COVENTYA
Beyond the Surface

Decorative Process Catalogue

Version 8

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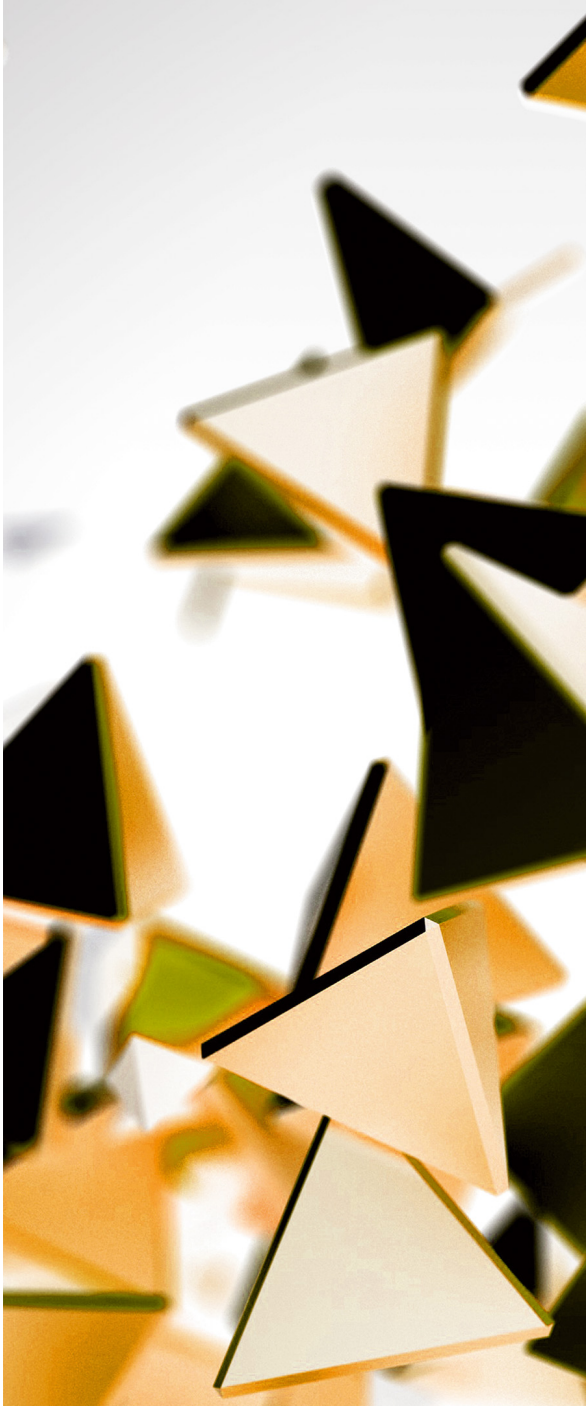


COPPER

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment: l/10.000Ah)	Ecology/ Comments
Acid Bright / Leveled High ↓ Low	CUBRAC 660	***Dye-based*** acid. Deep throwing power and highest leveling. Suitable for POP and Zinc Die Cast.	Base: 0.4 l/10,000 Ah Leveler: 0.75 l/10,000 Ah Brightener: 0.5 l/10,000 Ah	Free of complexing agents.
	CUBRAC 600	***Dye-based*** acid. Deep throwing power and excellent leveling. Suitable for POP and Zinc Die Cast.	Base: 0.6 l/10,000 Ah Leveler: 1.0 l/10,000 Ah Brightener: 0.6 l/10,000 Ah	Free of complexing agents.
	CUBRAC 480	***Dye-based*** acid. Excellent for high production applications- automatic plating machines. Suitable for POP and Zinc Die Cast	Base: 0.4 l/10,000 Ah Leveler: 0.75 l/10,000 Ah Brightener:0.5 l/10,000 Ah	Free of complexing agents.
	CUBRAC 2900	***Low Dye-Dye Assisted*** acid. New Dye Technology Excellent Elongation. Suitable for POP Aluminum and Zinc Die Cast	Base: 0.6 l/10,000 Ah Leveler: 0.6 l/10,000 Ah Brightener: 0.5 l/10,000 Ah	Free of complexing agents.
	CUBRAC 200	***Non-dye*** acid. Soft deposit with excellent elongation.	A: 0.25 ml/l weekly. B: 2.0 l/10,000Ah, C: As needed	Less requirement for carbon treatments
Acid High Build/Speed	CUBRAC GR-SG	***High efficiency non-dye*** acid process designed for high thickness/speed	GR-SG: 1.4 l/10,000 Ah	Free of complexing agents.

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment: l/10.000Ah)	Ecology/ Comments
~~Acid Hard: 190-220 Hv~~	~~CUBRAC 540~~	~~Non-dye acid. ***Printing rolls.***~~	~~Additive: 1.0 l/10,000 Ah Brightener: 1.0 l/10,000Ah~~	~~Free of complexing agents.~~
Acid Hard: 180-240 Hv	CUBRAC 542	Non-dye acid***. Printing rolls.***	Additive: 1.5 l/10,000 Ah	Free of complexing agents.
ACID Satin	CUBRAC SATIN 120	Acid. Alternative to satin nickel where hypoallergenic finishes are required.	Additive 1: 0.5 l/10,000 Ah Additive 2: 3.0 l/10,000 Ah	Nickel-free applications
Alkaline Non-Cyanide Semi-Bright Plate	DIASTAR 100	Alkaline***. Alternative to cyanide*** processes for barrel and rack plated steel, zincated aluminum and rack plated zinc die cast. Excellent as a heat treat Stop-Off deposit.	CPLX: 15 l/10,000 Ah Surfact: 1.0 l/10,000AH Brightener (if required): 0.3 l/10,000Ah	Cyanide free
Alkaline Non-Cyanide Strike	DIASTAR STRIKE	Alkaline, ***cyanide free*** copper process for depositing an adherent electrolytic copper flash on zinc die cast, steel and aluminium	CPLX: 15 l/10,000 Ah Strike Additive: 2.5 l/10,000Ah	Cyanide free
Cyanide Bright	CUPROPLATE K	Rack & barrel. ***Potassium cyanide based***.	Base: 1.5 l/10,000 Ah Brightener: 2.0 l/10,000Ah Condi: 1.0 l/10,000 Ah Surfact: 0.5 l/10,000 Ah	

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment: l/10.000Ah)	Ecology/ Comments
	CUPROPLATE RAPID	Rack & barrel. ***Sodium cyanide based.***	Base: 1.5 l/10,000 Ah Brightener:1.5 l/10,000Ah Condi:1.0 l/10,000 Ah Surfact: 0.5 l/10,000 Ah	
Cyanide Bright and/or dull	CUPROPLATE NA	Rack & barrel. ***Sodium cyanide based.***	Base: 1.5 l/10,000 Ah Brightener: 2.0 l/10,000 Ah Condi: 1.0 l/10,000 Ah Surfact : 0.5 l/10,000 Ah	
Cyanide Strike deposit (Pre-Copper)	CUPROPLATE PRE	Rack & barrel. ***Sodium or potassium cyanide based.***	Conduttori: As needed Surfact: As needed	

NICKEL

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Bright	CRYSTAL 301	Rack. Enhanced bright throwing power (low current density). Automatic line-job shop application. ***Index and Leveler Assisted.***	Brightener: 2.5 l/10,000 Ah 45S: 1.0 l/10,000Ah 44F: 2.0 l/10,000 Ah 47G: 0.5 l/10,000 Ah	
	CRYSTAL 103	Rack. Fast leveling. Preferred choice for POP Applications	Brightener: 2.5 l/10,000 Ah 45S: 1.0 l/10,000Ah 44F: 2.0 l/10,000 Ah 47G: 0.5 l/10,000 Ah	
	CRYSTAL 501	Rack. Superior Leveling.	Brightener: 2.0 l/10,000 Ah 45S: 1.0 l/10,000Ah 44F: 2.0 l/10,000 Ah 47G: 0.5 l/10,000 Ah	
	~~CRYSTAL ANTHEM~~	~~Rack. ***Leveler-only based.*** Extremely high or low cathode current densities.~~	~~Brightener: 3.8 l/10,000 Ah~~	
	CRYSTAL LC	***Very low nickel metal*** concentrations. 50% reduction in drag-out..	Base: 1.1 l/10,000Ah; Brightener: 2.1 l/10,000 Ah 44F: 0.8 l/10,000 Ah 55S: 1.0 l/10,000 Ah	Reduced waste water demands and costs

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Bright	CRYSTAL BARREL 110	Barrel. ***Minimal thickness applications.***	Bright: 3.0 l/10,000Ah 35S: 0.7 l/10,000 Ah 44F: 2.0 l/10,000 Ah	
	CRYSTAL BARREL 169	Barrel. ***Zinc die cast, brass and copper.***	169: 3.5 l/10,000Ah 45S: 1.0 l/10,000 Ah 44F: 2.0 l/10,000 Ah	
	CRYSTAL BARREL 210	Barrel. ***Low operating current densities*** and minimal thicknesses.	Bright: 3.5 l/10,000Ah 45S: 3.0 l/10,000 Ah 44F: 2.0 l/10,000 Ah	
Sulfur Free-Columnar <0.005% by weight sulfur	CRITERION SB 100	Duplex nickel applications. ***Ductile deposits. Meets OEM Automotive Specification Requirements.***	Base: 0.75 l/10,000Ah Bright: 0.75 l/10,000 Ah Additive:1.25 l/10,000 Ah or single via Replenisher: 2.0 l/10,000 Ah	
High Sulfur >0.15% by weight sulfur	CRITERION HS2	***Triple layer nickel.*** Additional mVolt potential between the semi and bright nickel deposits.	HP Carrier:1.8 l/10,000Ah HS2 100: 4.0 l/10,000 Ah	

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Micro Cracked (fissured)	CRITERION MC 300	High degree and uniform ***micro-cracks (fissures)*** in the subsequent chromium deposit.	MC 300: 1.0 Kg for every 5 Kg of NiCl added MC 300: 2.5-l/10,000 Ah	
Micro Porous 10,000 cm^2 to a maximum of 20,000 cm^2	CRITERION MP 250	High degree of ***micro-porosity*** in the subsequent chromium deposit. ***Used for Conventional Hex Chrome deposits or as a Noble Nickel layer for enhanced corrosion resistance of TRISTAR (Cr+3) deposits.***	MP 250 Carrier: 1.0 l/10,000 Ah MP Bright: 3.0 l/10,000 Ah MP F: 0.35 l/10,000 Ah or SB 100 Additive 1:0.2l/10,000 Ah MP Powder 1 & 2 As Needed	
Electroforming Stress : 500-1000 psi Hardness: 150-350 Hv	CRISAL 300	Intended for use in ***sulfamate*** nickel plating applicable to engineering and functional deposits.	300 Make-Up: based on Nickel metal analysis 300 Additive: based upon production experience.	
Boric Acid Free Bright Nickel	EMERALD 1000 Process	A breakthrough bright nickel plating process that meets the demands of conventional nickel deposits for Plating on Plastic or highly polished surfaces applications, ***but is completely free of boric acid thus enhancing the eco-friendly nature.***	1000 Brightener: 3.0 l/10,000 Ah Additive: As required 55S: 0.8 l/10,000Ah 44: 1.0 l/10,000 Ah 47G: 0.5 l/10,000 Ah	Eliminates the introduction of Boron into the environment.

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Satin Ra Low Gloss Bright High Matte	SATIN CRYSTAL 960	***Limited life dispersion:*** 6-8 hours. Light satin effect.	200:1.7 l/10,000Ah Base: 1.2 l/10,000 Ah 960: 25% of make-up dose per hour.	
	SATIN CRYSTAL FM	***Limited life dispersion:*** 6-8 hours. Light satin with white effect.	200: 1.8 l/10,000Ah Base: 1.3 l/10,000 Ah FM: 25% of make-up dose per hour.	
	SATIN CRYSTAL NFP	***Limited life dispersion:*** 6-8 hours. Light Satin with aluminum appearance.	200 2.2l/10,000Ah Base: 1.2 l/10,000 Ah 230: 0.5 ml/l, 0.1 ml/l per hour.	~~Long Life Dispersion- No Special Equipment~~
	SATIN CRYSTAL 230	***Limited life dispersion:*** **16-20 hours.** Slightly white.	200 1.7 l/10,000Ah Base: 1.2 l/10,000 Ah 230: 0.5 ml/l, 0.1 ml/l per hour.	
	SATIN CRYSTAL ST	***Limited life dispersion:*** **16-20** hours. White satin effect.	200: 1.7 l/10,000Ah Base: 1.2 l/10,000 Ah ST: 25% of make-up dose per hour.	
	SATIN CRYSTAL GFS	***Limited life dispersion:*** 6-8 hours. White-silver effect.	GFS:1.5 l/10,000Ah Base:1.2 l/10,000 Ah GFS: 25% of make-up dose per hour.	
	SATIN CRYSTAL V	***Indefinite life emulsion*** due to heat/cool cycle. Matte/Anti-glare.	D100: 1.3 l/10,000Ah M30: 3.0 l/10,000 Ah	

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Black-Gun Metal	CRYSTAL BLACK 700	Rack. Color based on nickel oxide.	700: 3.5 l/10,000Ah 700-M: 10 l/10,000 Ah	Cyanide Free
Deep Black	CRYSTAL BLACK 710	Rack & barrel. Sulphate /sulphocyanide based.	Part A: per analysis Part B: per analysis	
	CRYSTAL BLACK 720	Rack & barrel. Chloride /sulphocyanide based.	720 Salt: per analysis Additive 1: per analysis Additive 2: per analysis.	
Grey Black with blue tones	CRYSTAL BLACK 730	Rack and barrel. Cyanide based.	See TDs for details	
Tin (65%) / Nickel (35%) Grey with rose hues. 600 Vickers	NISTLA 70 AC	Rack & barrel. Acid/fluoride based.	70 AC: based on bivalent tin analysis 70 AC B: based upon 70 AC A Addition	
Tin (65%) / Nickel (35%) Grey-Black 600 Hv	NISTLA 650	Rack. Acid/fluoride based.	Additive: drag-out NC: pH adjust and Ni content SC: 2.5 l/1 kg $SnCl_2$	

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Tin (65%) / Nickel (35%) Light Grey to Grey Black	NISTLA ECO	Rack. Neutral pH. Low Sn & Ni concentrations. Flash deposits.	Eco: 1.8ml/l/0.1g add of Ni Eco: 2.5 ml/l/0.1 add of Ni Eco 3: based on sp. gr. Eco: 0.35 g/l/0.1 g/l Sn	Ammonia and Fluoride free
Tin (65%) / Nickel (35%) Grey Black 600 Hv	NISTLA ECO Black	Rack & barrel (no streaks).	Eco NiCl: 1.1 ml/l/0.1 gr Ni Eco SnCl: 0.2 g/l/0.1gr Sn_2 Eco 3 Cond: drag out Color: 4.0 ml/1000 Ah	Ammonia and Fluoride free. No Cyanide complex
Tin (65%) / Nickel (35%) Grey Black 600 Vickers	NISTLA 65 AL	Rack. Cyanide based. Single additive used in combination with sodium cyanide.	65 AL X 70:10 g/l for every 2 g/l NaCN addition.	
Tin (78%) / Cobalt (22%) White with blue hue	CEDIA	Barrel, but suitable for rack. Neutral pH. Excellent throwing & covering power.	Salt 1: based on Cobalt Salt 2: based on Tin Complexor: 1:1 with Salt 2.	Cyanide Free

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Tin (78%) / Cobalt (22%) Grey Black	CEDIA Black	Barrel, but suitable for rack. Mildly alkaline. Excellent throwing & covering power.	Make Up: drag-out Sn Salt: 0.5 g/l/0.1 g/l Sn_2 Co Salt: 5.0 g/l/0/1 g/l Co Additive: based on need	Cyanide Free
Nickel-Iron (35%)	CRYSTAL NF	Rack & barrel. Reduces nickel metal consumption.	Carrrier : 2.5l/10,000 Ah Additive: 4.0l/10,000 Ah Complexor: 75 g/10,000Ah	Reduction of Nickel usage
High Corrosion 87-89% Ni 550/600 Hv	CRYSTAL SHIELD	Rack & barrel. Intermediate deposit.	Brightener: 5 kg/10,000Ah Additive: 6 Kg/10,000Ah	Chloride free

TRIVALENT CHROME

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
White Deposit closely matches hex. Chrome color	TRISTAR 300 (EU and USA Versions)	***Chloride*** based utilizing graphite anodes. Liquid and powder Cr(III) additives. ***Passes Russian Mud***	See TDS	Cr(VI) free electrolyte
	TRISTAR 330 AF	***Sulphate*** based with excellent throwing power combined with higher than normal cathode efficiency. LAB values close to Cr(VI) deposits. ***Plating rate 0.03-0.06 µm/min (1.1-2.3 millionths per min)***	See TDS.	Cr (VI) and ammonium free electrolyte
Black-Transparent	TRISTAR 755 Intense (EU and USA Versions)	***Chloride*** based utilizing graphite anodes. Three distinct aspects. ***Passes Russian Mud.*** ***L.a.b. values:*** ***L: 54-56*** ***a: 0.8-0.9*** ***b: 4-5***	See TDS for Three distinct l.a.b. shades	Cr(VI) free electrolyte

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
	TRISTAR 760 Dark (EU and USA Versions)	***Chloride*** based utilizing graphite anodes. Three distinct aspects. ***Passes Russian Mud:*** ***L.a.b values:*** ***L: 57-61*** ***a: 0.5-0.6*** ***b:3-4***	See TDS for Three distinct l.a.b. shades	Cr(VI) free electrolyte
	TRISTAR 765 Light (EU and USA Versions)	***Chloride*** based utilizing graphite anodes. Three distinct aspects. ***Passes Russian Mud*** ***L.a.b. values:*** ***L: 65-68*** ***a: 0.2-0.3*** ***b: 2-3***	See TDS for Three distinct l.a.b. shades	Cr(VI) free electrolyte
	TRISTAR 720	***Sulphate*** based utilizing specially coated titanium anodes.	See TDS for various make-up and replenishment possibilities.	Cr(VI) free electrolyte

TRIVALENT CHROME Post Treatments

Characteristics	Process Name	Description / Key Features	Operation parameters	Ecology/ Comments
Immersion	TRISTAR POST DIP HM	Formulated to proivde Humidity protection to Trivalent Chromium deposits over plastic, copper alloy and steel substtates. Prevents flash rusting of steel parts during drying.	8-10% by volume, 23-30°C (73-86°F), 60-180 seconds.	Chrome Free
Electrolytic	TRISTAR SHIELD	Formulated to provide salt spray protection to Trivalent Chromium deposits over plastic (up to 1000 hours), Copper Alloy (250 hours and steel parts (24 hours).	Additive: 25ml/L, Salt: 15 g/L, pH: 9-10, 25°C, 2-3 minutes	Cr(VI) free

TRISTAR HP SYSTEM

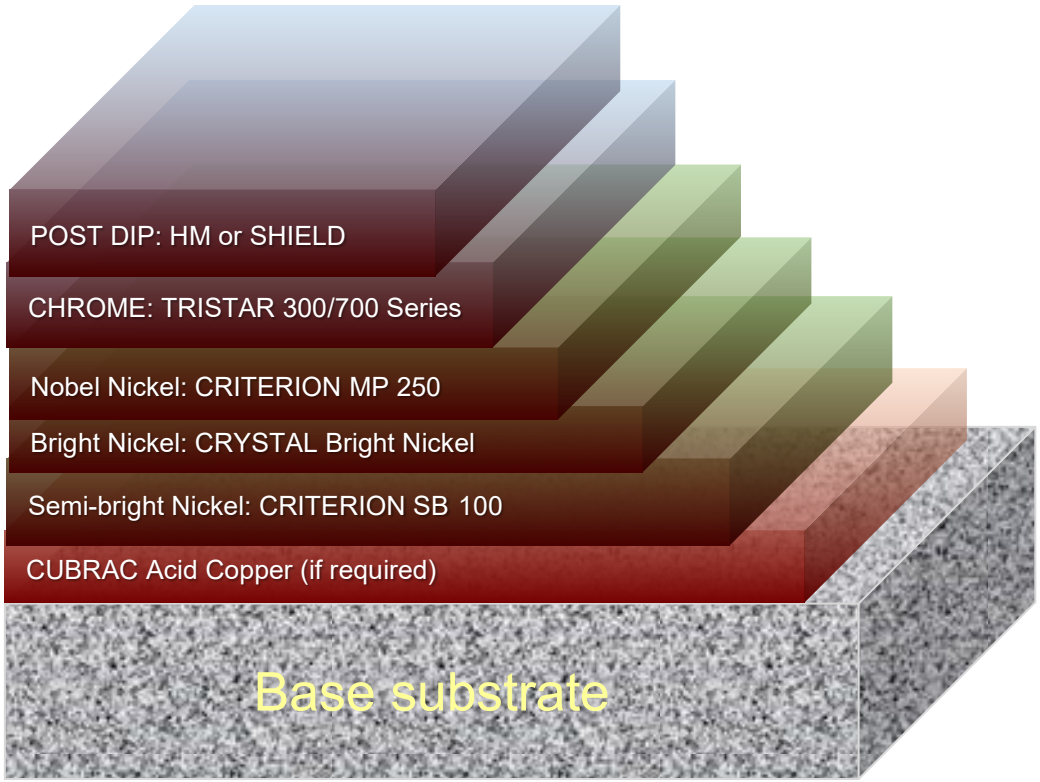
TRISTAR HP System is a trivalent chromium based plating system to achieve high corrosion resistant chromium finishes. It was especially developed to enhance the corrosion protection provided by Trivalent Chromium deposits.

TRISTAR HP System is a High Performance System that provides a Trivalent based Decorative Chrome deposit with up to 60 hours CASS resistance on Metal and Plastic Substrates.

TRISTAR HP System utilizes a Noble Nickel layer that slows the initial corrosion that cause discoloration or tarnishing providing a deposit with prolonged CASS corrosion resistance. The following is a summary of system benefits:

- Very attractive, bright finish
- Completely free of hexavalent chrome
- Passes up to 60 hour CASS with or without previous temperature cycles
- Passes Russian Mud test
- Passes Neutral Salt Spray test with TRISTAR SHILED Post Treatment
- Passed Humidity test with TRISTAR POST HM.
- No additional process tanks required
- Low conversion and replenishment cost

TRISTAR HP SYSTEM consists of several interacting layers (Semi-Bright Nickel through TRISTAR 300/700 Series) based upon electromotive potential that provide a barrier to corrosion. A schematic of the layer system is detailed below:



Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
TRISTAR HP	CRITERION SB 100	Sulfur-Free Nickel (<0.005% wgt) used for Duplex nickel applications. ***Deposit are semi-bright***. Excellent Ductility and Internal Stress.	1:1 mixture of Carrier and Leveler: 3.3l/10,000 Ah. SB-2 Additive: as required to maintain required STEP	
	CRYSTAL 301 Process for Ferrous applications and CRYSTAL 103 Process for POP applications	Rack. Enhanced bright throwing power (low current density). Automatic line-job shop application. ***Index and Leveler Assisted.***	Day Tank: 1/3 BRIGHTENER, 1/3 CARRIER 55S and 1/3 CARRIER 44 F and set to feed at 1.5 liters per / 10,000 Ah	
	CRITERION MP 250	Micro-porous nickel deposit with enhanced potential. With or without pores.	MP 250 Carrier: 1.0 l/10,000 Ah MP Bright: 3.0 l/10,000 Ah MP F: 0.35 l/10,000 Ah Powder 1 & 2 As Needed	
	TRISTAR 300/700 Series	***Chloride*** based utilizing graphite anodes. Liquid and powder Cr(III) additives. ***Passes Russian Mud***	See TDS	Cr(VI) free electrolyte
	TRISTAR POST DIP (HM or SHIELD)	Additional Salt Spray and Humidity resistance.	See TDS.	HM : Chrome Free SHIELD :Cr (VI) free

HEXAVALENT CHROME

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Blue-Decorative 900-950 Hv	CHROME 200	Based on chrome dioxide and a particular catalyst system.	Additive: 0.4 Kg/100 Kg of Chrome Dioxide 200 Catalyst: 4.0 Kg/100 Kg Chrome Dioxide	
Blue-Decorative Micro-Cracked 900-950 Hv	CHROME NMP	Provides micro-cracked (fissured) chrome deposits.	NMP 1: 10 Kg per 100 Kg of Chrome Dioxide NMP 2:10 Kg per 100 Kg Chrome Dioxide	
Black	CHROME Nero	Based on chrome dioxide and a special catalyst.	See TDS	
~~Mist Suppressant~~	~~CHROMSTOP SA-F~~	~~PFOS Free Mist Suppresant~~	~~SA-F: 50-250 mL/10,000 AH~~	
	CHROMSTOP AFL	PFOS/PFAS Free Suppresant	500-600 mL/10,000 AH	

BRASS

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Cu (70%) / Zn (30%)	BRASS 15	Large automatic rack. Lemon yellow color. Sodium cyanide based. Lighting & furniture applications.	See TDS	
	~~BRASS 20~~	~~Similar to Brass 15. Potassium cyanide based. Decorative & intermediate coatings. Single additive make-up.~~	~~See TDS~~	
	BRASS 30	Similar to Brass 15. Sodium cyanide based. Suitable for recovery systems (evaporation).	See TDS	
	BRASS 40	Sodium cyanide based formulated for barrel.	See TDS	
	BRASS 42	Similar to 40. Barrel. Decorative & thick coatings. Mass production of small parts.	See TDS	
	BRASS 82	Rack & Barrel. Gold color. Sodium cyanide based. Thin deposits (flash).	See TDS	

WHITE BRONZE

Characteristics	Process Name	Description / Key Features	Operation parameters (replenishment)	Ecology
Cu (60%) / Sn (29%) / Zn (10%) / Pb (1%) Bright silver-white 450-550 Hv Melting Pt: 350-400º C	AURALLOY 300	Rack. Decorative-jewelry, accessories & perfume applications. Functional-connectors.	See TDS	
Cu (58-62% Sn (28-32%) Zn (10-12%) Bright Silver White	AURALLOY 400 LF	Barrel. Decorative-jewelry, accessories & perfume applications.	See TDS	Lead Free
Cu (51-55%) Sn (28-32%) Zn13-18%) Bright Silver White	AURALLOY 450 LF RACK	Rack. Decorative-jewelry, accessories & perfume applications.	See TDS	Lead Free

Replenishment data in this bulletin is based on typical results and may vary depending upon different operating conditions.