



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 101

ELECTROLESS NICKEL PROCESS

1. DESCRIPTION

The electroless nickel process HR 101 is an extremely economic proceeding, distinguishing by high-bright deposits and a very high deposition speed.

Deposition rate at new make-up	:	25 - 26	my/h
Deposition rate after 1- 3 MTO	:	21 -23	my/h
Deposition rate after 5 MTO	:	21	my/h
Deposition rate after 7 MTO	:	18	my/h
Deposition rate after 10 MTO	:	12 - 15	my/h

The bath stability is very high still at more than 2.5 dm²/ L.

The HR 101 process is delivered in three liquid components :

HR 101 PART 1 New Bath Make Up and Bath replenishment

HR 101 PART 2 New Bath Make Up

HR 101 PART 3 Bath replenishment

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2. SOLUTION MAKE – UP

a) BATH MAKE-UP FOR 100 LITRES

HR 101 Part 1	6	litres
HR 101 Part 2	15	litres
Deionized water	79	litres

The bath – tub is filled up to approx. 60 % of the planned volume with deionized water. Under stirring the required quantities of HR 101 Part 1 and 2 are successively added. After having filled up to final volume the electrolyte is heated up to recommended temperature and the pH value adjusted.

Bath Temperature	85 – 93 0C
pH value	4.2 – 5.2

please see special information on page 3 of this operating instruction.

b) Bath Replenishment

For 100 gr nickel metal are required :	1 litre of HR 101 Part 1
	1 litre of HR 101 Part 3

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3. COATING PROPERTIES

a) Concentration of phosphor	5 - 8 %
b) Temper HV 100	500 - 600
c) Temper HV 100 after tempering at 400 o C	900 - 1000
d) Melting point o C	870 - 950 o C
e) Magnetic properties	slightly magnetic
f) Reaction of corrosion-resistance (25 my)	100 hours (DIN SS 50021)
g) Nitric acid test	light discoloration
h) Electric resistance (Micro ohm/cm)	50 - 100

4. BATH EQUIPMENT

Stainless steel tubs with anodic protection or polypropylene tubs are recommended. (For use of plastic tubs, the handling of the electrolyte is simplified, when a heat resistant plastic foil is put in. By this means the inconvenient and trouble some passivation by nitric acid is no more required.)

A powerful movement of the electrolyte is recommended. It is absolutely necessary to dispose of a good exhaust or to cover the bath.

Moreover it is recommendable to keep the bath covered during breaks.

5. FILTRATION

A continuous filtration through a 5 my filter is necessary. There by the electrolyte should be turned over at least 6 times per hour. If a continuous filtration is not possible, the electrolyte must be cooled down after work ending and filtered in another bath container through a 5 my filter.

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6. BATH MOVEMENT

As mentioned already under Bath Equipment it is important to dispose of a good bath movement. This can be made by air blowing in. A good bath circulation prevents local overheating as well as a loss of the electrolyte stability incident there to.

Provided that the electrolyte is turned over at least 6 times per hour by means of a filter pump or a good movement of the goods is available, overheating is no more possible.

7. BATH HEATING

For bath heating immersion heaters of high-grade steel or coated with teflon, should be used. (attention to local over heating)

NOTICE : In case that bath operation is made without use of put – in plastic foils. The used tubs must be passivated after each emptying, before refilling, with 30% of nitric acid. Ensuing it must be very carefully rinsed with water. Residues of nitric acid reduce the deposition speed, resp. lower life of the electrolyte.

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8. BATH CONTROL

As usual at all the electroless deposition processes, it is extremely important to meet the exact continuous dosage of the bath components and other deposition parameters (temperature, pH, etc.)

Temperature, pH value as well as metal content should be controlled by automatic analysis - , measuring - and dosing equipments.

We shall be pleased to inform you of corresponding equipments.

9. OPERATING CONDITIONS

	Operating range	Optimum
a) Temperature °C	82 - 93	88 - 90
b) pH value	4.2 - 5.2	4.7 - 4.9
c) Nickel concentration g/l	5.2 - 6.0	5.7
d) Load of bath dm ² /litre	0.5 - 2.5	1.25
e) Deposition speed at 88 °C	18 - 22 my/h	
f) Possible MTO on steel	Up to 10 are economically possible	
g) Possible MTO on Alu	Up to 8 are economically possible	

h) Influence on bath temperature and pH value:

With increasing bath temperature the deposition speed mount; the deposition rates shov/n on page 1 correspond to a temperature of 91 0C and a pH value of 4.7.

A temperature over 93 oC should be avoided.

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i) pH value :

The pH value is raised with diluted potash lye of 10 volume.% chem. pure and lowered by means of 10 vol.% chem. pure sulphuric acid. All additions must be carried out slowly and under powerful stirring. Please pay attention to the difference in temperature at the occasion of the pH control. The pH control follows either with a meter which is standardized regularly, or with pH paper.

10. STRAGE INFORMATION

All HR 101 chemical should be used within 10-12 month from date of purchase. For easy reference we provide a batch number on every container.

11. Effluent treatment

The HR 101 process contains acid and nickel salts. All waste water must be treated in accordance with local effluent control regulations prior to discharge.

12. PRETREATMENT

An optimal pretreatment of the pieces is the precondition for unobjectable result of the electroless nickel-plating. If aluminium has to be coated, we recommend our cyanide – free aluminium adhesion pickling, which is well-known for outstanding adhesive power. We shall be pleased to advise you.

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13. REPLENISHMENT

The bath control follows by the nickel concentration of the solution. This is determined by analysis (prescriptions we put with pleasure at your disposal) and maintained on the required value by identical addition of HR 101 part 1 and part 3.

The nickel concentration should not drop below 5.0 g/l.

For a constant deposition speed it is very important to make dosage regularly and in small intervals.

It must be mixed at each addition.

TABULATION OF REPLENISHMENT

Nickel Concentration (g/l)	Additions in ml HR 101 part 1	Additions in ml HR 101 part 3
5.6	1.5	1.5
5.5	3.0	3.0
5.3	4.5	4.5
5.1	7.5	7.5
4.9	9.0	9.0
4.6	13.5	13.5
4.4	15.0	15.0

We recommend you, not to let fall the nickel concentration below 5.0 g/l

The added nickel quantity should, in any case, not exceed 10% of the initial concentration.

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14. SAFETY INSTRUCTION

HR 101 part1 contains nickel salt, which may result allergies at touching the skin.

Please not that the HR 101 components should be stored at temperatures between 4 and 30 oC.

Influences of frost are harmful !

15. STORAGE LIFE

All HR 101 chemicals are storable during 10 to 12 months. All our containers are provided with a batch-number. This batch number informs you of the storage life.

16. Waste water

The rinsing water from the HR 101 process contains nickel. All waste water must be treated as law requires, before being admitted to the public canalization.

These operating in instructions are based on laboratory values and practical experiences. We have however no influence on the precise and conscientious use of our products.

For any further information we are always with pleasure at your disposal.

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