

Chrome Electrolytes

A perfect finish for much better products.

trivalent, hexavalent and
bright chrome processes

technical chrome processes



SLOTOCHROM DR 1140

Cr(III)

Chrome SLOTOCHROM DR 1140 is an electrolyte for decorative chrome layers. It's free from chromates (chromic acid), PFOS (PFT-containing wetting agents) and ammonium but operates on the basis of chromium(III) **sulphate compounds**. As a result, Environmental and Employment Protection are improved considerably. In addition, there will be no need for a separate effluent engineering and chromium(VI) reduction in the detoxification. The chrome coatings are light and very close in appearance to those provided by conventional chromium(VI) electrolytes. Layer thicknesses up to 0.3 μm can be deposited. The additive system has been optimised so the number of additives could be in comparison to the previous version reduced and so the handling significantly simplified. With regard to covering- and throwing power the electrolyte is su-

Concentrations and operating conditions

	Range	Optimum
Conducting Salt SLOTOCHROM DR g/l	185 - 230	195
pH range	3.5 - 3.9	3.7
Operating temperature °C	45 - 55	50
Cathodic current density A/dm ²	4 - 8	5
Deposition rate $\mu\text{m}/\text{min}$	0.03 at 5 A/dm ²	
Anodes	Mixed Metal Oxide - Anodes	

perior to the conventional chrome electrolytes on the basis of chromic acid. This means a considerably even metal distribution. The electrolyte is resistant to burnings in high current density areas. Auxiliary anodes or shields are seldom required even when parts with a complicated surface geometry are plated. There's no need to close drill holes or other perforations with a plug (unlike conventional chrome electrolytes) if parts are going to be chrome plated.



SLOTOCHROM 50

Cr(III)

Bright Chrome SLOTOCHROM 50 deposits light decorative chrome layers and doesn't contain any chromic acid. The process is **based on chloride** and chromium(III) compounds. Metal distribution and coverage of Bright Chrome SLOTOCHROM 50 is superior to conventional chromic acid based electrolytes. The electrolyte is resistant to burnings in high current density areas. Auxiliary anodes and blends are seldom needed even if parts with complicated geometry are plated. There is no need to close drill holes or other perforations with a plug if parts are going to be chrome plated. The additives of Bright Chrome SLOTOCHROM 50 are free of AOX.

Concentrations and operating conditions

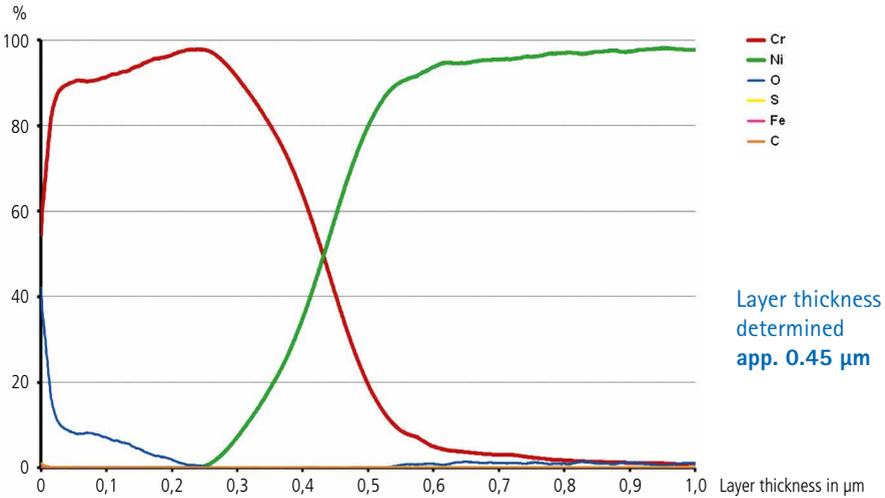
	Range	Optimum
Conducting Salt SLOTOCHROM DR 53 g/l	230 - 370	250
pH range	2.5 - 2.8	2.6
Operating temperature °C	30 - 35	32
Cathodic current density A/dm ²	10 - 20	15
Deposition rate $\mu\text{m}/\text{min}$	0.1 at 15 A/dm ²	
Anodes	Graphite Anodes	

Comparison of chrome layers by GDOS*

SLOTOCHROM DC 150



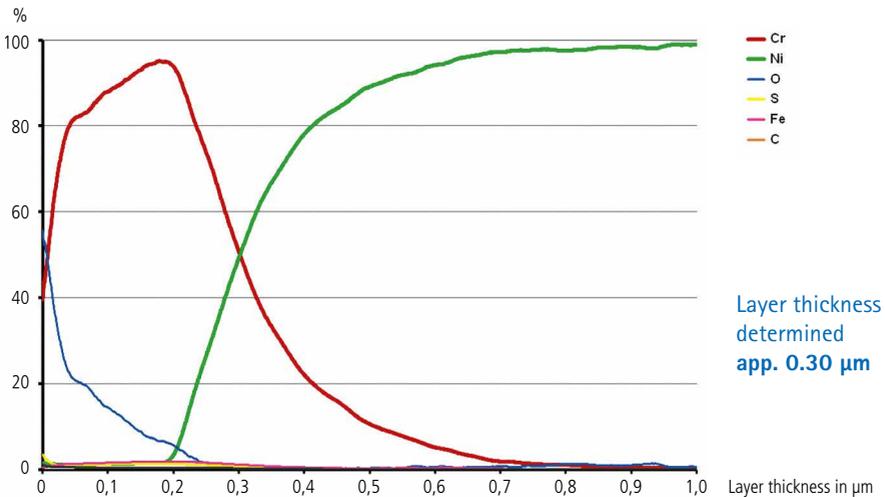
Bright Chrome Electrolyte, conventional chromic acid containing electrolyte



SLOTOCHROM DR 1140



Chrome Electrolyte, on sulphate-basis of the latest generation



*Glow Discharge Optical Emission Spectroscopy, GDOS/GDOES) indicates a spectroscopic process for the quantitative analysis of metals and also non-metallic materials. By GDOES-Spectroscopy, analysis of the layer structure can be performed and be used for the quantitative and qualitative determination of elements.

Comparison of Chrome Layers

by color measurements and spectral plot

SLOTOCHROM DC 150



Bright Chrome Electrolyte,
layer thickness app. 0.45 μm , conventional
chromic acid containing electrolyte

SLOTOCHROM DR 1140

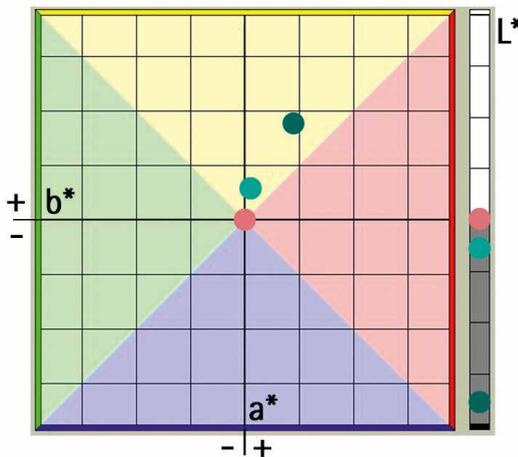


Chrome Electrolyte,
layer thickness app. 0.3 μm , electrolyte on
sulphate-basis of the latest generation

SLOTOCHROM 50

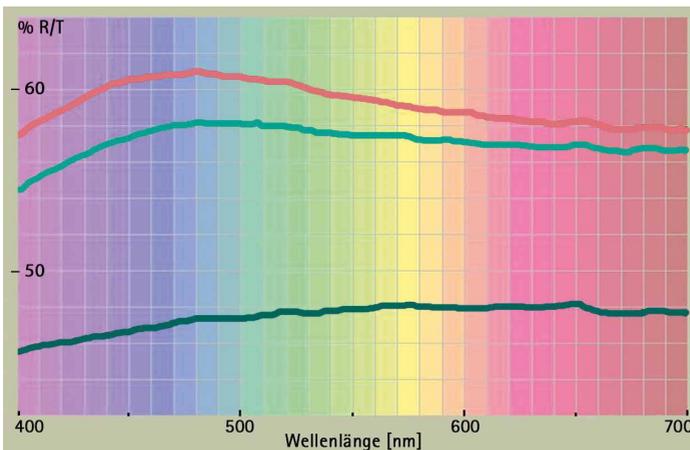


Bright Chrome Electrolyte,
layer thickness app. 0.3 μm , an approved
electrolyte system on chloride-basis



Comparison by color measurements

Color measurements at standard light conditions (D65) were carried out with the Diffus/8° geometry. They result in significantly higher reflections than color measurements according to 45/0° and so provide more stable measuring values. Chrome layers deposited from the trivalent SLOTOCHROM DR 1140 are in the color comparison very close to the layers deposited from the hexavalent Bright Chrome SLOTOCHROM DC 150.



The **spectral plot** reproduces the degree of reflectiveness of the chrome layers. This diagram shows very clear that chrome layers deposited from SLOTOCHROM DR 1140 and SLOTOCHROM DC 150 are very similar. On the contrary, the layer deposited from Bright Chrome SLOTOCHROM 50 (on chloride-basis) appears noticeably darker.

SLOTOCHROM DC 150

Cr(VI)

 **Schlötter**
Galvanotechnik

Bright Chrome SLOTOCHROM DC 150 is an easy to maintain chrome electrolyte with a variable chromic acid content. Trouble-free deposition is possible with a chromic acid content of only 150 g/l. If desired, a 300 g/l chromic acid content may be used without any problems. The components can be easily monitored analytically. Conventional chrome electrolytes can be easily converted to SLOTOCHROM DC 150.



Concentrations and operating conditions

	Range	Optimum
Chromic acid g/l	125 - 300	150
Chromium (III) oxide g/l	2 - 6	3
Sulphuric acid g/l	0.5 - 1.95	0.75
Operating temperature °C	40 - 50	45
Cathodic current density A/dm ²	10 - 25	15
Deposition rate µm/min	0.12 at 15 A/dm ²	

SLOTOCHROM 70

Cr(VI)

Black Chrome SLOTOCHROM 70 deposits uniform and decorative black chrome coatings for technical applications, e.g. solar technology and optical industry. A good throwing power, minimal soot formation, easy operation, high bath stability and short plating times are the features of Black Chrome SLOTOCHROM 70. The black chrome layers are uniform black, light-insensitive and may also be applied at higher temperatures due to their good thermal stability. The micro-porosity of the black chrome layers is responsible for the excellent

Concentrations and operating conditions

	Range	Optimum
Chromic acid g/l	300 - 500	450
Content of Cr(III) g/l	4 - 15	7,5
Operating temperature °C	13 - 24	18
Cathodic current density A/dm ²	5 - 40	20
Deposition rate µm/min	0.5 bei 20 A/dm ²	

abrasion and corrosion resistance. The reflexion of the black chrome coatings is approx. 94 % less than normal chrome layers. Post-treatment of the black chrome layers with wax, oil or clear lacquer improves reflectivity and blackness.

SLOTOCHROM S

Cr(VI)

Concentrations and operating conditions

	Range	Optimum
Chromic acid g/l	200 - 250	220
Sulphuric acid g/l	1,0 - 1,75	1,38
Operating temperature °C	50 - 58	54
Cathodic current density A/dm ²	30 - 70	50
Deposition rate µm/min	0,1 bei 50 A/dm ²	

Hard Chrome SLOTOCHROM S is a mixed-acid based electrolyte containing fluoride. Easy maintenance, no sediments and high deposition rates are the features of this electrolyte. Chromic acid as well as low quantities of sulphuric acid and Hard Chrome Additive S 1 are used for make-up. The latter can be analysed, making the solution very easy to monitor.

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