (see section under Behaviours). So, if you select to weld the part in-house, it will be a clocked operation, and the outsourced operation will be excluded. If you select to weld the part as an outsourced operation, then the in-house welding operation will be excluded.

## About Bill of Material (BOM)

A Bill of Material (BOM) contains BOM formulations that define a list of items and the quantity of each BOM item needed to produce a product. BOM items are defined and associated with BOM formulations in Plant Applications.

Using Route Editor, you can perform the following tasks:

- Link a BOM formulation to a route.
- Link BOM items to operations in the route.

After the route is released and used in a work order, you can provide details on the actual quantity of BOM items that are consumed, using the Work Queue module. This allows you to keep a track of the quantity of material that is consumed.

## About Properties

A property is an additional attribute that is assigned to a route or an operation to produce a product. Properties are defined and grouped under property groups in Plant Applications Administrator.

Using Route Editor, you can assign a property group to a route, and provide values for custom properties that are specific to the route. For example, if the route is for assembling a motor, you can provide the material grade, ERP project number, and other details specific to the route.

You can assign a property group to a route or an operation.

## About Documents

Using Route Editor, you can add a document that contains reference material to perform an operation (for example, circuit diagram, standard operating procedure). To do so, you must first upload the document *(on page 188)*, and then attach it to the appropriate route *(on page 189)*.

# Creating a Route

## About Creating a Route

A route defines the process and operations required to manufacture a product. It also specifies the order in which you must perform these operations.

A route is used in a work order or a process order in the Plant Applications database. This work order or process order is associated with a purchase order created in the ERP system, and is imported into Plant Applications using the ERP Integration services.

To create a route and make it available for use in a work order or a process order, you must perform the following steps:

1. Add a route *(on page 181)*.
2. Create operations in the route *(on page 183)*.
3. Link each operation to one or more pieces of equipment and BOM items *(on page 187)*.

> **Note:**
>
> The equipment and BOM items exist in Plant Applications.

4. Assign property groups and underlying properties to the route or individual operations in the route *(on page 191)*.

> **Note:**
>
> The property groups are created in the Property Definition module.

5. Provide values to the underlying properties in each property group *(on page 192)*.

> **Note:**
>
> If a property contains a default value, you can retain it or modify it.

6. Attach a document to the route or individual operations in the route *(on page 189)*.

> **Note:**
>
> The document must exist in Apache CouchDB. If it does not exist, upload it to Apache CouchDB *(on page 188)* before attaching it.

7. Release the route *(on page 206)*.

When you access a draft route, the **Edit Route** page appears, as shown in the following image:
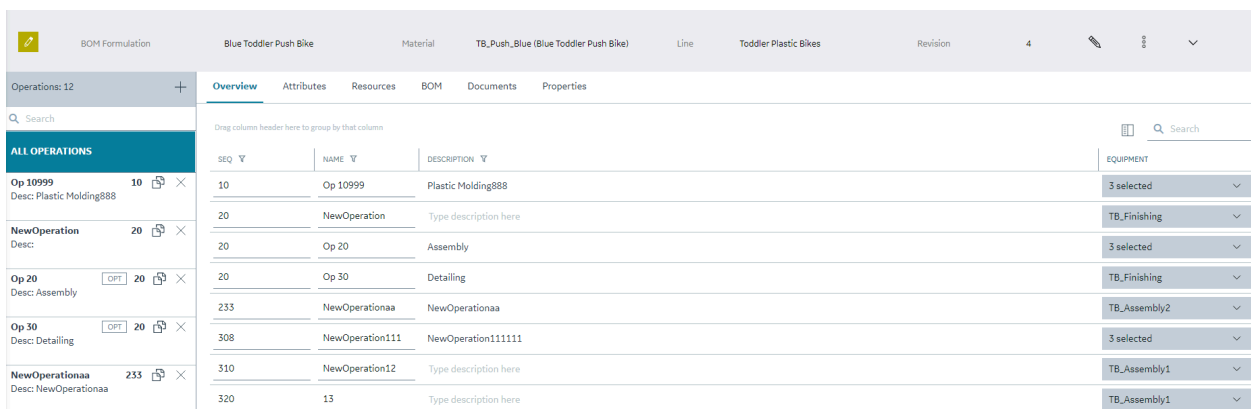


The **Edit Route** page contains the following sections:

- **Faceplate**: Contains details provided when the route was added , such as name, description, product line, and other related information. This section also contains buttons to modify these details, and release, revise, archive, or delete the route. You can expand or collapse this section.
- **Operations**: Contains a list of operations in the route. You can select an operation to access its details and link it to one or more pieces of equipment. You can create, copy, or delete an operation in this section.
- **Attributes**: Displays the operation's attributes (name, behaviour, labour types, default labour), which an operator can refer to when performing the operation.
- **Resources**: Contains a list of equipment used for each operation. You can also access a list of operations assigned to each piece of equipment, and assign more operations.
- **BOM**: Contains a list of BOM items assigned to each operation, along with details on the quantity of BOM items required for the operation, units of measurement, and whether consuming the BOM items is mandatory to perform the operation. You can also assign a BOM item to each operation.
- **Properties**: Contains a list of property groups and underlying properties linked to the route or individual operations in the route, along with the default values, units of measurement, and data type, as specified in the Property Definition module. You can also assign a property group, and provide values for the underlying properties.
- **Documents**: Contains a list of documents that are attached to the route or individual operations in the route. You can upload a document to Apache CouchDB, attach it to the route or an operation, upload a new version of a document, and remove the document from the route or operation.

## Add a Route

This topic describes how to create a route. You can also copy an existing one.

- Ensure that the production line that you want to use is route-enabled. When you do so, a virtual unit is created on the line, and a path is created on the line that contains the virtual unit.
- Associate the material with the virtual unit on any line where you want to produce the material
- Ensure that a BOM formulation is defined for the material. This is required if you want to leverage raw material tracking in the route.

If these components do not exist, contact the Plant Applications administrator.

1. In the **Route Editor** page, select ╋ .
   The **Create Route** window appears. The **REVISION** box is disabled and populated with the value 1 because this is the first draft of the route.
2. Provide values as specified in the following table.

| Field | Description |
|---|---|
| **NAME** | Enter a unique name for the route that does not exceed 100 characters. |
| **DESCRIP-TION** | Enter a description for the route that does not exceed 1000 characters. |
| **PRODUC-TION LINE** | Select a production line to which the route belongs. This box contains a list of production lines defined in Plant Applications Administrator. A value is required in this field. |
| **MATERIAL** | Select the material that you want to use in the route. This box is enabled after you select a value in the **PRODUCTION LINE** box. It contains a list of materials defined for the production line in Plant Applications. |
| **BOM FORMU-LATION** | Select the BOM formulation that you want to use in the route. This box is enabled after you select a value in the **MATERIAL** box. It contains a list of BOM formulations configured for the material in Plant Applications. |
| **BE-HAVIORS** | Use the check boxes to enable the following behaviors for the route:<br>• **Require Work Order to be completed manually** - This behavior allows for support of work orders to be completed manually by a supervisor. The default behavior is to not support manual completion, but to auto-complete the work order when all lots are completed.<br>• **Allow addition of material lots to a work order in progress** - This behavior allows operators or supervisors to add lots to a work order while it is in progress, regardless of the planned quantity for the order. This behavior can be set only on routes that are for serialized products. |

3. Select **Next**.

The route is created and is in the draft state. The **Edit Route** page appears, allowing you to create an operation.

Add an operation to the route. *(on page 183)*

## Copy a Route

This topic describes how to copy a route. You can also create a new one *(on page 181)*.

The following conditions apply when you copy a route:

- A copied route is in the draft state by default, regardless of the state of the original route.
- The operations, BOM items, properties, and documents in the route are also copied.
- If you are copying a released, pending approval, or an archived route, the copied route contains the same property definitions and document versions that existed when the route was released or archived. For example, suppose a route was linked to a document version 4 and a property group with three properties. After the route was released, suppose the latest version of the document is 6 and another property has been added to the property group. However, when you copy the route, it will be linked to document version 4, and the property group contains only three properties. Therefore, if you want the latest versions of the attached documents and properties of the route, you must manually attach the document and the property group again with the copied route. Changes to the BOM formulation of the original route, however, are reflected automatically in the copied route.

1. In the **Route Editor** page, perform one of the following tasks:
   - If you want to copy a route in the draft state, select the route that you want to copy.

     The **Edit Route** page appears.

   - If you want to copy a route in the released, pending approval, or archived state, select **Released**, **Pending Approval**, or **Archived**, respectively, and then select the route that you want to copy.

     The **View Route** page appears.

2. Select ⦂, and then select **Duplicate**.
   The **Copy Route** window appears.
   - The **NAME** box contains a value in the following format: Copy of <name of the original route>
   - The **REVISION** box is disabled and populated with the value 1, regardless of the value in the **REVISION** box of the original route. This is because this is the first draft of the copied route.
   - The remaining boxes are populated with the corresponding values in the original route.
3. Enter a unique name for the copied route. The name must not exceed 100 characters.
4. As needed, modify values in the remaining boxes, and then select **Copy**.

The route is copied. You can add or remove operations, property groups, and documents to the copied route.

## Create an Operation

An operation is an activity that consists of steps that you perform while producing a product.

You can create operations in a route that is in the draft state. However, if you want to create an operation in a released or archived route, you must first revise the route *(on page 210)*.

When you create an operation, you can set the sequence of the operation, and select the equipment used for that operation.

This topic describes how to create an operation. You can also copy an existing one. *(on page 201)*

Create a route *(on page 181)*.

1. In the **Route Editor** page, select the route for which you want to create an operation.
   The **Edit Route** page appears, displaying a list of operations in the route.

   > 🖊 **Note:**
   >
   > In the list of operations dispayed in the left panel, the operation(s) that has OPT as a flag are configured optional.

2. Select ╋.
   A blank row appears in the **Overview** section.

3. Provide values as specified in the following table.

| Column | Description |
|---|---|
| **SEQ** | Enter the sequence number of the operation. By default, the value in this column for the first operation is 1. The default sequence numbers of the subsequent records are automatically incremented by 10. However, you can modify this sequence number as per your requirement. This gap allows you to add new operations between two operations without the need to modify the sequence numbers of all the operations. If you want to perform multiple operations simultaneously (that is, for parallel tasks), provide the same sequence number. |
| **NAME** | Enter a unique name for the operation that does not exceed 100 characters.<br><br>> 🖊 **Note:**<br>> The name must be unique among all operations in the route. |
| **DESCRIPTION** | Enter a description for the operation that does not exceed 1000 characters. |

| Column | Description |
|--------|-------------|
| **EQUIP-MENT** | Select the equipment that is used to perform the operation. You can select multiple pieces of equipment for the same operation, and you can select the same piece of equipment for multiple operations. <br><br> When you select multiple pieces of equipment, the selected number appears. You can select the drop-down list box to view the selected pieces of equipment. <br><br> ⓘ **Tip:** <br> You can also select the equipment used in an operation from the **Resources** section. |

The operation is created and added to the route.

## Assign Attributes

Using Route Editor, you can assign attributes to an operation, which an operator can refer to when performing the operation.

1. In the **Route Editor** page, select the route for which you want to assign attributes.
2. Select **Attributes**.

   The **Attributes** section appears.
3. Provide values as specified in the following table.

| Box | Description |
|-----|-------------|
| **NAME** | The name for the operation. |
| **BEHAVIOUR** | Select the behavior of the operation. The following options are available: <br><br> • **Non Clocking**: Select this option if the operation does not require a manual clocking on. If you select this option, you can mark an operation complete even if serials/lots are not clocked on, mandatory BOM items are not consumed, or val- |

| Box | Description |
|---|---|
| | ues for mandatory quality variables are not specified.<br>• **Clocking**: Select this option if the operation requires manual clocking on and clocking off. By default, **Clocking** is selected for an operation. |
| **LABOR TYPES** | Select the labor types for the operation. A value is required.<br><br>**Note:**<br>If the behavior of the operation is set to **Non Clocking**, this field is disabled. |
| **DEFAULT LABOR** | Select the default labor type. A value is required. You can choose from the list of values that you selected in the **LABOR TYPES** column. When an operator clocks on a serial/lot number using the Work Queue or Unit Operations application, by default, the labor type that you select in this column is selected. The operator can, however, choose a different one from the ones that you selected in the **LABOR TYPES** column.<br><br>**Note:**<br>If the behavior of the operation is set to **Non Clocking**, this field is disabled. |
| **OPTIONAL** | Switch the toggle to specify if this operation is optional.<br><br>**Note:**<br>If you have set all operations as optional, you must at least complete one optional operation to execute the work order. |

| Box | Description |
|---|---|
| **MUTUAL EXCLUSION** | Switch the toggle to make the operation as mutually exclusive to another operation. <br><br> **Note:** <br> You can make an operation mutually exclusive to another operation that has the same sequence number (priority). |

4. Select **Save**.

   The selected attributes are assigned to the operation.

## Link a BOM Item to an Operation

A bill of material (BOM) contains BOM formulations that define a list of items and the quantity of each BOM item needed to produce a product. You can link a BOM item to a *single* operation. You can link multiple BOM items to an operation.

- Ensure that the route is linked to the BOM formulation that is associated with the BOM items that you want to link. To do so, in the **Edit Route** window of the route, select the appropriate value in the **BOM Formulation** box.
- Create an operation in the route *(on page 183)*.

1. Access the route that is linked to the operation to which you want to link a BOM item.

   The **Edit Route** page appears, displaying a list of operations linked to the route.

2. Select **BOM**.

   The **BOM** workspace appears, displaying a list of BOM items in the **PRODUCT DESCRIPTION** column. The **SEQUENCE**, **PRODUCT CODE**, **QT PER**, and **UOM** columns are populated with the sequence number of the BOM item, the product code, the quantity needed per operation, and the units of measure of the associated BOM formulation, respectively. You cannot modify these values.

3. For each operation, select a value in each column as described in the following table.

   **Note:**
   You can link a BOM item to an operation only if **ALL OPERATONS** is selected in the **Operations** section.

| Column | Description |
|---|---|
| **OPER-ATION** | Contains a list of operations that you have added to the route. Select the operation that you want to link to the BOM item. You can select just *one* of the operations. If a BOM item is already assigned to an operation, the operation does not appear in the list. If the behavior of an operation is set to Non Clocking, the operation does not appear in the list. |
| **MANDA-TORY** | Identifies whether the BOM item is required to perform the operation. By default, the value in this box is **No**. |

4. Select **Save**.

Each BOM item is linked to the selected operations.

## Upload a Document

Using Route Editor, you can add a document that contains reference material to perform an operation (for example, circuit diagram, standard operating procedure). To do so, you must first upload the document, and then attach it to the appropriate route.

When you upload a document, it is stored in a document store application named Apache CouchDB. The following conditions apply when you upload a document to attach to a route:

- You can use documents of the PDF format only.
- The maximum file size allowed is 25 MB.

Apache CouchDB must be installed, and the credentials must be provided while installing Plant Applications Web Client. For more information, contact your administrator.

1. In the **Route Editor** page, select the route for which you want to upload a document.

2. Select **Documents**, and then select ⬆.

   The **Upload document** window appears.

3. Provide values as specified in the following table.

| Box | Description |
|---|---|
| **FILE NAME / URL** | Identifies the URL or path to the document. The URL must use the HTTPS protocol.<br><br>ⓘ **Tip:**<br>If the document is stored in the local machine or in a network location accessible from the local machine, you can select **Browse** to go to the path. |
| **NAME** | Identifies the name of the document. Enter a unique value that does not exceed 100 characters.<br><br>❗ **Important:**<br>If a document with the same name exists, a new version of the same document is created, and is assigned the product line, material, and equipment of the original document. Therefore, you must ensure that the document name is unique among all the documents stored in the Plant Applications file store. |
| **EN-GINEERING REVISION #** | Identifies the revision number of the document as specified in your organization. For example, if the document that you want to upload is a design document of revision number 15, enter 15.<br><br>✏️ **Note:**<br>The engineering revision number is different from the revision number maintained in the document store. |
| **DESCRIP-TION** | Identifies the description of the document. You must enter a value. |

4. Select **Upload**.

The document is uploaded to the document store.

## Attach a Document

You can attach a document to an operation or a route so that an operator can refer to it when performing the operation.

1. In the **Route Editor** page, select the route to which you want to attach a document.

2. Select **Documents**.

   A list of documents attached to the route or to an individual operation in the route appears.

   > ℹ️ **Tip:**
   >
   > You can access a list of documents attached to each operation by selecting the corresponding operation.

3. If you want to attach the document to the route, select **ALL OPERATIONS**. If you want to attach the document to an operation, select the operation.

   A list of documents attached to the route or operation appears.

4. Select ➕.

   The **Attach Documents and/or URLs** window appears, displaying a list of documents that are available.

   > ℹ️ **Tip:**
   >
   > - You can preview a document by selecting the link in the **FILE/URL** column.
   > - By default, the latest version of each document appears in the list. If you want to attach a previous version of a document, in the row containing the document, select
   >   ↗️.

5. In each row containing the document that you want to attach, select the check box.

   > ℹ️ **Tip:**
   >
   > You can select all the documents in the list by selecting the check box in the column heading.

6. Select **Attach**.

The document is attached to the route or operation.

## Assign a Property Group

When you assign a property group to a route, you can provide values for custom properties that are specific to the route. For example, if the route is for assembling a motor, you can provide the assembly line number, types of motors that are normally assembled on the line, and other details specific to the route.

You can assign a property group to a route or an operation.

Ensure that the property group and underlying properties have been defined in the Property Definition module. For more information, refer to Property Definition *(on page 275)*.

1. In the **Route Editor** page, select the route to which you want to assign a property group.
2. Select **Properties**.

   A list of property groups assigned to the route appears.
3. If you want to assign a property group to an operation, select the operation. If you want to assign a property group to the route, select **ALL OPERATIONS**.
4. Select ┿.

   The **Assign Property Group(s)** window appears, displaying the property groups that have group definitions.
5. Select the check boxes corresponding to the property groups that you want to assign.

   > **ⓘ Tip:**
   > If you want to assign all the property groups, select the check box in the heading.

6. Select **Assign**.

The selected property groups are assigned to the route or operation.

> **ⓘ Tip:**
> By default, the latest version of each property is assigned to the route or operation. If you want to assign an earlier version, select ⬀ in the **ACTIONS** column, and then select the version that you want to assign.

Provide values for each property in the group *(on page 192)*.

## Provide Values for Properties

When properties are defined in Plant Applications, default value for each property may be provided. Using Route Editor, you can provide values for each property (and overwrite default values if they exist).

1. In the **Route Editor** page, select the route for which you want to provide values for properties.
2. Select **Properties**.

   A list of property groups assigned to the route appears.

   > 🛈 **Tip:**
   > If the property has been assigned to an operation, you can select the operation to access a list of property groups assigned to the operation (instead of accessing property groups assigned to all the operations in the route).

3. Select ❯ corresponding to the property group for which you want to provide values.

   A list of properties in the property group appears. If a default value has been provided for a property in the Property Definition module, it appears in the **VALUE** column.
4. Enter or modify the value in the **VALUE** column for each property for which you want to provide a value. The following conditions apply when you provide a value for a property:
   - If a property has been specified as mandatory in the Property Definition module, you must provide a value for the property.
   - The value must be of the same data type as specified in the **DATA TYPE** column.
5. Select **Save**.

The values for the properties are saved.

# Accessing a Route

## About Accessing a Route

Using Route Editor, you can access the routes in the draft, released, or archived state. You can also access the following details of a route:

- BOM Items *(on page 195)*
- Documents *(on page 196)*
- Properties *(on page 196)*

## Access a Route

As a supervisor, you can access the routes in the Draft, Released, and Archived states.

1. Access Plant Applications Web Client.
2. In the left pane, select **Route Editor**.

   The **Route Editor** page appears, displaying a list of routes that are in the draft state. The number of operations that appear in a page depends on the resolution of your computer screen. The following table provides information on each column in the table.

   | Column | Description |
   |---|---|
   | **STATUS** | The status of the route. |
   | **NAME** | The name of the route. |
   | **MATERIAL** | The material number used in the route. |
   | **MATERIAL DESC** | The description of the material. |
   | **PRODUCTION LINE** | The name of the production to which the route belongs. |
   | **DESCRIPTION** | The description of the route. |
   | **LAST MODIFIED** | The date and time when the route was last modified. The date and time appear in the format mm/dd hh:mm (for example, 03/27 10:58). |
   | **MODIFIED BY** | The name of the user who has modified the route the last time. |
   | **REVISION** | The number of times the route has been revised. |

3. Select the route whose details you want to view.

   The **Edit Route** window appears, displaying the list of operations in the route. You can also view the following details of the route:
     - Resources
     - BOM Items
     - Documents
     - Properties

## Access List of Operations

for which you want to view the operations.
The list of operations in the route appears, displaying the **Overview** section. The following table provides information on each column in the table.

| Column | Description |
|---|---|
| **SEQ** | The sequence number of the operation. |
| **NAME** | The name of the operation. |
| **DESCRIPTION** | The description of the operation. |
| **BEHAVIOR** | The behavior of the operation. The following options are available:<br><br>• Clocking: If this option is selected, the operation requires manual clocking on and clocking off.<br>• Non Clocking: If this option is selected, the operation does not require a manual clocking on. |
| **LABOR TYPES** | The labor type of the operation. |
| **DEFAULT LABOR** | The default labor type. |
| **EQUIPMENT** | The equipment that is used to perform the operation. There can be multiple equipment for the same operation. |
| **MUTUAL EX-CLUSION** | Switch the toggle to make the operation as mutually exclusive to another operation.<br><br>**Note:**<br>You can make an operation mutually exclusive to another operation that has the same sequence number (priority). |

## Access Resources

Using Route Editor, you can access the resources used for an operation (such as the equipment).

1. .
2. Select **Resources**.

   A list of resources associated with the route or the operation appears. The following table provides information on each column in the table.

| Column | Description |
|---|---|
| **ORDER** | The unit hierarchy of the units on the line. |
| **EQUIPMENT** | The name of the equipment. |
| **OPERATION** | The operations for which the equipment is used. You can use a single piece of equipment for multiple operations. |

## Access BOM Items

A Bill of Material (BOM) contains BOM formulations that define a list of items and the quantity of each BOM item needed to produce a product. In Route Editor, you can link BOM formulations to a route, and then link BOM items to operations.

1.
2. Select **BOM**.

   The list of BOM items appear. The following table provides information on each column in the table.

| Column | Description |
|---|---|
| **SEQUENCE** | The order of the BOM item in the formulation. |
| **MATERIAL** | The identifier of the product in which the BOM item is used. |
| **MATERIAL DESC** | The description of the product in which the BOM item is used. |
| **OPERATION** | The operation for which the BOM item is used. |
| **QTY** | The quantity of the BOM item required to manufacture each serial/lot of the product. |
| **UPPER QTY** | The upper tolerance quantity of the BOM item that can be consumed. |
| **LOWER QTY** | The lower tolerance quantity of the BOM item that can be consumed. |
| **STORAGE UNIT** | Unit currently storing the selected product. |
| **SCRAP FACTOR** | The Percentage of the BOM item that is expected to be lost during production of the formulation. |
| **UoM** | The unit of measure of the BOM item. |
| **MANDATORY** | Identifies whether the consumption of BOM items is mandatory to complete the operation. The possible values are **Yes** and **No**. |

## Access Documents

A route may have documents containing reference materials to perform an operation, such as circuit diagram, standard operating procedures, and so on. You can access the documents that are attached to a route.

1.
2. Select **Documents**.

   A list of documents associated with the route or the operation appears. The following table provides information on each column in the table.

   | Column | Description |
   |---|---|
   | **NAME** | The name of the attached document. |
   | **REV** | The current revision number of the attached document along with the total number of revisions. For example, if the document has been revised five times, and the fourth revision is used in the attachment, it displays 4 of 5. |
   | **DESCRIPTION** | The description of the attached document. |
   | **FILE/URL** | The location from where the attached document is uploaded. Select the link in this column to view the location of the document. |
   | **OPERATION** | The operations for which the attached document may be referenced. You can use a single document for multiple operations. |
   | **ACTIONS** | The actions that you can perform on the document. The following options are available:<br><br>• 🔗 : Displays all the revisions in the document.<br>• ⬆ : Uploads a new version of the document.<br>• ✕ : Removes the attached document. |

## Access Properties

A property is an additional attribute that is assigned to a route, an operation, or a material to produce a product. Properties for routes and operations are created in Property Definition and assigned values in Route Editor.

1.
2. Select **Properties**.

The property groups assigned to the route or the operations appear.

3. Expand the property group.

A list of property definitions in the property group appears. The following table provides information on each column in the table.

| Column | Description |
|---|---|
| **MANDATORY** | Specifies if the property is mandatory to perform the operation. For mandatory properties, the check box in this column is selected. |
| **NAME** | The name of the property. |
| **REVISION** | The current revision number of the property out of the total number of revisions. |
| **VALUE** | The value of the property. |
| **UOM** | The units of measure of the property. |
| **DATA TYPE** | The data type of the property. |
| **ACTIONS** | The actions that you can perform on the property. |

# Modifying a Route

## About Modifying a Route

You can modify a route only if it is in the draft state. You can modify a route to perform one or more of the following tasks:

> **✎ Note:**
>
> By default, the **Route Editor** page contains only the latest revision of each route. If you want the list to contain all the revisions of each route, contact your administrator to modify the settings in Plant Applications Administrator.

## Modify the Details of a Route

This topic describes how to modify the name, description, and BOM formulation of a route. You can, however, modify these details only if you have never created a revision of the route.

1. In the **Route Editor** page, select the route that you want to modify.

   The **Edit Route** page appears.

2. Select ✎.

   > **✎ Note:**
   >
   > The ✎ button is enabled only if you have never created a revision of the route.

3. As needed, modify values as specified in the following table.

| Field | Description |
| --- | --- |
| **NAME** | Identifies the name of the route. Enter a unique value that does not exceed 100 characters. |
| **DESCRIP-TION** | Identifies the description for the route. Enter a value that does not exceed 1000 characters. |
| **BOM FORMU-LATION** | Identifies the BOM formulation that you want to use in the route. This box contains a list of BOM formulations configured for the material in Plant Applications Administrator. You can select a value. |
| **BE-HAVIORS** | Use the check boxes to enable the following behaviors for the route:<br>• **Require Work Order to be completed manually** - This behavior allows for support of work orders to be completed manually by a supervisor. The default behavior is to not support manual completion, but to auto-complete the work order when all lots are completed. |

| Field | Description |
|---|---|
| | • **Allow addition of material lots to a work order in progress** - This behavior allows operators or supervisors to add lots to a work order while it is in progress, regardless of the planned quantity for the order. This behavior can be set only on routes that are for serialized products. |

> **✎ Note:**
> You cannot modify values in the **REVISION**, **PRODUCTION LINE**, and **MATERIAL** boxes.

4. Select **Update**.

The changes made to the route are saved.

## Modify an Operation

You can modify an operation if you want to change the name, description, equipment, or sequence of the operation.

1. In the **Route Editor** page, select the route containing the operation that you want to modify.
   The **Edit Route** page appears, displaying a list of operations in the route.
2. As needed, modify values as specified in the following table.

| Column | Description |
|---|---|
| SEQ | Identifies the sequence number of the operation. By default, the value in this column is 1. If multiple operations must be performed simultaneously, provide the same sequence number. <br><br> > **ⓘ Tip:** <br> > When setting the sequence numbers, provide a gap in their values so that you can easily add new operations between other operations. For example, if the sequence number of the first operation is 1, set the sequence number of the second operation to 10. This allows you to add new operations between these two operations without the need to modify the sequence numbers of all the operations. |
| NAME | Identifies the name for the operation. Enter a unique name for the operation that does not exceed 100 characters. |

| Column | Description |
|---|---|
| | **Note:**<br>The name must unique among all operations in the route. |
| **DESCRIP-TION** | Identifies the description for the operation. Enter a description that does not exceed 1000 characters. |
| **BE-HAVIOR** | Identifies the behavior of the operation. A value is required. The following options are available:<br>• **Non Clocking**: Select this option if the operation does not require a manual clocking on. If you select this option, you can mark an operation complete even if serials/lots are not clocked on, mandatory BOM items are not consumed, or values for mandatory quality variables are not specified.<br>• **Clocking**: Select this option if the operation requires manual clocking on and clocking off. By default, **Clocking** is selected for an operation. |
| **LABOR TYPES** | Identifies the labor types for the operation. A value is required. The following options are available:<br>• **Non Clocking**: Select this option if the operation does not require a manual clocking on. If you select this option, you can mark an operation complete even if serials/lots are not clocked on, mandatory BOM items are not consumed, or values for mandatory quality variables are not specified.<br>• **Clocking**: Select this option if the operation requires manual clocking on and clocking off. By default, **Clocking** is selected for an operation. |
| **DE-FAULT LABOR** | Identifies the default labor type. A value is required. You can choose from the list of values that you selected in the **LABOR TYPES** column.<br><br>When an operator clocks on a serial/lot using the Work Queue or Unit Operations application, by default, the labor type that you select in this column is selected. The operator can, however, choose a different one from the ones that you selected in the **LABOR TYPES** column. |
| **EQUIP-MENT** | Identifies the equipment that is used to perform the operation. You can select multiple pieces of equipment for the same operation, and you can select the same piece of equipment for multiple operations. |

| Column | Description |
|---|---|
| | **Tip:** <br> You can also select the equipment used in an operation by accessing the **Resources** section. |
| **MUTUAL EXCLUSION** | Switch the toggle to make the operation as mutually exclusive to another operation. A dialog box listing all the operations that have the same sequence number are listed. You can select the required operations and make the operation as mutually exclusive to the operations that you select. <br><br> **Note:** <br> You can make an operation mutually exclusive to another operation that has the same sequence number (priority). |

3. Select **Save**.

The changes made to the operation are saved.

## Copy an Operation

This topic describes how to copy an operation. You can also create a new operation *(on page 183)*.

**Note:**
When you copy an operation, the BOM items and documents are not copied.

1. In the **Route Editor** page, select the route in which you want to copy an operation.
   The **Edit Route** page appears.

2. In the left pane, in the row containing the operation that you want to copy, select .
   A new row for the copied operation appears in the **Overview** section.
   - The name of the copied operation is in the following format: Copy <name of the original operation>
   - The remaining columns are populated with the corresponding values in the original operation.

3. Enter a unique name for the operation. The name must not exceed 100 characters.

4. As needed, modify values as specified in the following table.

| Column | Description |
|---|---|
| SEQ | Identifies the sequence number of the operation. If multiple operations must be performed simultaneously, provide the same sequence number. <br><br> ℹ **Tip:** <br> When setting the sequence numbers, provide a gap in their values so that you can easily add new operations between other operations. For example, if the sequence number of the first operation is 1, set the sequence number of the second operation to 10. This allows you to add new operations between these two operations without the need to modify the sequence numbers of all the operations. |
| NAME | Identifies the name for the operation. Enter a unique name that does not exceed 100 characters. |
| DESCRIPTION | Identifies the description for the operation. Enter a description that does not exceed 1000 characters. |
| BEHAVIOR | Identifies the behavior of the operation. A value is required. The following options are available: <br> • **Non Clocking**: Select this option if the operation does not require a manual clocking on. If you select this option, you can mark an operation complete even if serials/lots are not clocked on, mandatory BOM items are not consumed, or values for mandatory quality variables are not specified. <br> • **Clocking**: Select this option if the operation requires manual clocking on and clocking off. By default, **Clocking** is selected for an operation. |
| LABOR TYPES | Identifies the labor types for the operation. A value is required. The following options are available: <br> • **Non Clocking**: Select this option if the operation does not require a manual clocking on. If you select this option, you can mark an operation complete even if serials/lots are not clocked on, mandatory BOM items are not consumed, or values for mandatory quality variables are not specified. <br> • **Clocking**: Select this option if the operation requires manual clocking on and clocking off. By default, **Clocking** is selected for an operation. |
| DEFAULT LABOR | Identifies the default labor type. A value is required. You can choose from the list of values that you selected in the **LABOR TYPES** column. |

| Column | Description |
|---|---|
| | When an operator clocks on a serial/lot using the Work Queue or Unit Operations application, by default, the labor type that you select in this column is selected. The operator can, however, choose a different one from the ones that you selected in the **LABOR TYPES** column. |
| **EQUIP-MENT** | Identifies the equipment that is used to perform the operation. You can select multiple pieces of equipment for the same operation, and you can select the same piece of equipment for multiple operations.<br><br> **i** **Tip:**<br>You can also select the equipment used in an operation from the **Resources** section. |

5. As needed, modify the property definitions and values.
6. Select **Save**.

The operation is copied.

- Link a BOM item to the operation *(on page 187)*
- Attach a document to the operation *(on page 189)*
- Assign a property group *(on page 191)* to the operation, and provide values for the underlying properties *(on page 192)*.

## Delete an Operation

You can delete an operation if it is no longer needed to produce the product using the route.

- If you have made any changes to the route, save the changes.

1. In the **Route Editor** page, select the route for which you want to delete an operation.
   The **Edit Route** page appears.
2. In the left pane, select ✕ in the row containing the operation that you want to delete.
   A message appears, asking you to confirm that you want to delete the operation.
3. Select **Yes**, and then select **Save**.

The operation is deleted.

> **Note:**
>
> The equipment, BOM items, documents,and properties associated with the operation are not deleted.

## Upload a New Version of a Document

Using Route Editor, you can access all the versions of a document that you upload to the document store.

You can upload a new version of a document whether or not it is attached to a route or an operation. If the document has already been attached to a route or an operation, after you upload the new version, you must manually attach the newer version to the route or the operation.

1. If the document has been attached to a route or an operation, perform the following steps:

    a. In the **Route Editor** page, select the route to which you have attached the document.

    b. Select **Documents**.
    A list of documents attached to the route or to an individual operation in the route appears.

    > **Tip:**
    >
    > You can access a list of documents attached to each operation by selecting the corresponding operation.

    c. In the row containing the document for which you want to upload a new version, select ⬆.
    The **Upload document** window appears. With the exception of the **FILE NAME / URL** box, all the boxes are disabled and populated with values from the previous version of the document.

    d. In the **FILE NAME / URL** box, enter the URL or path to the version of the document that you want to upload.

    > **Tip:**
    >
    > If the document is stored in the local machine, you can select **Browse** to go to the path.

    e. Select **Upload**.

The new version of the document is uploaded. As needed, you must attach this new version to all the routes and operations that use this document.

> **Note:**
>
> You can access each version of the document by selecting  in the row that contains the document.

2. If the document has not been attached to a route or an operation, perform the following steps:

   a. In the **Route Editor** page, select a route.

   b. Select **Documents**.

   c. In the upper-right corner of the **Documents** section, select .
      The **Upload Document** window appears.

   d. Provide the same values as those provided for the previous version of the document, and then select **Upload**.
      The new version of the document is uploaded.

   > **Note:**
   >
   > You can access each version of the document by selecting , and then selecting  in the window that appears.

# Releasing a Route

## About Releasing a Route

A route must be released for it to be available in a work order or a process order. The route once released cannot be modified/reverted.

As the manufacturing engineer creates routes, there is a necessity for the route to be reviewed before releasing a route, as it is an irreversible process. To facilitate a review process for releasing a route the approval process is introduced. You can create approval workflows for **Release Route** in the Approval Cockpit application.

The following conditions apply when you release a route:

- You can initiate route release only if it is in the draft state.
- You cannot release a route that is archived.
- You cannot modify the route while it is in **Pending Approval** state.
- You cannot modify a route that is released. However, you can revise or copy the route after it is released.
- After you release a route, you cannot reverse the action.

## Release a Route

- The route that you want to release must contain at least one operation.
- Each operation in the route must be associated with at least one piece of equipment.
- The approval workflows must be created in the Approval Cockpit application under **Release Route** section.

The below image shows different workflows created under **Release Route** section in the Approval Cockpit application.

1. In the **Route Editor** page, select the route that you want to release.

   The **Edit Route** page appears.

2. Select ⋮ , and then select **Release**.

   A message appears, specifying that the action cannot be reversed, and prompting you to confirm if you want to release the route. Also, you can view the workflows that are configured under **Release Route**. The production line of the workflows is same as the production line of **Route Editor**. You can select workflow and trigger the release process.
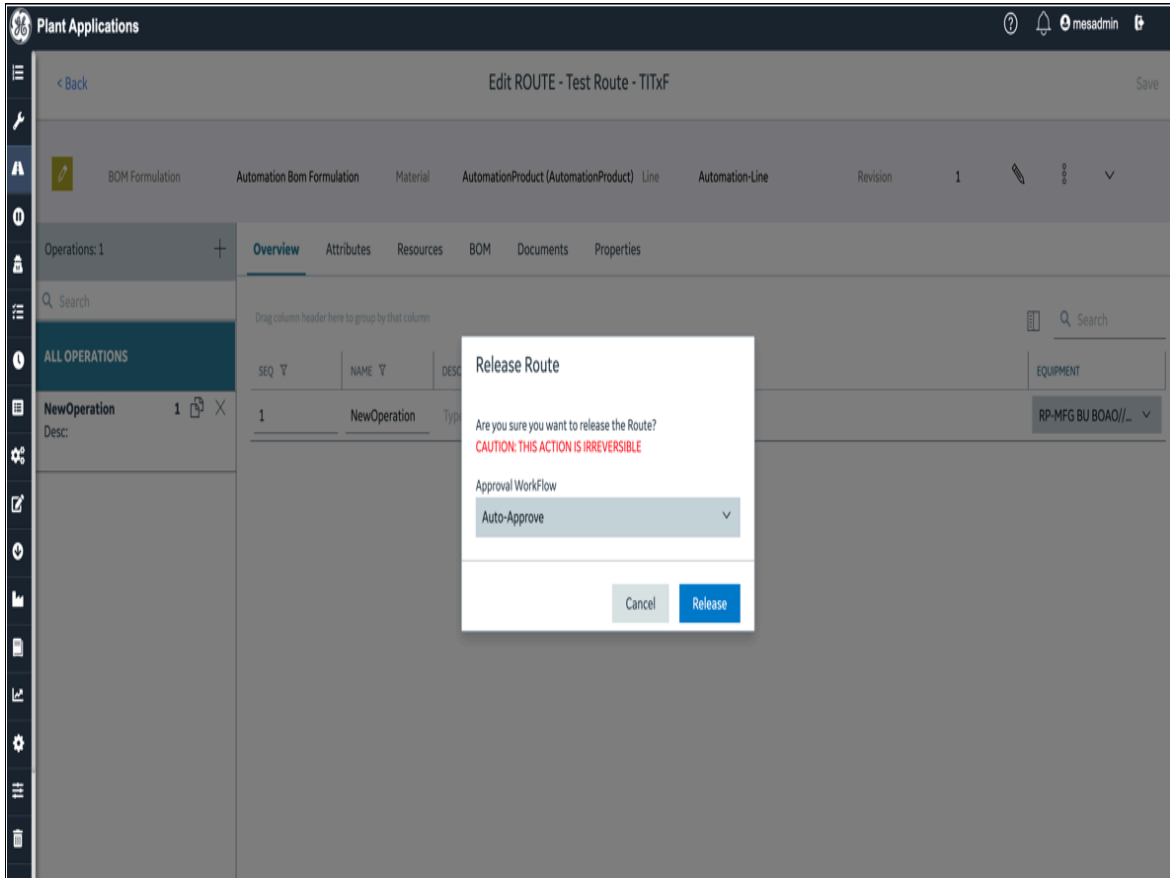


3. Select **Release**.

   - If you select the **Auto Approval** process, then approval workflow is not required, and the route moves to released state.
   - More than one workflow can be created for each production line. You can select the workflow that the route must follow for the approval in order to get released.
   - Once the valid workflow is selected, the route is displayed in the **Pending Approval** tab until all the levels are approved.

> **Note:**
>
> You can configure a Pre Call on Release Route in the Configuration application. This Pre Call operates before the route is released for approval.



> **Note:**
>
> The route is released automatically if all the pending approvals are approved, and no user action is required. The route is moved back to the draft status if it is rejected at any level during the approval process.

The route will be in **Pending Approval** status. Once all the approvals are completed, the route will be moved to released status. This route is now available and can be linked to a work order.

Use the route in a work order.

> **✎ Note:**
>
> A work order is created in an Enterprise Resource Planning (ERP) application and imported into Plant Applications Web Client using the Plant Applications Enterprise Resource Planning (ERP) scheduler and import services. For more information, refer to the Plant Applications ERP Integration Guide. The work order is then consumed in the Work Order Manager, Unit Operations, Work Queue, and other modules. For more information, refer to corresponding sections of the documentation.

# Archiving a Route

## About Archiving a Route

If you no longer want to use a route, you can archive it. The following conditions apply when you archive a route:

- You can archive a route that is in the released state.
- You cannot archive a route that is in the draft state.
- You cannot modify an archived route. However, if you want to use an archived route in future, you can revise or copy the route.
- An archived route is not available for use in a work order or a process order.
- After you archive a route, you cannot reverse the action.

## Archive a Route

1. In the **Route Editor** page, select **Released**, and then select the route that you want to archive.
   The **View Route** page appears.
2. Select ⋮ , and then select **Archive**.
   A message appears, specifying that the action cannot be reversed, and asking you to confirm that you want to archive the route.
3. Select **Archive**.

The route is archived.

# Creating a Route Revision

## About Creating a Route Revision

After you release or archive a route, you cannot modify it. However, if you want to update the route (for example, remove an operation or change the BOM formulation), you must create a revision of the route. The following conditions apply when you create a route revision:

- You can create a route revision for a released or archived route.
- You cannot create a route revision for a draft route.
- You can create a route revision only on the latest version of the route (includes draft versions as well).
- After revising a route, any subsequent changes to the route properties or documents attached to the route are not reflected in the route. For example, if another property definition has been added to the property group or a new revision of the document has been uploaded, the changes are not reflected in the revised route. If you want the changes to reflect in the revised route, you must link the property group or the document again to the route. Changes to the BOM formulation of the route, however, are reflected automatically in the revised route.

## Create a Route Revision

1. In the **Route Editor** page, perform one of the following tasks:
    - If you want to create a revision of a released route, select **Released**.
    - If you want to create a revision of an archived route, select **Archived**.
2. Select the route whose revision you want to create.

    The **View Route** page appears.
3. Select ⁝, and then select **Create New Revision**.

    The **Revise Route** window appears, displaying the route details.

    > ✏️ **Note:**
    >
    > The name, description, production line, material, and BOM formulation are copied from the latest version of the route and cannot be modified. You can change the settings for the route behaviors. You can add, modify, or remove an operation. You can also assign a different BOM item, equipment, property group, or document.

4. Select **Next**.

    The **Edit Route** page appears. The operations, resources, BOM items, properties, and documents linked to the route are the same as that of the latest version of the route.

5. As needed, add, modify, or remove operations, or assign a different BOM item, property, or document.

6. Select **Save**.

The route revision is created and is in the draft state. The value in the **REVISION** box is incremented by 1.

> ℹ️ **Tip:**
>
> To access the previous versions of the route, in the **Released** or **Archived** section, select 🔗 in the row containing the route.

# Deleting a Route

## About Deleting a Route

If you no longer want to work with a draft route, you can delete it. The following conditions apply when you delete a route:

- You cannot delete a route that is released or archived.
- You can only delete a route that is in the draft state.
- The operations in the route are deleted.
- The BOM items, properties, and documents used in the route are not deleted from the Plant Applications database.

## Delete a Route

1. In the **Route Editor** page, select the route that you want to delete.
   The **Edit Route** page appears.

2. Select ⋮, and then select **Delete**.
   A message appears, asking you to confirm that you want to delete the route.

3. Select **Delete**.

The route and the operations linked to it are deleted.

# Creating a Work Order

## About Creating a Work Order

A work order is a request to manufacture certain quantity of a product in a given time. It contains information about the product, a list of serials/lots and the quantity to be manufactured, the planned start time and end time, and the route that must be used to manufacture the product.

Work orders are created in Plant Applications from the following sources:

- ERP System: You can import work orders from an ERP system to Plant Applications using the import services.
- Route Editor: You can create work orders manually using Route Editor.
- Work Order Manager: You can create work orders manually using Work Order Manager.

These work orders then appear in Work Order Manager *(on page 287)*, where you can manage them.

When you create a work order in Route Editor, the following conditions apply:

- You can create a work order only for the latest version of a released route.
- You cannot create a work order for a draft or an archived route.
- A work order belongs to a single route. You can, however, create multiple work orders for a route.

## Create a Work Order

1. In the **Route Editor** page, select **Released**.

   A list of released routes appears.
2. Select the route for which you want to create a work order.

   The **View Route** page appears.
3. Select ⦂, and then select **Create Work Order**.

   The **Create Work Order** window appears.
4. Provide values as specified in the following table.

   | Box | Description |
   | --- | --- |
   | **WORK ORDER** | You must enter a value in this box. Enter a unique name for the work order that does not exceed 100 characters. If a work order with the same name exists: |

| Box | Description |
|---|---|
| | • If the work order is ready, a message appears asking you to confirm if you want to delete it and replace it with the one you are creating.<br>• If the work order is in progress, you cannot create this work order. |
| **NO OF LOTS** | Enter the number of serial/lots this work order is to create. The value in this box must not exceed 100. The value in this box determines the number of rows in the **ENTER SERIAL/LOT#** table. |
| **PRIORITY** | Enter the priority in which the work order must be completed.<br>• 1 = highest priority<br>• 0, -, or blank = lowest priority |
| **WORK ORDER PLANNED QUANTITY** | Enter the quantity of product to be manufactured as part of the work order. |
| **PLAN START** | Enter the planned date and time to begin work on the work order. By default, this box is populated with the current date and time. |
| **PLAN END** | Enter the planned date and time to complete the work on the work order. By default, this box is populated with the date and time that is 24 hours from the current date and time. |
| **SERIAL/LOT# PREFIX** | Enter the prefix for each serial/lot to be manufactured. The value in this box helps identify the serials/lots that belong to the same work order. |
| **ENTER SERIAL/LOT#** | A table with as many rows as the value entered in **NO OF LOTS**. Each row contains the following fields:<br>• **SEQ**<br>• **SERIAL/LOT#** |

| Box | Description |
|---|---|
| | • **GENERATED SERIAL/LOT#**<br>• **QUANTITY**<br>All rows must be completed, either manually, or by using the Auto Populate feature (see the note below). |
| SEQ | The row number, starting from 1. |
| SERIAL/LOT# | Enter a unique value for each serial/lot. |
| GENERATED SERIAL/LOT# | Identifies the serial/lot that will be assigned to each product in the work order. This box is disabled and populated with a combination of the values in the **SERIAL/LOT# PREFIX** and **SERIAL/LOT#** boxes. |
| QUANTITY | You must enter a value in this box. Enter a unique name for the work order that does not exceed 100 characters.<br><br>If a work order with the same name exists:<br>• If the work order is ready, it is deleted and replaced with the one that you are creating.<br>• If the work order is in progress, you cannot create this work order. |
| ORDER QUANTITY | Enter the quantity of the product that must be manufactured as part of the work order. The value in this box must not exceed 100. The value in this box determines the number of rows that appear in the **ENTER SERIAL/LOT#** section. |
| PRIORITY | Enter the priority in which the work order must be completed. |

| Box | Description |
|---|---|
| | • If you want to assign the highest priority for the work order, enter 1.<br>• If you want to assign the lowest priority for the work order, enter 0 or leave the box blank. |
| **SERIAL/LOT# PREFIX** | Enter the prefix for each serial/lot to be manufactured. The value in this box helps identify the serials/lots that belong to the same work order. |
| **PLAN START** | Enter the planned date and time to begin work on the work order. |
| **PLAN END** | Enter the planned date and time to complete the work on the work order. By default, this box is populated with the date and time that is 24 hours from the current date and time. |
| **SERIAL/LOT#** | You must enter a value in all the rows. Enter a unique value for each serial/lot. |
| **GENERATED SERIAL/LOT#** | Identifies the serial/lot that will be assigned to each product in the work order. This box is disabled and populated with a combination of the values in the **SERIAL/LOT# PREFIX** and **SERIAL/LOT#** boxes. |

> **Note:**
> You can automatically populate the rows in the table with the Auto Populate feature. To use Auto Populate you must manually populate **SEQ** (row) 1:
> - Enter a unique identifier in the **SERIAL/LOT#** field. Press the tab key to populate the rest of the row with a **GENERATED SERIAL/LOT#** and **QUANTITY**.
> - Click the Auto Populate icon. Auto Populate will fill in the remaining rows/lots, incrementing the **SERIAL/LOT#** and **GENERATED SERIAL/LOT#** in each subsequent

> ✏️     row by one based on the character(s) specified in **SEQ 1** (e.g., A, B, C, etc.; 01, 02, 03, etc.). The value in the **QUANTITY** field will be duplicated for each row.
> - To change the format/values of the **SERIAL/LOT#** and **GENERATED SERIAL/LOT#** fields, change the value in either of the **SERIAL/LOT# PREFIX** or **SERIAL/LOT#** fields and click Auto Populate.

======= >>>>>>> e156f57819d5aec268cc16c56ef7a42fa3984483

5. Select **Create**.

> ℹ️ **Tip:**
> If you want to create another work order for the same route, select **Create and Add Another**.

The work order is created, and it appears in Work Order Manager .

# Labor Planning

## About Labor Planning

Labor planning allows you to specify the amount of time to be spent by labor (people, machines) on operations (segment, planned unit). These times are specified when you create/edit a route.

Labor plans can be exported/uploaded to external schedulers (including ERPs) to inform execution planning and scheduling decisions. Labor plans are not used by execution; however, labor records created during execution may be used to compare execution against plan along multiple dimensions, including operator, line, product, etc.

There are four labor planning types for which times can be set:

- **Setup**: Time to prepare a machine (e.g., tooling, warm-up, pressurization, adjustments, calibration) or operator (e.g., don PPE).
- **Run**: Time to execute an operation.
- **Inspection**: Time to inspect or test a lot at an operation.
- **Transport**: Time to move a lot into, or out of, a work center; or bring material to a work center.

For each labor planning type, for both machines and people, times can be set for a:

- **Lot**: Time for the entire lot to be completed.
- **Item**: Time to complete a single item in the lot.

**Labor Types**

Labor types are user-extensible records for tracking the labor performed. Labor types must be associated with labor planning types to enable comparison between actual execution times and standard times. Plant Apps includes the following labor types:

- **Direct**: Work done as part of making a product.
- **Setup**: Work done to set up a machine or workstation.
- **Rework**: Work done to address a defect or deficiency.
- **Indirect**: Work done on an operation that doesn't fit into any of the above types.

Using REST APIs, additional Labor Types can be created and associated with Labor Planning Types.

**Labor Codes**

Labor codes are a set of scaling factors for each labor planning type that can be applied to a labor plan to generate another, calculated labor plan. Labor plan scaling factors limit the amount of configuration needed to generate multiple labor plans for a scheduler. A single scaling factor is a float - positive or zero - that is multiplied with a labor plan value to generate a new labor plan value. As such, a scaling factor of 1.0 means to use the planned value unchanged.

## Create a Labor Plan

1. In the **Route Editor** application, click an existing route name to modify it (if you need to create a new route, see Add a Route *(on page 181)*). This will bring up the **Edit ROUTE** page.
2. Click the **Resources** tab.
3. Group by **Operation** or **Equipment**.
4. Click the chevron for the operation you are going to modify.
5. Optionally you can select a value for each of **Machine Labor Codes** and **People Labor Codes**. If you specify a code for either of these labor types, you must enter a **Standard Time**. You have the option of entering a **Standard Time** without selecting a labor code.
6. Enter a **Standard Time** for the each of the four labor planning types for each of **Machine** and **People**. Times entered must be in the format hh:mm:ss.
7. Click **Save**.

## Viewing Material Properties

1. In the **Route Editor**, select a route.

2. To view the properties of the material this route is producing, click ⋮

3. To view the properties that are specific to the route and operation, click **Properties**. Properties can be associated to the:

   - Route level/route header
   - Route level/route header and Operations:
     - To all the Operations, or
     - A subset of the Operations

4. To view the material properties of a BOM item:

   a. Click **BOM**.

   b. Click a table row. This will display a dialog that will list the properties, if any, for that material.

# Chapter 6. Work Queue

## Overview

### About the Work Queue Application

As an operator, you can use the Work Queue application for maintaining a list of operations that you must perform, and report the status of completion of each operation.

Each row in Work Queue represents an operation to be performed. By default, Work Queue contains the operations in which at least one serial number is currently clocked on by you. You can add additional operations that are ready or in progress to Work Queue.

Using the Work Queue module, you can perform the following tasks:

- Access an operation *(on page 224)*.
- Add operations to Work Queue *(on page 235)*.
- Remove Operations from Work Queue *(on page 236)*
- Clock on a serial or lot *(on page 236)*.
- Clock off a serial or lot *(on page 239)*.
- Add a comment. *(on page 48)*
- Provide data for a quality variable *(on page 259)*.
- View the status of an operation *(on page 224)*.
- Access documents associated with an operation *(on page 224)*.
- Access a list of BOM parts associated with a serial or lot *(on page 37)*.
- Specify the consumption of BOM parts during production *(on page 248)*.
- Specify whether you have completed working on a serial or lot *(on page 260)*.
- Mark an Operation Complete *(on page 264)*
- Skip an Operation *(on page 267)*
- Creating a non-conformance *(on page 74)*.

### About Work Orders, Operations, and Serials/Lots

A work order is a request to manufacture a certain quantity of products. It contains information on the model, route, and quantity of a product that must be manufactured. Work orders are either created in Route Editor or imported into Plant Applications using the Enterprise Resource Planning (ERP) scheduler and import services.

Work orders are grouped by product and are assigned to a specific production line for manufacturing.

A work order comprises the job details and operations. To manufacture each type of product, a sequence of tasks must be performed. Each task or a set of tasks is called an operation. An operation in a work

order is an executable job performed on a Production Unit of a Production Line. Operations can be defined either in the route using the Route Editor module or in the work order that you import from an ERP system.

When all the operations are completed, the status of the work order changes to Completed in the Work Queue application.

> **Note:**
>
> If BOM parts are configured for an operation and marked as mandatory, the operation is marked complete only if the BOM parts are consumed. Similarly, if quality variables are configured for an operation, the operation is marked complete only if values for the quality variables are provided.

The quantity of the product to be manufactured determines the number of serial numbers that are created.

### Work Orders, Operations, and Sequence Numbers in a Motor Manufacturing Unit

Suppose you want to manufacture the following motors:

- 3 motors of model A
- 2 motors of model B

The following table provides the work orders, operations, and serial numbers for the plan.

| Work Order Number | Work Order Description | Operations | Serial Numbers |
|---|---|---|---|
| W.O 1 | To manufacture motors of model A | • Shell turning<br>• Rotor assembling<br>• End shield assembling<br>• Painting | • W.O.1_-S1<br>• W.O.1_-S2<br>• W.O.1_-S3 |
| W.O 2 | To manufacture motors of model B | • Shell turning<br>• Rotor assembling<br>• End shield assembling | • W.O.2_-S1<br>• W.O.2_-S2 |

Suppose Operator 1 wants to work on the shell turning operation for the two types of motors. Operator 1 can clock on the following serial numbers.

| Work Order Number | Operation | Serial Number |
|---|---|---|
| W.O 1 | Shell turning | W.O.1_S1 |
| W.O 1 | Shell turning | W.O.1_S2 |
| W.O 1 | Shell turning | W.O.1_S3 |
| W.O 2 | Shell turning | W.O.2_S1 |
| W.O 2 | Shell turning | W.O.2_S2 |

Suppose Operator 2 wants to work on the rotor assembling operation. When Operator 2 logs in to the application, Work Queue displays the rotor assembling operation only after the shell turning operation has been completed for at least one serial number.

## About the Status of a Serial/Lot and an Operation

The status of an operation indicates the progress of work for the operation.

The status of a serial/lot indicates the progress of work on the serial/lot *for that specific operation*. For example, suppose a work order includes performing operations 1 and 2. If operation 1 has been completed for a serial/lot, the status of the serial/lot for operation 1 is *complete*. If operation 2 is yet to begin on the same serial/lot, the status of the serial/lot for operation 2 is *ready*.

In the Work Queue application, the status of a serial/lot or an operation is automatically determined and displayed with a color-coded indicator. The following table provides a list of status indicators defined for a serial/lot and an operation.

| Status | Status Indicator | Description for a Serial/Lot | Description for an Operation |
|---|---|---|---|
| Not ready | ⚠ | Not applicable | Indicates that none of the serials/lots is available for you to perform the operation. |
| Cancelled | ⊠ | Indicates that the work for the serial/lot has been cancelled. This happens if a defect has been created for the serial/lot, and the dis- | Not applicable |

| Status | Status Indicator | Description for a Serial/Lot | Description for an Operation |
|---|---|---|---|
| | | position provided in NCR Management is Scrapped. | |
| Ready | | Indicates that the serial/lot is available for you to perform the operation. | Indicates that at least one serial/lot in the work order is available for you to perform the operation, and the operation is not in progress for any of the serials/lots. |
| Clocked on by you | | Indicates that the serial/lot is currently clocked on only by you for the operation. | Indicates that at least one serial/lot in the operation is currently clocked on by you, and none of the serials/lots in the operation is clocked on by others. |
| Clocked on by another user | | Indicates that the serial/lot is currently clocked on by multiple users for the operation, but is not clocked on by you for the operation. | Indicates that the serials/lots are currently clocked on by multiple users for the operation, but are not clocked on by you for the operation. |
| Clocked on by other users | | Indicates that the serial/lot is clocked on by multiple users for the operation, but is currently not clocked on by you for the operation. | Indicates that the serials/lots are clocked on by multiple other users for the operation, but none of them are clocked on by you for the operation. |
| Clocked on by you and other users | | Indicates that the serial/lot is currently clocked on by you and | Indicates that the serials/lots for the operation are currently |

| Status | Status Indicator | Description for a Serial/Lot | Description for an Operation |
|---|---|---|---|
| | | other users for the operation. | clocked on by you and other users. |
| Clocked on by other users in the past |  | Indicates that work for the serial/lot has begun, but the serial/lot is currently not clocked on for the operation. | Indicates that work has begun for at least one serial/lot in the operation in the past, but currently, no serial/lot is clocked on for the operation. |
| On hold |  | Indicates that the serial/lot is on hold. This status indicator appears if a defect has been created for the serial/lot for the operation. After the defect is closed, the status is changed to the original status. | Not applicable |
| Complete |  | Indicates that the operation is complete for the serial/lot. | Indicates that the operation is complete for all the serials/lots in the work order (or scrapped as applicable). |
| Skipped |  | Indicates that the operation is skipped for the serial/lot. | Indicates that the operation can be skipped. |
| Excluded |  | Not applicable | Indicates that the operation is excluded from a mutually exclusive operations set. |

# Accessing an Operation

## About Accessing an Operation

Using Work Queue, you can access operations added to Work Queue or operations grouped by work order. You can also access the following details of an operation:

- Documents *(on page 38)* linked to the associated route
- List of Bill of Material (BOM) items *(on page 37)* required for each serial/lot, along with the required quantity and consumed quantity
- Quality variables *(on page 39)*
- Non-conformances *(on page 40)*
- Properties *(on page 41)* defined for the operation or the associated route or material
- History *(on page 42)*

> **Note:**
>
> **Documents**, **BOM**, **Quality**, **NCR**, **Properties**, and **History** are standard tabs. You can show or hide them using the Configuration Management application. You can also rearrange the order of the tab display.

## Access an Operation

As an operator, you can access operations in the Ready or In Progress status.

1. Access Plant Applications Web Client.
2. In the left pane, select **Work Queue**.

   The **Queue** page appears, displaying a list of operations that are added to Work Queue. The number of operations that appear in a page depends on the resolution of your computer screen. The following table provides information on each column in the table.

| Column | Description |
|---|---|
| **STATUS** | The status *(on page 221)* of the operation. |
| **OP** | The name of the operation. |
| **WORK ORDER** | The unique identifier of a work order. |
| **DESCRIPTION** | The description of the operation. |
| **SERIAL/LOT** | If the work order contains only one serial/lot, this column contains the unique ID of the serial/lot. If the work order contains multiple se- |

| Column | Description |
|---|---|
| | rials/lots, this column contains a link, specifying the number of serials/lots in the work order. When you select the link, a window appears, displaying the statuses *(on page 131)* and IDs of all the serials/lots in the work order for the operation.<br><br>**Note:**<br>The value in this column does not include the number of serials/lots that are in the Cancelled status. |
| **COMPLETED** | The number of serials/lots for which the operation has been completed out of the [total number of serials/lots minus planned quantity of skipped serials/lots] on which you must perform the operation. |
| **SCRAP** | The number of serials/lots that have been scrapped during the operation. |
| **ON HOLD** | The number of serials/lots that are on hold. |
| **SKIP** | The number of serials/lots that are skipped. |
| **EXCLUDED QTY** | The number of operations excluded in a mutually exclusive set. |
| **ON/OFF** | Contains buttons to clock on *(on page 236)* or clock off *(on page 239)* an operation. The number in the **ON** button indicates the number of serials/lots that are clocked on. These buttons are disabled for an operation that does not require clocking on. |
| **OPT** | Indicates that the operation is **Optional** by displaying OPT against the operation. |
| **COMP/REC** | Contains the following buttons:<br><br>• ⊙ : Allows you to provide the completed quantity for an operation on a serial/lot.<br><br>• ✓ : Allows you to mark an operation complete after the completed quantity for a serial/lot equals the planned quantity.<br><br>• Skip : Allows you to skip an operation that in Ready status. For more information, refer |
| **COMPLETED** | Indicates whether the operation is complete. |

> **ⓘ Tip:**
>
> You can perform the following tasks in the **Queue** page:
>
> - Access the operations grouped by work order by selecting **By Work Order**.
>
> - Manually refresh the list of operations by selecting ↻.
>
> - Add or remove columns from the table by selecting ▤.
>
> - Filter the list of operations by selecting ▽ in a column heading.
> - Search for an operation in the queue using the **Search the queue** box.
> - Add an operation to the queue. For information, refer to About Adding Operations to the Work Queue *(on page 235)*.
>
> - To access an operation using a barcode, select 📷, and scan for the barcode specific to the option. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes.
>
> - In iPad, you can use 📷 only in the Safari browser.

3. If you want to access the details of an operation, select the operation.

   The workspace for the operation appears, displaying the details of the operation and the associated serials/lots, such as documents, BOM items, and so on.

## Access Documents

You can access the documents that are related to a route. The documents can be instruction manuals or technical publications, which may be required to perform the operation. They have been added to the operation or the associated route using the Route Editor application or the ERP system.

1. Access the operation whose documents you want to access.
2. Select **Documents**.

   A list of documents associated with the operation or the associated route appear.
3. Select the document that you want to access.

   The document appears in the workspace.

> **ⓘ Tip:**
>
> You can rotate the document.

## Access BOM Items

An operation contains a list of BOM items necessary to perform the operation. As an operator, you can access the **BOM** section to specify the consumption of the BOM items for a product.

1. Select the operation whose BOM items you want to access.
2. Select **BOM**.

   The **BOM** section appears, displaying the BOM items associated with the selected operation.

   The number of the BOM tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on the serial/lot.

   In Unit Operations, the number of the **BOM** tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on the serial/lot. In Work Queue, the number on the **BOM** tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on all the serials/lots that you have clocked on for the operation. The following table provides information on each column in the table.

| Column | Description |
|---|---|
| **ORDER** | The recommended order of consumption of the BOM item in an operation. |
| **MATERIAL** | The material number of the BOM item. |
| **MATERIAL DESC** | The material description of the BOM item. |
| **REQ QTY** | The planned quantity of the BOM items required for the completion of the serial/lot for the operation. |
| **CONSUMED QTY** | The actual quantity of the BOM items consumed during the production. |
| **UOM** | The unit of measure (UOM) of the BOM item. |
| **SERIAL/ LOT#** | The serial/lot of the raw material that was consumed. |
| **LOWER QTY** | The lower tolerance quantity of the BOM item that can be consumed. |
| **UPPER QTY** | The upper tolerance quantity of the BOM item that can be consumed. |
| **SCRAP FACTOR** | The Percentage of this BOM item that is expected to be lost during production of the formulation. For example, if 100 units of Product XYZ is required with a scrap |

| Column | Description |
|---|---|
|  | factor of 1%, then you should have a 101 units on hand when preparing to produce the product. |
| **STORAGE UNIT** | Unit currently storing the selected product. |

3. In the **BOM** section, select an item.

The page containing the item details and consumption history appears.

## Access the Quality Variables of an Operation

Quality variables include details about the data that are collected while performing an operation. These variables are defined in Plant Applications Administrator. The values that you provide for these variables help verify that the parameters that are critical to the quality and manufacturing processes are within the acceptable limits. You can use this data to review the performance of a production line and production unit and compare the quality of the products produced in each unit with projections for an operation.

For example, suppose you have been assigned the testing operation in a motor manufacturing unit. Quality variables can include the torque and rpm of the motor shaft. When you test each motor, you must enter the torque and rpm values for the corresponding serial number. A quality supervisor can then verify that the torque and rpm fall within the acceptable range.

1. Access the operation whose quality variables you want to access.
2. Select **Quality**.

The **Quality** section appears, displaying a list of quality variables defined for the operation, and values for these variables for the serial/lot selected in the left pane. These variables are grouped based on the quality variable group. In Unit Operations, the number on the **Quality** tab indicates the total number of mandatory quality variables for the serial/lot that still require a value. In Work Queue, the number on the **Quality** tab indicates the total number of mandatory quality variables for all the serials/lots that you have clocked on for the operation and that still require a value. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| **VARIABLE NAME** | The name of the variable. |
| **SPEC** | The value of the variable. You can enter a value only if you have clocked on the serial/lot. If an acceptable range has been defined for the variable, after you enter a value, the box in this |

| Column | Description |
| --- | --- |
| | column displays a color, indicating whether the value is within the acceptable range. |
| **CHART** | Contains a chart that plots the lower and upper limits for the variable and the value that you have entered in the **SPEC** column. The CHART column appears only in the Box Whisker view. |

> **Tip:**
> - By default, all the quality variables appear. If you want to access only mandatory variables, select **Mandatory Variables** in the drop-down list box.
> - If you want to view the lowest, highest, lower quartile, upper quartile, and median values for each variable, select ⊞. If you want to view the same values plotted on a chart, select ⟋.

3. In the left pane, select the serial/lot whose variable values you want to access.

   The **Quality** section displays the quality variables for the selected serial/lot.

## Access a Non-Conformance

1. Access the operation performed on the serial/lot whose non-conformance you want to access.
2. Select **NCR**.

   The **NCR** section appears, displaying a list of non-conformances for the serial/lot selected in the left pane.
3. In the left pane, select the serial/lot whose non-conformance you want to access.

   A list of non-conformances for the serial/lot that occurred at the operation appears. The following table provides information on the columns in the table.

| Column | Description |
| --- | --- |
| **STATUS** | The status of the non-conformance. |
| **SERIAL/LOT** | The unique identifier of the serial/lot. |
| **OP** | The operation during which the non-conformance has been created. |

| Column | Description |
|---|---|
| DISP | The disposition method *(on page 88)* chosen for the serial/lot. |
| MATERIAL | The material of the serial/lot. |
| MATERIAL FAMILY | The material family of the serial/lot. |
| MATERIAL DESC | The material description of the serial/lot. |
| CTP/REWORK OP | • For a Rework disposition method, this field contains the operation during which rework must be performed on the serial/lot.<br>• For a Continue-to-Process (CTP) disposition method, this field contains the operation until which you can continue to work with the serial/lot.<br>• For a disposition method other than CTP or Rework, this column is blank. |
| ACTIONS | Contains the following buttons:<br>• 👁 : Select this button to access the non-conformance details *(on page 84)*.<br>• 🕐 : Select this button to access the defect history *(on page 83)*. |

## Access the Properties of an Operation

A property is an additional attribute that is assigned to a route, an operation, or a material to produce a product. Properties are created in Property Definition and assigned values in the following ways:

- Properties for routes and operations are assigned values in Route Editor.
- Properties for materials are assigned values in an ERP system. These materials are imported to Plant Applications using import services.

1. Access the operation for which you want to access the properties.
2. Select **Properties**.
   The properties assigned to the operation, route, or material appear. The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| LEVEL | The level at which the property has been defined - operation, route, or material.<br>• If a property has been defined at the route or material level, the value in this column is **All Operations**.<br>• If a property has been defined at the operation level, the value in this column is **Operation**. |
| CATEGORY | The category to which the property group belongs. |
| GROUP | The group to which the property belongs. |
| NAME | The name of the property. |
| VALUE | The value of the property. |
| UOM | The units of measure of the property. |
| DATA TYPE | The data type of the property value. |

## Access the History of an Operation

As an operator, you can access the events associated with an operation. An event is created each time the status of a serial/lot, operation, or the work order is changed.

1. Access the operation whose history you want to access.
2. Select **History**.

   The **History** section appears, displaying the events associated with the operation and the serial/lot selected in the left pane. The events appear in the descending order of their timestamps (based on the **TIME STAMP** column). The following table provides information on the columns in the table.

| Column | Description |
|---|---|
| ACTION | The action performed on the serial/lot. |
| SERIAL/LOT | The unique identifier for the serial/lot on which the action was performed. |

| Column | Description |
|---|---|
| **OPERATION** | The name of the operation for which the action was performed. |
| **USER(S)** | The name of the user who performed the action specified in the **ACTION** column. |
| **TIME STAMP** | The date and time when the action was performed. |

> ℹ️ **Tip:**
>
> To export the data to a .csv file, select ⬇. The data for the columns that appear in the table are exported into a .csv file. If the data contains unicode characters, to access the data in a Microsoft Excel worksheet:
>
> a. Access a blank worksheet.
> b. Go to **Data > From text/CSV**, and select the .csv file.
> c. Select the file origin: **65001:Unicode (UTF-8)**.
> d. Load the data.
>
> This process is a requirement for Microsoft Excel.

## Actions Recorded in the Work Order History

The following table provides a list of actions that appear in the **History** section of a work order.

| Action | Description |
|---|---|
| Work Order Created | Indicates that the work order is created. |
| Work Order Ready | Indicates that the work order is ready for you to begin work on at least one serial/lot. |
| Work Order Started | Indicates that the work has begun on at least one serial/lot in the work order. This happens when at least one serial/lot in the work order has been clocked on for an operation. |
| Work Order Completed | Indicates that all the operations in the work order are completed for all the serials/lots in the work order. |

| Action | Description |
|---|---|
| Work Order Cancelled | Indicates that the work order is cancelled. |
| Work Order Planned Date Change | Indicates that the planned start and end dates of the work order have been changed. |
| Work Order Priority Change | Indicates that the priority for the work order has been changed. |
| Serial No Created | Indicates that an ID has been created for a serial/lot in the work order. |
| Serial/Lot Started | Indicates that work has begun on a serial/lot for the work order. This happens when the serial/lot has been clocked on for the first operation. |
| Serial/Lot Hold | Indicates that the serial/lot is on hold. This happens when a non-conformance is created on the serial/lot. |
| Serial/Lot Scrapped | Indicates that the serial/lot has been scrapped. This happens when a non-conformance is created on the serial/lot and the disposition method specified for the serial/lot is Scrap. |
| Serial/Lot Completed | Indicates that work on the serial/lot has been completed. This happens when all the operations defined in the associated route are completed for the serial/lot. |
| Serial/Lot Identifier Change | Indicates that the name of a serial/lot has been changed. |
| Operation Ready | Indicates that an operation is ready for you to begin work on the specified serial/lot. |
| Operation Started | Indicates that work for an operation for the specified serial/lot has begun. |
| Serial/Lot Clock On | Indicates that a serial/lot has been clocked on for an operation by an operator. |
| Serial/Lot Clocked Off | Indicates that a serial/lot has been clocked off for an operation by an operator. |

| Action | Description |
|---|---|
| Operation Hold | Indicates that work for an operation is on hold for a serial/lot. This happens when a non-conformance has been created on the serial/lot for the operation. |
| Operation Released | Indicates that an operation is released for the serial/lot. This happens when the serial/lot has been disposed to release the operation hold. |
| Operation Cancelled | Indicates that an operation is cancelled for the serial/lot. This happens when the serial/lot is scrapped at the operation. |
| Operation Completed | Indicates that an operation is completed for the serial/lot. |
| Operation Skipped | Indicates that an operation is skipped for the serial/lot. |
| Hold Released | Indicates that hold is released on an operation. This happens when the serial/lot on which a non-conformance has been created has been disposed. |
| Order Segments Changed | Indicates that the sequence of an operation in the work order has been changed. This happens when operations have been added or removed (for example, the disposition for a defective serial/lot is s et to rework). |
| Serial/Lot Split | Indicates that a serial/lot has been split up. This happens when a non-conformance has been created for some of the items in the lot. |
| Serial/Lot Planned Quantity Change | Indicates that the planned quantity of a serial/lot has changed. This happens when items have been added to the planned quantity of the lot or some of the items in the lot have been scrapped. |
| Quantity Completed | Indicates that completed quantity has been specified for a serial/lot for an operation using Unit Operations or Work Queue. |

# Adding Operations to Work Queue

## About Adding Operations to the Work Queue

Each row in Work Queue represents an operation to be performed. By default, Work Queue contains the operations that meet at least one of the following criteria:

- Operations in which at least one serial number has been clocked on
- Operations that you previously added to Work Queue, but not completed

In addition, you can add an operation or all the available operations in a work order to Work Queue. You can add an operation if at least one serial number is available for you to begin work.

Adding operations to Work Queue has the following advantages:

- Extends the list of operations that you want to perform
- Provides visibility on the progress of work that you plan to complete.

To add operations, you can enter the serial number (on which you want to perform an operation) manually or scan the bar code. You can also enter the name of the operation or work order.

> **Note:**
> If you add operations by entering operation names, all the operations with that name are added to Work Queue, regardless of the work order associated with each of them. Therefore, we recommend that you add operations by entering the serial numbers or work order names instead of entering operation names.

## Add Operations to Work Queue

If you want to add operations by scanning the bar code of a serial number, ensure that the camera has been enabled.

1. In the **Work Queue** page, in the **Enter a serial/lot no. or work order or operation to add to queue** box, enter the name of the operation or work order that you want to add to Work Queue. You can also enter a serial number on which you want to perform an operation.

2. Select ╋.

> **(i) Tip:**
> You can also scan the bar code of the serial number by selecting 📷.

- If you entered (or scanned) a serial number, the operations that you can perform on the serial number are added to Work Queue.
- If you entered the name of an operation, all the operations that contain the name and are ready are added to Work Queue.
- If you entered the name of a work order, all the operations in the work order are added to Work Queue.

Complete the operation *(on page 258)*.

# Removing Operations from Work Queue

## About Removing Operations from Work Queue

If you no longer want to work on operations in Work Queue, you can remove them from Work Queue.

You can only remove the operations that you have added manually to Work Queue. If you attempt to remove an operation that has been assigned to you or clocked on by you, the operation appears again when you refresh the page.

## Remove Operations from Work Queue

In the **Work Queue** page, in the row containing the operation that you want to remove, select ✕ . The operation is removed from Work Queue.

> **ⓘ Tip:**
> To remove all the operations that you have manually added, in the upper-right corner of the page, select ✕ .

# Clocking On a Serial or Lot

## About Clocking On Serials/Lots for an Operation

When an operation is created in Route Editor or the ERP system, if it is specified that the operation requires clocking on, you must clock on the serial/lot on which you want to work. It indicates that the you are ready to accept the work and perform the operation.

Operations are planned for execution in one or more production units during production. You can, however, clock on serials/lots for an operation only in one production unit.

A clock-on process on an operation locks the operation for a production unit. As an operator, you can clock on serials/lots for an operation in the Ready status to indicate that you are ready to accept the work and perform the operation. After you clock on, the following actions take place:

- The selected operation is no longer available in the other production units.
- A timer is enabled to monitor the time you spent on the completion of an operation. The time you spent on an operation is visible only to you. The completion time of an operation may differ from one operator to another.
- A clock-on status indicator *(on page 221)* appears for the serial/lot and the operation.

You can clock on multiple serials/lots at the same time. In addition, multiple users can clock on a single serial/lot.

> **Note:**
> If an operation does not require clocking on (as defined in Route Editor or the ERP system), you cannot clock on serials/lots for the operation.

## Clock On Serials/Lots for an Operation

You can clock on a serial/lot only if the operation requires clocking on (as defined in Route Editor or the ERP system).

- Ensure that you have the permission to perform this task. For more information, refer to Security *(on page 287)*
- Ensure that the operation is in the Ready or In Progress status.

1. In the **Work Queue** page, in the row containing the operation on which you want to begin work, select the **ON** button.
   Alternatively, you can select the operation and work order combination from the **Work Queue** page, and then select the **ON** button in the page heading.

   > **Note:**
   > The **ON** button is enabled only if the operation requires clocking on (as defined in Route Editor or the ERP system).

   The **Select Serial (s) to ClockOn** window appears, displaying a list of serials/lots in the operation that are available.
2. In the **LABOR TYPE** drop-down list box, select the type of labor you will perform at the operation.

> **Note:**
>
> By default, the default labor type for the operation is selected. Different serials/lots of the same work order can be clocked on with different labor types.

> **Tip:**
>
> To change the labor type for serials/lots that are currently clocked-on, select an operation and work order combination, and then select ⌄ to expand the header section, and then in the **LABOR TYPE** drop-down list box, select the type of the labor you will perform at the operation.

3. In the **EQUIPMENT** box, select the piece of equipment that you will use to perform the operation.

> **Note:**
>
> If the operation is associated with only one piece of equipment, it is automatically selected.

4. If you want to clock on all the available serials/lots, select the check box in the heading row of the table. If you want to clock on specific serials/lots, perform one of the following steps:

   - Select the check box for each serial/lot that you want to clock on.
   - Search for a serial/lot by entering the value in the **Search in available serial numbers** box, and then select the check boxes from the filtered list that appears.

   - Scan the bar code of the serial/lot by selecting 🔲.

> **Note:**
>
> By default, during Plant Application installation, `LotsToExecute` is set to 50, so you can clock on only 50 serials/lots at a time. If you want to change the value, you must edit the `LotsToExecute` property and set a new numerical value.
>
> If you have installed Enterprise Plant Applications Web Client, this parameter is available in the following file:
>
> ```
> <installation_path>/PlantApplicationsDocker/plantapps-web-docker/mnt/configfiles/workqueue-app/prod/<
> version>/workqueue-app-prod.properties
> ```
>
> After you change the value of the parameter, run the following Docker commands to restart the Work Queue application:

> - `sudo docker service scale PAContainer_workqueue-app=0`
>
> - `sudo docker service scale PAContainer_workqueue-app=1`
>
> If you have installed Standard Plant Applications Web Client, this parameter is available in
> the following file:
>
> ```
> C:\Program Files\GE
>  Digital\PlantApplicationsWebClient\config-repo\workqueue-app\prod\<version>\workqueue-app-prod.prope
> rties
> ```
>
> After you change the value of the parameter, restart the Work Queue application.

5. Select **Clock On**.

- The selected serials/lots are clocked on. In the **Queue** page, the number of serials/lots that are
  clocked on is updated in the **OFF/ON** column, in the **ON** button.
- All the serials/lots that you have clocked on are assigned the selected labor type.
- The assigned labor type is displayed with the serial/lot name in the clocked-on serials/lots list.

Access documents related to the operation *(on page 38)*.

# Clocking Off a Serial or Lot

## About Clocking Off Serials/Lots for an Operation

If you want to stop working on an operation for some time, you can clock off the serials/lots, and then
clock on again when you resume working on them. It provides visibility to the supervisor on the progress
of work for the operation. The timer in the page displaying operation details stops tracking the time when
you clock off an operation and resumes tracking only when you clock on the operation again.

The following conditions apply when you clock off serials/lots:

- You can clock off only the serials/lots that you have clocked on.
- You can clock off multiple serials/lots for an operation at the same time.
- When you complete an operation, the serials/lots are clocked off automatically.
- You can clock on or clock off serials/lots only if the operation requires clocking on (as defined in
  Route Editor or the ERP system).

## Clock Off a Serial/Lot for an Operation

Ensure that you have the permission to perform this task. For more information, refer to Security *(on page 287)*.

1. In the **Work Queue** page, in the row containing the operation on which you want to stop working, select **OFF**.

   > ✏ **Note:**
   >
   > The **OFF** button is enabled only if you have clocked on at least one serial/lot in the operation.

   The **Select Serial number(s) to clock off** window appears, displaying a list of serials/lots in the operation that you have clocked on.

2. If you want to clock off all the available serials/lots, select the check box in the heading column of the table.

3. If you want to clock off selected serials/lots, perform one of the following steps:
   - Select the check box for each serial/lot that you want to clock off.
   - Search for a serial/lot by entering the value in the **Search in available serial numbers** box, and then select the check boxes from the filtered list that appears.
   - Scan the bar code of the serial/lot by selecting 📷.

   > ✏ **Note:**
   >
   > By default, during Plant Application installation, `LotsToExecute` is set to 50, so you can only clock off 50 serials/lots at a time. If you want to change the value, you must edit the `LotsToExecute` property and set a new numerical value.
   >
   > If you have installed Enterprise Plant Applications Web Client, this parameter is available in the following file:
   >
   > ```
   > <installation_path>/PlantApplicationsDocker/plantapps-web-docker/mnt/configfiles/workqueue-app/prod/<
   > version>/workqueue-app-prod.properties
   > ```
   >
   > After you change the value of the parameter, run the following Docker commands to restart the Work Queue application:
   >
   > - ```
   >   sudo docker service scale PAContainer_workqueue-app=0
   >   ```
   >
   > - ```
   >   sudo docker service scale PAContainer_workqueue-app=1
   >   ```
   >
   > If you have installed Standard Plant Applications Web Client, this parameter is available in the following file:

```
C:\Program Files\GE

 Digital\PlantApplicationsWebClient\config-repo\workqueue-app\prod\<version>\workqueue-app-prod.prope

rties
```

After you change the values of parameters, restart the Work Queue application.

4. Select **Clock off**.

- The selected serials/lots are clocked off. In the **Work Queue** page, the number of serials/lots that are clocked on is updated in the **OFF/ON** column.
- When you clock off all the serials/lots of a work order that previously had all the serials/lots clocked-on, the labor type of the work order displayed in the header is changed to the default value.

# Adding a Comment

## About Adding a Comment

While working on a serial/lot, you can add a comment on the serial/lot or the work order to provide any additional information.

You can view the comment added to a serial/lot regardless of the operation you are performing on the serial/lot. For example, if you have added a comment to a serial/lot while performing the first operation, the comment also appears when you access the serial/lot for any subsequent operations. Similarly, when you add a comment to a work order, it appears when you access any of the serials/lots for the work order. For this reason, when you add a comment, it is a good practice to provide the details of the operation for which the comment is applicable.

If a work order or serial/lot contains comments, when you access an operation, the comments button ( 🗩 ) appears with a blue dot ( 🗩 ). If you select that button, the number of comments for the work order or serial/lot appears on the **Work Order** or **Serial/lot** tabs, respectively.

You can add an image, video, or attach the following document types to a comment:

- Microsoft Word (DOC/DOCX)
- Microsoft Power Point Presentation (PPT/PPTX)
- Microsoft Excel (XLS/XLSX)
- Text document
- PDF

Only images and videos can be attached inline within the Comment rich text editor along with the textual data. The other document types are uploaded to the comment as non-inline attachments.

## Add a Comment

You can compose comments with images, videos, and documents that support your comment.

Add images/videos to a comment using the camera/video option or upload them as attachments. You can copy paste images using clipboard, or drag and drop them into the rich text editor. You can also preview the image, video, and pdf file types.

1. Access the operation associated with the serial or lot or the work order for which you want to add a comment.

2. In the heading, select 🗩.
   A window appears, displaying a list of comments for the work order. These comments are arranged in the reverse order of creation (that is, the latest comment appears first).

3. Depending on whether you want to add a comment to the work order or serial/lot, select the appropriate tab.

4. In the **ADD COMMENT** box, enter the comment.

   > ℹ️ **Tip:**
   >
   > If needed, you can apply formatting, change the alignment of the comment, or insert a link in the comment.

   You can add inline images by copy pasting from a clipboard to the comment rich text editor.

   The maximum character limit for plain text is 7000 characters. The file size for images/videos should not exceed 25MB.

5. **Optional:** Attach documents *(on page 50)* and add images *(on page 51)*/videos *(on page 51)* to a comment.

6. Select **Add**.

The comment is added.

> ℹ️ **Tip:**
>
> To modify a comment, select ✎ and to delete a comment that you have added, select ✕. If you do not have the permission to perform this task, request your administrator to provide the permission using Security.
> The following conditions apply when you modify or delete a comment:

> **ℹ**
> - You can modify or delete comments added by others only if you have the permission to moderate comments. Otherwise, you can modify or delete only the comments that you have added.
> - After you modify a comment and save your changes, you cannot view the original text.
> - After you delete a comment, you cannot restore it.

## Upload Documents to a Comment

You can attach documents that support your comment.

Except for images and videos, all the other documents are attached as non-inline.

Ensure that the document that you want to upload is available on the Plant Applications server.

1. Select 📎 .

   The **Upload Document** window appears.
2. In the **FILE NAME/URL** box, enter the file path, or browse to select the document to upload.
3. Select **Upload**.

   If the document is an image/video, a preview of the file appears in the comment rich text editor along with its filename label.

   The document is inserted into the comment.
4. **Optional:**  To modify the uploaded image, select the image preview to open the image in an edit mode.
   a. Use the image editing options to resize or modify the image.
   b. Select **Save**.

> **✎ Note:**
> Images added to the comment from a URL cannot be modified. To delete uploaded images/videos, delete the file preview or its filename label from the editor.

## Add Images to a Comment

You can add images that support your comment.

A comment can have multiple images. You can add images to a comment by uploading them as documents *(on page 50)*, or taking a screenshot using the camera icon. The comments editor supports JPEG, PNG, GIF, ICO, and WebP image formats.

1. Select 📷 .

> 📝 **Note:**
>
> If a message appears, asking you to allow access to the camera, select **Allow**.

A screen appears in camera mode.

2. Point the camera to the subject, and select the shutter icon to capture a still image.
   A preview of the image appears in the comment rich text editor along with its filename label, and simultaneously saved to the database.
3. **Optional:** To modify the captured image, select the image preview to open the image in an edit mode.
   a. Use the image editing options to resize or modify the image.
   b. Select **Save**.

   To delete saved images from a comment, delete the image preview or its filename label in the editor.

## Add Videos to a Comment

You can add videos that support your comment.

Videos are streamed only when you play them. You can add videos to a comment by uploading them as documents *(on page 50)*, or use the video option to record a live video and save. The comments editor supports MP4, MOV, and WebM video formats.

1. Select 🎥 .

> 📝 **Note:**
>
> If a message appears, asking you to allow access to the camera, select **Allow**.

A screen appears to record the video.

2. Use the shutter icon to capture the video.
   A preview of the recorded video appears in the comment rich text editor along with its filename label, and simultaneously saved to the database. You cannot modify videos in the comment editor.

   To delete saved videos from a comment, delete the video preview or its filename label in the editor.

# Adding a Lot to an In-progress Work Order

## Adding a Lot to an In-progress Work Order

To add a lot to a work order, all of the following conditions must be met:

- The behavior **Allow addition of material lots to a work order in progress** is set for the route (see Create a Route Revision *(on page 210)*).
- The work order is in progress.
- The work order is for a serialized product.
- You have the permission to add lots to in-progress work orders running on the specified line (see About the Security Application *(on page 287)*)

1. Select the work order to modify.
2. Click ╂. This will bring up the **Add Lots to Work Order** dialog.
3. Enter the number of additional lots in **NO OF LOTS TO ADD**. This will add rows as required to the **ENTER SERIAL/LOT#** table.
4. Click ⤓ to auto-populate the remaining **SERIAL/LOT#** and **GENERATED SERIAL/LOT#**.
5. Click **ADD LOTS**.

Added lots will be appended to the bottom of the list. There is no need to enter anything in the **SERIAL/LOT#** field; the Auto Populate function looks after this.

# Consuming a Lot

## About BOM Items

The bill of materials (BOM) is a list of formulation items required to manufacture a product. Consuming a BOM item represents the process of utilizing a BOM item within an operation. The BOM items required to complete an operation are defined in Route Editor or in the ERP system, along with details on whether consuming a BOM item is mandatory to complete the operation.

Using Unit Operations, you can perform the following tasks:

- Access a list of BOM items associated with an operation.
- View the total number of mandatory BOM items to be consumed for the serials/lots that you have clocked on for an operation. This number appears on the **BOM** tab when you access an operation.
- Specify the quantity of BOM items that have been consumed for each serial/lot. If an operation requires clocking on (as defined in Route Editor or the ERP system), you can complete an operation

only if all the mandatory BOM items for each serial/lot in the operation are consumed. If, however, the operation does not require clocking on, you can complete the operation even if the mandatory BOM items are not consumed.

The color of a row in the list of BOM items indicates the requirement type and the consumption status of a BOM item, as described in the following table.

| Color | Description |
|---|---|
| Pink | Indicates that the BOM item is mandatory to complete an operation. To complete an operation, you must consume all the mandatory BOM items in the operation. The **BOM** section displays the quantity of mandatory BOM parts required to complete an operation when the following conditions are true: <br><br> • The required BOM items are not consumed for an operation. <br> • The quantity of BOM parts consumed is less than the lower quantity (if set), else the required quantity of the BOM parts. |
| White | Indicates that the BOM item is not mandatory to complete an operation (that is, BOM items are supplementary for an operation). |
| Blue | Indicates that consuming the BOM item is mandatory and the BOM item is consumed while executing an operation during production. The row containing the BOM item turns blue when the consumed quantity of the BOM item is greater than or equal to the required quantity of the BOM items for that operation. |

## Access BOM Items

An operation contains a list of BOM items necessary to perform the operation. As an operator, you can access the **BOM** section to specify the consumption of the BOM items for a product.

1. Select the operation whose BOM items you want to access.
2. Select **BOM**.

   The **BOM** section appears, displaying the BOM items associated with the selected operation.

   The number of the BOM tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on the serial/lot.

   In Unit Operations, the number of the **BOM** tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on the serial/lot. In Work Queue, the number on the **BOM** tab indicates the total number of mandatory BOM items that are yet to be consumed to complete the operation on all the serials/lots that you have clocked on for the operation. The following table provides information on each column in the table.

| Column | Description |
|---|---|
| **ORDER** | The recommended order of consumption of the BOM item in an operation. |
| **MATERIAL** | The material number of the BOM item. |
| **MATERIAL DESC** | The material description of the BOM item. |
| **REQ QTY** | The planned quantity of the BOM items required for the completion of the serial/lot for the operation. |
| **CONSUMED QTY** | The actual quantity of the BOM items consumed during the production. |
| **UOM** | The unit of measure (UOM) of the BOM item. |
| **SERIAL/ LOT#** | The serial/lot of the raw material that was consumed. |
| **LOWER QTY** | The lower tolerance quantity of the BOM item that can be consumed. |
| **UPPER QTY** | The upper tolerance quantity of the BOM item that can be consumed. |
| **SCRAP FACTOR** | The Percentage of this BOM item that is expected to be lost during production of the formulation. For example, if 100 units of Product XYZ is required with a scrap factor of 1%, then you should have a 101 units on hand when preparing to produce the product. |
| **STORAGE UNIT** | Unit currently storing the selected product. |

3. In the **BOM** section, select an item.

   The page containing the item details and consumption history appears.

## Specify Consumption of BOM Items for an Operation

Consuming a lot represents the process of utilizing a BOM item within an operation. As an operator, you can access the **BOM** section in the Work Queue application to consume the lots while executing an operation.

You can consume serial/lot in the following two methods as needed:

- **Consume exact serial/lot number**: If you already know the exact serial/lot that needs to be consumed, you can enter that serial/lot and the quantity to consume, and then consume.

  > **Note:**
  >
  > If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming an Exact Serial/Lot Number *(on page 252)*.

- **Search for a lot and consume (Partial search)**: If you do not know the exact serial/lot that needs to be consumed and/or if you want to consume from multiple serials/lots of a same BOM item, you can search for the complete or the partial name of the serial/lot. The serials/lots that match the searched string will be listed, and you can enter the quantity to consume for all those serials/lots as needed, and then consume.

  > **Note:**
  >
  > If the lot number that you have entered does not exist in Plant Applications, a window appears, asking you whether you want to create the lot number. If that happens, enter the quantity to create and consume, and then select **Yes**. For more information, refer to Create a Lot *(on page 256)*.

  > **Note:**
  >
  > If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming Serial/Lot using Partial Search *(on page 254)*.

- To consume a lot, you must have the **Consume raw material** permission. If you do not have the permission to perform this task, request your administrator to provide the permission using Security. For more information, refer to Create a Role *(on page 291)*.
- If clocking on is required for the operation, clock on the serials/lots *(on page 237)* for which you want to specify BOM consumption.

1. Log in to Plant Applications Web Client.
2. Select **Work Queue**.
3. Access the operation for which you want to specify the consumption of BOM items.
   The page for the operation appears, displaying the **Documents** section. On the **BOM** tab, a number appears, which indicates the total number of mandatory BOM items to be consumed for all the serials/lots that you have clocked on for the operation.
4. Select **BOM**.

   A list of serials/lots appears.
5. Select the serial/lot for which you want to specify the consumption of BOM items.
   A list of BOM items for the selected serial/lot appears in the workspace.
6. Select the BOM item whose consumption you want to specify.
   A window appears, providing information on the required quantity of the BOM item, whether consuming the BOM item is mandatory to complete the operation, and the quantity that has been already consumed for the serial/lot.
7. Search for a **Serial/Lot#**:
   - If you already know the exact serial/lot that needs to be consumed, in the **SCAN SERIAL/LOT#** box, enter the exact serial/lot of the BOM item.
   - If you do not know the exact serial/lot that needs to be consumed and/or if you want to consume from multiple serials/lots of a same BOM item, in the **SCAN SERIAL/LOT#**, enter the complete or the partial **Serial/Lot#** of the BOM item that you want to consume, and then select 🔍.

   > ✏️ **Note:**
   > If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming Serial/Lot using Partial Search *(on page 254)*.

   - If you want to search for a serial/lot by using a barcode, select 📷, and then scan the barcode of the serial/lot associated with the BOM item. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional

(Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes. In iPad, you can use 📷 only in the Safari browser.

> **Note:**
> - The search result of the **SCAN SERIAL/LOT#** box is not case-sensitive.
> - For an exact serial/lot search and consumption, the Available: <quantity_of_parts> message displays the quantity of BOM items available in the lot for consumption. If the required quantity of the BOM items specified in the REQUIRED QTY box is less than or equal to the quantity available in the lot, the Available: <quantity_of_parts> message appears in grey, else the message appears in red.

If you entered an exact serial/lot, you can enter the quantity to consume, and then select **Consume** as mentioned in the steps 8 and 9.

> **Note:**
> If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming an Exact Serial/Lot Number *(on page 252)*.

If you searched for multiple serials/lots for a BOM item, a list of serials/lots appears.

The following table provides information on each column in the **Consumption History** section.

| Column | Description |
| --- | --- |
| **SERIAL/LOT#** | The serial/lot of the raw material. If you have searched for a serial/lot with a partial name, all the serials/lots that match the partial name appear. |
| **AVAILABLE QTY** | The available quantity of the serial/lot. |
| **QTY TO CONSUME** | Box to enter the quantity of consumption of the BOM item. |
| **STORAGE UNIT** | The unit currently storing the selected product. |
| **DATE/TIME** | Storage date/time of the serial/lot. By default, the date/time results are sorted in chronological order. |

8. In the **QTY TO CONSUME** box, enter the quantity of consumption of the BOM item.

   - If you entered the exact serial/lot, then enter the quantity to consume in the **QTY TO CONSUME** box for that serial/lot number.
   - If you searched for multiple serials/lots for a BOM item, in the **Consumption History** section, in the **QTY TO CONSUME** boxes next to the serial/lot numbers, enter the quantity to consume as needed.

> ✏️ **Note:**
> If the lot number that you have entered does not exist in Plant Applications, a window appears, asking you whether you want to create the lot number. If that happens, enter the quantity to create and consume, and then select **Yes**. For more information, refer to Create a Lot *(on page 256)*.

9. Select **Consume**.

   An entry for the consumption of the material is added to the table in the **Consumption History** section. If you consume more than one lot for an operation, the number of entries in the **Consumption History** section depends on the number of lots that are consumed. After an entry is created in the **Consumption History** section, you cannot cancel the consumption of the BOM item. If there are any issues in the **Consumption History** section, contact your administrator.

10. **Optional:** Select the <BOM item number> links in the page displaying BOM item details to navigate to the previous and next BOM items in a sequential order of the BOM items.

11. **Optional:** In the **JUMP TO BOM ITEM** box, specify the BOM item number that you want to locate and then press Enter. You must enter the complete BOM item number in the search box.

    Alternatively, to search for a BOM item by using a barcode, select 📷, and then scan for the barcode of the BOM item. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes. In iPad, you can use 📷 only in the Safari browser.

The page containing the selected BOM item details appears. The BOM items are consumed in the selected operation, and the quantity of the BOM items consumed appears in the **CONSUMED QTY** box in the **BOM** section.

Provide data for quality variables *(on page 259)* for each serial/lot in the operation.

## Error Messages while Consuming an Exact Serial/Lot Number

This section describes the error messages that you might see while you try to consume an exact serial/lot number. For more information on consuming serial/lot, refer to the section Specify Consumption of BOM Items for an Operation *(on page 248)*.

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| Cannot consume more than what is currently available. Current Quantity is *<value>* | The available quantity in the serial/lot is less than the quantity specified in the **QTY TO CONSUME** box. | • Consume the available current quantity from the existing serial/lot, and then consume the remaining required quantity from another serial/lot.<br>• Consume from another serial/lot that contains the quantity as needed. |
| Unit of measure of the serial/lot does not match unit of measure for required quantity. Cannot consume this serial/lot: <Serial/lot name> | UOM of the BOM Material does not match the UOM of serial/lot that you are trying to consume from. | • Consume from a different serial/lot that has the correct UOM that matches the UOM for the required quantity.<br>• If you are a Plant Apps administrator, you can configure the UOM of the serial/lot in BOM Editor. |
| This serial/lot is currently not available. Production status = *<status>*, Current quantity = *<value>*, Inventory = *<No>* | The Inventory flag is **NO** for the production status of the serial/lot that you are trying to consume from. | • Consume from a different serial/lot.<br>• If you are a Plant Apps administrator, you can configure the Inventory flag as **Yes** for the production status of the serial/lot, using **Production Status Editor** in **Plant Applications Administrator**> **Global Configuration**. |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| This serial/lot is currently not available on a valid location. Production status = *<status>* , Current quantity = *<value>*, Inventory = *<No>* | In case of process manufacturing system, the serial/lot that you are trying to consume is created on an invalid storage unit (the unit is not attached to BOM Material).<br><br>✏️ **Note:**<br>In case of a process manufacturing system, for a BOM Material, a valid unit is the storage unit configured in the BOM formulation.<br><br>In case of a discrete manufacturing system, as there is no storage unit restriction, you will not get this error message. Instead, you can consume from the serial/lot. | You must consume from the serial/lot that is created on a valid storage unit. |
| This serial/lot is currently not available. Production status = *<status>*, Current quantity = *<value>*, Inventory = *<Yes/No>*, Not a valid status on the location | In case of a process manufacturing system, the production status of the serial/lot that you are trying to consume is not listed in the valid status list for the raw material input configuration.<br><br>In case of a discrete manufacturing system, as there is no storage unit restriction, you will not get this error message. Instead, you can consume from the serial/lot. | • Consume from a different serial/lot.<br>• If you are a Plant Apps administrator, you can do any of the following:<br>  ◦ Add the required status to the valid status list, using **Unit Properties Configuration** in **Plant Applications Administrator** > **Plant Model**.<br>  ◦ Configure the status of the serial/lot |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| | | to one of the valid statuses using **Production Status Editor** in **Plant Applications Administrator**> **Global Configuration**. |

## Error Messages while Consuming Serial/Lot using Partial Search

This section describes the different error messages that you might see while you do a complete or partial string search and try to consume a single serial/lot or multiple serials/lots. For more information on consuming serial/lot, refer to the section Specify Consumption of BOM Items for an Operation *(on page 248)*.

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| No Results Found | The serial/lot that you searched is not found due to any of the following reasons: <br><br> • The serials/lots that match the string searched are not available. However, you can create the required serial/lot. For more information, refer to Create a Lot *(on page 256)*. <br> • The material of the searched lot is different from the BOM material that is being searched for. <br> • In case of the process manufacturing system, the searched serials/lots do not belong to the defined valid unit for the process order. For a BOM Material, | • Try to consume from a different serial/lot. |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| | a valid unit is the storage unit configured in the BOM formulation.<br><br>📝 **Note:**<br>In case of a discrete manufacturing system, there is no valid storage unit restriction. If the serials/lots are not there in a storage unit, it will fetch the BOM Materials that have the same UOM from all the other units.<br><br>• The searched serials/lots are not available for consumption, either based on the status or the quantity. | |
| Unit of measure of the serial/lot does not match unit of measure for required quantity. Cannot show serial/lot(s) : <Names of all the lots that has UOM miss-match> | UOM of the BOM Material does not match the UOM of the searched serial/lot. | • Consume from a different serial/lot that has the correct UOM that matches the UOM of the searched serial/lot.<br>• If you are a Plant Apps administrator, you can configure the UOM of the lot in BOM Editor. |

# Create a Lot

- To create a lot, you must have the **Create raw material lots** permission. If you do not have the permission to perform this task, request your administrator to provide the permission using Security. For more information, refer to .
- You must clock on an operation to consume or create a lot. If the operation is not clocked on, the **SCAN SERIAL/LOT#** box is not enabled.

As an operator, you can create a lot in the **BOM** section if the lot is not available for consumption while executing an operation.

1. Log in to Plant Applications Web Client.
2. Select **Work Queue**.
3. Access the operation for which you want to specify the consumption of BOM items.
   The page for the operation appears, displaying the **Documents** section. On the **BOM** tab, a number appears, which indicates the total number of mandatory BOM items to be consumed for all the serials/lots that you have clocked on for the operation.
4. Select **BOM**.
   A list of serials/lots appears.
5. Select the BOM item whose consumption you want to specify.
   A window appears, providing information on the required quantity of the BOM item, whether consuming the BOM item is mandatory to complete the operation, and the quantity that has been already consumed for the serial/lot.
6. Select the serial/lot for which you want to specify the consumption of BOM items.
   A list of BOM items for the selected serial/lot appears in the workspace.
7. While consuming a lot, enter the lot number of the BOM item you want to consume in the **SCAN SERIAL/LOT#** box.
8. In the **QTY TO CONSUME** box, enter the quantity of the BOM items you want to consume in the operation.
9. Select **Consume**.
   A message appears, indicating that the lot number you entered is not available in the Plant Applications database and if you want to create a lot.
10. In the **EQUIPMENT** drop-down list box, select an equipment on which you want to consume the lot.

> 📝 **Note:**
> A list of equipment or units appears based on your product and equipment configuration, the unit of measure (UOM) of the BOM item, and the equipment. Based on these conditions, you can do one of the following:

> ✎ • Select one of the equipment if more than one equipment is available in the Plant Applications database.
> • By default, an equipment appears in the **EQUIPMENT** drop-down list box if there is only one equipment available in the Plant Applications database.
> • Create a lot on your current equipment if there is no equipment available in the Plant Applications database that matches with these conditions. However, you can create a lot on your current equipment only when the UOMs of your equipment and BOM item match.
>
> Else, an error message appears, indicating that the unit of measure (UOM) of the equipment does not match with the UOM of the BOM item. For more information on the error messages that you might see while creating a lot, refer to the section Error Messages while Creating a Lot *(on page 257)*.

11. In the **QTY TO CREATE** box, enter the quantity of the BOM items that you want to consume on the lot.

12. Select **Yes**.

    A lot is created in the Plant Applications database and the quantity of BOM items specified are consumed from the lot created.

## Error Messages while Creating a Lot

This section describes the different error messages that you might see while you create a lot during serial/lot consumption. For more information on creating a serial/lot, refer to the section Create a Lot *(on page 256)*.

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| Complete is the system default for lot creation but Inventory = *<No>* | The Inventory flag is **NO** for the **Complete** production status. | • Kindly contact your Plant Apps administrator.<br>• If you are the Plant Apps administrator, you must configure the Inventory flag to **YES** for the **Complete** production status using **Production Status Editor** in **Plant Applications Administrator> Global Configuration**. |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| Complete is not a valid status on this location, therefore lot cannot be created here | The unit on which you are creating the serial/lot belongs to the raw material input configuration, and for that unit, **Complete** is not available in the list of valid statuses in the **Raw Material Input** configuration. | • You must create the serial/lot on a different unit.<br>• If you are a Plant Apps administrator, you must add **Complete** to the list of valid statuses using **Raw Material Inputs** configuration in **Plant Applications Administrator**, for that unit. |

# Completing an Operation

## About Completing an Operation

Completing an operation involves performing the operation on all the serials/lots as specified in the work order.

To complete an operation that requires clocking on, you must perform the following tasks:

1. Clock on each serial/lot *(on page 237)* associated on which you want to perform the operation.
2. Perform the operation on each serial/lot that you have clocked on.
3. Specify the consumption of BOM items *(on page 248)* for each serial/lot on which you have performed the operation. Only if all the mandatory BOM items have been consumed for all the serials/lots in the work order, you can mark the operation complete.
4. Provide data for quality variables *(on page 259)* that have been defined for the operation in Plant Applications Administrator. Only if values for all the mandatory quality variables have been specified for all the serials/lots in the work order, you can mark the operation complete.
5. If needed, create a non-conformance *(on page 74)* for any defective serials/lots.
6. If needed, provide a comment *(on page 48)* on the serials/lots or work order.
7. Provide the completed quantity *(on page 260)* for each serial/lot on which you have performed the operation.

To complete an operation that does not require clocking on, you can mark the operation complete *(on page 264)* directly.

> **Note:**
>
> When an operation is clocked on by multiple operators and an operator completes the operation, the operation is marked complete for all the operators.

After all the operations in a work order are completed on all the serials/lots, the work order is marked complete. You can view the completion status of the work order in Work Order Manager *(on page 130)*.

## Provide Data for Quality Variables

Quality variables include details about the data that you must collect while performing an operation. These variables are defined in Plant Applications Administrator. The values that you provide for these variables help verify that the parameters that are critical to the quality and manufacturing processes are within the acceptable limits. You can use this data to review the performance of a production line and production unit and compare the quality of the products produced in each unit with projections for an operation.

For example, suppose you have been assigned the testing operation in a motor manufacturing unit. Quality variables can include the torque and rpm of the motor shaft. When you test each motor, you must enter the torque and rpm values for the corresponding serial number. A quality supervisor can then verify that the torque and rpm fall within the acceptable range.

For an operation that requires clocking on, you can mark the operation complete only after you provide data for all the mandatory quality variables. For an operation that does not require clocking on, however, you can mark the operation complete even if you have not provided data for the mandatory quality variables.

If the operation required clocking on, clock on the serials/lots *(on page 237)* for which you want to provide data for quality variables.

1. Select the operation for which you want to provide data for the quality variables.
2. Select **Quality**.

   A list of serials/lots in the operation appear in the left section.
3. Select the serial/lot whose data you want to provide.

   A list of quality variables defined for the operation appear in the workspace.

> **ⓘ Tip:**
>
> - By default, all the quality variables appear. If you want to access only mandatory variables, select **Mandatory Variables** in the drop-down list box.
> - If you want to view the lowest, highest, lower quartile, upper quartile, and median values for each variable, select ⊞. If you want to view the same values plotted on a chart, select ⬈.

4. For each variable, enter data in the **SPEC** column.

> **ⓘ Tip:**
>
> If you want to plot the value on a chart, select ⬈.

If acceptable limits have been specified for the variable, the box in the **SPEC** column displays a color, indicating whether the value that you have entered is within the acceptable range.

> **🖊 Note:**
>
> If the variable has electronic signature enabled, an **Electronic Signature** window appears whenever you insert or edit a test value for a variable. The ✐ icon near the text box indicates that the variable is entitled to electronic signature for any modifications. For more information about electronic signature, refer Modify the Value of an Electronic Signature Autolog Variable *(on page 439)*.

5. Repeat steps 3 and 4 for each serial/lot in the operation.

The data for the quality variables is saved.

If a serial/lot contains a defect, create a non-conformance *(on page 74)*. Otherwise, mark the operation complete for the serial/lot *(on page 260)*.

## Provide the Completed Quantity for an Operation

After you perform an operation on a lot, you can provide the quantity of the lot on which you have performed the operation.

You can provide the completed quantity only if the following conditions are satisfied:

- The operation requires clocking on (as defined in Route Editor or the ERP system).
- You have specified the BOM consumption for all the mandatory BOM items for the quantity of lot that you want to mark complete. For example, in a lot of eight items, if you have performed the operation on two items, you must specify the BOM consumption for the two items. The quantity of the consumed BOM items must be greater than or equal to the required quantity to perform the operation.
- You have provided data for all the mandatory quality variables for all the lots that you want to mark complete.
- The lots are clocked on by you.

Perform the following steps for all the lots for which you want to provide the completed quantity:

1. In the row containing the operation for which you want to provide the completed quantity, select
   .

   > **Note:**
   >
   > The  button appears only if there is at least one lot that for which you can provide the completed quantity.

   The **Select Serial/Lot number(s) to Record Quantity** window appears, displaying a list of lots for which you can provide the completed quantity. In the **COMPLETED** column, the quantity of the completed lots (out of the planned quantity) appears.
2. For each lot for which you want to provide the completed quantity, select the check box, and then enter the quantity in the **REC QUANTITY** column. The quantity that you enter must be less than or equal to the available quantity. If threshold values are defined for the lot, you must enter the quantity that satisfies the threshold range.
   A lot configured with threshold limits allows the operator to deviate from a planned quantity, and complete with more or less quantity based on the actual execution of the lot. A threshold range is configured for the product to identify the maximum and minimum allowed quantity to record in a lot to complete it.

> **Tip:**
>
> - If you want to provide the completed quantity for all the lots in the list, select the check box in the heading row of the table.
> - You can search for a lot by entering a value in the **Search in clocked on serial numbers** box, and then selecting the check boxes from the filtered list that appears.

> **Note:**
>
> **Record quantity** is populated by default, when
>
> `default.record.quantity.to.remaining.quantity` is set to true. If false, you must manually enter the outstanding quantity available for a serial/lot. This application service variable is set during Plant Applications installation.
>
> If you have installed Enterprise Plant Applications Web Client, these parameters are available in the following file:
>
> ```
> <installation_path>/PlantApplicationsDocker/plantapps-web-docker/mnt/configfiles/operator-app-service
> /prod/<version>/operator-app-service-prod.properties
> ```
>
> After you change the values of parameters, run the following Docker commands to restart the Operator app service:
>
> - `sudo docker service scale PAOperatorappservice_operatorappservice=0`
> - `sudo docker service scale PAOperatorappservice_operatorappservice=1`
>
> If you have installed Standard Plant Applications Web Client, these parameters are available in the following file:
>
> ```
> C:\Program Files\GE
>  Digital\PlantApplicationsWebClient\config-repo\operator-app-service\prod\<version>\operator-app-serv
> ice-prod.properties
> ```
>
> After you change the values of parameters, restart the Operator app service.

3. Select **Record**.

> **Tip:**
>
> If you also want to clock off the selected lots, select **Rec + Clock Off**.

> **Note:**
>
> The **Record** and **Rec + Clock Off** buttons are enabled only if you select the check box for at least one lot.

> **Note:**
>
> By default, during Plant Application installation, `LotsToExecute` is set to 50, so you can only record 50 serials/lots to complete. If you want to change the value, you must edit the `LotsToExecute` property and set a new numerical value.
>
> If you have installed Enterprise Plant Applications Web Client, this parameter is available in the following file:
>
> ```
> <installation_path>/PlantApplicationsDocker/plantapps-web-docker/mnt/configfiles/workqueue-app/prod/<
> version>/workqueue-app-prod.properties
> ```
>
> After you change the value of the parameter, run the following Docker commands to restart the Work Queue application:
>
> - ```
>   sudo docker service scale PAContainer_workqueue-app=0
>   ```
>
> - ```
>   sudo docker service scale PAContainer_workqueue-app=1
>   ```
>
> If you have installed Standard Plant Applications Web Client, this parameter is available in the following file:
>
> ```
> C:\Program Files\GE
>  Digital\PlantApplicationsWebClient\config-repo\workqueue-app\prod\<version>\workqueue-app-prod.prope
> rties
> ```
>
> After you change the value of the parameter, restart the Work Queue application.

4. Select any of these options:

| Button | Description |
|---|---|
| **Rec + Complete** | Appears only when the threshold values are configured for the lot.<br>• Records the actual quantity entered by the operator and completes the lot, provided the actual quantity is within the defined thresholds. |

| Button | Description |
|---|---|
| **Rec + Clock Off** | Enabled only if you select the check box for at least one lot.<br><br>• If threshold values are configured for the lot, records the entered quantity and the operator is clocked off the lot.<br>• If threshold values are not configured, and<br>  ◦ the recorded quantity is less than the planned quantity, then the quantity is recorded, and the operator is clocked off the lot.<br>  ◦ the recorded quantity is equal to the planned quantity, then the lot is completed, and the operator is clocked off the lot. |
| **Record** | Enabled only if you select the check box for at least one lot.<br><br>• If threshold values are configured for the lot, records the quantity entered by the operator.<br>• If threshold values are not configured, and<br>  ◦ the recorded quantity is less than the planned quantity, then only records the quantity.<br>  ◦ the recorded quantity is equal to the planned quantity, then records and completes the lot. |

The value in the **COMPLETED** column for the operation is updated. If the completed quantity of a lot is equal to the planned quantity, the operation is marked complete for the lot.

## Mark an Operation Complete

If the operation that you want to mark complete requires clocking on, provide the completed quantity of the serial/lot for the operation .

For an operation that requires clocking on, if the completed quantity of a serial/lot is equal to the planned quantity for the work order, the operation is automatically marked complete for the serial/lot. If, however, the operation does not require clocking on, and if you have performed the operation on the serial/lot, you must mark the operation complete. It is then removed from the list in the **Work Queue** page.

> **Note:**
>
> For a non-serialized lot, when an operation is a clocking operation and the material is configured with over and under production thresholds, the auto-complete feature is not triggered. In these cases, you must record a quantity and specify when they have completed the work. Completion is validated to ensure the quantity recorded is aligned to the over and under production thresholds based on the initial planned quantity of the serial/lot.

After all the operations are marked complete for all the serials/lots in a work order, the work order is marked complete in Plant Applications. You can view the completion status of the work order in Work Order Manager *(on page 130)*.

> **Note:**
>
> Even if a part is over or under claimed at an operation, the X of Y quantity, Y is always based on the initial planned quantity, that is, it does not fluctuate based on manufactured/created/recorded quantity at previous operations. However, X can vary based on over or under quantity at the operation.
>
> For example, Lot A is set for an initial planned quantity of 10. Now, at operation-1, the operator claims 9 of 10 quantity and completes the operation. In the Work Queue application, the operation-1 is complete with 9 of 10. However, for the next operation (operation-2), Lot A produces 10 quantity based on the initial planned quantity (and not as previous manufactured/created/recorded quantity of 9 at operation-1). In the Work Order Manager application, the work order can be completed with 9 of 10.

1. In the row containing the operation that you want to mark complete, select ✓.

   > **Note:**
   >
   > The ✓ button appears only if the completed quantity of the serial/lot equals the planned quantity for the work order or if the operation does not require clocking on.

The **Select Serial/Lot number(s) to Complete** window appears, displaying a list of serials/lots in the work order that are clocked on by you for the operation. If, however, the operation does not require clocking on, a list of all the serials/lots in the work order appears.

2. Select the check boxes corresponding to the serials/lots for which you want to mark the operation complete, and then select **Complete**.

> **ⓘ Tip:**
> - If you want to mark the operation complete for all the serials/lots in the list, select the check box in the heading row of the table.
> - You can search for a serial/lot by entering a value in the search box or by scanning for the bar code using the 📷 icon, and then selecting the check boxes from the filtered list that appears.

> **✏️ Note:**
> By default, the **EQUIPMENT** box is populated with the piece of equipment assigned for the operation. If required, you can select a different piece of equipment.

If the operation is marked complete for all the serials/lots in the work order, the operation no longer appears in the **Queue** page. It appears in the **By Work Order** page until all the operations in the work order are complete.

# Skipping an Operation

## About Skipping an Operation

As an operator, you can see the **OPT** flag on any optional operation. You can skip an operation that is in Ready state and is configured as Optional. However, you cannot skip all operations that are set to Optional. There are two types of skip actions that can be performed on an optional operation.

- **Implicit Skip**: You cannot skip these operations using the **Skip** button even if you have the permission. In this case, you can see that the operation is Optional, however, you cannot see the **Skip** button. You can only skip these operations by starting the next operation.

  For example, Let's assume you have operations OPT10, OPT20, and OPT30 that are sequential and optional. If you have selected OPT10 and you cannot see the **Skip** button for this, it implies that you can only skip this operation by starting OPT20. When you start OPT20, OPT10 is implicitly skipped

and OPT20 moves into **In progress**. OPT30 changes state to **not ready**. OPT 30 cannot be started until OPT20 is **complete**.

- **Explicit Skip**: You can skip these optional operations that are in **Ready** state by using the **Skip** button. When you select an operation that is configured for explicit skip, you can see the **Skip** button. Additionally, you can also perform implicit skip on this operation by starting the next operation.

> **Note:**
>
> - Once an operation is skipped, explicitly or implicitly, it is considered completed. Skipped operations are in queues with completed operations.
> - When you have a Work Order with a single optional operation that has only one seria/lot, you cannot skip this optional operation. If you try to skip this operation, a **Unprocessable Entity** error message appears.

## Skip an Operation

You can skip an operation that is configured as optional.

- If you do not have the permission to perform this task, a message appears, stating the same. In such case, request your administrator to provide the permission using **Security**.
- You can only skip an operation that is configured as Optional. You can specify an operation as optional using **Route Editor**.
- Ensure that the optional operation is in **Ready** status.

1. In the **Work Queue** page, in the row containing the optional operation that you want to skip, select the **SKIP** button under COMP/REC column.

   Alternatively, you can select the operation and work order combination from the **Work Queue** page, and then select the **SKIP** button in the page heading.

   > **Note:**
   > You can identify an operation as optional using the **OPT** column. You can add the **OPT** column using .

   The **Select Serial number(s) to Skip** window appears displaying all the serials/lots of the operation that are in **Ready** status.

2. If you want to skip all the available serials/lots, select the check box in the heading row of the table. If you want to skip specific serials/lots, perform one of the following steps:

   - Select the check box for each serial/lot that you want to skip.
   - Search for a serial/lot by entering the value in the **Search in available serial numbers** box, and then select the check boxes from the filtered list that appears.
   - Scan the bar code of the serial/lot by selecting ⬚.

3. Select the **Skip** button to skip the operation.
   The selected serials/lots are skipped.

# Creating a Non-Conformance

## About Creating a Non-Conformance

A non-conformance occurs when a serial/lot contains a defect (that is, it does not meet the specification or requirement of a process, system, internal policies and procedures, customer requirements, or regulatory body). Each non-conformance can be related to multiple defects.

You can create a non-conformance for the following types of products:

- Serialized: You can create a non-conformance for multiple serialized products at the same time. Defects that are created as part of a non-conformance appear in Non Conformance *(on page 78)*, where they can be disposed.
- Non-serialized: You can create a non-conformance only for a single lot at a time. If only some quantity of the lot is defective, you can specify the quantity of the defective pieces. The lot is then split into sublots. This will allow you to continue working on the non-defective quantity, while the defective quantity is disposed using Non Conformance *(on page 78)*.

The following conditions apply when you create a non-conformance:

- You can create a non-conformance on a serial/lot only if you are clocked on to the serial/lot.
- You can create a non-conformance only on the available quantity of a lot (that is, the quantity for which the operation is not yet complete).
- The defective serial/lot and the operation are changed to the On Hold status. Depending on the configuration, you are clocked off the serial/lot and the operation.
- You can complete the operation on the serial/lot only after the serial/lot is disposed in Non Conformance.

## Create a Non-Conformance

1. Access the operation during which you want to create a non-conformance.
2. In the left pane, select the serial/lot for which you want to create a non-conformance.
3. Select **NCR**.

   A list of non-conformances created for the serial/lot selected in the left pane appears.
4. In the workspace, select **Create Non Conformance**.

   > ✏️ **Note:**
   >
   > The **Create Non Conformance** button is enabled only if you select a serial/lot that you have currently clocked on.

   The **Create Non Conformance** window appears.
5. Provide values as specified in the following table.

| Box or Section | Description |
| --- | --- |
| **SUMMARY** | Enter a summary for the non-conformance. A value is required. |
| **AFFECTED QUANTITY** | • For a serialized product, this box is disabled and populated with the value 1.<br>• For a non-serialized product, enter the quantity of the lot that contains the defect. A value is required.<br><br>> ✏️ **Note:**<br>> The value in this box must be less than or equal to the quantity of the lot for which the operation is not complete. |
| **NON CONFORMANCE TYPE** | This box is disabled and populated with the value **Manufacturing Defect**. |
| **DEFECT TYPE** | Select the type of the defect associated with the non-conformance. A value is required. |

| Box or Section | Description |
|---|---|
| **DEFECT REASON** | Select **Select Reason**, specify the hierarchical set of reasons for the non-conformance, and then select **Apply**.<br><br>📝 **Note:**<br>The reasons that appear in the **Select Reasons** window are pre-defined in Plant Applications Administrator, and appear based on the value in the **NON CONFORMANCE TYPE** box. If you want to modify the list of reasons, contact your administrator. |
| **FULL DESCRIPTION** | Enter the full description of the non-conformance. |

6. Select **Submit**.

A non-conformance is created for the serial or the defective pieces of the lot, and appears in Non Conformance *(on page 78)*.

- For a serialized product, depending on the configuration, you are clocked off the serial and the operation. You can complete the operation on the serial only after it is disposed *(on page 88)*.
- For a non-serialized product, if the affected quantity is less than the available quantity of the lot, the lot is split into two sublots:
  - One lot contains the defective pieces. This lot is changed to the On Hold status, and the non-conformance for this lot appears in Non Conformance. This lot is numbered in the following format: <original lot number>-2. You can complete the operation on this lot only after it is disposed.
  - The other lot contains the remaining pieces. This lot is in the In Progress status. It is numbered in the following format: <original lot number>-1. If none of the pieces in this lot is defective, you can continue working on this lot. If, however, some of the pieces in this lot are defective, you can split this lot further by creating a non-conformance again.
  - The original lot is changed to the Cancelled status, and no longer appears in Unit Operations. Values of the quality variables, BOM consumption, and the completed quantity of this lot are copied to the sublot that contains the non-defective pieces.

# Chapter 7. Time Booking

## Time Booking

### About the Time Booking Application

As an operator or supervisor, you can view your labor records (timesheet). You can also add missing time records, or modify the applied time of a previously submitted record. When an operator performs a clock off, the time difference between the clock on and clock off is the default calculated applied labor time for that labor record. In the event of any discrepancy, you can manually adjust the applied labor time.

You can use the Time Booking application in the following scenarios:

- an operator has made a mistake related to vouchering a transaction (for example, clocked off 10 minutes late)
- an operator forgot to clock off at the end of a shift
- an operator did not clock on at all for the day
- the vouchering or punchout system was not working
- the MES system was down

Users with an operator role have access to view and edit records that were transacted by them. Users with a supervisor role can view and edit records for other users, in addition to managing their own records.

> **!** **Important:**
> A submitted labor record cannot be deleted, regardless of the role of the submitter.

Operators and supervisors can adjust the applied labor time for three types of operation statuses:

- ready
- in-progress
- completed

Operators and supervisors can perform the following tasks in the Time Booking application:

1. View the labor records by a time period.
2. Create a labor record. The following labor types are available:
   - Direct
   - Rework

- Setup
- Indirect

3. Modify the applied time for a labor record.

## Access a Labor Record

In the Time Booking page, depending on the time period by which you want to view the labor records, in the **View By** box, select one of the following options:

- Today: Labor records created from 12:00 AM to 11:59 PM today.
- Last 7 days: Labor records processed starting at 12:00 AM seven days ago to 11:59 PM of today.
- Custom: Labor records for the defined date and time range.

Apart from the labor records, a snapshot of the applied labor time is displayed in the following manner:

- Total applied time: Aggregate of the applied time of the labor records that are displayed for the selected time period.

> **Note:**
>
> If the applied time is more than 24 hours, the total applied time is displayed in number of days.

- Total filtered time: Aggregate of the applied time of the labor records that are displayed for the selected time period when a filter is applied to the table.

## Add Applied Time for a Work Order

To add the applied time for a work order, you must create a labor record.

> **Note:**
>
> Once a labor record is created and submitted, an operator or a supervisor cannot delete it.

1. In the Time Booking page, in the **View By** box, select a time period to view the labor records.
2. Select **Add New Record** and select the type of labor record you want to add.
   A blank row with the selected labor type is displayed.
3. Provide values as specified in the following table:

| Column | Description |
|---|---|
| Work Order | Enter the work order name of the selected labor type for which you want to add the applied labor time. |
| Serial/Lot# | Enter the serial or lot number associated with the work order. |
| Operation | Enter the type of operation for which you want to add the applied labor time. |
| Machine | Enter the name of the machine for which you want to add the applied labor time. |
| Applied Time | Enter the time range, in HH:MM format, that you want to add as applied time for this labor record. Alternatively, you can also select the <insert clock icon> and select the time range from the list |

> **Note:**
> - If you have selected a labor of type Direct, the information that is populated in the **Work Order**, **Serial/Lot**, **Operation**, and **Machine** columns are of the same type.
> - Only work orders that are ready, in-progress, and completed are populated in the respective fields.
> - If you add an indirect labor record, then the fields **Work Order**, **Serial/Lot**, **Operation**, and **Machine** are not mandatory. However, you must select the reason from the **Select reason for Indirect Labor** window. The reasons that are displayed in the **Select reason for Indirect Labor** window are based on the configuration made under the **Sample_Labor_Indirect** reason tree in the Plant Applications Administrator.

4. To create more labor records, repeat steps 2 through 4.

> **Tip:**
> - To cancel the current record, select **X**.
> - To cancel all the records that you are currently creating, select **Cancel**.

5. Select **Submit**.

The labor records are added to the table.

## Modify Applied Time for a Labor Record

1. In the Time Booking page, select the **View By** list, and select a time period to view the labor records.
2. Locate the labor record that you want to modify.
   You can either use the filters or the Search option to locate the record.
3. Modify the value in the **Applied Time** column.
4. Select **Submit**.

> **Note:**
> - You cannot modify any other data in the record.
> - You cannot delete a labor record.

The applied time for the labor record is modified.

## Switch to a Different User

If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

1. In the Time Booking page, select **Change User** located below your username.
   The **Change User** window appears and displays all the usernames configured in the User Account Authentication (UAA) system.

> **Note:**
> If you do not have the permission to switch to a different user, **Change User** is not available.

2. Enter the username of the user you want to switch to.
   A list of usernames that matches your entry appears.
3. Select the username of the user you want to switch to, and select **Change**.
   The records of the user you switched to are displayed.

# Chapter 8. Property Definition

## Overview

### About the Property Definition Application

You can access the Property Definition application to define properties that are tailored to the requirements of your business. The data acquired from these properties can be further processed and used for different purposes in the respective applications. For example, you can define properties to capture additional business data related to ERP inbound messages.

Using this application, you can:

- Access the existing property definitions.
- Create, modify, or delete a property category.
- Create, modify, or delete a property group for a selected category.
- Create, modify, or delete a property definition.
- Link properties to a group.
- Filter property definitions by category and group.

### About Property Definitions

Properties enable you to capture the business data that can be used for further analysis. Each property is associated with a group, and, in turn, each group is mapped to a category.

A property definition contains the following components:

- **Property Category:** A property category is a parent object that denotes the area of application to which a property group belongs. You can use it to organize the property groups and definitions associated with the application.
- **Property Group:** A property group is a collection of properties. You can use it to group fields that are commonly used so that the individual fields are automatically added in the configured applications.
- **Property Definition:** A property definition includes the alias name, data type, default value and other information of the property.

### Default Categories, Groups and Properties

The following table includes the default categories, groups and properties defined in the ERP and Route Editor applications:

| Category | Group | Property |
|---|---|---|
| **ERP App** | **Material Import** | • **unitofmeasure**<br>• **OP_Threshold**<br>• **UP_Threshold** |
| **ERP App** | **MaterialLot Import** | • **Receive Line**<br>• **Receiver Status**<br>• **Receiver Unit**<br>• **Inventory Line** |
| **Route App** | **WorkOrder Import** | No default properties |
| **ERP App** | **BomItem Import** | No default properties |
| **Process Order App** | **ProcessOrder Import** | No default properties |

> **Note:**
>
> Do not delete the aforementioned Categories, Groups and Properties that appear in the Property Definition by default.

The above properties can be used in the respective applications to store, process, and analyze data.

Example: The value of the unitofmeasure property is set by the ERP import for materials.

OP_Threshold is over production threshold. UP_Threshold is under production threshold. The default float value 0.2 represents a threshold of 20%.

Example: Suppose, the planned quantity for a lot is 5. 20% OP_Threshold of 5 calculates the maximum quantity (more than 5) you can add to the lot. 20% UP_Threshold of 5 calculates the minimum quantity (less than 5) you can record and complete the lot.

You can also create more property definitions in the aforementioned groups as required.

Example: When you import a material, if you require more information on the material , you can add more property definitions in the Material Import group to capture and utilize that information. Refer to Create a Property Definition .

# Managing Property Categories

## Create a Property Category

1. Select ⊞.

   The **Property Definition** page appears, displaying a list of properties available in Plant Applications Web Client.

2. From the **CATEGORY** drop-down list box, select **Create New**.

   The **Create Property Category** page appears.

3. Enter a category name in the **CATEGORY NAME** text box and then select **Create**.

   > ✏️ **Note:**
   >
   > When you create a category for the Route Editor application, the category name should include the string **Route**. A category which does not include the string **Route** in its name cannot be used in the application.

   The newly created category is added to the **CATEGORY** list.

## Modify a Property Category

1. Select ⊞.

   The **Property Definition** page appears, displaying a list of properties available in Plant Applications Web Client.

2. Select the **CATEGORY** drop-down list box.

   The list of categories is displayed.

3. Select ✎ in the row containing the category you want to modify.

   The **Update Property Category** window appears.

4. Modify the category name in the **CATEGORY NAME** text box.

5. Select **Update**.

The category name is updated.

## Delete a Property Category

Delete all the property groups that are included in the property category you want to delete.

> ⚠️ **Important:**
> You must not delete the default groups that appear in the application such as Material Import, MaterialLot Import, and WorkOrder Import. If you delete any default property group, the corresponding application integration will stop working.

1. Select 📋.

   The **Property Definition** page appears, displaying a list of properties available in the Plant Applications Web Client.

2. Select the **CATEGORY** drop-down list box.

   The list of previously created property categories appear.

3. Select ✕ in the row containing the category you want to delete.

   The **Delete Property Category?** window appears.

4. Select **Delete**.

The property category is deleted.

# Managing Property Groups

## Create a Property Group

For an ERP application, you should use only the default groups available in the Property Definition application. However, you can create new groups for the Route Editor application. Create groups only in the category that includes the string **Route** in its name. You can add these property groups to a route or an operation in the Route Editor application. For more information, refer to Assign a Property Group *(on page 191)*.

1. Select 📋.

   The **Property Definition** page appears, displaying a list of properties available in the Plant Applications Web Client.

2. From the **CATEGORY** drop-down list box, select a required category for which you want to associate this group.

   > ✎ **Note:**
   > You can skip to step 3, if you want to create a group and not map it to a category.

3. From the **GROUP** drop-down list box, select **Create New**.

   The **Create Property Group** page appears.

4. Enter a group name in the **GROUP NAME** text box and then select **Create**. The newly created group is added to the **Group** list and is mapped to the selected category.

> ✎ **Note:**
> To create multiple property groups and map it to a specific category, perform the following:
> a. From the **CATEGORY** drop-down list box, select a required category.
> b. Now, perform step 3 and 4 by not changing the category for creating each group. The newly created groups are mapped to the selected category respectively.

## Modify a Property Group

You must not modify the default groups *(on page 275)* that appear in the application such as Material Import, MaterialLot Import, and WorkOrder Import. If you modify any default property group, the corresponding application integration will stop working.

1. Select ☰.

   The **Property Definition** page appears, displaying a list of properties available in the Plant Applications Web Client.
2. Select the property category of the property group you want to modify, from the **CATEGORY** drop-down list box.

   The groups in the **GROUP** drop-down list are filtered based on the category selected.
3. Select the **GROUP** drop-down list box.
4. Select ✎ in the row containing the group you want to modify.

   > ⚠ **Important:**
   > Do not modify the default property groups such as Material Import, MaterialLot Import, WorkOrder Import.

   The **Update Property Group** window appears.
5. Update the group name in the **GROUP NAME** text box.

The group name is updated.

## Delete a Property Group

All the property definitions included in the group should be deleted before deleting the property group.

> **⚠ Important:**
>
> You must not delete the default groups *(on page 275)* that appear in the application such as Material Import, MaterialLot Import, and WorkOrder Import. If you delete any default property group, the corresponding application integration will stop working.

1. Select ☰.

   The Property Definition page appears, displaying a list of properties available in the Plant Applications Web Client.
2. Select the **GROUP** drop-down list box.

   > **✎ Note:**
   >
   > Alternately, you can first select the property category to the which the group you want to delete belongs, from the **CATEGORY** drop-down list box, and then select the **GROUP** drop-down list box.

   The list of groups appear.
3. Select ✕ in the row containing the group you want to delete.

   The **Delete Property Group?** window appears.
4. Select **Delete**.

The group is deleted.

# Managing Property Definitions

## About Creating a Property Definition

Property Definition enables you to create new properties for various applications and add the relevant data for the properties such as the alias name, data type, default value and so on. Each property is associated with a group, and, in turn, each group is mapped to a category.

Using the Property Definition application, in addition to creating a property, you can copy, modify, and delete a property, category, or group.

# Create a Property Definition

- For an ERP application, you should create property definitions in only the default groups, Material Import, MaterialLot Import, and WorkOrder Import.
- For Route Editor, you should create property definitions in the groups that belong to the categories that include the word **Route** in their names.

1. Select ▤.

   The **Property Definition** page appears, displaying a list of properties available in the Plant Applications Web Client.
2. Select a category and an associated group for which you want to create a property definition from the **CATEGORY** and **GROUP** drop-down list boxes respectively.
3. Select ✛.

   A blank row appears.
4. Enter the values as specified in the following table.

| Box | Description |
|---|---|
| **PROP-ERTY NAME** | Denotes the name for the property. You must enter a value that is unique to a group. |
| **ALIAS NAME** | Enter an alias for the property. |
| **DATA TYPES** | Select a data type for the property. <br><br> **Note:** <br> A data type defines the format in which the data is stored and displayed in the application. |
| **DE-FAULT VAL-UE** | Enter a default value for the property based on the data type. |
| **RE-QUIRED VAL-UE** | Select this check box only if you want the property to be a required value. |

| Box | Description |
|-----|-------------|
| **PROP-ERTY GROUP** | Displays the group name based on the selection in the **GROUP** drop-down list box. You cannot edit this field if you have already selected the group from the **GROUP** drop-down list box.<br><br>**Note:**<br>• If you have selected a specific category from **CATEGORY**, you can select a group that is mapped to the selected category from this drop-down list box.<br>• If you have left **CATEGORY** and **GROUP** drop-down list boxes to defaults, this drop-down list box displays a list of groups defined in the Plant Applications database. You must select the group to which you want to assign the property. |
| **UOM** | This box contains a list of UOMs defined in the Plant Applications database. Select a unit of measurement (UOM) for the property. |

5. Select **Save**.

   A property definition is created. This property definition is integrated with the respective application.

   > **Note:**
   > To modify the property definition details, select **Edit**. To create another property definition with the details of the current property definition, select **Copy**.

Assign a property group *(on page 191)* to a route in the Route Editor application, and then provide values for the property definition *(on page 192)*.

## Modify a Property Definition

You must not modify the default property definitions *(on page 275)* that appear in the application such as, Receive Line. If you modify any default property definition, the corresponding application integration will stop working.

1. Select ▤.

   The **Property Definition** page appears, displaying a list of properties available in the Plant Applications Web Client.

2. Select a category and an associated group that includes the property definition you want to modify, from the **CATEGORY** and **GROUP** drop-down list boxes respectively.

   The property definitions are filtered based on the selected category and group.

3. Edit the details of the property definition. The following details are available for editing:
   - **DATATYPES**
   - **DEFAULT VALUE**
   - **REQUIRED VALUE**
   - **UOM**

4. Select **Save**.

The property definition is updated.

## Add Default Value for the List Datatype

Use this procedure the set the default values for the property definition having 'List' as the datatype.

1. Select ▤.

   The **Property Definition** page appears, displaying a list of properties available in Plant Applications Web Client.

2. Select a category and an associated group from the **CATEGORY** and **GROUP** drop-down list boxes respectively.

3. Select ＋ .

   A blank row appears.

4. In the **NAME** field type the name for the property. You must enter a value that is unique to a group.

5. In the **DISPLAY NAME** field, type the display name for the property.

6. In the **DATA TYPES** field, select the **List** datatype from the list.

7. In the **DEFAULT VALUE** field, select **View**.

   The **Add/Edit List** page appears.

8. Select ＋.

   A blank row appears. Use this row to add the property value details.

9. Based on the requirement, build a list of values by adding rows.

10. To add a default value, select the value, then select the **DEFAULT VALUE** toggle button to mark the default value.

    The default value is added to the property value.

> **Note:**
>
> You can add a default value for only one given value at a time.

11. Select **Close**.

12. On the **Property Definition** page, under **ACTIONS**, select **Save** to save the default value for the property.

    The set default value appears for applications (for example, Route Editor) that use the **List** datatype property.

## Delete a Property Definition

You must not delete the default property definitions *(on page 275)* that appear in the application. If you delete a default property definition, the corresponding ERP integration will stop working. You should install the definition using a GUID. For more information, refer to ERP Integration Guide.

1. Select .

   The **Property Definition** page appears, displaying a list of properties available in the Plant Applications Web Client.

2. Select the property category from the **CATEGORY** drop-down list box, and then select the property group of the property definition from the **GROUP** drop-down list box.
   The property definitions are filtered based on the selected category and group.

3. Select **Delete** in the **Actions** column in the row containing property definition you want to delete.
   The **Delete Property?** window appears.

4. Select **Delete**.

The property definition is deleted.

## Copy a Property Definition

You can copy a property definition when you want to create a new property definition but do not want to re-enter all the property definition values.

1. Select .

   The **Property Definition** page appears, displaying a list of properties available in Plant Applications Web Client.

2. **Optional:** Select a category and an associated group that includes the property definition you want to copy, from the **CATEGORY** and **GROUP** drop-down list boxes respectively.

3. Select **Copy** in the **Actions** column in the row containing property definition you want to delete.

   A copy of the property definition is created.

4. Edit the property definition details, as needed.

| Box | Description |
|---|---|
| PROP-ERTY NAME | Denotes the name for the property. You must enter a value that is unique to a group. |
| ALIAS NAME | Enter an alias for the property. |
| DATA TYPES | Select a data type for the property. <br><br> **Note:** <br> A data type defines the format in which the data is stored and displayed in the application. |
| DE-FAULT VAL-UE | Enter a default value for the property based on the data type. |
| RE-QUIRED VAL-UE | Select this check box only if you want the property to be a required value. |
| PROP-ERTY GROUP | Displays the group name based on the selection in the **GROUP** drop-down list box. You cannot edit this field if you have already selected the group from the **GROUP** drop-down list box. |

| Box | Description |
|---|---|
| | ✏️ **Note:** <br>• If you have selected a specific category from **CATEGORY**, you can select a group that is mapped to the selected category from this drop-down list box. <br>• If you have left **CATEGORY** and **GROUP** drop-down list boxes to defaults, this drop-down list box displays a list of groups defined in the Plant Applications database. You must select the group to which you want to assign the property. |
| UOM | This box contains a list of UOMs defined in the Plant Applications database. Select a unit of measurement (UOM) for the property. |

✏️ **Note:**

• You cannot have multiple property definitions with the same name in the same group. You can have multiple properties with same name in different groups.

• If a group was selected in the **Groups** drop-down list box at step 2, the value of **GROUP** column is non-editable. A copy of the property definition will be created in the same group and it is mandatory to change the property name.

• If a group was not selected in the **Groups** drop-down list box, the value of **GROUP** column is editable. You can select any group from the drop-down list of GROUP column.

5. Select **Save**.

The property definition is saved.

# Chapter 9. Security

## Overview

### About the Security Application

As an Administrator, you can use the Security application to provide permissions to group of users to access various Plant Applications modules. It also enables you to provide access to perform various tasks within the applications. You can provide department-level, line-level and unit-level access privileges to the users.

Terminology used in Security application:

- Applications: Various modules of Plant Applications such as, Work Order Manager.
- Resources: A resource is a unit, line, or a department. Example: Welding Department
- Groups: A group is a collection of people and sub-groups. You can create a group of users doing the same task on the same resource. Example: You can have a group of supervisors for each line. Example: Supervisors_LineA, Supervisors_LineB, Supervisors_LineC.

  A group can also have multiple sub-groups: Example: You can create a group All_Supervisors and add Line A, B & C supervisors to that group.

- Role: A role contains a set of permissions required to perform various tasks. Example: Role1 may include permission to create a work order, update a work order and so on.
- Assignment: Enables you to assign a role and resources to groups. An assignment defines the tasks and the resources to which a group of users have access.

The following table describes the tasks that are now secure. A user needs permission to these tasks to be able to perform the tasks.

| Application | Tasks | Lowest level of resource that could be added to an assignment |
|---|---|---|
| Unit Operations and Work Queue | • Execute work orders<br>  ◦ clock on<br>  ◦ clock off<br>  ◦ provide completed quantity for an oper-ation | • Unit |

| Application | Tasks | Lowest level of resource that could be added to an assignment |
|---|---|---|
| | ◦ specify a quality variable<br>◦ mark an operation as complete<br>• Skip an operation<br>• Consume BOM<br>• Create raw material lots | |
| | • Add produced material lot to in-progress work order | • Line |
| Work Order Manager | • Create a work order<br>• Edit a work order plan<br>  ◦ change start/end dates<br>  ◦ update the priority<br>• Edit the work order (change operations)<br>• Change lot identifiers<br>• Clock off another operator<br>• Cancel a work order<br>• Add produced material lot to an in-progress work order<br>• Add produced material lot to a not started work order<br>• Manually complete a work order<br>• Cancel a not started serial/lot | • Line |
| Unit Operations, Work Queue, and Work Order Manager | • Edit and delete comments of other users | • Site |
| Time Booking | • Edit and delete labor records of other users | • Site |

| Application | Tasks | Lowest level of resource that could be added to an assignment |
|---|---|---|
| ERP | • Import the details related to Work Orders, Material Lots, and Outside Processing (OSP) from ERP to MES. To enable this, the user should have the permission to:<br>  ◦ Create a work order<br>  ◦ Edit a work order<br>  ◦ Execute a work order<br>  ◦ Cancel a work order<br>  ◦ Clock off others<br>  ◦ Change work order plans<br>  ◦ Create a raw material lot | • Line |

> **Note:**
>
> When you create an assignment, if you add a resource that is at lower level than the lowest level required, the permissions will fail. Example: Suppose you want a user to have permission to create a work order, while creating an assignment, if you include only a unit level resource, the permission will fail, because work orders are created on lines and not on units.

Example 1: Ram and Ravi are operators. To provide them access to Non Conformance, perform the following steps:

1. Create a group such as Operators_1.
2. Add Ram and Ravi to Operators_1.
3. Add Operators_1 group to Non Conformance. Ram and Ravi can then access

Example 2: John and Stacy are supervisors. To give them access to edit work order plans on Line 1 in Work Order Manager, perform the following steps:

1. Create a role such as Supervision_1 and provide permission to edit work order plan.
2. Create a group such as Supervisors_Line1 and, add John and Stacy to the group.

3. Ensure that the Supervisors_Line1 group has been added to Work Order Manager.

4. Create an assignment to assign the role Supervision_1, the resource Line 1 to Supervisors_Line1. John and Stacy will then have the permission to edit work order plans on Line 1 in Work Order Manager.

Example 3: Carol and David are supervisors. To give them access to edit work orders on Line 2 in Work Order Manager, perform the following steps:

1. Create a role such as Supervision_2 and provide permission to edit a workorder.

2. Create a group such as Supervisors_Line2 and add Carol and David to the group.

3. Ensure that the Supervisors_Line2 group has been added to Work Order Manager.

4. Create an assignment to assign the role Supervision_2, the resource Line 2 to Supervisors_Line2. Carol and David will then have the permission to edit work orders on Line 2 in Work Order Manager.

Example 4: You can create an assignment to give permission to all the supervisors (John, Stacy, Carol and David) of the Site1 (includes Line 1 and Line 2) access to moderate comments on an application (example: Unit Operations).

1. Create a role Moderator and provide permission to edit and delete comments.

2. Create a group such as Supervisors_All and add Supervisors_1 and Supervisors_Line2 to the group.

3. Ensure that the Supervisors_All group has been added to the application for which you want to access comments (example: Unit Operations).

4. Create an assignment to assign the Moderator role, the Site1 resource to Supervisors_All group.

   All the supervisors included in Supervisors_All will now have access to edit or delete comments from within the application (example: Unit Operations).

# Managing Applications

## Add a Group to an Application

As an Administrator, you can add a group to an application to manage application access for multiple users conveniently and easily. When you add a group to an application, all the users associated with the group can access the application.

1. Select .

   The **Applications** page appears, displaying a list of applications.

2. Select an application.

The **Application Details** page appears, displaying a list of groups associated with the selected application.

3. Select **Add Group**.

   The **GROUP NAME** window appears.

4. In the **Enter a Group Name** box, specify a group name that you want to add to the application, and then select **Add**.

> **ⓘ Tip:**
> When you enter three or more characters, a list of group names that contain the characters appear. If the group does not exist, you can enter the full name of the group to create a new one in UAA. To create new users, refer to the Operations Hub documentation

The group is added to the application. The users associated with the group can now access the application.

## Remove a Group from an Application

As an Administrator, you can remove a group from an application if you do not want the group of users to have access to that application.

1. Select **Applications**.

   The list of applications appears.

2. Select the application from which you want to remove the group.

3. Select ✕ in the row containing the group.

   A message appears, asking you to confirm that you want to remove the group.

4. Select **Delete**.

The group is removed from the application.

# Managing Roles

## Create a Role

A role contains a set of permissions required to perform various tasks. Example: Role1 may include, the permission to create a work order, update a work order, and so on.

1. Select **Roles**.

   The **Roles** page appears, displaying the list of roles.

2. Select ➕.

   The **Create Role** page appears.

3. Provide values as specified in the following table

| Field | Description |
|---|---|
| **ROLE NAME** | Provide a unique name for the role. |
| **ROLE DESCRIPTION** | Provide a description for the role. |

4. Select a role category from the **ROLE CATEGORY** list.

   The relevant permissions appear in the **PERMISSIONS** workspace.

| ROLE CATEGORY | PERMISSIONS (with description) |
|---|---|
| **Work Order Execution** | **Execute a work order**<br><br>The ability to execute a work order by clocking on, clocking off, confirming completed quantities, logging quality variables and completing execution.<br><br>**Consume raw material**<br><br>The ability to search for a raw material lot and consume quantity.<br><br>**Create raw material lots**<br><br>The ability to create raw material lots.<br><br>**Change lot identifiers**<br><br>The ability to modify the serial numbers or lot identifiers within a work order.<br><br>**Manually skip**<br><br>Enable the ability to manually skip an operation that is configured as optional. |
| **Work Order Management** | **Create a work order**<br><br>The ability to create a new work order.<br><br>**Change a work order plans** |

| ROLE CATEGORY | PERMISSIONS (with description) |
|---|---|
| | The ability to change the planned start or end dates or the priority of a work order. |
| | **Change lot identifiers** |
| | The ability to modify the serial numbers or lot identifiers within a work order. |
| | **Cancel a work order** |
| | The ability to cancel a work order that has not been started. |
| | **Edit a work order** |
| | The ability to modify operation definitions within a work order. |
| | **Clock off others** |
| | The ability to clock off any user that is currently clocked on. |
| **Time Booking** | **Moderate time booking records** |
| | The ability to edit other users time booking records. This permission is only applicable at a site level resource. |
| **Comments** | **Moderate comments** |
| | The ability to edit and delete other users comments. This permission is only applicable at a site level resource. |
| **Process Order Execution** | **Consume raw material** |
| | The ability to search for a raw material lot and consume quantity. |
| | **Create raw material lots** |
| | The ability to create raw material lots. |

5. Switch the toggles of the permissions you want to include in the role.
6. Repeat steps 4 and 5 to include permissions of other role categories.

> **Note:**
> The **Summary** page appears, displaying the list of selected role categories and permissions.

7. Select **Create**.

The role is created.

## Modify a Role

1. Select **Roles**.

   The **Roles** page appears, displaying the list of roles previously added.

2. Select .
3. Modify the **ROLE DESCRIPTION**, as needed.
4. Select a role category from the **ROLE CATEGORY** list.

   The relevant permissions appear on the **PERMISSIONS** workspace.
5. Switch the toggles of the permissions you want to include or remove from the role.
6. Repeat Step 4 and 5 to include or remove permissions of other role categories.

> **Tip:**
> You can view the list of selected role categories and permissions in the **Summary** page.

7. Select **Update**.

   The role is modified.

## Delete a Role

You cannot delete a role which is part of an assignment.

1. Select **Roles**.

   The **Roles** page appears displaying the list of roles previously added.

2. Select .

   The **Confirm changes** window appears.
3. Select **Delete**.

The role is deleted.

# Managing Groups

## Create UAA Groups

As an administrator, you can create new UAA groups based on your requirement. Example: You can create a group for the users who perform the same task on the same resource. You can have a group of supervisors for each line such as, Supervisors_LineA, Supervisors_LineB, Supervisors_LineC.

1. Select **Groups**.

   The **Groups** page appears, displaying the list of the previously created groups.

2. Select ➕.

   The **Add Group** window appears.

3. Enter a name for the group, in the **GROUP NAME** text box.

4. Enter a description for the group, in the **DESCRIPTION** text box.

5. Select **Add**.

The group is created and add to the list of groups on the **Groups** page.

## Add or Delete Members from Groups

1. Select **Groups**.

   The **Groups** page appears, displaying the list of groups.

2. In the row containing the group that you want to modify, select ✎ .

   The **Members** page appears, displaying the members added to the group.

3. To add members to the group, perform the following steps:

   a. Select the users or groups you want to add to the group from the **Search for Users and add them to this group** drop-down list box.

   > ✎ **Note:**
   > You can select multiple groups.

   b. Select ➕.

   > ✎ **Note:**
   > A group can have sub-groups.

The members (users or groups) are added to the group. The count of the total members of the group is updated.

4. To delete a member from the group, select ✕ in the row containing the group you want to delete. The member is deleted from the group. The count of the total members of the group is updated.

## Add or Delete Applications from Groups

When an application is added to the group, the users in the group can access the application.

1. Select **Groups**.

   The **Groups** page appears displaying the list of groups.

2. Select ✎ in the row containing the group you want to modify.

   The **Members** page appears, displaying the members added to the group.

3. Select **Applications**.

4. To add applications to the group perform the following steps:

   a. Select the applications you want to add to the group from the **Search for Applications to add them to this group** drop-down list box.

   > **✎ Note:**
   > You can select multiple applications.

   b. Select ✚.

   The applications are added to the group. The count of total applications of the group is updated.

5. To delete applications from the group, select ✕ in the row containing the group you want to delete.

   The applications are deleted from the group. The count of the total applications of the group is updated.

## Add or Delete Assignments from Groups

When an assignment is added to the group, the users in the group can perform the roles included in the assignment, on the resources added to the assignment.

1. Select **Groups**.

   The Groups page appears, displaying the list of groups.

2. Select ✎ in the row containing the group to which you want to add an assignment.

The **Members** page appears displaying the members added to the group.

3. Select **Assignments**.

The list of assignments that are already added to the group appear.

4. To add assignments to the group perform the following steps:

   a. Select the applications you want to add to the group from the **Search for Assignments to add them to this group** drop-down list box.

   b. Select ➕.

   The assignments are added to the group. The count of total assignments of the group is updated.

5. To delete assignments from the group, select ✕ in the row containing the assignment which you want to delete.

   The assignment is deleted from the group. The count of the total assignments of the group is updated.

# Managing Resources

## Add a Resource to an Assignment

1. Select **Resources**.

   The **Resources** page appears, displaying list of departments.

2. Select ❯ in the row containing the department for which you want to view the lines.

   The lines which are part of the selected department appear.

3. Select ❯ in the row containing the line for which you want to view the units.

   The units which are part of the selected line appear.

4. Select ➕ to add the units, lines, or departments to an assignment.

   > **Note:**
   > When you add a department to an assignment, all the lines and units included in the department are added to an assignment. When you add a line to the assignment, all the units included in the line are added to the assignment.

The resources are added to the assignment.

To create an assignment refer to Create an Assignment .

# Managing Assignments

## Create an Assignment

1. Create a role.
2. Add members to the groups.

An assignment must contain only one role. It can contain multiple resources and groups.

1. Select **Create Assignments**.

   The **Create Assignments** window appears.
2. To add a role to the assignment, select **Roles** and then, in the row containing the role you want to

   add to the assignment, select ╋.

   The role is added to the assignment.
3. To add groups to the assignment, select **Groups** and then, in the row containing the group you want

   to add to the assignment, select ╋.

   The group is added to the assignment.
4. To add a resource to the assignment:

   a. Select **Resources**.

      The **Resources** page appears, displaying the list of departments.

   b. Select ❯ for the department for which you want to view the lines.

      The lines that owned by the selected department appear.

   c. Select ❯ for the line for which you want to view the units.

      The units that are part of the selected line appear.

   d. Select ╋ to add the unit, line, or department to the assignment.

> **Note:**
>
> When you add a department to the assignment, all the lines and units included in the department are added to the assignment. When you add a line to the assignment, all the units included in the line are added to the assignment.

> **Tip:**
>
> If you do not want to create an assignment after adding roles, groups or resources, select **Discard**.

The assignment is created..

## Access an Assignment

1. Select **Assignments**.

   The **Assignments** page appears.
2. Refer to each of an assignment as described in the following table:

| Field | Description |
|---|---|
| **CREATED BY** | The user who created the assignment. |
| **CREATED DATE** | The date on which the assignment was created. |
| **ASSIGNMENT NAME** | Name of the assignment. |
| **MODIFIED BY** | The user who modified the assignment. |
| **MODIFIED DATE** | The date on which the assignment was modified. |
| **ACTIONS** | The actions you can perform on an assignment. Includes the following:<br><br>• Modify an Assignment *(on page 300)*<br>• Delete an Assignment *(on page 301)* |

> **Note:**
>
> The above columns are hidden, by default. You can add them to the grid using the Column Chooser.

# Modify an Assignment

1. Select **Assignments**.

   The list of assignments appears on the page.

2. Select ✎ for the assignment you want to edit.

   The **Edit Assignment** window appears, displaying the previously selected role, groups, and units.

3. Select ✕ in the box of the group, role or unit that you want to delete from the assignment.

4. To change the name of the assignment, modify the value in the **ASSIGNMENT NAME** box.

5. To add a role to the assignment, select **Roles**, and then, in the row containing the role that you want

   to add to the assignment, select ✚.

6. To add a group to the assignment, select **Groups**, and then, in the row containing the role that you

   want to add to the assignment, select ✚.

   The group is added to the assignment.

7. To add a resource to the assignment,

   a. Select **Resources**.

      The **Resources** page appears, displaying the list of departments.

   b. Select ❯ in the rows containing the departments for which you want to view the lines.

   c. Select ❯ in the rows containing the lines for which you want to view the units.

   d. Select ✚ to add the units, lines, or departments to the assignment.

   > 📝 **Note:**
   >
   > When you add a department to the assignment, all the lines and units included in the department are added to the assignment. When you add a line to the assignment, all the units included in the line are added to the assignment.

8. Select **Save**.

The assignment is modified.

## Delete an Assignment

1. Select **Assignments** in the header section.

   The list of assignments appears on the page.

2. Select ✕ in the row containing the assignment you want to delete.

The assignment is deleted from the list.

# Chapter 10. Configuration

## Overview

### About Configuration

As a system integrator, you can use **Configuration** to perform the following tasks in the Unit Operations and Work Queue applications:

- Show or hide the tabs.
- Arrange the sequence of tabs.
- Integrate external applications and services.

The Configuration application contains the following pages:

## Standard Tab

### About Standard Tab

Standard Tab displays the list of standard and custom tabs that are associated with the Activities, Unit Operations, Work Queue, Process Orders, or Receiving Inspection applications. You can use this page to show or hide the default and custom tabs in the Activities, Unit Operations, Work Queue, Process Orders, or Receiving Inspection applications. You can also specify the order in which they appear in these applications.

In this page, you can perform the following tasks:

- Change the sequence of the application-specific tabs.

## Show or Hide Tabs

You can configure to show or hide tabs in the Activities, Unit Operations, Work Queue, Process Orders, and Receiving Inspection applications.

1. Log in to the Plant Applications Web Client.

2. Select ▤.

   The **Configuration** page appears with **Standard Tab** selected by default. The **Standard Tab** page lists all the available default and custom tabs for a selected application.

3. In the **Standard Tab** page, from the **Application** section in the left pane, select an application for which you want to show or hide tabs.

   The list of default and custom tabs appears. The following table provides information on each column in the table.

| Col-umn | Description |
|---|---|
| ON/ OFF | You can switch the toggle to either show or hide the associated tab in the selected application. |
| TAB NAME | The name of the tab along with its description that appears in the selected application. For Custom tabs, CustomTab appears as a suffix to the tab name. You can create custom tabs using the **Custom Tab** page. |
| RE-ORDER | Use ↑ or ↓ to shift the tab names up or down to arrange them in a sequence depending on how you want them to appear in the selected application. |

4. Select **Update** to save your changes.

You can navigate to the corresponding application to verify if the changes you made are reflected.

# Custom Tab

## About Custom Tab

Custom tabs are useful to load external third-party web applications. Using Configuration, you can add and configure (the information that will be displayed) custom tabs to Work Queue, Unit Operations, Process Orders, Activities, or Receiving Inspection applications.

> **Note:**
> The external application URL must be Cross-Origin Resource Sharing (CORS)-enabled so that specified input parameters or custom properties can be transferred from the integrated application to the external application.

In this page, you can perform the following tasks:

- Create a new custom tab *(on page 305)* and associate it to either Work Queue, Unit Operations, Process Orders, Activities, or Receiving Inspection applications.
- Adding input parameters to custom tab URLs *(on page 307)*.
- Modify a custom tab *(on page 307)*.
- Delete a custom tab *(on page 307)*.

# Create a Custom Tab

1. In the **Configuration** page, select **Custom Tab**.
2. In the **CUSTOM TABS** section left pane, select **CREATE NEW**.

   The **Create New Custom Tab** section appears on the right pane.
3. Under **Tab Configuration**, provide values as specified in the following table.

> **Note:**
> Name, Description, and URL are mandatory fields to create a custom tab.

| Field | Description |
|---|---|
| DISPLAY NAME | Enter a name that does not exceed 100 characters. |
| DESCRIPTION | Enter a description that does not exceed 250 characters. |
| URL | Enter the URL of the external web application.<br><br>For example, `https://<hostname>:<portnumber>/workqueue-app/api/ workqueue/operations?workOrderId={WorkOrderId}&segmentId={seg- mentid}`. |

| Field | Description |
|---|---|
| | 📝 **Note:**<br><br>Only CORS-enabled URLs are valid. |
| **Authentication** | Switch the toggle to enable URL authentication and display the web application within the custom tab screen.<br><br>📝 **Note:**<br><br>For Single Sign-On, only Operations Hub UAA authentication is supported. However, you can use an application URL that has a different authentication method. You may have to provide credentials at the login screen. |
| **Enable Serial Left Nav** | Select the check box to embed the out of the box serial/lot filter left navigation pane into the custom tab. |
| **Input Parameters** | Select to add input parameters *(on page 307)* to the header. If you want to add parameters to the URL, you must add them using parenthesis {}.<br><br>For example: `https://<IP address>/workqueue-app/api/workqueue/operations?workOrderId={WorkOrderId}&segmentId={segmentid}` |

4. Under **Tab Association**, following applications are displayed. Switch the toggle corresponding to the application for which you want to associate the custom tab.
   - Work Queue
   - Unit Operations
   - Process Orders
   - Activities
   - Receiving Inspection

5. Select **Create** to create and save the custom tab configuration.

   You can see the custom tab listed under the **Standard Tab** section for the respective mapped applications.

   📝 **Note:**

   For Custom tabs, CustomTab appears as a suffix to the tab name.

6. **Optional:** Select **Reset** to reset the configured values.

## Add Input Parameters to Custom Tab URLs

1. In the **CUSTOM TAB** page, under **Tab Configuration**, select **Add another input parameter**.
   The **PARAMETER** box appears.
2. Select an input parameter from the **PARAMETER** box.

   > **Note:**
   > The input parameters are a list of all property definitions including definitions under the MaterialLot and Material property groups. However, the **Configuration** application does not support the property definitions within the MaterialLot Import and Material Import property groups even though they are listed.

3. Enter the alias name in the **ALIAS** text box based on the selected input parameter.

   > **Note:**
   > The alias name is the external application's input parameter. It is mapped to the internal application's input parameter to read values.

## Modify a Custom Tab

1. In the **Configuration** page, select **Custom Tab**.
2. In the **CUSTOM TABS** page, in the left pane, select the custom tab that you want to modify.
   The **Custom Tab Details** section appears in the right pane.
3. Under **Tab Configuration**, modify the custom tab details.
4. To reset configured values, select **Cancel**, and set a new configuration.
5. Under **Tab Association**, switch the toggle corresponding to the application that contains the custom tab.
6. Select **Update**.

The changes made to the custom tab are saved.

## Delete a Custom Tab

1. In the **Configuration** page, select **Custom Tab**.
2. In the **CUSTOM TABS** page, in the left pane, select ✕ for the custom tab that you want to delete.
   A message appears, asking you to confirm that you want to delete the custom tab.
3. Select **Ok**.

The custom tab record is deleted.

# Custom Calls

## About Custom Calls

Custom Calls allow you to configure and integrate an external service as a PRE or a POST call with an action performed in the integrated application. This configuration is action-specific, not application-specific. For example, for any action (Clock on/off, BOM Item Consumption/ Selection, or Complete), if there is any PRE/POST call configuration created, the expected behaviour is same in the Unit Operations, Work Queue, and Process Order applications.

In this page, you can perform the following tasks:

- Access a list of actions and their details. You can also modify the details of an action.
- Configure and integrate an external service.
-
-
-



## Create a PRE or POST Call

1. In the **Configuration** page, select **Custom Calls**.
2. In the **Actions** section, in the left pane, select a required action from the list of actions for which you want to create a PRE or POST call.

3. Under **Custom Call Details** section, select **PRE** or **POST** and enter the required information in the following fields.

> 📝 **Note:**
>
> Pre call is not applicable for BOM item selection; only Post call is applicable. However, both the Pre and the Post calls are applicable for BOM item consumption.

| Field | Description |
|---|---|
| **URL** | Enter the external service URL. <br><br> For example, `https://<IP address>:<port number>/workqueue-app/api/workqueue/operations?workOrderId={WorkOrderId}&segmentId={segmentid}`. <br><br> > 📝 **Note:** <br> > Only CORS-enabled URLs are valid. |
| **METHOD** | Select the request type (GET or POST) that will be used to call the external service. |
| **Authentication** | Switch the toggle to enable URL authentication. <br><br> > 📝 **Note:** <br> > Only Operations Hub UAA authentication is supported. |
| **Add another input parameter** | Select to add as many input parameters you would like to pass to the external service URLs. The **PARAMETER** list, along with the **ALIAS** text box, appears. |
| **PARAMETER** | Select an input parameter that you want to add to the URL. <br><br> > 📝 **Note:** <br> > The input parameters are a list of all property definitions including definitions under the MaterialLot and Material property groups. However, the **Configuration** application does not support the property definitions within the MaterialLot Import and Material Import property groups even though they are listed. |
| **ALIAS** | Enter the alias name based on the selected input parameter. |

| Field | Description |
|---|---|
| | **Note:** The alias name is the external application's input parameter. It is mapped to the internal application's input parameter to read values. |

4. Under **Output Parameters**, provide values as specified in the following table.

| Field | Description |
|---|---|
| PARA-METER | Enter the output parameter so that data can be transferred from an external service to the integrated application. |
| Display Message Key | Enter a string output parameter, which is a property returned by the API that contains a custom user message. The parameter displays the message when the parameter is present and does not have null, blank or space value. |

5. Select **Update** to save your changes.

## Delete a Custom Call

If you no longer want to work with a custom call, you can delete it.

1. In the **Configuration** page, select **Custom Calls**.
2. In the **Actions** section, in the left pane, select a required action from the list of actions for which you want to create a PRE or POST call.
3. Under **Custom Call Details** section, select **PRE** or **POST** based on the requirement.
4. In the **URL** box, delete the application URL.
5. Select **Update** to save your changes.

# Chapter 11. Approval Cockpit

## Overview

### About the Approval Cockpit Application

You can use Approval Cockpit to create and execute approval workflows for action events raised in Plant Applications.

For example, to release a route in the Route Editor application, the event must pass through an approval workflow process in the Approval Cockpit application. The delegated approver groups in the workflow should provide their approval before releasing a route.

After you configure an approval workflow for an action event, the execution of the workflow becomes an automated process whenever the respective event is initiated in Plant Applications. The delegated groups log in to the Approval Cockpit application to access the tasks awaiting their response, and can track the status of the workflows in progress.

> ⚠ **Important:**
>
> To access the Approval Cockpit application, ensure that all the workflow users (members in group names) are a part of the UAA group and client with `mes.approval_cockpit.user` scope.

As an administrator, you must complete the following tasks to enable the workflow configuration and execution in Approval Cockpit:

1. In Plant Applications Administrator,
   - Verify that the action events for Approval Cockpit are available as production units under **Plant Model** > **APC Department** > **APC Line**.
   - Verify that each production unit also has a variable group to list variables related to the action events.

   For more information on production units and variable groups, refer to the *Plant Applications Administrator Help*.
2. In Approval Cockpit,
   - Configure a workflow for an action event .
   - Modify the configured workflows .
3. In Plant Applications Administrator, for every workflow configuration:

- Verify that the display sheets are available under **Client Management** > **Displays** > **APC Line**. Create display sheets with the naming convention: `ProductionUnitName_WorkflowLevel_WorkflowGroup`.

> **ⓘ Tip:**
>
> Display sheets for a typical two-level workflow can look like this:
>
> `Route Approval Form_Level 1_Approvers 1`
>
> `Route Approval Form_Level 1_Approvers 2`
>
> `Route Approval Form_Level 1_Monitoring`
>
> `Route Approval Form_Level 2_Approvers 1`
>
> `Route Approval Form_Level 2_Rejection`

- Verify that the variables are linked to the display sheets. Modify the display sheets to set display options and variables.

For more information on autolog displays and variables, refer to the *Plant Applications Administrator Help*.

4. In Approval Cockpit, as a supervisor, you can:
   - Participate in the approval workflows *(on page 319)*.

# Configuring a Workflow

## About Configuring a Workflow

A workflow involves a series of tasks that are set up to acquire approvals from responsible groups.

Workflows can be configured to be simple with only one level of approvals, or they can be complex with multi-level approval processes. Separate groups to handle rejections and escalations, and monitor overall process can be included in a workflow.

As an administrative user in Plant Applications, you can create and set up a workflow in the Approval Cockpit application with the following tasks:

- Create and save a basic workflow *(on page 313)*.
- Add workflow levels *(on page 315)*.
- Add a monitoring group to the workflow *(on page 314)*.
- Add a rejection responding group to the workflow *(on page 315)*.
- Add an escalation responding group to the workflow *(on page 316)*.

## Create a Workflow

This topic describes how to create a basic workflow for approvals.

The action event for which you want to create a workflow is available as a production unit in Plant Applications Administrator.

The approval workflow you are creating for an action event cannot be deleted. It can only be modified.

1. In the **Approval Cockpit** page, on the **Approver Configuration** tab, select ✛.
   The **Add Workflow Details** screen appears.
2. Provide values as specified in the following table.

| Field | Description |
|---|---|
| WORKFLOW NAME | Enter a unique name for the workflow that does not exceed 100 characters. |
| SELECT FORM | Select a form to use with the workflow. This box contains a list of forms defined for the Approval Cockpit workflows. These forms are production units created under the Approval Cockpit department and line in Plant Applications Administrator. A set of variables associated to the form or unit serve as an approval questionnaire. |
| PRODUCTION LINE | Select a production line to which the workflow belongs. This box contains all the production lines defined in Plant Applications Administrator. |

3. Select **Add**.
   The **Create New Workflow** page appears with the added workflow details.
4. Add the first level of approvers in a workflow .
   To create and save a basic workflow, you must add groups under the **Approvers 1** section.
5. Select **Save**.
   The workflow is saved to the list of workflows on the **Approver Configuration** tab.

- Add a monitoring group *(on page 314)*, rejection responding group *(on page 315)*, or escalation responding group *(on page 316)*.
- Add another level to your workflow *(on page 315)*.
- In Plant Applications Administrator, ensure that the display sheets are created for the configured workflow under the client management section.

## Add Monitoring Group

The role of a monitoring group in a workflow is to supervise the workflow process.

Create and save a basic workflow *(on page 313)*.

You can add a monitoring group while configuring a workflow. You can also add and modify monitoring group *(on page 317)* during workflow execution.

1. In the **Create New Workflow** page, under the **Monitoring Group** section, select **Add**.

   The **Add Monitoring Group** screen appears with a list of group names.
2. Select the group you want to assign to monitor the workflow process.
3. Select **Add**.

   The selected group is listed under the **Monitoring Group** section.
4. Select **Save**.

   The workflow configuration is saved. If you want to modify the added group name, you must delete *(on page 319)* the current one, and add a new one.

## Add Approvers Group

The groups listed under the **Approvers 1** section, under **Level 1** are the initial approvers in a workflow.

Specify the workflow details to create a workflow.

You cannot save a workflow in Approval Cockpit without adding the **Approvers 1** section. All additionally added approver sections can be deleted from a workflow *(on page 318)*.

1. In the **Create New Workflow** page, under the **Approvers 1** section, select **Add**.

   The **Add Alternative Approver Groups** screen appears with a list of group names.
2. Select the check box for the groups you want to assign as approvers to the workflow.
3. Select **Add**.

   The selected groups are listed under the **Approvers 1** section. The workflow process requires any one group among the selected groups to provide their approval.
4. To add additional approver sections in the same level, select **Add New Approver Group**, and repeat steps 2 and 3 to add approvers.

Every additional section in the same level is incrementally labeled. For example, Approvers 2, Approvers 3, etc. The sections are added with an AND operator implying that the approval workflow must pass through all the approver sections in the given order.

5. Select **Save**.

The workflow configuration is saved.

You have the option to add a monitoring group *(on page 314)*, rejection responding group *(on page 315)*, or an escalation responding group *(on page 316)* to your workflow.

## Add a Workflow Level

Workflows can have one or many levels of approval processes. By default, every workflow has one level labeled as **Level 1**.

Create and save a basic workflow *(on page 313)*.

Each workflow level inserts sections on approvers, rejection, and escalation.

1. In the **Create New Workflow** page, select **Add New Level**.

A new level is added to the workflow. New levels are labeled incrementally, such as Level 2, Level 3, etc.

2. To insert a level above an existing level, select ⋮ on any existing level, and then select **Add new level above**.

A new level is inserted above the existing level.

3. To insert a level below an existing level, select ⋮ on any existing level, and then select **Add new level below**.

A new level is inserted below the existing level.

4. Select **Save**.

The workflow configuration is saved.

In Plant Applications Administrator, ensure that the display sheets are created under the client management section. Every level and every group in the level should have a display sheet with the naming convention: `ProductionUnitName_WorkflowLevel_WorkflowGroup`.

## Add Response Groups for Rejection

The role of a rejection group in a workflow is to assess the reasons for rejecting an approval workflow, and take further action.

Create and save a basic workflow *(on page 313)*.

You have the option to add a rejection responding group at every level in a workflow only after adding the approvers group for that respective level.

> **Note:**
>
> In workflows, if a group member is part of both the approver and the rejection responding groups, then during the workflow execution, the member's role as a rejection responder overrides their approver's role. Such members are not allowed to approve any levels in the workflow. However, they can confirm or undo a rejection, if it occurs in the workflow.

1. In the **Create New Workflow** page, under the **Rejection Responding Group** section, select **Add**.
   The **Add Rejection Responding Group** screen appears with a list of group names.
2. Select the group you want to assign as responders to an approval rejection in a workflow.
3. Select **Add**.
   The selected group is listed under the **Rejection Responding Group** section.
4. Select **Save**.
   The workflow configuration is saved.

## Add Response Groups for Escalation

The role of an escalation group in a workflow is to resolve any setback faced due to delay in getting approvals.

Create and save a basic workflow .

You have the option to add an escalation responding group at every level in a workflow only after adding the approvers group for that respective level.

1. In the **Create New Workflow** page, under the **Escalation Responding Group** section, select **Add**.
   The **Add Escalation Responding Group** screen appears with a list of group names.
2. Select the group you want to assign as responders to any escalation in a workflow.
3. Select **Add**.
   The selected group is listed under the **Escalation Responding Group** section.
4. Enter the number of days in **SET ESCALATION REPORTING TIME** after which any pending approvals are escalated. An email is sent to the escalation responding group to take action on the pending approvals.

> ✏️ **Note:**
>
> An escalation can be set to a maximum of 365 days. If the escalation reporting time is not set, then by default the system sets a period of 2 days to escalate the pending approvals.

5. Select **Save**.

The workflow configuration is saved.

# Modifying a Workflow

## About Modifying a Workflow

This topic describes how to modify an approval workflow.

A workflow created in the Approval Cockpit application cannot be deleted. It can be only modified to update its existing configuration. Every new update is saved as a revised version of the workflow. You can perform the following tasks to modify a workflow:

- Add *(on page 315)* or delete *(on page 318)* levels in a workflow.
- Add *(on page 314)* or delete *(on page 318)* approver groups in a workflow level.
- Add *(on page 314)* or delete *(on page 319)* the group names from the approver groups.
- Add *(on page 314)*, modify *(on page 317)*, or delete *(on page 319)* a group name from the monitoring group.
- Add *(on page 315)* or delete *(on page 319)* a group name from the rejection responding group.
- Add *(on page 316)* or delete *(on page 319)* a group name from the escalation responding group.

## Modify Monitoring Group

This topic describes how to update a monitoring group that is configured in a workflow.

A monitoring group exists in a workflow.

During workflow execution, monitoring group can be modified at every workflow level.

1. Log in to the Plant Applications Web Client.
2. In the **Approval Cockpit** page, on the **Approver Execution** tab, access the workflow for which you want to modify the monitoring group and select ⋮ , then select **Edit Monitoring Group**.

    The **Update Monitoring Group** screen appears with a list of group names.
3. Select the group you want to assign to monitor the workflow process.

4. Select **Update**.

   The selected group is saved as the monitoring group for the workflow.

## Delete a Workflow Level

This topic describes how to delete a level in a workflow.

You cannot delete **Level 1** in a workflow.

1. In the **Approval Cockpit** page, on the **Approver Configuration** tab, select ✎ for the workflow you want to modify.

   The **Create New Workflow** page appears with the existing workflow configuration.
2. Access the workflow level you want to delete.

   Workflows can have multiple levels. You can expand and collapse workflow levels. Levels can have one or more approver groups. Levels can also have rejection and escalation groups.
3. Select ⋮ on the level you want to delete, and then select **Delete**.

   The workflow level with any configured approvers, rejection, or escalation is deleted from the workflow.
4. Select **Update**.

   The updated workflow configuration is saved.

## Delete an Approver Group from Workflow Level

This topic describes how to delete additional approver groups added to a level in a workflow.

You cannot delete the **Approvers 1** section, under **Level 1** in a workflow.

1. In the **Approval Cockpit** page, on the **Approver Configuration** tab, select ✎ for the workflow you want to modify.

   The **Create New Workflow** page appears with the existing workflow configuration.
2. Access the workflow level you want to modify.

   Workflows can have multiple levels. Levels can have one or more approver groups.
3. Select 🗑 for the approver group you want to delete.

   At least one approver group is mandatory for a workflow level.
4. Select **Update**.

   The updated workflow configuration is saved.

## Delete a Group Name from Workflow Groups

This topic describes how to delete group names from the monitoring, approvers, rejection, and escalation groups in a workflow.

You cannot delete the only assigned group name under the **Approvers 1** section, under **Level 1** in a workflow.

1. In the **Approval Cockpit** page, on the **Approver Configuration** tab, select ✎ for the workflow you want to modify.
   The **Create New Workflow** page appears with the existing workflow configuration.
2. Access the workflow level and group you want to modify.
   Workflows can have a monitoring group and multiple levels. Levels can have one or more approver groups. Levels can also have rejection and escalation groups. Any assigned group names are listed under the respective workflow groups.
3. Select 🗑 for the group name you want to delete.
4. Select **Update**.
   The updated workflow configuration is saved.

# Executing a Workflow

## About Executing a Workflow

Workflows configured in the Approval Cockpit application are implemented when the workflow specific events are raised in Plant Applications.

Based on the configured workflow, an email notification is sent to the groups participating at different stages of the approval process. The group participants are required to review the workflow request, and provide their approval (or rejection).

> **✎ Note:**
> A group assigned to a workflow can have 1, 2, 3, or more participants. Emails are sent to all of them to participate in the approval process. Any one participant can approve (or reject) and accomplish the request. The workflow request is removed from the other group participants' task list.

On the **Approver Execution** tab:

• You can sort the workflows by their status:

| Status | Description |
|--------|-------------|
| Pending | The workflow for the action event is in progress. |
| Approved | The workflow for the action event ended with an approved result. |
| Rejected | The workflow for the action event ended with a rejected result. |

• Select any workflow to view a history of its current status.



| LEVEL 01 | LEVEL 02 | LEVEL 03 | LEVEL 04 |
|----------|----------|----------|----------|
| ✓ Approvers 01 Approved by: JohnDoe | ✓ Approvers 01 Approved by: JohnDoe | Approvers 01 | Approvers 01 |
| ✓ Approvers 02 Approved by: Smith | ✓ Approvers 02 Approved by: Philip | Approvers 02 | Approvers 02 |
| ✓ Approvers 03 Approved by: Criss | ✗ Approvers 03 Rejected by: Shawn | Approvers 03 | Approvers 03 |
| ✓ Approvers 04 Approved by: Peter | Approvers 04 | Approvers 04 | Approvers 04 |

Workflow Status: Level 02 - Approver Group 03, Shawn has rejected the request, Please contact admin for further investigation

• Add *(on page 314)* or modify *(on page 317)* a monitoring group at any level during workflow execution.

You can perform the following tasks with the workflow requests assigned to you.

• Approve or reject after you review the workflow request *(on page 320)*.
• Ask for re-verification of an approved workflow level *(on page 321)*.

## Approve or Reject a Workflow

This topic describes how to accomplish a workflow request for approval.

An email notification is sent to you on the workflow request.

1. Log in to the Plant Applications Web Client.
2. In the **Approval Cockpit** page, on the **Approver Execution** tab, access the workflow assigned to you and select ⦂, then select **Review**.

The **Approver Level Questions** screen appears with a list of questions to be answered for quality check. These questions are variables associated to the workflow from the Plant Applications Administrator.

3. Enter your answers in the text box for the questions.

The mandatory questions need an answer to proceed to the next step. To set the questions to be mandatory or non-mandatory, refer to Plant Applications Administrator.

4. Select **Approve** or **Reject** based on your review.

Based on the status (approved or rejected), the workflow proceeds to the next activity in the process. The rejected workflows are routed to the rejection responding group, if assigned. If not, then the workflow is terminated at this point with no further action.

## Send Approvals for Re-verification

This topic describes how to request for re-verifying already approved workflow levels.

You can request approval re-verification only for levels that are one level above you in a workflow. For example, if you are a workflow **Level 3** approver, you can request re-verification for **Level 2**, but not **Level 1**.

1. Log in to the Plant Applications Web Client.
2. In the **Approval Cockpit** page, on the **Approver Execution** tab, access the workflow assigned to you and select ⦙, then select **Review**.

The **Approver Level Questions** screen appears with a list of quality variables associated to the workflow.

3. Select **Request Re-Verification** based on your review.

If answers to the questions are not meeting the quality requirements, you can ask for re-verifying the approvals granted at one level above you.

The **Select Approver Groups for Re-Verification** screen appears with a list of approver groups assigned to the level you want to re-verify.

4. Select the groups you want to assign to re-verify the approved level.
5. Select **Save**.

The status of the level you requested for re-verification is changed from approved to pending. This level must go through the approval process all over again.

# Chapter 12. Downtime

## About Downtime

As an operator, you can use the Downtime application to access the downtime overview and downtime events list for the equipment assigned to you.

You can access the following pages in the Downtime application:

- **Events**: A list of downtime events and their statuses corresponding to the equipment selected in the **My Machines** page appears. Only the machines that you as an operator can access appear in this page. In this page, you can perform the following actions:
  - Add a downtime event *(on page 335)*
  - Add a non-productive time (NPT) event *(on page 337)*
  - Modify existing downtime events *(on page 339)*
  - Split events *(on page 343)*
  - Merge events *(on page 345)*
  - Delete events *(on page 346)*
  - Access KPIs *(on page 325)*
  - Access downtime events *(on page 328)*
  - Add a downtime event *(on page 335)*
  - Add a non-productive time (NPT) event *(on page 337)*
  - Modify existing downtime events *(on page 339)*
- **KPIs**: An overview of key performance indicators (KPIs) such as overall equipment effectiveness (OEE), availability, mean time between failures (MTBF), and mean time to repair (MTTR) appears for all the equipment that you as an operator can access. The line charts for downtime breakdown and downtime by category also appear in this page.

> ✎ **Note:**
> If no data is available for a KPI or chart, a message indicating the non-availability of data for the corresponding KPI or chart appears in the **KPIs** page.

## About Non-Productive Time in Downtime Calculations

When accessing the KPIs in Downtime, OEE Dashboard, and Reports, you can include or exclude non-productive time (NPT) in the downtime calculation of KPIs.

The following sections describe various scenarios of downtime calculations.

### Scenario 1: Downtime Duration is Within NPT Duration

The following table describes the scenario when the NPT event starts before the start time of the downtime event and ends after the end time of the downtime event. The table further includes the downtime calculation in this scenario.

| Time Entry Type | Start Time (mm/dd/yy hh: mm) | End Time (mm/dd/yy hh: mm) | Duration (mins) | Downtime Calculation (mins) | |
| --- | --- | --- | --- | --- | --- |
| | | | | Include NPT | Exclude NPT |
| Downtime | 5/10/18 5:08 | 5/10/18 5:10 | 2 | 0 | 2 |
| NPT | 5/10/18 5:05 | 5/10/18 5:15 | 10 | | |

The downtime duration is calculated as follows:

- When NPT is included: The downtime duration is ignored by the application. In this scenario, the downtime duration appears as 0 mins.
- When NPT is excluded: The actual downtime duration appears. In this scenario, the downtime duration appears as 2 mins.

### Scenario 2: Downtime Starts Before NPT Starts and Ends Before NPT Ends

The following table describes the scenario when the downtime event starts after the start time of the NPT event and ends before the end time of the NPT event. The table further includes the downtime calculation in this scenario.

| Time Entry Type | Start Time (mm/dd/yy hh: mm) | End Time (mm/dd/yy hh: mm) | Duration (mins) | Downtime Calculation (mins) | |
| --- | --- | --- | --- | --- | --- |
| | | | | Include NPT | Exclude NPT |
| Downtime | 5/10/18 5:17 | 5/10/18 5:25 | 8 | 3 | 8 |
| NPT | 5/10/18 5:20 | 5/10/18 5:30 | 10 | | |

The downtime is calculated as follows:

- When NPT is included: Only the downtime duration before the NPT event starts appears as the downtime duration. In this scenario, the downtime duration appears as 3 mins.
- When NPT is excluded: The actual downtime duration appears. In this scenario, the downtime duration appears as 8 mins.

### Scenario 3: Downtime Starts After NPT Starts and Ends After NPT Ends

The following table describes the scenario when the downtime event starts after the start time of the NPT event and ends after the end time of the NPT event. The table further includes the downtime calculation in this scenario.

| Time En-try Type | Start Time (mm/dd/yy hh: mm) | End Time (mm/dd/yy hh: mm) | Duration (mins) | Downtime Calculation (mins) | |
| --- | --- | --- | --- | --- | --- |
| | | | | Include NPT | Exclude NPT |
| Downtime | 5/10/18 5:47 | 5/10/18 5:52 | 5 | 2 | 5 |
| NPT | 5/10/18 5:40 | 5/10/18 5:50 | 10 | | |

The downtime is calculated as follows:

- When NPT is included: Only the downtime duration after the NPT event ends appears as the downtime duration. In this scenario, the downtime duration appears as 2 mins.
- When NPT is excluded: The actual downtime duration appears. In this scenario, the downtime duration appears as 5 mins.

### Scenario 4: Downtime Starts Before NPT Starts and Ends After NPT Ends

The following table describes the scenario when the downtime event starts before the start time of the NPT event and ends after the end time of the NPT event. The table further includes the downtime calculation in this scenario.

| Time En-try Type | Start Time (mm/dd/yy hh: mm) | End Time (mm/dd/yy hh: mm) | Duration (mins) | Downtime Calculation (mins) | |
| --- | --- | --- | --- | --- | --- |
| | | | | Include NPT | Exclude NPT |
| Downtime | 5/10/18 5:34 | 5/10/18 5:41 | 7 | 2 | 7 |
| NPT | 5/10/18 5:35 | 5/10/18 5:40 | 5 | | |

The downtime is calculated as follows:

- When NPT is included: The sum of downtime durations before the NPT event starts and after the NPT event ends appears as the downtime duration. In this scenario, the downtime duration appears as 2 mins.
- When NPT is excluded: The actual downtime duration appears. In this scenario, the downtime duration appears as 7 mins.

# Access KPIs

The Downtime application enables you to access key performance indicators (KPIs) and a summary of downtime events for the equipment assigned to you. In the **KPIs** page, you can review the overall equipment effectiveness (OEE), availability, mean time between failures (MTBF), and mean time to repair (MTTR) values. You can use the charts for Downtime Breakdown and Downtime by Category to review the durations of different downtime events and their reasons.

1. Log in to the Plant Applications Web Client.
2. Select .

   The **Events** page appears.
3. Select the **KPIs** tab.

   The Donut chart appears in the dashboard summarizing the OEE and availability of the equipment. Each KPI shows the following status information.

| Status | Colors | Range |
|---|---|---|
| Good | Blue | > 85 percent |
| Moderate | Yellow | > 50 percent and <= 85 percent |
| Low | Red | <= 50 percent |

> **Note:**
>
> The maximum value for the KPIs are set to 100% by default. However, you can override this by setting **OEE Max Limit Override** to true. The OEE Max Limit Override flag allows the OEE cap beyond 100%. When this flag is set to false and the KPI actual value is more than 100%, the value is defaulted to 100% in the chart.

The time duration for MTBF and MTTR values appears in hours and minutes.
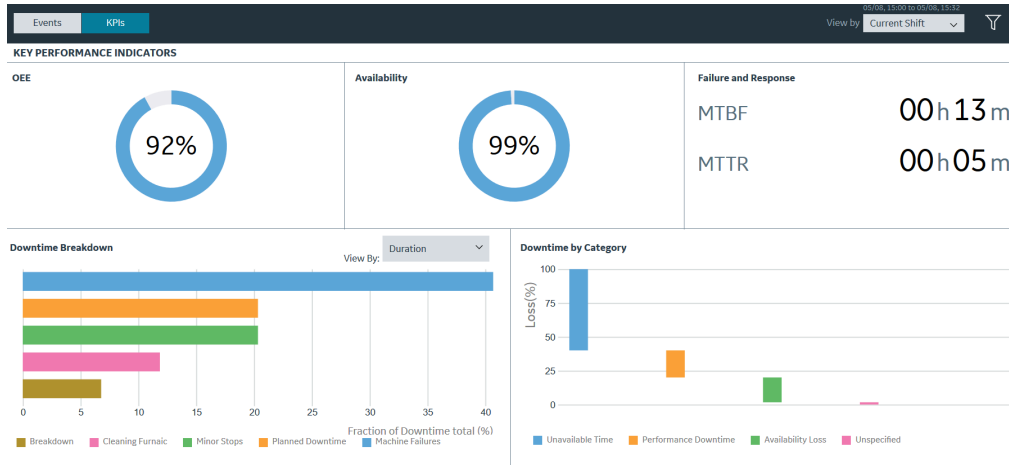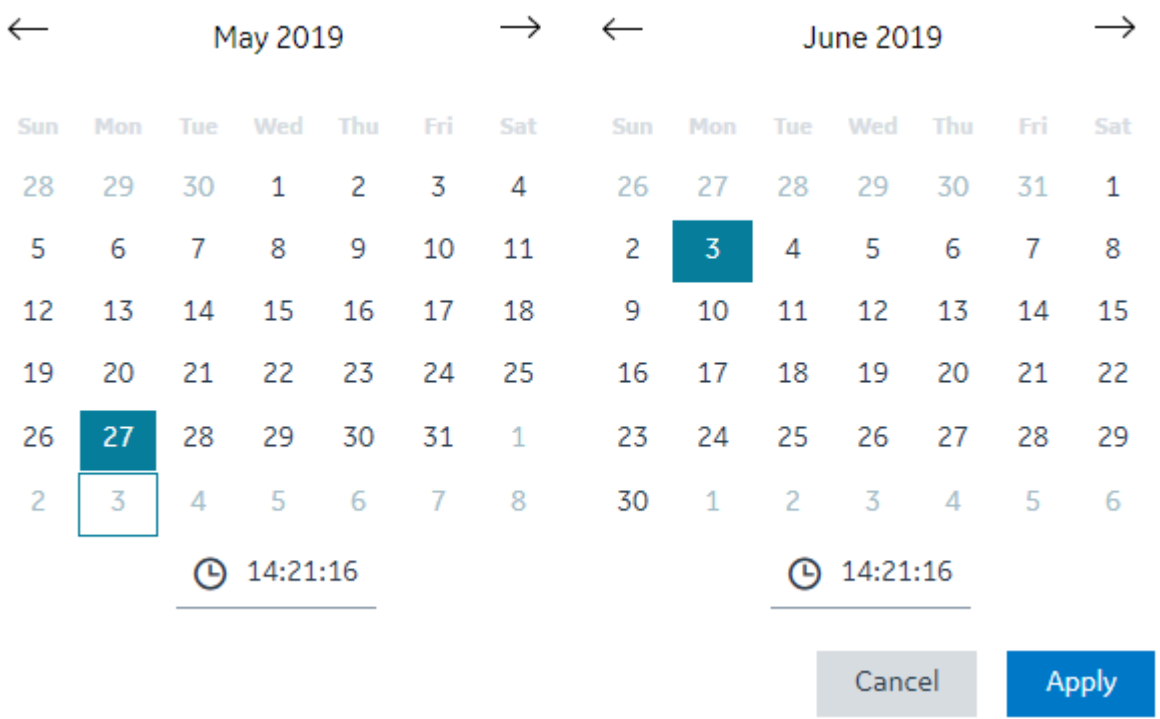
> **Note:**
>
> These KPI metrics are based on the **OEE Aggregation Store** setting. If **OEE Aggregation Store** is set to False, the values are calculated on the fly every time the chart is opened or refreshed. If it is set to True, the values are populated from the OEE Aggregation tables. For more information, refer to the OEE Aggregation Store topic.

4. In the drop-down list box containing the time range options, select a time range as described in the following table.

| Time Range | Description |
|---|---|
| Last <number> Hours | Select to access all KPIs within <number> hours prior to the current Production Day. The value of <number> is configured in Plant Applications Administrator. |
| Previous Day | Select to access all KPIs from the day prior to the current Production Day. |
| Current Day | Select to access all KPIs from the start time of the current Production Day until the current time. If there are no shifts configured for the plant, this option is selected by default. |

| Time Range | Description |
|---|---|
| Current Shift | Select to access all KPIs from the start time of the ongoing shift until the current time. If shifts are configured for the plant, this option is selected by default. |
| Previous Shift | Select to access all KPIs from the shift prior to the current shift. |
| Last 7 days | Select to access all KPIs within seven days prior to the current Production Day. |
| Custom | Select to access all KPIs within a date and time range that you specify by using a calendar window. The following calendar window appears when you select the **Custom** option.<br><br><br><br>To specify a custom date and time range in the calendar window:<br><br>a. In the **START DATETIME** section, select a date and enter a time in the format hh:mm:ss.<br>b. In the **END DATETIME** section, select a date and enter a time in the format hh:mm:ss.<br>c. Select **Apply**. |

5. **Optional:** Select ▽, then select the **NPT** check box, and then select **Apply** to include any non-productive time (NPT) in the results. For more information, refer to the About Non-Productive Time in Downtime Calculations *(on page 322)* topic.

6. In the **Downtime Breakdown** section, in the **View By** box, select **Duration** or **Count** to access downtime events.

   You can access the loss percentage and reasons for the downtime events in the **Downtime by Category** chart.

## Access a Downtime Events List

You can access the list of downtime events for the selected time range to review the status and details for the downtime events.

1. Log in to the Plant Applications Web Client.

2. Select 🕐.

   The **Events** page appears, displaying a list of downtime events and their details in a tabular format. In the table displaying the list of downtime events and their details, you can resize a column or drag and drop a column to a new position. The column settings you select in the table are retained when you access the **Events** page later.

> ✎ **Note:**
> The date and time format is m/dd/yyyy hh:mm:ss or dd/m/yyyy based on the localisation settings.

A summary of unplanned, planned, external, and NPT downtime events within a time range appears in the page. In addition, the following information appears in a tabular format for each downtime event.

| Column | Description |
|---|---|
| **DT Status** | The downtime status for a downtime event along with the corresponding color.<br><br>• **Green**: Active<br>• **Blue**: Open<br>• **Black**: Complete<br><br>**Note:**<br>The color scheme is based on the default color scheme setting in the Plant Applications Administrator. |
| **Category** | The downtime category for a downtime event. You can select ▽ appearing next to this column and then select required filters from the menu to include in the list.<br><br>**Note:**<br>The filters that you set for the **Category** column are retained when you access the **Events** page later. |
| **Location** | The location of an equipment experiencing downtime. |
| **Start Time** | The start time for the downtime event. |
| **Duration** | The downtime duration for the downtime event.<br><br>**Note:**<br>The value in this field is blank for open downtime events. |

| Column | Description |
|---|---|
| **Reason** | The downtime reason for the downtime event. |
| **Actions** | The actions that you can perform on a downtime event. You can select one of the following action items:<br><br>• 🖉: Select to modify a downtime event *(on page 339)*.<br><br>• ↰: Select to split a downtime event *(on page 343)*.<br><br>• ✕: Select to delete a downtime event *(on page 346)*.<br><br>• 🗗: Select to copy faults and reasons from a downtime event to the required selected downtime events *(on page 342)*. |

> 🖉 **Note:**
> You can filter the downtime events based on filters applied to the selected columns. Select ▽ appearing next to the column name and then select required filters from the menu to include in the list. You also can drag a column to the column header to group the downtime events based on the column selected.

> ⓘ **Tip:**
> The downtime events are listed in multiple pages. One page contains maximum of seven downtime events.

3. In the drop-down list box containing the time range options, select a time range as described in the following table. The range that you select appears in the form of date and time interval next to the drop-down list box containing the time range options.

| Time Range | Description |
|---|---|
| Pre-vious Day | Select to access all downtime events from the day prior to the current Production Day. |
| Cur-rent Day | Select to access all downtime events from the start time of the current Production Day until the current time. If there are no shifts configured for the plant, this option is selected by default. |
| Cur-rent Shift | Select to access all downtime events from the start time of the ongoing shift until the current time. If shifts are configured for the plant, this option is selected by default. |
| Pre-vious Shift | Select to access all downtime events from the shift prior to the current shift. |
| Last 7 days | Select to access all downtime events within seven days prior to the current Production Day. |
| Cus-tom | Select to access all downtime events within a date and time range that you specify by using a calendar window.<br><br>The following calendar window appears when you select the **Custom** option. |

| Time Range | Description |
|---|---|
| | ←     May 2019     →    ←     June 2019     →<br><br>**May 2019**<br>Sun Mon Tue Wed Thu Fri Sat<br>28 29 30 1 2 3 4<br>5 6 7 8 9 10 11<br>12 13 14 15 16 17 18<br>19 20 21 22 23 24 25<br>26 27 28 29 30 31 1<br>2 3 4 5 6 7 8<br>🕐 14:21:16<br><br>**June 2019**<br>Sun Mon Tue Wed Thu Fri Sat<br>26 27 28 29 30 31 1<br>2 3 4 5 6 7 8<br>9 10 11 12 13 14 15<br>16 17 18 19 20 21 22<br>23 24 25 26 27 28 29<br>30 1 2 3 4 5 6<br>🕐 14:21:16<br><br>Cancel    Apply<br><br>To specify a custom date and time range in the calendar window:<br><br>   a. In the **START DATETIME** section, select a date and enter a time in the format hh:mm:ss<br>   b. In the **END DATETIME** section, select a date and enter a time in the format hh:mm:ss<br>   c. Select **Apply**. |

> **Note:**
>
> The shift values for current and previous shifts are determined by the settings selected in the Plant Applications Department level. The time-interval that you select appears in the form of date and time next to the time-interval drop-down list box.

4. **Optional:** Select a downtime event to access the **Quick Edit** page and perform the following tasks:

a. In the **FAULT CODE** section, select the box for the Fault Code, and then select a Fault Code associated with the downtime event.

> **ⓘ Tip:**
>
> Alternatively, within the **FAULT CODE** section, you can enter the text to search for and select a Fault Code.

b. In the **REASONS** section, select **Top <number>** to access the **Top <number> Reasons** menu, and then select a reason associated with the Fault Code.

The <number> represents a numeric value ranging from 0 to 5, indicating the top downtime reasons most frequently selected by the operator. You can configure reasons in the Plant Applications Administrator.

> **✎ Note:**
>
> The values that appear in the **L1**, **L2**, **L3**, and **L4** boxes for the levels of reasons are configured in the Plant Applications Administrator and are automatically populated, if available, based on the reason you select in the **Top <number> Reasons** menu.

c. In the **ADD COMMENTS** section, select **Click to add/edit comment**.

The **Comment** window appears.

d. In the **ADD COMMENT** box, enter a comment for the changes you made, and select **Add Comment**.

e. Select **Save** to apply your changes.

5. **Optional:** In the table displaying the list of downtime events and their details, select an option to perform an action as described in the following table.

| Option | Description |
|---|---|
| ▽ | Select to filter the downtime events based on the specified duration. You can also select the **NPT** check box, and then select **Apply** to include any non-productive time (NPT) in the results. |
| ↻ | Select to update the downtime events list with the latest information available for your equipment. |

| Option | Description |
|---|---|
| | **Note:** This icon is enabled only when there are updates to the downtime events list. Else, one of the following icon appears:<br><br>• : Indicates that there are no updates to the downtime events list.<br><br>• : Indicates that the RabbitMQ service is down. |
| + | Select either to add a downtime event *(on page 335)* or add a non-productive time (NPT) downtime event *(on page 337)*. |
| ⇥ | Select to merge downtime events for the equipment from the same location *(on page 345)*.<br><br>**Note:** This icon is enabled only when you select the check boxes for more than one downtime event in the table. |
| ✕ | Select to delete multiple downtime events *(on page 346)*.<br><br>**Note:** This icon is enabled only when you select the check boxes for more than one downtime event in the table. |
| | Select to add or remove columns from the table displaying the downtime events list. The added columns are retrieved when you access the **Events** page later.<br><br>By default, the following columns appear in the specified order when you access the **Events** page:<br><br>a. DT STATUS<br>b. CATEGORY<br>c. LOCATION<br>d. START TIME<br>e. DURATION<br>f. REASON<br>g. PRODUCT |

| Option | Description |
|---|---|
| | ⓘ **Tip:**<br>You can use the horizontal scroll bar in the table to drag the scroll box and access the data from all the added columns. |
| ◯ | Select to automatically update the downtime events based on the selected time duration. |

## Customize Time Duration to Refresh Data

You can set the following values for the list of activities:

- The frequency of refreshing a page if left idle for certain minutes.
- The number of hours for collating and displaying the data in the grid.

1. Depending on your installation, access the `app.properties.json` file in the following folder:
   - **Enterprise installation:** `<Install Directory>/PlantApplicationsDocker/ plantapps-web-docker/mnt/configfiles/downtime-app/prod/ {{appVersion}}/<appname>.yml`
   - **Standard installation:** `<Install Directory>\config-rep\downtime-app\prod \{{appVersion}}\<appname>.yml`
2. Modify the values for the following parameters:
   - **lastNHours**
   - **refreshNMinutesDuration**

   If the **refreshNMinutesDuration** is set to five minutes and the page is idle for five minutes, the list is refreshed and the timestamp is updated accordingly.
3. Refresh Plant Applications Web Client.

   The list of activities is refreshed based on the values you have specified.

## Add a Downtime Event

You can add a downtime event for the equipment that you are authorized to access.
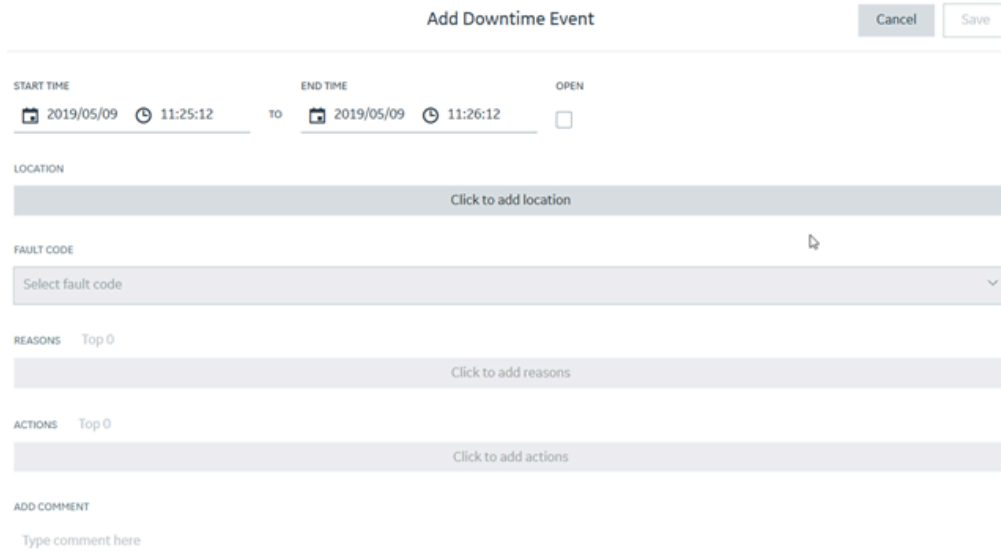
1. Log in to the Plant Applications Web Client.
2. Select 🕐.

   The **Events** page appears, displaying a list of downtime events and their details in a tabular format.

3. In the **Events** page, select ✛ and then select **Add Downtime Event** from the menu to add a downtime event.
   The **Add Downtime Event** page appears.



4. In the **START TIME** and **END TIME** box, enter a duration for the downtime event.
5. In the **LOCATION** section, select **Click to add location**. The Select location windows appears. Select a department, line, and machine in the **DEPARTMENT**, **LINE**, and **MACHINE** sections, respectively, where you plan to add the downtime event. Select **Apply**.

> ⓘ **Tip:**
> Alternatively, within the **DEPARTMENT, LINE**, and **MACHINE** sections, in the search box displaying 🔍, you can enter the text to search for and select the required item.

6. In the **FAULT CODE** box, select a Fault Code to describe the downtime event.

> ⓘ **Tip:**
> Alternatively, within the **FAULT CODE** box, enter the text to search for and select a Fault Code.

7. In the **REASONS** section, select **Top <number>** to access the **Top <number> Reasons** menu, and then select a reason associated with the Fault Code.

The <number> represents a numeric value ranging from 0 to 5, indicating the top downtime reasons most frequently selected by the operator. You can configure reasons in Plant Applications Administrator.

> **Note:**
> The values that appear in the **L1**, **L2**, **L3**, and **L4** boxes for the levels of reasons are configured in Plant Applications Administrator and are automatically populated, if available, based on the reason you select in the **Top <number> Reasons** menu.

8. In the **ACTIONS** section, select **Top <number>** to access the **Top <number> Actions** menu, and then select an action taken by the operator for the downtime event.
The <number> represents a numeric value ranging from 0 to 5, indicating the top actions most frequently performed by the operator. You can configure actions in Plant Applications Administrator.

> **Note:**
> The values that appear in the **L1**, **L2**, **L3**, and **L4** boxes for the levels of actions are configured in Plant Applications Administrator and are automatically populated, if available, based on the action you select in the **Top <number> Actions** menu.

9. In the **ADD COMMENT** box, enter a comment for the downtime event. Depending on the configuration in Plant Applications Administrator, this step can be optional or mandatory.
10. Select **Save** to add the downtime event for the selected machine.

The newly added downtime event appears in the table displaying the list of downtime events and their details in the **Events** page.

## Add an NPT Downtime Event

1. Log in to the Plant Applications Web Client.
2. Select .
The **Events** page appears, displaying a list of downtime events and their details in a tabular format.
3. In the **Events** page, select  and then select **Add NPT** to add a non-productive time (NPT) downtime event.
The **Add NPT Event** page appears.

4. In the **START TIME** and **END TIME** box, enter a duration for the NPT downtime event.

5. In the **LOCATION** section, select **Click to add location**. The **Select location** window appears. Select a department, line, and machine in the **DEPARTMENT**, **LINE**, and **MACHINE** sections, respectively, where you plan to add the NPT downtime event. Select **Apply**.

> **Tip:**
> Alternatively, within the **DEPARTMENT**, **LINE**, and **MACHINE** boxes, in the search box displaying 🔍, you can enter the text to search for and select the required item.

6. In the **REASONS** section, select **Click to add reasons**. The **Select Reasons** window appears. Select the levels of reasons from the available reasons and then select **Apply**.

> **Note:**
> The **Click to add reasons** button is enabled only when you configure the reasons for the selected machines in Plant Applications Administrator.

7. **Optional:** In the **ADD COMMENT** section, in the box for the comment, enter a comment for the event.

8. Select **Save** to add the NPT downtime event in the downtime events list.

The newly added NPT downtime event appears in the corresponding downtime.

# Modify Downtime Events

1. Log in to the Plant Applications Web Client.

2. Select ![clock icon].

   The **Events** page appears.

3. Access the required downtime events list *(on page 328)*.

4. In the row containing the downtime event whose detail you want to modify, select ![edit icon].

   The **Edit Downtime Event** page displaying the **Basics** section appears.



5. In the **Basics** section, modify the duration and machine for the downtime event.

   a. Enter a date and time in the **Start time** and **End time** boxes to update the duration of the downtime event.

   > ![note icon] **Note:**
   > The **End time** box is enabled only when the **Open** check box is cleared.

   b. Select the **Open** check box to mark the event status as open.

   c. In the **LOCATION** section, select an existing location. The **Select location** window appears. In the **Machine** section, select a machine to modify the machine selected initially for the downtime event and then select **Apply**.

   > ![tip icon] **Tip:**
   > The modified downtime event details appear in the **CURRENTLY UPDATED** section.

6. Select the **Reasons** tab, and then modify the Fault Code and reasons for the downtime event.

    a. In the **FAULT CODE** section, select the required Fault Code.

    > **ℹ Tip:**
    >
    > Alternatively, within the **FAULT CODE** section, enter the text to search for and select a Fault Code.

    b. In the **REASONS** section, select reasons corresponding to the Fault Code for the downtime event.

    > **✎ Note:**
    >
    > Select **Top <number>** to access the **Top <number> Reasons** menu, and then modify the action taken by the operator for the downtime event. The <number> represents a numeric value ranging from 0 to 5, indicating the top downtime reasons most frequently selected by the operator. You can configure reasons in Plant Applications Administrator.
    >
    > The values that appear in the **L1**, **L2**, **L3**, and **L4** boxes for the levels of reasons are configured in Plant Applications Administrator and are automatically populated, if available, based on the reason you select in the **Top <number> Reasons** menu.

    c. In the **ADD/EDIT COMMENTS** section, select **Click to add/edit comment**. The Comment window appears. In the **ADD COMMENT** box, enter a comment or modify the comment for the changes you made and select **Add Comment**

7. Select the **Actions** tab, and then, in the **ACTIONS** section, modify the level of reasons for an event.

    > **✎ Note:**
    >
    > Select **Top <number>** to access the **Top <number> Actions** menu, and then modify the action taken by the operator for the downtime event. The <number> represents a numeric value ranging from 0 to 5, indicating the top actions most frequently performed by the operator. You can configure actions in Plant Applications Administrator.
    >
    > The values that appear in the **L1**, **L2**, **L3**, and **L4** boxes for the levels of actions are configured in Plant Applications Administrator and are automatically populated, if available, based on the action you select in the **Top <number> Actions** menu.

a. In the **ADD/EDIT COMMENTS** section, select **Click to add/edit comment**. The **Comment** window appears. In the **ADD COMMENT** box, enter a comment or modify the comment for the changes you made and select **Add Comment**

8. As needed, select the **NPT**  tab, and then modify the event details for an NPT.

a. In the **End Time** box, modify the duration for the non-productive time (NPT) downtime event.

b. In the **ADD/EDIT COMMENTS** section, select **Click to add/edit comment**. The Comment window appears. In the **ADD COMMENT** box, enter a comment or modify the comments entered for the NPT downtime event and select **Add Comment**.

> **Note:**
> The **NPT** section appears based on the selected Fault Code and downtime reasons.

9. Select **Save** to save the modified details of the downtime event.

> **Note:**
> If another user has saved changes to the same downtime event while you are modifying it, you will see the message **Event details updated by another user, would you like to accept the changes?** Click **Yes** to accept their changes (in which case the page will update to include the other user's changes) or **No** to reject them.

The modified details appear for the downtime event.

# Download Downtime Events Data

Use this procedure to export and download the downtime events data for the selected time range in the following formats:

- CSV
- Excel

1. Log in to the Plant Applications Web Client.
2. Select  .

The **Events** page appears, displaying a list of downtime events and their details in a tabular format.

3. In the **View by** list, select the required time range.

4. Select **Export** (⤓), and then select one of the following:

   • Export as CSV

   • Export as Excel

   The downtime events data for the selected time range and format is downloaded.

# Copy Faults and Reasons to the Selected Downtime Event

1. Log in to the Plant Applications Web Client.

2. Select ⬇.

   The **Events** page appears, displaying a list of downtime events and their details.

3. Access the required downtime events list *(on page 328)*.

4. In the list of downtime events, select the check box of the target downtime events to copy the faults and reasons.

   > **Note:**
   > The selected downtime events and equipment must belong to the same location.

   The ⧉ button is enabled for the cleared rows.

5. Select ⧉ for the source downtime event row from which you want to copy the faults and/or reasons.

> **Note:**
>
> Depending on the configuration set for the **CopyPaste Type** site parameter in the Plant Applications Administrator, one of the following options is displayed for the downtime event:
>
> - Reason only
> - Fault only
> - Both fault and reason

6. Select **OK** to confirm that you want to copy the faults and/or reasons for the selected downtime events.

The target downtime events now have the same faults and reasons as the source downtime event.

## Split a Downtime Event

You can split a downtime event into multiple downtime events of equal or customized duration. Splitting an event allows you to add the reason for the downtime events that happened during the overall downtime duration.

1. Log in to the Plant Applications Web Client.
2. Select ⬇️.

   The **Events** page appears, displaying a list of downtime events and their details.
3.
4. Select ↷ corresponding to a downtime event to split the downtime event.

   The **Split** page appears.
5. In the **Split** page, enter the number of target downtime events and the option to split the duration.

   a. In the **Split Durations** section, select one of the following options:
   - **Equally**: The total duration of the selected source downtime event is equally divided into the duration of target downtime events.

     > **Note:**
     >
     > If you select this option, you cannot modify the duration for downtime events later.

   - **Manually**: The total duration of the selected source downtime event is manually divided into the duration of new target downtime events.

b. In the **Number of Events** box, select how many events you want to split the downtime event into, and then select **Next**.

> **Note:**
>
> You can split a downtime event to a maximum of six downtime events.

The **Split Event** page appears.

6. In the **Split Event** page, enter the duration and reason for the downtime.

a. In the **Duration** column, enter a duration in the boxes corresponding to the time format hh:mm:ss.

> **Note:**
>
> You can enter the duration for target downtime events only if you selected **Manually** in the **Split Durations** section.

b. In the **Quick Pick** column, you can select **Top <number>** to access the **Top <number> Reasons** menu, and then select a reason associated with a Fault Code.

The <number> represents a numeric value ranging from 0 to 5, indicating the most frequently selected reasons for a downtime.

> **Note:**
>
> The values that appear in the **L1**, **L2**, **L3**, and **L4** boxes for the levels of reasons are configured in the Plant Applications Administrator and are automatically populated, if available, based on the reason you select in the **Top <number> Reasons** menu.

> **Tip:**
>
> Alternatively, you can select a downtime reason in the **L1** box, and then select the associated reason levels, if available, in the **L2**, **L3**, and **L4** boxes.

c. The information displayed in the **Reason** column depends on the configuration set for the **CopyPaste Type** site parameter in the Plant Applications Administrator.

> **Note:**
>
> The options for the **CopyPaste Type** site parameter are:

> ✏️
> - Reason only
> - Fault only
> - Both fault and reason

For example, if the **CopyPaste Type** site parameter in Plant Applications Administrator is set to **Reason only**, then the fault is not displayed in the **Reason** column.

7. Select **Save** to split the downtime event in the selected number of target downtime events.

The target downtime events, and the list and details of downtime events appear in the **Events** page.

# Merge Downtime Events

You can merge multiple downtime events into one event.

1. Log in to the Plant Applications Web Client.
2. Select ⏲.

   The **Events** page appears, displaying a list of downtime events and their details in a tabular format.
3. Access the required downtime events list *(on page 328)*.
4. In the **Events** page, select the check box for each source downtime event that you want to merge into a single downtime event.

   > ✏️ **Note:**
   > You can merge downtime events associated with the equipment from the same location only.

5. Select ⤳ to merge the selected events.

The merged downtime event appears in the table displaying the list of downtime events and their details in the **Events** page.

> ✏️ **Note:**
>
> - When you merge downtime events, the time interval between the source downtime events is also added to the downtime duration of the merged downtime event.
> - If the reasons for downtime differ between the source downtime events, the new merged downtime event uses the reason associated with the oldest source downtime event.

# Delete a Downtime Event

1. Log in to the Plant Applications Web Client.
2. Select .

   The **Events** page appears, displaying a list of downtime events and their details in a tabular format.

3. In the table displaying the list of downtime events and their details, select ✕ to delete a single or multiple downtime events.

   > ✎ **Note:**
   >
   >   - To delete a downtime event, select ✕ for the downtime event in the table displaying the list of downtime events and their details.
   >   - To delete multiple downtime events, select the check box for each of them in the table displaying the list of downtime events and their details, and then select ✕ to delete the selected downtime events.

The selected downtime events are deleted and no longer appear in the table displaying the list of downtime events and their details in the **Events** page.

# Downtime Viewer Error

**Downtime viewer returns "400: Bad Request" error**

**Possible root cause:** The length of the URL is too long, exceeding the default value.

**Resolution:** Increase the value of the **server.max-http-header-size** property to 20kb (`server.max-http-header-size=20000`) in the `prod.properties` file.

Depending on your installation, access the `prod.properties` file in the following folder:

- **Enterprise installation:** `<Install Directory>/PlantApplicationsDocker/plantapps-web-docker/mnt/configfiles/downtime-app/prod/{{appVersion}}/<appname>.yml`
- **Standard installation:** `<Install Directory>\config-rep\downtime-app\prod\{{appVersion}}\<appname>.yml`

Ensure this line is not marked as a comment and restart the service to apply the change.

# Chapter 13. OEE Dashboard

## About OEE Dashboard

As a supervisor, you can use the OEE Dashboard application to review summary and status information for plant lines and units. Here, you can identify production inefficiencies contributing to lower OEE.

> ✏️ **Note:**
> To access information about a Production Unit in the OEE Dashboard application, you must specify Production Rate Specification for the Production Unit in Plant Applications Administrator. Else, the Production Unit does not appear in the OEE Dashboard application. For more information, refer to the OEE: Production Metrics topic in the Proficy Plant Applications Help.

The following donut charts display line and machine metrics:

- OEE: Overall equipment effectiveness (OEE) is a measure of production health or status. By comparing OEE between machines or group of machines, you can identify lines or machines with production inefficiencies like waste, downtime, speed/performance loss, and production throughput that contribute to lower OEE.
- Performance: You can review line and unit performance rates to compare how much each line or unit produced against projections.
- Quality: You can review the quality rate to identify lines with high waste counts, which reduces quality and contributes to a lower OEE.
- Availability: You can review the Availability rate for a Machine or group of Machines for a selected time range (for example, Current Shift, Yesterday).

The following OEE Dashboard dashboard displays information for the selected department HISTCENT, viewed by Lines in that department. It contains KPI information for each of the lines collected over the past week.

Figure 1. OEE Dashboard Dashboard
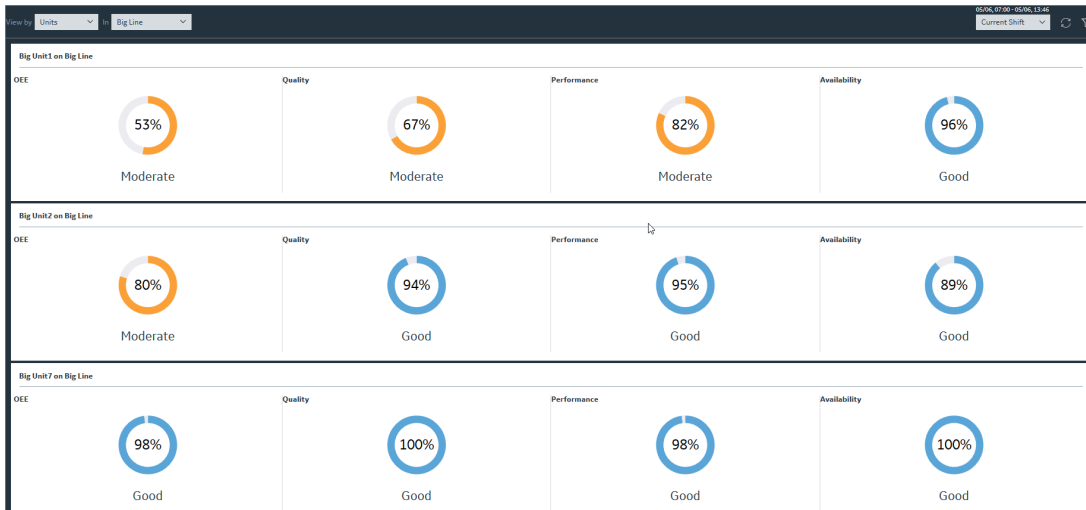


When you expand a KPI card, you can review detailed information such as downtime reasons, downtime by category, scrap breakdown, and loss by category as Pareto and waterfall charts.

The following example expands the view of the Availability KPI.

- In the **Downtime Breakdown** section, a Pareto chart displays the downtime breakdown by reasons, while in the **Downtime by Category** section, a waterfall chart displays the downtime by category.
- In the **Downtime Breakdown** or **Downtime by Category** section, select an option in the **View by** drop-down list box to view the chart by Duration or Count.
- You can access a similar expanded view for Quality and Performance KPIs.

Figure 2. Availability: Expanded View
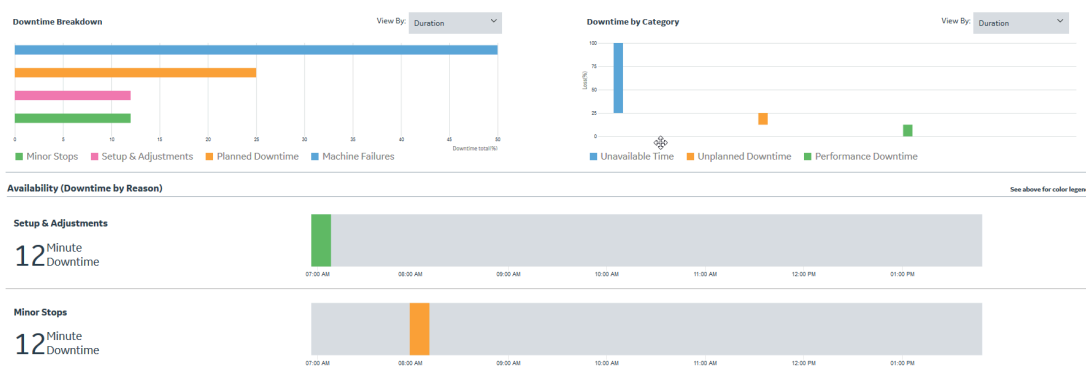


A Gantt chart displays the up and downtime on the time axis. The grey colored vertical strips represent the up-time, and the other colored strips display the downtime events for different categories.

If you select the Line level, the Gantt chart displays the downtime events for individual Units. If you select the Unit level, the Gantt chart displays the individual downtime reasons. In both the cases, colors

displayed for the downtime events are based on the categories, and they are inconsistent with the Waterfall and Pareto charts.

When you pause on a chart, a tooltip displays the following details:

- Fraction: Corresponding percentage of the total downtime
- Count: Number of events
- Duration: Downtime duration

You can use the OEE Dashboard application to perform the following tasks.

# Access the Equipment Summary

The OEE Dashboard application in Plant Applications enables you to access the summary of Equipment for the Production Lines in a Department or Production Site or Production Units in a Production Line. The Equipment summary appears as a series of Donut charts for KPIs such as OEE, Performance, Quality, and Availability.

1. Log in to the Plant Applications Web Client.
2. Select .

   A page displaying the Equipment summary appears.
3. Select an option in the **View by** box as described in the following table.

| Option | Description |
|---|---|
| Summary | When you select this option, a summary for all the Production Lines with Low OEE across departments appears in the page. This option is selected by default. |
| Lines | When you select this option, an **In** box appears, in which you can select a Department. After you select a Department, the page displays the Equipment summary for the Production Lines within the selected Department. |
| Units | When you select this option, an **In** box appears, in which you can select a Production Line. After you select a Production Line, the page displays the Equipment summary for the Production Units within the selected Production Line. |

4. In the drop-down list box next to the **View by** box, select a time range as described in the following table.

| Op-tion | Description |
|---|---|
| Cur-rent Shift | Select to access the summary of the Equipment in the ongoing shift. By default, this option is se-lected. |
| Last Shift | Select to access the summary of the Equipment in the shift prior to the current shift. |
| To-day | Select to access the summary of the Equipment on the current Production Day. |
| Yes-ter-day | Select to access the summary of the Equipment from the day prior to the current Production Day. |
| Cur-rent Week | Select to access the summary of the Equipment within the ongoing Production Week. |
| Last Week | Select to access the summary of the Equipment within the Production Week prior to the current Production Week. |
| Cus-tom | Select to access the summary of the Equipment within a date and time range that you specify by using a calendar window. The following calendar window appears when you select the **Custom** option. |

| Op-tion | Description |
|---|---|
| |  To specify a custom date and time range in the calendar window:<br><br>a. In the **START DATETIME** section, select a date and enter a time in the format hh:mm:ss.<br>b. In the **END DATETIME** section, select a date and enter a time in the format hh:mm:ss.<br>c. Select **Apply**. |

> **Note:**
>
> If there are no shifts configured for the plant, the **Current Shift** and **Last Shift** options do not appear.
>
> The time range calculations for the **Current Shift** and **Last Shift** time range options are based on the `Site_Parameters` table rather than the `Crew_Schedule` table.

In the page displaying the Equipment summary:

- The time range that you select appears.
- The Donut charts summarizing OEE, Quality, Performance, and Availability for each KPI appear

> **✎ Note:**
>
> These KPI metrics are based on the **OEE Aggregation Store** setting. If **OEE Aggregation Store** is set to False, the values are calculated on the fly every time the chart is opened or refreshed. If it is set to True, the values are populated from the OEE Aggregation tables. For more information, refer to the About OEE Aggregation Store *(on page 393)* topic.

Each KPI card displays the following status information.

| Status | Colors | Range |
| --- | --- | --- |
| Good | Blue | > 85 percent |
| Moderate | Yellow | > 50 percent and <= 85 percent |
| Low | Red | <= 50 percent |

> **✎ Note:**
>
> The maximum value for the KPIs are set to 100% by default. However, you can override this by setting **OEE Max Limit Override** to true. The OEE Max Limit Override flag allows the OEE cap beyond 100%. When this flag is set to false and the KPI actual value is more than 100%, the value is defaulted to 100% in the chart.

5. To access the detailed KPI information, select ╋ in the KPI card. The Availability KPI card with the detailed KPI information also includes summary statistics.

> **✎ Note:**
>
> The detailed KPI information is not available for the OEE KPI card.

The Pareto and Waterfall charts that show the detailed information for the selected KPI appear in the page displaying the Equipment summary. When you select **+** for a KPI card, the charts appear, displaying information about the KPI as described in the following table.

| KPIs | Description |
| --- | --- |
| Quality | Displays the following details about the calculated Quality by product: |

| KPIs | Description |
|---|---|
| | • **Scrap Breakdown**: A Pareto chart displaying the top five reasons for the scrap breakdown. Select **Get By Duration** to access the breakdown information by duration.<br>• **Loss By Product**: A Waterfall chart displaying losses by product.<br><br>✎ **Note:**<br>In the **View by** box for a chart, select **Quantity** or **Count** to access the data according to the selected option in the chart. |
| Performance | Displays the following details about the calculated Performance by product:<br>• **Speed Loss Breakdown**: A Pareto chart displaying the top five reasons for the speed loss breakdown.<br>• **Speed Loss By Category**: A Waterfall chart displaying speed losses by category.<br><br>✎ **Note:**<br>In the **View by** box for a chart, select **Duration** or **Count** to access the data according to the selected option in the chart. |
| Availability | Displays the following details about the calculated Availability related to the uptime of the machine:<br>• **Summary Statistics**: A list of the number of events, total downtime, mean time to repair (MTTR), and mean time between failures (MTBF) values. By knowing MTBF and MTTR values, you can schedule around the availability of the Equipment while informed of the time between failures and the time it takes to resolve issues, thus enhancing OEE.<br>• **Downtime Breakdown**: A Pareto chart displaying the top five reasons for the downtime breakdown.<br>• **Downtime by Category**: A Waterfall chart displaying downtime by category.<br>• A list of reasons for the downtime and color-coded charts that display uptime and downtime for the selected time range. |

| KPIs | Description |
|------|-------------|
| | **✏ Note:**<br>In the **View by** box for a chart, select **Duration** or **Count** to access the data according to the selected option in the chart. |

When you hover over any bars in the charts, the tooltip displays the information about the attributes described in the following table.

| Attribute | Description |
|-----------|-------------|
| Fraction | Corresponding percentage of the total downtime |
| Count | Number of events |
| Duration | Downtime duration |

6. **Optional:** Select ▽ , then select the **NPT** check box, and then select **Apply** to include any non-productive time (NPT) in the results. For more information, refer to the About Non-Productive Time in Downtime Calculations *(on page 322)* topic.

# Customize Time Duration to Refresh Data

You can set the following values for the list of activities:

- The frequency of refreshing a page if left idle for certain minutes.
- The number of hours for collating and displaying the data in the grid.

1. Depending on your installation, access the `app.properties.json` file in the following folder:
   - **Enterprise installation:** `<Install Directory>/PlantApplicationsDocker/ plantapps-web-docker/mnt/configfiles/downtime-app/prod/ {{appVersion}}/<appname>.yml`
   - **Standard installation:** `<Install Directory>\config-rep\downtime-app\prod \{{appVersion}}\<appname>.yml`
2. Modify the values for the following parameters:
   - **lastNHours**
   - **refreshNMinutesDuration**

If the **refreshNMinutesDuration** is set to five minutes and the page is idle for five minutes, the list is refreshed and the timestamp is updated accordingly.

3. Refresh Plant Applications Web Client.

The list of activities is refreshed based on the values you have specified.

# Chapter 14. Reports

## About Reports

As a supervisor, you can generate OEE and production status reports for selected assets, displayed as a series of cards.

The Reports application enables you to generate OEE and production status reports for selected assets, displayed as a series of cards. You can access the KPI reports and production status of the plant by Department, Production Line, and Production Unit. The application also provides information about Planned vs. Actuals for each KPI.

The OEE reports track production conditions and events that contribute to manufacturing inefficiencies related to downtime, waste, and production throughput. The application automatically tracks OEE by product and order.

> **Note:**
> To access information about a Production Unit in the Reports application, you must specify the **Production Rate Specification** attribute for the Production Unit in the Plant Applications Administrator. Else, a message indicating the non-availability of data for the corresponding unit appears in the Reports application. For more information, refer to the OEE: Production Metrics topic in the Proficy Plant Applications Help.

OEE is derived as a product of the following metrics:

OEE = Availability x Performance x Quality

> **Note:**
> For information about the calculation of OEE parameters for time-based units, refer to the OEE Parameters Calculation for Time-Based Units *(on page 361)* topic.

When reporting OEE statistics, the following thresholds apply:

| Good | > 85 percent |
| --- | --- |
| Moderate | > 50 percent and <= 85 percent |
| Low | <= 50 percent |

> **Note:**
>
> The maximum value for the KPIs are set to 100% by default. However, you can override this by setting **OEE Max Limit Override** to true. The OEE Max Limit Override flag allows the OEE cap beyond 100%. When this flag is set to false and the KPI actual value is more than 100%, the value is defaulted to 100% in the chart.

The production status report provides data related to tracking of products and order-completion status (scheduled for production, in progress, or completed).

In the Reports application, in the **Show** list, you can select one of the following options to generate the corresponding report type:

- **Product OEE**: Displays the OEE report for a product. You can expand a row in the search results to compare planned versus actual KPI data for the product as shown in the following image.

Figure 3. Product OEE Report



- **Order OEE**: Displays the OEE report for an order. You can expand a row in the search results to compare planned versus actual KPI data for the order as shown in the following image.

Figure 4. Order OEE Report



- **Production Status**: Displays the status of an order in a shift. You can expand a row in the search results to access more information about the order as shown in the following image.

Figure 5. Production Status Report



> ⓘ **Tip:**
>
> You can select ▽ , select the **NPT** check box, and then select **Apply** to include any non-productive time (NPT) in these reports. For more information, refer to the About Non-Productive Time in Downtime Calculations *(on page 322)* topic.

# OEE Parameters Calculation for Production Lines

To calculate an OEE parameter (Availability, Performance, or Quality) value for a Production Line, the corresponding OEE parameter for each Production Unit within the Production Line are summed up based on the OEE mode selected for the Production Unit. For more information, refer to the following topics:

- OEE Parameters Calculation for Standard Units *(on page 359)*
- OEE Parameters Calculation for Time-Based Units *(on page 361)*

> **Note:**
>
> These KPI metrics are based on the **OEE Aggregation Store** setting. If **OEE Aggregation Store** is set to False, the values are calculated on the fly every time the chart is opened or refreshed. If it is set to True, the values are populated from the OEE Aggregation tables. For more information, refer to the About OEE Aggregation Store *(on page 393)* topic.

# OEE Parameters Calculation for Standard Units

The classic OEE mode approach to the OEE calculation for standard units measures the performance and quality losses in terms of loss of production availability or productivity that are attributed to the performance and quality, respectively.

The classic OEE modes are Standard, None, Long Running 840D, and Long Running EDM are defined for a Production Unit in Plant Applications Administrator. The OEE calculation formula for all these modes are same.

The OEE parameters Availability, Performance, and Quality for the standard Production Units are calculated based on the formula described in the following table.

| OEE Parameter | Calculation Formula |
|---------------|---------------------|
| Availability | Availability = Net availability run time/Planned production time<br><br>Where, Net availability run time = Planned production time - Availability downtime |
| Performance | Performance = Actual production/Target production<br>Where, |

| OEE Parameter | Calculation Formula |
|---|---|
|  | • Actual production is the actual productivity of the Unit<br>• Target production is the potential productivity of the Unit |
| Quality | Quality = Net production/Actual production<br>Where,<br><br>• Net production = Actual production - Waste<br>• Actual production is the actual productivity of the Unit<br>• Waste is the amount of rejected products |

## Classic-Mode OEE Parameters Calculation

In this example, the value for each OEE parameter per day for a bottle manufacturing plant is as shown in the following table.

| Inputs | Value |
|---|---|
| Planned production time | 24 hr |
| Availability downtime | 1 hr |
| Actual production | 900 bottles |
| Target production | 1000 bottles |
| Waste | 100 bottles |

The following table provides the value of each OEE parameter calculated based on the formula described in the earlier section.

| OEE parameter | Parameter value | Formula used | Explanation |
|---|---|---|---|
| Availability | 23/24 = 0.125 | Availability = Net availability run time/Planned production time. | Planned production time = 24 hr<br><br>Availability downtime = 1 hr<br><br>Net availability run time = 24 - 1 = 23 hr |

| OEE parameter | Parameter value | Formula used | Explanation |
|---|---|---|---|
| Performance | 900/1000 = 0.9 | Performance = Actual production/Target production | Actual production = 900 bottles<br><br>Target production = 1000 bottles |
| Quality | 800/900 = 0.8889 | Quality = Net production/Actual production | Actual production = 900 bottles<br><br>Waste = 100 bottles<br><br>Net production = 900 - 100 = 800 bottles |

## OEE Parameters Calculation for Time-Based Units

The time-based approach to the OEE calculation measures the performance and quality losses in terms of loss of production time or downtimes that are attributed to the performance and quality, respectively.

The OEE parameters Availability, Performance, and Quality for the time-based units are calculated based on the formula described in the following table.

| OEE Parameter | Calculation Formula |
|---|---|
| Availability | Availability = Net availability run time/Planned production time<br><br>Where, Net availability run time = Planned production time - Availability downtime |
| Performance | Performance = Net performance run time/Net production time<br>Where,<br><br>&bull; Net production time = Planned production time - Availability downtime<br>&bull; Net performance run time = Net production time - Performance downtime |
| Quality | Quality = Net quality run time/Net production time<br>Where, |

| OEE Parameter | Calculation Formula |
|---|---|
| | • Net production time = Planned production time - Availability downtime - Performance downtime<br>• Net quality run time = Net production time - Quality downtime |

## Time-Based OEE Parameters Calculation

In this example, the value for the production time and downtime for each OEE parameter is as shown in the following table.

| Inputs | Value |
|---|---|
| Planned production time | 60 minutes |
| Availability downtime | 10 minutes |
| Performance downtime | 10 minutes |
| Quality downtime | 10 minutes |

The following table provides the value of each OEE parameter calculated based on the formula described in the earlier section.

| OEE parameter | Parameter value | Formula used | Explanation |
|---|---|---|---|
| Availability | 50/60 = 0.8333 | Availability = Net availability run time/Planned production time. | Planned production time = 60 minutes<br><br>Availability downtime = 10 minutes<br><br>Net availability run time = 60 - 10 = 50 minutes |
| Performance | 40/50 = 0.8 | Performance = Net performance run time/Net production time | Planned production time = 60 minutes<br><br>Availability downtime = 10 minutes<br><br>Performance downtime = 10 minutes |

| OEE parameter | Parameter value | Formula used | Explanation |
|---|---|---|---|
| | | | Net performance run time = 50 - 10 = 40 minutes |
| | | | Net production time = 60 - 10 = 50 |
| Quality | 30/40 = 0.75 | Quality = Net quality run time/Net production time | Planned production time = 60 minutes |
| | | | Availability downtime = 10 minutes |
| | | | Performance downtime = 10 minutes |
| | | | Quality downtime = 10 minutes |
| | | | Net quality run time = 50 - 10 = 40 minutes |
| | | | Net production time = 60 - 10 - 10 = 40 minutes |

# Viewing Reports

You can view the **Reports** summary for Product OEE, Order OEE, and Production status as a series of cards based on selected assets.

1. On the **Reports** screen, select an option from the **Show** drop-down list.
   - Product OEE
   - Order OEE
   - Production Status

   **Show** determines the data to be displayed on the cards, such as OEE data or Production Status tracking data.
2. Select one of the following from the **View by** drop-down list:
   - Summary (Default option)
   - Department
   - Line
   - Unit

**View by** determines the physical assets upon which the display is based, such as Departments, Lines, and Units, with an additional summary view.

3. You can group the information as per your requirement

| View by option | Grouping options |
|---|---|
| Summary (default option) or Department | **Group by** drop-down-list contains the following options:<br>    • None (default option)<br>    • Shift<br>    • Crew |
| Line | **In** drop-down list contains a full list of department names.<br>Example:<br>    • *Department 1*<br>    • *Department 2*<br>    • *Department 3*<br>You can also group results by none, shift, or crew. |
| Unit | **In** drop-down list contains a full list of line names. Example:<br>    • *Line 1*<br>    • *Line 2*<br>    • *Line 3*<br>You can also group results by none, shift, crew, or path. |

4. Select the required time range and click the refresh button next to the drop-down to view and update the results.

    • Current Shift (Default)

    • Last Shift

    • Today

    • Yesterday

    • Current week

    • Last week

    • Custom

    • Tomorrow (for Production Status only)

    • Next Week (for Production Status only)

    • Next Shift (for Production Status only)

The time range that you select will be displayed in the form of date and time next to the time-interval drop-down list. The **Reports** screen generates the report for the selected options. For

example, if you select **Product OEE** by **Line** in *department 1* grouped by **Shift** for the current shift, the application generates a list with the following information:

- A summary of KPIs is displayed at the top: OEE, Quality, Performance, and Availability

> **✎ Note:**
> The KPI values are based on the selected time range and not on the Product or Order time durations.

- For each line, grouped by shift, following columns are displayed:
  - `Product` – Products produced on the Machine or Machine group. If the report selected is **Product OEE**, this column shows the Product information. If the report selected is **Order OEE**, this column shows the Order information.
  - `Status` – When an OEE exceeds an established threshold, the Status column displays a red dot.
  - Separate columns display each KPI for the listed products: `OEE %`, `Performance %`, `Availability %`, and `Quality %`.
  - The last row for each shift displays the `Total` value rolled up for each KPI card.

If you select **Production Status** in the **Show** drop-down list, you see the production status report for the model context selected through **View By** and **In** drop-down list and grouped by the **Group by** category. The report view includes the following information:

- `Order` (sortable) – The list of Orders in the Machine or Machine Group, or as a Summary, as per the orders configured in the Plant during the time range selection made.
- `Product` – Name of the Product associated with the Order in the row.
- `Status` – the status of the Order (for example: Completed, Active, Pending).
- `Complete %` – completion percentage at the time the Report is displayed.
- `Start` – start time of the Order. If the Order has already started or completed, this time shows the actual time, else it displays the planned time.
- `End` – End time of the Order. If the Order is already completed, this time shows the actual time, else it displays the planned time. If the order is in process, it displays the estimated time.
- In-line View – If you select a row, an in-line view opens, displaying Production Information along with the `Planned vs. Actual` values of Quality and Schedule.

5. **Optional:** Click a row to see the color chips for all the three KPIs. The colors of these chips indicate the ranges of the KPI values which are static and are not based on Product or plant model context.
6. **Optional:** Click a row to see the details of the KPIs of that particular row.

The row expands to display `Planned vs. Actual` raw values of the KPIs for the corresponding row.

7. **Optional:** For any combination of the Options selected, once the data is retrieved and displayed they can be exported to a `csv` file by clicking the export icon on the right top corner of the cards.

# Chapter 15. My Machines

## About My Machines

As an Operator, you can use the **My Machines** application to select machines from the list of machines accessible to you across a plant model. The selected machines are set as your user preferences in the Plant Applications Web Client. The other applications in the Plant Applications Web Client, such as Downtime and Reports, display their application-specific data for only those machines that were set as your user preferences.

> **Note:**
> Two user preferences are stored for a user. You can switch back to previous user preference using the **Restore Previous Profile** option.

My Machines provides two types of views: Exclusive and Inclusive. When you access the application, you can see these two views in respective tabs.

- **Exclusive**: Allows you to select machines from the list of machines accessible to you across a plant model.
- **Inclusive**: Allows you to create your own profile and add machines to it.

When you load the My Machines application for the first time or if no machines are displayed, the machines for which you have access to appear in the **Selected Machines** section.

> **Note:**
> If no machines are authorized to you, an error message is displayed. Contact your System Administrator.

## Select Exclusive Machines

1. Log in to the Plant Applications Web Client.
2. Select ⚙.
   The **My Machines** page appears. By default, the **Exclusive** tab is selected.
3. Select the relevant departments, lines and machines from the **Departments**, **Lines** and **Machines** boxes, respectively. The list of machines appears.
4. Select the machines you want to set as your user preferences.

> **Note:**
>
> The values that appear in the **Department**, **Line**, and **Machine** boxes are based on the Production Units associated with an active Display for which you have write access. You can configure Production Units for a Display in the Plant Applications Administrator.



5. Select **Save**.

Based on machines selected in the My Machines application, application-specific data appears in the other applications. For example, in the **Events** page in the Downtime application, the downtime records for the machines selected in the My Machines application appear.

> **Note:**
>
> You must have at least one machine authorized to you. If you delete all the machines authorized to you, an error message is displayed and the option to save the changes is not available. If you want to delete all the machines, contact your System administrator.

## Select Inclusive Machines

1. Log in to the Plant Applications Web Client.
2. Select ⚙.

   The **My Machines** page appears. By default, the **Exclusive** tab is selected.
3. Select the **Inclusive** tab.

The list of machines appears along with an option to create your primary profile. You can use the **Clear All** link located at top-right corner to clear the list of machines.



4. Select **Add Machines**.

   The **Add Machines** window appears with the list of machines.

   > **Note:**
   > If you have already selected the machines previously, you can see them being selected in the **Add Machines** window.

5. You can search for the relevant departments, lines, and machines using the **Search** box. Based on the keywords entered, the list of machines appears.

6. From the list, select the machines you want to set as your user preferences or remove the machines that you no longer required. You can expand the tree view to select relevant departments, lines, and machines.

7. After the selection, select **Add&Close** to add the selected machines to your profile. Alternatively, you can select **Add** if you choose to stay in the **Add Machines** window to make more selections. The selected machines are added to your profile. If you want to add or remove machines from your profile, you can use the **Add Machines** button.

   Based on machines selected in the My Machines application, application-specific data appears in the other applications. For example, in the **Events** page in the Downtime application, the downtime records for the machines selected in the My Machines application appear.

8. Select **Clear All** at any point to time to clear the list of machines.

# Chapter 16. Analysis

## About Analysis

As a supervisor, you can use the Analysis application to plot historical and live charts to visualize time series data available in Plant Applications and Historian.

Analysis application displays information for production batches in the form of a Gantt chart.

It enables operators, supervisors, and process engineers to analyze time series data and live issues, and to quickly troubleshoot issues and make improvements. Process engineers can also analyze the production batches and golden batches information.

## Analyze a Batch

You can use the Analysis application to analyze a batch, compare the batch with the other batches, navigate to previous and next batches, and compare how the variables associated with the batch produced trend over the batch duration. The ANSI/ISA−88.01−1995 documentation defines a batch as the material that is being produced or that has been produced by a single execution of a batch process or an entity that represents the production of a material at any point in the process. Batches are produced on a single equipment or a process cell. A golden batch is a batch that is identified to be used as a reference batch for a few specific KPIs such as the best yield, lowest waste, best quality, and higher productivity.

1. Log in to the Plant Applications Web Client.
2. Select ⊡.

   The **Chart Configuration** page appears.

   > ✏️ **Note:**
   > After you login and select ⊡ for the first time, the default trend chart appears. You can select 🔍 to go back to the **Chart Configuration** page.

3. In the **Plant Model** list, select a plant model associated with the batch.
4. In the **Data type** list, select **Batches**.

   > ✏️ **Note:**
   > The **Batches** and **Golden Batches** options appear only when the Plant Applications Web Client is configured to use batches instead of process orders.

5. Search for the batch that you want to analyze, and then, in the **Batches** section, select **Add Batches**.

> **ⓘ Tip:**
> You can add multiple normal batches or golden batches to compare their details. For more information, refer to the Add Tags, Variables, KPIs, Process Orders, and Batches *(on page 372)* topic.

6. Select **Plot** to access the **CHART CONTROLS** page, and then analyze the batch.

> **ⓘ Tip:**
> Alternatively, you can select ⤴ to access the **CHART CONTROLS** page.

By default, the **CHART CONTROLS** page appears in **Normal View**, displaying a Gantt chart for the selected batch. If you selected only one batch, the batches available within the five days before and after the selected batch also appears in the chart. You can hover over a batch to view its details. For more information about trend charts, refer to the Types of Trend Charts *(on page 384)* topic.

In the **CHART CONTROLS** page, you can use the **Toggle View** option to toggle between the interval and duration modes.

7. Analyze the selected batch with respect to variables in a Line chart by following these steps:

   a. Select 🔍 to return to the **Chart Configuration** page.
   b. In the **Data type** list, select **Variables**.
   c. Search for the variables you want to plot in the Line chart, then select **Add Chart**, and then select **Plot** to plot the selected variables for the selected batch in a single Line chart.

   > **ⓘ Tip:**
   > Select **Add Chart** to add more charts and plot a single variable or a combination of variables in different charts.

In the **CHART CONTROLS** page, the Line chart appears in the **CHART 2** section after the Gantt chart as shown in the following image.
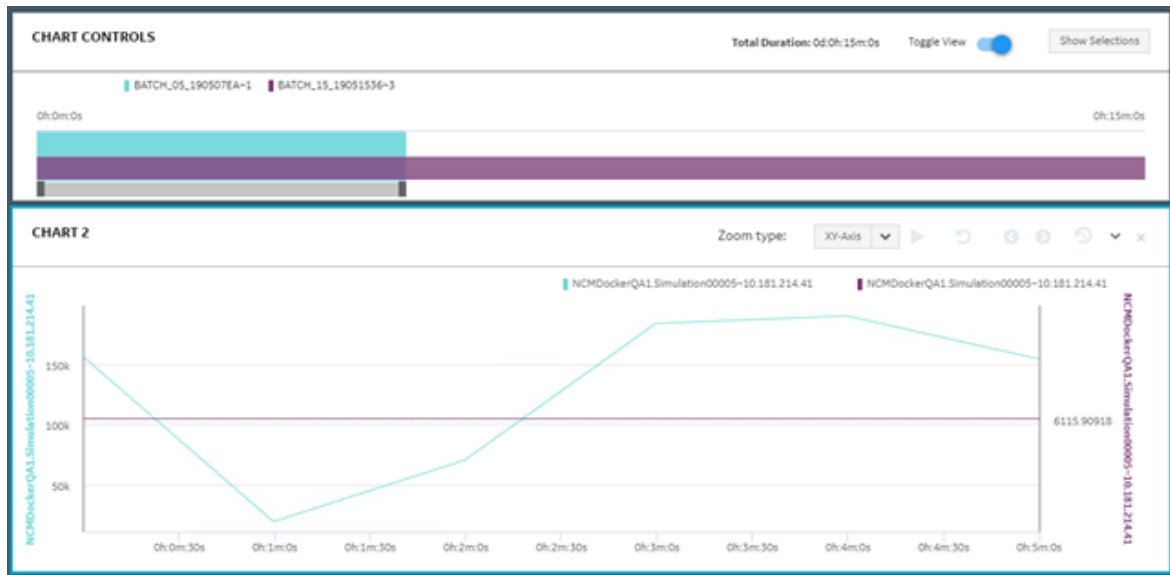
You can set the time slider bar for the required time duration for the process order. When you update the time duration for the process order in the Gantt chart, the application updates the corresponding Line chart displaying the time series data. In addition, the application synchronizes the horizontal axis for the Gantt and Line charts.

## Add Tags, Variables, KPIs, Process Orders, and Batches

You can add Historian tags, Plant Applications variables, KPIs, process orders, batches, and golden batches to the **Analysis** page to trend required charts and display tables for analyzing information.

If you want to add Historian tags, you must provide the Historian details:

1. Install Historian Web-based Clients.
2. Access the `historian-config-prod.properties` file. For Enterprise Plant Applications, this file is located at `<installation folder of Docker>/plantapps-web-docker/mnt/configfiles/historian-config/prod/1.1.0-SNAPSHOT`
3. For each Historian server whose tag data you want to add, provide the details of Historian as described in the following table.

| Parameter | Description | Required/Optional? |
| --- | --- | --- |
| histN.service.origin | The IP address, hostname, or the fully qualified domain name (FQDN) of the machine | Required |

| Parameter | Description | Required/Optional? |
|---|---|---|
| | on which you have installed Historian Web-based Clients. | |
| histN.service.port | The port number on which the Historian Web-based Clients is running. | Required only if it is other than 8443 |
| histN.service.hostname | The hostname of the Historian server, as configured in Plant Applications. | Required |
| histN.service.client_id | The client ID of the Historian UAA service. The default value is admin. | Required |
| histN.service.client_secret | The client secret of the Historian UAA service. | Required |
| histN.uaa.origin | The IP address, hostname, or the FQDN of the machine on which the UAA service used by Historian is installed. | Required |
| histN.uaa.port | The port number of the UAA service used by Historian. | Required |
| hist.service.clientSecretEn-crypted | Indicates whether the client secret that you have provided is encrypted. The default value is false. | Required |

4. Restart the following services:
   - mesdataservice
   - Processanalyserappservice

For Enterprise Plant Applications, these services are available as Docker containers. For Standard Plant Applications, they are available as Tomcat services.

1. Log in to Plant Applications Web Client.
2. Select .

   The **Chart Configuration** page appears. By default, the **Tags** option appears in the **Data type** list.

> **Note:**
>
> After you login and select ⬚ for the first time, the default trend chart appears. You can
>
> select ⬚ to go back to the **Chart Configuration** page.

3. Select a context in the **Plant Model** list.

> **Note:**
>
> You must expand the plant name to navigate and select the required department, line, or
> unit of your plant. The selected department, line, or unit appears for the plant model in the
> **Plant Model** list.

4. Select the required Historian server in the **Historians** list.

> **Note:**
>
> The **Historians** list appears only when you select **Tags** in the **Data type** list. You can plot
> the Historian tags belonging to multiple Historian servers, limited to 10 servers only. The
> Historian server can be local or remote. A local Historian server is installed on the same
> node as the Process Analyzer. The remote Historian server is installed on a node different
> than that of the Process Analyzer. The minimum supported version is Historian 7.0 SP5 or
> later.

5. In the **Data type** list, select one of the following options:
   - **Tags**
   - **Variables**
   - **KPI** (available for lines and units only)
   - **Process Orders** (available only if Plant Applications Web Client is configured to use process
     orders)
   - **Batches** (available only if Plant Applications Web Client is configured to use batches)
   - **Golden Batches** (available only if Plant Applications Web Client is configured to use
     batches)

> **Tip:**
>
> To sort the search results, select a column name. To filter the data, select . For more
> information, refer to the topic Filter Tags, Variables, KPIs, Process Orders, and Batches *(on
> page 376)*.

6. Depending on the data type, select one of the following options as shown in the following table.

| Data Type | Option |
| --- | --- |
| Variables | Add Chart |
| KPIs | Add Chart |
| Variables | Add Chart |
| Batches | Add Batches |
| Golden Batches | Add Batches |
| Process Orders | Add Process Orders |

You can select multiple items.

> **Note:**
> To add multiple items to an existing chart, select **Add Data** for the chart. Alternatively, to add a new chart, drag the required items to the **Add Chart** button. GE recommends that you should restrict the total count of tags or variables for Live charts to five to optimize the trend chart output.

7. Select to select an interval from the available Presets or to select a custom time interval by selecting the required dates and time, and then select **Apply**.

The default time duration selected is the current time minus one hour. If you select an interval from the calendar, the chart is enabled to be plotted as the Historical chart instead of the Live chart.
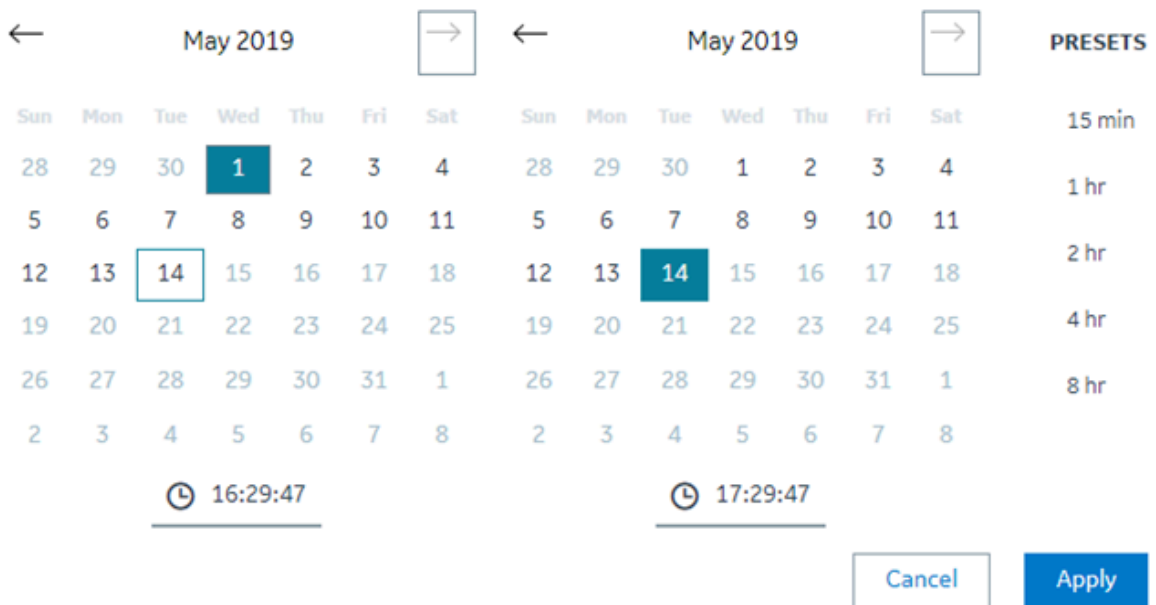
8. After you add the required items to the charts, select **Plot**.

With larger data samples the loading time of the analysis session may increase.

A live chart is plotted on the screen as Chart 1.

The **Analysis** page appears, displaying the required trend charts and information.

> **ⓘ Tip:**
>
> You can select 🔍 to open the **Chart Configuration** page to search and add more tags, variables, KPIs, batches, or process orders for analysis. In the **Chart Configuration** page, you can select 📈 to open the **Analysis** page.

You can further save an analysis trend to restore the analysis view. The trends you save are accessible by all users. For more information, refer to the Save an Analysis Trend *(on page 386)* topic.

# Filter Tags, Variables, KPIs, Process Orders, and Batches

1. Log in to the Plant Applications Web Client.
2. Select 📈.

The **Chart Configuration** page appears as shown in the following image. By default, the **Tags** option appears in the **Data type** list.

> **Note:**
>
> After you login and select ![icon] for the first time, the default trend chart appears. You can
>
> select ![icon] to go back to the **Chart Configuration** page.

3. Select a context in the **Plant Model** list.

> **Note:**
>
> You must expand the plant name to navigate and select the required department, line, or
> unit of your plant. The selected department, line, or unit appears for the plant model in the
> **Plant Model** list.

4. Select the required Historian server in the **Historians** list.
5. In the **Data type** list, select one of the following options:
   - **Tags**
   - **Variables**
   - **KPI** (available for lines and units only)
   - **Process Orders** (available only if Plant Applications Web Client is configured to use process orders)
   - **Batches** (available only if Plant Applications Web Client is configured to use batches)
   - **Golden Batches** (available only if Plant Applications Web Client is configured to use batches)
6. Select ![icon] to filter the required data.

   The filter window appears based on the selected Data type.

The data is filtered per your selections.

# Analyze a Process Order

You can use the Analysis application to analyze one or more Process Orders when Plant Applications is configured to use process orders instead of batches. In some organizations, a batch is identified as a process order number. In this scenario, the process order quantity is the batch quantity produced in a production run.

1. Log in to the Plant Applications Web Client.
2. Select ![icon].

The **Chart Configuration** page appears.

> ✏️ **Note:**
>
> After you login and select 📈 for the first time, the default trend chart appears. You can
>
> select 🔍 to go back to the **Chart Configuration** page.

3. In the **Plant Model** list, select a plant model associated with the process order.

4. In the **Data type** list, select **Process Orders**.

> ✏️ **Note:**
>
> The **Process Orders** option appears only when the Plant Applications Web Client is
> configured to use process orders instead of batches.

5. Search for the process order that you want to analyze, and then, in the **Process Orders** section,
   select **Add Process Orders**.

> ℹ️ **Tip:**
>
> You can add multiple process orders to compare their details.

6. Select **Plot** to access the **CHART CONTROLS** page, and then analyze the process order.

> ℹ️ **Tip:**
>
> Alternatively, you can select 📈 to access the **CHART CONTROLS** page.

By default, the **CHART CONTROLS** page appears in Normal View and a Gantt chart appears for the
selected process order.

If you selected only one process order, the process order available in the five days before and after
the selected process order also appears in the chart. You can hover over a process order to view
its details. For more information about trend charts, refer to the Types of Trend Charts *(on page
384)* topic.

In the **CHART CONTROLS** page, you can use the **Toggle View** option to toggle between the interval
and duration modes.

If you selected multiple process orders, then the Gantt chart appears in the duration mode only.

7. Analyze the selected process order with respect to variables in a Line chart by following these steps:

   a. Select 🔍 to go back to the **Chart Configuration** page.

   b. In the **Data type** list, select **Variables**.

   c. Search for the variables you want to plot in the Line chart, then select **Add Chart**, and then select **Plot** to plot the selected variables for the selected process order in a single Line chart.

   > ℹ️ **Tip:**
   >
   > Select **Add Chart** to add more charts and plot a single variable or a combination of variables in different charts.

In the **CHART CONTROLS** page, the Line chart appears in the **CHART 2** section after the Gantt chart as shown in the following image.
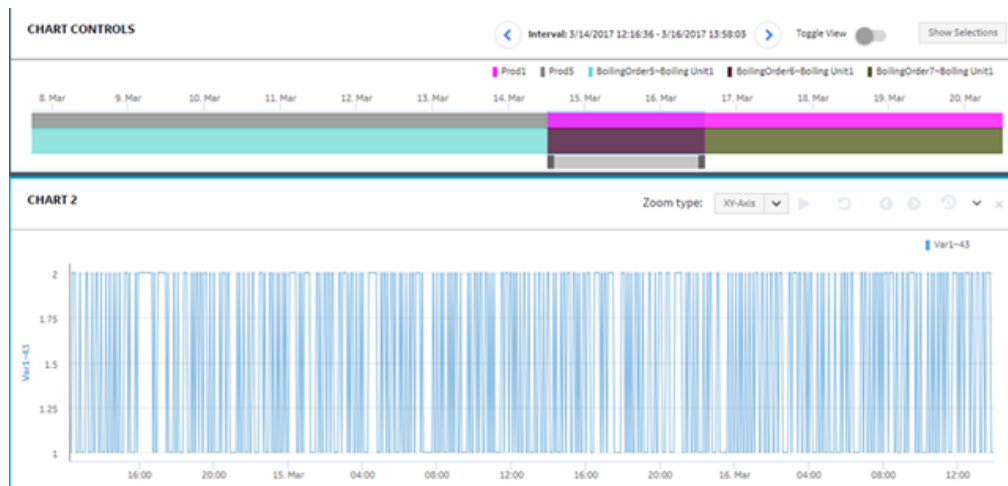


You can set the time slider bar for the required time duration for the process order. When you update the time duration for the process order in the Gantt chart, the application updates the corresponding Line chart displaying the time series data. In addition, the application synchronizes the horizontal axis for the Gantt and Line charts.

## Access Trend Charts

When you select tags, variables, or KPIs and add the data for analysis, your selections are added to a Live chart instance in the Analysis application.

> **Note:**
>
> The following features are currently not available for live charts:
>
> - Print preview and print
> - Export
> - Filter
> - Zoom
> - Range for y-axis
> - Multifield and string tags
>
> You cannot modify the live charts. The chart is autorefreshed with the x-axis duration set to 60 minutes.
>
> > **Note:**
> >
> > You can change the Sampling Mode of Trend Charts by changing the value of the samplingMode property in `app.properties.json`. The location of this file depends on your installation.
> >
> > - **Enterprise installation:**`<Install Directory>/ PlantApplicationsDocker/plantapps-web-docker/mnt/ configfiles/process-analyzer-app/prod/{{appVersion}}/ <appname>.yml`
> > - **Standard installation:** `<Install Directory>\config-rep\process- analyzer-app\prod\{{appVersion}}\<appname>.yml`
> >
> > By default, the value is set to Interpolated. The interpolated values are displayed on the chart. Another permissible value of samplingMode property is Trend,in that selection all the sample count values are displayed.

1. In the **Analysis** page, select ⬛ to access the historical chart for a live chart.

   > **Note:**
   >
   > Live mode is not supported when the batches with specific times are displayed along with Tags, Variables, and KPIs. You must edit the chart and select **Use Time** to reset before

> you switch to Live mode. For more information, refer to the Modify Charts *(on page 383)* topic.

2. Select ∨ for a chart to access a menu containing **Chart Info** and to **Show Statistics** options.

   • Select **Chart Info** to access the Chart Type, Start and End date and time, and Tags information.

   • Select **Show Statistics** to access the Name of the trended tags, First Raw Value, Last Raw Value, Minimum Value, Maximum Value, Count, Raw Total, Raw Average, and Raw Standard Deviation.

   • Select **Remove Chart** or select ✕ to delete the respective chart.

   If you add more than two tags, variables, or KPIs to a chart for analysis, a common y-axis appears in the chart. The y-axis is automatically scaled based on the minimum and maximum values of all the individual y-axes.

3. **Optional:** To rename a chart, select the title, and then enter the new name.

4. **Optional:** Select ◀ to zoom backwards, or select ▶ to zoom forward for the saved zooms in a session.

   In a Historical chart, you can drag and select a time frame to analyze. You can zoom forward multiple times. The forward and backward zooms are saved for a session or until the zoom is reset. For example, if the trend chart represents a longer time frame of one month, you can zoom in to a shorter time frame for a week, and further zoom in to specific hours or minutes of a day to analyze the trend data.

   > **Note:**
   > When no data is available for a time window, or if the time window spans less than one second, you may not see any information.

   Select ↺ to reset the zoom to default.

   You can also select one of the following options in the **Zoom type** list to refine your selection:

   • **XY-Axis**: To zoom both x- and y-axes in the Historical chart.

   • **X-Axis**: To zoom only x-axis in the Historical chart.

   • **Y-Axis**: To zoom only y-axis in the Historical chart.

5. **Optional:** Use one of the following layout options.

| Layout Options | Description |
|---|---|
| **Multi-select mode** | Selects multiple trend charts or events from the session. After selecting the required trend |

| Layout Options | Description |
| --- | --- |
| | charts and events you can perform the following actions:<br><br>• After you select multi-select mode, you can select ⤢ to view one or two trend charts in full-screen mode. You can select ⤡ to exit full-screen mode.<br>• You can clear the **Multi-select mode** check box to return to the default mode.<br><br>You cannot modify the charts in multi-select mode. |
| **Normal View** | Displays the default view. |
| **Column View** | Displays the trend charts and batches information in two columns. |
| **Stacked View** | Displays the trend charts and batches information as stacked rows. |
|  **(Show / Hide Chart controls)** | Enables the following behaviors:<br><br>• When the chart controls for the batches are not available, the chart controls are disabled.<br>• When the chart controls for the batches appear, you can select the icon to hide chart controls.<br>• When the chart controls for the batches are hidden, you can select the icon to show chart controls. |
|  **(Export Trended Data)** | Downloads trended data (both good and bad qualities data) to a .csv file.<br><br>> ✏ **Note:**<br>> When the chart appears blank; that is, the plotted variable has no data, if you |

| Layout Options | Description |
|---|---|
| | 📝 export trended data, dummy data of the type bad quality appears in the .csv file. |
| ⊕ (Export Raw Data) | Downloads raw data (only good quality data) as a .csv file.<br><br>📝 **Note:**<br>When the chart appears blank; that is, the plotted variable has no data, if you export raw data, dummy data of the type bad quality appears in the .csv file. |
| 🖨 (Preview Page) | Previews available trend charts for printing. You can select the **Print Page** button to print the charts. |
| ⤢ (Full screen) | Displays the selected charts in full-screen mode. Select ⤡ to exit full-screen mode.<br><br>📝 **Note:**<br>You cannot use the keyboard shortcuts like F11 (to run in full-screen mode) or Esc (to exist full-screen mode). |
| ✖ (Clear Analysis) | Deletes the trend charts and event information from the current session. |

# Modify Charts

You can modify the type, color, and scale of a displayed chart.

1. Select ⌄ next to the tag name to access the editing menu for the respective trend.

   📝 **Note:**
   You can enable or disable a trend on a chart by clicking on the respective tag name.

2. **Optional:** Select **Edit** to modify the following chart elements, and then select **OK** to apply the changes.

| Select | Options |
|--------|---------|
| **Type** | <ul><li>`Line`</li><li>`Line Smoothed`</li><li>`Area`</li><li>`Area Smoothed`</li><li>`Scatter`</li></ul>For more information about chart types, refer to the Types of Trend Charts *(on page 384)* topic. |
| **Color** | Select a color for the trend chart. |
| **Auto Scale** | By default, Auto Scale is enabled. You can disable the default settings and provide your own range for the scale by providing Min and Max values. |
| **Use Time** | By default, Use Time is enabled, which means that the tag or variable uses the current time. You can disable the time and select the required date and time interval you want to analyze for the corresponding tag or variable. |

3. **Optional:** Select the **Switch Y-Axis** option to switch the y-axis for the corresponding tag or variable.
4. **Optional:** You can show and hide rejection limits for the Plant Applications variables by using Show Spec Limits and Hide Spec Limits respectively. If the variable exceeds the rejection limits (L Rej, U Rej), the product is rejected.

> ✏️ **Note:**
> You can only display specification limits for Plant Applications variables. By default, the variable specifications limits do not appear in the chart.

5. Select **Remove** to remove a chart or variable from a trend chart.

## Types of Trend Charts

Trend charts are graphical representations for showing how the value of one or more items changes over time.

Trend charts can display information as Line, Area, and Scatter charts.

Figure 6. Line Chart

Line is the default type of chart.
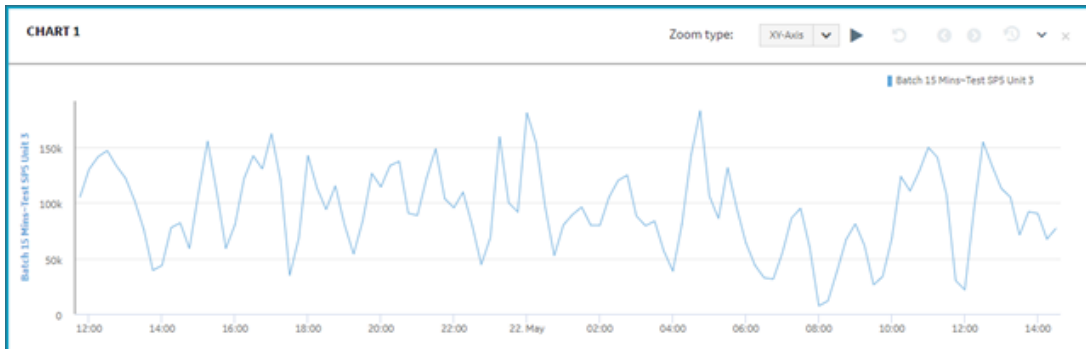


Figure 7. Line Smoothed Chart
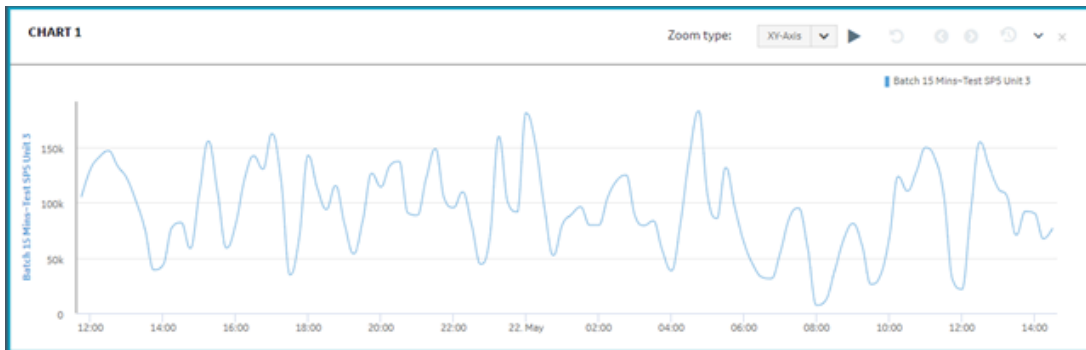


Figure 8. Area Chart
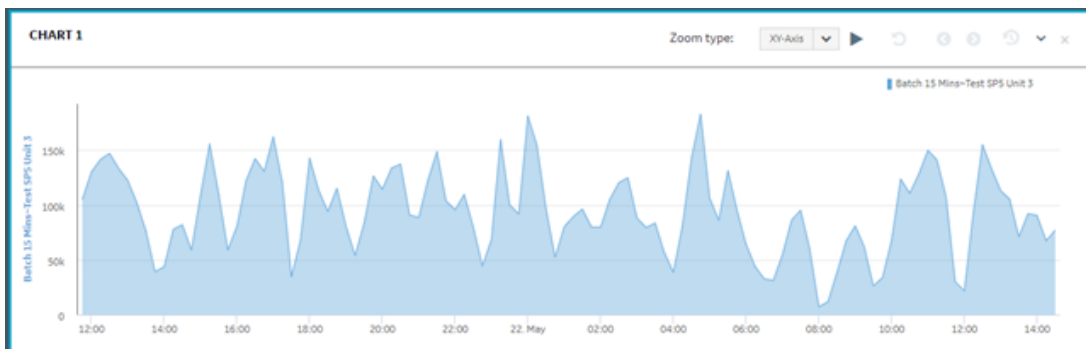
Figure 9. Area Smoothed Chart
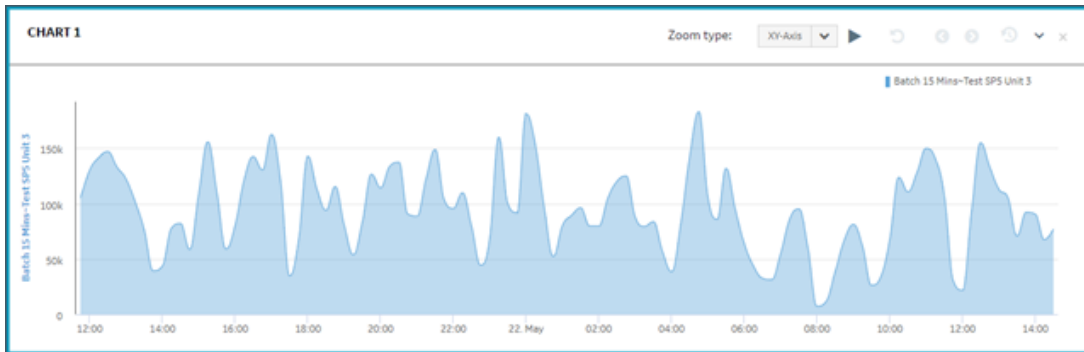


Figure 10. Scatter Chart
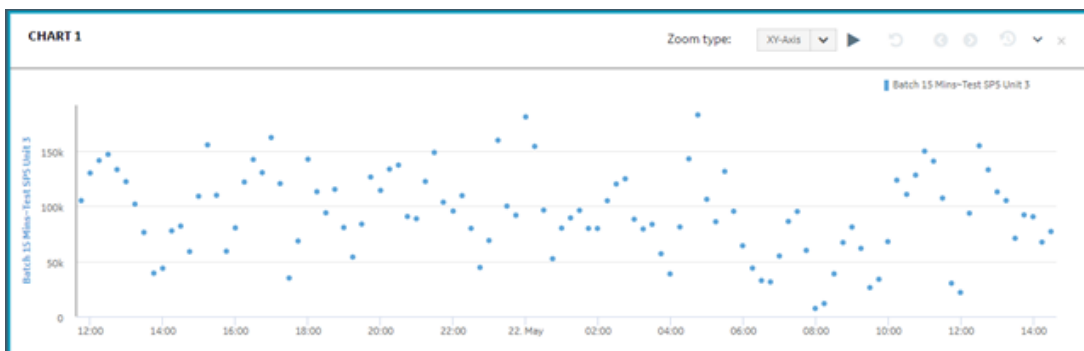


# Save an Analysis Trend

Using the **Save Trend** option, you can save your current view (trend) in a selected folder. You can choose a folder to save an analysis trend or organize saved trends. When you choose to save a trend, you are presented with a folder structure that allows you to keep your trends organized. You can also mark a saved trend as default, which then appears when you login to the Plant Applications Web Client and access the **Analysis** application for the first time.

1. Log in to the Plant Applications Web Client.
2. Select ![icon].

   The **Chart Configuration** page appears.

   > ✎ **Note:**
   >
   > For every new session, when you login and select ![icon] for the first time, the default trend chart appears. You can close the chart to go back to the **Chart Configuration** page.

3. Select a plant model and data type for which you want to view the trend chart.

4. Depending on the data type, select **Add Chart** or **Add Batches**, and then select **Plot**.

5. Select .

   The **Save Trend** window appears.



Each field that appears in the **Save Trend** window is described in the following table.

| Field | Description |
|---|---|
| **Title** | Enter a descriptive name for the chart. |
| **Saved Charts** | Displays the folder tree view under **Saved Charts** for you to save a trend. You can either select an existing folder or you can create a new folder using the ➕ icon. You can perform below actions by selecting a required folder. <br><br> 📝 **Note:** <br> The 📂 icon indicates that the current default trend is saved in this folder. |
| **Actions** | The actions that you can perform for saving a trend. You can select one of the following action items: |

| Field | Description |
|---|---|
| | - $+$: Select to add a new folder.<br><br>- ☆: Select to mark a trend as default. This appears only when you select an existing trend from a folder. For more information, refer Mark a Saved Trend as Default *(on page 390)*.<br><br>> ✎ **Note:**<br>> ⭐ indicates that the selected trend is the current default trend.<br><br>- ✎: Select to rename a folder or a trend name.<br><br>- 🗑: Select to delete a saved trend. For more information, refer Delete a Saved Trend *(on page 392)*.<br><br>- ↑: Select to go a level above the current folder. Alternatively, you can use the breadcrumbs to navigate through the current directory.<br><br>- ↻: Select to refresh the list of files and folders for a selected folder. |

6. Select **Save Chart**.

The current analysis view is saved as an analysis trend and is accessible by all users.

> ℹ **Tip:**
>
> To restore or delete the saved trend, select 📂 in the **Chart Configuration** page. For more information, refer to the Restore a Saved Trend *(on page 388)* and Delete a Saved Trend *(on page 392)* topics.

# Restore a Saved Trend

1. Log in to the Plant Applications Web Client.
2. Select 📈.

The **Chart Configuration** page appears.

> **Note:**
>
> For every new session, when you login and select ![icon] for the first time, the default trend chart appears. You can close the chart to go back to the **Chart Configuration** page.

3. Select ![folder icon].

The **Restore Trend** window appears.
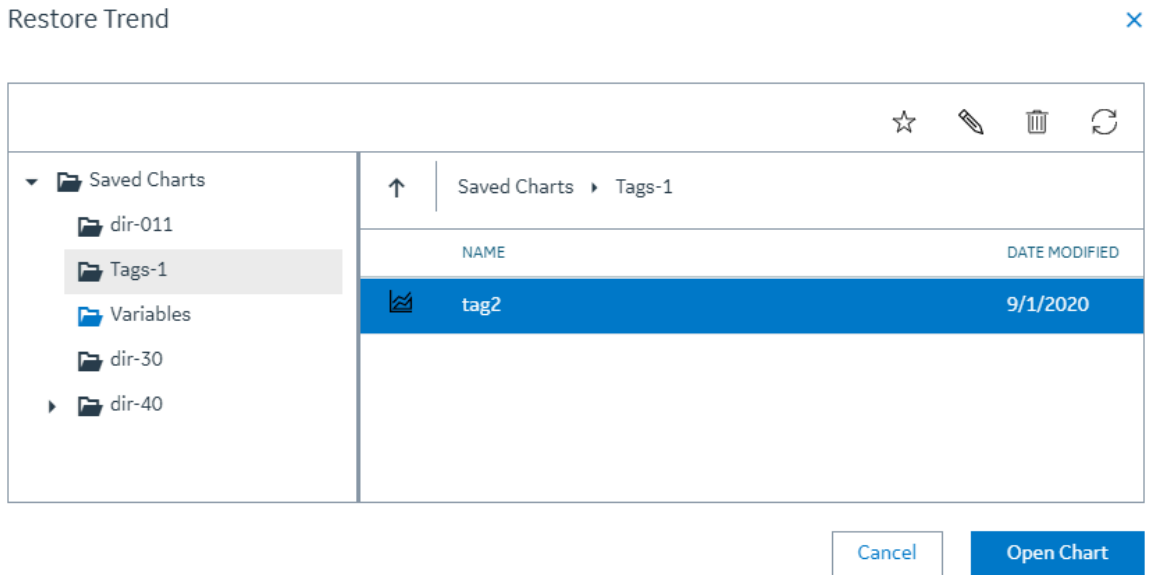


Each field that appears in the **Restore Trend** window is described in the following table.

| Field | Description |
|---|---|
| **Saved Charts** | Displays the folder tree view under **Saved Charts** for you to restore a saved trend. Select a required folder from where you want to restore a trend. From the right pane, select a trend that you want to restore from the list and perform Step-4. Additionally, you can perform below actions by selecting a required folder. <br><br> > **Note:** <br> > The ![folder icon] icon indicates that the current default trend is saved in this folder. |
| **Actions** | The actions that you can perform for saving a trend. You can select one of the following action items: |

| Field | Description |
|-------|-------------|
|  | • ☆: Select to mark a trend as default. This appears only when you select an existing trend from a folder. For more information, refer Mark a Saved Trend as Default *(on page 390)*.<br><br>**Note:**<br>★ indicates that the selected trend is the current default trend.<br><br>• ✎: Select to rename a folder or a trend name.<br>• 🗑: Select to delete a saved trend. For more information, refer Delete a Saved Trend *(on page 392)*.<br>• ↑: Select to go a level above the current folder. Alternatively, you can use the breadcrumbs to navigate through the current directory.<br>• ↻: Select to refresh the list of files and folders for a selected folder. |

4. Select **Open Chart**.

   The saved trend is restored as an analysis view.

# Mark a Saved Trend as Default

You can mark your favorite saved trend as default. The default trend appears when you login to the Plant Applications Web Client and access the **Analysis** application for the first time. You can mark or change your favorite trend as default at any time by following the below procedure.

1. Log in to the Plant Applications Web Client.
2. Select 📈.

   The **Chart Configuration** page appears.

   **Note:**
   For every new session, when you login and select 📈 for the first time, the default trend chart appears. You can close the chart to go back to the **Chart Configuration** page.

3. Select 💾 or 📁.

Based on the selection, the **Saved Trends** or **Restore Trends** window appears. Each field that appears in the window is described in the following table.

| Field | Description |
|---|---|
| **Saved Charts** | Displays the folder tree view under **Saved Charts** for you to access a saved trend. Select the folder where the trend is saved. From the right pane, select a trend that you want to mark as default. <br><br> **Note:** <br> The 📂 icon indicates that the current default trend is saved in this folder. |
| ☆ | Select to mark a trend as default. This appears only when you select an existing trend from a folder. A confirmation message appears for you to confirm the selection. |

4. Select **Confirm**.

   The saved trend is marked default. This default trend appears when you login to the Plant Applications Web Client and access the **Analysis** application for the first time.

# Load the Default Trend

At any given time, you can load your favorite default trend.

1. Log in to the Plant Applications Web Client.
2. Select 📈.

   The **Chart Configuration** page appears.

   > **Note:**
   > For every new session, when you login and select 📈 for the first time, the default trend chart appears. You can close the chart to go back to the **Chart Configuration** page.

3. Select ☆ to view your favorite trend chart.

   Your favourite trend appears.

   > **Note:**
   > The icon is enabled only if you have an existing saved trend that is set to default.

# Delete a Saved Trend

1. Log in to the Plant Applications Web Client.
2. Select ![icon].

   The **Chart Configuration** page appears.

   > ✏️ **Note:**
   >
   > For every new session, when you login and select ![icon] for the first time, the default trend chart appears. You can close the chart to go back to the **Chart Configuration** page.

3. Select ![icon] or ![icon].

   Based on the selection, the **Saved Trends** or **Restore Trends** window appears. Each field that appears in the window is described in the following table.

   | Field | Description |
   |---|---|
   | **Saved Charts** | Displays the folder tree view under **Saved Charts** for you to access a saved trend. Select the folder where the trend is saved. From the right pane, select a trend that you want to delete. <br><br> > ✏️ **Note:** <br> > The ![icon] icon indicates that the current default trend is saved in this folder. |
   | 🗑️ | Select to delete a saved trend. The **Delete Favorite** window appears, asking you to confirm that you want to delete the selected trend. |

4. Select **Confirm**.

   The saved trend is deleted and is no longer accessible to any users.

# Chapter 17. OEE Aggregation Store

## About OEE Aggregation Store

The OEE Aggregation Store is designed to improve the performance of the following screens on Plant Applications Web Client:

- OEE dashboards
- Reports
- Downtime KPI
- Waste KPI

The OEE Aggregation Store calculates the OEE values every 60 minutes for production units and then having those values available in the database. This way OEE values do not have to be calculated on the fly every time the screens are opened or refreshed.

The values are populated within the OEE Aggregation Store database table. The OEE Aggregation Store is managed by the following parameters:

**Table 2. Populate OEE Aggregation**

| Value | Result |
|-------|--------|
| True | Enables the population of the OEE Aggregation tables and use of the tables on the screens. |
| False | Disables the population of the OEE Aggregation tables and use of the tables on the screens. |

**Table 3. OEE Refresh Intervals**

| Value | Result |
|-------|--------|
| 1-24 | Defines the number of hours worth of data to refresh. For example: The OEE Refresh Intervals value is set to 5. At 2 PM the OEE Aggregation store table is updated to show values for 2 PM, 1 PM, 12 PM, 11 AM, and 10 AM. |

> **Note:**
> The OEE Aggregation Store functionality will not be leveraged in existing Plant Applications Client.

# Chapter 18. Activities

## About the Activities Application

As a supervisor or an operator, you can use the Activities application to create and perform activities associated with an event in the specified duration of a shift. After you perform an activity, you can analyze the data entered for a variable in the quartile view, whisker chart, or SPC charts.

You can perform an activity for the following types of events:

- **Time-based:** An event that occurs at a scheduled time.
- **Production-based:** A production-based event for a lot or batch on a production line.
- **User-defined:** A manually recorded event used to document important occurrences related to process operations.
- **Product change:** An event that occurs when there is a product change on a production unit.
- **Process order change:** An event that occurs when the process order for the associated production unit is set to Complete in Plant Applications Administrator.

> ✎ **Note:**
> You cannot create an activity for a process order change event in the Activities application. You can only filter the activities associated with this event type.

Before you work on the Activities application, edit the display in Plant Applications Administrator to configure the settings. For example, you can specify whether an activity must be created automatically when an event is created, or the duration within which an activity must be completed after it is created. For information, refer to the following topic in Proficy Plant Applications Help: Configure the Administrator to Work with the Activities Application

## About Autolog Variables

Autolog variables are measurements or calculations related to a product based on an event or time. Each autolog variable is associated with an event. For each activity, you can add values for only the supported Autolog variables available in Plant Applications Administrator.

**Supported data types or autolog variables:** The data type defines the type of the value entered for an autolog variable. The Activities application supports autolog variables of the following data types.

| Data type | Description |
|---|---|
| Integer | An integer number. |

| Data type | Description |
|---|---|
| Float | A floating-point number. |
| Boolean | A logical entity that can have two values: true and false. |
| String | A sequence of up to 25 characters. |
| Comment | A comment variable. |
| Custom | A user-defined data type. |
| Array | An array of any data type other than string. |

For more information about events and autolog variables, refer to the Proficy Plant Applications Help.

# Workflow for Using Activities

To create an activity for an event, and to make it available for data analysis, you must perform the following tasks:

1. Configure the Plant Applications Administrator settings.
2. Create an activity *(on page 407)* depending on the type of the event.
3. As needed, use a custom form *(on page 411)*.
4. Provide variable values for the activity *(on page 417)*, and statistically analyze the data *(on page 419)*.
5. As needed, add a comment for a variable *(on page 426)*.
6. Complete the activity *(on page 431)*.

# Accessing an Activity

## About Accessing an Activity

As an operator or a supervisor, you can access the following types of activities:

- Open
- Completed
- Skipped

When you select the **View** tab of an activity that is not started yet, you can view the standard or custom tabs added using the configuration application. For more details, refer to Create a Custom Tab *(on page 305)*.

You can also:

- Pause over an activity to view the following information about the activity:
    - **Time**: Displays the time stamp when the activity was created.
    - **Product**: Displays the product associated with the activity.
    - **Equipment**: Displays the equipment associated with the activity.
    - **Process Order**: Displays the process order, if available, associated with the activity.
- Access the autolog history of a completed activity *(on page 404)*.
- Customize the time duration to refresh data *(on page 335)*.
- Filter the list of activities *(on page 405)*.
- Search for an activity *(on page 406)*.

By default, the option to automatically refresh activities is disabled. You can switch the toggle to enable or disable the option to automatically refresh the page as described in the following table. After you select an option, your selection is saved.

| Option | Description |
|---|---|
|  | When this option is selected:<br><br>• If  appears in the **Open** page, additional completed or skipped activities are available in the shift. Select  to refresh the page and access all the completed or skipped activities.<br>• If  appears in the **Completed** page, no additional completed or skipped activities are available to access.<br>• If  appears in the **Completed** page, the RabbitMQ service is down. |
|  | When this option is selected: |

| Option | Description |
|---|---|
| | • If  appears in the **Completed** page, the manual refresh option is disabled. The page automatically refreshes when an additional completed or skipped activity is available.<br><br>• If  appears in the **Completed** page, the RabbitMQ service is down. |

The number of records displayed in the page depends on the value that is configured for the **maxRecordsToFetch** property in the **app.properties.json** file. The location of this file depends on the type of installation:

- **Enterprise installation:** `/home/administrator/build/PlantApplicationsDocker/plantapps-universal-client/activities-app`
- **Standard installation:** `C:\Program Files\GE Digital\PlantApplicationsUniversalClient\NodeUIApp\activities-app\assets`

If the number of records in the database is more than the value configured for the **maxRecordsToFetch** property, a notification to contact the administrator appears.

## Access an Open Activity

1. Log in to Plant Applications Web Client.
2. In the application navigation menu, select .

   The **Open** page appears, displaying a list of activities in progress. The following table describes each column.

   >  **Note:**
   > By default, all the latest activities are displayed at the top of the list. However, you can choose to sort the columns is an ascending or descending order after loading all the open activities.

| Column | Description |
|---|---|
| **Activity** | The name of the activity. The default format for the activity name is configured in Plant Applications Administrator. |

| Column | Description |
|---|---|
| **Time Due** | The date and time when the activity is due for completion. The date and time is displayed in the format is mm/dd hh:mm (Example: 09/29 09:20) or dd/mm hh:mm (Example: 29/09 09:20) based on the localization settings. When you hover over the date and time, the complete date and time appears on the tool tip in the format mm/dd/yyyy hh:mm:ss or dd/mm/yyyy hh:mm:ss based on the localization settings. |
| **Due In** | The time in hh:mm:ss (for example, 02:00:21) until the activity is expected to be completed. If the activity is overdue, the time appears in red and within parentheses (for example, (02:00:21)). The value in this field is calculated using the formula: Due In = Current Time - Time Due **ⓘ Tip:** Select the time in the **Due In** column for an overdue activity to enter an overdue comment. For more information, refer to Add an Overdue Comment for an Activity *(on page 428)*. By default, this column is sorted in a descending order to display the latest open activities at the top. |
| **% Completed** | The completion status of the activity as a percentage. The calculation of the completion status of the activity is based on criteria as described in the following table. |

| Column | Description |
|---|---|
| | <table><tr><th>Criteria</th><th>Percentage Completion Calculation</th></tr><tr><td>• No sampling interval or test frequency set for variables associated with the time-based events<br>• No test frequency set for variables associated with the production-based or user-defined events</td><td>The ratio of the total variables for which you entered values to the total variables</td></tr><tr><td>• Sampling interval or test frequency is set for variables associated with the time-based events<br>• Test frequency is set for variables associated with the production-based or user-defined events</td><td>The ratio of the total variables with a test ID for which you entered values to the total variables with a test ID</td></tr></table> |

| Column | Description |
|---|---|
| | The test IDs for variables are generated in the Plant Applications database. |
| | In the autolog sheet, a box appears in a white background for variables with a test ID in the Plant Applications database. Otherwise, it appears in a grey background. |
| | If there are mandatory variables for the activity, the % Completed value is calculated based on the number of mandatory variables that contain values. Otherwise, the status is calculated based on the number of non-mandatory variables that contain values. For example, suppose there are five variables for the activity, and two of them are mandatory. |
| | • **Case 1:** If two of the five variables are mandatory, and you have not entered values for any of the two mandatory variables, the % Completed value is 0 (regardless of whether you entered values for the three non-mandatory variables). Only if you enter values for the two mandatory variables, the % Completed value becomes 100. |
| | • **Case 2:** If none of the five variables are mandatory, and you have entered values for two of them, the % Completed value is 40. |
| **Status** | The completion status of the activity such as Not Started, In Progress, Completed, System Completed, or Skipped. |
| **User** | The ID of the user who is performing the activity. |
| **Equipment** | The equipment type. |

| Column | Description |
|---|---|
| **Event Type** | The event type. |
| **Process Order** | The process order type. |
| **Product** | The product type. |

## Access a Completed or a Skipped Activity

1. Log in to Plant Applications Web Client.
2. In the application navigation menu, select .

   The **Open** page appears.
3. Select **Completed**.

   The **Completed** page appears, displaying a list of completed or skipped activities. The following table describes each column.

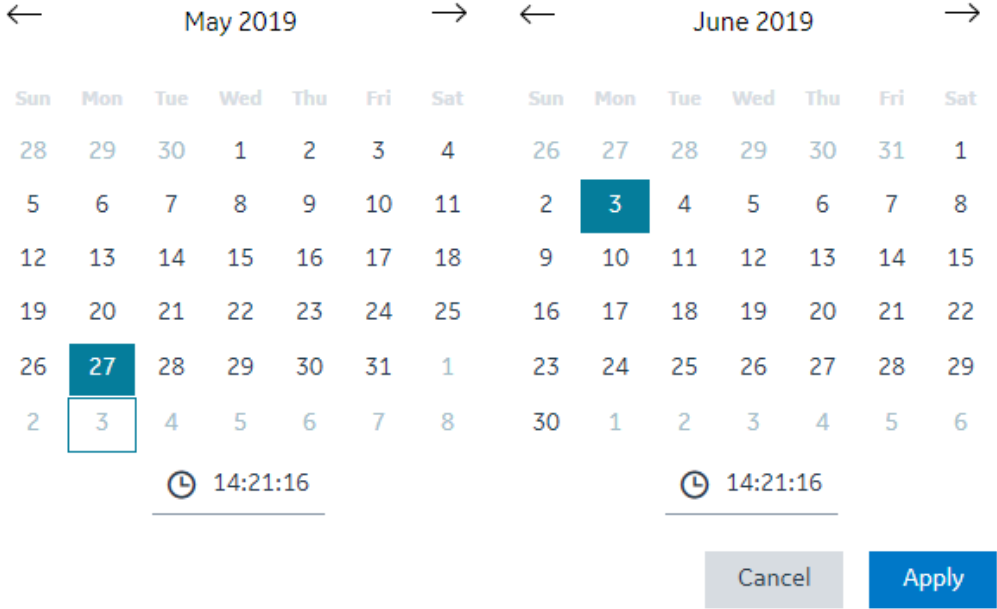| Column | Description |
|---|---|
| **Activity** | The name of the activity. The default format for the activity name is defined in Plant Applications Administrator. |
| **Time Completed** | The date and time when the activity was completed. The date and time is displayed in the format is mm/dd hh:mm (Example: 09/29 09:20) or dd/mm hh:mm (Example: 29/09 09:20) based on the localization settings. When you hover over the date and time, the complete date and time appears on the tool tip in the format mm/dd/yyyy hh:mm:ss or dd/mm/yyyy hh:mm:ss based on the localization settings. |
| **Duration** | The time taken to complete the activity. The duration is displayed in the format hh:mm:ss (for example, 02:00:21). |
| **% Complete** | The completion status of the activity as a percentage. |
| **User** | The ID of the user who completed or skipped the activity. |

| Column | Description |
|---|---|
| **Event Type** | The event type associated with the activity. |
| **Equipment** | The equipment type. |
| **Status** | The completion status of the activity as a percentage. |
| **Process Order** | The process order type. |
| **Product** | The product type. |

> **Note:**
> If you select the **Open** tab, and then select the **Completed** tab, the selection of the **View by** box and the active page number are retained.

4. In the drop-down list box next to the **View by** box, select a time range as described in the following table.

| Option | Description |
|---|---|
| Last <number> Hours | Select to access all completed activities within <number> hours prior to the current production day. The value of <number> is configured in Plant Applications Administrator. |
| Previous Day | Select to access all completed activities from the day prior to the current production day. |
| Current Day | Select to access all completed activities from the start time until the end time of the current production day. If there are no shifts configured for the plant, this option is selected by default. |
| Current Shift | Select to access all completed activities from the start time until the end time of the ongoing shift. This option appears only if shifts are defined for the display in Plant Applications Administrator. |
| Previous Shift | Select to access all completed activities from the shift prior to the current shift. This option appears only if shifts are defined for the display in Plant Applications Administrator. |

| Option | Description |
|--------|-------------|
| Last 7 days | Select to access all completed activities within seven days prior to the current production day. |
| Custom | Select to access all completed activities within a date and time range of up to seven days that you specify by using a calendar window. <br><br> The following calendar window appears when you select the **Custom** option. <br><br>  <br><br> To specify a custom date and time range in the calendar window: <br><br> a. In the **START DATETIME** section, select a date and enter a time in the format hh:mm:ss. <br><br> b. In the **END DATETIME** section, select a date and enter a time in the format hh:mm:ss. <br><br> **Note:** <br> The end date must be within seven days of the start date. <br><br> c. Select **Apply**. |

The list of completed or skipped activities appear based on the time range selected.

## Access the Autolog History of a Completed Activity

The autolog history contains the overall details of the event associated with an activity and a maximum of 20 historical values of autolog variables entered for the event at different durations when the activity was scheduled.

You can access the autolog history of only a completed activity.

1. Access the activity <span>(on page 401)</span> whose autolog history you want to access.

   The autolog history of the activity appears. The following table describes each column.

   | Column | Description |
   |---|---|
   | **Event Name** | The unique ID of the event. |
   | **Date** | The current date and time in the format dd/mm/yyyy hh:mm:ss (for example, 27/03/2022 10:58:29). |
   | **Process Order** | The process order associated with the event. |
   | **Product** | The product associated with the process order. |

   You can select any of the three views based on the specifications:
   - **Data**: Displays only the autolog variable details.
   - **Spec**: Displays only the autolog variable box, which is colored based on the specification limits for the autolog variable as configured in Plant Applications Administrator.
   - **Data & Spec**: Displays the autolog variable details along with the background color based on the specification limits.

2. If you want to view the specification limits and the colors associated with them, select **View Legend**.

   The following specification limits appear:
   - **Reject**
   - **Warning**
   - **Target**
   - **User**
   - **Unavailable**

3. Select an autolog variable.

   If the specification limits for an autolog variable are available, the following information appears:

- The lower and upper specification limits
- The specification limit associated with the variable based on the value entered for the variable
- The threshold value based on whether the entered value is higher or lower than the target value

## Customize Time Duration to Refresh Data

You can set the following values for the list of activities:

- The frequency of refreshing a page if left idle for certain minutes.
- The number of hours for collating and displaying the data in the grid.

1. Depending on your installation, access the `app.properties.json` file in the following folder:
   - **Enterprise installation:** `<Install Directory>/PlantApplicationsDocker/ plantapps-web-docker/mnt/configfiles/downtime-app/prod/ {{appVersion}}/<appname>.yml`
   - **Standard installation:** `<Install Directory>\config-rep\downtime-app\prod \{{appVersion}}\<appname>.yml`
2. Modify the values for the following parameters:
   - **lastNHours**
   - **refreshNMinutesDuration**

   If the **refreshNMinutesDuration** is set to five minutes and the page is idle for five minutes, the list is refreshed and the timestamp is updated accordingly.
3. Refresh Plant Applications Web Client.

   The list of activities is refreshed based on the values you have specified.

## Filter an Activity

You can filter activities either in the **Open** or **Completed** page based on the filter applied to the selected columns. Select ▽ appearing next to the column name and then select required filters from the menu to include in the list. You also can drag a column to the column header to group the downtime events based on the column selected. criteria that you enter.

> **Note:**
>
> By default, in the **Open** page, a numeric value in **red** indicating the number of overdue activities appears as shown in the following image. You can select the numeric value to view all activities that are overdue. Ensure that you select **Clear results** to load the default activites list.
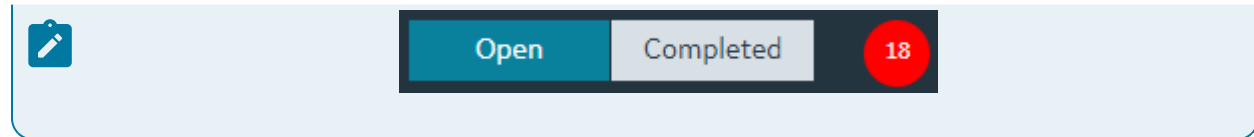
1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select .

3. Select the tab for which you want to apply a filter.

4. Select  next to the column name.

5. As needed, select the applicable filter options, and then select **Apply**.

The activities based on the specified filtered criteria appears.

>  **Note:**
>
> To reset the filter options to their default setting, select , select **Select All** from the filter options, and then select **Apply**.

## Search for an Activity

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select .

3. If you want to search for a completed or a skipped activity, select **Completed**.

4. Select .

5. As needed, specify the search options within a specified start and end time.

>  **Tip:**
>
> To search for an activity using a barcode, select  for an option and scan for the barcode specific to the option. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes.

>  **Note:**
>
> In an iPad, you can use  only in the Safari browser.

6. Select **Apply**.

The activities that match the search criteria appear.

> **Tip:**
> To clear results and perform new search, select **Reset**.

# Creating an Activity

## About Creating Activities

To create activities, you must add one of the following types of events. Activities are then created for the event:

- Time-based event *(on page 408)*
- Production-based event *(on page 408)*
- User-defined event *(on page 409)*
- Production change event *(on page 410)*

You cannot add a process order change event by using the Activities application. The activities for a process order change event are automatically created in the Activities application when you complete the process order in the associated display and the option to create activities is set to **True**. You configure the display associated with a production unit in Plant Applications Administrator.

Based on the configuration in Plant Applications Administrator, the number of activities created for an event depend on the number of variable groups in the display (the autolog sheet).

Activities are created only if:

- The option to create activities in the display associated with the autolog sheet or the production unit is set to true.
- Variables are configured in the display associated with the autolog sheet or the production unit, and the display type is set to custom.
- Variable groups do not contain the same title (in case the display associated with the autolog sheet or the production unit is configured to create activities with titles corresponding to the titles of the variable groups).

> **Note:**
> When Activities are created based on the title, the order of the activity execution is based on the Activity Order defined in the **Activity Order** column in the **Variable** tab of Autolog Sheet in Plant Applications Administrator. By default, all activities created per title will have the Activity Order

> 📝 defined as zero. When you create titles and set their activity order in the Administrator, these activities become available to perform in the same order as configured in the Plant Applications Web Client. This is applicable only for the Process applications and is not supported for the Discrete applications.

## Add a Time-Based Event

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.

   The **Open** page appears.

3. Select ➕, and then select **Time Based Event**.

   The **Add Time Based Event** window appears, displaying a list of time-based autolog sheets accessible to you as configured in Plant Applications Administrator.

4. In the **Choose activity** section, select an activity that you want to create for the event.

5. In the **Add Event Details** section, in the **TIMESTAMP** box, select a date and time.

   The time stamp of the event must be within two hours from the current date and time.

6. **Optional:** In the **COMMENT** box, enter a comment for the event.

7. Select **Save**.

The time-based event for the selected activity is added and an activity is automatically created for the event. The activity appears in the **Open** page.

## Add a Production-Based Event

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.

   The **Open** page appears.

3. Select ➕, and then select **Production Based Event**.

   The **Add Production Event** window appears, displaying a list of production-based Autolog sheets accessible to you as configured in Plant Applications Administrator.

4. In the **Choose activity** section, select an activity that you want to create for the event.

5. In the **Event Details** section, in the **EVENT NUMBER** box, enter an event number that is unique per unit.

> **✏ Note:**
>
> If the string of the event number of the last added event has numeric values in it, the
> application automatically increments the last numeric value by 1. The string with the
> incremented numeric value for the new event appears in the **EVENT NUMBER** box. You
> can retain or modify this value. For example, if the event number of the last added event is
> `PB79RQ89AP`, the value `PB079RQ90AP` appears in the **EVENT NUMBER** box for the new event.
> Similarly, if the event number of the last added event is `PB79RQ89AP1`, the value `PB79RQ89AP2`
> appears in the **EVENT NUMBER** box for the new event.

6. In the **DURATION** box, select a start time and end time for the event.

   The start and end time of the event must be within two hours from the current date and time.

7. **Optional:** Enter values for the following properties: STATUS, APPLIED PRODUCT, and COMMENT.

> **✏ Note:**
>
> When the status of a production-based event associated with the activity is set to a
> production status that has the **Lock Event Data** option enabled, you do not have the
> privilege to modify the autolog variables for that event.

8. Select **Save**.

The production-based event for the selected activity is added, and an activity is automatically created for
the event. The activity appears in the **Open** page.

## Add a User-Defined Event

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ▣.

   The **Open** page appears.

3. Select ✛, and then select **User Defined Event**.

   The **Add User Defined Event** window appears, displaying a list of user-defined autolog sheets
   accessible to you as configured in Plant Applications Administrator.

4. In the **Choose activity** section, select an activity to create a user-defined event on the selected
   activity.

5. In the **Add Event Details** section, in the **EVENT NUMBER** box, enter a unique event number.

6. In the **DURATION** box, select a start and end time for the event.

7. **Optional:** Specify values for the following properties: STATUS, APPLIED PRODUCT, and COMMENT.

> **Note:**
>
> When the status of a user-defined event associated with the activity is set to a production
> status that has the **Lock Event Data** option enabled, you do not have the privilege to modify
> the autolog sheet for that event.

8. In the **REASONS** box, select a reason to create a user-defined event.
9. Select **Save**.

The user-defined event for the selected activity is added and an activity is automatically created for the
event. The activity appears in the **Open** page.

## Add a Product-Change Event

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.
   The **Open** page appears.

3. Select ✛, and then select **Product Change Event**.
   The **Add Product Change** window appears, displaying a list of production units on which you to
   want to make a new product. The production units that you can access are configured in Plant
   Applications Administrator.

4. In the **Choose Activity** section, select a production unit to create a product change event on the
   selected production unit.

5. In the **Add Event Details** section, in the **PRODUCT GROUP** box, select the product group containing
   the product you want to make in the production unit.

> **Tip:**
>
> In the **PRODUCT GROUP** box, you can select **All Products** if you are not sure you about the
> product group.

6. In the **PRODUCT** box, select the product you want to make.

7. In the **TIMESTAMP** box, enter the date and time from when you want to initiate the product change
   event on the selected Production Unit.
   By default, the current date and time appears in the **TIMESTAMP** box. You can select the date and
   time by using the following options:

- Select 📅 to select the date by using a calendar picker, or in the text box next to 📅 you can manually enter the date in the format yyyy/mm/dd (for example, 2018/11/21).
- In the text box next to 🕐, enter the time in the format hh:mm:ss (for example, 5:03:44).

> ℹ️ **Tip:**
>
> The **PRODUCT CHANGE HISTORY** section contains a history of all product changes on the selected production unit with a time stamp when the product was changed.

8. Select **Save**.

The product change event is created for the production unit in Plant Applications Administrator. In Plant Applications Administrator, if the option to create activities is enabled in the display associated with the production unit, the activity associated with the product change event appears in the **Open** page.

# Using Custom Forms

## About Custom Forms

While performing an activity, if you want to perform additional activities, you can use custom forms. They contain an external URL with the required information. They are created in Plant Applications Administrator.

You can associate custom forms with an activity using the Activities application. Before you do so, you must complete the following tasks in Plant Applications Administrator:

- Configure the URL of the custom form.
- Configure the Autolog sheets to generate custom form driven activities.
- Configure the user name and password for the user authentication of the custom form.

**Data Flow**

When you perform custom activities, you are redirected to the custom activity URL. In addition to the external URL, some additional information is sent as a post message that is a part of the HTML5 Web Messaging specification. The following data flow diagram describes the interaction between the Activities application and the custom form to establish the connection and send data.
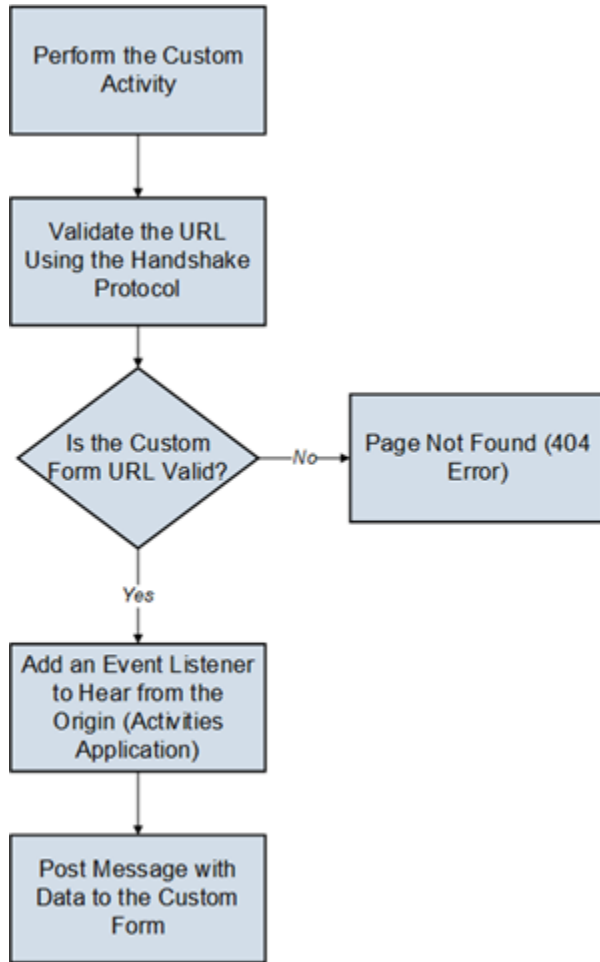
The following procedure is described in the data flow diagram:

1. The user performs a custom activity in the Activities application.
2. The Activities application initiates the Handshake protocol by sending a message to the form and checks whether the URL of the custom form is valid.
   - If the URL is valid, the Activities application receives the message back. The application then adds an event listener to hear from the origin and then posts the message with the variable data to the custom form.
   - If the URL is not valid, an error message appears in the Activities application.

**Post Data**
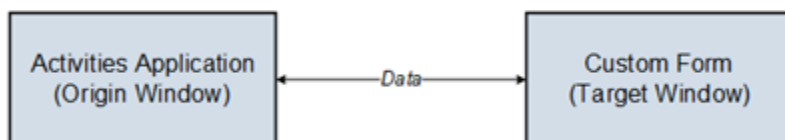
The `window.postmessage()` method is used to send data from the Activities application to the custom form. The `window.postmessage()` method enables cross-origin communication between the following items:

- Window objects such as between a page and a window that the page spawned.

  Example: The `window.postmessage()` method is used when you select the option to access the URL of the custom in a separate page.

- A page and iframe such as between a page and an iframe embedded within the page.

  Example: The `window.postmessage()` method is used when you select the option to access the URL of the custom form embedded within the window displaying the autolog sheet or as a replacement of the window displaying the autolog sheet.

The arguments (also called messages) passed to the `window.postMessage()` method are exposed to the receiving window through the event object. The Activities application creates an instance of target window to post message by using the following syntax:

```
targetWindow.postmessage(message, targetOrigin, [transfer]);
```

Where:

- `targetWindow` is a reference of the custom form window that receives the message.
- `message` is data to be sent to the custom form. The data is serialized using the structured clone algorithm. The algorithm enables you to pass a broad variety of data objects safely to the destination window without serializing them.
- `targetOrigin` is the origin of target window. By default, asterisk (*) is set to indicate no preference. The `postMessage()` transmits vital information. It is absolutely critical that this argument be a URI whose origin is the same as the intended receiver of the message containing the password to prevent interception of the password by a malicious third party.
- `Transfer` is a sequence of transferable objects that are transferred with the message. An optional parameter not used in the Activities application.

### Event Listener

An event listener is added by the Activities application when the custom form is loaded to receive the message coming from the Activities application as shown in the following code snippet.

```
window.addEventListener("message", receiveMessage, false);

function receiveMessage(event)

{

    if (event.origin !== "http://example.org:8080")
```

```
    return;

    }
```

The properties of the dispatched message are:

- `data (event.data)`: The information passed by the Activities application.
- `origin`: The origin of the window that sent the message at the time `postMessage` was called. In the code snippet, the `http://example.org:8080` is an example of `origin`.
- `source`: A reference to the window object that sent the message. You can use this property to establish two-way communication between two windows with different origins.

## Security Concerns

Remember the following security concerns when you use a custom activity:

- If you do not expect to receive messages from other sites, disable the Activities application to add any event listeners for message events.
- If you expect to receive messages from other sites, always verify the sender's identity using the `origin` and possibly source properties. Any window (including a URL) can send a message to any other window, and an unknown sender can send malicious messages. You must verify the syntax of the received message.

> **Note:**
> Failure to check the `origin` and possibly `source` properties enables cross-site scripting attacks.

- Always specify an exact target origin, not an asterisk (*) in the Activities application configuration when you use `postMessage` to send data to other windows. A malicious site can change the location of the window without your knowledge. Therefore, the site can intercept the data sent using `postMessage`.

## Data Sent to a Custom Form

The data sent to custom form in the `event.Data` object is in the JSON format. The following code sample shows the data sent to a custom form and the syntax to access the data.

```
{

        "loggedUserInfo": {

            "token": <<token>>

        },

        "header": {
```

```
            "activityId": <<activityId>>,

            "activityType": <<activityType>>,

            "activityDescription": <<activityName>>,

            "startTime": <<startTime>>
        },

        "productInfo": <<productId>>,

        "processOrderInfo": <<processOrder>>,

        "variableInfo": <<variable_data>>,

        "activityStatusInfo": {

            "statusId": <<Activity_statusId>>,

            "status": <<Activity_status>>,

            "readOnly": <<readOnly_status>>
        },

        "userConfigurationDetails": <<customActivityUser>>

    }
```

- `loggedUserInfo`: Provides the user name and token. The UAA token is required when the custom forms use the public REST APIs provided to save variables into SOADB.
- `Header`: Provides the activity ID, activity type as Production, Time-Based, or User-Defined, activity description, and start time of the activity.
- `ProductInfo`: Provides the ID, name, and value of the product.
- `ProcessOrderInfo`: Provides the ID, name, and value of the process order.
- `Variables`: Provides the list of variables with ID, name, data type, and value.
- `ActivityStatusInfo`: Provides information regarding whether the activity is locked, read-only state, or modifiable.
- `userConfigurationDetails`: Provides the user name and password configured in Plant Applications.

### Data Size

As a data point, the WebKit implementation (used by Safari and Chrome) does not currently enforce any limits regarding the size of the data sent through a message.

The following domains were tested for use of the custom form:

- Same domain: successful (same IP address)
- Cross domain: successful (with different IP addresses and ports, messages transfer between http and https)

The transmission process of data has the following limitations:

- Data cannot be transmitted using form headers, form body, or query parameters by using `postmessage`.
- All data is transmitted through `postmessage` only.

## About Accessing a Custom Form

You can access a custom form for an activity in the Activities application. The custom form must be embedded in an external URL.

You must configure Plant Applications Administrator to enable the use of custom forms for the display associated with the autolog sheet. For more information, refer to the Proficy Plant Applications Help.

To access the custom form and complete the associated activity, in the **Activities** page, select **Perform** for a new activity or **In Progress** for an ongoing activity. For more information, refer to the Complete an Activity *(on page 432)* topic.

Depending on the Plant Application Administrator configurations for the display associated with the autolog sheet, you can access a custom form in the following UI areas:

- **As a page:** The URL of the custom form opens in a separate page.
- **Embedded within the window displaying the autolog sheet:** The custom form appears in an embedded pane in the window displaying the autolog sheet.

> ✎ **Note:**
>
> To view the custom form, in the window displaying the autolog sheet, select ▱.

- **As a replacement of the window displaying the autolog sheet:** The custom form replaces the window displaying autolog sheet.

# Working with Variables

## About Variables

Variables are measurements or calculations attached to a given production unit that produce values either by time or event. Variables are created in Plant Applications Administrator. Using the Activities application, you can:

- Enter the values for these variables while performing an activity.
- Identify whether the values are within acceptable limits.

- Analyze the trend of the values using charts *(on page 419)*.
- Depending on the configuration in Plant Applications Administrator, receive alarm notifications and acknowledge them. For information, refer to About an Alarm Event Notification *(on page 493)*.

The following conditions apply when you enter or modify a variable value:

- You must configure a variable and include that variable on an autolog display using Plant Applications Administrator.
- You must create an activity *(on page 407)* for the autolog variable.
- If the data source of the variable is Historian or Calculation Manager, you must have the Admin privilege. Note that when the data source is Historian or Calculation Manager, the variable already contains a value, and you can only modify the value.
- If the data source of the variable is Autolog, you must have the Read/Write, Manager, or the Admin privilege.
- In Plant Applications Administrator, when the status of a production-based or user-defined event associated with the activity is set to a production status that has the **Lock Event Data** option enabled, you do not have the privilege to modify the autolog variables.
- In Plant Applications Administrator, if the **LockUnavailableCells** option is enabled for the display associated with the activity, only the users in the Administrator security group with an access Level other than Read can enter values for the modifiable autolog variables that have no available data.

## Provide Values for Autolog Variables

1. Log in to Plant Applications Web Client.
2. In application navigation menu, select .
3. If the activity for which you want to provide variable values is locked, select **Release**.
4. Select **Perform**.
   A list of variables configured for the activity appears.
5. Enter values for each variable in the **SPEC** column.
   The **SPEC** column indicates whether the value is in the acceptable range using a color coding, which is configured in Plant Applications Administrator. The quartile chart and the whisker chart are updated.

   The **SPEC** column indicates whether the value is in the acceptable range using a color coding, which is configured in Plant Applications Administrator. The quartile chart, whisker chart, and the SPC chart are updated.

If you have provided values for all the variables in the activity, complete the activity *(on page 431)*. Depending on the configuration, if the activity is overdue, it may be mandatory to enter an overdue

comment. If yes, before you complete the activity, you must add an overdue comment *(on page 428)*. You can choose to also add a general comment *(on page 427)* for the activity or a comment for the variable *(on page 430)*.

## Modify the Value of an Autolog Variable

1. Log in to Plant Applications Web Client.
2. In application navigation menu, select  .
3. Depending on whether the activity is open or completed, select the appropriate tab.
4. If the activity is locked, select **Release** to release the activity.
5. Select **Perform**.

   The autolog history appears, displaying values for the modifiable autolog variables. The last entered variable value appears automatically in the page, displaying the autolog history (irrespective of the application or page from which the value is modified).

   If the Engineering Units display property is enabled for the display associated with the event in Plant Applications Administrator, the units of measurement defined for variables also appear next to the variable value in the autolog sheet.

6. Point to the value that you want to modify.

   An option to modify the value appears.

   > **Note:**
   > If the option to modify is unavailable, it is due to one of the following reasons:
   > - You do not have the permission to modify the values. Contact your administrator.
   > - You have exceeded the time limit set by the administrator within which you can modify the values. This time limit is set in the **Time to Edit Completed Activity** field in the **Global Settings** > **Site Parameters** window in Plant Applications Administrator. After this duration, only a user with the Admin privilege can modify the value of the autolog variable.

7. Select **EDIT**.

   The text box for entering the autolog variable value is now modifiable.

8. In the text box for the autolog variable value, enter a new value, and then press Tab to save the new value.

> **Note:**
>
> If the variable has electronic signature enabled, an **Electronic Signature** window appears whenever you insert or edit a test value for a variable. The ✎ icon near the text box indicates that the variable is entitled to electronic signature for any modifications. For more information about electronic signature, refer Modify the Value of an Electronic Signature Autolog Variable *(on page 439)*.

9. **Optional:** To modify the autolog variables in the **Spec** and **Data & Specs** sections, repeat steps 5 through 7.
10. Select **Back**.

The updated value for the autolog variable appears in the autolog history.

In the autolog history, all the completed activities and skipped activities appear. If you modify the value of an autolog variable later, the status of the activity does not change. However, based on the values, the percentage completion of the activity is updated in the **% Complete** box in the **Completed** page.

## About the Statistical Analysis of Autolog Variables

You can statistically analyze the value you enter for autolog variables using one of the following charts:

- **Quartile chart:** A type of quantile, which divides the number of data points into four quarters. The Quartile chart is an indicator of the range of values you can enter for a variable. In addition to the Quartile view, you can access the specification-limit view.
- **Whisker chart:** A visual representation of the range of values for statistical items associated with the variable.
- **Statistical Process Control (SPC) chart:** Contains one of the following charts to help determine if a process is stable and predictable:
  - X-Bar and Range
  - X-Bar and Sigma
  - X-Bar and Moving Range
  - P chart
  - U chart

If a variable is configured with other SPC variables, its value will not be plotted on the SPC chart.

## Access a Quartile Chart

1. Access the autolog history *(on page 404)* of the activity for which you want to access the Quartile chart.

2. Select ⊞, and then select **Quartile View**.

   The Quartile chart appears, displaying values for the following statistical items for each variable:

   - Lowest
   - Lower Quartile
   - Median
   - Upper Quartile
   - Highest



> ✏ **Note:**
>
> The values for these statistical items are calculated based on the value entered for the variable in the last 20 completed activities associated with the same event. If no historical data exists for a variable, the values do not appear.

3. If you want to access the specification-limit view, select ⊞, and then select **Specification Limit View**.

   The specification-limit view appears, displaying values for the following specification limits, which are defined in Plant Applications Administrator:

   - Lower Reject
   - Lower Warning
   - Target
   - Upper Warning
   - Upper Reject

The following table describes the color-coding for a variable value.

| Color | Description |
|---|---|
| White | No value is entered for the variable. |
| Blue | The value entered for the variable is within the upper and lower user limits, or the target value. |
| Green | The value entered for the variable is within the upper and lower warning limits, and below or beyond the upper and lower user limits, respectively. |
| Yellow | The value entered for the variable is within the upper and lower reject limits, and below or beyond the upper and lower warning limits, respectively. |
| Red | The value entered for the variable is below or beyond the upper and lower reject limits, respectively. |
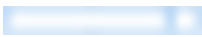
- As needed, add a comment *(on page 426)* for the activity or a variable.
- Complete the activity *(on page 431)*.

## Access a Whisker Chart

1. Access the autolog history *(on page 404)* of the activity for which you want to access the Whisker chart.

2. Select .

   The Whisker chart appears, plotting the variable value, along with the following statistical items:

| Statistical Item | Icon |
|---|---|
|  | Represents the Lower Quartile point at left and the Upper Quartile point at right with median represented by a vertical line. |
|  | Represents the Upper Reject limit beyond which the variable value is rejected. |
|  | Represents the Lower Reject limit below which the variable value is rejected. |
|  | Represents the Target value for the variable. |
|  | Represents the Actual value you entered for the variable. |



> **Note:**
> The lower, median, and upper quartile points are calculated based on the values entered for the variable in the last 20 completed activities associated with the same event. If no historical data exists for a variable, the values do not appear. The values for upper and lower reject limits are based on the Plant Applications Administrator settings.

> **Tip:**
> You can pause over an icon to view the value of the statistical item.

- As needed, add a comment *(on page 426)* for the activity or a variable.
- Complete the activity *(on page 431)*.

## Access an SPC Chart

- In the variable definition in Plant Applications Administrator, specify the type of the SPC chart that you want to see for the variable. For instructions, refer to the Configure and Run the SPC Chart topic in Proficy Plant Applications Help. If you do not configure an SPC chart for a variable, the SPC chart will not appear.
- When you configure the autolog sheet, place all the variables and subgroup variables with SPC configuration in the correct sequence (that is, do not place the variables without SPC configuration in between the ones with SPC configuration). The following table provides an example for the correct sequence and the incorrect sequence.

| Variable | Configured for SPC Charts? | Correct Sequence | Incorrect Sequence |
|---|---|---|---|
| Motor torque (main variable) | Yes | ◦ Motor torque (main variable)<br>◦ Motor rpm<br>◦ Motor current<br>◦ Motor power<br>◦ Motor length end-to-end | ◦ Motor torque (main variable)<br>◦ Motor rpm<br>◦ Motor length end-to-end<br>◦ Motor current<br>◦ Motor power |
| Motor rpm | Yes | | |
| Motor current | Yes | | |
| Motor power | Yes | | |
| Motor length end-to-end | No | | |

- If you want alarm notifications to be plotted on the SPC chart, configure alarms for the SPC chart. For instructions, refer to the Configuring Alarms topic in Proficy Plant Applications Help.

1. Access the autolog history *(on page 404)* of the activity for which you want to access the SPC chart.

2. Select ⌁ .

   The ⌁ button appears only if at least one variable in the activity is configured for SPC charts. Depending on the type of the SPC chart configured for the variable, one of the following charts appears:
   - X-Bar and Range
   - X-Bar and Sigma
   - X-Bar and Moving Range
   - P chart
   - U chart

If a variable is configured with other SPC variables, its value will not be plotted on the SPC chart.

The following table describes each chart.

| Chart Type | Description |
|---|---|
| XBar | Plots the average of the variable values for each subgroup, indicated by the black line. In addition:<br><br>    • The red dotted lines indicate the calculated upper and lower control limits for the variable.<br>    • The blue dotted line indicates the average of the XBar values for all the 30 samples for the variable.<br><br>The serial names for the red and blue lines appear in the legend.<br><br>**Note:**<br>By default, values for the last 30 samples appear in the chart. You can, however, change this value by setting the **numberOfSamplePoints** property in the `app.properties.json` file. If you have installed Plant Applications Web Client using Docker, this file is located in the `Plant Applications installation folder/PlantApplicationsDocker/plantapps-universal-client/activities` folder. Otherwise, this file is located in the `<Plant Applications installation folder>\PlantApplicationsWebClient\NodeUIApp\activities-app\assets` folder. |
| Range | Plots the difference between the maximum and minimum values in a subgroup. |

| Chart Type | Description |
|---|---|
| Sigma | Plots the standard deviation of the values in a subgroup. |
| Moving Range | Plots the range calculated between the current and previous data points in a subgroup. |
| P Chart | Plots the fraction of the non-conforming items in a subgroup. This chart is used for subgroups of varying sizes and with pass/fail or yes/no type of variable values (for example, tests conducted using a go-no-go guage). |
| U Chart | Plots the number of non-conformities per item in a subgroup (for example, a scratch, dent, or a bubble). This chart is used for subgroups of varying sizes. |

If alarms are configured for one or more values, and if the value is beyond an acceptable limit, the value is indicated by a color-coded indicator in the SPC chart, representing an alarm. The color of the indicator depends on the priority of the alarm. For information, refer to Acknowledge an Alarm Notification *(on page 495)*.

When you pause over a value on the SPC chart, a tooltip appears, displaying the SPC variable name, the event number, end date and time of the event, data point, xlcl, xucl, and xcl of the main variable for which the SPC chart is plotted. For an alarm, the alarm description also appears.

The SPC charts appears inline with the variables whose values are plotted on the chart. Variables that are not configured for an SPC chart appear below the SPC variables and the chart.

- As needed, add a comment *(on page 426)* for the activity or a variable.
- Complete the activity *(on page 431)*.

## Verify Sign Later Variables

You can use the ☍ icon (along with the counter) if, for any reason, you choose to modify multiple Autolog variables that require electronic signature at a time. The ☍ icon (along with the counter) is enabled only after you select the **Sign Later** button in the **Electronic Signature** window for modifying a variable. For more information, refer Sign Later for Bulk Electronic Signature *(on page 446)*.

# Adding a Comment

## About Comments

You can add the following types of comments to an activity:

- General
- Overdue

In addition, you can add a comment to a variable.

If an activity or a variable contains comments, it is indicated by a red dot ().

If the **Overdue Task Requires Comment** option is set to true in the sheet display options in Plant Applications Administrator, and if the activity is overdue, it is mandatory to add an overdue comment.

In the list of comments, the most recently added comment appears last. The information about the user who added the comment, the type of comment, and time stamp when the comment was added also appear for the comment.

## Access Comments for an Activity

1. Log in to Plant Applications Web Client.
2. In the application navigation menu, select .
   The **Open** page appears.
3. If the activity for which you want to access comments is completed or skipped, select **Completed**.
4. Select  for the activity, and then select **Add/Edit Comment**.
5. As needed, select or clear the **General**, **Overdue**, or **Skip** check boxes to filter the comments list.

   > ✎ **Note:**
   > The **General**, **Overdue**, or **Skip** check boxes appear for an activity only when the comment type corresponding to the box exists for the activity.

The comments associated with the activity appear.

> ⓘ **Tip:**
> If you are in the **ADD GENERAL COMMENT** box, then select **Show Comments** to access all the comments for the activity.

## Add a General Comment for an Activity

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select [icon].

   The **Open** page appears.

3. If the activity for which you want to add a comment is completed or skipped, select **Completed**.

4. Select [icon] for the activity, and then select **Add Comment**.

   A window for entering comments appears.

5. In the **ADD GENERAL COMMENT** box, enter a comment for the activity, and then select **Save**.

   The comment is added.

> (i) **Tip:**
>
> Select **Show Comments** to access the comments for the activity.

## Modify a General Comment for an Activity

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select [icon].

   The **Open** page appears.

3. Select the tab that includes the activity for which you want to modify a general comment.

4. Select [icon], and then select **Add/Edit Comment** for the activity.

   A list of comments for the activity appears.

5. **Optional:** In the window for entering general comments, select the **General** check box.

   A list of general comments for the activity appears.

6. Select [icon] for the comment that you want to modify.

   The **EDIT GENERAL COMMENT** box appears, displaying the comment.

7. Modify the comment, and then select **Save**.

   The changes to the comment are saved.

> [icon] **Note:**
>
> The position of a comment in the comments list remains constant even after you modify the comment.

## Delete a General Comment for an Activity

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.
   The **Open** page appears.

3. If you want to delete a comment for a completed or a skipped activity, select **Completed**.

4. Select ⬚, and then select **Add/Edit Comment** for the activity.

5. **Optional:** In the window for entering general comments, select the **General** check box to filter comments in the existing comments list by the general type.
   A list of general comments for the activity appears.

6. Select ✕ for the comment that you want to delete.
   A message appears, asking you to confirm that you want to delete the comment.

7. Select **Yes**.
   The comment is deleted.

## Add an Overdue Comment for an Activity

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.
   The **Open** page appears.

3. Select the time in the **Due In** column for an overdue activity for which you want to add an overdue comment.
   A window for entering overdue comments appears.

4. In the **ADD OVERDUE COMMENT** box, enter a comment for the activity, and then select **Save**.
   The overdue comment is added for the activity.

## Modify an Overdue Comment for an Activity

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.
   The **Open** page appears.

3. Select the tab that includes the activity for which you want to modify the overdue comment.

4. Select ⬚, and then select **Add/Edit Comment** for the activity.
   A list of comments for the activity appears.

> **ⓘ Tip:**
> Alternatively, for open activities, in the **Open** page, you can select the time in the **Due In** row for an overdue activity. All overdue comments appear in the list of comments in the window for entering comments. Skip step 5 if you use this navigation.

5. **Optional:**  In the window for entering comments, select the **Overdue** check box to filter comments in the existing comments list by the overdue type.

   A list of overdue comments for the activity appears.

6. Select ✎ for the comment that you want to modify.

   The **EDIT OVERDUE COMMENT** box appears, displaying the comment.

7. Modify the comment, and then select **Save**.

   The changes to the comment are saved.

> **✎ Note:**
> The position of a comment in the comments list remains constant even after you modify the comment.

## Delete an Overdue Comment for an Activity

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select 🖉.

   The **Open** page appears.

3. Select ▤, and then select **Add/Edit Comment** for the activity.

   A list of comments for the activity appears.

> **ⓘ Tip:**
> Alternatively, for open activities, in the **Open** page, you can select the time in the **Due In** row for an overdue activity. All overdue comments appear in the list of existing comments in the window for entering comments. Skip step 5 if you use this navigation.

4. **Optional:** In the window for entering general comments, select the **Overdue** check box to filter comments in the existing comments list by the overdue type.

   A list of overdue comments for the activity appear.

5. Select ✕ for the comment that you want to delete.

A message appears, asking you to confirm that you want to delete the comment.

6. Select **Yes**.

The comment is deleted.

## Add a Comment for a Variable

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.

   The **Open** page appears.

3. Depending on the status of an activity, select **Perform** or **In Progress** for the activity associated with the variable.

   The page for entering data for the modifiable variables appears.

4. Select ⬚, and then select **Add Comment** for a variable to add a comment.

   A window for entering comments for the selected variable appears.

5. In the **ADD NEW COMMENT** box, enter a comment for the variable, and then select **Save**.

   The comment is added for the variable.

> ⓘ **Tip:**
> If you are in the **ADD NEW COMMENT** box, then select **Show Comments** to access all existing comments entered for the variable.

## Modify a Comment for a Variable

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.

   The **Open** page appears.

3. Depending on the status of an activity, select **Perform** or **In Progress** for the activity associated with the variable.

   The page for entering data for the modifiable variables appears.

4. Select ⬚, and then select **Add/Edit Comment** for a variable.

   A comments list in the window for entering comments for the selected variable appears.

5. Select ✎ for the comment that you want to modify.

   The **EDIT COMMENT** box appears, displaying the comment.

6. Modify the comment, and then select **Save**.

The changes to the comment are saved.

> ✎ **Note:**
> The position of a comment in the comments list remains constant even after you modify the comment.

## Delete a Comment for a Variable

1. Log in to Plant Applications Web Client.
2. In the application navigation menu, select ⬒.
   The **Open** page appears.
3. Depending on the status of an activity, select **Perform** or **In Progress** for the activity associated with the variable.
   The page for entering data for modifiable variables appears.
4. Select ☰, and then select **Add/Edit Comment** for a variable.
   A list of comments for the variable appears.
5. Select ✕ for the comment that you want to delete.
   A message appears, asking you to confirm that you want to delete the comment.
6. Select **Yes**.

The comment is deleted.

# Completing an Activity

## About Completing an Activity

To complete an activity, you must perform the following tasks:

1. Enter values for all the mandatory variables in the activity.
2. If it is mandatory to enter a comment for an overdue activity, enter the comment.
3. Mark the activity complete.

The following conditions apply when you complete an activity:

- If there are mandatory variables for the activity, you must enter values for all of them (that is, the status of the activity must be 100%).
- If the **Overdue Task Requires Comment** option is set to true in the sheet display options in Plant Applications Administrator, and if the activity is overdue, you must add an overdue comment *(on page 428)*.
- If the option to lock activities is set to True in Plant Applications Administrator, when you select **Perform** for an activity, the activity is locked and the **In Progress** option appears for the activity. Another operator cannot perform the activity until you release the activity *(on page 437)*.
- If the **System Complete Activity On New Event** option in Plant Applications Administrator is enabled for the display, and you create an activity inPlant Applications Web Client whose product ID, process order ID, and unit ID match those of any existing activities, the existing activities are automatically set to complete. Depending on the number of such existing activities, the application might take some time to set all the activities to complete. You can then perform only the new activity that was last created.

## Complete an Activity

1. Log in to Plant Applications Web Client.
2. In the application navigation menu, select .
   The **Open** page appears.
3. Select **Perform** for the activity that you want to complete.
   The **Activity** section appears, displaying the autolog sheet for the associated display, which is configured in Plant Applications Administrator. If the Engineering Units property is enabled for the Display associated with the event, the units of measurement defined for variables also appear next to the variable value in the **Activity** section.
4. In the autolog sheet, enter data for all the modifiable autolog variables *(on page 416)*. You can enter values only for the autolog variables for which you have permissions. The permissions are assigned in Plant Applications Administrator.
5. Press Tab to save the values.
6. Select **Back**, and then select **Complete** or **In Progress** as described in the following table.
   The behavior of the **Open** page and the percentage completion of the activity is based on a few criteria and the **Auto Complete Display** display option as described in the following table. The **Auto Complete Display** display option for the display associated with the activity is set in Plant Applications Administrator.

| Criteria | Auto Complete Display Option Value | Behavior | Percentage Completion Calculation |
|---|---|---|---|
| • No sampling interval or test frequency set for variables associated with the time-based events<br>• No test frequency set for variables associated with the production-based or user-defined events | False | The **Complete** option appears for that activity. You can then select the **Complete** option to complete the activity. The activity then appears in the **Completed** page. | Optional variables are not used to calculate percentage of completion. Therefore, this value remains zero. |
| • No sampling interval or test frequency set for variables associated with the time-based events<br>• No test frequency set for variables associated with the production-based or user-defined events | True | The **Complete** option appears for that activity. You can select **Complete** to complete the activity. The activity then appears in the **Completed** page. | Optional variables are not used to calculate percentage of completion. Therefore, this value remains zero. |
| • Sampling interval or test frequency is set for variables associated with | False | If you enter values for:<br>• Only a few selected modifiable autolog variables in an | The ratio of the total variables with a test ID for which you entered values to the total variables with a test ID. |

| Criteria | Auto Complete Display Option Value | Behavior | Percentage Completion Calculation |
|---|---|---|---|
| the time-based events<br>• Test frequency is set for variables associated with the production-based or user-defined events | | activity, the **In Progress** option appears for that activity. You can select **In Progress**, and then enter values for the remaining modifiable autolog variables.<br>• All modifiable autolog variables in an activity, the **Complete** option appears for that activity. You can then select the **Complete** option to complete the activity. The activity then appears in the **Completed** page. | |
| • Sampling interval or test frequency is set for variables associated with the time-based events<br>• Test frequency is set for vari- | True | If you enter values for:<br>• Only a few selected modifiable autolog variables in an activity, the **In Progress** option appears for that activi- | The ratio of the total variables with a test ID for which you entered values to the total variables with a test ID. |

| Criteria | Auto Complete Display Option Value | Behavior | Percentage Completion Calculation |
|---|---|---|---|
| ables associated with the production-based or user-defined events | | ty. You can select **In Progress**, and then enter values for the remaining modifiable autolog variables<br>• All applicable autolog variables in an activity, the activity is automatically moved to the **Complete** page. | |

7. If the activity is overdue, and if it is mandatory to add an overdue comment for the activity, add the comment *(on page 428)*. You can also choose to add a general comment or a comment for a variable *(on page 430)*.

8. **Optional:** For an array type variable, select ⊟, and then select **Show Trend** to view the graph for the tag values imported from Historian.

> ✏️ **Note:**
> The tags for the variables are configured in Plant Applications Administrator. If you enter a value for the array type variable from Web Client, the **Show Trend** option is disabled.

9. If the activity is associated with a production-based or a user-defined event, select **Event**.

For an activity associated with a production-based event, the following table describes the fields that appear in the **Event** section.

| Field | Description |
|---|---|
| EVENT NUMBER | The unique ID of the event. |
| START TIME | The time when the production started for the event. |
| END TIME | The time when the production stopped for the event. |

| Field | Description |
|---|---|
| EVENT STATUS | The disposition status of the event. |
| PRODUCT | The product associated with the event. |
| APPLIED PRODUCT | The product actually associated with the event. |
| DIMENSION NAME | The dimension of the event as configured in Plant Applications Administrator. You cannot modify the value in this field. |
| UNITS | The equipment that produced (or contains) the production-based event. |
| INITIAL | The initial value of the dimension. The value in this field appears blank if you do not modify the dimension value. You cannot modify the value in this field. |
| FINAL | The current value of the dimension. |
| ADD BATCH COMMENT | The option to add a comment or modify or delete comments for the event. Depending on the security levels defined for your role, you can add, modify, or delete comments. |

For an activity associated with a user-defined event, the following table describes fields that appear in the **Event** section.

| Field | Description |
|---|---|
| EVENT NUMBER | The unique ID of the event. |
| START TIME | The time when you started the user-defined event. |
| END TIME | The time when the you stopped the user-defined event. |
| L1 | The reason for creating the user-defined event. |
| | **Note:**<br>You configure the reason tree for a user-defined event in Plant Applications Administrator. |

| Field | Description |
|---|---|
| L2, L3, L4 | The subreasons, if available, associated with the reason entered for the user-defined event. |
| ADD COMMENT | The option to add a comment or modify or delete comments for the event. You can modify or delete only those comments that were added by you. |

10. **Optional:** In the **Event** section, enter values in the modifiable fields, and then select **Save**.

The activity is completed and appears in the **Complete** page.

# Releasing an Activity

## About Releasing an Activity

If the option to lock activities is set to True in Plant Applications Administrator, when you select **Perform** for an activity, the activity is locked and the **In Progress** option appears for the activity. Another operator cannot perform the activity until you release the activity.

You can release an activity only if it is yet to be completed.

## Release an Activity

1. Log in to Plant Applications Web Client.
2. In the application navigation menu, select .
3. Select **Release** for the activity that you want to release.

The activity is released, and you can now perform or skip the released activity.

# Skipping an Activity

## About Skipping an Activity

You can skip an activity if you no longer need to perform the activity. You can skip an activity only if it is yet to be performed.

## Skip an Activity

1. Log in to Plant Applications Web Client.

2. In the application navigation menu, select ⬚.

3. Select **Skip** for the activity you want to skip.

   The window for entering skip comments appears.

   > ✏ **Note:**
   >
   > If the activity is overdue and the option to enter overdue comments for an activity is required, the window for entering overdue comments appears. If that happens, add an overdue comment *(on page 428)*. The window for entering for skip comments then appears.

4. In the **ADD SKIP COMMENT** box, enter your comment about skipping the activity.

   The comment is added.

5. Select **Save**.

The activity is skipped and no longer appears in the **Open** page. You can view the activity in the **Completed** page.

# Working with Electronic Signature

## About Electronic Signatures

The Electronic Signature option provides a highly secure environment by requiring that operators electronically "sign" for all database process changes resulting from data entry. Electronic signatures uniquely identify the user making the change and can optionally require the electronic signature of another person to verify the change. Electronic signatures are the computer-generated, legally binding equivalents of handwritten signatures. They uniquely identify the person(s) responsible for an action.

An electronic record is generated each time an action is signed for. Electronic records consist of the name of the person(s) involved in the signing process, and other details, such as the type of action performed. Electronic records are written to the ESignature table in the Plant Applications database and retained as a permanent record of a signed action.

Depending on how your displays are configured, a signed action may require a supervisor or an operator to verify or validate the action performed by an operator. The concepts of Performer and Verifier provide the foundation of understanding how electronic signatures work in Plant Applications.

In Plant Applications Administrator, an autolog variable can be configured for an electronic signature in two levels: Level-1 requires only a Performer signature and Level-2 requires both the Performer and a Verifier signature.

- **Level-1**: Requires only the **Performer signature.** The performer who initiated the action must electronically sign for that action.
- **Level-2**: Requires both the **Performer** and a **Verifier signature**. The performer who initiated the action must electronically sign for that action and the verifier must electronically sign to validate the action. The action is not initiated until both signatures are entered. To require an approver signature, the approver must have a minimum of manager rights to a security group assigned to the display or, if no security group has been assigned to the display, the approver must have a minimum of manager rights to the Administrator security group.

A signature consists of two components that uniquely identify the signer: a username and a password. When the operator performs an action or verifies an action, a window appears in which the operator must enter these two identifiers:

- **Username**: Name of the user performing the action or verifying the action.
- **Password**: Password for the user performing the action or verifying the action.

> **Note:**
>
> - Ensure the performer and verifier both have access to the UAA server.
> - Ensure there is no time skew between UAA server and Web client clocks.

## Modify the Value of an Electronic Signature Autolog Variable

In an Autolog display, inserting or editing a test value for a variable will open the **Electronic Signature** window (if electronic signature is enabled for the variable).

> **Note:**
>
> - The session timeout is based on the number of minutes set in the **ESignatureInactivityPeriod** site parameter. That is, the value entered for this site parameter is the number of minutes a user has, following an authentication, to make additional changes without having to authenticate again. For example, if the site parameter is set to 2. After you make a change and authenticate that change, you have two minutes

> to make additional changes without having to authenticate the changes. The site
> parameter applies only to performer level authorization. Verifier-level authorization will still
> be required regardless of how this site parameter is set.
>
> • If the **ESignatureInactivityPeriod** site parameter is set to zero or the
> **ESignatureRequireAuthentication** site parameter is set to true in the Plant Applications
> Administrator, then the performer session timeout in Web Client will be automatically set
> to 5 minutes.
>
> • When the Performer session is active, as a **Performer**, you can see the 🔓 icon is
> activated in the Activity session of Autolog Display or in the **Open** page. If you need
> to leave your workstation for a brief period, you can select the 🔓 to ensure that any
> additional changes will require performer authentication. This helps prevent unauthorized
> changes.
>
> • When you try to select any other application, an alert message appears stating that the
> current modified values will not be saved and you are not allowed to navigate to any
> other application. You need to complete the operation before you proceed with any other
> application.

1. Log in to Plant Applications Web Client.

2. In application navigation menu, select 🔲.

3. Depending on whether the activity is open or completed, select the appropriate tab.

4. If the activity is locked, select **Release** to release the activity.

5. Select **Perform**.

   The autolog history appears, displaying values for the modifiable autolog variables. The
   last entered variable value appears automatically in the page, displaying the autolog history
   (irrespective of the application or page from which the value is modified).

6. In the SPEC column, the ✍ icon near the text box indicates that the variable is entitled to
   electronic signature for any modifications. Modify or enter a new value in the text box for a
   selected variable that requires electronic signature and then press **Tab**.

   The **Electronic Signature** window appears. The ✍ icon turns RED indicating that the change in
   value of the corresponding electronic signature variable. Based on the electronic signature level
   configured for the variable, the Electronic Signature window appears with the following levels:

- **Level-1**: Requires only a Performer signature. The Performer Signature section will be available for input.
- **Level-2**: Requires both the Performer and the Verifier signature. The Verifier Signature section will be available for input after the performer information has been authenticated.



7. If you are a **Performer**, in the **Electronic Signature** window, the following sections and fields are available for you to provide your performer information.

| Field | Description |
|---|---|
| **Performer Level** | Stepper indication for an operator or a supervisor to be informed of which level they are into. <br><br> Indicates the Electronic Signature window is available for inputs of the performer information only. <br><br> **Note:** <br> This indication is display only when both the **Performer** and **Verifier** authentication is required. |

| Field | Description |
|---|---|
| **Verifier level** | This indicator is activated only after the performer authentication is successful and if a verifier signature is required.<br><br>📝 **Note:**<br>This indication is display only when both the **Performer** and **Verifier** authentication is required. |
| **Authenticate Performer** | Enabled only at the performer level. Select to authenticate through UAA to accomplish electronic signature. After selecting this button, a new tab appears for you to enter the UAA credentials.<br><br>In the User Account Authentication page, enter the following credentials and then select **Authenticate**.<br><br>• **USERNAME**: Enter the performer username.<br>• **PASSWORD**: Enter the performer password.<br><br>Once the authentication is successful, you will be navigated back to the **Electronic Signature** window, and the button name changes to **Unauthenticate Performer**. If you need to leave your workstation for a brief period, you can select the **Unauthenticate Performer** button to ensure that any additional changes will require performer verification. This helps prevent unauthorized changes. |
| **Authenticate verifier** | Disabled at the performer level. This button is activated only if a verifier signature is required. |
| **AVAILABLE VERIFIERS** | Displays the list of available approvers to choose in your vicinity. |
| **ADD REASONS** | Select to expand the section if you want to select a reason. From the available list, select a reason for modification. You can also use the search functionality to select an appropriate reason. |
| **ADD COMMENT** | Select to expand the section if you want to add a comment. You can use this section to add a comment, reason, or note to a verifier about your action. |
| **Sign Later** | Select to save the changed value and continue to modify the other variable values in the Autolog. Using this, you can perform electronic signature for all the modified values at one go. |

| Field | Description |
|-------|-------------|
| |  **Note:** You must stay in the Activity section and must not navigate to any other page or application. If you have navigated from the Activity section, all the modifications you made are reverted to old values. For more information, refer to Sign Later for Bulk Electronic Signature *(on page 446)*. |
| **Cancel** | Select to cancel the changes and revert to the old value. |
| **Approve** | Enabled only after you provide the performer credentials. Select to approve and advance for Verifier authentication. Once you selected this, the verifier level is enabled for the verifier to approve the changes. |

The **Verifier Level** is enabled once the performer has supplied the correct performer electronic signature information and selected the **Approve** button.

8. If you are a Verifier, in the **Electronic Signature** window, the following sections and fields are available for you to provide your verifier information.

| Field | Description |
|---|---|
| **Performer Level** | Indicates the performer credentials has been authenticated and approved. This indicator is disabled at Verifier Level.<br><br>✎ **Note:**<br>This indication is display only when both the **Performer** and **Verifier** authentication is required. |
| **Verifier level** | This indicator is activated only after the performer authentication is successful and if a verifier signature is required. The Electronic Signature window is available for inputs of the verifier information.<br><br>✎ **Note:**<br>This indication is display only when both the **Performer** and **Verifier** authentication is required. |
| **Authenticate Verifier** | Enabled only at the verifier level. Select to authenticate through UAA to accomplish electronic signature. After selecting this button, a new tab appears for you to enter the UAA credentials.<br><br>In the User Account Authentication page, enter the following credentials and then select **Authenticate**.<br><br>&bull; **USERNAME**: Enter the performer username.<br>&bull; **PASSWORD**: Enter the performer password.<br><br>Once the authentication is successful, you will be navigated back to the **Electronic Signature** window, and the button name changes to **Unauthenticate Verifier**. If you need to leave your workstation for a brief period, you can select the **Unauthenticate Verifier** button to ensure that any additional changes will require performer verification. This helps prevent unauthorized changes. |
| **AVAILABLE VERIFIERS** | Displays the list of available approvers to choose in your vicinity. |
| **ADD REASONS** | Select to expand the section if you want to view the reason added by the performer or select a reason from the available list. You can also use the search functionality to select an appropriate reason. |

| Field | Description |
|---|---|
| **ADD COM-MENT** | Select to expand the section if you want to view the comments added by the performer or to add a comment. You can use this section to add a comment, reason, or note to the performer about your action. |
| **Reject** | Select to reject the modifications made by the performer. Once rejected, the modified value is reverted to the old value. You will notice that a new browser window or tab appears and then closes immediately. This is to properly logout the verifier from the browser session.<br><br>📝 **Note:**<br>Ensure that the pop-ups are allowed for this web site. You can disable the Pop-up blocker for the web site by adding an exception in your browser settings. When a pop-up is blocked, the address bar will be marked Pop-up blocked . |
| **Cancel** | Select to cancel to log off or unauthenticate. This levels down to the performer level. This helps if you want the performer to make changes to the value based on your suggestion. Once the performer makes the suggested changes, you must again authenticate with verifier credentials and then can approve the changes. You will notice that a new browser window or tab appears and then closes immediately. This is to properly logout the verifier from the browser session.<br><br>📝 **Note:**<br>Ensure that the pop-ups are allowed for this web site. You can disable the Pop-up blocker for the web site by adding an exception in your browser settings. When a pop-up is blocked, the address bar will be marked Pop-up blocked . |
| **Approve** | Enabled only after you provide the verifier credentials. Select to approve the modifications made by the performer. You will notice that a new browser window or tab appears and then closes immediately. This is to properly logout the verifier from the browser session. |

| Field | Description |
|---|---|
| |  **Note:** Ensure that the pop-ups are allowed for this web site. You can disable the Pop-up blocker for the web site by adding an exception in your browser settings. When a pop-up is blocked, the address bar will be marked Pop-up blocked . |

## Sign Later for Bulk Electronic Signature

The **Sign Later** option allows you to perform electronic signature for all the modified values at one go.

In the Activities section, you can use the  icon (along with the counter) located next to the  icon if, for any reason, you choose to modify multiple Autolog variables that require electronic signature at a time. The  icon (along with the counter) is enabled only after you select the **Sign Later** button in the **Electronic Signature** window for modifying a variable.

For this to work, you must modify a variable value that requires an electronic signature and when the **Electronic Signature** window appears, select the **Sign Later** button located at the bottom of the window. However, when working in offline mode (lost network connectivity), any changes made to the variable values that require electronic signature are marked for Sign Later by default. Once the connectivity is restored, the  icon (along with the counter) is enabled to proceed with the authentication and approval.

 **Note:**

- When the Performer session is active, as a **Performer**, you can see the  icon is activated in the Activity session of Autolog Display or in the **Open** page. If you need to leave your workstation for a brief period, you can select the  to ensure that any additional changes will require performer verification. This helps prevent unauthorized changes.
- You must stay in the Activity section and must not navigate to any other page or application. If you have navigated from the Activity section, a warning message appears stating all the modifications made to the variables for electronic signature will be lost. You

> can either choose to exit from the Activity section or select Open Electronic Signature to authenticate and approve changes.
>
> **Electronic Signature warning**
>
> Updated data of Autolog variables for Electronic Signature will be lost, do you want to exit this page?
>
> Exit | Open Electronic Signature

1. In the **Activity** section of Autolog display, in the **SPEC** column, the ✍ icon near the text box indicates that the variable is entitled to electronic signature for any modifications. Modify or enter a new value in the text box for a selected variable that requires electronic signature and then press **Tab**.

   The Electronic Signature window appears. The ✍ icon turns RED indicating that the change in value of the corresponding electronic signature variable.

2. Select **Sign Later** located at the bottom of the window.

   The Electronic Signature window closes, and the Activity section allows you to modify multiple variable values that require electronic signature. The ✍ icon (along with the counter) located next to the ⬚ icon in the **Activities** section is enabled and the counter is incremented for every variable value modification. For example, if you have modified two variable values, the counter is incremented to 2 and is illustrated as ✍ **2**.

| < Back | | [E_Sign_PE - SIGNLATER3] | | | | | | |
|---|---|---|---|---|---|---|---|---|

| Date | 10/12 | | Process Order | - | | |
|---|---|---|---|---|---|---|
| Time | 14:38 | | Product | 50Gloss | | |

| Activity   Event | | All Variables ⌄ | ⬚▾  ☰  ⬀  ✍ 2  🔒  ▽ |
|---|---|---|---|

| | VARIABLE NAME | SPEC | | LOWEST | LOWER QUAR... | MEDIAN | UPPER QUART... | HIGHEST |
|---|---|---|---|---|---|---|---|---|
| ▤ | Approvers Var | ✍ | 12 | | 0 | 0 | 0 | |
| ▤ | Array Approvers Var | ✍ | 14 | | "0.0" | "0.0" | "0.0" | |

3. Select 🖊 2️⃣.

The **Electronic Signature** window appears. The list of modified values (FROM value – TO value) that you made are displayed in the left pane of the window. Based on the electronic signature level configured for the variable, the Electronic Signature window appears with the following levels:

- **Level-1**: Requires only a Performer signature. The Performer Signature section will be available for input.
- **Level-2**: Requires both the Performer and the Verifier signature. The Verifier Signature section will be available for input after the performer information has been authenticated.
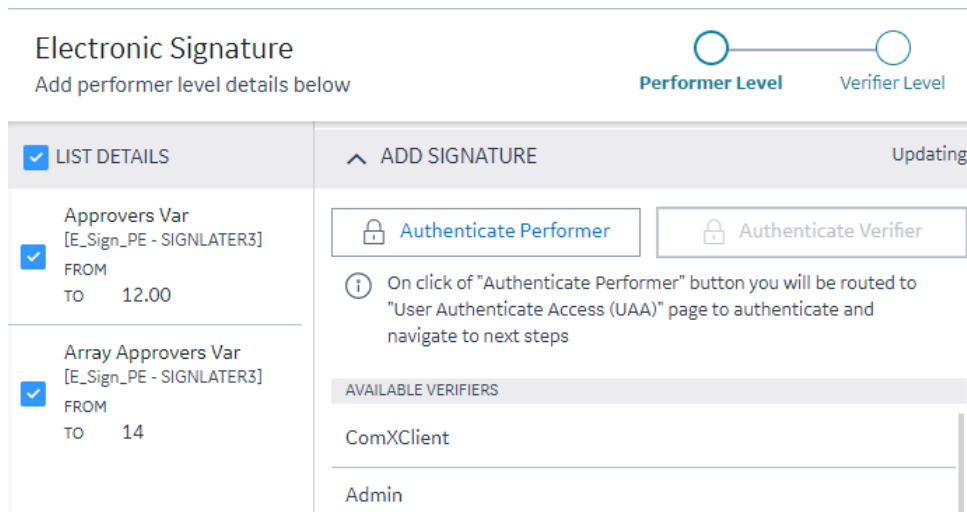


4. As a performer, select the required modifications by selecting respective checkboxes from the left pane. The electronic signature details appear for you to provide the performer credentials. The following sections and fields are available for you to provide your user information.

| Field | Description |
|---|---|
| **LIST DE-TAILS** | Displays the list of modifications in the left panel that you made. Select the required modifications by selecting respective checkboxes. |
| **Performer Level** | Stepper indication for an operator or a supervisor to be informed of which level they are into. Indicates the Electronic Signature window is available for inputs of the performer information only. **Note:** This indication is display only when both the **Performer** and **Verifier** authentication is required. |

| Field | Description |
|---|---|
| **Verifier level** | This indicator is activated only after the performer authentication is successful and if a verifier signature is required. <br><br> ✏️ **Note:** <br> This indication is display only when both the **Performer** and **Verifier** authentication is required. |
| **Authenti-cate Per-former** | Enabled only at the performer level. Select to authenticate through UAA to accomplish electronic signature. After selecting this button, a new tab appears for you to enter the UAA credentials. <br><br> In the User Account Authentication page, enter the following credentials and then select **Authenticate**. <br><br>    • **USERNAME**: Enter the performer username. <br>    • **PASSWORD**: Enter the performer password. <br> Once the authentication is successful, you will be navigated back to the **Electronic Signature** window, and the button name changes to **Unauthenticate Performer**. If you need to leave your workstation for a brief period, you can select the **Unauthenticate Performer** button to ensure that any additional changes will require performer verification. This helps prevent unauthorized changes. |
| **Authenti-cate verifi-er** | Disabled at the performer level. This button is activated only if a verifier signature is required. |
| **AVAILABLE VERIFIERS** | Displays the list of available approvers to choose in your vicinity. |
| **ADD REASONS** | Select to expand the section if you want to select a reason. From the available list, select a reason for modification. You can also use the search functionality to select an appropriate reason. |
| **ADD COM-MENT** | Select to expand the section if you want to add a comment. You can use this section to add a comment, reason, or note to a verifier about your action. |
| **Cancel** | Select to cancel the changes and revert to the old value. |
| **Approve** | Enabled only after you provide the performer credentials. Select to approve and advance for Verifier authentication. Once you selected this, the verifier level is enabled for the verifier to approve the changes. |

| Field | Description |
|---|---|
| **Revert** | Select at any point of time to revert the modifications you made. |

5. The Verifier Level is enabled once the performer has supplied the correct performer electronic signature information and selected the **Approve** button. If you are a Verifier, in the Electronic Signature window, the following sections and fields are available for you to provide your user information.

| Field | Description |
|---|---|
| **LIST DE-TAILS** | Displays the list of modifications in the left panel that performer made and approved. Select the required modifications by selecting respective checkboxes. |
| **Performer Level** | Indicates the performer credentials has been authenticated and approved. This indicator is disabled at Verifier Level.<br><br>**Note:**<br>This indication is display only when both the **Performer** and **Verifier** authentication is required. |
| **Verifier level** | This indicator is activated only after the performer authentication is successful and if a verifier signature is required. The Electronic Signature window is available for inputs of the verifier information.<br><br>**Note:**<br>This indication is display only when both the **Performer** and **Verifier** authentication is required. |
| **Authenticate Verifier** | Enabled only at the verifier level. Select to authenticate through UAA to accomplish electronic signature. After selecting this button, a new tab appears for you to enter the UAA credentials.<br><br>In the User Account Authentication page, enter the following credentials and then select **Authenticate**.<br><br>• **USERNAME**: Enter the performer username.<br>• **PASSWORD**: Enter the performer password.<br>Once the authentication is successful, you will be navigated back to the **Electronic Signature** window, and the button name changes to **Unauthenticate Verifier**. If you need to leave your workstation for a brief period, you can select the **Unauthenticate** |

| Field | Description |
|---|---|
|  | **Verifier** button to ensure that any additional changes will require performer verification. This helps prevent unauthorized changes. |
| **AVAILABLE VERIFIERS** | Displays the list of available approvers to choose in your vicinity. |
| **ADD REASONS** | Select to expand the section if you want to view the reason added by the performer or select a reason from the available list. You can also use the search functionality to select an appropriate reason. |
| **ADD COM- MENT** | Select to expand the section if you want to view the comments added by the performer or to add a comment. You can use this section to add a comment, reason, or note to the performer about your action. |
| **Cancel** | Select to cancel to log off or unauthenticate. This levels down to the performer level. This helps if you want the performer to make changes to the value based on your suggestion. Once the performer makes the suggested changes, you must again authenticate with verifier credentials and then can approve the changes. <br><br> **Note:** <br> You will notice that a new browser window or tab appears and then closes immediately. This is to properly logout the verifier from the browser session. |
| **Approve** | Enabled only after you provide the verifier credentials. Select to approve the modifications made by the performer. <br><br> **Note:** <br> You will notice that a new browser window or tab appears and then closes immediately. This is to properly logout the verifier from the browser session. |
| **Revert** | Select at any point of time to revert the modifications you made. <br><br> **Note:** <br> You will notice that a new browser window or tab appears and then closes immediately. This is to properly logout the verifier from the browser session. |

## Conditional Electronic Signatures

A conditional electronic signature can be used to override the defined electronic signature settings when certain other conditions (variable definitions) you configure are met.

1. Configure the stored procedure

   `dbo.spActivities_GetCustomEsignatureLevelForVariables` (which ships with Plant Applications). You will need access to the Plant Applications database as well as administration/database owner permissions to modify this stored procedure.

   > ✏️ **Note:**
   >
   > When modifying this procedure, be sure to maintain its input and output structures.

2. Ensure the variable `plant.apps.override-variable-esignatureLevel` (located in the `activities-app-service-prod.properties` file) is set to **true** (the default is **false**). Depending on your installation, `activities-app-service-prod.properties` will be located at:

   a. Enterprise edition: `<Install Directory>/PlantApplicationsDocker/plantapps-web-docker/mnt/configfiles/activities-app-service/prod/{{appVersion}}/<appname>.yml`

   b. Standard edition: `<Install Directory>\config-rep\activities-app-service\prod\{{appVersion}}\<appname>.yml`

# Chapter 19. Process Orders

## About Process Orders

As a supervisor or an operator, you can use the Process Orders application in the Plant Applications Web Client to monitor the progress of a process order. Active process orders track actual production and quantities against process orders, and display remaining quantities, planned quantities, planned start times, and planned end times. You can reorder, change the status of, and edit process orders, and the production schedule provides normal, warning, and alarm indicators to aid in tracking progress. You can configure the execution paths controlled by a schedule out of following types of Schedule Control Flows, which can be configured in Plant Applications Administrator.

- **All Units Run Same Schedule Simultaneously**: This setting is used in production process that are running very fast and producing product at a high rate. This allows multiple Production Units to run against the same Schedule at the same time.
- **Schedule Flows By Event:** This setting allows a Process Order to flow through the process with the Production Event. When the Production Event is loaded on to the next Production Unit, the Process Order will follow that Event and become the Active order on that next Unit.
- **Schedule Flows Independently:** In this setting, Process Orders need to be pushed to the next Production Unit. The Order can be pushed manually or automatically. The Operator can push the Process Order from one Production Unit to the next. The Order can be pushed automatically through models. This can be done with various triggers that can be watched by a model.

All Units Run Same Schedule Simultaneously,

As a supervisor, you can use the Process Orders application to perform the following actions:

# Access Open Orders

To access the open process orders, you must have the operator or supervisor role assigned to your user ID.

1. Log in to Plant Applications Web Client.
2. Select ⚏.

   By default, the **Open** page appears, displaying a list of process orders grouped based on the multiple execution paths (configured in Plant Applications Administrator) or unbound path in a tabular format.

   > ✎ **Note:**
   >
   > The unbound Process Orders are always displayed on Plant Applications Web Client in the **Unbound** category. The path column is not displayed separately, because the process orders are grouped by the path column. User can use the **PATH** filter to filter out the **Unbound** POs from being displayed. The filter selection will persist for the user.

   The process orders are sorted based on their status. By default, the sorting order is Active, Next, Pending, or Planning. However, you can change this sorting order using the **statusorder** and **statusgroup** parameters in the **process-order-status-controller** api end point.

   > ✎ **Note:**
   >
   > If you have a process order with custom status, you must define the **statusgroup** parameter in the **process-order-status-controller** api end point for it to display in the **Open** or **Closed** tabs. By default, the status sorting order is not set and appears at the end on the list. As an administrator, you can change the sorting order using the **statusorder** parameter in the **process-order-status-controller** api end point.

   In the table displaying the list of open orders and their details, you can resize a column or drag and drop a column to a new position. The column settings you select in the table are retained when you access the **Open** page later. You can select the path headers to either collapse or expand the list of process orders associated to that execution path.

> **Note:**
>
> The number of records displayed in the **Open** page depends on the value that is configured for the **maxRecordsToFetch** property in the **app.properties.json** file.
>
> Depending on your installtion, access the app.properties.json file in the following folder:
>
> - **Enterprise installation:** `<Install Directory>/PlantApplicationsDocker/`
>   `plantapps-web-docker/mnt/configfiles/production-scheduler-`
>   `app/prod/{{appVersion}}/<appname>.yml`
> - **Standard installation:** `<Install Directory>\config-rep\production-`
>   `scheduler-app\prod\{{appVersion}}\<appname>.yml`
>
> If the number of records in the database is more than the value configured for the **maxRecordsToFetch** property, a notification to contact the administrator appears.

In addition, the following information appears in a tabular format for each process order.

| Option | Action |
|---|---|
| **STATUS** | The process order status along with the corresponding color.<br><br>• **Green**: Active<br>• **Blue**: Next<br>• **Yellow**: Pending<br>• **Orange**: Planning |
| **ORDER** | The unique process order number. |
| **LINE** | The production line description. |
| **PRODUCT** | The product associated with the process order. |
| **QUANTITY** | The planned quantity for the process order. |
| **PLANNED START TIME** | The date and time when the process order was planned to begin. The date and time format |

| Option | Action |
|---|---|
|  | is driven by localization setting. For example: mm/dd hh:mm or dd/mm hh:mm. |
| **PLANNED END TIME** | The date and time when the process order was planned to end. The date and time format is driven by localization setting. For example: mm/dd hh:mm or dd/mm hh:mm |
| **ACTUAL START TIME** | The actual start date and time of the process order. The date and time format is driven by localization setting. For example: mm/dd hh:mm or dd/mm hh:mm |
| **ACTUAL END TIME** | The actual end date and time of the process order. The date and time format is driven by localization setting. For example: mm/dd hh:mm or dd/mm hh:mm. |
| **ACTIONS** | The actions that you can perform on a process order. You can select one of the following action items: <br><br> • ↑ and ↓ : Select to change the sequence of a pending process order. <br><br> • ◇ : Select to change the status of process order. <br><br> • ⋮ : Select to edit, comment, delete, or advance a process order. <br><br> **Note:** Advance PO Unit is enabled only when the **Schedule Control Type** path configuration is set to **Schedule Flows Independently** in Plant Applications Administrator. For more information on |

| Option | Action |
|---|---|
| | ✎ advancing a process order, refer to Advance a Process Order *(on page 477)*. |
| **ACTUAL PRODUCED QUANTITY** | The actual produced quantity for the open process order. |

3. **Optional:** In the table displaying the list of process orders and their details, select an option to perform an action as described in the following table.

| Option | Description |
|---|---|
| + | Select to Add a New Process Order *(on page 472)*. |
| ↻ | Select to update the process orders list with the latest information. ✎ **Note:** This icon is enabled only when there are updates to the process orders list. Else, one of the following icons appears: • ↻: Indicates that there are no updates to the process orders list. • ↻: Indicates that there are additional open process orders available. Select ↻ to refresh the page and access all the open process orders. • ↻: Indicates that the RabbitMQ service is down. |
| ⬤▭ | Select to automatically update the process orders. You can disable this if you do not want to update the newly added process orders. |
| PATH ▽ | Select to filter the process orders based on the selected path. Select a check box, and then select **Apply** to include the process orders that are grouped by selected paths in the results. |
| ✕ | Select to delete multiple process orders. ✎ **Note:** This icon is enabled only when you select the check boxes for one or more process orders in the table. |

| Option | Description |
|---|---|
|  | Select to add or remove columns from the table displaying the process orders list. The added columns are retrieved when you access the **Open** page later. <br><br> By default, the following columns appear in the specified order when you access the **Open** page: <br> • STATUS <br> • ORDER <br> • PRODUCT <br> • QUANTITY <br> • LINE <br> • PLANNED START TIME <br> • PLANNED END TIME <br> • ACTUAL START TIME <br> • ACTUAL END TIME <br> • ACTUAL PRODUCED QUANTIY <br> • ACTIONS <br><br> **ⓘ Tip:** <br> You can use the horizontal scroll bar in the table to drag the scroll box and access the data from all the added columns. |

# Search for a Process Order

1. Log in to Plant Applications Web Client.
2. Select ![icon].
3. If you want to search for a completed or a skipped activity, select **Completed**.
4. Select ![icon].
5. Provide values in any of the available boxes as described in the following table.

| Box | Description |
|---|---|
| **Execution Path** | Enter the name of an execution path. |
| **Process Order** | Enter a process order number. |
| **Product Code** | Enter a product code associated with the process order |

| Box | Description |
|---|---|
| **Select Dates** | Select this check box to enable Start and End Time entries. Using these fields, you can specify the time range by selecting the start and end times. |

> **ⓘ Tip:**
>
> To search for an operation using a barcode, select 📷 for an option, and scan for the barcode specific to the option.
> - Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes.
> - In iPad, you can use 📷 only in the Safari browser.

6. Select **Apply**.

The Process Orders that match the search criteria appear.

> **ⓘ Tip:**
>
> To clear results and perform new search, select **Reset**.

# Access Closed Orders

To access the completed, cancelled, over produced, under produced, and error process orders, you must have the operator or supervisor role assigned to your user ID.

1. Log in to Plant Applications Web Client.
2. Select ⬛.

   By default, the **Open** page appears, displaying a list of process orders grouped based on the multiple execution paths (configured in Plant Applications Administrator) in a tabular format. The process orders are sorted based on their actual end date, actual start time, or entry on (modified) value.
3. Select the **Closed** tab to access all the process orders that were completed, cancelled, over produced, under produced, and error process orders. In the table displaying the list of closed orders and their details, you can resize a column or drag and drop a column to a new position. The column settings you select in the table are retained when you access the **Closed** page later.
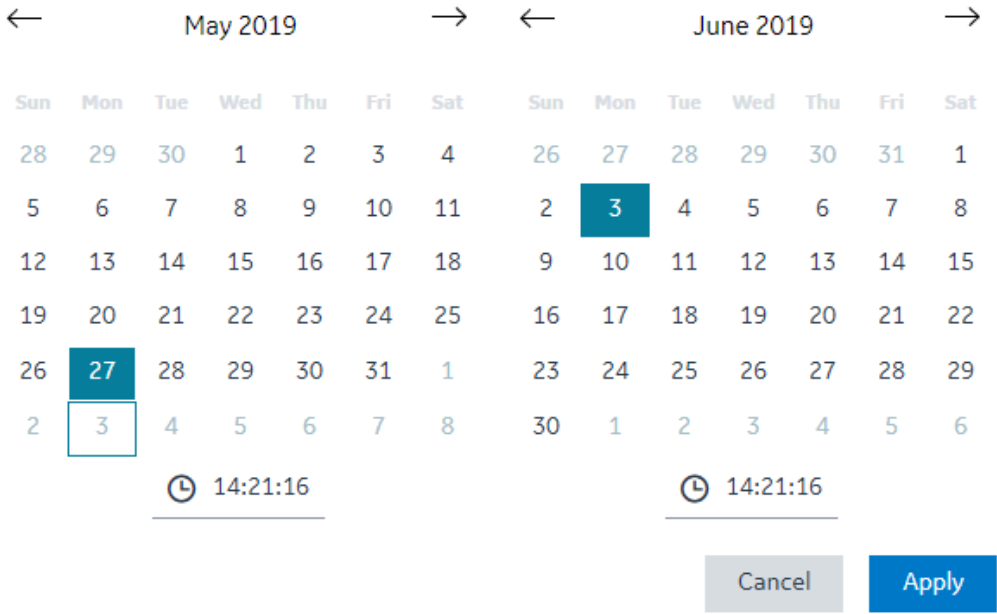
In addition, the following information appears in a tabular format for each process order.

| Option | Action |
|---|---|
| STATUS | The process order status along with the corresponding color.<br><br>• **Grey**: Complete or Cancelled<br>• **Red**: Error, Underproduced, or Overproduced |
| ORDER | The unique process order number. |
| LINE | The production line description. |
| PRODUCT | The product associated with the process order. |
| QUANTITY | The planned quantity for the process order. |
| PLANNED START TIME | The date and time when the process order was planned to begin. The date and time appear in the following format: mm/dd hh:mm (for example, 03/27 10:58). |
| PLANNED END TIME | The date and time when the process order was planned to end. The date and time format is driven by localization setting. For example: mm/dd hh:mm or dd/mm hh:mm |
| ACTUAL START TIME | The actual start date and time of the process order. The date and time format is driven by localization setting. For example: mm/dd hh:mm or dd/mm hh:mm |
| ACTUAL END TIME | The actual end date and time of the process order. The date and time format is driven by localization setting. For example: mm/dd hh:mm or dd/mm hh:mm. |

| Option | Action |
|---|---|
| **ACTIONS** | The actions that you can perform on a process order. You can select one of the following action items:<br><br>• ⬦ : Select to change the status of process order.<br><br>• ⣀ : Select to edit, comment, or delete a process order. |
| **ACTUAL PRODUCED QUANTITY** | The actual produced quantity for the closed process order. |

4. In the **View by** drop-down list box containing the time range options, select a time range as described in the following table. The range that you select appears in the form of date and time interval next to the drop-down list box containing the time range options.

| Option | Description |
|---|---|
| Last \<number\> Hours | Select to access all closed process orders within \<number\> hours prior to the current Production time. The value of \<number\> is configured in Plant Applications Web Client using the property "lastNHours" in the `apps.properties.json` file. |
| Previous Day | Select to access all closed process orders from the day prior to the current Production Day. |
| Current Day | Select to access all closed process orders from the start time until the end time of the current Production Day. If there are no shifts configured for the plant, this option is selected by default. |
| Current Shift | Select to access all closed process orders from the start time until the end time of the ongoing shift. If shifts are configured for the plant, this option is selected by default. |
| Previous Shift | Select to access all closed process orders from the shift prior to the current shift. |
| Last 7 days | Select to access all closed process orders within seven days prior to the current Production Day. |
| Custom | Select to access all closed process orders within a date and time range of up to seven days that you specify by using a calendar window. |

| Option | Description |
|---|---|
| | The following calendar window appears when you select the **Custom** option. <br><br> ←    May 2019    →    ←    June 2019    → <br><br> *May 2019:* Sun Mon Tue Wed Thu Fri Sat <br> 28 29 30 1 2 3 4 <br> 5 6 7 8 9 10 11 <br> 12 13 14 15 16 17 18 <br> 19 20 21 22 23 24 25 <br> 26 **27** 28 29 30 31 1 <br> 2 3 4 5 6 7 8 <br> 🕐 14:21:16 <br><br> *June 2019:* Sun Mon Tue Wed Thu Fri Sat <br> 26 27 28 29 30 31 1 <br> 2 **3** 4 5 6 7 8 <br> 9 10 11 12 13 14 15 <br> 16 17 18 19 20 21 22 <br> 23 24 25 26 27 28 29 <br> 30 1 2 3 4 5 6 <br> 🕐 14:21:16 <br><br> Cancel    Apply <br><br> To specify a custom date and time range in the calendar window: <br><br> a. In the **START DATETIME** section, select a date and enter a time in the format hh:mm:ss. <br><br> b. In the **END DATETIME** section, select a date and enter a time in the format hh:mm:ss. <br><br> > **Note:** <br> > The end date must be within seven days of the start date. <br><br> c. Select **Apply**. |

> **Note:**
> The **Previous Shift** and **Current Shift** options appear only when shifts are defined for the display in Plant Applications Administrator.

The list of closed process orders appear based on the time range selected.

> **Note:**
>
> The list of closed process orders displayed is refreshed based on the
> **refreshNMinutesDuration** set in the `apps.properties.json` file.
>
> - For docker-based installation, the `apps.properties.json` file is located at
>   `<installation_directory>/PlantApplicationsDocker/plantapps-`
>   `universal-client/production-scheduler-app`
> - For standard installation, the `apps.properties.json` file is located at
>   `C:\Program Files\GE Digital\PlantApplicationsWebClient`
>   `\NodeUIApp\<application name>\assets`.
>
> For example: If the **refreshNMinutesDuration** is set to 5 minutes and the user does not
> interact with the UI for a duration greater than or equal to 5 minutes, the list gets refreshed
> and the timestamp is updated accordingly.

5. **Optional:** In the table displaying the list of process orders and their details, select an option to perform an action as described in the following table.

| Option | Description |
|---|---|
| + | Select to Add a New Process Order *(on page 472)*. |
| ⟳ | Select to update the process orders list with the latest information. <br><br> > **Note:** <br> > This icon is enabled only when there are updates to the process orders list. Else, one of the following icon appears: <br> > - ⟳: Indicates that there are no updates to the process orders list. <br> > - ⟳: Indicates that there are additional open process orders available. Select ⟳ to refresh the page and access all the open process orders. <br> > - ⟳: Indicates that the RabbitMQ service is down. |
| ◯▬ | Select to automatically update the process orders. You can disable this, if you do not want to update only the newly added process orders. |

| Option | Description |
|---|---|
| PATH ⧩ | Select to filter the process orders based on the selected path. Select a check box(es), and then select **Apply** to include the process orders the are grouped by selected paths in the results. |
| ✕ | Select to delete multiple process orders.<br><br>📝 **Note:**<br>This icon is enabled only when you select the check boxes for one or more process orders in the table. |
| ▤ | Select to add or remove columns from the table displaying the process orders list. The added columns are retrieved when you access the **Open** page later.<br>By default, the following columns appear in the specified order when you access the **Open** page:<br>    • STATUS<br>    • ORDER<br>    • PRODUCT<br>    • QUANTITY<br>    • LINE<br>    • PLANNED START TIME<br>    • PLANNED END TIME<br>    • ACTUAL START TIME<br>    • ACTUAL END TIME<br>    • ACTUAL PRODUCED QUANTITY<br>    • ACTIONS<br><br>ⓘ **Tip:**<br>You can use the horizontal scroll bar in the table to drag the scroll box and access the data from all the added columns. |

# Access Details of a Process Order

As an operator, you can access the detailed information on the progression of a process order. You can view Statistics, BOM, Properties, and History for a selected process order. Using this page, you can also edit comments or change status of the process order.

1. Log in to Plant Applications Web Client.

2. Select .

   By default, the **Open** page appears, displaying a list of process orders grouped by the associated execution path in a tabular format. You can select the **Closed** tab if you want to access details of process orders that are in the completed status.

3. From the table, select a process order.

   The **Process Order Details** page appears. In the left panel, you can view the process order that you have selected, along with remaining process orders grouped by their execution paths. In the right panel, you can view the high-level statistics of the process order that you have selected, along with the other details that are segregated under the **Statistics**, **BOM**, **Properties** and **History** sections.

   > **Note:**
   >
   > - If you have defined the custom tab(s) in the **Configuration** application, the associated custom tab details appear.
   > - Although, the **BOM Details** tab is a standard tab; it is not visible by default in the **Process Order** application. To view it in the **Process Order** application, in the **Configuration** application's **Standard Tab**, you must switch **BOM Details** to show. For more information on how to show or hide tabs, refer to Show or Hide Tabs *(on page 303)*.

The following table describes all the fields for the selected process order.

| Option | Action |
|---|---|
| **Current Order** | The selected process order. |
| **Product** | The product associated with the process order. |
| **Start Time** | The planned start time of the process order. |
| **End Time** | The planned end time of the process order. |
| **Forecast Quantity** | The planned quantity for the process order. |
| **Actual Good Quantity** | The total good quantity from the defined production counting units on the path. |
| **Predicted Remaining Quantity** | The predicted remaining quantity. |

| Option | Action |
|---|---|
| | • If Control Type = Quantity<br><br>Remaining Quantity indicates how much product is left to be produced for the order and is in row 1 under the Quantity column.<br><br>Remaining Quantity = Planned Quantity - Total Good Quantity<br><br>• If Control Type = Duration<br><br>Remaining Quantity indicates how much time is left to produce the order.<br><br>Remaining Quantity = [(ForecastEndTime - ForecastStartTime) - (CurrentTime - ActualStartTime)] * ProductionRate<br><br>• If Control Type = Time<br><br>Remaining Quantity indicates how much time is left to produce the order.<br><br>Remaining Quantity = (ForecastEndTime - CurrentTime) * ProductionRate<br><br>✎ **Note:**<br>ProductionRate = Quantity Produced Till Now / Time Taken To Produce It |

4. To view the detailed information about the process order against the production metrics, select the **Statistics** tab.

   The following table describes all the fields for the selected process order.

| Option | Description |
|---|---|
| **Production** | The production metric. |
| **Quantity** | The quantity associated to the production metric. |
| **Start** | The planned start time of the process order. |

| Option | Description |
|---|---|
| **End** | The planned end time of the process order. |
| **Planned** | The planned duration to run the order. |
| **Predicated** | The predicted total duration required to run the order. |
| | Predicted Total Duration = ForecastStartTime - ForecastEndTime |
| **Running** | The amount of time an order is in the active status. |
| **Down** | The duration of downtime accumulated on the production unit the process order is currently running during the time the order was active. This only applies to units that are set up as a production point. |
| **GOOD** | The total quantity produced from production events that are considered **Good** production. |
| **BAD** | The total quantity produced from production events that are considered **Reject** or **Bad** production. |
| **GOOD BATCH** | The number of production events with a status that is considered as **Good** production. |
| **BAD BATCH** | The number of production events with a status that is considered **Reject** or **Bad** production. |

5. To view the associated BOM formulation, select **BOM**.

   Details about the associated BOM formulation appears.

   > **Note:**
   >
   > BOM formulation quantity cannot be zero.

   The following table describes all the fields for the selected process order.

| Option | Description |
|---|---|
| **SERIAL/ LOT#** | The serial/lot of the raw material that was consumed. |

| Option | Description |
|---|---|
| | **Note:** For multiple lots, you can select the row to expand and see individual details such as SERIAL/LOT, CONSUMED QTY, USERNAME, and DATE/TIME in a new table. |
| **ORDER** | The recommended order of consumption of the BOM item in an operation. |
| **MATERIAL DESC** | The material description of the BOM item. |
| **REQ QTY** | The planned quantity of the BOM items required for the completion of the serial/lot for the operation. |
| **MATERIAL** | The material number of the BOM item. |
| **CONSUMED QTY** | The actual quantity of the BOM items consumed during the production. |
| **UOM** | The unit of measure (UOM) of the BOM item. |
| **LOWER QTY** | The lower tolerance quantity of the BOM item that can be consumed. |
| **UPPER QTY** | The upper tolerance quantity of the BOM item that can be consumed. |
| **SCRAP FACTOR** | The percentage of this BOM item that is expected to be lost during production of the formulation. |
| **STORAGE UNIT** | Unit currently storing the selected product. |

You can use the **Search** box for search for a material. To access a material using a barcode, select 📷 for an option and scan for the barcode specific to the option. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes.

6. To view the BOM item consumption details for production event level or to view the roll-up consumption for a process order, select **BOM Details**.
   By default, the list of production events and the roll-up consumption details of all the BOM formulations associated to the selected process order appear.

You can do any of the following in the **BOM Details** section:

- To view the roll-up consumption details for the selected process order, select **View Rollup Consumption**.
- To view and consume BOM items for a prodcution event, in the **Production Event List**, select a production event. For more information, refer to Specify Consumption of BOM Items for a Production Event *(on page 481)*.

> ✎ **Note:**
>
> You cannot consume BOM items when you have selected to view the roll-up consumption. You can consume BOM items only if you select a production event.

- To expand or collapse the **Rollup Consumption** and the **Production Event List** section, in the

  **Production Event List**, select  ⟨.

  If you collapse the section, to identify your current selection, the details of the selected view is displayed vertically. For example, if you had selected to view the consumption details for a production event list, and then you collapse the section, the name of the selected production event list is displayed vertically on the collapsed section.

The following table describes all the column fields of the BOM formulation for the selected process order.

| Option | Description |
|---|---|
| **ORDER** | The recommended order of consumption of the BOM item in an operation.<br><br>> ✎ **Note:**<br>> For multiple lots, you can select the row to expand and see individual details such as SERIAL/LOT, CONSUMED QTY, USERNAME, and DATE/TIME in a new table. |
| **MATERIAL** | The material number of the BOM item. |
| **MATERIAL DESC** | The material description of the BOM item. |
| **REQ QTY** | The planned quantity of the BOM items required for the completion of the serial/lot for the operation. |

| Option | Description |
|---|---|
| CONSUMED QTY | The actual quantity of the BOM items consumed during the production. <br><br> **Note:** <br> If you have selected **View Rollup Consumption**, this field is the total quantity of the BOM items consumed during the production. |
| UOM | The unit of measure (UOM) of the BOM item. |
| SERIAL/ LOT# | The serial/lot of the raw material that was consumed. |
| LOWER QTY | The lower tolerance quantity of the BOM item that can be consumed. |
| SCRAP FACTOR | The percentage of this BOM item that is expected to be lost during production of the formulation. For example, if 100 units of Product XYZ are required with a scrap factor of 1%, then you should have 101 units on hand when preparing to produce the product. |
| UPPER QTY | The upper tolerance quantity of the BOM item that can be consumed. |
| STORAGE UNIT | Unit currently storing the selected product. |

7. To view the properties, select **Properties**. The associated properties appear, grouped by property type (Standard, Custom (multiple groups), or, User-defined properties).

The following table describes all the fields for the selected process order.

| Option | Description |
|---|---|
| MANDA- TORY | The property group type (Standard, Custom, or User-Defined). |
| NAME | The name of the property. |
| REVISION | The current revision number of the property against the total revisions performed on this property. |
| VALUE | The value of the property. |
| UOM | The unit of measure (UOM) of the BOM item. |

| Option | Description |
|---|---|
| **DATA TYPE** | The data type of the property. |
| **ACTIONS** | ↗ : Select to view the revision history of the property. |

8. To view the history of changes made to a specific process order, select **History**.

   A history of all changes made to the process order appears.

   The following table describes all the fields for the selected process order. You can use the ⤓ button to export the history data to a .csv or an .xlsx file.

| Option | Description |
|---|---|
| **User** | Displays the name of the user who made the change. |
| **Change Time** | The date and time when the process order was updated. The date and time are displayed in the format mm/dd hh:mm (for example, 03/27 13:05). |
| **Trans Type** | The transaction type such as insert or update. |
| **Status** | The process order status. |
| **Forecast Start Date** | The planned start date of the process order. |
| **Forecast End Date** | The planned end time of the process order. |

9. **Optional:** If you have defined a custom tab using the **Configuration** application, the associated custom tab appears. For more information on creating a custom tab, refer to About Custom Tab *(on page 304)*.

10. **Optional:** You can use ⋮ to edit *(on page 475)*, comment *(on page 478)*, or change status *(on page 479)* of a process order.

# Add a New Process Order

The process order appears in the Process Order view when a period containing the specified process order's projected start time is set. All information specified when adding the process order is preserved throughout the Process Order view.

1. Log in to Plant Applications Web Client.

2. Select ☰.

   By default, the **Open** page appears, displaying a list of process orders grouped by the associated execution path in a tabular format.

3. In the **Open** page, select ✛ .

   The **Add Process Order** page appears.



4. Under the **General** tab, provide values as specified in the following table.

| Option | Description |
|---|---|
| **PRO-CESS ORDER** | Enter a unique process order number that does not exceed 50 characters. <br><br> ✎ **Note:** <br> If the character length exceeds 50 characters, the Process Order name will be truncated. |

| Option | Description |
|---|---|
| PATH | Select or enter the production execution path code. <br><br> ✎ **Note:** <br> You can skip this field if you want to create a process order without binding (unbound process order) it to a path. You can bind the unbound process orders using the **Edit** option. |
| STATUS | The Pending status of the order. |
| CON-TROL TYPE | Select a Control Type of Quantity, Duration, or Time. |
| TYPE | Indicates the process order type. You cannot edit this field. |
| PROD-UCT | Select a Product for the Process Order. |
| BOM FOR-MU-LATION | Select the BOM formulation that you want to use in the order. It contains a list of BOM formulations configured for the material in Plant Applications. When you associate a bill of materials formulation with a process order, only the formulations associated with the selected product will be available for selection. <br><br> ✎ **Note:** <br> BOM formulation quantity must be non-zero. |
| START TIME <br><br> END TIME | Enter a date and time in the Start time and End time boxes to complete the running of the order at the specified time. <br><br> ✎ **Note:** <br> The End time box is enabled only when the Open check box is cleared. |
| QUAN-TITY | Enter a Planned Quantity for the process order. |

5. Select the **Properties** tab.

   By default, the list of Standard properties appears.

> **Note:**
>
> The user-defined properties (UDP) appears only if they are added in Plant Applications Administrator using the **Edit** option. You cannot add or edit the UDP. However, you can access or edit the value.

Provide values as specified in the following table.

| Option | Description |
|---|---|
| MANDA-TORY | The property group type (Standard, Custom, or User-Defined). |
| NAME | The name of the property. |
| REVISION | The current revision number of the property against the total revisions performed on this property. |
| VALUE | Enter the value of the property. |
| UOM | The unit of measure (UOM) of the BOM item. |
| DATA TYPE | The data type of the property. |
| ACTIONS | • ⬀ : Select to view the revision history of a property. |

6. Under the **Properties** tab, select the ➕ icon to assign the Custom properties to the list. The Assign property Groups(s) window appears displaying the list of available custom and user defined properties.

   From the list, select a property group using the check box and then select **Assign**. You can use the arrow button to expand the property group to view associated properties for that group.

> **Note:**
>
> You cannot select individual properties in a group.

7. Select **Save**.

   The process order is created.

# Modify a Process Order

1. Log in to Plant Applications Web Client.

2. Select ![icon].

   By default, the **Open** page appears, displaying a list of process orders grouped based on the multiple execution paths (configured in Plant Applications Administrator) or unbound path in a tabular format.

   > ✎ **Note:**
   >
   > If the **Display Unbound Process Orders** display option is set to **True** (this value is set in the Display Options from the Plant Applications Administrator), the unbound Process Orders are displayed below the Unbound category, with no Path column displayed.

   You can select the **Closed** tab if you want to edit process orders that are in the completed status.

3. From the **Actions** column, select ⋮ for a required process order.

4. From the menu, select **Edit**.

   The **Edit Process Order** page appears.

5. As needed, modify process order parameters as required in the **General** and **Advanced** sections.

   > ✎ **Note:**
   >
   > When you associate a bill of materials formulation with a process order, only the formulations associated with the selected product will be available for selection.

6. **Optional:** If the selected process order is not bound to a path, in the **General** section, you can use the **PATH** field to bind the process order to a path.

7. **Optional:** In the **General** section, select **Add Comments** to either add, modify, or delete comments for the process order.

   The **Add Comment** window appears.

8. In the **ADD COMMENT** box, enter a comment for the changes you made, and select **Add**.

   > ✎ **Note:**
   >
   > You can modify or delete only those comments that were added by you. However, based on the site parameter, you can also update comments from other users if you have the required permissions.

9. Select **Save**.

> **Note:**
> The changes made to the process order are saved.

## Delete a Process Order

1. Log in to Plant Applications Web Client.
2. Select ▤.

   By default, the **Open** page appears, displaying a list of process orders grouped based on the multiple execution paths (configured in Plant Applications Administrator) in a tabular format. You can select the **Closed** tab if you want to delete process orders that are in the completed status.

3. From the **Actions** column, select ⁝ for a required process order.
4. From the menu, select **Delete**.
   The **Delete** page appears.
5. Select **Ok** to complete the delete action.

## Advance a Process Order

You can manually move an active process order to a next linked production unit that is part of the production execution path. This option is enabled only for an Active process order.

> **Note:**
> Before you can manually advance a process order, the **Schedule Control Type** needs to be set to **Schedule Flows Independently** on the **General** tab of the **Execution Path Configuration** dialog box in the Plant Applications Administrator.

1. Log in to Plant Applications Web Client.
2. Select ▤.

   By default, the **Open** page appears, displaying a list of process orders grouped based on the multiple execution paths (configured in Plant Applications Administrator) in a tabular format

3. From the **PATH** filter, select the required execution path for which the Schedule Control Type is set to **Schedule Flows Independently** in the Plant Applications Administrator.

4. For a process order with a status of **Active**, from the **Actions** column, select ⁝ for a required process order.
5. From the menu, select **Advance PO Unit**.

The **Advance PO Unit** window appears displaying active and completed units under the **Active Completed Units** section and available production units under **Advance To Units** section.

6. From the **Advance To Units** section, select the production unit that you want to advance the process order to and select the **OK** button.

The selected production unit moved to the **Active and Completed Units** section.

# Add Comments to a Process Order

1. Log in to Plant Applications Web Client.

2. Select ⬚.

By default, the **Open** page appears, displaying a list of process orders grouped by the associated execution path in a tabular format. You can select the **Closed** tab if you want to add comments to process orders that are in the completed status.

3. From the **Actions** column, select ⣿ for a required process order.

4. From the menu, select **Comment**.

The **Add Comment** page appears.

5. In the **ADD COMMENT** box, enter a comment for the changes you made, and select **Add**.

> 🖊 **Note:**
>
> You can modify or delete only those comments that were added by you. However, based on the site parameter, you can also update comments from other users if you have the required permissions.

# Modify Process Order Comments

You can modify the comments made to a specific process order if security allows it.

> 🖊 **Note:**
>
> You can modify or delete only those comments that were added by you.

1. Log in to Plant Applications Web Client.

2. Select ⬚.

By default, the **Open** page appears, displaying a list of process orders grouped by the associated execution path in a tabular format. You can select the **Closed** tab if you want to modify the existing comments of process orders that are in the completed status.

3. From the **Actions** column, select ⠿ for a required process order.

4. From the menu, select **Comment**.

   The **Add Comment** page appears.

5. Select ✎ for an existing comment.

   The **Add Comment** box appears, displaying the current comment.

6. Modify the comment, and then select **Save**.

   The changes to the comment are saved.

# Delete Process Order Comments

You can delete the comments made to a specific Process Order if security allows it.

> 📝 **Note:**
>
> You can modify or delete only those comments that were added by you. However, based on the site parameter, you can also update comments from other users if you have the required permissions.

1. Log in to Plant Applications Web Client.

2. Select ⚎.

   By default, the **Open** page appears, displaying a list of process orders grouped by the associated execution path in a tabular format. You can select the **Closed** tab if you want to delete the existing comments of process orders that are in the completed status.

3. From the **Actions** column, select ⠿ for a required process order.

4. From the menu, select **Comment**.

   The **Add Comment** page appears.

5. Select ✕ for an existing comment.

   A confirmation message appears.

6. Select **Yes** to complete the delete action.

   The selected comment is deleted for the process order.

# Modify a Process Order Status

1. Log in to Plant Applications Web Client.

2. Select ⚎.

By default, the **Open** page appears, displaying a list of process orders. You can select the **Closed** tab if you want to change the status of process orders that are in the completed status.

3. From the **Actions** column, select ⬦ for a required process order.

    Based on the current status of the process order, you can perform any of the following actions:

    - If the current Status is **Pending**, then you can either select Next or Planning based on the valid transition states configured for the execution path to which the process order belong.
    - If the current Status **Next**, then you can select Active or Pending based on the valid transition states configured for the execution path to which the process order belong.

    > ✏️ **Note:**
    >
    > Activating a process order makes it the current running process order that product quantities, process order run times, and process order statistics are applied to.

    - If the current Status **Active**, then you can select Complete or Pending based on the valid transition states configured for the execution path to which the process order belong.

    > ✏️ **Note:**
    >
    > For a given execution path, you can have only one process order that is in active or next state. Completing an **Active** process order allows a different process order to be activated. If another process order has a status of **Next**, it will automatically become the Active process order when the current Active process order is moved to **Complete**.

4. **Optional:** Alternatively, you can change the status of a process order from the Process Order Details page.

    In the Process Order Details page, select ⋮ and then select the required status from the available options.

## Sequence a Process Order

By default, process orders are sorted by schedule status, then implied sequence (descending), and then forecast start date. In the **Open** page, a selected process order that is in pending status can be moved up or down one row on the path it is bound to (switching places with the process order above or below it).

1. Log in to Plant Applications Web Client.
2. Select ▤.

By default, the **Open** page appears, displaying a list of process orders grouped by the associated execution path in a tabular format.

3. From the **Actions** column, select ↑ or ↓ for a required process order that is in the pending status to move up or down one row on the path it is bound to.

# Specify Consumption of BOM Items for a Production Event

- To consume a lot, you must have the **Consume raw material** permission. If you do not have the permission to perform this task, request your administrator to provide the permission using Security. For more information, refer to Create a Role *(on page 291)*.

Consuming a lot represents the process of utilizing a BOM item within a process order. As an operator, you can access the **BOM Details** section in the Process Orders application to consume the lots for a production event, while executing a process order.

> **Note:**
> Although, the **BOM Details** tab is a standard tab; it is not visible by default in the **Process Order** application. To view it in the **Process Order** application, in the **Configuration** application's **Standard Tab**, you must switch **BOM Details** to show. For more information on how to show or hide tabs, refer to Show or Hide Tabs *(on page 303)*.

You can consume serial/lot in the following two methods as needed:

- **Consume exact serial/lot number**: If you already know the exact serial/lot that needs to be consumed, you can enter that serial/ lot and the quantity to consume, and then consume.

  > **Note:**
  > If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming an Exact Serial/Lot Number *(on page 485)*.

- **Search for a lot and consume (Partial search)**: If you do not know the exact serial/lot that needs to be consumed and/or if you want to consume from multiple serials/lots of a same BOM item, you can search for the complete or the partial name of the serial/lot. The serials/lots that match the searched string will be listed, and you can enter the quantity to consume for all those serials/lots as needed, and then consume.

> **Note:**
> If the lot number that you have entered does not exist in Plant Applications, a window appears, asking you whether you want to create the lot number. If that happens, enter the quantity to create and consume, and then select **Yes**. For more information, refer to Create a Lot *(on page 489)*.

> **Note:**
> If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming Serial/Lot using Partial Search *(on page 487)*.

1. Log in to Plant Applications Web Client.
2. Select ▤.

   By default, the **Open** page appears, displaying a list of process orders grouped by the associated execution path in a tabular format.
3. From the table, select a process order.

   The **Process Order Details** page appears. In the left panel, you can view the process order that you have selected, along with remaining process orders grouped by their execution paths. In the right panel, you can view the high-level statistics of the process order that you have selected, along with the other details that are segregated under the **Statistics**, **BOM**, **Properties** and **History** sections.

   > **Note:**
   > If you have defined the custom tab(s) in the **Configuration** application, the associated custom tab details appear.

4. Select **BOM Details**.

   By default, the production events and all the BOM formulation details associated with the selected process order appear.
5. In **Production Event List**, select a production event as needed.

   The BOM item details for the selected production event appears.
6. Select a BOM item whose consumption you want to specify.

   A window appears, providing information on the required quantity of the BOM item, and the quantity that has been already consumed for the serial/lot.

> **ⓘ Tip:**
>
> You can access the consumption history of the BOM items in the **Consumption History** section.

7. Search for a **Serial/Lot#**:

   - If you already know the exact serial/lot that needs to be consumed, in the **SCAN SERIAL/ LOT#** box, enter the exact serial/lot of the BOM item.

   - If you do not know the exact serial/lot that needs to be consumed and/or if you want to consume from multiple serials/lots of a same BOM item, in the **SCAN SERIAL/LOT#**, enter the complete or the partial **Serial/Lot#** of the BOM item that you want to consume, and then select 🔍.

   > **✎ Note:**
   >
   > If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming Serial/Lot using Partial Search *(on page 487)*.

   - To search for a serial/lot by using a barcode, select 📷, and then scan the barcode of the serial/lot associated with the BOM item. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes. In iPad, you can use 📷 only in the Safari browser.

   > **✎ Note:**
   >
   > ◦ The search result of the **SCAN SERIAL/LOT#** box is not case-sensitive.
   > ◦ For an exact serial/lot search and consumption, the Available: <quantity_of_parts> message displays the quantity of BOM items available in the lot for consumption. If the required quantity of the BOM items specified in the REQUIRED QTY box is less than or equal to the quantity available in the lot, the Available: <quantity_of_parts> message appears in grey, else the message appears in red.

   If you entered a specific serial/lot, you can enter the quantity to consume, and then select **Consume** as mentioned in the steps 8 and 9.

> **Note:**
> If the entered serial/lot is invalid for any reason, you will be notified with an appropriate error message, as described in Error Messages while Consuming an Exact Serial/Lot Number *(on page 485)*.

If you searched for multiple serials/lots for a BOM item, a list of serials/lots appears.

The following table provides information on each column in the **Consumption History** section.

| Column | Description |
| --- | --- |
| **SERIAL/LOT#** | The serial/lot of the raw material. If you have searched for a serial/lot with a partial name, all the serials/lots that match the partial name appear. |
| **AVAILABLE QTY** | The available quantity of the serial/lot. |
| **QTY TO CONSUME** | Box to enter the quantity of consumption of the BOM item. |
| **STORAGE UNIT** | The unit currently storing the selected product. |
| **DATE/TIME** | Storage date/time of the serial/lot. By default, the date/time results are sorted in chronological order. |

8. In the **QTY TO CONSUME** box, enter the quantity of consumption of the BOM item.
   - If you entered the exact serial/lot, then enter the quantity to consume in the **QTY TO CONSUME** box for that serial/lot number.
   - If you searched for multiple serials/lots for a BOM item, in the **Consumption History** section, in the **QTY TO CONSUME** boxes next to the serial/lot numbers, enter the quantity to consume as needed.

> **Note:**
> If the lot number that you have entered does not exist in Plant Applications, a window appears, asking you whether you want to create the lot number. If that happens, enter the quantity to create and consume, and then select **Yes**. For more information, refer to Create a Lot *(on page 489)*.

9. Select **Consume**.

   An entry for the consumption of the material is added to the table in the **Consumption History** section. In case you consume more than one lot for a process order, the number of entries in the **Consumption History** section depends on the number of lots that are consumed. After an entry is created in the **Consumption History** section, you cannot cancel the consumption of the BOM item. If there are any issues in the **Consumption History** section, contact your Administrator.

10. **Optional:** Select the <part number> links in the page displaying BOM item details to navigate to the previous and next BOM items in a sequential order of the BOM items.

11. **Optional:** In the **JUMP TO BOM ITEM** box, specify the part number that you want to locate and then press Enter. You must enter the complete part number in the search box and the Unit Operations application displays only the BOM item that contains the search text. Alternatively, to search for a BOM item by using a barcode, select ⬚, and then scan for the barcode of the BOM item. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes. In iPad, you can use ⬚ only in the Safari browser.

    The page containing the selected BOM item details appears.

The BOM items are consumed in the selected operation, and the quantity of the material consumed appears in the **CONSUMED QTY** box in the **BOM Details** section.

## Error Messages while Consuming an Exact Serial/Lot Number

This section describes the error messages that you might see while you try to consume an exact serial/lot number. For more information on consuming serial/lot, refer to the section Specify Consumption of BOM Items for a Production Event *(on page 481)*.

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| Cannot consume more than what is currently available. Current Quantity is *<value>* | The available quantity in the serial/lot is less than the quantity specified in the **QTY TO CONSUME** box. | • Consume the available current quantity from the existing serial/lot, and then consume the remaining required quantity from another serial/lot.<br>• Consume from another serial/lot that contains the quantity as needed. |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| Unit of measure of the serial/lot does not match unit of measure for required quantity. Cannot consume this serial/lot: <Serial/lot name> | UOM of the BOM Material does not match the UOM of serial/lot that you are trying to consume from. | • Consume from a different serial/lot that has the correct UOM that matches the UOM for the required quantity.<br>• If you are a Plant Apps administrator, you can configure the UOM of the serial/lot in BOM Editor. |
| This serial/lot is currently not available. Production status = *<status>*, Current quantity = *<value>*, Inventory = *<No>* | The Inventory flag is **NO** for the production status of the serial/lot that you are trying to consume from. | • Consume from a different serial/lot.<br>• If you are a Plant Apps administrator, you can configure the Inventory flag as **Yes** for the production status of the serial/lot, using **Production Status Editor** in **Plant Applications Administrator**> **Global Configuration**. |
| This serial/lot is currently not available on a valid location. Production status = *<status>* , Current quantity = *<value>*, Inventory = *<No>* | In case of process manufacturing system, the serial/lot that you are trying to consume is created on an invalid storage unit (the unit is not attached to BOM Material).<br><br>📝 **Note:**<br>In case of a process manufacturing system, for a BOM Material, a valid unit is the storage unit configured in the BOM formulation. | You must consume from the serial/lot that is created on a valid storage unit. |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| | In case of a discrete manufacturing system, as there is no storage unit restriction, you will not get this error message. Instead, you can consume from the serial/lot. | |
| This serial/lot is currently not available. Production status = *<status>*, Current quantity = *<value>*, Inventory = *<Yes/No>*, Not a valid status on the location | In case of a process manufacturing system, the production status of the serial/lot that you are trying to consume is not listed in the valid status list for the raw material input configuration.<br><br>In case of a discrete manufacturing system, as there is no storage unit restriction, you will not get this error message. Instead, you can consume from the serial/lot. | • Consume from a different serial/lot.<br>• If you are a Plant Apps administrator, you can do any of the following:<br>  ◦ Add the required status to the valid status list, using **Unit Properties Configuration** in **Plant Applications Administrator** > **Plant Model**.<br>  ◦ Configure the status of the serial/lot to one of the valid statuses using **Production Status Editor** in **Plant Applications Administrator** > **Global Configuration**. |

## Error Messages while Consuming Serial/Lot using Partial Search

This section describes the different error messages that you might see while you do a complete or partial string search and try to consume a single serial/lot or multiple serials/lots. For more information on consuming serial/lot, refer to the section Specify Consumption of BOM Items for a Production Event *(on page 481)*.

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| No Results Found | The serial/lot that you searched is not found due to any of the following reasons:<br><br>• The serials/lots that match the string searched are not available. However, you can create the required serial/lot. For more information, refer to Create a Lot *(on page 489)*.<br>• The material of the searched lot is different from the BOM material that is being searched for.<br>• In case of the process manufacturing system, the searched serials/lots do not belong to the defined valid unit for the process order. For a BOM Material, a valid unit is the storage unit configured in the BOM formulation.<br><br>> **Note:**<br>> In case of a discrete manufacturing system, there is no valid storage unit restriction. If the serials/lots are not there in a storage unit, it will fetch the BOM Materi- | • Try to consume from a different serial/lot. |

| Error Messages | Message Description | Corrective Actions |
| --- | --- | --- |
| | als that have the same UOM from all the other units.<br><br>• The searched serials/lots are not available for consumption, either based on the status or the quantity. | |
| Unit of measure of the serial/lot does not match unit of measure for required quantity. Cannot show serial/lot(s) : <Names of all the lots that has UOM mismatch> | UOM of the BOM Material does not match the UOM of the searched serial/lot. | • Consume from a different serial/lot that has the correct UOM that matches the UOM of the searched serial/lot.<br>• If you are a Plant Apps administrator, you can configure the UOM of the lot in BOM Editor. |

# Create a Lot

To create a lot, you must have the **Create raw material lots** permission. If you do not have the permission to perform this task, request your administrator to provide the permission using Security. For more information, refer to Create a Role .

As an operator, you can create a lot in the **BOM Details** section if the lot is not available for consumption while executing an operation.

1. Log in to Plant Applications Web Client.
2. Select ▤.

   By default, the **Open** page appears, displaying a list of process orders grouped by the associated execution path in a tabular format.
3. From the table, select a process order.

   The **Process Order Details** page appears. In the left panel, you can view the process order that you have selected along with remaining process orders grouped by their execution paths. In the right

panel, you can view the high-level statistics of the process order that you have selected along with the other details that are segregated under the **Statistics**, **BOM**, **Properties** and **History** sections.

> ✏️ **Note:**
>
> If you have defined the custom tab(s) in the **Configuration** application, the associated custom tab details appear.

4. Select **BOM Details**.

   By default, the production events and all the BOM formulation details associated to the selected process order appear.

5. Expand **Production Event List**, and then select a production event as needed.

   The BOM item details for the selected production event appears.

6. Select a BOM item whose consumption you want to specify.

   A window appears, providing information on the required quantity of the BOM item, whether consuming the BOM item is mandatory to complete the operation, and the quantity that has been already consumed for the serial/lot.

> ℹ️ **Tip:**
>
> You can access the consumption history of the BOM items in the **Consumption History** section.

7. While consuming a lot, enter the lot number of the BOM item you want to consume in the **SCAN SERIAL/LOT#** box.

8. In the **QTY TO CONSUME** box, enter the quantity of the BOM items you want to consume in the operation.

9. Select **Consume**.

   A message appears, indicating that the lot number you entered is not available in the Plant Applications database and if you want to create a lot.

10. In the **EQUIPMENT** drop-down list box, select an equipment on which you want to create the lot.

> ✏️ **Note:**
>
> A list of equipment or units appear based on your product and equipment configuration, the unit of measure (UOM) of the BOM item, and the equipment. Based on these conditions, you can do one of the following:

> ✏️ • Select one of the equipment if more than one equipment is available in the Plant Applications database.
> • By default, an equipment appears in the **EQUIPMENT** drop-down list box if there is only one equipment available in the Plant Applications database.
> • Create a lot on your current equipment if there is no equipment available in the Plant Applications database that matches with these conditions. However, you can create a lot on your current equipment only when the UOMs of your equipment and BOM item match.
>
> Else, an error message appears, indicating that the unit of measure (UOM) of the equipment does not match with the UOM of the BOM item. For more information on the error messages that you might see while creating a lot, refer to the section Error Messages while Creating a Lot *(on page 491)*.

11. In the **QTY TO CREATE** box, enter the quantity of the BOM items that you want to create on the lot.
12. Select **Yes**.

    A lot is created in the Plant Applications database and the quantity of BOM items specified are consumed from the lot created.

## Error Messages while Creating a Lot

This section describes the different error messages that you might see while you create a lot during serial/lot consumption. For more information on creating a serial/lot, refer to the section Create a Lot *(on page 489)*.

| Error Messages | Message Description | Corrective Actions |
| --- | --- | --- |
| Complete is the system default for lot creation but Inventory = *<No>* | The Inventory flag is **NO** for the **Complete** production status. | • Kindly contact your Plant Apps administrator.<br>• If you are the Plant Apps administrator, you must configure the Inventory flag to **YES** for the **Complete** production status using **Production Status Editor** in **Plant Applications Administrator> Global Configuration**. |

| Error Messages | Message Description | Corrective Actions |
|---|---|---|
| Complete is not a valid status on this location, therefore lot cannot be created here | The unit on which you are creating the serial/lot belongs to the raw material input configuration, and for that unit, **Complete** is not available in the list of valid statuses in the **Raw Material Input** configuration. | • You must create the serial/lot on a different unit.<br>• If you are a Plant Apps administrator, you must add **Complete** to the list of valid statuses using **Raw Material Inputs** configuration in **Plant Applications Administrator**, for that unit. |

# Chapter 20. Alarm Notifications

## About an Alarm Event Notification

An alarm event occurs when a variable violates an alarm condition based on alarm rules configured for the variable specification limits, such as a reject or warning limit. You configure the alarm rules for a variable in Plant Applications Administrator. The alarm events are added for any production-based, time-based, or user-defined events that include the variable for which you configured the alarm rule. The variable corresponding to the equipment selected appears in the **My Machines** page.

> ✏ **Note:**
>
> Only users with their user roles included in the Security Group assigned to the Alarm Display can access the alarm notifications. You assign the Alarm Display to a Security Group in Plant Applications Administrator.

> ✏ **Note:**
>
> The Alarm Icon  appears on the application only when **enableAlarm** property is set to true in **localconfig.json** file in Apphub. It is set to true by default.

### Alarm Conditions

Alarm conditions are based on alarm rules that compare data to product-based specification limits in real time. They are used to set alarms on critical variables where acknowledgement of a violation is required. Alarms capture key events that require an immediate action from an operator. You can also enter the cause reasons and the corrective actions based on the alarm condition.

### Access Alarm Notifications

You can access alarm notifications in the following ways in the Plant Applications Web Client:

- Float alarm notification: Appears for a short duration in the main navigation bar in the Plant Applications Web Client. These notifications appear only when an alarm event is created for a variable and the **Notifications** pane is not already displayed. You can select **Show more** in the float alarm notification window to access the **Notifications** pane. A Float alarm notification appears in the main navigation bar in the Plant Applications Web Client for the duration of time set in the **Dismiss Float Alarm Notification in** of **Settings** pane.

> **Note:**
>
> In the Activities application, you enter or modify the value of an Autolog variable value for an activity in the window displaying the Autolog sheet. If you refresh an application page and an alarm is triggered when the page is being refreshed, the float alarm notification for that alarm condition does not appear. Instead, the alarm notification appears in the **Notifications** pane only.

- **Notifications** pane: Appears when you select  in the Plant Applications Web Client. The pane lists all the new and modified unacknowledged alarms associated with a variable. In the **Notifications** pane, you can directly acknowledge a notification, or enter the cause and action reasons using the **Perform** button in the notification, and then acknowledge a notification. For more information, refer to the Acknowledge an Alarm Notification *(on page 495)* topic.

> **Note:**
>
> To acknowledge a notification, your role must have appropriate rights configured in Plant Applications Administrator.

You can also manage settings for the alarm notifications that appear in the **Notifications** pane and float notifications. For more information, refer to the Configure Alarm Notification Settings *(on page 498)* topic.

After you acknowledge all alarms in the **Notifications** pane,  is replaced with .

## Plant Applications Administrator Settings for Alarms

To access alarms in the Activities application, you configure the following settings for an Autolog variable in Plant Applications Administrator:

- Specification limits
- Alarm Template

> **Note:**
>
> You configure an Alarm Template in the **Administer Alarms** section in Plant Applications Administrator.

To access notifications, you must assign the Alarm Display to a Security Group that includes your role in Plant Applications Administrator. For more information, refer to the Proficy Plant Applications Help.

# Acknowledge an Alarm Notification

To acknowledge an alarm notification, your role must have appropriate rights configured in Plant Applications Administrator. As an operator or supervisor, you can access the **Notifications** pane to acknowledge an alarm notification.

1. Log in to the Plant Applications Web Client.
2. In the main navigation bar, select .

   The **Notifications** pane appears.

   The alarm notifications that appear in the **Notifications** pane are displayed based on the scenarios described in the following table.

| Scenario | Alarm Notification Behavior |
|---|---|
| When the variable value violates an alarm condition for the first time. | • A new alarm event is added for the alarm condition and the notification for the alarm condition is added to the **Notifications** pane.<br>• The time when the alarm was added appears in the Start field. The date and time is displayed in the format is mm/dd hh:mm (Example: 09/29 09:20) or dd/mm hh:mm (Example: 29/09 09:20) based on the localization settings. When you hover over the date and time, the complete date and time appears on the tool tip in the format mm/dd/yyyy hh:mm:ss or dd/mm/yyyy hh:mm:ss based on the localization settings.<br>• The End field appears blank for the open alarm. |
| When the variable value is within the specification limits for all current and past events. | The alarm event is deleted for the alarm condition, and the alarm notification is removed from the **Notifications** pane. |
| When the variable value is modified to be within the specification limits for an event. However, any past or current events still include variable value violating the alarm condition. | The time when the variable value was modified to be within the specification limits for an event appears in the End field. The date and time is displayed in the format is mm/dd hh:mm (Ex- |

| Scenario | Alarm Notification Behavior |
|---|---|
| | ample: 09/29 09:20) or dd/mm hh:mm (Example: 29/09 09:20) based on the localization settings. When you hover over the date and time, the complete date and time appears on the tool tip in the format mm/dd/yyyy hh:mm:ss or dd/mm/yyyy hh:mm:ss based on the localization settings.The number of batches for which the alarm notification is still unacknowledged also appears. |
| When a closed alarm event is reopened because the variable value was modified to a value that violates the alarm condition. | • The closed alarm event is reopened for the alarm condition and the notification for the alarm condition appears in the **Notifications** pane.<br>• The time when the alarm was added initially appears in the **Start time** option. The date and time is displayed in the format is mm/dd hh:mm (Example: 09/29 09:20) or dd/mm hh:mm (Example: 29/09 09:20) based on the localization settings. When you hover over the date and time, the complete date and time appears on the tool tip in the format mm/dd/yyyy hh:mm:ss or dd/mm/yyyy hh:mm:ss based on the localization settings.<br>• The **End time** option value appears blank for the open alarm. |

In the **Notifications** pane, the priority is indicated by the numeric color-coded indicators described in the following table.

| Indicator | Description |
|---|---|
|  | A high priority alarm. |
|  | A medium priority alarm. |

| Indicator | Description |
|---|---|
|  | A low priority alarm. |

3. In a notification, select **Show More**.

   A detailed view of the notification appears, displaying a sparkline (a line chart without axes or coordinates) between the two dash lines that indicate upper and lower reject or warning limits of the variable value as configured in the alarm template. If there is a product change associated with the variable, the dash lines appear modified, indicating the upper and lower reject or warning limits of the variable value for the new product.

   By default, the sparkline plots a line graph based on the variable values trending four hours before and after the variable value on which the alarm was created. The actual variable value on which the alarm was triggered is indicated by a red dot.

   > ✏️ **Note:**
   >
   > You set the duration of the time range for the variable value in the `BorderDuration` site parameter for Alarms in Plant Applications Administrator. By default, the value of the `BorderDuration` site parameter is set to 240 minutes.

   > ℹ️ **Tip:**
   >
   > In the **Notifications** pane, select **Expand All** to access the detailed view of all notifications. You can then select **Collapse All** to go back to the summary view of all notifications.

4. Select **Perform** to enter cause and action reasons if configured in the Alarm Template in Plant Applications Administrator.

   The **Perform** button appears only when the Alarm Template is configured to enter the cause and action reasons for acknowledging the alarm notification.

   The **Edit Alarm** window appears.

5. In the **CAUSE REASONS** section, select **Add reasons**, and then select a reason and associated subreasons, as applicable, for the cause of the alarm notification.

   > ✏️ **Note:**
   >
   > The values in this section are populated based on the cause reason tree you configure for the alarm in Plant Applications Administrator.

6. In the **ADD COMMENTS** section, select **Add comment** to enter a new comment for the specified cause reason or to modify or delete any comments entered earlier for the alarm notification. You can delete or modify only those comments that were added by you.

7. In the **Edit Alarm** window, select the **Actions** tab.

8. In the **ACTIONS REASONS** section, select a corrective action for the cause of the alarm notification. The values in this section are populated based on the action reason tree you configure for the alarm in Plant Applications Administrator.

9. In the **ADD COMMENTS** section, select **Add comment** to enter a new comment for the specified action reason or to modify or delete any comments entered earlier for the alarm notification. You can delete or modify only those comments that were added by you.

10. Select the **ACKNOWLEDGE** check box to acknowledge the notification.

> **Note:**
> The **ACKNOWLEDGE** check box is enabled only when you have entered the appropriate cause and action reasons for the alarm notification.

> **Tip:**
> Alternatively, you can skip this step and select **Acknowledge** for the alarm notification in the **Notifications** pane to acknowledge the notification later.

11. **Optional:** Select **Acknowledge All** in the **Notifications** pane to acknowledge all notifications at once.
    Only those alarm notifications for which your role has appropriate rights are acknowledged.

The acknowledged notification is removed from the **Notifications** pane.

## Configure Alarm Notification Settings

1. Log in to the Plant Applications Web Client.

2. In the main navigation bar, select .
   The **Notifications** pane appears.

3. In the **Notifications** pane, select .
   The **Settings** pane appears.

> **ⓘ Tip:**
>
> To navigate back to the **Notifications** pane, select ⟨ .

In the **Settings** pane, you can configure the options as described in the following table.

| Option | Description |
|---|---|
| **Sort Notifications by** | Select one of the following options to decide the order in which alarm notifications appear in the **Notifications** pane: <br><br>• **Priority**: Select to access alarm notifications sorted by decreasing order of alarm priorities; that is, high priority alarms appear first, followed by medium priority alarms, and then low priority alarms. <br><br> **Note:** You set priority of an alarm notification in the alarm template in Plant Applications Administrator. <br><br>• **Time Received**: Select to access alarm notifications sorted chronologically by the date (and time) when they were received; that is, any new alarm notification will appear first. <br><br> **Note:** By default, the alarm notifications are sorted by time received. |

| Option | Description |
|---|---|
| **View Alarms By** | Select one of the following options to view alarms only in the selected time range option, product, or process order:<br><br>• **Current Shift**: Select to access all alarm notifications associated with activities in the ongoing shift.<br><br>> 📝 **Note:**<br>> By default, this option is selected.<br><br>• **Current and Previous Shift**: Select to access all alarm notifications associated with activities in the ongoing shift and from the shift prior to the current shift.<br>• **Current Day**: Select to access all alarm notifications associated with activities on the current Production Day.<br><br>> 📝 **Note:**<br>> If shifts are not configured, this option is selected by default.<br><br>• **Current and Previous Day**: Select to access all alarm notifications associated with activities on the current Production Day and from the day prior to the current Production Day.<br><br>> 📝 **Note:**<br>> The **Previous Shift** and **Current and Previous Shift** options appear only when shifts are defined for the Display in Plant Applications Administrator. |

| Option | Description |
|---|---|
| **Dismiss Float Alarm Notification in** | Enter a duration in seconds after which the float alarms notifications disappear.<br><br>✎ **Note:**<br>By default, the box value is set to 5 seconds. |
| **Until I Close Manually** | Select to close the float alarm notification window manually.<br><br>✎ **Note:**<br>If you select this check box, the **Dismiss Float Alarm Notification in** is disabled. |

ⓘ **Tip:**
To restore the default settings, select **Reset**.

4. Select **Save**.

The notification settings are saved, and the **Notifications** pane appears again.

The alarm notifications appear in the **Notifications** pane according to the settings you saved.

# Chapter 21. Alarms

## Introduction

An alarm is a response to one or more related events. An alarm event occurs when a variable violates an alarm condition. The alarm condition is based on alarm rules configured for the variable specification limits, such as a reject or warning limit. Alarms are configured for the following purposes:

- To document alarm conditions in addition to reasons and actions
- For real-time and historical analysis
- To expose exception-based operating procedures
- To provide quality control and dispositioning

The PA Web Client displays alarms in the Alarm View page.

The Alarms application provides a detailed list of alarms that you can view and monitor. The list includes alarms that are:

- Acknowledged
- Open
- Completed

## Access Alarm View Page

To use the **Alarm View** page, you must first configure alarms.

The **Alarm View** page is a real-time application that displays active and historical alarms on key variables.

The active alarms are displayed on the **Open** tab, and the closed and completed alarms are displayed on the **Completed** tab.

Access the Plant Applications Web Client, and then select the Alarms application icon ( ) from the left navigation bar.
The **Alarm View** page appears and displays the following fields:

- Acknowledgement status
- Comments for each alarm
- Time Range for an alarm
- Cause Reasons
- Action taken

# Alarm Conditions

Alarm conditions are based on alarm rules, which compare data to product-based specification limits in real time. They are used to set alarms on critical variables where acknowledgement of a violation is required. Alarms capture key events that require immediate action from an operator. Alarms capture causes or reasons based on the alarm location, and the corrective action that can be entered by an operator.

The Alarms application generates alarms in the following ways:

- Pop-up messages
- Audible alarms
- Color coding of cells in the displays

# Initial Grid

Based on the severity of an event, the initial grid on the **Alarm View** page shows the following types of alarms:

- High
- Medium
- Low Priority

You can perform actions and acknowledge multiple alarms in bulk. The initial grid provides these two tabs to view and monitor a detailed list of alarms:

- **Open**: Displays alarms that are in open state and might or might not be acknowledged.
- **Completed**: Displays alarms that are resolved and are in closed and completed state. It includes the time selector to view the closed alarms for a given time range.

The default fields on the initial grid are:

- Alarm Description
- Start and End Time
- Duration
- Priority
- Acknowledge Status
- Unit

Using the **Column Chooser** icon (  ), you can select group fields, sort, or filter them.

# About Adding a Comment to an Alarm

You can add a comment to an alarm for the following:

- **Reason**. Add a Reason comment from the Initial grid or the Edit page.
- **Action**. Add an Action comment from the Edit page.

# Add an Action to an Alarm

Use this procedure to add an action to an alarm.

1. From the navigation menu, select the Alarms application.

   The initial grid appears.



2. Select an alarm, and then select the **Edit** icon ( ✎ ).

   The **Edit** page appears.

3. Select the **Actions** tab, and then select **Add Actions**.

   The **Select Actions** page appears.



4. Select the required action from the list, and then select **Apply**.

   The alarm is updated with the required action.

5. On the **Edit** page, select **Save**.

# Add Reason to an Alarm

Use this procedure to add reason to an alarm.

1. From the navigation menu, select the Alarms application.

   The initial grid appears.
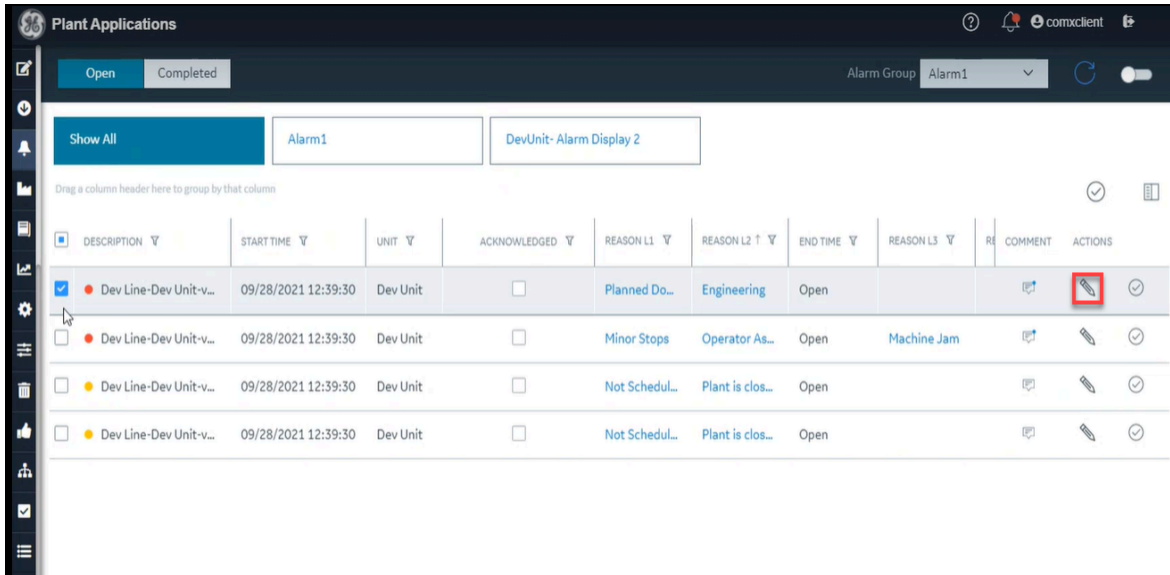
2. Select an alarm, and then select the **Edit** icon ( ✎ ).

   The **Edit** page appears.
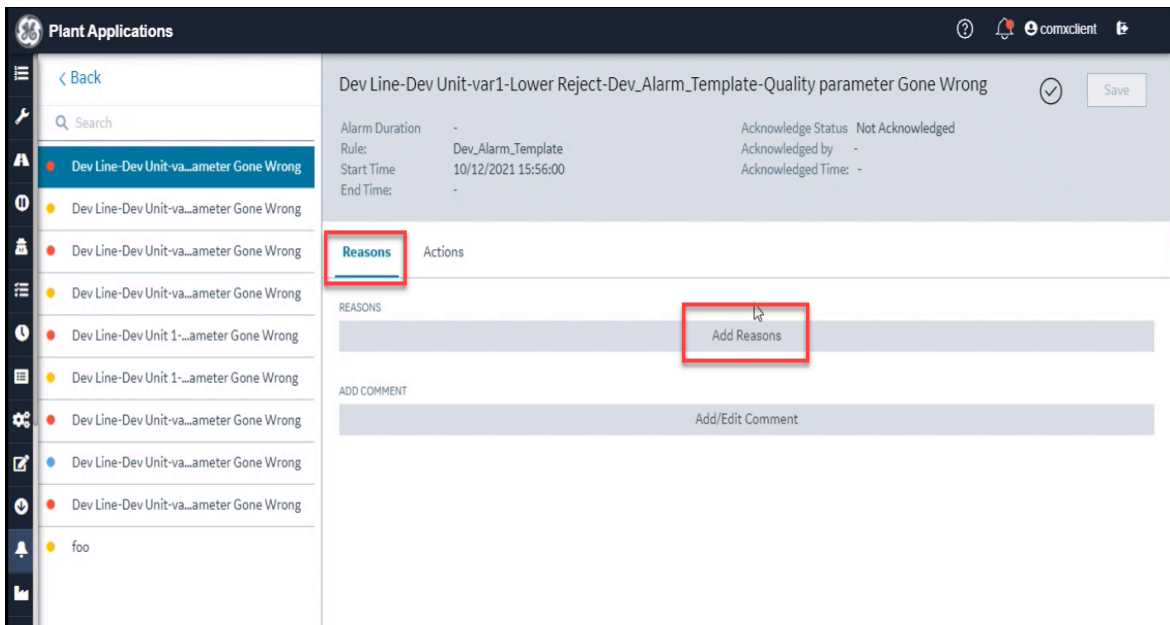


3. Select the **Reasons** tab, and then select **Add Reasons**.

   The **Select Reasons** page appears.

4. Select the required reason from the list, and then select **Apply**.

   The alarm is updated with the required reason.

5. On the **Edit** page, select **Save**.

# Add an Action Comment to an Alarm

Use this procedure to add an Action comment to an alarm using the following:

- The Initial grid
- The Comments icon

To add an action comment to an alarm, select an alarm, and then do the following:

- On the initial grid, select the **Edit** icon ( ✎ ).
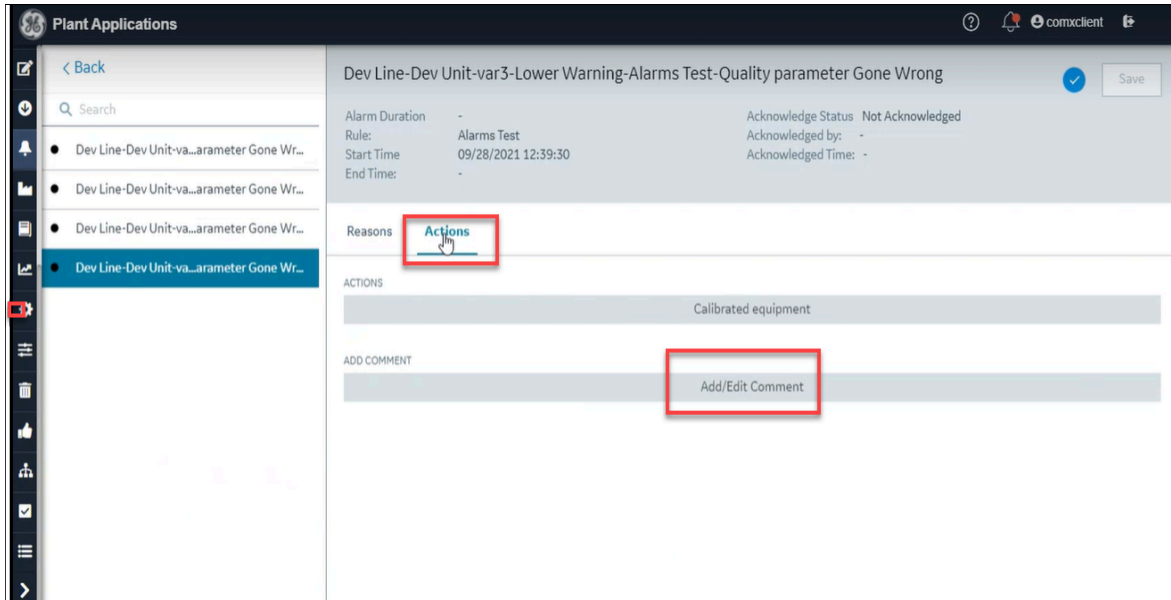
  The **Edit** page appears.

Select the **Actions** tab, and then select **Add/Edit Comment**.

An editor to add a comment appears.
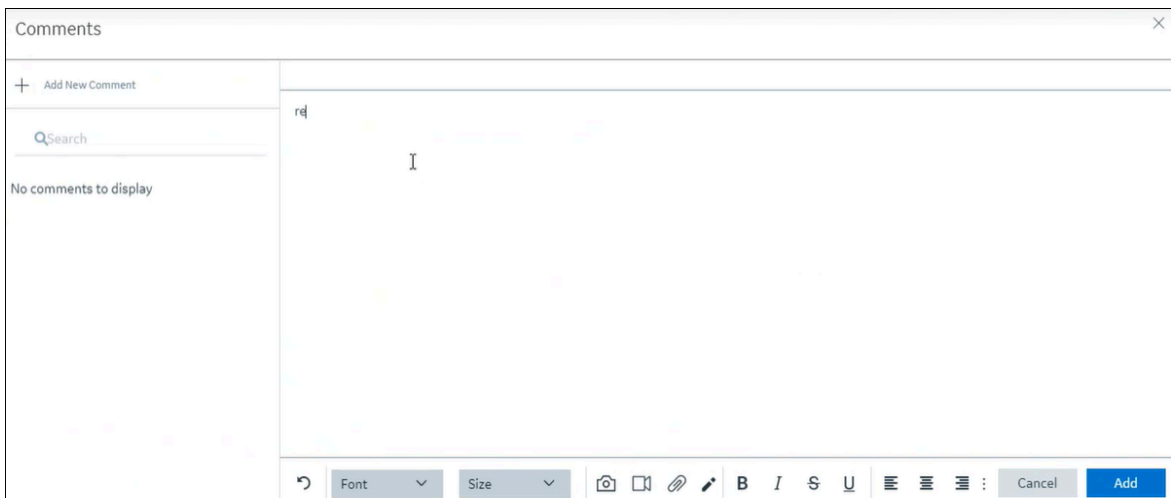


Enter your comment, and then select **Add**.

- To add an Action comment using the **Comments** icon ( ), select the icon under the **Comment** column.

  The **Comments** page appears.
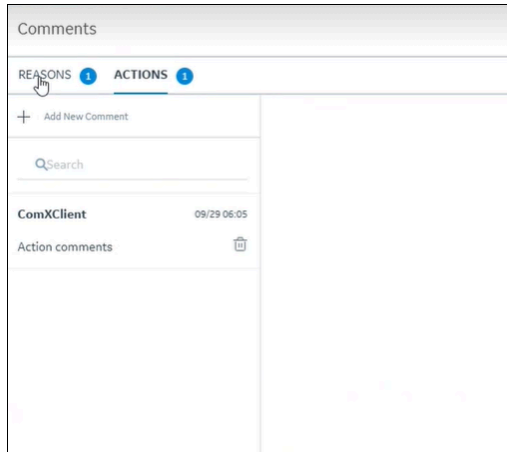
Select the **Actions** tab, and then select **Add New Comment**.

An editor to add a comment appears.
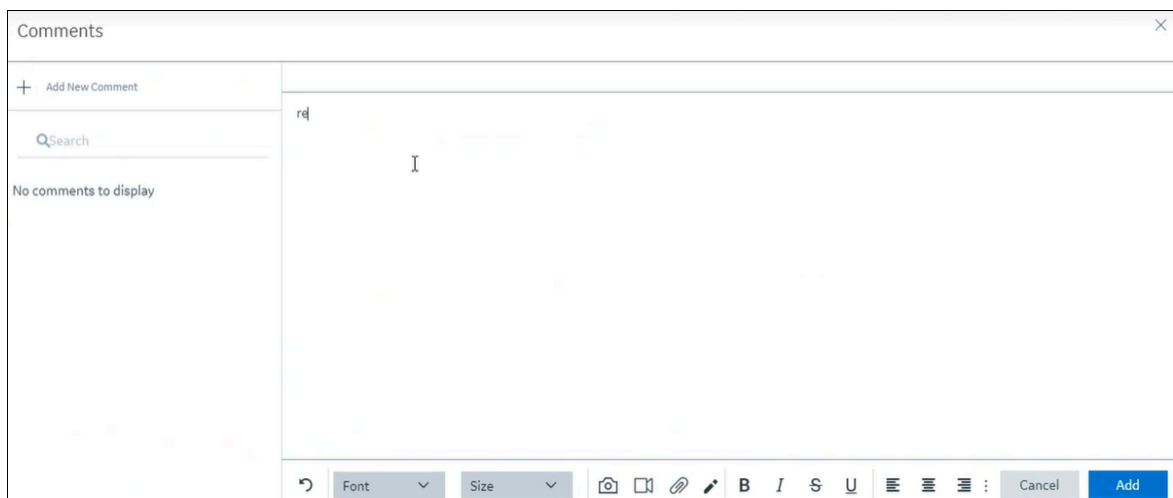


Enter your comment, and then select **Add**.

The alarm is updated with an Action comment.

# Add a Reason Comment to an Alarm

Use this procedure to add a Reason comment to an alarm using the following:

- The Initial grid
- The Comments icon

To add a Reason comment to an alarm, select an alarm, and then do the following:

- In the Initial grid, select the **Edit** icon ( ✎ ).
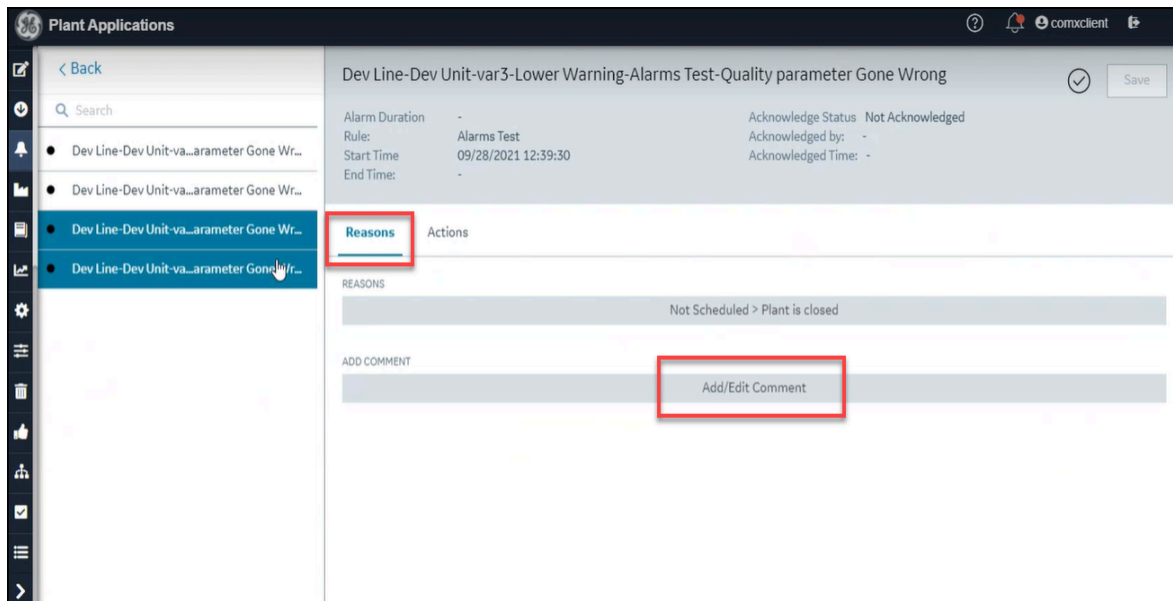
  The **Edit** page appears.



Select the **Reasons** tab, and then select **Add/Edit Comment**.

An editor to add a comment appears.
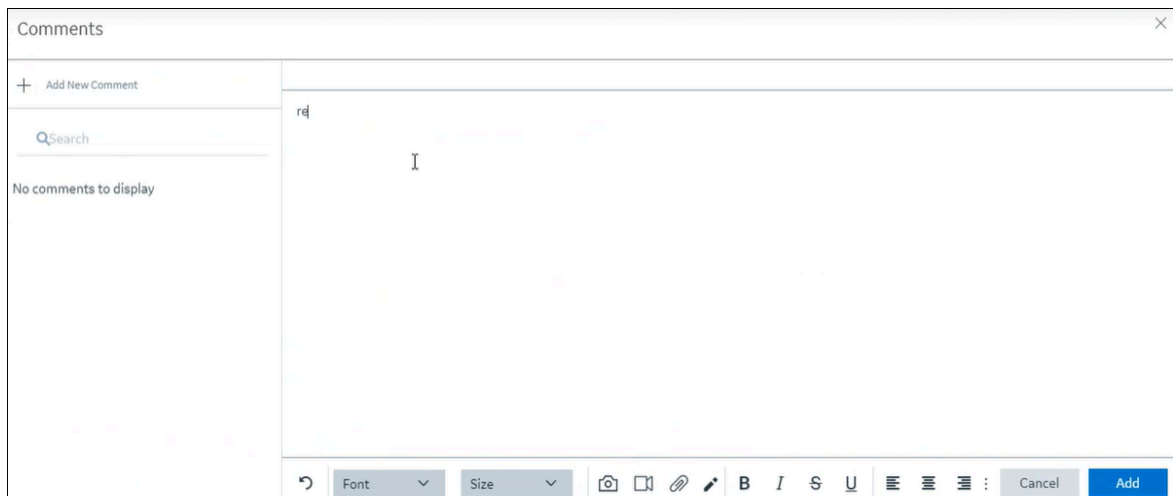


Enter your comment, and then select **Add**.

- To add a Reason comment using the **Comments** icon (  ), select the icon under the **Comments** column.

  The **Comments** page appears.
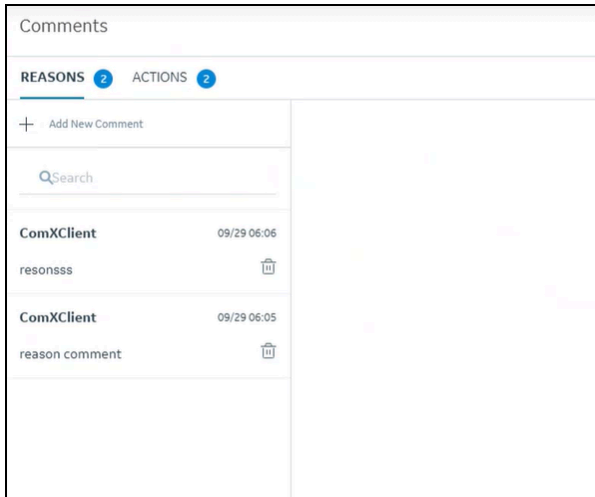
Select the **Reasons** tab, and then select **Add New Comment**.

An editor to add a comment appears.
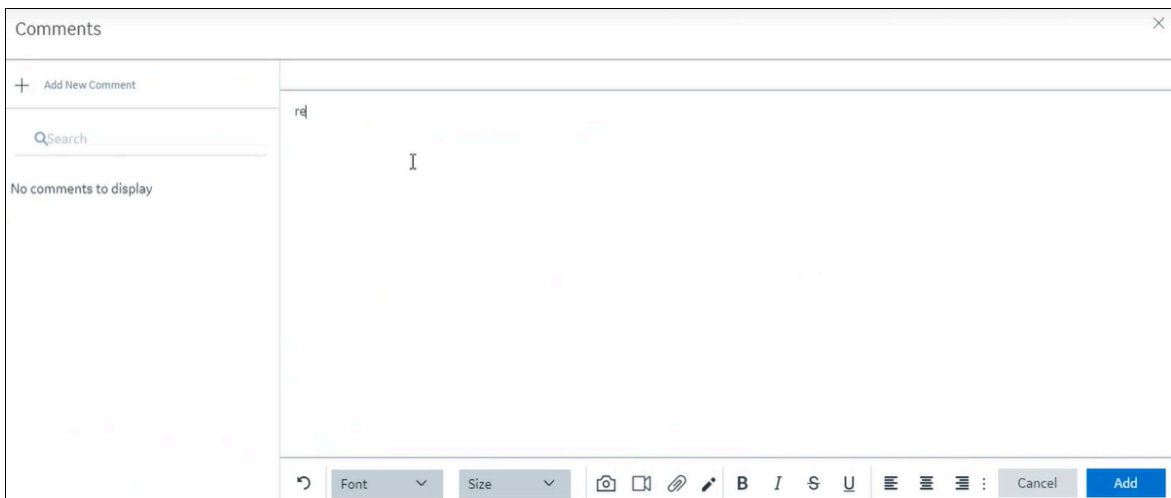


Add the required comment, and then select **Add**.

The alarm is updated with a Reason comment.

# Acknowledge an Alarm

Use this procedure to acknowledge a single alarm or multiple alarms in bulk.

To acknowledge an alarm, you must add:

- A Reason comment
- An Action comment

You can acknowledge an alarm in the following ways:

- **Initial Grid**: Use this grid to acknowledge a single alarm or multiple alarms in bulk.
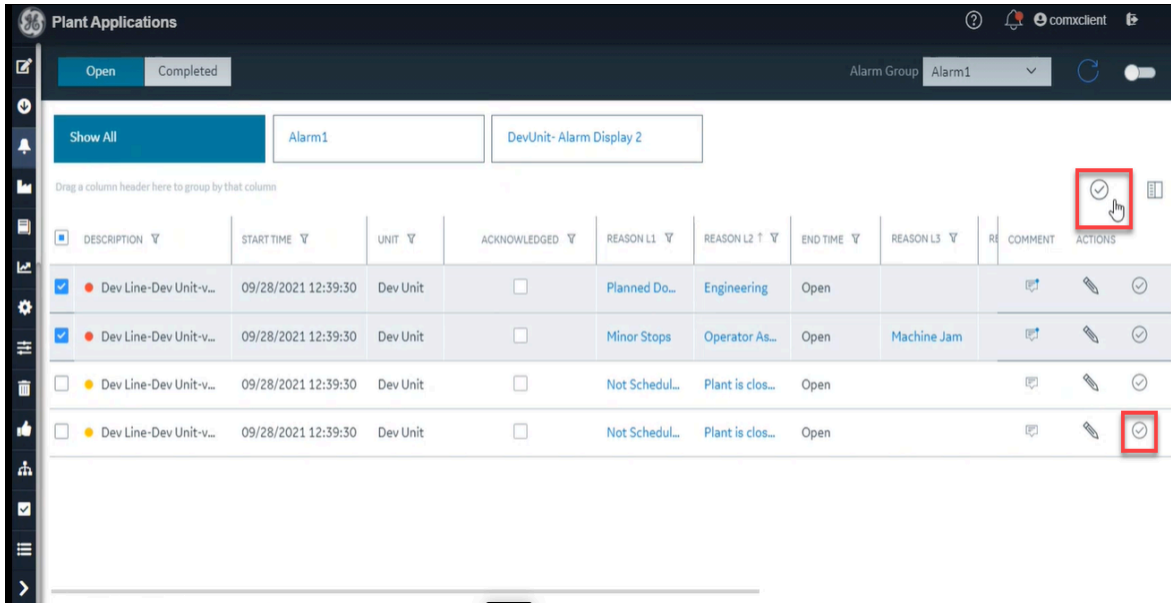


- **Edit**: Use this page to acknowledge an alarm and save it.
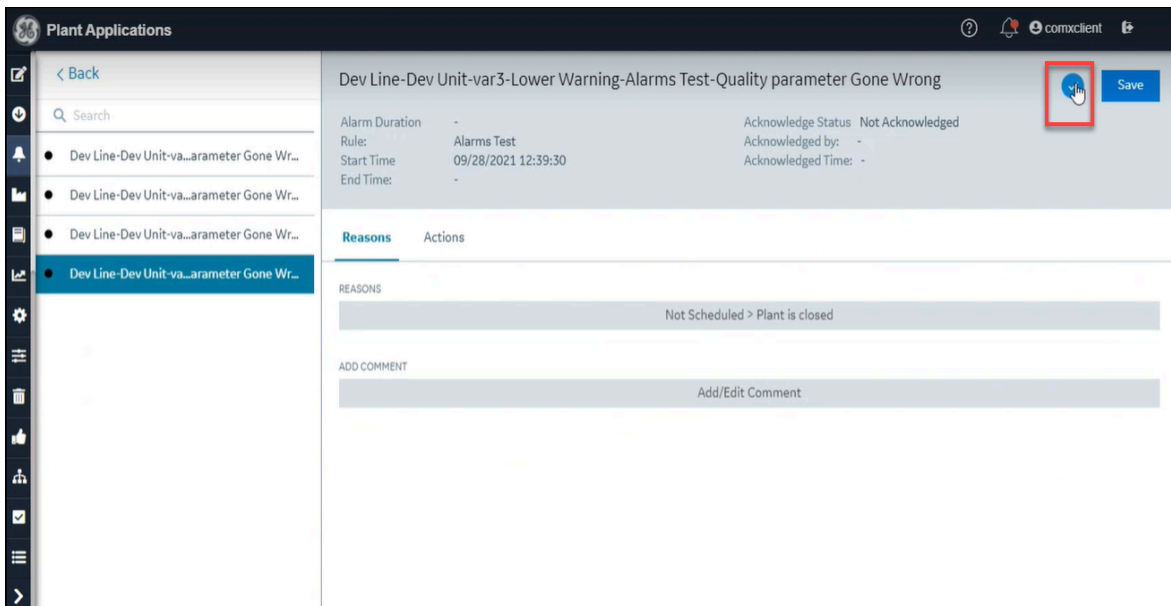


To acknowledge an alarm, do one of the following:

- On the Initial grid, select an alarm, then select the **Acknowledge** icon ( ⊘ ).
- On the Initial grid, select multiple alarms, then select the **Acknowledge all** icon.
- On the Initial grid, select the **Edit** icon ( ✎ ). The **Edit** page appears. Select the **Acknowledge** icon ( ⊘ ), and then select **Save**.

# Select an Alarm Template

Use this procedure to select alarm templates from the **Alarms Group**.

The **Alarms Group** displays a list of alarm templates. You can select and add upto five alarm templates from the list.

1. From the navigation menu, select the Alarms application.

   The Plant Applications Web Client displays the initial grid.
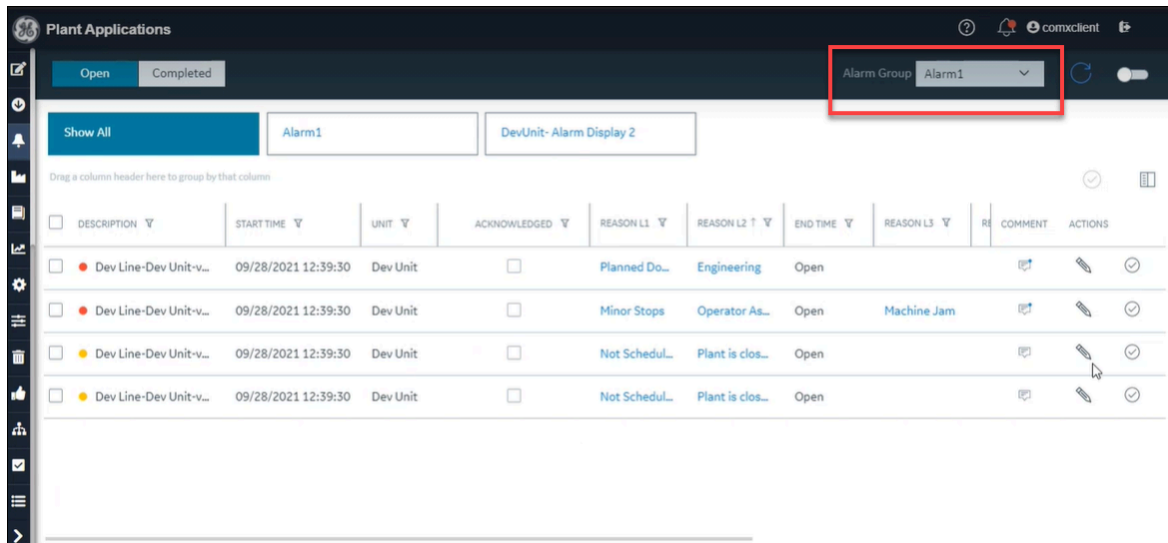


2. Select an alarm template from the **Alarms Group** list.

   The selected alarm template is added to the initial grid. When you add more than one alarm template, the previous alarm template gets disabled.

# Chapter 22. Waste

## About the Waste Application

A waste event occurs when a product is rejected or lost in a processing stream. A waste event is calculated against a location and production unit. Waste events can be associated with a production-based event or time-based event. A production event can be associated with one or more waste events. Each waste event has a calculated amount of waste and the following factors are associated with it:

- Fault: the error in the processing stream or equipment that led to generation of waste
- Reason: the reason for the fault
- Action: the corrective action taken to fix the fault

Using the Waste application an operator or supervisor to create records for a waste event and associate it with a production event.

## Configurations in Plant Applications Administrator

Before you access the Waste application in Plant Applications Web Client, the System Administrator must configure a minimum of one Waste+ display and assign a minimum of one user to that unit in Plant Applications Administrator.

> **Note:**
> You can create a waste record only to a unit that you have access to.

## Accessing Waste Event Records by Time Range

In the **View by** box, select a time range as described in the following table:

| Option | Description |
|---|---|
| Last <number> Hours | Select to access waste event records from the last <number> hours prior to the current production day. For information on how to modify this configuration, refer the topic Customise Time Duration to Refresh Data. |
| Previous Day | Select to access waste event records from the day prior to the current production day. |

| Option | Description |
|---|---|
| Current Day | Select to access waste event records from the start time until the end time of the current production day. If there are no shifts configured for the plant, this option is selected by default. |
| Previous Week | Select to access waste event records for seven days prior to the current day. |
| Next Week | Select to access waste event records for seven days after the current day. |
| Custom | Select to access waste event records within a date and time range that you can specify by using a calendar window. <br> To specify a custom date and time range in the calendar window: <br><br> 1. In the **START DATETIME** section, select a date and enter a time in the format hh:mm:ss. <br> 2. In the **END DATETIME** section, select a date and enter a time in the format hh:mm:ss <br> 3. Select **Apply**. |

## Customize Time Duration to Refresh Data

You can set the following values for the list of activities:

- The frequency of refreshing a page if left idle for certain minutes.
- The number of hours for collating and displaying the data in the grid.

1. Depending on your installation, access the `app.properties.json` file in the following folder:
    - **Enterprise installation:** `<Install Directory>/PlantApplicationsDocker/ plantapps-web-docker/mnt/configfiles/downtime-app/prod/ {{appVersion}}/<appname>.yml`
    - **Standard installation:** `<Install Directory>\config-rep\downtime-app\prod \{{appVersion}}\<appname>.yml`
2. Modify the values for the following parameters:
    - **lastNHours**
    - **refreshNMinutesDuration**

    If the **refreshNMinutesDuration** is set to five minutes and the page is idle for five minutes, the list is refreshed and the timestamp is updated accordingly.

3. Refresh Plant Applications Web Client.

The list of activities is refreshed based on the values you have specified.

# About the Waste Event Records

When you access the Waste application, based on the configurations in Plant Applications Administrator, the following columns appears in the **Events** page:

| Field | Description |
|---|---|
| VIEW BY | The production event to which the waste is associated. By default, 500 records will be displayed. As you scroll down and reach the end of the list, you can select **More** to display 500 more records.<br><br>✏️ **Note:**<br>This field is populated only for a production-based event. In case of a time-based event, this field is blank. |
| EVENT | The production event to which the waste is associated. By default, 500 records will be displayed. As you scroll down and reach the end of the list, you can select **More** to display 500 more records.<br><br>✏️ **Note:**<br>This field is populated only for a production-based event. In case of a time-based event, this field is blank. |
| CREATED ON | The date and time when the waste record was created. The date and time is displayed in the format mm/dd/yyyy or dd/mm/yyyy based on the localisation settings. |
| UPDATED ON | The date and time when the waste record was updated either by an operator a service. The date and time is displayed in the format mm/dd/yyyy or dd/mm/yyyy based on the localisation settings. |
| TYPE | The category of waste configured in Plant Applications Administrator. |
| FAULT | The error in the processing stream or equipment that led to generation of waste. |
| AMOUNT | The amount of waste that was generated for the event. |

| Field | Description |
|---|---|
| MEASURING UNIT | The unit of measurement that corresponds with the amount of generated waste. |
| LOCATION | The specific piece of equipment along a production line that caused the waste. |
| REASON | The reason selected to describe the cause of the waste.<br><br>✏️ **Note:**<br>The columns Reason 1, Reason 2,...Reason 5 refer to the top five reasons that are usually selected. |
| Action | The corrective action taken to fix the fault.<br><br>✏️ **Note:**<br>The columns Action 1, Action 2,...Action 5 refer to the top five actions that are usually selected. |
| Actions | Lists the actions that you can perform on the waste event record such as Edit, Copy, and Delete. |

# View the Details of an Event

You can access the **Events Details** report of an event by selecting an event in the Waste page. The report provides all the details relevant to the selected event in the following sections:

- Event Information
- Waste Cause Information
- Waste Variables

**Event Information**

This section displays the generic details about the waste event and consists of the following fields:

| Field | Description |
|---|---|
| Event | The production event to which the waste is associated. By default, 500 records will be displayed. As you scroll down and reach the end of the list, you can select **More** to display 500 more records. |

| Field | Description |
|---|---|
| | **Note:**<br>This field is populated only for a production-based event. In case of a time-based event, this field is blank. |
| Created On | The date and time the waste event record was created. |
| Updated On | The date and time the waste event record was updated. |
| Amount | The amount of waste that was generated for the event. |
| Units | The unit of measurement that correspond with the amount of generated waste. |
| Product | The product that was being produced. |
| Added By | The name of the service or person who created the waste event. |

## Waste Cause Information

This section displays the details of the waste that was generated and consists of the following fields:

| Field | Description |
|---|---|
| Location | The specific piece of equipment along a production line that caused the waste. |
| Fault | The error in the processing stream or equipment that led to generation of waste. |
| Type | The physical state of waste that was generated. |
| Waste Reason | The reason that describes the cause of the waste. |
| Waste Action | The corrective action taken to fix the fault that caused the waste. |

## Waste Variables

This section splits the production event into different timelines according to the amount of waste that was generated every time the production event was triggered. The final entry displays the overall waste that was generated for the entire production event.

# Creating a Waste Event

A waste event is a material loss associated with a specific production event or the loss is calculated over time.

You can create two types of events to track waste – time-based and production-based. Using the Waste app, you can:

- track the amount of waste that was generated
- identify the type of waste
- assign a reason for generation of the waste

## Creating a Production-Based Waste Event

You can track the waste that was generated for a specific production event. A production-based waste event is tagged to the event number.

1. Access the Waste page.
2. Select ✛, and select **Add Production Based Waste Event**.

    The **Add Production Based Waste Event** page opens.

    The **EVENT TIME** is the date and time of creating the waste event record.

3. Select the **UNIT** box.

    The **Select Unit** window opens listing the units.

    > 📝 **Note:**
    >
    > If the selected unit has child units, you can select the child unit and proceed with the waste event creation.

4. Select the unit as needed.
5. Select **Apply**.

    The **Select Unit** window closes. In the **UNIT** box, the selected unit is populated.

6. In the **VIEW BY** box, select the time range to retrieve the events.
7. In the **EVENT** box, select the event for which you want to create a waste record.

    > 📝 **Note:**
    > - Only the events that are associated with the selected **UNIT** are listed.
    > - By default, 500 records will be displayed. As you scroll down and reach the end of the list, you can select **More** to display 500 more records.

8. If a child unit is configured for the master unit, select it in the **LOCATION** box. If no child unit is configured, the **LOCATION** box is blank and if only one child unit is configured, it is auto-populated.

9. In the **AMOUNT** field, enter the amount of waste that was generated.

10. In the **MEASURING UNITS** box, select the unit of measurement to correspond with the amount of generated waste.

11. In the **WASTE TYPE** box, select the category of waste as configured in the waste model that you created in Plant Applications Administrator.

12. In the **FAULT** box, select the error that led to the generation of waste.

13. In the **REASON** box, the reason is auto populated based on the error selected in the **FAULT** box.

> ✏️ **Note:**
> The reasons are configured in Plant Applications Administrator.

14. In the **ACTION** box, select the corrective action that was taken to fix the fault.

15. Optional: In the **ADD COMMENT** field, enter a comment or observation, and select **Save**.

> ✏️ **Note:**
> The **Save** button will be enabled only if you enter all the mandatory fields.

## Creating a Time-Based Waste Event

You can track the waste that was generated during a specific time period. You can create a time-based waste event for future production events as well. A time-based waste event is tagged to the start time of the event.

1. Access the Waste page.

2. Select ➕ and select **Add Time Based Waste Event**.
   The **Add Time Based Waste Event** page opens.

   The **EVENT TIME** is the date and time of creating the waste event record.

3. Select the **UNIT** box.
   The **Select Unit** window appears, listing the units.

4. Select the unit as needed.

> ✏️ **Note:**
> If the selected unit has child units, you can select the child unit and proceed with the waste event creation.

5. Select **Apply**.

   The **Select Unit** window closes. In the **UNIT** box, the selected unit is populated.

6. If a child unit is configured for the master unit, select it in the **LOCATION** box. If no child unit is configured, the **LOCATION** box is blank and if only one child unit is configured, it is populated.

7. In the **AMOUNT** field, enter the amount of waste that was generated.

8. In the **MEASURING UNITS** box, select the unit of measurement to correspond with the amount of generated waste.

9. In the **WASTE TYPE** box, select the category of waste as configured in the waste model that you created in Plant Applications Administrator.

10. In the **FAULT** box, select the error that led to the generation of waste.

11. In the **REASON** box, the reason is auto populated based on the error selected in the **FAULT** box.

> ✎ **Note:**
> The reasons are configured in Plant Applications Administrator.

12. In the **ACTION** box, select the corrective action that was taken to fix the fault.

13. In the **ADD COMMENT** field, enter a comment or observation, and select **Save**.

> ✎ **Note:**
> The **Save** button will be enabled only if you enter all the mandatory fields.

# Modifying a Waste Event Record

1. Access the Waste page.

2. Select ✎ for the record you want to modify.

   The **Event Information** section appears. For more information about this section, refer View the Details of an Event.

3. Modify the required fields as needed and select **Save**.

## Copying Fault and Reason to a Waste Event Record

The System Administrator must have assigned you the required permissions to perform this task.

If you need to modify only the **Fault** and **Reasons** fields of waste records based on the entries selected for these fields in another waste record, you can copy the entries and paste it in the required records.

1. Access the Waste page.
2. Select the check boxes for the respective records to which you want to copy the fault and reason, that is, the destination records.
3. In the **Actions** section, select  on the record from which you want to copy the fault and reason, that is, the source record.
4. Select **Copy** to complete the action.

The **Fault** and **Reason** fields in the destination records displays the copied entries for the respective fields.

## Deleting a Waste Event Record

You must have the permission to delete a record. If you do not have the permission to perform this task, request your administrator to provide the permission using Security.

1. Access the Waste page.
2. Select ✕ for the waste event record you want to delete.
3. Click **OK** to delete the record.

## Analysing a Waste Event

In the Waste application, you can access the Key Performance Indicators (KPIs) and a summary of the generated waste. You can analyse the wastage that occurred for an event, and perform an analysis based on the various KPIs that are available.

1. Access the Waste page.
2. Select the **KPIs** tab.
3. In the **VIEW BY** box, select the time range for which you want to perform the analysis.

   The page displays the key performance indicators for the selected time range. The charts displayed on this page are generated by the OEE Dashboard app.

   The following KPIs are displayed:
   - OEE: Overall equipment effectiveness (OEE) is a measure of production health or status. By comparing OEE between machines or group of machines, you can identify lines or machines with production inefficiencies like waste, downtime, speed/performance loss, and production throughput that contribute to lower OEE.
   - Quality: You can review the quality rate to identify lines with high waste counts, which reduces quality and contributes to a lower OEE.

     For more information about OEE and Quality KPIs, refer OEE Dashboard.

- Waste Statistics: Two key concepts are used to derive this analysis. They are:
    ◦ Mean Amount Per Event (MAPE) which is the mean amount of waste that is generated for an event.
    ◦ Mean Amount Between Event (MABE) which is the production amount calculated between two consecutive waste event.
- Top Waste Cause: This chart displays waste events by the cause or reason associated with the generation of the waste. You can choose to view this chart by the quantity of waste generated (Quantity) or by the number of events (Count).
- Waste by Product Code: This chart displays waste events generated by product. You can choose to view this chart by the quantity of waste generated (Quantity) or by the number of events (Count).

> **Note:**
>
> These KPI metrics are based on the OEE Aggregation Store setting. If OEE Aggregation Store is set to False, the values are recalculated every time the chart is opened or refreshed. If it is set to True, the values are populated from the OEE Aggregation tables. For more information, refer to the OEE Aggregation Store topic.

# Chapter 23. Receiving Inspection

## Overview

### Overview

As a material engineer or a quality engineer, you can use the Receiving Inspection application to perform inspection on serials/lots of material received from an external source or a vendor. The serials/lots are received from an ERP application, or you can receive material lots for which you can create serial/lot numbers in Plant Applications. After you perform the inspection, you can review the results, dispose defective serials/lots (if any), and then submit the results. They then appear in the list of outbound messages of the ERP interface.

Before you begin using the Receiving Inspection application, complete the steps provided in the Sampling Engine Configuration document, which is available in the installation package. This document also contains information on the stored procedure.

### About Receivers

A receiver is an item or a package received from a vendor. Each receiver contains the serials/lots that you can assign and inspect using the Receiving Inspection application.

A receiver number is always unique. A single receiver can contain serials/lots of multiple materials. When a receiver is received, a production event is created in Plant Applications for each serial/lot in the material lot in the receiver. These production events are assigned a temporary name, which you can change based on the traceability that you want to maintain before generating samples. They are linked to the receiver via the event component (genealogy) records.

### About Periodic Inspection and Risk Release

Periodic Inspection is done by the manufacturing units on the materials supplied by a vendor (usually raw material) which undergoes receiving inspection. In periodic inspection, depending on the business objectives and requirements, one or more serial numbers or quantities of a lot can be selected from the receiver and sent for a destructive or non-destructive inspection. Based on the result of this inspection, the rest of the serial numbers or quantities from that lot is then inspected using the standard receiving inspection process.

If the periodic inspection is delayed, but the material itself is acceptable to use, the receiving inspector can inspect the other parts using the standard process, but instead of directly accepting, the inspector can raise a non-conformance for the rest of the quantity which would then be dis-positioned as risk release.

Risk release means that the part is released under certain risk criteria. If a part that is released at risk is consumed as part of the manufacturing process, the consumer is notified that the selected part is dispositioned as risk release. However, the final quality inspectors must ensure that the parts are still acceptable as per the quality standards.

You can perform the following related to periodic inspection and risk release:

- Generate samples for periodic inspection
- Add samples for the other parts that were not selected for periodic inspection and perform inspection
- Create non-conformance for the other parts that you want to inspect and submit your inspection results
- Disposition a part that belongs to the lot from which you have generated a sample for periodic inspection and risk release.

## Workflow

The following diagram describes the steps that you must perform in the Receiving Inspection application to complete an inspection and submit inspection results. In the diagram:

- The blue text represents the actions that you must perform.
- The solid lines represent the sequence of the steps you must perform.
- The dotted lines represent the artifacts that are created during the process and the associated applications.
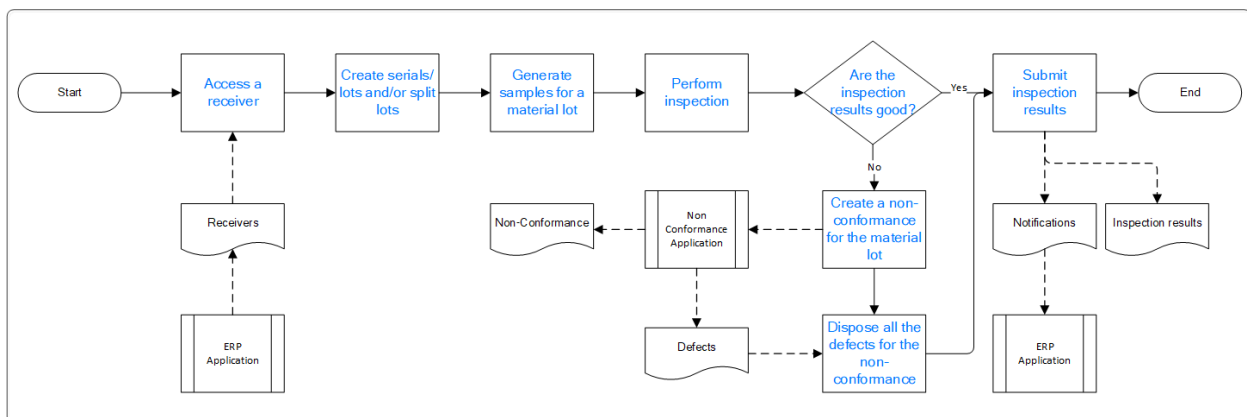
## Status Indicators of Receivers

The following table describes the inspection status indicators of a receiver.

| Status Indicator | Status | Description |
|---|---|---|
| | Open | Indicates that the receiver has been created in the ERP application and that you can create serial/lots and/or split the lots. |
| | Defined | Indicates that serials/lots for inspection have been identified and their numbers have been changed. |
| | Awaiting inspection | Indicates that samples have been generated for the material and are awaiting inspection. |
| | Inspection in progress | Indicates that inspection has begun on at least one material lot. |
| | Awaiting disposition | Indicates that the material contains a non-conformance and that the defects are yet to be disposed.<br><br>**Note:**<br>If you use unapproved supplier status, then you will see this status indicator. |
| | Inspection complete | Indicates that the inspection results have been submitted. |
| | Awaiting periodic inspection result | Indicates that the receiver is awaiting periodic inspection result. |

# Configuring Sampling Engine

## About Configuring a Sampling Engine

A sampling engine is an algorithm that generates samples on which you must perform inspection. The sampling engine determines the sample size depending on the number of items in material lots. This configuration is mandatory to perform inspection using the Receiving Inspection application.

To configure a sampling engine, perform the following steps in Plant Applications Administrator.

| Step Number | Description | Notes |
|---|---|---|
| 1 | Configure Global and Product Settings *(on page 529)*. | This step is required to create the appropriate production or user-defined events. After you perform this step, events will be available for the subsequent steps, and you can create products. This step is performed during the initial setup. We recommend that you take the support of your local implementation team to perform these steps correctly. |
| 2 | Configure Plant Model *(on page 533)*. | This step is required to create the department, line, or unit associated with the material lots on which you will perform inspection using Receiving Inspection. In this step, you will specify the appropriate events and status transitions for a unit. It is performed during the initial set up or when there is a material with a new UOM that you want to add to Plant Applications. |
| 3 | Create Quality Variable Groups and Variables *(on | This step is required to create or update quality variables used in Receiving Inspection. Ideally, this step is performed when you set up materials, create department, line, or units, or when quality variables change. You can categorize these variables into groups, and they can be of any datatype. These groups are then used as target specifications on product characteristics. The sampling engine then creates these variables. |

| Step Number | Description | Notes |
|---|---|---|
| | *page 536)*. | |
| 4 | Set Up New Materials for Receiving Inspection *(on page 536)*. | This step is required to ensure that the sampling engine calculation is properly set up with the stored procedure, and that all inputs are defined. It is performed when a material is added to Plant Applications. A system administrator or a super user at the site can perform this procedure.<br><br>When a new part is created in Plant Applications (either directly or through an external interface), you must perform a basic set up to use Receiving Inspection. |
| 5 | Configure Sampling Engine Calculation *(on page )*. | This step is required. It is performed during the initial setup. We recommend that you take the support of your local implementation team to ensure that these steps are performed correctly. |
| 6 | Configure Property Definition *(on page 539)*. | This step is required to set default values to the properties used while importing material lots from an ERP application. |

## Configure Global and Product Settings

1. Access Plant Applications Administrator.
2. Create a production event sub-type named Receiver. This event must have UOM defined as "Lot" which is available from the list.
3. Create a user-defined event sub-type named Inspection Sample. Select the Require Selection Of Event Duration check box when you so do.

> ✏️ **Note:**
>
> The name of the event sub-type is case-sensitive and must be Inspection Sample only.



4. Create an engineering unit record for every unit of measurement (UOM) associated with the material lots that you want to inspect.
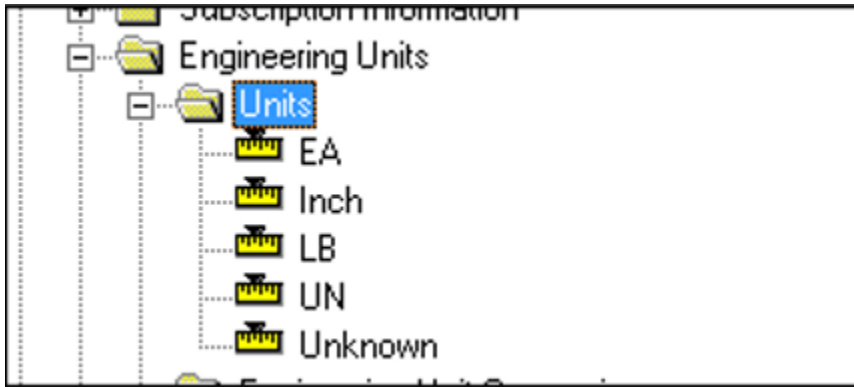
5. Create a new production event sub-type named Received Material Lot-<UOM> for every UOM that you have created. Configure these new event sub-types to use the appropriate UOM. Ensure that the name of the receiver UOM matches the UOM selected from the list. If the UOM is not listed, follow Step 4 to add it.
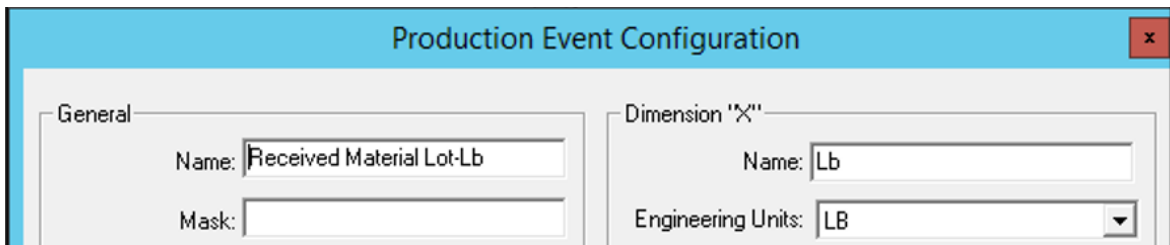


6. Create a product family named Receiving and Inspection.

> **Note:**
> If there are no products in the system, create at least one serialized and one non-serialized product.

7. Create a product property named Receiving and Inspection, and configure it to create the characteristics on the Receiving and Inspection product family.
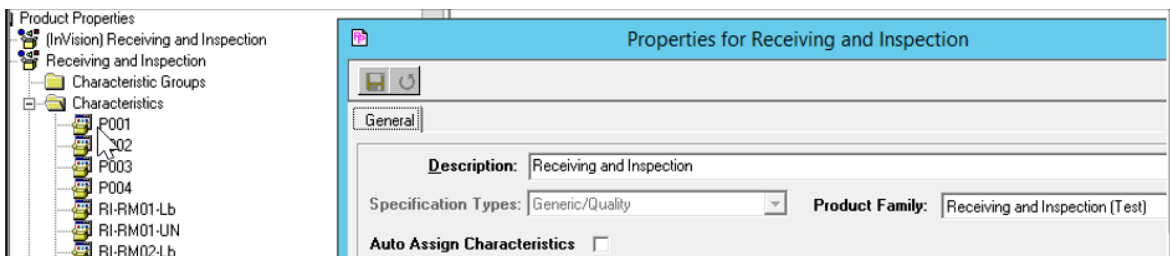


8. Create a characteristic for every material that you want to inspect using the Receiving Inspection product property.
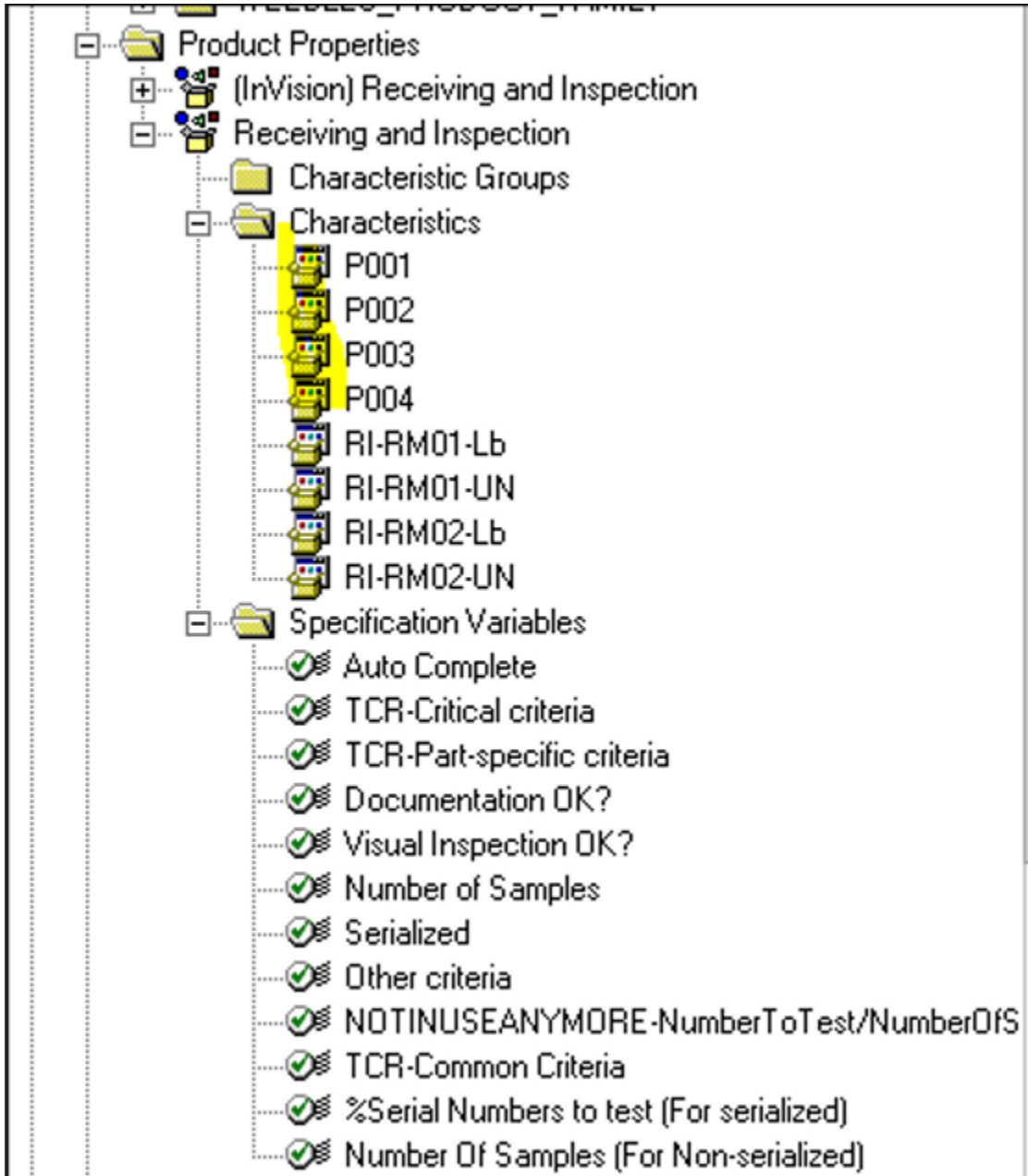
9. Make sure that every inspected material under the Receiving and Inspection family has the default characteristic for the Receiving Inspection product property set to a characteristic that matches the product code.
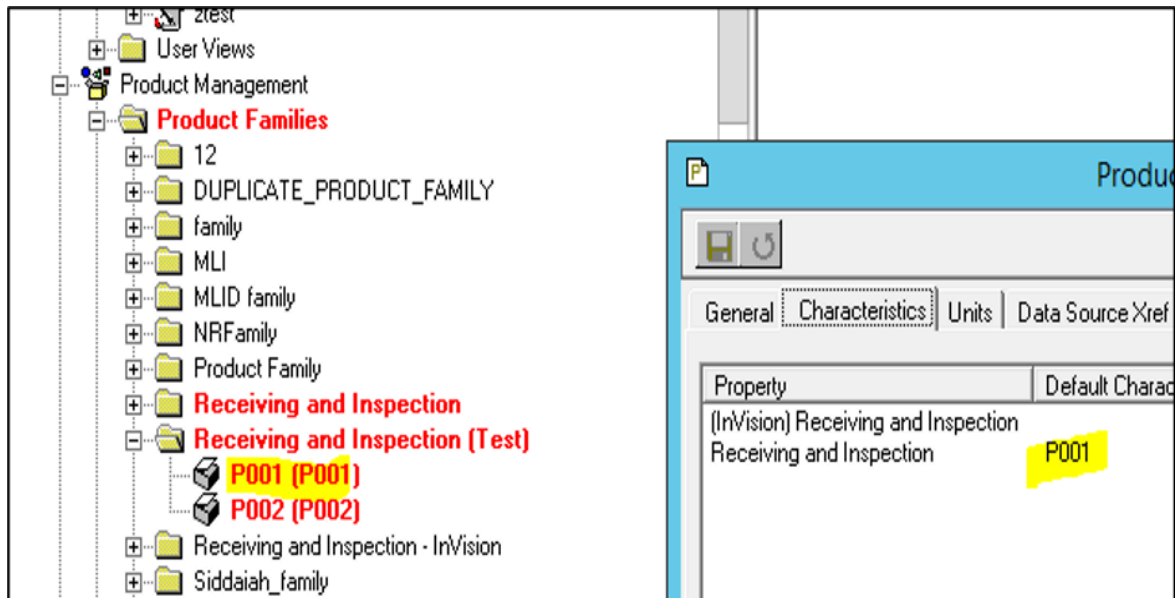
10. Create the following specification variables under the Receiving and Inspection product property:

| Specification | Data Type | Description |
| --- | --- | --- |
| Auto Complete | Logical | If set to true, the sampling engine will not create any tests, and you can access Inspection Results to complete material lots. |
| TCR-Critical Criteria | String | The name of the variable group the sampling engine will use to generate tests marked as critical. |
| TCR-Part-specific Criteria | String | The name of the variable group the sampling engine will use to generate tests marked as part-specific. |
| TCR-Common Criteria | String | The name of the variable group the sampling engine will use to generate tests marked as common. |
| %Samples to test (for Non-Serialized products) | Float | The percentage of lot quantity to be tested. For example, |

| Specification | Data Type | Description |
|---|---|---|
| | | if the value is 10%, and the received material lot has 50 lots, then five samples will be generated. |
| %Serial Numbers to test (For Serialized products) | Float | The percentage of lot quantity to be tested. |

11. Enter the target specifications for all characteristics for the specification variables that you have created.

## Configure Plant Model

This task is usually performed during the initial set up or when there is a material with a new UoM that you want to add to Plant Applications.

1. Access Plant Applications Administrator.
2. Create a department named Receiving and Inspection.
3. Create a production line named Received Material Lots in the department. This is the default name. If you want to change it, you must also change the property name in Property Definition (in the ERP App category, MaterialLot Import group).
4. Create a production unit named Receiver in the production line to handle Receiving Inspection tasks, and configure an inactive production event model for the Receiver sub-type on this production unit.
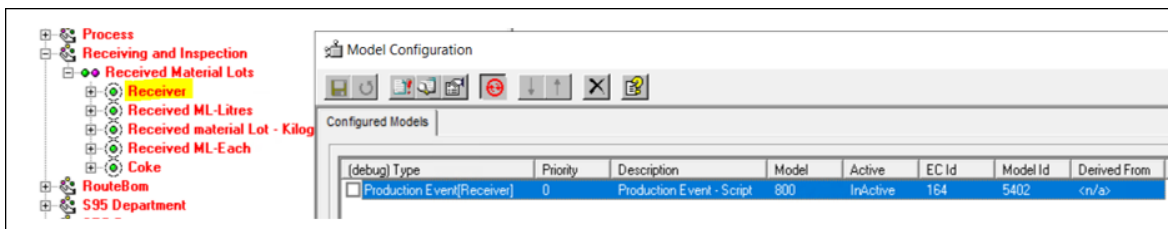


5. Create a production unit named Received Material Lots-<UOM> in the production line for every UOM used by materials that you want to inspect.
6. Create an inactive production event model for the correct Received Material Lot-<UOM> event sub-type on these production units.
7. Create an inactive user-defined event model using the Inspection Sample event sub-type on these production units.
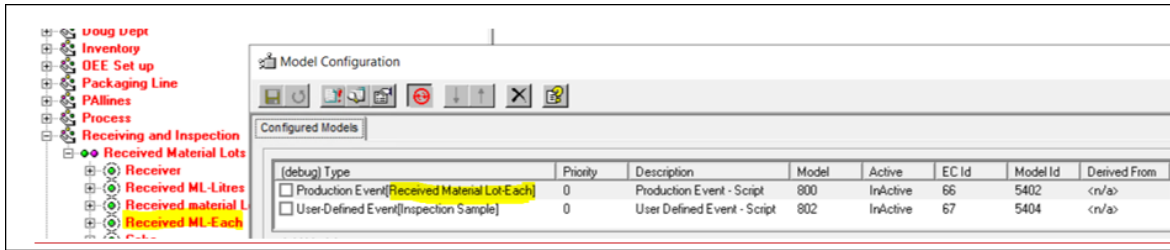
8. Ensure that the inspected materials for a given UOM are associated with the Received Material Lots production unit configured for the same UOM. You can specify the unit using Plant Applications Administrator or import a material master import document (MMID) during ERP integration.

9. For the organization codes that you want to use with external systems (such as an ERP application), add the values in the Extended Information field in the **Edit <production unit name>** window.

10. In the **Production Statuses** section, ensure that the check boxes for the statuses related to Receiving Inspection are selected. In addition, set the Unassigned status as the default one.

11. Set the valid transitions for "Receiver" unit as described in the following table.

| Status | Valid Transitions |
|---|---|
| Receiver Complete | None |
| Defined | Waiting Inspection |
| Inspection in Progress | • Receiver Complete<br>• Pending MRB/NCR |
| Open | Defined |
| Pending MRB/NCR | Receiver Complete |
| Waiting Inspection | Inspection in Progress |

12. Set the valid transitions for units where the lots are created as described in the following table.

| Status | Valid Transitions |
|---|---|
| Accept | None |
| DIT | None |
| MRB/NCR | • Accept<br>• DIT<br>• RTV<br>• Scrap |

| Status | Valid Transitions |
|---|---|
|  | • Open<br>• Periodic Inspection<br>• Risk Release |
| Open | • Accept<br>• MRB/NCR |
| RTV | None |
| Scrap | None |
| Unassigned | Open |
| Periodic Inspection | None |
| Risk Release | None |

13. Create a variable group for the Receiver production unit called "Calculations".

14. In this variable group, create a variable named Material ID with the following specifications:

   • Data source: Autolog

   • Event type: Production Event

   • Subtype: Receiver

   • Data type: Integer

15. Create a variable group for each Received Material Lots (<UOM>) production unit called "Sampling Engine".

16. In this variable group, create a variable named AutoGeneratedSample with the following specifications:

   • Data source: Autolog

   • Event type: User-Defined Event

   • Subtype: Inspection Sample

   • Data type: Logical

> **Note:**
>
> In order to generate samples, set the parameter **ClearAppliedProductIfSame** (found in **Administer Site Parameters**) to `False`.

## Create Quality Variable Groups and Variables

This procedure is usually performed when setting up materials or when quality variables change.

1. Create a variable group for each Received Material Lots (<UOM>) production unit.
2. In each variable group, create a variable named AutoGeneratedSample with the following specifications:
   - Data source: Autolog
   - Event type: User-Defined Event
   - Subtype: Inspection Sample
   - Data type: Logical
3. Apart from the Variable Group created in the above step, create a variable group for each test criterion used on the targets for the TCR* specification variables for every Received Material Lots (<UOM>) production unit. Normally, these criteria can be classified as common or product-specific.
4. Create an autolog variable for every test that is part of each test criterion under the appropriate variable group. You must create multiple variables if the same test is performed under multiple test criteria. These variables must be UDE-based for the Inspection Sample event sub-type.
5. If needed, enter central or unit specifications for these variables.
6. In **Variable Alias**, enter the alias name for the variable. The alias name helps in better understandability of the variable type.

   > ✎ **Note:**
   > In the Receiving Inspection application, to view the **Variable Alias** field instead of the **Variable Name** field, in the app properties **YML** file, you must set `DisplayVariableAlias` as **True**.

7. Create specification limits for the variable. If you do so, in the Receiving Inspection application, when you enter a value that is not in the specification limits, the background color changes.

   > ✎ **Note:**
   > The Receiving Inspection application does not validate values for variables of string data types. It validates the target specification for variables of all the other data types.

## Set Up New Materials for Receiving Inspection

This procedure is usually performed when a new material is added to Plant Applications. A system administrator or a super user at the site can perform this procedure. When a part is created in Plant

Applications (either directly or through an external interface), you must perform a basic set up to use Receiving Inspection.

1. If the UOM of the material that you want to add does not exist in Plant Applications, perform the following steps:

   > ℹ️ **Tip:**
   > To check if the UoM of the material exists, select **Global Configuration > Engineering Units > Units**.

   a. Create an engineering record for every unit of measurement (UOM) associated with the material lots that you want to inspect.

   b. Create a new production event sub-type named Received Material Lot-<UOM> for every UOM that you have created. Configure these new event sub-types to use the appropriate UOM.

   c. Create a product family with a name appropriate for your business (e.g., Receiving and Inspection).

   d. Create a product property named Receiving and Inspection, and configure it to create the characteristics on the Receiving and Inspection product family.

   e. Create a characteristic for every material that you want to inspect using the Receiving and Inspection product property.
   A product for the characteristic will be created.

   f. Make sure that every inspected material under the Receiving and Inspection family has the default characteristic for the Receiving and Inspection product property set to a characteristic that matches the product code.

   g. If this is a first-time set up, create the following specification variables under the Receiving and Inspection product property:
      - Auto Complete (logical)
      - TCR-Critical Criteria (string)
      - TCR-Part-specific Criteria (string)
      - TCR-Common Criteria (string)
      - %Serial Numbers to test (For Serialized)
      - %Samples to test (Integer) (For Non-Serialized)

h. Enter the target specifications for all characteristics for the specification variables that you have created.

i. Configure the plant model *(on page 533)*.

j. As needed, create quality variable groups and variables *(on page 536)*.

2. If the UoM of the material that you want to add exists but does not have the corresponding production unit, perform the following steps:

> **ⓘ Tip:**
> To check if the production unit for the UOM exists, select **Plant Model > \<Receiving Inspection Department> > \<Receiving Inspection Line>**).

a. Configure the plant model *(on page 533)*.

b. Create a characteristic for every material that you want to inspect using the Receiving and Inspection product property.
A product for the characteristic will be created.

c. Make sure that every inspected material under the Receiving and Inspection family has the default characteristic for the Receiving and Inspection product property set to a characteristic that matches the product code.

d. Enter the target specifications for all characteristics for the specification variables that you have created.

e. As needed, create quality variable groups and variables *(on page 536)*.

3. If the material that you want to add has UOM and a corresponding unit:

a. Create a characteristic for every material that you want to inspect using the Receiving and Inspection product property.
A product for the characteristic will be created.

b. Make sure that every inspected material under the Receiving and Inspection family has the default characteristic for the Receiving and Inspection product property set to a characteristic that matches the product code.

c. Enter the target specifications for all characteristics for the specification variables that you have created.

d. As needed, create quality variable groups and variables *(on page 536)*.

## Configure Property Definition

1. Access the Property Definition application in Plant Applications Web Client.
2. In the ERP App category, MaterialLot Import group, set the default values for the following properties:

| Name | Default Value |
|---|---|
| Receiver Line | Received Material Lots |
| Receiver Unit | Receiver |
| Inventory Line | Received Material Lots |
| Receiver Status | No Value. <br><br> **Note:** <br><br> All receivers are created in Plant Applications by default in the "Open" status while using the ERP interface. If the user wants to change the default status to something different the user can add a valid status existing in Plant Applications for the property "Receiver Status" (shown above) in the Property Definition Application. If alternately the Receiver Status in specified in the ERP Material Lot Import Document which comes from an external system, that will always take the precedence. |

> ✏️ **Note:**
>
> The receiver line is where the receivers are created, and the inventory line is where the material lots within that receiver is created. If you want to configure the material lots within the receiver line itself, then you must set up the inventory line similar to the receiver line.
>
> If you want to configure the material lot under a different line, then you must ensure that the unit where this needs to be created has the appropriate user defined events and production events. For more information, refer to Configure Plant Model *(on page 533)* .

3. If you want to include any custom properties while importing material lots from an ERP system, create them. For information, refer to the ERP Integration Guide.

# Generating Samples for Inspection

## About Generating Samples for an Inspection

For each material in a receiver, you must generate samples on which you will perform an inspection. On each sample, you will perform the tests that you have identified for the inspection.

The size of a sample is calculated automatically using the Plant Applications sampling engine. For each sample, a user-defined event is created and linked to the associated production event.

To generate a sample:

1. Configure the sampling engine, which is used to generate samples. For instructions, refer to the Sampling Engine Configuration document provided with the installation package.
2. Access the receiver that you want to inspect *(on page 541)*.
3. Generate a sample for a serialized *(on page 542)* or a non-serialized *(on page 544)* material.

When you generate samples for a non-serialized material, you can choose to split the lot if you want to perform different types of tests on different samples. For example, for a material lot containing 100 leaf springs, you can choose to perform stress test on one sample and endurance test on another sample.

## Access a Receiver

- In Plant Applications Web Client, in the Property Definition application:
  - Create a property definition named OrgCode under the Erp App category and the MaterialLot Import group.
  - Create property definitions for all the additional properties of a receiver (such as shelf life, heat code, date code) under the Receiving Inspection category and the Additional Details group.

  For instructions on creating a property definition, refer to About Creating a Property Definition *(on page 280)*.
- In Plant Applications Administrator, define the values for the OrgCode property for each unit. To do so, access the unit's properties, and enter the values in the **Extended Information** field.

You can import a material lot from an ERP application only if:

- The Material Lot Import Document (MLID) contains the required properties. For a sample MLID, refer to the ERP Integration Guide.
- The value of the OrgCode property matches one of the values that you have defined in Plant Applications Administrator.
- The units of measure and the OrgCode combination for a material lot is unique.

1. Access Plant Applications Web Client.
2. In the left pane, select **Receiving Inspection**.

   The Receiving Inspection page appears, displaying the **Open** section.
3. If you want to access a closed receiver, select **Closed**.
4. In the **Enter Receiver# or Material** box in the left section, enter the receiver or the material number.

   > ⓘ **Tip:**
   > You can enter any three consecutive characters in the name for the search results to appear.

   A list of receivers that match the search criteria appear, along with the status *(on page 526)* and materials in each receiver.
5. Select the material for which you want to generate samples.

   The **Edit Traceability** section appears.

Generate samples for a serialized *(on page 542)* or non-serialized *(on page 544)* material.

## Access Receiver and Material Properties

1. Access Plant Applications Web Client.

2. In the left pane, select .

   The Receiving Inspection page appears, displaying the **Open** section.

3. If you want to access the properties of a closed receiver or its material, select **Closed**.

4. In the **Enter Receiver# or Material** box in the left section, enter the receiver or the material number.

   > **ⓘ Tip:**
   >
   > You can enter any three consecutive characters in the name for the search results to appear.

   A list of receivers that match the search criteria appear, along with the status *(on page 526)* and materials in each receiver.

5. In the upper-right corner of the page, select .

   The **Additional Properties** window appears, listing all the properties of the receiver and the material.

## Generate Samples for a Serialized Material

Access the receiver *(on page 541)* for which you want to generate samples. You can generate samples only for a material lot for which inspection tests are defined in Plant Applications Administrator (indicated by ).

1. In the left pane, under the receiver, select the material for which you want to generate samples.

   The **Edit Traceability** section appears.

2. In the **Add** subsection, provide values as described in the following table.

| Box | Description |
| --- | --- |
| **PREFIX** | The prefix of the item's serial number. The value can be in alphanumerical format with any special characters. For example AV-. |
| **SUFFIX** | The suffix of the item's serial number. The value can be in alphanumerical format with any special characters. For example -2021. |

| Box | Description |
|---|---|
| **STARTING SERIAL** | The serial number of the first item in the material lot. This value is used to number each item in the material lot. For example, if you enter PVC Pipe 01, the items in the material lot are numbered PVC Pipe 01, PVC Pipe 02, PVC Pipe 03, and so on.<br><br>A value is required.<br><br>> **Note:**<br>> The Starting serial can be either alphabets or numbers. No special characters are allowed. |
| **SERIAL COUNT** | The total number of items in the material lot. |

> **Note:**
> The validation of duplicate serial numbers happens along with the concatenation of the string that you entered.

3. As needed, enter values in the remaining fields.
4. Select **Add to Table**.

   Serial numbers are generated for all the items in the material lot, and appear in the table in the **Edit** subsection. The fields in the **Add** subsection are disabled.
5. In the grid, perform the following:

   a. Enter a number in the **LOT NUMBERS** column.

   b. Enter the quantity in the **QTY** column.

   c. If you want to generate samples for a periodic inspection, ensure to select the check box that is available under **Periodic Inspection** column.

   > **Note:**
   > Once you select a part and its quantity for periodic inspection, you cannot change the quantity or the inspection type for that lot.

6. Select **Save**.

   Changes to the serial numbers are saved.

   > ✎ **Note:**
   >
   > You can continue to change the serial numbers until the inspection begins. After you enter the inspection criteria, you cannot change the serial numbers.

7. Select **Generate Samples**.

   Samples are generated for the serialized material lot and appear in the **Inspection Criteria** section. The size of the sample is calculated based on the size of the lot. The status of the receiver changes to awaiting inspection (indicated by  ).

Perform inspection on the samples *(on page 546)*. If needed, you can add more samples *(on page 546)*.

## Generate Samples for a Non-Serialized Material

Access the receiver *(on page 541)* for which you want to generate samples. You can generate samples only for a material lot for which inspection tests are defined in Plant Applications Administrator (indicated by  ).

1. In the left pane, under the receiver, select the material for which you want to generate samples.
   The **Edit Traceability** section appears.
2. If you do not want to split the lot:

   a. Enter a number in the **LOT NUMBERS** column.

   b. Enter the quantity in the **QTY** column.

   c. If you want to generate samples for a periodic inspection, under the **Periodic Inspection** column, ensure to select the check box and enter the quantity.

   > ✎ **Note:**
   >
   > Once you select a part and its quantity for periodic inspection, you cannot change the quantity or the inspection type for that lot.

3. If you want to split the lot:

a. In the **LOT NUMBERS** column, select ⤴.

A new row appears for the sublot. Repeat this step depending on the number of sublots you want to create.

b. For each sublot, enter a value in the **LOT NUMBERS** column. This value must be unique for the lot.

c. For each sublot, enter the quantity in the **QTY** column.

d. If you want to generate samples for a periodic inspection, under the **Periodic Inspection** column, ensure to select the check box and enter the quantity.

> ✏️ **Note:**
>
> Once you select a part and its quantity for periodic inspection, you cannot change the quantity or the inspection type for that lot.

4. As needed, enter values in the remaining fields.

5. Select **Save**.

Changes to the lot are saved.

> ✏️ **Note:**
>
> You can continue to change the lots until the inspection begins. After you enter the inspection criteria, you cannot change the lots.

6. Select **Generate Samples**.

The **Generate Samples** button is enabled only if the sum of the quantities of all the sublots is equal to the total number of items in the lot.

Samples are generated for the lot or each sublot and appear in the **Inspection Criteria** section. The size of the sample is calculated based on the size of the lot or sublot. The status of the receiver

changes to awaiting inspection (indicated by 🗄️).

## Add or Remove a Sample

Depending on the number of items in a material lot, the size of a sample is automatically calculated. If, however, you want to perform inspection on more samples, you can add more samples.

You can remove the samples that you have added. You cannot, however, remove the samples that are created automatically by the sampling engine.

1. If you want to add a sample, in the **Inspection Criteria** section, select .

   A new column is added in the table for another sample.

   > ✎ **Note:**
   >
   > If you generated a sample of certain quantity of parts for periodic inspection, you will be able to add samples only for the remaining parts that were not selected for periodic inspection. For example, if you selected one part out of five parts for a periodic inspection, you can add only four samples and perform inspection. You will not be able to perform inspection on the part that was selected for periodic inspection.

2. If you want to remove a sample that you have added, in the **Inspection Criteria** section:

   a. Place the cursor in the column for the sample that you want to remove.

   b. Select .

      A message appears, asking you to confirm that you want to remove the sample.

   c. Select **Delete**.

   The sample is removed.

# Performing an Inspection

## About Performing an Inspection

After you generate samples for a material, you must perform an inspection on them. After you begin the inspection, you cannot change the serials/lots.

The inspection results are captured in the table in the **Inspection Criteria** section. In this table:

- Each row represents a test that you must perform during the inspection. These tests are defined in Plant Applications Administrator.
- Each column represents a sample on which you must perform the inspection.

- If a value that you enter for a test does not fall within a specified range, the cell appears in a red background. When you later review the inspection results, you can create a non-conformance for the material. The acceptable limits for the range are defined in Plant Applications Administrator, and appear below the table when you place the cursor in a table cell.
- You can add a comment for each sample while performing an inspection.

## Perform an Inspection

Generate samples *(on page 540)* for the material lot on which you want to perform inspection.

1. In the **Inspection Criteria** section, the quality variables and their serial numbers are displayed in table format. To see the descriptions for the quality variables, move the **Show details** slider to the right.
2. For each test, enter the value for each sample in the corresponding cell for the quality variable and serial number. When a cell is selected, a modal will appear that shows the tolerance limits for that variable. The color of the cell will correspond to the relative value in the cell as follows:

| Cell value is in range: | Cell color: |
| --- | --- |
| Target (**T**) | White |
| User (**U**) | Green |
| Warning (**W**) | Orange |
| Reject (**R**) | Red |
| Entry (**E**) | Grey |

Use the tab key to move from sample to sample; use the enter key to move to the next quality variable.

3. For quality variables marked as common criteria (See Create Quality Variable Groups and Variables *(on page 536)*), a result entered for one serial number will be replicated for all serial numbers (as opposed to non-common criteria, for which you have to manually enter a result for each serial number).
4. If needed, you can add a sample *(on page 546)*, and perform inspection on that sample as well.
5. If needed, you can add a comment for a sample while performing the inspection.

## Add a Comment

You can compose comments with images, videos, and documents that support your comment at Receiving Inspection level, lot level, or test (quality variable) level.

Add images/videos to a comment using the camera/video option or upload them as attachments. You can copy paste images using clipboard, or drag and drop them into the rich text editor. You can also preview the image, video, and pdf file types. You can compose comments at the following three levels as needed:

- Receiving Inspection level: At this level, you can compose comments for multiple lots in Receiving Inspection.
- Lot level: At this level, you can compose comments for a specific lot.
- Test (quality variable) level: At this level, you can compose comments for a test variable that is associated to a specific lot.

1. In the **Inspection Criteria** section, in the column containing the sample (either for a lot or a lot's test variable) for which you want to add a comment, select ⋮, and then select **Add/View Comments**. Alternatively, to compose comments for multiple lots at the Receiving Inspection level, in the **Inspection Criteria** section, select .

   The **Comments** window appears, displaying a list of comments in the left section.

   > ℹ️ **Tip:**
   >
   > To modify a comment, select  and to delete a comment that you have added, select .
   >
   > The following conditions apply when you modify or delete a comment:
   > - You can modify or delete only the comments that you have added.
   > - After you modify a comment and save your changes, you cannot view the original text.
   > - After you delete a comment, you cannot restore it.

2. Select **Add New Comment**, and then enter the comment.

   > ℹ️ **Tip:**
   >
   > If needed, you can apply formatting, change the alignment of the comment, or insert a link, image, attachment, or a recording in the comment.

   You can add inline images by copy pasting from a clipboard to the Comment rich text editor.

   The maximum character limit for plain text is 7000 characters. The file size for images/videos should not exceed 25MB.

3. **Optional:** Attach documents *(on page 50)* and add images *(on page 51)*/videos *(on page 51)* to a comment.

4. Select **Add**.

    The composed comment is added.

    Once you have added the comment at the required levels, you can view them again at the same levels. To view the comments, at the respective levels, select ⬜.

## View Test History

View the test history details of all the serials/ lots in receiving inspection. You can view the test history details like under which unit and line the test was created, the current value, when it was entered, who performed the test, and who verified the test.

In the **Inspection Criteria** section, in the column containing the sample (either for a lot or a lot's test variable) for which you want to view the test history, select ⦚, and then select **Show Test History**. The **Test History Details** window appears, displaying the following test history details of the selected serial or the variable:

| Field | Description |
|---|---|
| Sheet | Name of the display sheet configured in Plant Applications. Not applicable for Receiving Inspection. |
| Variable | The quality test that was performed. |
| Production Unit | The production unit on which the lot was created. |
| Production Line | The production line one which the lot was created. |
| Records Found | The total number of changes made to this test historically. |
| Result On | The date of the latest entry. |
| Current Value | The value of the latest test. |
| Entered On | The date on which the latest entry was made. |
| Performed by | The name of the user who performed the test. |
| Verified by | The name of the user who verified the test entry while using the e-signature feature. Currently not available for Receiving Inspection. |

> **Note:**
>
> For boolean type, the value 0 denotes **Fail**, and 1 denotes **Pass**.

# Submitting Inspection Results

## About Submitting Inspection Results

After you perform an inspection, you must review the results to perform the following tasks:

- If the inspection results of a sample fall under the specified limits, accept the serial/lot.
- If the inspection results of a sample do not fall under the specified limits and/or the material is defective:

    1. Create a non-conformance for the material lot. When you do so, a defect is created for each defective serial/lot in the material lot and linked to the non-conformance. The non-conformance and the underlying defects appear in the Non Conformance application.
    2. Dispose all the defects in the non-conformance.

    > **Note:**
    >
    > You can now select multiple serials/lots and update the status simultaneously.

Only after you complete this task for all the serials/lots in a material lot, you can submit the inspection results. The inspection is marked complete (indicated by ), and it appears in the **Closed** section. You can no longer modify the inspection.

## Submit Inspection Results

Perform an inspection *(on page 547)* on all the samples of the material lot for which you want to access the inspection results.

1. Select **Inspection Results**.

   A list of serials/lots in the material lot appears.
2. You can update the status of serial/ lot in the following methods:
   - If you want to update the status of a specific serial/lot, for that serial/lot, in the **STATUS** column, select an option as needed.
   - If you want to update the status for multiple serials/lots simultaneously, select the check boxes that are available beside the required serials/ lots or to select all the serials/ lots, select the check box that is available on the table header row. Once you select the required

serials/ lots, select the suitable status from the status drop-down box that is available beside the search box.
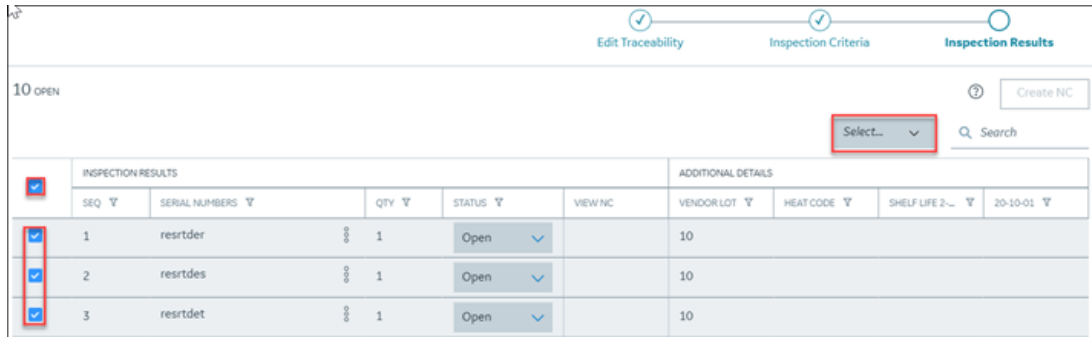


> **Note:**
> ◦ For multiple selection of serials/ lots, you can change the status only in the following sequence:
>   ▪ **Open** to **MRB/NCR** or **Accept**
>   ▪ **MRB/NCR** to **Open**
> ◦ You can only accept the serials/ lots that have all conforming tests.
> ◦ You can mark the serials/ lots that are not inspected (quality variables are not filled) as **MRB/NCR** directly.

| Option | Description |
|---|---|
| **Accept** | Select this option if you want to accept the inspection results for the serial/lot. |
| **MRB/NCR** | Select this option if the serial/lot is defective and you want to create a non-conformance. It is then available for the material review board (MRB) to dispose the defect. The status of the receiver is then indicated by ![icon]. |
| **Open** | |

The options that you have selected for each serial/lot are saved.

3. If you have accepted all the serials/lots in the material lot, select **Submit**. If, however, you want to create a non-conformance for at least one of them:

a. Select **Create NC**.

> ✎ **Note:**
>
> The **Create NC** button is enabled only if you have selected **Accept** or **MRB/NCR** in the **STATUS** column for *all* the serials/lots in the material/lot, and you have selected **MRB/NCR** for at least one of them.

The **Create Non Conformance** window appears, displaying a list of serials/lots for which you have selected **MRB/NCR** in the **STATUS** column.

b. Enter values in the available fields, and then select **Submit**.

> ✎ **Note:**
>
> If you are creating an NC for a periodic inspection part, enter that you are awaiting for the periodic inspection results.

For information on the fields, refer to Modify a Non-Conformance *(on page 87)*.
A non-conformance is created for all the defective serials/lots and appears in the Non Conformance application. A defect is created for each defective serial/lot and linked to the non-conformance. In the Receiving Inspection application, next to each serial/lot for which the defect is created, the 👁 button appears in the **VIEW** column.

c. Select 👁 in the **VIEW** column to copy the non-conformance number, and access the non-conformance *(on page 84)* in the Non Conformance application.

d. Dispose all the defects in the non-conformance *(on page 88)*.
In the Receiving Inspection application, the **STATUS** column in the **Inspection Results** section contains the disposition you have selected for each defective serial/lot.

e. Select **Complete**.

> ✎ **Note:**
>
> The **Complete** button is enabled only after you dispose all the defects in the non-conformance and you have accepted all the non-defective serials/lots in the material lot.

The inspection is complete (indicated by ). The inspection now appears in the **Closed** section. You can no longer modify the inspection results.

# Chapter 24. BOM Editor

## About BOM Editor

A Bill of Materials (interchangeably known as "BOM" or "BOM Formulation") contains BOM Formulation Items that define a list of materials and the quantity of each of these materials needed to produce a product. As an authorized user, you can use the BOM Editor to create and maintain BOM Formulations.

> **Note:**
> The following terminologies are used interchangeably regarding the BOM Editor:
>
> - Unit of Measure / UOM / Engineering Unit
> - BOM / BOM Formulation
> - Material / Product / Part

## Access a BOM

1. Log in to Plant Applications Web Client.
2. Select ▦.

   The **BOM Editor** page appears displaying the list of BOMs.
3. You can use the **Search** box to search for a BOM in the list. In the **Search** box, enter a keyword as available in a column of the list.

   Based on the entered keyword, the list is filtered for you to select the required BOM. Alternatively, you can use 🔍 to filter the list based on specific BOM name or/and selected material.
4. From the list, select the BOM for which you want to view item details.

   The **BOM** details window appears displaying the available items.

## Create a BOM Formulation

1. Log in to Plant Applications Web Client.
2. Select ▦.

   The **BOM Editor** page appears displaying the list of BOMs.
3. In the **BOM Editor** page, select ➕.

   The **Create BOM** window appears.

4. Provide values as specified in the following table.

| Field | Description |
|---|---|
| ENTER BOM NAME/DESCRIP-TION | Enter the name or a description for the new BOM formulation. |
| BOM FAMILY | Select a BOM family from the list to enable and populate the Master BOM field. |
| MASTER BOM | Select the name of the master BOM to which the new BOM formulation be-longs. |
| MATERIAL | Select the materials for which the BOM formulation will be created/available. You can select the **Select All** check box if you want to include all. |
| ENGINEERING UNITS | Select appropriate engineering units (also known as Units of Measure) for the material selected in the previous field. |
| QUANTITY PRECISION | Enter the valid number of decimal places for the value.<br><br>**Note:**<br>You can enter a precision up to 10 decimal places. |
| QUANTITY | Enter the quantity for the BOM formulation. This must follow the defined pre-cision value. |
| EFFECTIVE DATE | Using the date picker, select the effective date and time of the formulation.<br><br>**Note:**<br>You can use a BOM formulation only from its effective date. |
| EXPIRATION DATE | Select the check box to enable the date picker. Using the date picker, select the date and time at which the formulation will expire. |

5. Select **Next**.

The BOM formulation is created and opened in the **BOM** details window for you to begin adding BOM formulation items.

# Add Items to a BOM

1. Log in to Plant Applications Web Client.

2. Select ▤.

    The **BOM Editor** page appears, displaying the list of BOMs.

3. Select the BOM for which you want to view item details.

    The **Item Details** section appears, displaying the available items.

4. Select ✚ to add new items to the BOM.

    The **Add New Item** window appears.

5. In the **Enter material code** box, enter the material code, and then select **Search**.

6. Select the material code from the search filter results, and then select **Create**.

    A new entry is added to the **Item Details** section.

7. For the item you have added, provide values where appropriate as specified in the following table.

| Option | Description |
|---|---|
| SEQUENCE | The item sequence number. |
| PRODUCT CODE | The product code of the material that was selected when adding the item. |
| PROD DESC | The product description of the material that was selected when adding the item. |
| ALIAS | Enter an alias name to the item. |
| STORAGE UNIT | Select the storage unit currently storing the selected product. |
| QUANTITY PRECISION | Enter the number of decimal places to which the Quantity will be valid. <br><br> ✎ **Note:** <br> You can enter a precision up to 10 decimal places. |
| QTY | Enter the quantity of the product of the item needed for the BOM item, measured in the chosen UOM of the Item. The value must be within the decimal places entered in the quantity precision field. . |
| UOM | Select the Units of Measure (UOM - also known as Engineering Units) of the BOM formulation item. |
| UPPER TOLERANCE PRECISION | Enter the number of decimal places to which the Upper Tolerance will be valid. |

| Option | Description |
|---|---|
| | 📝 **Note:** <br><br> You can enter a precision up to 10 decimal places. |
| UPPER TOL-ERANCE | Enter the Upper Tolerance value, measured in the chosen UOM of the Item. |
| LOWER TOL-ERANCE PRECISION | Enter the number of decimal places to which the Lower Tolerance will be valid. <br><br> 📝 **Note:** <br><br> You can enter a precision up to 10 decimal places. |
| LOWER TOL-ERANCE | Enter the Lower Tolerance value, measured in the chosen UOM of the Item. |
| SCRAP FTR* | Enter the Percentage of this BOM Formulation Item that is expected to be lost during production. |

Based on your requirement, you can use ➕ again to add additional items.

8. Select **Save**.

The BOM items are added.

> ℹ️ **Tip:**
>
> Select the **< Back** link if you want to navigate from an open BOM to the BOM Editor list screen.

# Modify Items on a BOM

1. Log in to Plant Applications Web Client.
2. Select ▤.

   The **BOM Editor** page appears displaying the list of BOMs.
3. Select a BOM that you want to modify.

   The **BOM** details window appears.
4. Select the relevant BOM Formulation Item from the list.
5. Where appropriate, modify the values of any relevant columns.
6. Select **Save**.

Any change to the list of BOM Formulation Items will be saved.

7. Select the **< Back** link if you want to navigate from an open BOM to the BOM Editor list screen.

# Remove Items from a BOM

1. Log in to Plant Applications Web Client.

2. Select ▤.

   The **BOM Editor** page appears displaying the list of BOMs.

3. From the list, select the BOM for which you want to view item details.

   The **BOM** details window appears displaying the available items.

4. From the left panel, select ✕ against the item that you want to remove from the BOM.

5. Select **Save**.

   Any change to the list of BOM Formulation Items will be saved.

6. Select the **< Back** link if you want to navigate from an open BOM to the BOM Editor list screen.

# Update Expiration Date of a BOM

1. Log in to Plant Applications Web Client.

2. Select ▤.

   The **BOM Editor** page appears displaying the list of BOMs.

3. Select a BOM that you want to modify.

   The **BOM** details window appears.

4. Select ⌄ to view the details of the BOM that you have opened.

5. Select ✎ if you want to add or modify the expiration date of the BOM.

6. After updating **EXPIRATION DATE**, select **Update** to save the change.

7. Select the **< Back** link if you want to navigate from an open BOM to the BOM Editor list screen.

# Chapter 25. Genealogy

## About Genealogy

**Genealogy** is a web-based reporting application that allows you to look up the historical data of serials/lots that can be handy during a recall or an audit. In a complex manufacturing processes, the genealogy can be a facet that can cater overall serial/lot traceability.

As a supervisor or an operator, you can use the **Genealogy** application to trace or track the real-time details of any serial/lot such as current status, location, initial and current quantities, what raw materials the serial/lot consumed, where the serial/lot was used, what triggered its execution, and how did it come to be manufactured in the MES (a work order, a process order, a receiving inspection record, or a production event).

Let's take a process example about the manufacturing vats of paint. The BOM of paint is water, powder additives of bonding, and color. The same lot of powder can be used to create many vats of paint. Genealogy allows you to search for the lot of powder and find all the vats of paint that used the powder. You can also search of a specific paint and find out what lots of powder it consumed.

## Access Serial/Lot Details

1. Log in to Plant Applications Web Client.
2. Select ⛓.

   The **Genealogy** page appears allowing you enter a serial/lot number.
3. In the **Enter a Serial/Lot#** box, enter a serial/lot number for which you want to view the details.

> ℹ **Tip:**
>
> To search for an activity using a barcode, select 📷 for an option and scan for the barcode specific to the option. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes.

> ✏ **Note:**
>
> In an iPad, you can use 📷 only in the Safari browser.

Select .

An entry with the entered serial/lot number in the left side panel appears and associated details appear in the right panel.

> ✎ **Note:**
> If the entered serial/lot number has associated serial/lots or events, you can expand by selecting the arrow icon to view the hierarchy of raw consumption. You can select any specific serial/lot to view its details in the right panel. The following table provides the header details of the selected serial/lot. However, the source details of the serial/lot and where it has been used can be viewed in the **Source Details** (source details) and **Used in** tabs respectively.

| Label | Description |
|---|---|
| **Sl/ lot#** | The serial/lot for which you want to access the details. |
| **Ma- terial** | The material of the serial/lot. |
| **Ma- terial Desc** | The material description of the serial/lot. |
| **Sta- tus** | The status of the serial/lot. |
| **Ma- terial Fam- ily** | The material family of the serial/lot. |
| **Loca- tion** | Specifies the location of the serial/lot. |
| **Initial Qty** | The initial number of items in the serial/lot. |
| **Cur- rent Qty** | The current number of items that are useable and available quantity of the serial/lot after consumption. |

| Label | Description |
|---|---|
| | **Note:**<br>The current quantity differs from initial quantity if quantity of the serial/lot is consumed through the manufacturing processing of a different material, some quantity of the lot was scrapped, or so on. |
| ← | Select if you want to collapse the side panel. |
| ↻ | Select to refresh the selected serial/lot in the left panel and associated details in the right panel. |

4. By default, the tab (**Source Details** ) that displays the related Work Order, Process Order, Receiver, or Production Event details is selected.

> **Note:**
> **Source Details** is replaced with Work Order, Process Order, Receiver, or Production Event based on the source of that serial/lot's manufacturing)

5. Select the **Used in** tab to view where the serial/lot was used.

The following details appear displaying all the associated serial/lots that consumed some quantity of the serial/lot selected in the left panel.

> **Note:**
> You can drill into details about the individual serials/lots that are consumed for the selected serial/lot and add the associated serial/lot to the left panel navigation to review its details such as raw material consumption, status, source, and used in serials/lots. If you want to view associated serial/lot details, select the ＋ icon from the **ACTION** column to add the required serial/lot to the queue in the left panel.

| Column | Description |
|---|---|
| **STATUS** | The status of the serial/lots. |
| **SL/LOT** | The target serial/lot identifier that consumed some portion of the selected serial/lot from the left panel. |
| **MATERIAL** | The material name, family, and description. |

| Column | Description |
|---|---|
| QUANTITY | The initial, current, and used quantities. <br><br> **Note:** <br> The **USED** quantity is the quantity that was consumed from the selected serial/lot in the left panel by the produced material. However, the **INITIAL** and **CURRENT** are the line item quantities of the raw material. <br><br> For example, consider a Bike as a produced material. It has a crankset assembly as a raw material with initial quantity 10. This implies that the current quantity is also 10. Now, when the Bike consumes a crankset assembly, the current quantity of crankset assembly becomes 9. <br><br> Select the crankset assembly in the left panel and then select the **Used in** tab, you can notice that the **USED** quantity indicates 1 as the crankset is used or consumed by the Bike (produced material). However, the **INITIAL** and **CURRENT** quantity values are that of the line item (individual rows) quantities of the serial/lot and not that of crankset serial/lot. |
| LOCATION | The location of the serial/lots. |
| ACTION | • ✛ : Select to list the details of the respective serial/lot separately. Selecting this creates an entry with the selected serial/lot along with its status color indicator in the left panel. |

**Note:**
If you have added a serial/lot to the left panel queue that is a product of a split serial/lot as a result of discrete execution, you can view the BOM consumption tree that indicates the produced material and the produced material consumption records.

6. Select the **Graph** tab for a graphical view of the serial/lot relationships of the manufacturing lifecycle. Select a box from the left panel queue, or within a graph, to make it the central item in the graph (surrounded by a blue box outline). Details indicated within the box are:

- the current status of the item (in the top right corner)

-  the material code of the serial/lot

-  the current location of the serial/lot

To the left of the selected serial/lot will be a list of the materials, by serial/lot, that were consumed (or nothing if it is a raw material); to the right will be the materials, by serial/lot, that used the selected serial/lot (or nothing if it is the finished product).

The arrows between the boxes indicate the flow of serials/lots, identifying the quantity and unit of measure.

7. From the list of entered serial/lots in the left panel, you can use the **Enter Sl/Lot** search box to search for a specific component from the list.

8. **Optional:** If you want to remove a specific entry from the left panel queue, select the  icon. However, if you want to clear all the entries you made from the left panel, select **Clear All**.

> **Note:**
> Any changes (adding/removing/clearing entries) you make to the left panel queue will persist when you navigate away from the Genealogy page.

# About BOM Item

The bill of materials (BOM) is a list of formulation items required to manufacture a product.

Using the **Genealogy** application, you can perform the following tasks:

- Access a list of BOM items associated to a serial/lot.
- View the rollup consumption history of all the BOM items associated to a product.

To view the list of BOM items and the rollup consumption, refer to Access a BOM Item *(on page 563)*.

# Access a BOM Item

A product contains a list of parts necessary to execute an operation. As an operator, you can access the **BOM** section in the **Genealogy** application to view all the associated BOM items and their roll-up (cumulative) consumption.

1. Log in to Plant Applications Web Client.

2. Select .

The **Genealogy** page appears, listing all the serials/lots in the panel containing all the serial/lots, and listing all the associated details in the panel containing the details of serials/lots.

3. In the pane containing the list of serials/lots, select the serial/lot as needed.

   The details of the serial/lot appear in the details section.

4. Select **BOM**.

   The **BOM** section appears, displaying the BOM items associated with the selected serial/lot.

   The following table provides information on each column in the table.

| Column | Description |
|---|---|
| **ORDER** | The recommended order of consumption of the BOM item in an operation.<br><br>📝 **Note:**<br>For multiple lots, you can select the row to expand and see individual details such as SERIAL/LOT, CONSUMED QTY, USERNAME, and DATE/TIME in a new table. |
| **MATERIAL** | The material number of the BOM item. |
| **MATERIAL DESC** | The material description of the BOM item. |
| **REQ QTY** | The planned quantity of the BOM items required for the completion of the serial/lot for the operation. |
| **CONSUMED QTY** | The actual quantity of the BOM items consumed during the production. |
| **UOM** | The unit of measure (UOM) of the BOM item. |
| **SERIAL/ LOT#** | The serial/lot of the raw material that was consumed. |
| **LOWER QTY** | The lower tolerance quantity of the BOM item that can be consumed. |
| **UPPER QTY** | The upper tolerance quantity of the BOM item that can be consumed. |
| **SCRAP FACTOR** | The percentage of this BOM item that is expected to be lost during production of the formulation. For example, if 100 units of Product XYZ are required with a scrap factor of 1%, then you should have 101 units on hand when preparing to produce the product. |

| Column | Description |
|---|---|
| **STORAGE UNIT** | Unit currently storing the selected product. |

5. You can also do the following:

- Use the **Search material here** box to search for a specific serial/lot.

- Search for a serial/lot by using a barcode, select , and then scan the barcode of the serial/lot as needed. Use your device's front camera only for Barcode/QR code scanning. The application supports one-dimensional (Aztec, Data Matrix, MaxiCode, PDF417, UPC-A, UPC-E, UPC/EAN Extension) and two-dimensional (Codabar, Code 39, Code 93, Code 128, EAN-8, EAN-13, ITF, QR Code, RSS 14, RSS Expanded) types of standard codes. In iPad, you can use  only in the Safari browser.