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Arnold Umformtechnik: Green screws

Arnold Umformtechnik offers an alternative to hexavalent chrome – Chromiting[®] overcomes residual risk

(Forchtenberg, Germany) Long before the official date on which materials containing hexavalent chrome are to be banned in motor vehicles (July 2007) Arnold Umformtechnik GmbH is offering a system that can be used in bulk manufacturing, to replace the old method of yellow chromating[®]. The fasteners specialist calls the technique "thick-layer passivating", a new process technique jointly developed with the surface treatment specialists, SurTec Deutschland GmbH, used to apply corrosion protective barrier coats. During laboratory tests carried out by the German Automobile Industry Association (VDA) the new system stood out from 56 systems covering a total of 133 hexavalent chrome-free surface coatings. The system is beneficial not merely in replacing the hexavalent chrome surface treatment, but it also provides increased protection against corrosion.

Hexavalent chrome guaranteed high-quality corrosion protection in the automotive industry. However it is also extremely toxic and carcinogenic if it gets into human organs. That is why, from July 2007, the EU End-of-Life Vehicles Order bans the use of materials containing hexavalent chrome in vehicles. The EU Directive, announced in September 2000, posed a major challenge to the fastener industry in particular as it considered how to develop and manufacture their products. They needed to



achieve zero risk for health and corrosion protection, while maintaining economic viability.

Progress made by cooperation Arnold Umformtechnik GmbH got to grips with the subject at a very early stage. The aim was to develop "green" screws, i.e. screws containing no hexavalent chrome. Together with SurTec, the surface treatment company based in south-west Germany, they had been working since 1994 on an economically equivalent replacement system, which allowed no compromise with regard to the quality of hexavalent chrome, but which did not have the carcinogenic side effects. The alternative to yellow chromating[®], as it is known, had to provide good corrosion protection, had to look shiny, and also comply with manufacturers' specifications with regard to bonding and abrasion resistance. A crucial factor was the need for a fastener to maintain its dimensions in every respect.

Every year in Germany some 600,000 tons of steel are turned into fasteners and cold extrusion parts. The majority of these are electroplated to provide a zinc coating, ensuring cathodic corrosion protection. The products manufactured at Arnold are treated in a process developed by SurTec, replacing the hexavalent chrome with trivalent chrome. The chromiting[®] technique developed and patented by SurTec replaces the conventional chromating[®] process. With its partners, Arnold has perfected the process to meet the requirements of the industry. In addition to the fact that the technique contains no toxic substances, the new process provides improved corrosion protection. In particular, small electro-plated screws with diameters of less than M6 are key candidates for the thick-layer passivating technique.

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Meets requirements in full

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. The colouring is an indication of the fastener'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 maintained.

The process reliability of chromiting[®] has been proved. The new products from Arnold have passed the market test. An advanced Supply Chain Management guarantees availability and economic efficiency. The static process control system, closely linked with the electronic systems, ensures that the required maximum specifications are main-

tained for every single fastener the company supplies. The list of Arnold's customers and references confirms the success of this cooperation leading German car manufacturers and international tier 1 supplier companies have put their trust Arnold products.

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