STI SURFACE TECHNOLOGIES INTERNATIONAL

STI Hartchrom

The precision company

Hard Chrome Factors of Success

Surfaced by STI | Hartchrom

Trust the Market Leader

Thanks to its technological competence, its modern infrastructure, its wide range of technologies and its comprehensive range of services, STI | Hartchrom has been the preferred supplier to discerning companies for several decades.

High-quality surface solutions to suit your application are an important factor for your commercial success. Our Technical Sales cooperates closely with Research & Development to specify coating profiles that precisely meet your functional and commercial requirements.

Largest infrastructure worldwide

STI | Hartchrom thinks globally and acts locally. This means that you benefit from worldwide technology transfer on the one hand and from our presence on site very near you on the other. As partner of leading manufacturers in the printing, paper, film, foil, automotive and aeronautic industries, in shipping, defense technology and general engineering, our infrastructure is designed for both serial production and individual parts and for small to very large components. STI | Hartchrom's surface treatment technology can handle components with dimensions of up to 4,500 mm diameter, 12,000 mm length and a weight of up to 64,000 kg; its mechanical precision machining can handle components of up to 6,000 mm diameter, 27,000 mm length and a weight of up to 64,000 kg. The comprehensive and modern infrastructure is designed for high flexibility, short through-put times, and hence maximum commercial efficiency.

Top quality and precision

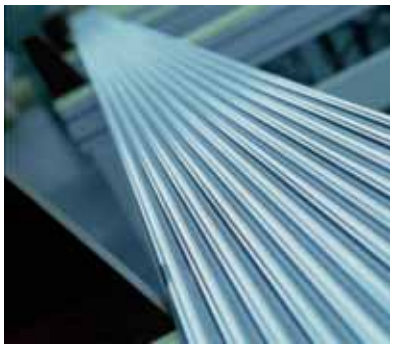
Although the functional requirements are different for each surface, they are always exactly defined in each case. STI | Hartchrom works to highly detailed specifications and controls each individual parameter. Controlling the processes in this way means that we can comply with very struct tolerances and garantee surfaces of top quality and precision for rotation-symmetric components as well as those with complex shapes. High quality standards and environmental accountability are important cornerstones at STI | Hartchrom, as evidenced by ISO 9001/14001 certification and the process-oriented Hartchrom Management System (HMS).

Hard chrome – really tough

Technical chromium surfacing with hard chrome has many advantages. Hard chrome layers are extremely hard and boast excellent wear and corrosion resistance, outstanding adhesive strength, and a homogenous layer structure. The resulting surface quality cannot be achieved with any other coating process. In addition, components are only exposed to very low temperatures, so that they are not subject to distortion. Very thick layers can be achieved and it is possible – using the extra strength of the layer – to apply chrome surfacing to soft materials. Components with suitable base materials are enhanced for heavy duty applications. Thanks to excellent mechanical processing options, it is possible to achieve highly polished surfaces with a roughness Rmax of less than 0.05 µm. In addition, there are methods of affecting the surface topography and micro-structure and of combining the coating with different materials with which the functionality of the coating can be further differentiated.

Customised surface solutions

In close cooperation with its customers, STI | Hartchrom develops customised solutions for industry-specific requirements. You can benefit from our experience in various industries such as the printing and paper industry, or engine manufacturing.



Cylinders for the printing industry

Due to the effect of aggressive media, such as printing ink and cleaning agents, these cylinders need to be extremely corrosion resistant. Dimensional precision in the micron range and perfect cylinder surfaces garantee top print quality. The specifically optimized hard chrome layers provide maximum corrosion protection and total absence of pores (even on cast-iron) and are mechanically finished using CNC-controlled precision circular grinding machines.

Perforated baskets for the treatment of scrap paper material in the paper industry

These require resistance to wear and impact, defined slot widths, repairability, compliance with minimum layer thicknesses and short delivery periods.

Piston heads and piston rings for engines

Hard chrome surfacing optimized for piston ring grooves combines very good wear protection characteristics with excellent lubrication through integrated "oil pockets". Chrome ceramics coating offers maximum wear protection of the piston rings and increased hot hardness of the layer.

Layer specifications	
layer hardness	750 – 1050 HV 0.1 (up to 1200 HV 0.1 possible)
wear	high wear resistance
corrosion	high corrosion resistance
achievable layer thickness	up to 1000 µm and thicker
common layer thicknesses	10 – 250 µm
thin coatings	2 – 10 µm
layer structure	single or multiple layer chrome coating with fine microcrack network
melting point	1875 – 1920°C
finishing	can be ground and polished
surface roughness/ surface texture	from highly polished to textured surfaces: 0.05 µm < Rmax < 60 µm
thermal expansion coefficient	$6.6*10^{-6}$ K^{-1} between 0 and 100°C
friction coefficient	low, can be determined by layer specification
coefficient of sliding friction	Cr-steel 0.12 to 0.16, sliding, well lubricated
coefficient of adhesion	Cr-steel 0.13 to 0.17, depending on roughness
max. coefficient of adhesion	structured chrome against steel up to 0.7
thermal conductivity at 18°C	69.069 J/(m s K)
wettability	normally hydrophobic but specification can be changed for a hydrophilic surface texture on request
others	neither toxic nor allergenic, can be repaired (stripped and re-coated, selectively re-coated, spot re-coating also possible on request)

Base materials

- steel of any kind (alloyed, unalloyed, hardened, etc.)
- cast-iron
- non-ferrous metal (copper, brass, bronze, etc.)
- light metal such as aluminum and aluminum alloys
- plastics, e.g. epoxy compounds

STI | Hartchrom – Pioneers in Surface Technology

Surface technologies for your applications

Treatment	Wear protection	Corrosion protection	Other advantages	Application examples
Precision hard chrome	++	+	very economical, layer up to 0.1 mm	pistons and piston rods for hydraulics and pneumatics, mold-making tools
Thick hard chrome	+++	++	layer up to 1 mm, high geometric precision and highly polished finishes through grinding and polishing	ring grooves for piston crowns, bridge bearings, repair layers
Triplex hard chrome	+++	+++	non-porous layers, high geometric precision, highly polished finishes through grinding and polishing	print cylinders, calender rolls, cooling rolls
Matt hard chrome	++	++	customized, reproducible texture, anti adhesive	cooling rolls, damping distributor rolls
Hydrophilic hard chrome	++	+++	adjustable surface properties for defined fluid transport	coating rolls for producing special papers
Dispersion layers				
Chrome ceramic dispersion	++++	+++	high thermal resistance	drill rods, heavy duty bearings
Hybrid layers				
Electroless nickel/ Hard chrome	+++	++++	electroless nickel plating-deposits the material on the base material true to contours	hydraulics industry, printing machine industry, use in seawater environments
Galvanic nickel/ Hard chrome	+++	++++	galvanic nickel layers up to 1mm	re-coating and repair of cast iron rolls, suitable in seawater environments
Hard chrome / PTFE	+++	+++	very good anti-adhesion-effect, low coefficient of friction	roller dryers for the food and paper industries
Nanochrome	+	+++	high anti-adhesion effect, very good cleaning properties	cooling rolls for the foil industy
Capacity				
Plating: up to Ø 4,500 mm, length up to 12,000 mm, weight up to 64,'000 kg Grinding: up to Ø 6,000 mm, length up to 27'000 mm, weight up to 64'000 kg Further treatments and component dimensions on request or www.hartchrom.com				

0 = adequate + = satisfactory ++ = good +++ = very good ++++ excellent

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