



# PT. SINAR CEMARAMAS ABADI

- VERCOPPER (ACID / CYANIDECOPPER)
- VERNICKEL
- VERCHROME
- VERZINC ACID / CYANIDE ZINC
- CLEANER (ELEKTRO / SOAK)
- PHOSPHATING
- CHROMATING
- ELECTROLESS NICKEL

#### FOR HIGHTECT ELECTROPLATING :

- ELECTROLESS NICKEL PLATING FOR ALUMINIUM AND ZINC DIE CAST, MAGNESIUM
- GOLD PLATING
- PTFE FORELECTROLESS NICKEL
- HARDCHROM
- SAND CAST ALUMINIUM ALLOYS PLATING
- MAGOXID – COAT FOR PROTECTING MAGNESIUM SUBSTRATES

- KEPLA – COATING FOR ALUMINIUM AND TITANIUM ALLOYS
- ELECTROLESS NICKEL PLATING WITH INTEGRATED SILICON CARBIDE PARTICLES (SIC)
- GLISS – COAT
- A CLEAN SOLID FILM LUBRICATION FOR A MAINTENANCE FREE PERMANENT LUBRICATION OF ALL KIND OF FRICTION PAIRINGS
- SEPA – COAT (ANTI ADHESIVE COATING AND ACTIVATOR) FOR THE REMOVAL OF PART FROM MOULDS

## **HR 75**

### BRIGHT CHROME PLATING

## 1. PROPERTIES

The Bright Chrome plating Solution HR 75 is a mixed-acid chrome electrolyte. It is applied for deposition of decorative bright chrome layers. The special characteristic of this electrolyte is excellent covering power which can be obtained by operation within a wide range of current density.

## 2. SOLUTION MAKE – UP

### a) MAKE UP QUANTITY FOR 100 LITRES

Standard Make up :                      30.00 kg Chromic acid (Bayer or Stoppani)  
   0.065 lt Sulphuric acid, chem, pure conc., d = 1.84  
   3.00 lt Catalyser HR 75

Low concentrated make up : 19.00 kg Chromic acid (Bayer or Stoppani)  
   0.044 lt Shulpuric acid, chem, pure conc., d = 1.84  
   2.00 lt Catalyser HR 75

- b) Equipment:                                      See Instruction Sheet R 20
- c) Make up instructions:                              See Instruction Sheet R 21

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## 3. OPERATING CONDITIONS

- a) Density : Be (15 °C) = 25<sup>0</sup>  
d (20 °C) = 1.21 g/cm<sup>3</sup>
- Low concentrated  
Make up : Be (15 °C) = 17<sup>0</sup>  
d (20 °C) = 1.135 g/cm<sup>3</sup>
- b) Temperature : 35 - 50 °C
- c) Current density : 10 - 25 A/dm<sup>2</sup>
- d) Voltage : The voltage is mainly depending upon the plant-and operating conditions. Average voltage : 6 – 12 volt.
- e) Anode current density : 15 –25 A/dm<sup>2</sup>
- f) Anode material : See instruction Sheet R 22
- g) Rectifiers : Usually 8 V units, for higher outputs usually 12 V units. The rectifiers must provide a residual ripple of less than 5 % within the whole current range.
- h) Rate of deposition : Rate of deposition (standard make-up) at between 40 and 50 °C and cathodic current densities of :
- 10 A/dm<sup>2</sup> = approx. 0.08 µm/ min  
15 A/dm<sup>2</sup> = approx. 0.14 µm/ min  
20 A/dm<sup>2</sup> = approx. 0.22 µm/ min  
25 A/dm<sup>2</sup> = approx. 0.29 µm/ min

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## 4. MAINTENANCE

a) Nominal values Minimum and maximum values :

Standard make-up 280 – 350 g/l CrO<sub>3</sub>

Low conc. make-up 170 – 210 g/l CrO<sub>3</sub>

Sulphuric acid 0.4 – 0.6 %

(in relation to the content of chromic acid)

The widest range of operation is achieved at a concentration of 320 – 340 g/l CrO<sub>3</sub>

b) Reinforcement :

The electrolyte is reinforced by adding Chromic acid, Catalyser **HR 75**.

For increasing the density by 1o Be an addition of 1,5 kg Chromic acid per 100 lt solution is required.

At addition of chromic acid, 10 % of the quantity of catalyser HR 75 have likewise to be added. (1 kg CrO<sub>3</sub> = 0,1 lt HR 75 catalyser)

Sulphuric acid is only added after made analysis, where at it should also be taken care that the H<sub>2</sub>SO<sub>4</sub> content between 0,4 – 0,6 % of the CrO<sub>3</sub> content is maintained. ( 0,4 % H<sub>2</sub> SO<sub>4</sub> at lower CrO<sub>3</sub> values, at higher ones (300 g/l CrO<sub>3</sub>) 0,6 % H<sub>2</sub>SO<sub>4</sub>).

Under normal working conditions and if strictly at adhering to our recommendations correction are required in exceptional cases only and will be prescribed by us after analysis of the solution.

Attention : Addition of other chemicals may cause trouble and may adversely effect the performance of the electrolyte and the quality of the deposits.

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## 5. EFFLUENT TREATMENT

The electrolyte contains hexavalent chromium compounds and usually heavy metal contamination, such as iron and copper. Concentrates and rinse water have to be disposed of in compliance with the legal regulations.

### PERTAINING TO THESE TECHNICAL DATA SHEET :

- R 1 - Working Precaution For Operation And Plating Solutions.
- R 20 – Technical Equipment For Chrome Electrolyte
- R 21 – Make-up and Maintenance of Chrome Electrolytes
- R 22 – Anodes for Chrome Solutions.

### SCA CHEMICALS

- Catalyser HR 75
- Barium carbonate
- SCA correction salt G

To be procured by the customer :

Sulphuric acid, chem. Pure conc., 95 % DIN 50.973,  $d = 1.840$

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## 6. FOR YOUR KIND ATTENTION

The information contained in these Technical Data Sheet is given to the best of our knowledge and based on careful tests carried out in practice and in the laboratory, however, without warranty.

As we do not have any influence on the careful handling and proper application of our products, we can assume responsibility only for a faultless quality of our products at the time of delivery.

Despite closely following these Technical Data Sheet, defects may occur which are caused by faults beyond our control. May we ask you, therefore, to draw our attention to possible special sources of trouble when sending us electrolyte samples or when you are visited by our exports. Send electrolyte samples only in packages approved for transport !

Fill in the tag precisely !

## 7. WORKING PRECAUTIONS FOR OPERATION WITH ELETROLYTES

When working with electroplating plants, the accident prevention rules issued by the various authorities have to be observed in any case.

We would like to draw your special attention to the Regulation for Prevention of Accidents 57 “ Electrochemical and chemical surface ; GALVANOTECHNIK “ (VBG 57) dated 01.01.1993.

When making up and using electrolytes, suitable protective clothings have to be wom in any case.

The general association of the industrial trade union has published

“Instruction Sheet for First Aid in Case of Exposure of Chemical substances”

the special leaflet ZH 1/175, 1984 ( Procurable from the Carl Heymanns Verlag KG, Cologne ).

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This special leaflet should be available in every electroplating shop to ensure a proper “First Aid” in case of any accidents caused by the used electrolytes.

For daily care of the skin, we supply, among other items, skin protective soap and ointment G 24.

## 8. Technical Equipment for Chromium Electrolytes

- a) Tanks : Steel with special plastic lining
- b) Heating : a). Immersion heaters : Teflon  
b). Heating Coils : Teflon  
c). Heat Exchangers : Teflon  
d). Indirect Heating

For sulphuric acid chrome electrolyte as well as the electrolytes RI 26 and RI 27 Titanium (Anodically polarized) may be applied as material for heating coils, immersion heaters and Heat Exchangers.

- c) Cooling : Cooling coil made of teflon.

For sulphuric acid chrome electrolytes as well as the electrolytes RI 26 and RI 27 Anodically polarized Titanium cooling coils may be used.

### Automatic Temperature

- a) Control : Can be taken for granted
- b) Fittings : Copper or Nickel Plated Copper
- c) Fume Extraction : Necessary,
- d) Material : plastic

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## 9. Make Up and Maintenance of Chromium Electrolytes

### a) Make up

For make up use potable water or distilled or fully demineralized water, resp. , if the total hardness does not exceed 10\* German Hardness.

#### ATTENTION :

For all SCA chromium solution, water containing more than 25 mg of chloride per litre may neither be used for make up nor for replenishing.

Also for normal sulphuric acid chromium solution it is recommended to use water with low chloride content.

For make up of each 100 l of solution start with heating up approx. 70 l of water to approx. 50 o C. In this water, the quantities of make up salt and additives stated in the operating instruction are dissolved in small quantities while continuously stirring ( plastic stirrer ).

#### ATTENTION :

Exhaust system has to be in operation during make up. Wear protective clothing, rubber gloves and goggles! The electrolyte is highly irritating!

Subsequently fill up to 100 l with the same quality of water used for make up.

### b) WORKING IN

Work the electrolyte through for approx. 1 hour with scrap cathodes ( steel sheets ) at working temperature and 15 – 25 A/dm<sup>2</sup> of anodic current density.

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## c) MAINTENANCE

For normal sulphuric acid chromium electrolytes the CrO<sub>3</sub> nominal values are maintained by reinforcing with chromic acid.

Adjustment of the sulphate content in chromium solutions is effected by additions of diluted chem. Pure sulphuric acid ( dilution approx. 1 : 4 ).

**ATTENTION :** Put Sulphuric acid into the water, Never vice versa !

By adding barium carbonate, the sulphuric acid content is neutralized. 2 g/l of barium carbonate precipitate approx. 1 g/l H<sub>2</sub>SO<sub>4</sub>. The required quantity of barium carbonate must added cautiously to the chromium electrolyte under continuous stirring. For at least 10 minutes afterwards, the electrolyte must be stirred. If there is a lot of sludge sediment, the electrolyte should be decanted and the remaining sludge must be removed from the chromium plating tank.

For all SCA chromium solutions care should be taken that, during pumping the electrolyte into the storage tank, the electrolyte does not cool down more than 15 – 20 o C below the working temperature.

This applies to longer working pauses as well. Only after the electrolyte has been rewarmed to working temperature and intensively stirred, it is completely ready for operation.

The chromium electrolytes of the SCA series may be reinforced only with the special chromium salts provided for the different types of solution. Do not reinforce these solutions with commercial chromic acids ( please see also relevant working instruction )

When using untested commercial chemicals we cannot accept any responsibility for a faultless operation of the electrolyte.

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## d) EVAPORATION AND DRAG-OUT LOSSES

The losses will be replenished from the economical rinse tank or by adding water (please see paragraph 1).

If the regeneration of the electrolyte should be necessary, it is taken for granted that the amount of water to be added is used for the dissolution of the reinforcing chemicals.

After every working pause, the chromium electrolyte should be first worked through for some minutes with scrap cathodes ( steel sheets ) at working temperature and at an anodic current density of 15 – 25 A/dm<sup>2</sup>

## e) CONTENT OF TRIVALENT METALS, METALLIC IMPURITIES

In SCA chromium electrolytes, the total amount of trivalent metals, such as iron and chromium III, should not exceed 10 g/l, as at these concentrations the covering capacity will be affected.

Special attention has to be paid to the iron content of the electrolytes which are used for hard chromium plating.

A contamination of the electrolyte with the foreign metals, such as copper, nickel, zinc etc., should be avoided as well. Work pieces which fell into the electrolyte have to be removed immediately.

In the event that the chromium III content is too high, the electrolyte has to be worked through with large anode surface, and small cathode surface. The cathode surface should be approx. 10 % of the anode surface. A cathodic current density of approx. 50 A/dm<sup>2</sup> is recommended.

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The content of the trivalent chromium is analytically indicated as Cr<sub>2</sub>O<sub>3</sub>.

1 g/l chromium III corresponds to 1.5 g/l Cr<sub>2</sub>O<sub>3</sub>

## DRAG-OUT OF ACIDS

Any drag-out of dipping acids or nickel electrolyte into a chromium electrolyte must be avoided by intensive and thorough rinse. A certain content of anion will result in faulty chromium deposits.

## 10. ANODES FOR CHROMIUM ELECTROLYTES

- a) Anode Quality : For all chromium electrolytes, excluding RI 23 and RI 24, use lead alloy anodes.  
PbSn with 6 % Sn  
PbAgSn with 2 % Ag and 2 % Sn  
For chromium electrolytes RI 23 and RI 24 the RI 27 anodes have to be used.
- b) Shape of anodes : Depending upon the purpose, band or rod anodes are applied.
- c) Auxiliary anodes : As auxiliary anodes, e.g. for hard chromium plating, only lead alloy anodes may be used. Steel is not recommended as the electrolytes will be considerably contaminated by iron.
- d) Maintenance of anodes: The anodes should be controlled and cleaned every 4 weeks. The anodes brushed clean with a fiber brush (do not use wire brush) under a jet of water outside the solution tank.  
Since the protective lead peroxide layer is damaged or removed during cleaning, the anodes have to be newly formed after each cleaning (see instruction sheet R 21).  
When refitting the anodes, particular care must be taken with respect to the cleaning of the anode fittings and the contact screws which must be metallically clean.

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