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# The Mechanical Integrity Work Process

V3.6.0.0.0





## The Meridium APM Mechanical Integrity Work Process V3.6.0.0.0

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# About This Document

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This file is provided so that you can easily print the **Mechanical Integrity** section of the Meridium APM Help system. This document is not meant to be read electronically using the PDF. If you want to read the documentation electronically, you should use the Help system. This file is set up to facilitate double-sided printing and includes blank pages between sections so that each section will begin on an odd page and will be printed on the *front* of the page.

Because this file represents an excerpt from the Help system, parts of this document may seem incomplete outside of the Help system itself. When you read the documentation via the Help system, you will see links which serve as cross-references to other areas of the documentation. These cross-references are not available in this document.

To access the Meridium APM Help, in the Meridium APM Framework application, click the **Help** menu, and then click **Meridium APM Framework Help**.





# Documentation Conventions

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Throughout the documentation, we use various stylistic conventions that make it easier to interpret information and instructions. The following table provides a list and description of the conventions that are used throughout the Meridium APM documentation.

Convention	Description	Example
<b>Bold</b>	Identifies labels that appear on the screen. Identifies folder paths and file names when the folder path or file name is included in step-by-step instructions.	The <b>Save As</b> dialog box appears. Click <b>Cancel</b> . In the Catalog folder <b>\\Public\Meridium\Modules\Core\Queries</b> , open the query <b>Field History Records</b> .
\\	Identifies the beginning of a folder path.	The query is located in the following Catalog folder: <b>\\Public\Meridium\Modules\Core\Queries</b> .
<b>Courier New</b>	Identifies text that you must type.	Type <b>root</b> .
<>	Indicates that the data inside the angle brackets is variable.	Click <b>Expand/Collapse &lt;Record&gt;'s Children</b> , where <b>&lt;Record&gt;</b> is the ID of the selected record.

Convention	Description	Example
[ ]	Indicates that the data inside the square brackets is optional.	Type the following text: <Meridium APM Catalog Path>,[Query Parameters] ...where: <ul style="list-style-type: none"> <li>• &lt;Meridium APM Catalog Path&gt; is the Catalog path of the desired query.</li> <li>• [Query Prompt Value] is a value that you want to supply for a prompt in the query. If you do not pass in query prompt values, you will be prompted to supply them when you run the query.</li> </ul>

# Basics

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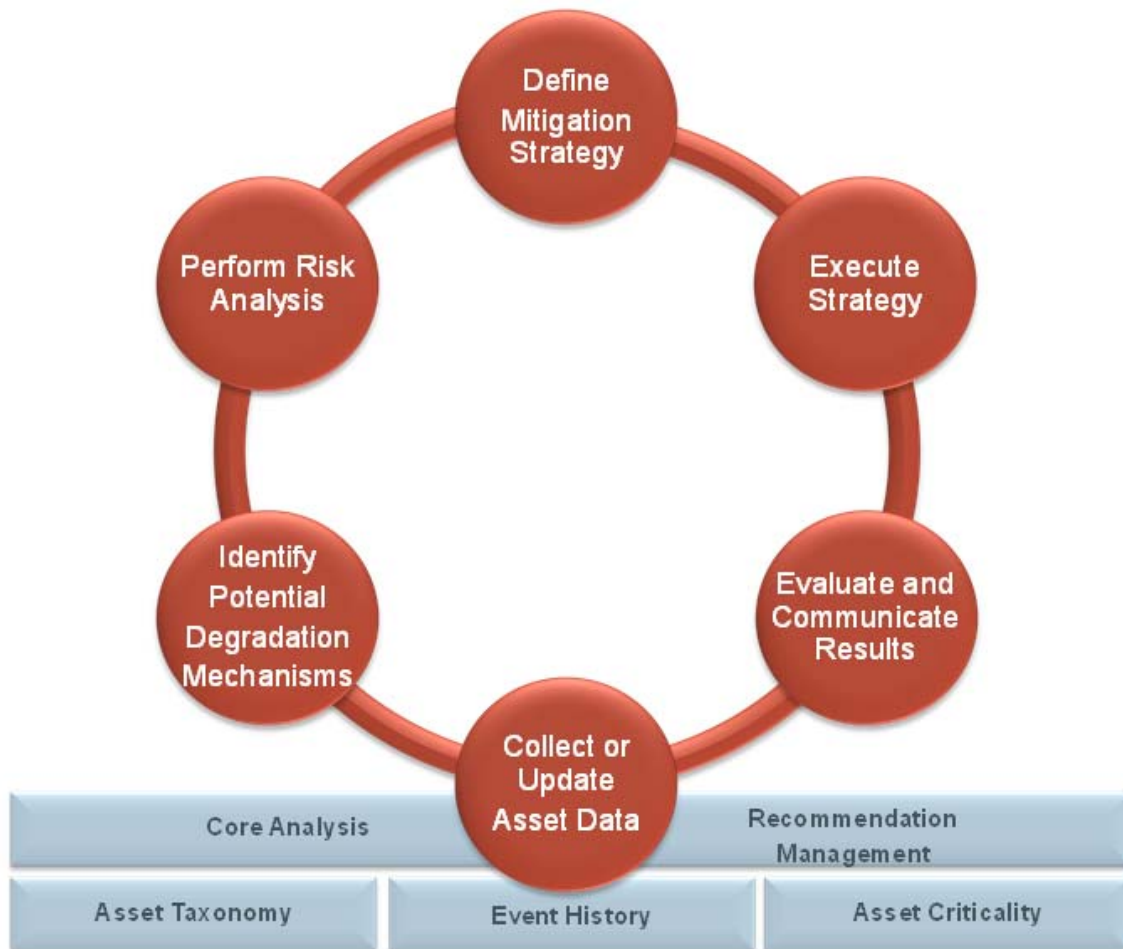
## About the Mechanical Integrity Work Process

The *Mechanical Integrity Work Process* is focused on mitigating the risk of loss of containment by implementing condition assessment activities. The Mechanical Integrity Work Process consists of the steps that are outlined in the following table.

Step	Description	Details
1	Collect or update equipment and location data.	Allows you to gather the data that is required to perform a degradation mechanism review, calculate risk, and plan and execute the appropriate activities.
2	Identify potential degradation mechanisms.	Allows you to identify and quantify the types and locations of degradation that are occurring in your equipment and their components. After doing so, the probability of failure can be calculated so that you can plan effective activities.
3	Perform a risk analysis.	Allows you to calculate risk for equipment and their components so that you can optimize and prioritize the condition monitoring activities that will help mitigate the risks.
4	Define a mitigation strategy.	Allows you to use risk results and strategy rules to generate recommendations to mitigate risk.
5	Execute the strategy.	Allows you to perform recommended inspection or test activities so that you can mitigate the risk associated with each potential degradation mechanisms.
6	Evaluate and communicate results.	Allows you to evaluate existing data to obtain better information about a piece of equipment's or location's condition so you can reduce uncertainty and risk.

The following image shows an illustration of how *all* the steps in the Mechanical Integrity Work Process relate to one another. Each step in the work process is

represented by a red circle. In addition, you can see that the entire work process is built upon the APM Foundation Work Process, whose components are represented by the blue boxes.



Within the Meridium APM product, each of the steps listed above can be accomplished using one or more of the following modules:

- Risk Based Inspection (RBI)
- Inspection Management
- Thickness Monitoring (TM)
- NR13

# Mechanical Integrity System Requirements

Multiple licenses are required to take advantage of Mechanical Integrity modules. In addition to the following licenses, your system must contain the basic Meridium APM system architecture:

- Risk Based Inspection (RBI)
- Inspection Management
- Thickness Monitoring (TM)
- NR13

After you have configured the basic system architecture and licensed these modules, you will need to perform configuration steps for each module.



# Installation, Upgrade, and Configuration

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## First-Time Deployment Workflow

Deploying and configuring the Mechanical Integrity Work Process for the first time includes completing multiple steps, which are outlined in the table in this topic. *All* of the steps are required to fully implement the Mechanical Integrity Work Process. These steps provide all the information that you need to deploy and configure Mechanical Integrity with the basic Meridium APM system architecture

Step	Task
1	Configure the Risk Based Inspection module.
2	Configure the Inspection Management module.
3	Configure the Thickness Monitoring module.

## Upgrade Workflow

You can upgrade to V3.6.0.0.0 using the instructions that are provided in the Installation, Upgrade, and Configuration documentation for each Mechanical Integrity module:

- Risk Based Inspection
- Inspection Management
- Thickness Monitoring





# User Instructions

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## Mechanical Integrity User Instructions

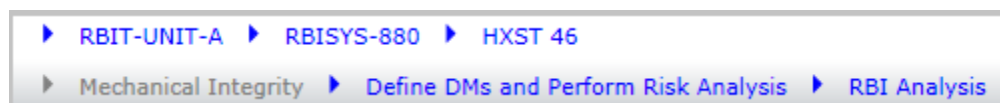
With the exception of instructions on using the navigation bar that is displayed on various pages in Mechanical Integrity modules, the user instructions for Mechanical Integrity modules are provided in the documentation for the related module. Documentation for the Mechanical Integrity dashboard is provided in the Mechanical Integrity Reference Information documentation.

## Navigating Mechanical Integrity Modules

### About Navigating Mechanical Integrity Modules

In place of the site map, a *navigation bar* is provided on various pages throughout Mechanical Integrity (MI) modules and allows you to:

- Select the records that you want to work with on various pages throughout MI modules.
- Navigate to various pages and features within and across MI modules.

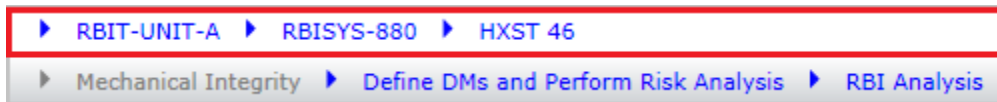


The navigation bar displays the following levels:

- Record
- Work Process

## Hierarchy Level

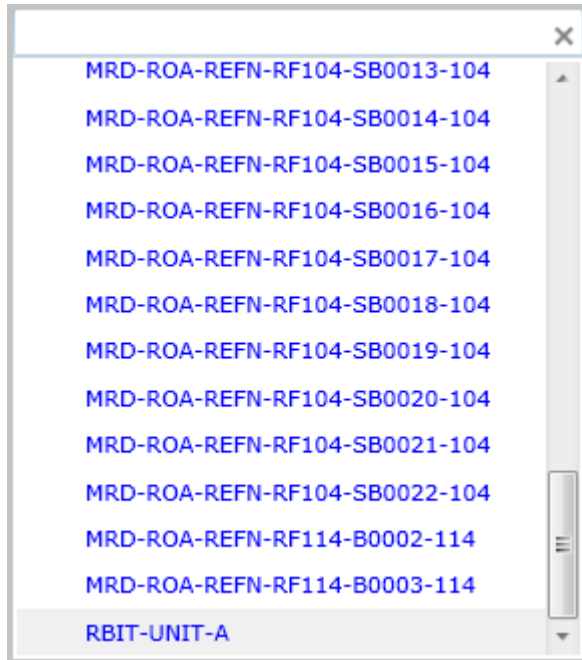
The record level of the navigation bar displays options that correspond with the records that you are working with on the current page. A red outline has been added to the following image to highlight the record level of the navigation bar.



The record level is displayed only on certain pages throughout MI modules. The text that is displayed for each option will vary, depending upon the record that you select for that option. The documentation refers to these options and the lists that are displayed when you click the ▶ button that is displayed to the left of each option using the following terms:

- **Unit:** Displays a list of the Functional Location records in your database whose Is a Unit? field is set to *True* and the value *Undefined Unit*. When you access a page that displays the navigation bar for a record that is not linked to one of these Functional Location records, the value *Undefined Unit* is selected in this list by default. The **Unit** option and list are enabled *only* when the RBI license is active.

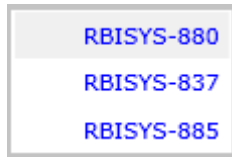
The image at the beginning of this topic shows the Functional Location record *RBIT-UNIT-A* specified for the **Unit** option, and the following image shows this same record selected in the **Unit** list.



- **RBI System:**
    - Displays a list of all RBI System records in your database that are linked to the Functional Location record selected in the **Unit** list and to which one or more Criticality Calculator RBI Components record is linked.
- or-
- Displays the text *Undefined System* if the value *Undefined Unit* is selected in the **Unit** list or an RBI System record is not linked to the Functional Location record that is selected in the **Unit** list.

When you select in the **Unit** list a Functional Location record that is linked to only one RBI System record, the RBI System record is selected in the **RBI System** list automatically. The **RBI System** option and list are enabled *only* when the RBI license is active.

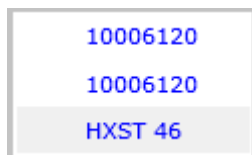
The image at the beginning of this topic shows the RBI System record *RBISYS-880* specified for the **RBI System** option, and the following image shows this same record selected in the **RBI System** list.



- **Equipment:** Displays the following lists, depending upon whether or not the RBI license is active:
  - When the RBI license is active, displays a list of all Equipment records in your database that are linked:
    - To the RBI System record that is selected in the **RBI System** list.
  - or-
  - Directly to the Functional Location record selected in the **Unit** list when an RBI System is not selected in the **RBI System** list.
- When the RBI license is not active, displays a list of all Equipment records in your database.


When a value is not selected in the **Equipment** list, the text (*Select Asset*) is displayed.

The image at the beginning of this topic shows the Equipment record *HXST* specified for the **Equipment** option, and the following image shows this same record selected in the **Equipment** list.



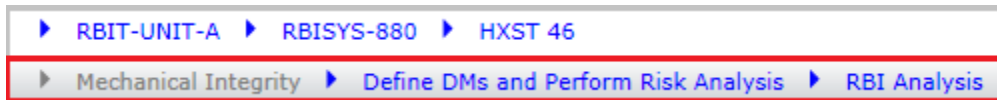
Throughout the documentation, the lists that are displayed for navigation bar options are referred to using the name of the corresponding option. For example, the lists that are displayed for the **Unit**, **RBI System**, and **Equipment** options are referred to as the *Unit*, *RBI System*, and *Equipment lists* respectively.


For each list that displays *more than* ten records, a text box is displayed above the list that you can use to search for records in the list. To the right of the

text box, the  button is displayed and clears any text that you have typed in the text box. The image of the **Unit** list in this topic shows an example of this text box.

## Work Process Level

The Work Process level of the navigation bar displays options that correspond with the Mechanical Integrity Work Process. Specifically, this level displays options that correspond with the step in the Mechanical Integrity Work Process that is associated with the page that you are currently viewing. A red outline has been added to the following image to highlight the Work Process-level of the navigation bar.



When the record level of the navigation bar is displayed, the Work Process level of the navigation bar is displayed *below* the record level, as shown in the preceding image. The text that is displayed for each option will vary, depending upon your selection for that option. The documentation refers to these options and the submenus that are displayed when you click the  button that is displayed to the left of each option using the following terms:

- **Work Process:** Displays the text *Mechanical Integrity*, which indicates that the Mechanical Integrity Work Process is associated with this level of the navigation bar. This option is always disabled.
- **Work Process Step:** Displays text that corresponds with the step(s) in the Mechanical Integrity Work Process that are associated with the page that you are currently viewing, and displays a submenu of links, organized according to the steps in the Mechanical Integrity Work Process.

The following image shows an example of the **Work Process Step** submenu that is displayed when you are working on the **RBI Asset View** or **RBI Unit View** page.

<b>Collect Asset Data</b> <a href="#">Export and Import RBI Data</a>	<b>Define DMs and Perform Risk Analysis</b> <a href="#">RBI Analysis</a> <a href="#">Mass RBI Analysis</a>	<b>Define Mitigation Strategy</b> <a href="#">T-Min Calculator</a> <a href="#">Manage Work Packs</a> <a href="#">Manage Inspection Tasks</a> <a href="#">Manage Profiles</a> <a href="#">Manage RBI Recommendations</a> <a href="#">Mass RBI Recommendation Management</a> <a href="#">Manage Inspection Documents</a>
<b>Execute Strategy</b> <a href="#">Datalogger</a> <a href="#">TMLs and Measurements</a> <a href="#">Initial Measurement Data Entry</a> <a href="#">Measurement Data Entry</a> <a href="#">Bulk Analyze</a> <a href="#">Create Inspection Document</a>	<b>Evaluate Results</b> <a href="#">Corrosion Analysis Summary</a> <a href="#">Quick View</a> <a href="#">Review and Approve Inspections</a> <a href="#">Published Inspections</a>	

The following text that corresponds with the following step(s) in the Mechanical Integrity Work Process can be displayed for the **Work Process Step** option.

Text displayed for Work Process Step option	Corresponding step(s) in the Mechanical Integrity Work Process
Collect Asset Data	Collect or Update Asset Data
Define DMs and Perform Risk Analysis	Identify Potential Degradation Mechanisms Perform Risk Analysis
Defined Mitigation Strategy	Define Mitigation Strategy
Execute Strategy	Execute Strategy
Evaluate Results	Evaluate and Communicate Results

In image at the beginning of this topic, the Work Process step *Define DMs and Perform Risk Analysis* is specified, (i.e., the text *Define DMs and Perform Risk Analysis* is displayed for the **Work Process Step** option).

- **Task:** Displays text that corresponds with the task that you are completing for the specified step in the Work Process, and displays a submenu of links that correspond with that step in the Work Process. The text that is displayed for the **Task** option corresponds with the labels of each hyperlink that is displayed on the **Work Process Step** submenu.

In the image at the beginning of this topic, the task *RBI Analysis* is specified, (i.e., the text *RBI Analysis* is displayed for the **Task** option).

The following image shows an example of the Task submenu that is displayed when the Work Process step *RBI Analysis* is specified.



Throughout the documentation, the submenus that are displayed for navigation bar options are referred to using the name of the corresponding option. For example, the submenus that are displayed for the **Work Process Step** and **Task** options are referred to as the *Work Process Step* and *Task submenus* respectively.

## Pages that Display the Navigation Bar

Various pages throughout Mechanical integrity modules display the navigation bar. The record hierarchy level of the navigation bar is displayed only on some pages, but it is displayed only *after* you have selected records that correspond with this level of the navigation bar. Additionally, when you are working on pages that are not specific to the records represented on the record level of the navigation bar, this level is disabled.

The following table lists the pages, organized by module, on which the navigation bar is displayed, whether or not the record level is displayed after you have selected to work with records that correspond with this level of the navigation bar, and whether or not the record level is enabled when it is displayed.

Page	Record level displayed?	Record level enabled?
<b>Risk Based Inspection</b>		
RBI Asset View	Yes	Yes
RBI Component List	No	N/A
RBI Export and Import	Yes	No
RBI System List	No	N/A
RBI Unit View	Yes	Yes
<b>Inspection Management</b>		
Inspection Finding Checklist	Yes	No

Page	Record level displayed?	Record level enabled?
Inspection History Summary Query	Yes	Yes
Inspection Manage Documents	Yes	No
Inspection Manage Tasks	No	N/A
Inspection Profile	Yes	Yes
Manage Work Packs	Yes	No
Published Inspection Documents	Yes	Yes
Review and Approve Inspection Documents	Yes	No
Thickness Monitoring		
T-Min Calculations	Yes	Yes
TM Analysis	Yes	Yes
TM Initial Measurement Data Entry	Yes	Yes
TM Measurement Data Entry	Yes	Yes
TM Quick View	Yes	Yes
TM TMLs/Measurements	Yes	Yes

## About Navigation Bar Submenus

Navigation to various areas within and across Mechanical Integrity modules using the **Work Process Step** and **Task** submenus are determined by license activation and security permissions. As such, the links that appear on these submenus are conditionally enabled according to the following criteria:

- In order for *any* link to be enabled, the license for the module that corresponds with that link must be *active*.
- In order for *certain* links to be enabled, in addition to the license for the corresponding module being active, the appropriate security permissions must be associated with your Security User account.
- The link that corresponds with the page that you are currently viewing will always *disabled*.



The documentation assumes that all Mechanical Integrity users are assigned to the MI Everyone Security Group *at a minimum*. The following table provides details on:

- The links that appear on the **Work Process Step** and **Task** submenus, organized according to the applicable step in the Mechanical Integrity Work Process.
- The corresponding page or feature to which the links provide access.
- The type of permissions that you must have to entity and relationship families, (beyond what is provided via membership in the MI Everyone Security Group), unless otherwise noted, in order to access the page or feature.
- Whether or not the link is conditionally enabled based upon the security permissions associated with your Security User account. When you click a link that is associated with a page or feature to which you do not have the necessary security permissions, an error message is displayed, indicating that you do not have the necessary security permissions to access the page or feature.

Link	Page/feature	Entity family permissions required	Relationship family permissions required	Co b s
Collect Asset Data				
Export and Import RBI Data	RBI Export and Import page	View permissions to the following families: <ul style="list-style-type: none"> <li>• RBI Components</li> <li>• RBI System</li> </ul>	View permissions to the following families: <ul style="list-style-type: none"> <li>• Has RBI Components</li> <li>• Has RBI System</li> </ul>	Ye
Defined DMs and Perform Risk Analysis				

Link	Page/feature	Entity family permissions required	Relationship family permissions required	Co ba s
RBI Analysis	RBI Asset View page	View permissions to the following families: <ul style="list-style-type: none"> <li>• EquipmentTypes</li> <li>• Potential Degradation Mechanisms</li> <li>• RBI Components</li> <li>• RBI Degradation Mechanisms</li> </ul>	View permissions to the following families: <ul style="list-style-type: none"> <li>• Has Degradation Mechanisms</li> <li>• Has Potential Degradation Mechanisms</li> <li>• Has RBI Components</li> <li>• Has RBI Criticality Analysis</li> <li>• Has Recommendations</li> </ul>	Ye
Mass RBI Analysis	RBI Review Analyses page	View permissions to the following families: <ul style="list-style-type: none"> <li>• RBI Components</li> <li>• RBI System</li> </ul>	View permissions to the following families: <ul style="list-style-type: none"> <li>• Has RBI Components</li> <li>• Has RBI System</li> </ul>	Ye
Define Mitigation Strategy				
T-Min Calculator	T-Min Calculations page	You be a Meridium APM Super User or a member of the MI Thickness Monitoring Inspection Group to access the T-Min Calculations page.	You be a Meridium APM Super User or a member of the MI Thickness Monitoring Inspection Group to access the T-Min Calculations page.	No

Link	Page/feature	Entity family permissions required	Relationship family permissions required	Co b s
Manage Work Packs	Manage Work Packs page	View permissions to the Work Pack family	View permissions to the following families: <ul style="list-style-type: none"> <li>• Has Tasks</li> <li>• Has Work Pack</li> <li>• Is Executed By</li> <li>• Is Planned By</li> </ul>	No
Manage Inspection Tasks	Task List page	View permissions to the Task family	N/A	No
Manage Profiles	Inspection Profile page	View permissions to the Inspection Method family	View permissions to the Has Inspection Method family	No
Manage RBI Recommendations	Recommendation Management page	View permissions to the following families: <ul style="list-style-type: none"> <li>• RBI Recommendation</li> <li>• Task</li> </ul>	View permissions to the Has Consolidated Recommendations family	Ye
Mass RBI Recommendation Management	Recommendation Management page	View permissions to the following families: <ul style="list-style-type: none"> <li>• RBI Recommendation</li> <li>• Task</li> </ul>	View permissions to the Has Consolidated Recommendations family	Ye
Manage Inspection Documents	Inspection History Summary Query page	N/A	N/A	No
Execute Strategy				

Link	Page/feature	Entity family permissions required	Relationship family permissions required	Co b s
Datalogger	Select a Device and Properties dialog box	View permissions to the following families: <ul style="list-style-type: none"> <li>• Device</li> <li>• Device Data Presentation</li> <li>• Device Mapping</li> <li>• Device Mapping Family</li> <li>• Device Mapping Field</li> <li>• Thickness Measurement Location</li> <li>• Thickness Measurement</li> </ul>	View permissions to the following families: <ul style="list-style-type: none"> <li>• Device Has Send Presentation</li> <li>• Device Has Receive Presentation</li> </ul>	No
TMLs and Measurements	TM TMLs/Measurements page	View permissions to the Corrosion Analysis Settings family	View permissions to the following families: <ul style="list-style-type: none"> <li>• Has Corrosion Analysis</li> <li>• Has Corrosion Analysis Settings</li> <li>• Has Datapoints</li> </ul>	No
Initial Measurement Data Entry	TM Initial Measurement Data Entry page	The following permissions to the following families: <ul style="list-style-type: none"> <li>• View permissions to the Corrosion Analysis Settings family</li> <li>• Update, Insert, or Delete permissions to the Thickness Measurement family</li> </ul>	View permissions to the following families: <ul style="list-style-type: none"> <li>• Has Corrosion Analysis</li> <li>• Has Corrosion Analysis Settings</li> <li>• Has Datapoints</li> </ul>	No

Link	Page/feature	Entity family permissions required	Relationship family permissions required	Co b s
Measurement Data Entry	TM Measurement Data Entry page	The following permissions to the following families: <ul style="list-style-type: none"> <li>View permissions to the Corrosion Analysis Settings family</li> <li>Update, Insert, or Delete permissions to the Thickness Measurement family</li> </ul>	View permissions to the following families: <ul style="list-style-type: none"> <li>Has Corrosion Analysis</li> <li>Has Corrosion Analysis Settings</li> <li>Has Datapoints</li> </ul>	No
Bulk Analyze	Thickness Monitoring - Bulk Analyze window	You be a Meridium APM Super User or a member of the MI Thickness Monitoring Inspection Group to access the <b>Thickness Monitoring - Bulk Analyze</b> window.	You be a Meridium APM Super User or a member of the MI Thickness Monitoring Inspection Group to access the <b>Thickness Monitoring - Bulk Analyze</b> window.	No
Create Inspection Document	Event Builder	View, Update, and Insert, permissions to the Inspection family for which you want to create a record.	View, Update, and Insert permissions to the Has Inspection family	No
<b>Evaluate Results</b>				
Corrosion Analysis Summary	TM Analysis page	View permissions to the Corrosion Analysis Settings family	View permissions to the following families: <ul style="list-style-type: none"> <li>Has Corrosion Analysis Settings</li> <li>Has Corrosion Analyses</li> </ul>	No

Link	Page/feature	Entity family permissions required	Relationship family permissions required	Co b s
Quick View	TM Quick View page	View permissions to the following families: <ul style="list-style-type: none"> <li>• Thickness Measurement</li> <li>• Thickness Measurement Location</li> </ul>	View permissions to the Has Datapoints family	No
Review and Approve Inspections	Review and Approve Inspection Documents page	N/A	N/A	No
Published Inspections	Published Inspection Documents page	N/A	N/A	No

While the preceding table lists the minimum privileges necessary to access pages and features via the navigation bar, some *additional* privileges are necessary to use functionality that is provided on some pages. The following table lists these pages, the necessary additional privileges, and the associated functionality.

Page	Entity family permissions required	Relationship family permissions required	Associated functionality
RBI Asset View page	View permissions to the following families: <ul style="list-style-type: none"> <li>• RBI Consequence Evaluation</li> <li>• RBI Degradation Mechanism Evaluation</li> <li>• RepresentativeFluids</li> <li>• Risk Translation</li> </ul>	View privileges to the following families: <ul style="list-style-type: none"> <li>• Has Consequence Evaluation</li> <li>• Has RBI Degradation Mechanism Evaluation</li> </ul>	To view RBI Criticality Analysis records that are linked to Criticality Calculator RBI Components records in the RBI Explorer pane.

Page	Entity family permissions required	Relationship family permissions required	Associated functionality
Inspection History Summary Query page	Update privileges to the General Finding or Checklist Finding family, depending upon which of these records is linked to the Inspection record that you want to view.	View privileges to the Has Findings or Checklist Has Findings family, depending upon which type of record (General Finding or Checklist Finding) is linked to the Inspection record that you want to view.	To use the <b>Load Inspection</b> hyperlink that appears in the <b>Action</b> column in the grid on the <b>Inspection History Summary Query</b> page to open the Inspection record in Record Manager.
Inspection Profile page	View, Update, Insert, and Delete privileges to the following families: <ul style="list-style-type: none"> <li>Inspection Method</li> <li>Inspection Profile</li> </ul>	View, Update, Insert, and Delete privileges to the following families: <ul style="list-style-type: none"> <li>Has Inspection Method</li> <li>Has Inspection Profile families.</li> </ul>	To use the full functionality of this page.

## Using the Navigation Bar

### About Using the Navigation Bar

Depending upon your security permissions and which MI module licenses are active, you can use the navigation bar to:

- Select the records that you want to work with on various pages throughout MI modules.

- Navigate to various pages and features within and across MI modules.

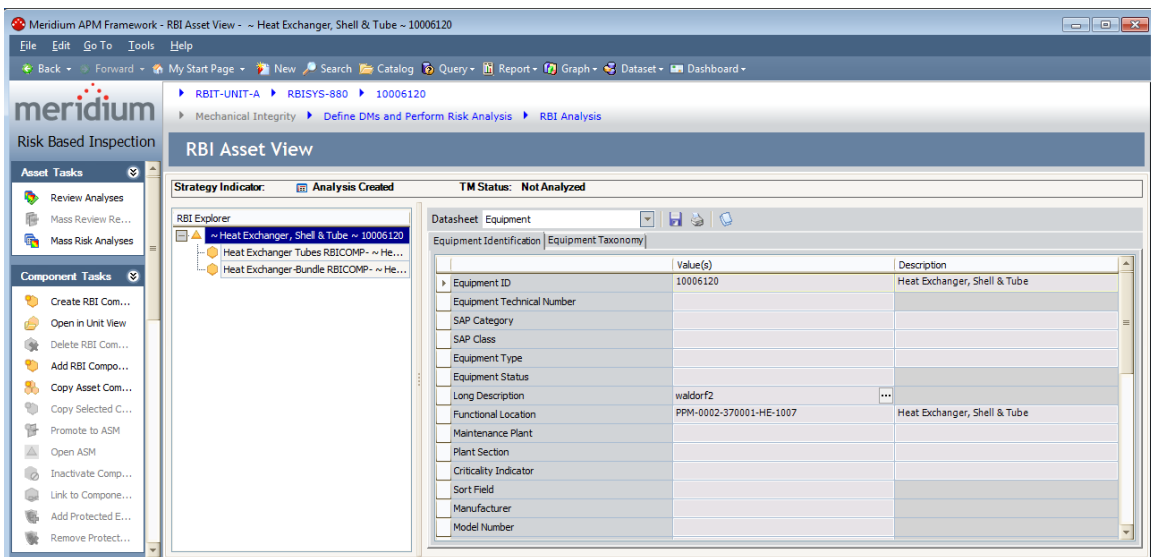
The documentation assumes that the following licenses are active, and that you have the necessary security permissions to access all pages and features available via the navigation bar:

- Risk Based Inspection
- Inspection Management
- Thickness Monitoring

## Selecting Records That You Want to Work With In MI Modules

You can use the record level of the navigation bar to select the records that you want to work with on various pages throughout MI modules.

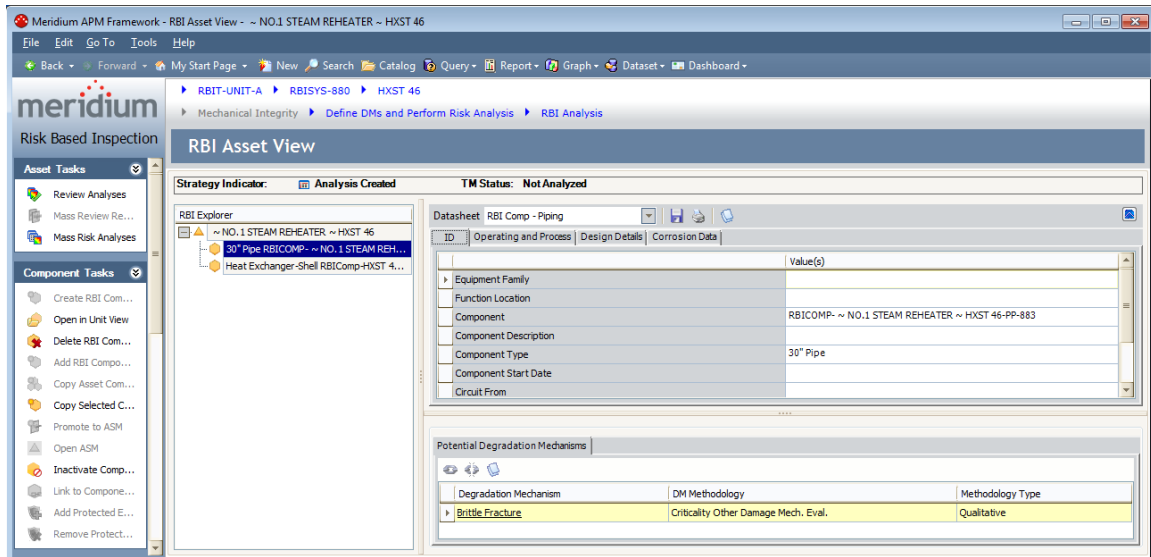
For example, suppose that you are working with the RBI Analysis that is associated with the Equipment record *10006120* that is linked to the RBI System record *RBISYS-880* on the **RBI Asset View** page, as shown in the following image.



Now, suppose that you want to work with the RBI Analysis that is associated with the Equipment record *HXST 46* that is linked to the RBI System record *RBISYS-880*. Using the record level of the navigation bar, you could select the Equipment record *HXST 46* in the Equipment list, and the RBI Asset View page



will be refreshed to display information for that Equipment record, as shown in the following image.



The following instructions assume that you are viewing a page that displays the navigation bar.

To select records that you want to work with in MI modules:

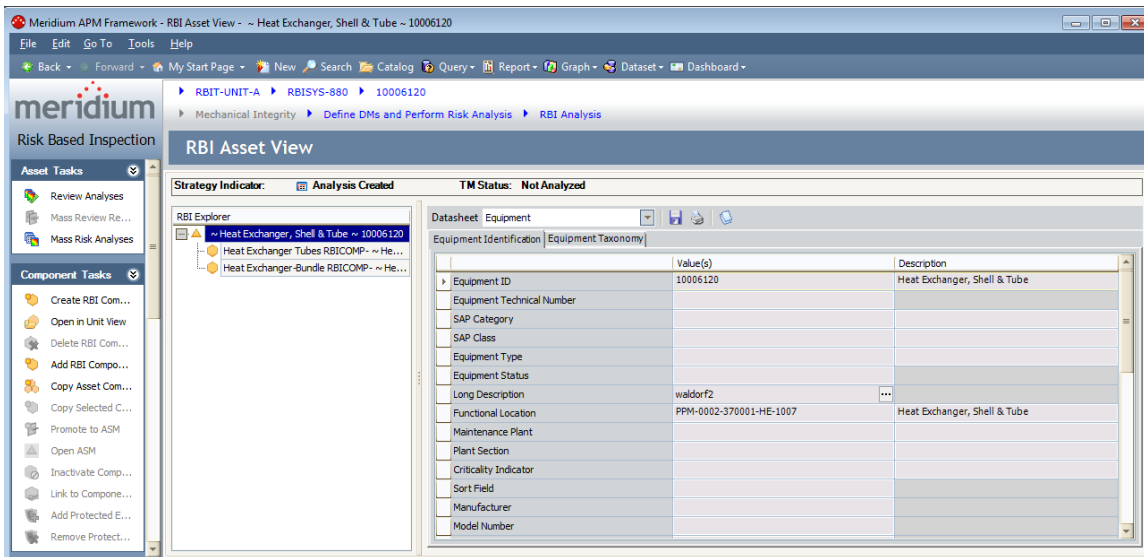
- On the record level of the navigation bar, in the lists displayed for the **Unit**, **RBI System**, or **Equipment** options, select the records that you want to work with on the current page.

The page is refreshed according to your selections.

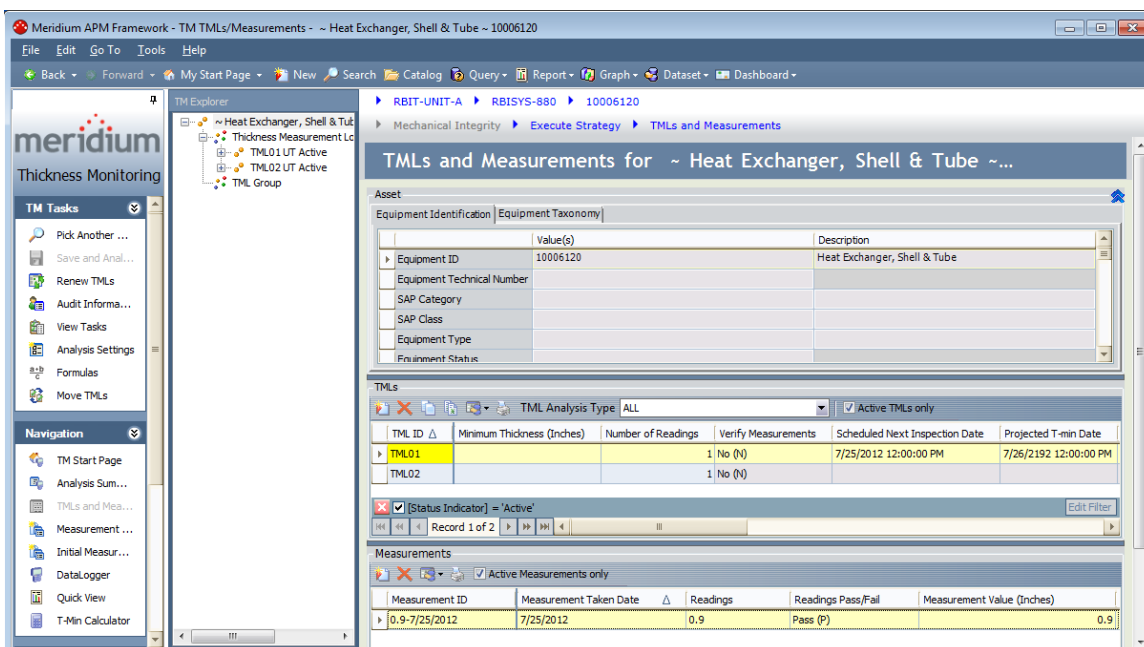
## Navigating Within and Across Modules

You can use the navigation bar to navigate to other pages and features within and across Mechanical Integrity modules.

For example, suppose that you are working with the RBI Analysis that is associated with the Equipment record *10006120* on the **RBI Asset View** page, as shown in the following image.



Continuing with the example, suppose that you want to view data that you have recorded in TM for this Equipment record on the TM TMLs/Measurements page. When you click the TMLs and Measurements link on the Task submenu, the TM TMLs/Measurements page is displayed for the Equipment record 10006120, as shown in the following image.



The following instructions assume that you are viewing a page that displays the navigation bar.

To navigate within and across modules:

- On the Work Process level of the navigation bar, on the **Work Process Step** or **Task** submenus, click the link that corresponds with the page to which you want to navigate.

The page that corresponds with the link that you clicked is displayed.



# Reference Information

## Dashboard

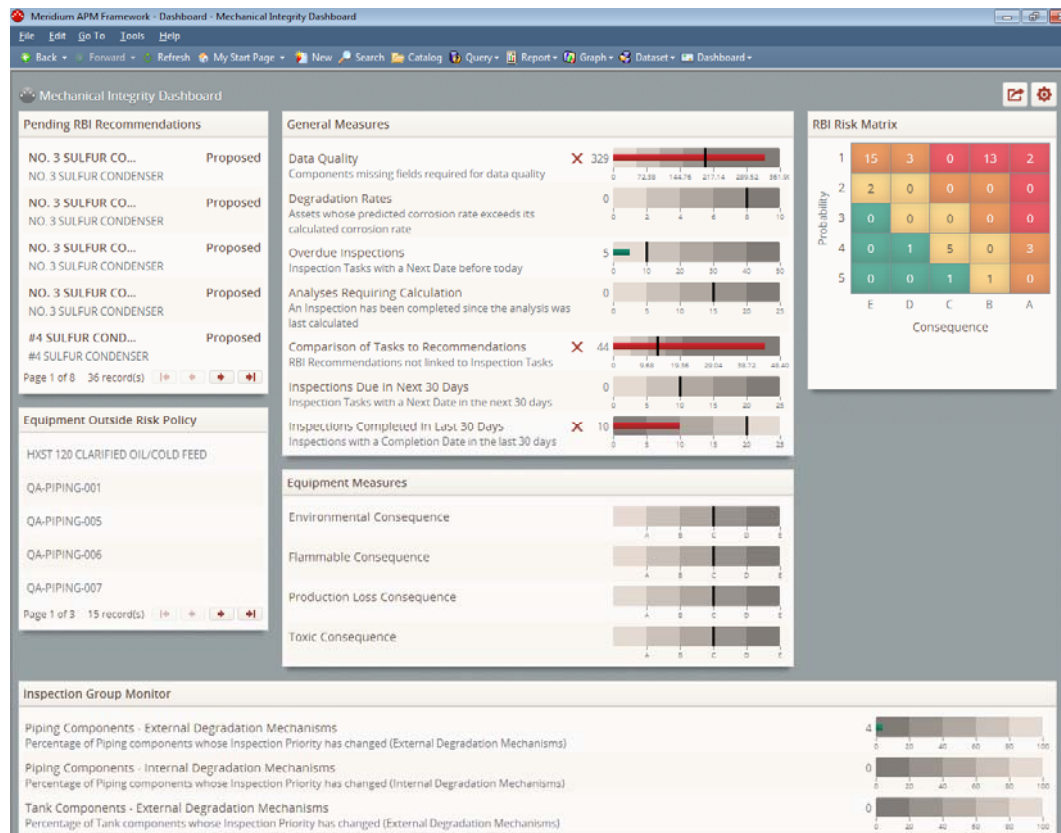
### Accessing the Mechanical Integrity Dashboard

The Mechanical Integrity dashboard serves as an example of how you can configure a dashboard to display information about pieces of equipment and locations that you analyze in Mechanical Integrity modules.

To access the Mechanical Integrity dashboard:

- On the Meridium APM Framework main menu, click **Go To**, point to **Mechanical Integrity**, and then click **Dashboard**.

The Mechanical Integrity dashboard is displayed on the **Dashboard** page.



## Aspects of the Mechanical Integrity Dashboard

The Mechanical Integrity dashboard serves *solely* as an example of how you can configure a dashboard to display information about equipment and locations that you analyze in Mechanical Integrity modules. It is expected that all customers will configure the Mechanical Integrity dashboard to suit their individual needs. The documentation does not provide additional details on configuring the Mechanical Integrity dashboard, however, details on working with dashboards in general, the type of sections that are displayed on the Mechanical Integrity dashboard, and the underlying queries that are used to determine their content are provided. You can use this documentation as a starting point for customizing the Mechanical Integrity dashboard, if desired.

## Sections Displayed on the Baseline Mechanical Integrity Dashboard

The following table lists the type of dashboard section that corresponds with each section that is displayed on the Mechanical Integrity dashboard.

Baseline Mechanical Integrity dashboard section	Section type
Equipment Measures	Measures - Linked
Equipment Outside Risk Policy	List - Single Column
General Measures	Measures - General
Inspection Group Monitor	Measures - General
Pending RBI Recommendations	List - Summary
RBI Risk Matrix	RBI Risk Matrix <b>Note: This section is specific to the Mechanical Integrity dashboard.</b>

# Family Field Reference

## Meridium Reference Table Records

### Inspection Strategy

Records in the Inspection Strategy family store information and guidelines for performing various types of inspections on equipment and locations that you analyze using the RBI and Inspection modules. Some Inspection Strategy values are used to populate values in:

- RBI Recommendation records that are generated automatically in the RBI module.
- Inspection records that are used in the Inspection module.

The following table provides a list and description of the fields that exist in the Inspection Strategy family. The information in the table reflects the baseline state and behavior of these fields.

Field	Data Type	Description	Behavior and Usage
Inspection Confidence	Character	A value that indicates how effective prior inspections were at identifying the degradation mechanism and the rate of degradation.	<p>This field is populated with a list of System Codes that are stored in the INSPECTION CONFIDENCE System Code table.</p> <p>The value in this field is populated in the Inspection Confidence field in Inspection records whose:</p> <ul style="list-style-type: none"> <li>• Type of Inspection value corresponds with the value in the Inspection Task Type field in the Inspection Strategy record.</li> <li>• Extent value corresponds with the value in the Inspection Extent field in the Inspection Strategy record.</li> </ul>
Inspection Extent	Character	The extent to which the inspection was performed.	This field is populated with a list of System Codes that are stored in the MI_INSPECTION_EXTENT System Code table.
Inspection Strategy Description	Character	A description of the inspection.	The value in this field is populated in the Recommendation Basis field in RBI Recommendation records that are generated automatically.
Inspection Strategy ID	Character	The Record ID of the Inspection Strategy record.	You must specify a unique value in this field. This value is used to identify the Inspection Strategy record.



Field	Data Type	Description	Behavior and Usage
Inspection Task Type	Character	The type of inspection that corresponds with the Inspection Strategy record.	<p>This field is populated with a list of all Task Types records whose Reference field contains the value <i>Inspection Strategy (INSPECTION_STRATEGY)</i>.</p> <p>The value in this field is populated in the:</p> <ul style="list-style-type: none"> <li>• Task Type field in RBI Recommendation and Inspection Task records.</li> <li>• Type of Inspection field in Inspection records.</li> </ul>
Recommended Inspection Interval	Number	The interval at which the inspection should be performed.	When the Use Calculated Data field is set to <i>False</i> , the value in this field is used to populate the Recommended Interval Scope field in RBI Recommendation records that are generated automatically.

Field	Data Type	Description	Behavior and Usage
Recommended Inspection Scope	Text	Information related to the scope of the inspection, including: <ul style="list-style-type: none"> <li>• A description of tasks that the inspector should perform.</li> <li>• The minimum information that should be returned by the inspection.</li> <li>• Credentials that the inspector is required to have.</li> </ul>	The value in this field is populated in the Recommended Inspection Scope field in RBI Recommendation records that are generated automatically.

Field	Data Type	Description	Behavior and Usage
Use Calculated Data	Logical	Determines how the Recommended Interval Scope field is populated in RBI Recommendation records that are generated automatically.	<p>This field is set to <i>False</i> by default. When this field is set to:</p> <ul style="list-style-type: none"> <li>• <i>True</i>, the Recommended Interval Scope field in the RBI Recommendation record is populated with the value in the Estimated Half Life field in the Criticality Int. Corr. Deg. Mech. Eval. record that is linked to the associated RBI Criticality Analysis record.</li> <li>• <i>False</i>, the value in the Recommended Interval Scope field is populated with the value in the Recommended Inspection Interval field.</li> </ul>

## Catalog Folder Structure

### About the Mechanical Integrity Catalog Folder Structure

The following topics contain information about the folders that are stored in the Catalog location \\Public\Meridium\Modules\Mechanical Integrity, their content, and details on how this content can be used by Mechanical Integrity (MI) users. This information is intended to serve as a quick reference to details that are provided elsewhere in the MI documentation.

- Dashboard Folder
- Queries Folder

**Note:** All of the Public folders exist by default. Any item in a Public folder is also available in the corresponding Baseline folder. Throughout this documentation, we refer to items in the Public folder.

## Dashboard Folder

The dashboard listed in the following table is stored in the Catalog location \\Public\Meridium\Modules\Mechanical Integrity\Dashboard. In this table, the value listed in the **Dashboard** column refers to the dashboard *name*. The baseline dashboard caption is the same as the dashboard name.

Dashboard	Behavior and Usage
Mechanical Integrity Dashboard	Displays the baseline Mechanical Integrity dashboard on the <b>Dashboard</b> page.

## Queries Folder

### About the Queries Folder

The Queries folder that is stored in the Catalog location \\Public\Meridium\Modules\Mechanical Integrity contains the following subfolders:

- Navigation Bar Queries
- Dashboard Queries

### Navigation Bar Queries Folder

The queries listed in the following table are stored in the Catalog location \\Public\Meridium\Modules\Mechanical Integrity\Queries\Navigation Bar Queries. In this table, the values listed in the **Query** column refer to the query *names*. The baseline query captions are the same as the query names.

Query	Behavior and Usage
All Assets	Returns all Equipment records in your database. The results of this query are used to populate the <b>Equipment</b> list that is accessed via the navigation bar when the Risk Based Inspection license is not active.
Assets in Hierarchy	<p>Returns the following items, depending upon the types of records that you have created:</p> <ul style="list-style-type: none"> <li>• Functional Location, RBI System, and Equipment records that are linked to one another.</li> <li>-or-</li> <li>• Functional Location and Equipment records that are linked to one another but are not linked to RBI System records.</li> <li>-or-</li> <li>• Equipment records that are not linked to RBI System or Functional Location records.</li> </ul> <p>The results of this query are used to populate the <b>Unit</b>, <b>RBI System</b>, and <b>Equipment</b> lists that are accessed via the navigation bar when the Risk Based Inspection license is <i>active</i>.</p>

## Dashboard Queries Folder

The queries listed in the following table are stored in the Catalog location \\Public\Meridium\Modules\Mechanical Integrity\Queries\Dashboard Queries. In this table, the values listed in the **Query** column refer to the query *names*. The baseline query captions are the same as the query names.

Query	Behavior and Usage
Data Quality	<p>Used to return results that are displayed for the Data Quality measure that is displayed in the <b>General Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Criticality Calculator RBI Components records whose Component Type value is any value other than <i>Heat Exchanger-Bundle</i> and when any of the following conditions related to other Criticality Calculator RBI Components values are true:</p> <ul style="list-style-type: none"> <li>• Operating Pressure is null or is greater than Design Pressure.</li> <li>• Operating Temperature is null or is greater than Design Temperature.</li> <li>• Diameter is null or 0 (zero).</li> <li>• Expected Internal Corrosion is null or 0 (zero).</li> <li>• Inventory is null.</li> <li>• Process Fluid is null.</li> <li>• Weld Joint Effy is null.</li> <li>• Nominal Thickness is null or 0 (zero).</li> <li>• Toxic Mixture is <i>True</i>.</li> <li>• Toxic Model is null.</li> <li>• Percent toxic is 0 (zero).</li> </ul>
Degradation Rates	<p>Used to return results that are displayed for the Degradation Rates measure that is displayed in the <b>General Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are linked to Asset Corrosion Analysis records whose Average Corrosion Rate value is <i>greater than</i> the BM Estimate Rate value in the Criticality Int. Corr. Deg. Mech. Eval. record associated with that Equipment record.</p>
Environmental Consequence	<p>Used to return results that are displayed for the Environmental Consequence measure that is displayed in the <b>Equipment Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database this query:</p> <ul style="list-style-type: none"> <li>• Is configured to return Equipment records that are associated with RBI Criticality Analysis records whose Environ Crack Prob Cat field contains a value other than <i>N/A</i>.</li> <li>• Contains a prompt on the Equipment Entity Key.</li> </ul>

Query	Behavior and Usage
Equipment Outside Risk Policy	Used to return results that are displayed in the <b>Equipment Outside Risk Policy</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are linked to RBI Criticality Analysis records whose Risk Category value corresponds with the value <i>High</i> in the Criticality Rating field.
Flammable Consequence	Used to return results that are displayed for the Flammable Consequence measure that is displayed in the <b>Equipment Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query: <ul style="list-style-type: none"> <li>• Is configured to return Equipment records that are associated with RBI Criticality Analysis records whose Flamm Conseq Cat field contains a value other than <i>N/A</i>.</li> <li>• Contains a prompt on the Equipment Entity Key.</li> </ul>
Inspections Completed	Used to return results that are displayed for the Inspections Completed in Last 30 Days measure that is displayed in the <b>General Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are linked to Inspection records whose Completion Date field contains a value that corresponds with today's date or a date within the last 30 days.
Inspections Due	Used to return results that are displayed for the Inspections Due in Next 30 Days measure that is displayed in the <b>General Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are linked to Inspection Task records whose Next Date value corresponds with within the next 30 days.
Inspections Overdue	Used to return results that are displayed for the Overdue Inspections measure that is displayed in the <b>General Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are linked to Inspection Task records whose Next Date value corresponds with today's date or a date before today's date.
Pending Recommendations	Used to return results that are displayed in the <b>Pending RBI Recommendations</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are linked to RBI Recommendation records that are in the Proposed state.

Query	Behavior and Usage
<p>Percentage Change in External DM for Piping</p>	<p>Used to return results that are displayed in the <b>Inspection Group Monitor</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return:</p> <ul style="list-style-type: none"> <li>• The number of Criticality Calculator RBI Components records in the database whose Component Type field contains any value that includes the word <i>Pipe</i>.</li> <li>-and-</li> <li>• The percentage of those Criticality Calculator RBI Components records whose CUI Inspection Priority Change field is set to <i>True</i>.</li> </ul>
<p>Percentage Change in External DM for Tanks</p>	<p>Used to return results that are displayed in the <b>Inspection Group Monitor</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return:</p> <ul style="list-style-type: none"> <li>• The number of Criticality Calculator RBI Components records in the database whose Component Type field contains the value <i>Storage Tank</i>.</li> <li>-and-</li> <li>• The percentage of those Criticality Calculator RBI Components records whose CUI Inspection Priority Change field is set to <i>True</i>.</li> </ul>
<p>Percentage Change in External DM for Vessels</p>	<p>Used to return results that are displayed in the <b>Inspection Group Monitor</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return:</p> <ul style="list-style-type: none"> <li>• The number of Criticality Calculator RBI Components records in the database whose Component Type field contains any of the following values: <ul style="list-style-type: none"> <li>▪ Air Cooled Exchanger-Header</li> <li>▪ Column-Bottom</li> <li>▪ Column-Middle</li> <li>▪ Column-Top</li> <li>▪ Filter</li> <li>▪ Heat Exchanger-Channel</li> <li>▪ Heat-Exchanger-Shell</li> <li>▪ Pressure Vessel</li> <li>▪ Reactor</li> </ul> </li> <li>-and-</li> <li>• The percentage of those Criticality Calculator RBI Components records whose CUI Inspection Priority Change field is set to <i>True</i>.</li> </ul>



Query	Behavior and Usage
Percentage Change in Internal DM for Piping	<p>Used to return results that are displayed in the <b>Inspection Group Monitor</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return:</p> <ul style="list-style-type: none"> <li>• The number of Criticality Calculator RBI Components records in the database whose Component Type field contains any value that includes the word <i>Pipe</i>.</li> <li>-and-</li> <li>• The percentage of those Criticality Calculator RBI Components records whose Int. Corr. Inspection Priority Change field is set to <i>True</i>.</li> </ul>
Percentage Change in Internal DM for Tanks	<p>Used to return results that are displayed in the <b>Inspection Group Monitor</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return:</p> <ul style="list-style-type: none"> <li>• The number of Criticality Calculator RBI Components records in the database whose Component Type field contains the value <i>Storage Tank</i>.</li> <li>-and-</li> <li>• The percentage of those Criticality Calculator RBI Components records whose Int. Corr. Inspection Priority Change field is set to <i>True</i>.</li> </ul>
Percentage Change in Internal DM for Vessels	<p>Used to return results that are displayed in the <b>Inspection Group Monitor</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return:</p> <ul style="list-style-type: none"> <li>• The number of Criticality Calculator RBI Components records in the database whose Component Type field contains any of the following values: <ul style="list-style-type: none"> <li>▪ Air Cooled Exchanger-Header</li> <li>▪ Column-Bottom</li> <li>▪ Column-Middle</li> <li>▪ Column-Top</li> <li>▪ Filter</li> <li>▪ Heat Exchanger-Channel</li> <li>▪ Heat-Exchanger-Shell</li> <li>▪ Pressure Vessel</li> <li>▪ Reactor</li> </ul> </li> <li>-and-</li> <li>• The percentage of those Criticality Calculator RBI Components records whose Int. Corr. Inspection Priority Change field is set to <i>True</i>.</li> </ul>

Query	Behavior and Usage
Production Loss Consequence	<p>Used to return results that are displayed for the Production Loss Consequence measure that is displayed in the <b>Equipment Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query:</p> <ul style="list-style-type: none"> <li>• Is configured to return Equipment records that are associated with RBI Criticality Analysis records whose Production Loss Conseq Categ field contains a value other than <i>N/A</i>.</li> <li>• Contains a prompt on the Equipment Entity Key.</li> </ul>
Recommendations Without Tasks	<p>Used to return results that are displayed for the Comparison of Tasks to Recommendations measure that is displayed in the <b>General Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are not linked to at least one Inspection Task record.</p>
Risk Matrix	<p>Used to return results that are displayed in the <b>RBI Risk Matrix</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are associated with an RBI Criticality Analysis record that is in the Risk Completed state <i>and</i> whose Risk Category field contains a value.</p>
Task Complete Greater Than Risk Assessment	<p>Used to return results that are displayed for the Analyses Requiring Calculation measure that is displayed in the <b>General Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return RBI Criticality Analysis records that are:</p> <ul style="list-style-type: none"> <li>• In the Risk Completed State.</li> <li>-and-</li> <li>• Linked to an Inspection record whose Completion Date value corresponds with a date that is <i>after</i> the Date Criticality Calculated value in the RBI Criticality Analysis record.</li> </ul>
Toxic Consequence	<p>Used to return results that are displayed for the Toxic Consequence measure that is displayed in the <b>Equipment Measures</b> section that is displayed on the Mechanical Integrity dashboard. In the baseline database, this query is configured to return Equipment records that are associated with RBI Criticality Analysis records whose Toxic Conseq Cat field contains a value other than <i>N/A</i>.</p>

# System Code Tables Used by MI Modules

The following System Code tables are used by Mechanical Integrity modules:

Table ID	Table Description	Function
INSPECTION CONFIDENCE	Inspection Confidence	Used to populate the <b>Inspection Confidence</b> list in Inspection Strategy records.
MI_INSPECTION_EXTENT	Extent values for Inspection Strategies	Used to populate the <b>Inspection Extent</b> list in Inspection Strategy records.



# NR13

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## About NR13

NR13 is a Brazilian Regulatory Standard issued by the Department of Labor, applicable only to sites in Brazil. Its general purpose is to ensure safety in all aspects of designing, installing, operating, and maintaining certain types of equipment.

The NR13 module expands Meridium APM's baseline function to support the collecting and storing of technical data that is required to create NR13-compliant inspection reports. The module also adds two new inspection reports specifically for NR13 inspections.

The NR13 module is enabled by the *NR13* license.

You can download the NR13 help documentation here:

[https://www.meridium.com/secure/documentation/NR13/Meridium\\_APM\\_NR13\\_Module.pdf](https://www.meridium.com/secure/documentation/NR13/Meridium_APM_NR13_Module.pdf)