



Hard chrome

English

Surface solutions by **STI Group**



Trust the Market Leader



Thanks to its technological competence, its modern infrastructure, its wide range of technologies and its comprehensive range of services, STI Group 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 Group 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 Group'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 Group works to highly detailed specifications and controls each individual parameter. Controlling the processes in this way means that we can comply with very strict tolerances and guarantee 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 Group, as evidenced by ISO 9001/14001 certification and the process-oriented Hartchrom Management System (HMS).

HARD CHROME

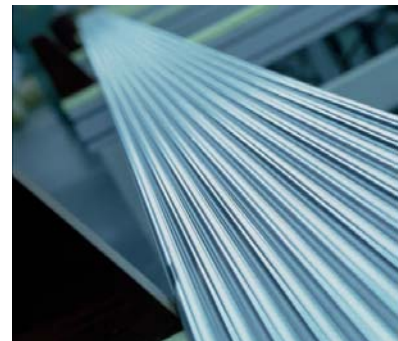
Hard chrome – really tough

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 R_{max} of less than $0.05\ \mu\text{m}$. 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.



Customized surface solutions

In close cooperation with its customers, STI Group 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 guarantee 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 Group Surface solutions worldwide.

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 industry
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.sti-surface.com				
0 = adequate + = satisfactory ++ = good +++ = very good ++++ excellent				

www.sti-surface.com



Hartchrom AG

Schulstrasse 70
CH – 9323 Steinach
T +41 71 447 97 97
F +41 71 447 97 92
sti@sti-surface.com

Hartchrom Defense Technology AG

Schulstrasse 70
CH – 9323 Steinach
T +41 71 447 97 97
F +41 71 447 97 92
sti@sti-surface.com

Hartchrom Inc.

25 Gibson Street
Watervliet NY 12189-3342 USA
T +1 518 880 04 00
F +1 518 880 04 50
sti.us@sti-surface.com

Hartchrom Schoch GmbH

Mühlackerstrasse 10
DE – 75447 Sternenfels-Diefenbach
T +49 7043 95 32 0
F +49 7043 95 32 299
sti.germany@sti-surface.com

Hartchrom Teikuro Automotive GmbH

Mühlackerstrasse 10
DE – 75447 Sternenfels-Diefenbach
T +49 7043 95 32 500
F +49 7043 95 32 599
sti.germany@sti-surface.com

STI France SAS

BP 17, ZI Le Touya
FR – 64260 Arudy
T +33 559 05 60 34
F +33 559 05 64 96
sti.france@sti-surface.com

STI France SAS

Route de Pau, ZA du Gabarn
FR – 64870 Oloron-Escout
T +33 559 39 71 01
F +33 559 39 22 33
sti.france@sti-surface.com

STI France SAS

ZA Ambroise
FR – 40390 Saint Martin de Seignanx
T +33 559 56 57 58
F +33 559 56 10 43
sti.france@sti-surface.com

STI Precision Machining (Changshu) Co., Ltd.

Xiang Yuan Rd. 16
South-east Economic Development Zone
CN – 215500 Changshu (Jiangsu Province)
T +86 512 5290 6200
F +86 512 5290 6299
sti.china@sti-surface.com

**STI Surface Technologies
International Holding AG**

Schulstrasse 70
CH – 9323 Steinach
T +41 71 447 97 97
F +41 71 447 97 92
sti@sti-surface.com

Contact

STI Group

Schulstrasse 70
CH – 9323 Steinach
T +41 71 447 97 97
F +41 71 447 97 92
sti@sti-surface.com