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Arnold Umformtechnik: Cooperation derives benefits

Transfer from laboratory to practice – with the “Chromiting[®]” example, Arnold Umformtechnik highlights its innovative skills -

(Forchtenberg, Germany) Automotive suppliers consistently operate in the face of increasing demands upon their skills. It’s not just the manufacturers that are putting on the pressure; legislation, too, is constantly raising the sights for industry’s power to innovate and evolve. Component manufacturers can no longer point out solely the excellent quality of their products. They must provide daily evidence that in their research and development work, they are able to forge new paths, yet exclude residual risk. Capacity must be assured without compromising system and process reliability.

Arnold Umformtechnik GmbH of Forchtenberg is a company within the globally successful Würth Group, which is able to prove its capacity to adapt to the enormous changes in the legislative framework. As a company manufacturing fasteners, Arnold Umformtechnik is particularly affected by the EU End-of-Life Vehicles Order, which bans the use of hexavalent chrome fastenings in cor-



rosion protection treatments from 1st July 2007.

New manufacturer standards

In Germany alone, every year around 600,000 tons of steel are turned into fasteners and cold extrusion parts in various fastener factories. A major proportion of these items are treated with an electro-plated zinc coating and then chromated with hexavalent chrome, in order to prevent corrosion. Hexavalent chrome is extremely toxic and carcinogenic if it gets into human organs. In fact the carcinogens are associated with the chromating but contamination caused by defective application cannot be excluded. Consequently, in September 2000 the European Union adopted the EU End-of-Life Directive banning the use of materials treated with hexavalent chrome in motor vehicles. All the vehicle manufacturers have reacted to the ban by making changes to their surface treatment standards, so that a standardised basis can be created for the change.

From laboratory experiment to practical application

As soon as it was announced that the Directive had been adopted in 2000, the Product Manager at Arnold approached SurTec Deutschland GmbH, the surface treatment specialists. At that

time SurTec had already developed a new process technology called “Chromiting[®]”. This made it possible to apply a reaction-inhibiting barrier coat using trivalent chrome onto electroplated surfaces. Trivalent chrome is not toxic, but its properties fall a long way below the necessary corrosion protection qualities. The process developed by SurTec consisting of a thick-layer passivation eliminates the problem of quality; and even increases the level of corrosion protection. To test the theory of the chromiting[®] process, it was tested in an inter-laboratory test carried out by the German Automobile Industry Association (VDA) during which it was compared with 56 competing systems

We’ve found a “green” screw

Since 2001, the managers at Arnold have been working towards putting this ground-breaking technology into practice. The aim was to develop the so-called “green” fastener, which would combine the zero health and corrosion risk with the economic viability of the new generation of products. The partnership between developers, business

The Arnold Group is a wholly owned subsidiary of the Würth Group, which, with over 50.000 employees and with 314 companies world-wide operates on a global basis with earnings of over 6 billion euros.

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administrators, and production engineers has worked perfectly and the "chromiting[®] in industrial practice" project has met with success.

Based on field research, the practical applications of chromiting[®] were tested on a step-by-step basis, and then tested for appropriateness in application. The process was standardised and incorporated into various company specifications and factory standards. Fasteners undergoing chromiting[®] progress through a multi-stage electro-plating line, consisting of more than 20 baths. The fasteners are given their anodic zinc layer inside a drum. The chromiting[®] then follows, still inside the drum. The process produces a slightly green coating on the surface. It is an indication of the screw's environmental sustainability. Chromited[®] parts can be tempered, underlining the economic efficiency of the system. The new alkaline cyanide free process also ensures that even difficult-to-reach places are evenly coated. The thread geometry is unchanged and adherence to calibration is assured.

"Human factor" taken into account

A crucial factor in the successful transfer of the demanding technology from theory to practice was early preparation and training of employees. Right from the start they have been trained in the

required quality management techniques, and quality managers were nominated. From the moment it arrives, until the time it is despatched, every customer order is accompanied by a bar-coded document containing a dimensioned drawing. A statistical process control system traces every step of manufacture. Close synchronisation with the electronic control systems ensures that every fastener meets maximum requirements. The test log serves as a valid document and is secured against falsification.

Meanwhile the system has established itself on the market, is now widely used, and has become standard practice. Pricing is aligned towards the preceding generation of yellow chromating; quality is endorsed by ISO TS 16949 certification. Added value is derived from a demonstrable increase in corrosion protection. Advanced Supply Chain Management guarantees product availability. They are in use in components within the passenger compartment, such as the airbag, seats, and navigation systems. Arnold's early investment in the new technology is paying dividends; as one of the first suppliers to offer the method, Arnold is setting the standards. The list of customers and references confirms the success: DaimlerChrysler, BMW, Bosch and many other tier 1 suppliers trust Arnold's products.

Arnold Umformtechnik GmbH is an SME with a production of around 3.5 billion screws every year. The company's specialty is the development and manufacture of thread-forming fasteners. The Taptite and Remform brands form a swarfless thread in drilled or cast holes, reducing assembly costs by up to 80 percent. On average there are 250 Arnold fasteners in every car produced in Germany. 50 percent of Arnold's total sales of 66 m. euros in 2005 is derived from the automotive industry. However customers from the electronics and consumer goods industries also make use not just of fasteners, but also the full range of services offered by Arnold – covering application-specific advice, development, production, and a full safety guarantee.

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