

Specialist expertise is needed to achieve high quality chrome surfaces. **David Vink** visited a chrome plating expert, Cromaplast, and Kolzer's sputtering technique is described on the next page

# Cromaplast's plating skill comes to the surface

**C**romaplast is an injection moulding company with 140 employees, located in Valdagno in the northern Italian province of Vicenza, which specialises in moulding and chrome-plating automotive parts.

Established in 1967 by founder Montagna Angelo as a plater of metal parts, Cromaplast started injection moulding in the 1970s for the domestic electrical appliance industry. The company soon started gradually shifting towards automotive applications, finally abandoning all appliance industry work by 1986.

The company's parts can be found on major Italian automotive brands such as Alfa Romeo, Fiat, Ford, Lancia, Maserati and Piaggio. Non-Italian brands supplied include Audi, BMW, Citroën, Dacia, General Motors, Mercedes Benz, Peugeot (PSA), Renault, Rolls Royce and VW/Skoda.

Although most parts are delivered to automotive system suppliers, Cromaplast itself has Tier One automotive system supplier status for Aixam-Maga, Fiat/Magneti Marelli and Piaggio. The company also plates some plastic parts for automotive moulder Sole in Oderzo, even though Sole also has plating facilities (see Sole article, page 23).

The company's turnover continued to rise even during the 2008-2009 recession, reaching €14m in 2007, €15m in 2009, €15.8m in 2010 and €17m (estimated) for 2011.

There are 10 injection moulding machines in the Cromaplast mould shop, one each with clamping forces of 65, 120, 200, 300, four of 420 and two of 650 tonnes. The oldest machines have been running since 1985. All machines have hydraulic drive and are now entirely from KraussMaffei, following substitution of four older



**Above: Mounted on copper frames, mouldings await plating at Cromaplast**  
**Right: Examples of plated mouldings**



Italian machines by 420-tonne KraussMaffei CX machines in mid 2011 and a renewal of the machine park in 2010.

Managing director Stefano Tecchio runs the company on a day-to-day basis on behalf of the other two family directors of the privately owned business, Angelo Tecchio (chairman) and Giovanna Tecchio.

Stefano Tecchio showed *European Plastics News* that all machines are fitted with linear robots

for part removal, sprue cutting and placement on conveyor belts. They all have hydraulic drives and Tecchio says: "We don't need exceptionally high speed, but our challenge is to respect close dimensional tolerances for later assembly operations and perfect surface quality prior to the plating in order to meet the stringent automotive industry standards."

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The KM machines are well suited for part production, Tecchio says, as they are free of grease and dust. Only ABS and ABS/PC blend materials are used, classic plastics for plated parts, but demanding automotive standards mean that Cromaplast only uses virgin materials and no recycle. Tecchio estimates ABS material consumption at around 25 tonnes/month and ABS/PC at 10 tonnes/month.

A second plating line was added in 2000, bringing chroming capacity up to 1,800 m<sup>2</sup>/day. The two lines produce not only high gloss chromed surfaces, but also satin, micro-porous and micro-cracked surfaces. The parts are mounted on copper frames prior to plating, with fully automated

equipment used for immersion, removal and conveying processes.

The elastomer content of the plastic parts is first etched in a sulphuric bath which contains a proportion of chromium. This is followed by activation of the oxidised surface, electroless deposition of a precious metal layer and chemical binding to nickel.

In preparation for electroplating of chromium, the mouldings first receive an electroless deposition of nickel to make the surface conductive, followed by acid surface etching. This provides adhesion for the electroplating of nickel, copper, nickel (again) and chromium layers.

Automotive specifications for satin surfaces include Fiat's CM 604 & 3Q7, VW's 2A 11, 2A17 (Silver Shadow) and PSA's M018



specifications. Cromaplast produces internal but mainly external parts, typically front grilles and company emblems, on tools supplied by several local mould-makers.

Due to high quality requirements, test and analysis equipment in Cromaplast's laboratory play an important role in checking surface quality and part dimensions, alongside visual inspection from experienced staff. The tests also cover aspects such as adhesion, corrosion resistance, ductility, impact strength, thermal shock and thermal cycling.

A particularly important tool is digital microscope equipment used to detect micro-crazing in mouldings prior to electroplating, as well as to check special micro-porous and micro-cracked surfaces. ■

# Sputtering into life

Vacuum treatment systems company Kolzer has sold three sputtering plants over the last two years to Imper, an injection moulder based in Milan. Imper is using the systems to produce electrical switch cover plates for Italian electrical equipment group Bticino.

Sputtering is a PVD (physical vapour deposition) method for coating substrates made from plastics and other materials. It can be used to apply a chrome coating to switches, reflectors, lamps and other applications in the automotive and electrical sectors.

Kolzer says there are environmental reasons for adopting the technology. In particular, companies working in the electrical and electronics sectors are looking for new surface treatments due to the EU's directive on restriction of hazardous substances. The directive imposes restrictions on the use of certain dangerous substances, including hexavalent chromium in the galvanizing industry.

It says: "Sputtering, which enables [deposition of] any kind of alloy or metal (and therefore also chromium) on any kind of substrate, other than having zero discharge also uses 'zerovalent' metallic chromium, which is not



dangerous for health and does not pollute."

Kolzer says Imper provides a case study of how plastics manufacturers benefit from using sputtering. Advantages include: guaranteeing the repeatability of the process; uniformity of the deposited material; and the ability to deposit alloys such as brass and copper and so obtain different metallic shades.

For decorative finishes, preparation is key, says Kolzer. In the first stage of the sputtering technique, a base coat of ultraviolet varnish is applied to level, harden and shine the surface. UV lamps quickly dry the varnish, to which a photoinitiator has been added to absorb UV radiation.

Kolzer supplies various sputtering plants, with a single station

**The automotive sector is increasingly using chrome sputtering, says Kolzer**



Kolzer sputtering system for metal deposition

or in-line, manual or with robots. "In each case it is essential to apply the varnish in a clean environment without the presence of dust, which would otherwise be captured by the thin layer of [varnish], with consequent marking of the surface," the company says.

The sputtering process takes place within the plant's vacuum chambers. The process happens at room temperature, which means the items can be packaged immediately after treatment.

In the automotive sector, Kolzer says: "More and more often, automotive components such as door handles and internal and external profiles are moulded in plastic and then chromium-plated using sputtering to give the illusion of metal, avoiding in this way, galvanics."

The company says sputtering can create numerous shades in the chromium range, which are repeatable and uniform. ■