



# 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 103

### Electroless Nickel Process

PHYSICAL PROPERTIES :	HR 103 Make-up	:	Clear Liquid
	HR 103 Part I	:	Green Liquid
	HR 103 Part II	:	Clear Liquid

## 1. DESCRIPTION

HR 103 produces bright phosphorous nickel alloys on all metals and non-metals without the use of external power source.

HR 103 produces extremely hard deposits with high corrosion resistance.

HR 103 exhibits a high and constant rate of deposition coupled with exceptional bath stability.

HR 103 has a metal efficiency of 8 – 10 times its original make-up.

The pH can be adjusted with either ammonia-free HR 103 pH or ammonium hydroxide.

HR 103 pH is a liquid additive that does not produce ammonia fumes and has the additional advantage of improving the life time of the bath.

#### *Head Office* :

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## 2. EQUETMENT

- a) Tanks : Titanium or stainless steel which is anodically protected, glass or propylene ( resistant to a temperature of 90o C ).  
Plastic liners ( e.g. bags made of polythene ) which are loose and thus easy to dispose off, are suitable for use in stainless steel.
- b) Heating : Heating should be done with PTFE-steam-coils or immersion heaters ( glass, porcelain or PTFE )
- c) Agitation : This feature is highly recommended particularly near to immersion heater if the letter are in use. Gentle air agitation is permissible, but must be avoided directly under any parts being process.
- d) Filtration : The use of filters made of polypropylene and free of any metal components is essentil. 5 – 10 micron cartridges should be employed.

## 3. SOLUTION MAKE - UP

### BATH MAKE-UP FOR 100 LITRES

HR 103 – Part I	8,0	litres
HR 103 – Make-Up	15,0	litres
Distilled or deionised water		balance

Adjust pH to 4.8 – 5.0 by using ammonium hydroxide or HR 103 pH or 10 % Sulphuric acid. Now fill up to 100 litres with distilled or deionised water.

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## 4. WORKING CONDITIONS :

- a) pH value                                      4.5 – 5.2  
To lower pH use 10 % Sulphuric acid  
To raise pH use 50 % ammonium hydroxide or HR 103 pH
- b) Temperature                                    88 – 95 ° C  
Temperature should be lowered when not in use
- c) Filtration                                        Continuously
- d) Rate of deposition                            20 my/h at 90 ° C  
25 my/h at 95 ° C
- e) Recommended workload                    0.5 – 2.5 dm<sup>2</sup>/l
- f) Nickel content                                   5.8 – 6.2 g/l

## 5. REPLENISHING

The HR 103 process is easy to operate. The bath can be maintained by adding HR 103 Part I and HR Part II. This is done based on chemical analysis.

<b><u>COCENTRATION</u></b> <u>As per analysis</u>	<b><u>REPLENISHING</u></b> <u>HR 103 Part I</u>	<u>HR 103 Part II</u>
<u>90 %</u>	<u>8.0 ml/l</u>	<u>8.0 ml/l</u>
<u>80 %</u>	<u>16.0 ml/l</u>	<u>16.0 ml/l</u>
<u>70 %</u>	<u>24.0 ml/l</u>	<u>24.0 ml/l</u>

Per µm<sup>2</sup> are used 1.0 HR 103 Part I and 1.0 ml HR 103 Part II.

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## 6. GENERAL INFORMATION

- a) pH is best determined at ambient temperature using electrometric methods. Although pH paper can be used if the preferred method is not feasible, a salt error of App. 0.4 pH low means that the bath must be held between an apparent range of 4.4 and 4.8 when establishing the pH at working temperature.
- b) Pumps which are used should have special designed seals.
- c) If Nickel metal percentage drops below 50 % don't make addition until bath has been cooled down to room temperature.
- d) Proper chemical cleaning of parts to be plated with Electroless Nickel is most important to insure maximum performance.
- e) Deposition rate decreases as pH of the plating bath is decreasing
- f) Do avoid any drag in of impurities, because the system can be effected negatively.

## 7. PHYSICAL PROPERTIES OF A NICKEL DEPOSIT

- a) Phosphor content 8 – 12 % ( depends how long bath is in use)
- b) Hardness 45 – 48 RC or 500 – 600 V ( not hot treated)  
Hardness 69 RC or 900 – 1100 V (heat treated 400 °C 1 hr)
- c) Ductility Follows the expansion of basis material to a minimum of 0.8 – 1.6 % without cracking.
- d) Melting point 870 – 1150 °C
- e) Density 7.8 – 8.0 g/cm<sup>3</sup>
- f) Spec. Elec. Resistance 80 – 95 my ohm cm  
(after heat-treatment) 60 my ohm cm
- g) Heattransfer Coefficient 0.04 W/cm x °C  
(after heat-treatment) 0.05 W/cm x °C
- h) Abrasion test 2 – 15 mg/1000 RP

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## 8. SAFETY PRECAUTION

Addition agents and plating solution are poisonous and/or highly acidic.

Necessary safety precautions should be adhered at all times.

## 9. Waste water

All waste water must be treated as law required before being admitted to the public canalization.

## 10. GUARANTEE

Instructions and recommendations are the result of intensive testing and ship experiences. They are for your information only.

Our guarantee extends to the continuous quality of our products as they leave our factory and not to their usage in the field, which is a factor beyond the control of a supplier.

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