



Rübig Improves Steel Treatment with Real-Time and Remote Visualization from CIMPLICITY HMI/SCADA



Overview

Steel is tough—and yet so sensitive in its alloy and surface structure—especially when it comes to spectacular applications in the most adverse environments, such as in the automotive, aerospace and wind energy industries or in tool making.

RÜBIG DRIVING SUCCESS

For such tough requirements, the Rübiger GmbH & Co. KG company has developed the plasma nitriding process over many years of research and development work, which makes the surface structure of steel particularly resistant. As powerful as the plasma nitriding system from Rübiger is, its CIMPLICITY HMI/SCADA system from GE Digital, implemented by partner Taschek & Gruber (T&G), is just as powerful – providing many benefits as Rübiger grows and exceeds the needs of all customer requests.

Hardening steel surfaces

In order to be able to harden steel surfaces, a wide variety of nitriding processes are usually used, such as salt bath or gas nitriding. However, if you want to achieve increased resistance to abrasive, adhesive and corrosive wear, only one nitriding process is possible, namely that of plasma nitriding, which has only been used for about 20 years.

In this process, nitrogen is selectively mixed into the edge zone of iron-based alloys in an ionized gas atmosphere. This sounds easier than it is and requires a high level of know-how in materials and process engineering. It is therefore not surprising that so far only three providers worldwide have shared the market for plasma nitriding. One of these companies is Rübiger GmbH & Co. KG from Wels in Upper Austria.

Plasma nitriding - a specialty in material treatment

“Our strength is the individual development of plasma nitriding processes in order to meet customer requirements in terms of nitriding hardness, connection layer thickness, corrosion protection and oxide layer thickness - for individual parts up to large series,” explains DI Andreas Gebeshuber, the application engineer responsible for the R&D area and sales manager at Rübiger. “All kinds of alloys on steel or cast iron can be treated. The range of nitriding processes used ranges from the application of a certain ceramic connection layer on the surface of the workpiece to a diffusion zone for good flexural fatigue strength.”

At Rübiger, the Rübiger SIR program stands for the development of systems and processes for optimal performance enhancement of the surface of tools and components made of steel materials in the spirit of environmental protection. SIR enables a reduction in hard fine machining and offers manufacturing integration, partial nitriding and process combinations. In addition, the lowest emissions result with minimal gas consumption. The elimination of hard fine machining enables savings of around 20%. The MICROPULS® Everest system enables optimal use of the RÜBIG SIR range.

Environmentally conscious as well as energy efficient

The MICROPULS® Everest plasma nitriding systems from Rübiger offer the highest level in nitriding technology for contract heat treatment for the automotive, aviation and wind energy industries. Constant further developments make the Rübiger plasma nitriding systems the optimal solution for premium applications. The MICROPULS® Everest provides the profitable redesign in terms of heat treatment because its technological uniqueness optimizes the processes of its users by means of high-tech plasma generators and thus contributes to an increased degree of filling as well as improved economy. This is also ensured by an optimal, environmentally friendly energy concept: independent multi-heating and cooling zones, temperature measurements that are carried out directly on the component, as well as the avoidance of toxic gases, are responsible for economical and environmentally friendly energy consumption and, at the same time, perfect reproducibility.



Customized fit

In addition to these advantages, users of MICROPULS® Everest achieve increased strengths and tailor-made surfaces in the production of their components, which can be flexibly adapted to their layer requirements depending on the component requirements – regardless of the component geometry. And if further processing of the components for tribological or corrosion-like protective measures is possibly required, Rübiger also makes this possible with its PLASOX® process range.

Flexible through automation

The flexible system concept of MICROPULS® Everest is perfectly suited for in-house sourcing including any future upgrades. This is also due to their individually developed automation concept, which enables the system to be integrated into any manufacturing environment and meets the requirements of a visionary factory of the future, like Industry 4.0. For example, the user-friendly operation via remote access and online diagnostics are already the system standard – which provides considerable efficiency to be gained in the process flow.

For example, the CIMPLICITY HMI/SCADA system from GE Digital and partner T&G has been in use at Rübzig for the visualization of the processes and for communication of the control with MICROPULS® system very successfully for years.

Siegfried Zauner, software developer for MICROPULS® at Rübzig, explains: “At the time, CIMPLICITY was one of the few HMI SCADA systems that could communicate in all facets with the Eurotherm control system we were using at the time.”

Martin Toth, project manager at T&G, explains the reason for this: “CIMPLICITY has always had an open interface design and has been able to integrate numerous third-party systems and devices. With the help of native drivers and standard communication interfaces such as OPC, data can be recorded from virtually any third-party device.”

Martin Toth,
Project Manager at T&G



Higher performance standards

“In the meantime, however, we recently evaluated all of our processes again and during this, of course, we also looked at all of CIMPLICITY's competitors and examined any high-level programming languages. In the end, we came to the decision that there would be no benefit from switching to another HMI/SCADA system and that we would therefore continue to use CIMPLICITY. In addition, from the beginning we were and are more than satisfied with the support in the visualization area by Taschek & Gruber (T&G),” said Siegfried Zauner, confirming the continuity of the cooperation.

CIMPLICITY gives the plant developers at Rübzig as well as the operators the opportunity and the secure-by-design technology to visualize every aspect of the manufacturing environment, equipment and resources, to monitor them automatically and to deliver reliable production data to higher-level analysis applications.

The screenshot shows the RÜBIG AT-HT software interface. At the top, it displays 'Anlagenstatus: Anlage Bereit' and 'Chargenname: n.a.'. The main area is a table titled 'Stückliste' with columns for 'Nummer', 'Baugruppe', 'Artikelnummer', 'Bezeichnung', 'Menge', 'Typ', 'Ausfallrisiko', and 'Verfügbarkeit'. The table lists various components like 'PN 70x120 D RU-US', 'Rezi Unterteil PN70 DUO kompl.', and 'Membranventil DN40 Type 2031 str.g.'. To the right, there is a 'Warenkorb' (shopping cart) section showing 'Anlage: 8113013', 'Kunde: Ruebzig HT', and a table with one item: 'Rohr 44,5x2 1.4571 nahtlos' with a quantity of 1.

The screenshot shows the RÜBIG AT-HT software interface with a process flow diagram and real-time data. The central part features a 3D visualization of a process vessel with multiple temperature measurement points (TE 1 to TE 8) and a pressure gauge. The 'Zeit' (Time) section shows 'Prozesszeit: 00:00:00' and 'Schrittzeit: 00:00:01'. The 'Temperatur' (Temperature) section displays 'Chargentemperatur: 300,0 °C' and 'Thermoelementauswahl: 0 1'. The 'Generator' section shows 'Spannung: 0 V' and 'Strom: 00,0 A'. The 'Gas' section shows 'H2 l/h: 0,0', 'N2 l/h: 0,0', 'Ar l/h: 0,0', and 'CH4 l/h: 0,0'. The interface also includes a 'Prozessablauf' (Process Flow) section with buttons for 'Start', 'Abkühlen', and 'Handbetrieb'.

Features for all configuration requirements

"What I particularly like personally is for example, in the document library. I can create programs and can easily integrate them into the visualization of the system. The system operator can be provided with information of any kind without having to go into programming. This is a feature that hardly any other program offers," said Siegfried Zauner, describing one of the programming benefits from CIMPLICITY.

This means that applications can be called up in the background which are written in a wide variety of programming languages.

"These are standard functions in CIMPLICITY. If, as with Rübig, you now have special system logic where you program certain functions in a high-level language, you can develop this configuration and embed it in the entire visualization in addition to the existing visualization images," explains Martin Toth.

In this way, Siegfried Zauner has already programmed many visualization functions for the MICROPULS®, for example an operating hours counter, record displays for process costs per batch, recipe, system and work orders or a shopping cart for defective components to be replaced with all vacant additional information, such as technical information about the component itself, e-mail ordering options to the in-house purchasing department or directly to Rübig - and more like that.

"Another special feature is that I can also create my own design elements in the programming, for example to be able to display the status of a certain value. Here in CIMPLICITY there is a broad 'playground' of ready-made templates that I can design accordingly for individual process scenarios. I can even develop user access authorizations for all system states in CIMPLICITY," said Siegfried Zauner, explaining further programming options.

For the software development team at Rübig, it is therefore an easy undertaking for the standard systems to be configured to meet individual customer requests in the system visualization.

Easy-to-use operator displays in real time

Thanks to the real-time display with data that is recorded via SQL server, plant operators and the management team can make informed decisions at any time. As already mentioned, the user-friendly operation via remote access and online diagnosis also contributes to this.

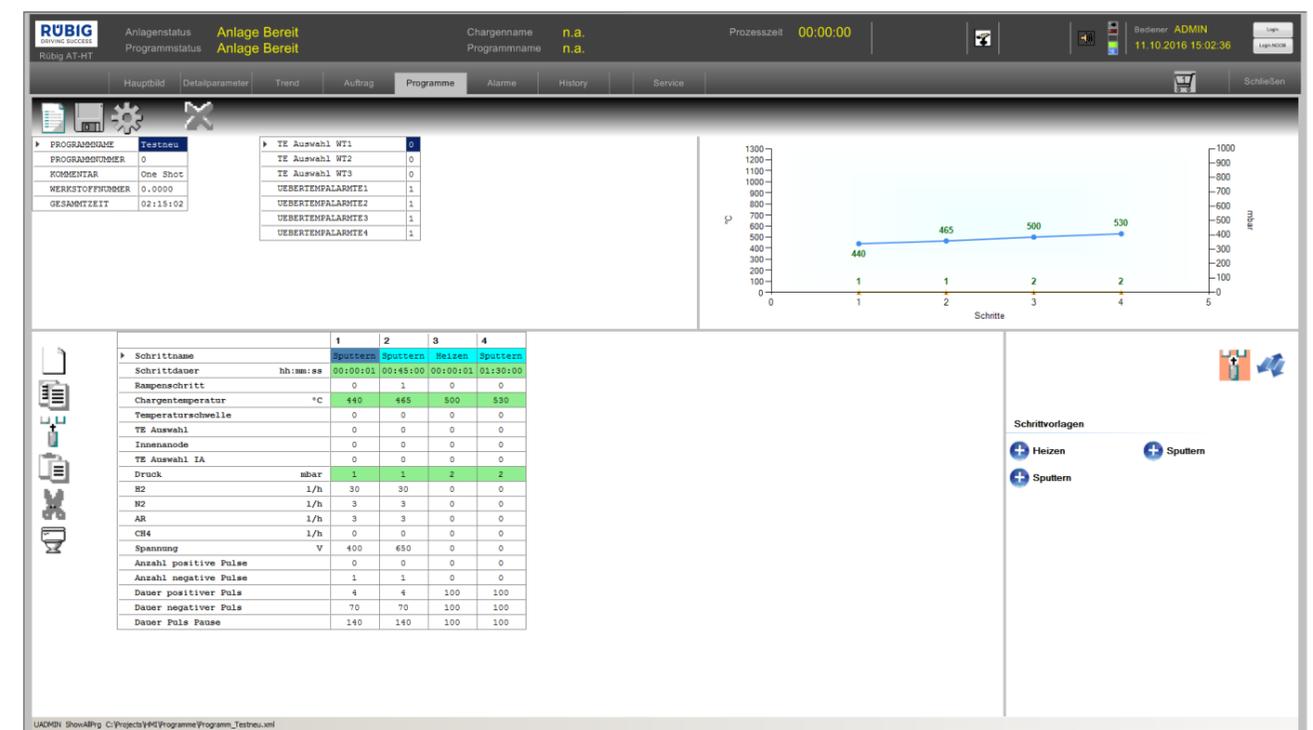
For example, CIMPLICITY has a powerful Digital Graphical Replay (DGR) recorder, with the help of which events in time can be called up in slow motion, in real time or at a maximum of ten times the speed and analyzed graphically. In this way, problems can be identified and corrected, and their recurrence avoided. The DGR recorder even conveniently reproduces trend data and analyzes for the user.

With the Action Calendar, the calendar-based time planning of manufacturing events and associated actions can be created, maintained and executed in order to control one plant or several plants according to a predefined schedule and according to the predefined recipes. The system status is - as already described for the features to be programmed - continuously visualizes for the operator: operating hours counter, recordings for the process costs per batch, maintenance indicators

for defective components to be replaced with all vacant additional information, a shopping cart for ordering spare parts - and much more.

Exceptional competence

"The big plus of the Rübig Group can be found in the high level of process engineering know-how through the in-house hardening shop and our many years of experience in the development of systems. This gives our customers the security of being able to treat the surfaces of their workpieces with the latest state of the art in premium quality," sums up Andreas Gebetshuber and Siegfried Zauner, adding: "The CIMPLICITY HMI/SCADA system provides us with powerful support for the visualization of processes and for communication with the system control. And, Mr. Toth from T&G always gives us support if necessary!"





About GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology and scale, GE delivers better outcomes for customers by speaking the language of industry.

Contact Information

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