

Technical Article

March 2014

Lineguard ProcessControl 200 from Henkel for reliable regulation of pretreatment processes in the metals industry

Unique single-source solutions

In the manufacture of metal components, the ability to continuously monitor surface pretreatment processes and to ensure the optimum infeed of the chemicals required is of crucial importance. Henkel's TCS Engineering department has developed a modular metering and control system under the brand name Lineguard specifically for such applications. With this technology, the world market leader for adhesives, sealants and functional coatings is able to offer fully fledged programmable logic control systems (PLCs) for the precise measurement of bath concentrations and in-process regulation. This fully automatic monitoring, measuring, metering and control concept means that gauging and replenishment errors by operators can be extensively avoided and process costs substantially reduced. A comprehensive master program is currently being installed at the premises of autobody fabricator Tofaş in Turkey. Henkel is also developing a Windows program and an app for the mobile control of such systems.

Due to various influences, the chemical pretreatment processes applied in the automotive industry are subject to fluctuations. More often than not, these can only be precisely analyzed manually once a day. The amounts of chemicals that needed to be added to the baths are then determined on the basis of these human-based evaluations. While inadequate replenishment leads to impaired quality in the metal components, overdosing results in additional process costs for the operator.

Engineered especially for the pretreatment processes developed by Henkel, Lineguard monitoring and control systems ensure automatic process compliance. They offer precise determination of the requisite chemical feed rate. This can lead to a reduction of between 10 and 30 percent in chemicals consumption, so contributing to resource conservation. There are round 370 Lineguard monitoring and control units already installed around the world. In combination with the comprehensive portfolio of Henkel metal pretreatment processes, these closed-loop regulating systems lead to outstanding results in quality and efficiency

Innovative pretreatment processes

The new technologies marketed under the Bonderite M-NT brand offer the high-performance, chrome-free pretreatment of aluminum and other light alloys, together with improved paint adhesion and corrosion resistance on steel.

With its products in the Bonderite C-AK series, Henkel provides a comprehensive portfolio of water-based alkaline, acidic and neutral-pH quality cleaners for efficient process, component and repair cleaning applications.

The products of the Bonderite M-PP line with their organic, autodeposition coatings suitable for all metals ensure maximum surface and corrosion protection, at the same time eliminating several of the process stages required by conventional coating technologies.

Henkel's high-performance cutting fluids under the Bonderite L-MR brand are tailor-made for the cost-efficient machining and forming of light alloys, cast iron, steel alloys and non-ferrous metals.

Solutions from Lineguard for modern pretreatment technologies

Leveraging 30 years of experience in the development of monitoring, measurement, metering and control systems for the regulation of chemical baths, Henkel has engineered a range of pretreatment process stabilizing systems. Lineguard process equipment is specially designed to meet the requirements encountered in the automotive industry. Lineguard monitoring and control units come with measurement modules and metering pumps aligned to the customer's plant configuration. All the process data captured by the system are automatically recorded and archived. Customers are therefore provided with full and comprehensive documentation of their processes, with the added benefit that measurement values determined in the laboratory can also be manually input into the system.

The basic unit in the equipment series is the Lineguard Control 210. As a modular controller, it is designed to support Henkel processes in metal pretreatment in combination with the likewise modular measuring system Lineguard 97 and the metering stations of the Lineguard DosEMP range. The Lineguard Control 210 unit can also be hooked up to the customer's own metering pumps. The metering stations come with a range of application possibilities checked for compatibility with Henkel products, with consumption in the individual zones being accurately logged. The Lineguard Control 210 responds to data fed in from the Lineguard 97, a flexible measuring system with up to three channels for the simultaneous capture and control of process parameters such as pH level, conductivity and redox potential. It also offers a serial interface for data interchange. As a further extension to this monitoring and control configuration, Henkel's Lineguard DosEMP metering system comes equipped with its own set of rugged, durable pumps to ensure the precise metering of fluids plus a fault diagnostics function.

Taking the capabilities of the Lineguard Control 210 one step further, the Lineguard ProcessControl 200 offers truly centralized regulation. With this, up to 20 different products can be metered under close-loop control covering the full range of bath variables – from the measured values captured online by the Lineguard 97 unit to the bath concentrations determined in the laboratory and the manual inputs for the system. The continuous monitoring regime combined with data acquisition of up to 80 bath parameters generates a level of process transparency never before seen. The system also features a titration table for manual entry of the threshold and target concentration values. In the event that the spray nozzles should become clogged, the system emits an alarm and status message which is also duly logged.

The advantages that accrue from optimum process monitoring

“At the focus of our system development the desire to ensure easy operability and regulation of our systems, thus supporting our customers in the measurement and control of some very complex processes,” explains Frank Krude, Head of TCS Engineering at Henkel. Hence, for example, the fast and easy touchscreen user interface common to all the company's cutting-edge monitoring and control systems. Through precise monitoring of the bath parameters and automatic control of the chemical replenishment process based on a continuous flow of measurement data as calculated by the systems, very tight process tolerances can be maintained. Indeed, even the smallest deviations can be immediately corrected. This creates a permanently optimized mix of chemicals in the process baths, enhancing pretreatment quality while also substantially reducing resource consumption. Automatic replenishment also saves labor while also avoiding frequent contact by employees with the chemicals themselves. Henkel's systems therefore provide for

improved occupational health and safety as well as greater quality throughout the production process. Downtimes and reject rates are significantly reduced.

A further benefit lies in the fact that the systems can be integrated within the operator's main communications network via an Ethernet interface. All the process parameters and operating conditions can thus be monitored by means of a browser such as Internet Explorer – and from locations anywhere in the world. Simple updating of the process parameters during operations, and the improvement in the customer's product standards achieved through the continuously high quality of the coating processes, increase the overall quality of the metal components being manufactured.

Wide range of process support services

— Henkel offers its customers a comprehensive package of services, from advice and installation oversight to troubleshooting. Customers are also assisted on site in the selection of suitable process technologies for their specific requirements. Aside from innovative products and methods for process optimization, Henkel also provides professional services ensuring comprehensive guidance as to the Lineguard control systems most suited to each application. Tailored training and familiarization courses are also available on site. In addition to supplying preassembled components to ensure the uncomplicated commissioning of its systems, Henkel also offers surveillance, audits and support by its experienced field engineers. With fast fault rectification and spare parts delivery, Henkel can also help to substantially reduce the costs arising from system malfunction. The company will also regularly inform customers and partners of new statutory regulations, directives and guidelines, as well as any new pretreatment processes and technologies likely to be of interest.

Installation of an innovative master program at Tofaş

— Since the beginning of last year, Henkel experts at TCS Engineering have been developing a comprehensive master program for the complete monitoring and control of the pretreatment processes at Tofaş Automobile Production – a fabricator of two autobody lines for Italian automobile constructor Fiat – in Turkey. For the Lineguard system engineers, the Tofaş contract provided a springboard for developing the next generation of the Lineguard ProcessControl 200 system aligned to minimizing the documentation work required for the full range of pretreatment processes. As well as proven Lineguard technologies, new functions have been implemented in this new master program – for example the recording and monitoring of the spray pressures for up to 15 zones. The Lineguard ProcessControl 200 system for this automotive production application in Turkey is due to be installed by the middle of this year.

A further innovation this year is the development of a program for controlling Lineguard systems directly from a Windows computer. This can be achieved via a WLAN link or through direct access to the in-house network. An app for Android tablets and smart phones is also currently being developed so that the pretreatment systems can be monitored and controlled directly, using a common program, without any manual input required at the various units themselves.

With continuous monitoring, fully automatic chemical replenishment, transparent data logging and the global access afforded by Internet Explorer, modern and innovative Lineguard monitoring and control systems both increase product quality and substantially reduce process costs for the operator. Henkel, with its innovative products, its modern control systems and its comprehensive service capability, is able to offer unique, single-source solutions that meet all the requirements encountered in the surface treatment of metal components.

“If the chemistry is right, the end result is also right. We have proven this with numerous systems already installed with customers throughout Europe,” concludes Krude. “Lineguard Control 210 and Lineguard ProcessControl 200 ensure attainment of the required surface quality in the treated component for the subsequent processes, which means that right at the start of the line, these systems make an important contribution to overall production cost efficiency.”

For further information, go to www.henkel.com/lineguard.

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Henkel operates worldwide with leading brands and technologies in three business areas: Laundry & Home Care, Beauty Care and Adhesive Technologies. Founded in 1876, Henkel holds globally leading market positions both in the consumer and industrial businesses with well-known brands such as Persil, Schwarzkopf and Loctite. Henkel employs about 47,000 people and reported sales of 16.4 billion euros and adjusted operating profit of 2.5 billion euros in fiscal 2013. Henkel's preferred shares are listed in the German stock index DAX.

Photo material is available at <http://www.henkel.com/press>

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Henkel AG & Co. KGaA

The following material is available:



Immersion baths are used in the automotive industry to guarantee an even coating of the bodies.



The Lineguard ProcessControl 200, a centralized monitoring and control solution, offers the advantages of controlled metering of up to 20 different products.



The flexible Lineguard 97 measuring system offers the simultaneous capture and control of process parameters such as pH level, conductivity and redox potential.



The Lineguard DosEMP metering station with its rugged, long-life pumps ensures the precise feed of fluids as well as offering an important fault diagnostics capability.



Frank Krude, Head of TCS Engineering at Henkel.

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