



CORPORATE STANDARD

AA 067 36 04

Rev. No. 05

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PROCESS FOR PASSIVATION OF ZINC AND CADMIUM PLATED ARTICLES

1.0 GENERAL:

This standard details the compositions of the passivation solution and the procedure for passivation of zinc and cadmium electroplated articles.

2.0 APPLICATION:

To increase resistance to corrosion and finger marking.

3.0 COMPLIANCE WITH NATIONAL STANDARDS:

This standard has reference to the following Indian standards regarding the quality of the passivated film:

- i) IS: 1340-1977 (RA2006): Code of practice for chromate conversion coating on zinc and cadmium coated articles and zinc base alloys
- ii) IS: 1573-1986(RA 2006): Electroplated coating of zinc on iron and steel.

4.0 MATERIAL:

	Material	CPS No. / IS No. / Available From
4.1	Sulphuric Acid (Technical)	: AA 541 01
4.2	Nitric Acid (Technical)	: AA 541 02
4.3	Chromic Acid-Electroplating Grade:	AA 541 04
4.4	Sodium Bichromate (Technical)	: AA 556 12
4.5	Ginthox - Q.982 (L)	: M/s Grauer & Weil (I) Ltd.,
4.6	Ginthos - 995	: Mumbai.
4.7	Kempas - 755	: M/s Artek surfen Chemicals (P) Ltd., Mumbai
4.8	Zinc chrome 62L	: M/S Platewel & process chemicals, Vadodara

5.0 EQUIPEMENT:

- 5.1 Passivating Rinsing Tank : FRP/PVC lined mild steel tank preferable with heating arrangements.

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INTERPLANT MATERIAL
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- 5.2** Cascade Rinsing Tank : FRP/PVC lined mild steel tank with suitable partitions and provided with running water facilities, water cascading from one partition to the other
- 5.3** Acid Treatment Tank (Optional) : FRP/PVC lined mild steel tank
- 5.4** Rinsing Tank - After Acid Treatment - (optional) : FRP/PVC lined mild steel tank
- 5.5** Hot Air Oven : Hot air oven suitable for heating 50-70° C
- 5.6** Centrifugal Drier : A standard centrifugal drier suitable for drying barrel components

6.0 COMPOSITION/PREPARATION OF SOLUTIONS & OPERATING INSTRUCTIONS:

6.1 Passivating Solution:

6.1.1 Composition and Operating Conditions:

The passivating solution shall be made of any one of the following compositions and operating conditions

Parameter	Composition				
	I	II	III	IV	V
Name of Chemical	Ginthox-Q.982	Ginthox-995	Sodium Bichromate	Chromic Acid	Kempax 755
Chemical Content	15 ml/l	15-20 ml/l	180 g/l	110 g/l	15-20 ml/l
Nitric acid, m/l	4	-	2	2	-
Sulphuric acid, m/l	-	-	6.5	-	-
Water	-	To make up the volume		-	-
Temperature	<----- Ambient ----->				
Dipping time, sec.	10-30	10-30	10-30	10-30	10-30
pH		1.8-2.0			1.8-2.0

6.2 Preparation of solution:

- 6.2.1** The tank shall be filled with water preferably demineralised water to about two-thirds of its capacity.



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- 6.2.2** The required amount of salt/chemical shall be added to the bath in small quantities with stirring.
- 6.2.3** After complete dissolution, the required quantity of recommended acid shall be poured to the solution with stirring.
- 6.2.4** Finally, the solution shall be brought to the operating level by adding water.

6.3 Maintenance of the solution:

Any deficiency of the acid from the above composition shall be corrected by cautious addition of concentrated acid.

After the solution has been working from some time/and or any deficiency in the solution, if observed, then the passivating chemicals shall be added to keep the solution upto the working strength, or if required a fresh solution shall be prepared. While making the addition the salt shall be dissolved in the separate acid resisting container with the required quantity and then added to the tank.

7.0 PROCESS:

7.1 Acid Treatment:

- 7.1.1** Zinc/cadmium plated, heat treated articles after proper rinsing, shall be dipped in 0.4 to 0.50% nitric acid solution for 5-10 seconds.
- 7.1.2** After acid treatment, the articles shall be rinsed in clean cold running water.

7.2 Passivation:

- 7.2.1** The articles shall then be immersed in the passivating solution as specified in clause 6.1.1 for 10 to 30 seconds.
- 7.2.2** The articles shall be drained for about 30 seconds after passivation.
- 7.2.3** The passivated articles shall be double rinsed in cold water for a period sufficient to ensure that water draining from the articles contains no trace of yellow colouration. The total rinsing time shall not be longer than 5 minutes.
- 7.2.4** After rinsing, the articles shall be dried off using air oven/compressed air. In case of barrel plating, the articles shall be dried by means of centrifugal drier.

7.3 Age Hardening:

No article shall be used in assemblies within 24 hours of age hardening after passivation.

Note:

After passivation, no heat treatment of the plated articles shall be done.

**8.0 INSPECTION:****8.1 Visual:**

All the jobs shall be tested visually the passivated film shall have a greenish iridescent or greenish yellow iridescent appearance, free from areas of unconverted zinc or cadmium plating.

8.2 Adhesion (IS: 8602):

Adherence may be determined after age hardening by rubbing the surface with white paper. The paper must not show more than a slight trace of stain and the treated surface shall not show signs of having been rubbed through.

8.3 Chromate Film Test (IS: 1573):

The chromate film shall be free from bare (unconverted zinc) patches and shall be adherent.

9.0 REFERRED STANDARDS (Latest Publications Including Amendments):

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|--------------|--------------|--------------|--------------|
| 1. IS: 1340 | 2. IS: 1573 | 3. IS: 8602 | 4. AA 541 01 |
| 5. AA 541 02 | 3. AA 541 04 | 7. AA 556 12 | |