

(ALL DIMENSIONS ARE IN mm.)

કુદરતી વા

150 KG (SEE NOTE-5)



1. HV TEST 9 KV FOR 1 MIN.
 2. INSULATION RESISTANCE 400 MEGAOHMS MIN.AT ROOM TEMP.
 3. TORQUE TEST: 5 KGM MIN.
 4. TENSILE STRENGTH : 1000 KG.
 5. BRUSH HOLDER ARM TO WITHSTAND BENDING STRENGTH OF 150 KG AS SHOWN
- TYPE TESTS:--(TO BE CONDUCTED ONCE IN TWO YEARS)
1. INSULATION RESISTANCE AT 100 DEG. C UNDER CLAMPED CONDITION 200 MEGAOHMS MINIMUM.
 2. BDV AT ROOM TEMPERATURE (12 KV MIN.)

TYPE TESTS:-(TO BE CONDUCTED ONCE IN TWO YEARS)

1. IT. 001 & 002 TO BE ZINC PLATED TO AA 0673603 & PASSIVATED TO AA 0673604 WITH A PLATING THICKNESS OF 0.013 TO 0.025 MM.
2. IT. 001 & 002 TO BE MACHINED ALL OVER UNTOLERATED DIMN. AS PER PROD. STD. AA 0230208 GR. M.
3. AFTER ASSY. OF IT.001&002 THE SURFACE OF IT.002 SHOULD BE CONCENTRIC WITH THE AXIS OF IT.001 WITHIN 0.3MM.
4. IT.005 TO BE MOULDED ON IT. 002 AS PER PR. SPEC TM-97246.
5. MYCALEX PIN TO BE AS PER PR. SPEC 97246 EXCEPT ROUTINE AND TYPE TEST.
6. IDENTIFICATION MARK OF SUPPLIER TO BE PUNCHED IN 5 MM HEIGHT AT STUD FACE AS SHOWN IN VIEW.


[illegible]

SIGN. & DATE	REF. DRG. NO.
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REV	DATE	ALTERED
		CHECKED
		APPROVED

REV	DATE	ALTERED
09	05.08.14	<div> <div>APPROVED</div> <div>  </div> </div>

REV	DATE	ALTERED	—SD—
08	09.07.09	CHECKED	—SD—
		APPROVED	—SD—


 भारत भारी बिजली. BHARAT HEAVY ELECTRICALS LTD. BHOPAL	DRN.	NAME	SIGN.	DATE	73 NO. OF VAR.	74
		S. GOND	Sd / -	05.05.00		
	KGD.	N.N.N.	Sd / -	05.05.00		01
	APPD.	R.N.P.	Sd / -	05.05.00		

INVENTORY No.	


	STYLE NO. WAS NOT ON.
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	DRG.UPDATED & DIGITIZED

405				14392008001	
TITLE MYCALEX BRUSH HOLDER SUPPORT PIN (TWO PIECES)				DRAWING NO. 34392028003	23 REV. 09
SHT. NO		01	NO. OF SHT.		01

	CORPORATE PURCHASING SPECIFICATION	AA10112 Rev No. 07 PAGE 1 of 4
BRIGHT STEEL BARS AND SECTIONS (STANDARD QUALITY)		
1 GENERAL: This specification governs the quality requirements of Bright Steel Bars and Sections of standard quality, such as I-beams and equal angles required in very small sections.		
2 APPLICATION: Bars are used in the manufacture of threaded and machined components for general engineering purposes. Sections are used as stator spacer plate vents in generators.		
3 CONDITION OF DELIVERY:		
3.1 Round Bars - Class 4, surface quality. Up to 50 mm diameter - Cold drawn. Above 50mm diameter - Cold drawn or Hot rolled, turned and polished		
3.2 Rectangular/Square/Hexagonal Bars - Class 3, surface quality. All sizes - Cold drawn.		
3.3 Sections - Class 4, surface quality. All sizes - Cold drawn		
3.4 Bars and sections shall be straight, with their ends sheared, square and true and shall have a smooth surface.		
3.5 The bars and sections shall be given a clear temporary rust preventive (TRP) coating to avoid corrosion during transit and storage. Black TRP coating is not acceptable. Clear TRP used shall be free from pungent smell. The following clear TRP's are suggested:		
a) Servo RP 150 - M/s Indian Oil Corporation b) HE - 1612 - M/s. BHEL, Bhopal c) Rustilo DW-901 - M/s. Indrol Lubricants and Specialties Ltd. d) Rustpro Special - M/s. Tide water oil co. e) Any other clear TRP conforming to IS: 1154		
4 COMPLIANCE WITH NATIONAL STANDARDS: The material shall comply with the requirements of the following National standards and also meet the requirements of this specification. IS: 9550-2001 : Bright steel bars		
Revisions: CI 27.2.d of MOM of MRC-S&GPS		APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(S&GPS)
Rev No.07	Amd No.	Reaffirmed
Dt:15-06-2005	Dt:	Year:2019
Prepared HEP, Bhopal		Issued Corp.R&D
Dt. of 1 st Issue September 1976		5

RA5302

AA10112	CORPORATE PURCHASING SPECIFICATION	
Rev No. 07		
PAGE 2 of 4		

5 DIMENSIONS AND TOLERANCES:

5.1 Sizes:
Bars shall be supplied to the dimensions specified in BHEL order.

5.2 Tolerances:

5.2.1 Rectangular/Square/Hexagonal/Flat Bars:
Unless otherwise specified, tolerances on dimensions shall be as follows:

For drawn round bars and turned bars h10 to table 2 of IS:9550

For hexagonal and square drawn bars upto and including 80mm h11 and above 80mm h12 according to table 2 of IS:9550

For drawn flats in accordance with table 3 and 4 of IS:9550

For ground products in accordance with table 1 and 2 of IS:9550

5.2.2 Sections:
As specified in BHEL order/drawing.

5.3 Length:
Bar and sections shall be supplied in lengths of 2.5 to 4.5 meters with maximum 10% of shorts of not less than 1.5 meters.

5.4 Straightness:
Unless otherwise agreed to, the permissible deviation shall not exceed 1.5mm in any one meter length. Bars and sections shall be free from twists and bends.

6 MATERIAL:
The rolled bars used for purpose of producing the bright bars shall be such, so as to ensure freedom from segregation, piping and other harmful defects.

7 MANUFACTURE:
Steel shall be manufactured by the open-hearth, electric, basic oxygen or a combination of these processes.

8 FREEDOM FROM DEFECTS:
All finished steel bars and section shall be sound and free from internal and surface defects. They shall be bright and clean.


9 SURFACE CONDITION:

9.1 Round Bars and Sections:
Shall be entirely free from cracks and other surface defects.

9.2 Rectangular/Square/Hexagonal Bar-Type '3' Finish:
Shall comply with IS: 9550, Class 3 of table 5.

10 CHEMICAL COMPOSITION:
The melt analysis of steel and the permissible variation in the composition of the material form the melt analysis shall be as follows:

6

	CORPORATE PURCHASING SPECIFICATION	AA10112 Rev No. 07 PAGE 3 of 4
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Element	Melt analysis percent, max	Permissible variation percent
Carbon	0.25	± 0.02
Sulphur	0.040	+ 0.005
Phosphorus	0.040	+ 0.005

11 TEST SAMPLES:

One sample for chemical and tensile test shall be selected from finished steel for every 20,000 kg or part thereof, with a minimum one per heat.

12 MECHANICAL PROPERTIES:

When tested in accordance with IS:1608, the test pieces shall show the following properties:

12.1 Rectangular/Square/Hexagonal/Section - Cold Drawn:

Tensile Strength : 440 N/mm², min

Elongation on $5.65\sqrt{S_0}$ gauge length : 8 – 20%

12.2 Round Bars:

12.2.1 Bars upto 50mm Diameter – Cold Drawn

Tensile Strength : 440 N/mm², min

Elongation on $5.65\sqrt{S_0}$ gauge length : 8 – 20%

12.2.2 Bars above 50mm Diameter:

Cold drawn or hot rolled, turned and polished.

Property	Hot rolled, turned and polished		Cold drawn
Tensile strength, min.	: 410 N/mm ²		440 N/mm ²
Elongation on $5.65\sqrt{S_0}$ gauge length	: 23%, min	OR	8-20%

13 TEST CERTIFICATES:

Three copies of test certificates shall be supplied, unless otherwise stated on the order.

In addition, to the above, the supplier shall ensure to enclose one copy of the test certificate along with their despatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information:

AA10112; Rev. No. 07 :
BHEL order No,
Supplier's Reference:
Name
Identification No.
Melt No.
Results of Tests:
Dimensional inspection.
Results of Chemical analysis and mechanical tests.

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14 PACKING AND MARKING

The material shall be suitably packed in bundles – polythene wrapped to prevent sagging, corrosion and damage during transit. A suitable clear temporary rust preventive shall be applied all the bars as per clause 3.5 above and finally dispatched in wooden boxes.

Each bar over 50mm shall be stamped at one end with 'AA10112'. Bars 50mm and below shall be bundle together and tied with wire at 3 to 4 places along the length of the bar.

A metal label shall be securely attached to each bundle and shall bear the following information:

AA10112: BRIGHT STEEL BARS AND SECTIONS (STANDARD QUALITY)

BHEL Order No.

Consignment/Identification No.


Melt No.

Size and Weight.

Supplier's Name.

15 REFERRED STANDARDS (Latest Publications Including Amendments):

- 1) IS: 1154 2) IS: 1608 3) IS: 9550

	CORPORATE PURCHASING SPECIFICATION	AA 256 01 Rev. No. 01 PAGE 1 OF 3
GLASS FIBRE WOVEN CLOTH		
<p>1.0 GENERAL:</p> <p>This specification governs the quality requirements of Loom state Glass Fibre Cloth, woven plain from continuous filament yarn of type E, low alkali glass.</p> <p>2.0 APPLICATION:</p> <p>Used in the manufacture of composite insulation of electrical machines.</p> <p>3.0 COMPLIANCE WITH NATIONAL STANDARDS:</p> <p>There is no national standard covering this material. However, assistance has been taken from "BS 3396, Part I: Woven glass fibre fabrics for plastics reinforcement-Loom state fabrics and IS:5352: Glass fibre woven tape for electrical purposes", in preparation of this specification.</p> <p>4.0 DIMENSIONS AND TOLERANCES:</p> <p>Thickness, width and length /roll shall be as stated on BHEL order.</p> <p>4.1 Thickness: See Annexure -I</p> <p>4.2 Width:</p> <p>The standard widths are 450, 700, 915 and 1000mm with tolerance of ± 10mm. However, any other width can also be ordered.</p> <p>4.3 Length:</p> <p>Unless otherwise specified, the fabric shall be supplied in continuous length of not less than 100 metres.</p> <p>5.0 SAMPLE FOR TEST:</p> <p>2 sq.metre of required thickness shall be sent for test and approval purposes.</p> <p>6.0 TEST METHOD:</p> <p>Unless other wise specified, the tests shall be conducted as per IS:5352.</p> <p>7.0 PHYSICAL PROPERTIES:</p> <p>7.1 Finish:</p> <p>Shall be smooth and uniform, free from yarn defects and defect of weaving, streaks, stains, oil and grease spots, creases, wrinkles etc.</p> <p>7.2 Texture: See Annexure - I</p> <p>Other constructions may also be accepted against particular thickness, provided the cloth complies with all other characteristics specified in this specification.</p>		
Revisions : Cl: 32.4.68 of MOM of MRC-E		APPROVED : INTERPLANT MATERIAL RATIONALISATION COMMITTEE-MRC (E)
Rev. No. 01	Amd.No.	Reaffirmed
Dt:15.01.2003	Dt :	Year :
Prepared BHOPAL		Issued Corp. R&D
Dt. of 1st Issue FEB., 1980		



CORPORATE PURCHASING SPECIFICATION

AA 256 01

Rev. No. 01

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ANNEXURE - I

Nom. Tkns.	Tolerance on Thickness	Recommended BS: Designa- tion	Substance (average)	Thread count (average) Nos. /10 cm	Yarn Count (nominal)		Breaking Strength (average) Kgt/cm, Min.		
(mm)	(mm)		(g/m ²)	Ends/Warp	Picks/Weft	Warp Tex	Weft Tex	Warp	Weft
0.025	+ 0.002	-	24 + 2	250 + 6	235 + 6	2.8-2/0	2.8-2/0	7.2	3.6
0.043	+ 0.004	-	37 + 4	216 + 5	212 + 5	5.5-1/2	5.5-1/0	8.3	4.0
0.05	+ 0.005	P32/11	50 + 5	252 + 6	181 + 5	11 -1/0	11 -1/0	9.7	7.0
0.08	+ 0.008	P 2/11	100 + 10	252 + 6	173 + 4	11 -1/2	11 -1/2	19.5	13.5
0.10	+ 0.010	P36/33				33 -1/0	33 -1/0	12	10.5
0.125	+ 0.012		125 + 13	252 + 6	158 + 4	11 -1/3	11 -1/2	29	12
0.18	+ 0.018	P41/66	200 + 20	165 + 4	126 + 3	66 -1/0	66 -1/0	30	23
0.255	+ 0.025	-	300 + 30	118 + 3	100 + 3	22 -2/3	22 -2/3	50	40

Note: There shall be no minus tolerance on the above breaking strength.
A tolerance of - 20 percent shall be permitted on individual values.

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			Rev. No. 04
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PROCESS FOR ELECTROPLATING OF ZINC ON STEEL SURFACES FROM CYANIDE BATH

1 GENERAL

This standard details the process for high-speed bright zinc plating on steel surfaces from cyanide zinc solution bath by tank or barrel to provide protection against corrosion and to give a bright attractive finish to the surface.

2 APPLICATION

Used for components like fasteners, nuts, bolts, electronic panels etc. This process is not suitable for plating on cast iron surfaces.

3 COMPLIANCE WITH NATIONAL STANDARDS

This Standard has reference to the following Indian Standards regarding surface condition and quality of deposit.

IS 1340 : 1977 : Code of Practice for chromate conversion coating on Zinc and Cadmium coated articles and zinc base alloys.

IS 1573 : 1986 : Electroplated coatings of Zinc on Iron and Steel.

IS 3203 : 1982: Methods of Testing Local Thickness of Electroplated Coatings.

IS 9844 : 1981: Method of testing of corrosion resistance of Electroplated and Anodized Aluminium coatings by neutral salt spray test.

4 MATERIALS

Material	CPS No./IS No./Available from
Sodium cyanide for electroplating	AA55610
Caustic Soda (Tech.)	AA54201
Nitric Acid (Tech.)	AA54102
Zinc Anodes (99.98% Purity, Min.) (Grade 1)	IS 2605
Bright Zinc Salts	M/s. Ronuk Industries Ltd. Mumbai
Zinc Brightener Zn-21	
Zinc Brightener Zn-22	
Zinc Purifier	
Zinc Brite 16 Salt	
Zinc Brite 20 Brightener	M/s. Grauer & Weil (I) Ltd., Mumbai
Monicol Purifier	
Zinek Salt - 501	
Super Zinc Brightener – 505	M/s. Platelwel Processes & Chemicals Ltd., Vadodara
Supra Zinc Brightener 555	
Zincad Purifier - 503	
Teknobrite CZ 920 Salt	M/s. Artek Surfin Chemicals (P) Ltd., Mumbai

Revisions: As per clause 28.16.6 of MOM of 28th MRC (CPO)

APPROVED:
INTERPLANT MATERIAL RATIONALISATION
COMMITTEE – MRC (CPO&NM)

Rev. No. 04	Amd. No. 02	Reaffirmed	Prepared HEP, Bhopal	Issued Corp. R&D	Dt. of 1 st Issue 01-01-1985
Dt: 15-10-2000	Dt: 15-10-2002	Year: 2021 12			

AA0673603

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CORPORATE STANDARD

Teknobrite CZ 920 Brightener

Purisol

M/s. Artek Surfin Chemicals (P) Ltd., Mumbai

5 EQUIPMENT**5.1 Plating Tank / Vat**

The Tank/vat shall be made of plain welded steel sheets with rubber lining. The vat shall be provided with an insulated frame on top fitted with insulators for holding the anode and cathode rods. The tank shall also be provided with exhaust system.

5.2 Barrel

The plating barrel shall be constructed out of polypropylene perspex and shall be so driven as to rotate at 5 to 12 rpm.

5.3 Rinsing Tanks

Mild steel tank lined with rubber / FRP / PVC.

5.4 Hot Water Rinsing Tank (Optional)

Mild steel tank with rubber / FRP lining and heating arrangements.

6 COMPOSITION OF ELECTROLYTE AND OPERATING INSTRUCTIONS**6.1 Composition of Electrolyte (Bath Solution) and Operating Conditions**

The electrolyte shall be prepared according to any one of the following compositions and operated at the conditions specified below:

	Parameter	Composition			
		I RONUK	II G&W	III PLATEWEL	IV ARTEK SURFIN
Sl. No.	Name of salt	Bright Zinc	Zinek. Brite	Zinek 501	Tekno Brite CZ 920
	Salt Content				
	For vat	180-200	200	200	200
	For barrel	200-220	200	200	200
1	Zinc Brightener Zn-21, ml/l	1.5	---	---	---
2	Zinc Brightener Zn-22, ml/l	2.5	---	---	---
3	Super zinc	---	---	6-8	---
	Brightner-505, ml/l	---	---	3-5	---
4	Supra Zinc				
	Brightener 555, ml/l	---	3-5	---	---
5	Zinc Brite 20				
	Brightener, ml/l	---	3-5	---	---
6	Tekno Brite CZ 920 Brightener	---	---	---	2-4
7	Monicol Purifier, ml/l	---	5	---	---
8	Zincad Purifier-503, ml/l	---	---	5	---
9	Purisol, ml/l	---	---	---	4
10	Temperature	Room-55	20-45	25-55	20-45
11	Anode to Cathode Ratio	1:1	1:1	1:1	1:1
12	Current density, A/dm ²				
	a) For vat	1.5-4.5	2-5	2-5	2-5
	b) For barrel	1.5-4.5	0.5-2	0.5-2	0.5-2

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13	Voltage, (Volts)				
	a) For vat	6-8	2-6	3-6	2-5
	b) For barrel	12-15	10-15	12-16	10-15

6.2 Preparation of Electrolyte

6.2.1 The vat/barrel shall be filled with water, preferably with demineralised water, to about two-thirds of its capacity.

6.2.2 The required amount of salt shall be added to the bath in small quantities with stirring.

6.2.3 The temperature of the solution should not raise beyond 70°C.

6.2.4 Stirring shall be continued until all the salts get dissolved.

6.2.5 The solution shall then be brought upto the working level by adding cold demineralised water. At this stage the temperature of the bath shall be at the working range.

6.2.6 The requisite amount of purifier shall now be added to the solution and stirred thoroughly. If necessary, filtration at this stage shall be carried out. Then requisite amount of brightener shall be added.

6.3 Analysis of the Electrolyte

The solution shall be analysed initially after make up and subsequently at suitable intervals.

6.4 Maintenance of the Electrolyte


6.4.1 The concentration of the electrolyte shall be maintained as below:

Parameter	Composition			
	I	II	III	IV
	RONUK	G&W	Platewel	ARTEK
Zinc as metal, g/l	33-40	30-40	30-34	30-40
Total Sodium Cyanide, g/l	90-105	75-140	80-90	75-140
Total Sodium Hydroxide, g/l	75-93	65-85	70-80	65-85
Sodium Cyanide to Zinc ratio	2.5-3:1	2.5-3.5:1	2.7-3.2:1	2.5-3.5:1

6.4.2 Addition of Brighteners

Brightness of the deposit shall be maintained by adding brighteners for every 1000 ampere-hours as shown below:

Brightener	Composition			
	I	II	III	IV
	RONUK	G&W	PLATEWEL	ARTEK
Brightener Zn-21, ml	60	---	---	---
Brightener Zn-22, ml	100	---	---	---
Zinc Brite 20 Brightener:				
i) For vat, ml	---	100-150	---	---
ii) For barrel, ml	---	150-200	---	---
Super Zinc Brightner-505:				
i) For vat, ml	---	---	150	---
ii) For barrel, ml	---	---	200	---
Supra Zinc Brightener – 555	---	---	100	---
Teknobrite CZ 920 Brightener	---	---	---	100-250

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Brighteners may be added directly into the bath and stirred well. Excess of brightner must be avoided.

6.4.3 Bath shall be analyzed periodically and if the values do not lie in the limits as given in 6.3.1, required chemicals shall be added to the bath to bring the composition to the required level.

6.4.4 Purification of Electrolyte:

The electrolyte shall be filtered at least once in a week or as required addition of 0.25 ml of zinc purifier per litre of solution for Composition-I, 0.1 to 0.2 ml of Monicol per litre for Composition-II and 0.1 to 0.2 ml of Zincad-503 purifier for Composition-III shall be made daily and stirred well to eliminate impurities in the solution and also to settle before resuming the work.

7 PROCESS:

7.1 Cleaning

All articles shall be properly cleaned as described in BHEL Standard AA0673601: Process for cleaning and preparation of metal surfaces prior to electroplating or BP0673693: Electroplating of zinc on steel surface from Acid bath.

7.2 Rinsing

All articles shall be rinsed thoroughly after cleaning to avoid contamination of the plating solution.

7.3 Plating

It shall be ensured that the current is on before the articles are put into barrel or tank.

All articles shall be plated at the specified current density for a duration, which will depend on the thickness of the deposit required.

7.4 Cold Rinsing

After removal from the plating bath, all articles shall be rinsed thoroughly in cold running water till all the traces of solution are removed.

7.5 Drying

The rinsed articles shall be dried using a centrifugal drier or hot air blower /hot air oven.

8 HEAT TREATMENT: (Whenever required)

Note : Steels of tensile strength of 100 kgf/mm² or corresponding hardness should be heat treated.

8.1 Stress Relieving Before Plating: (IS 1573)

In accordance with IS 1573.

8.2 Stress Relieving after Plating: (IS 1573)

In accordance with IS 1573.

9 PASSIVATION

Electroplated heat treated articles shall be passivated as per AA0673604 : Process for Passivation of Zinc And Cadmium Plated Articles.


10 CARE OF ANODES

Anodes shall be removed from the bath when the bath is idle.

Ensure that the anodes are bright in luster while plating is on.

11 PRECAUTIONS

11.1 While preparing the solution the operator shall use rubber hand gloves, apron and respirator mask to avoid irritation of skin and suffocation due to fumes. The safety precautions for electroplating shop and handling of chemicals given in AA0462801 shall be followed.

	<h2 style="text-align: center;">CORPORATE STANDARD</h2>	AA0673603
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11.2 Solution shall be kept covered when not in use.

11.3 Any chemical that may be necessary to be added shall be dissolved in a part of the original solution (except brighteners) before adding it to the vat/barrel. It shall be poured through a filter or perforated bucket.

11.4 Any metal that may be deposited on any part of the vat/barrel shall be removed immediately.

11.5 Any article that becomes lodged in any part of the vat / barrel shall be removed immediately.

11.6 Remove Zinc Anode at the end of shift so as to avoid dissolution of zinc metal during idle period.

12 INSPECTION AND QUALITY OF DEPOSIT

When tested in accordance with the test methods shown against each, the deposit shall conform to the norms specified below:

12.1 SAMPLING

Minimum of 1% of each batch of tank/barrel load of part there of shall be taken at random for testing with a minimum of 5 samples. When plated components are big and cannot be subjected to any of the specified test, a test panel of suitable size of the same basis metal shall be plated along with component under identical conditions for the purpose of testing. For corrosion resistance tests, test piece of minimum 150 mm. length, and 100 mm width and approximately 1 mm thick shall be used.

12.2 Condition of Surface

The plated surface shall appear as a smooth and continuous film over the basis metal and shall be free from defects such as pits, stains, cracks, blisters, nodules, pinholes, un-plated areas and other superficial blemishes visible to the unaided eye. The plated surface shall be bright with required passivation.

12.3 Thickness of Deposit (IS 3203)

The minimum thickness shall be as specified on relevant drawing on BHEL order.

12.4 Adhesion (IS 1573)

Flaking and blistering of the coating is not acceptable and the coating shall continue to adhere to the base metal after this test.

12.5 Humidity test (IS 1573)

Breakdown of the film or appearance of white corrosion products after two cycles of the test shall be taken as failure.

13 ADDITIONAL TESTS

Whenever required, the following test shall be conducted as per the test methods shown against each and the norms of acceptance shall be as specified below:

13.1 SALT SPRAY TEST (IS 9844)

When tested in accordance with IS 9844 white corrosion products shall not be visible within 96 hours on plated and passivated components.

14 REJECTION

If the samples taken do not comply with clauses 12.2 to 12.5 and 13, a further quantity not less than twice the number originally taken, shall be subjected to these tests. If any one of these samples also fails, the whole batch shall be rejected.

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CORPORATE STANDARD**15 REFERRED STANDARDS (Latest Publications Including Amendments)**

- 1) IS 1573
- 2) IS 2605
- 3) IS 9844
- 4) AA54102
- 5) AA54201
- 6) AA55610
- 7) AA0673601
- 8) AA0673604



CORPORATE STANDARD

AA0673604

Rev. No. 05

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PROCESS FOR PASSIVATION OF ZINC AND CADMIUM PLATED ARTICLES

1 GENERAL

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

2 APPLICATION

To increase resistance to corrosion and finger marking.

3 COMPLIANCE WITH NATIONAL STANDARDS

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

IS 1340 : 1977: Code of practice for chromate conversion coating on zinc and cadmium coated articles and zinc base alloys

IS 1573 : 1986: Electroplated coating of zinc on iron and steel.

4 MATERIAL

Material	CPS No. / IS No. /Available From
Sulphuric Acid (Technical)	AA54101
Nitric Acid (Technical)	AA54102
Chromic Acid-Electroplating Grade	AA54104
Sodium Bichromate (Technical)	AA55612
Ginthox - Q.982 (L)	M/s Grauer & Weil (I) Ltd., Mumbai.
Ginthos – 995	
Kempas – 755	M/s Artek surfen Chemicals (P) Ltd., Mumbai
Zinc chrome 62L	M/S Platewel & process chemicals, Vadodara

5 EQUIPEMENT

5.1 Passivating Rinsing Tank

FRP/PVC lined mild steel tank preferable with heating arrangements.

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

Revisions: As per 40th MOM of MRC-CPO

APPROVED:
INTERPLANT MATERIAL RATIONALISATION
COMMITTEE – MRC (CPO&NM)

Rev. No. 05	Amd. No.	Reaffirmed	Prepared HEEP, Haridwar	Issued Corp. R&D	Dt. of 1 st Issue 01-02-1986
Dt: 26-05-2012	Dt:	Year: 2021 18			

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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 COMPOSITION/PREPARATION OF SOLUTIONS & OPERATING INSTRUCTIIONS

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

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.

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 cautions 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 PROCESS

7.1 Acid Treatment

7.1.1 Zinc/cadmium plated, heat treated articles after proper rinsing, shall be dipped in 0.4 to 0.5% 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.


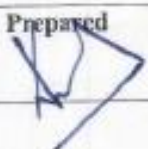

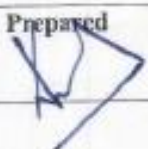

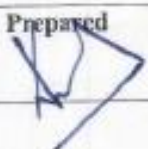

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- 1) IS 1340
- 2) IS 1573
- 3) IS 8602
- 4) AA54101
- 5) AA54102
- 6) AA54104
- 7) AA55612





TME/2010

<p align="center">BHARAT HEAVY ELECTRICALS LIMITED , BHOPAL</p> <p align="center">TRACTION MACHINES ENGINEERING DIVISION</p>				
<p align="center">PRODUCT STANDARD CONCURRENT SHEET</p>				
<p>GENERAL INFORMATION</p> <p>DATE: 27/09/2022</p> <p>PRODUCT STANDARD NO: TM97246</p> <p>DESCRIPTION: <u>BRUSH HOLDER INSULATOR PINS FOR TRACTION MACHINES</u></p>				
REVISION NO.	DETAILS OF REVISION			
08	1. Changes made as per MOM TME/708 dt. 12.01.2022. 2. Clause 1.0, 6.1, 6.2, 6.3, 7.1 & 7.2 revised. 3. Clause 2.2 & 8.0 added.			
09	1. For Reference added in heading of Cl. 2.0 2. Type test requirement changed from "To be done once in every 2 years at TSD BHEL, Bhopal to "To be done in first lot of supplies by a new vendor (i.e. those vendors who are supplying Brush Holder Arms to BHEL for the first time) before commencement of bulk supplies.			
	NAME	SIGNATURE	DATE	
PREPARED BY:	Kunal Dugvekar		27.09.2022	
AGREED BY	REMARK	DEPTT./SEC	SIGNATURE	DATE
P Telang	OK	TME		27.09.2022
Shishupal	OK	TME		27.09.2022

 PRODUCT STANDARD TME DIVISION, BHOPAL	TM 97246 Rev.09															
	PAGE 01 OF 04															
TME/2011																
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company	<u>BRUSH HOLDER INSULATOR PINS FOR TRACTION MACHINES</u>															
	1.0 GENERAL : This standard details the process to be followed for the manufacture of the brush holder insulator pins for traction machines. This standard also covers brush holder arm, support and other similar items.															
	2.0 INSULATION MOULDING PROCEDURE (For Reference):															
	2.1 Epoxy resin bonded woven glass cloth moulding															
	Step 1 - Steel pins are machines as specified in drawing. Step 2 - Machines pins are cleaned with acetone/toluene to remove any physical contamination such as dust/dirt particles, grease etc. which may be present on the pin surface. Step 3 - Fix a sealing insulation of epoxy glass as per drg. Centrally at the non-threaded end of the pin with epoxy compound. Step 4 - Pins are then wrapped with preheated (100-110 deg.C) Silane treated woven glass cloth (AA-25601) layers of 0.18mm thk thoroughly soaked in unmodified Epoxy resin to build up insulation. The Epoxy resin shall be CIBA Geigy resin type CY 205, hardner HY 905, plasticizer DY 040 & Accelerator DY 061 or equivalent epoxy resin formulation with the approval of BHEL. Step 5 - After this the pin is clamped in the mould and cured at a temperature of 80-90 deg.C for 2 hours followed by curing at 150-160 deg.C for 1 ½ to 2 hours (time to be reckoned after the required temperature is attained). Step 6 - The pins are to be removed from the moulds & post cured at 150-160 deg.C for 4 hours.															
Revision: 09 Date: 27.09.2022	<table border="1"> <thead> <tr> <th>Distribution</th> <th>Qty.</th> <th>Approved :</th> <th>Checked</th> <th>Date:</th> </tr> </thead> <tbody> <tr> <td>TME</td> <td>2</td> <td rowspan="3" style="text-align: center;">  </td> <td rowspan="3" style="text-align: center;">  </td> <td rowspan="3" style="text-align: center;"> 27.09.22 (W. K. Rao) </td> </tr> <tr> <td>TXM</td> <td>2</td> </tr> <tr> <td>TAM</td> <td>2</td> </tr> </tbody> </table>	Distribution	Qty.	Approved :	Checked	Date:	TME	2			27.09.22 (W. K. Rao)	TXM	2	TAM	2	
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TME	2			27.09.22 (W. K. Rao)												
TXM	2															
TAM	2															

		 <p>PRODUCT STANDARD TME DIVISION, BHOPAL</p>	<p>TM 97246 Rev.09</p> <hr/> <p>PAGE 02 OF 04</p>
<p>COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company</p>		<p>Step 7 - Moulded pins are to be machined to obtain the final dimension specified on drg.</p> <p>Step 8 - Heating of pins is done at 80-100 deg. C for 2 hours to remove moisture. Apply a coat of Epoxy Red Gel to BP 27476.</p> <p>Step 9 - Preheat the pins at 40 deg. C for 10 hours followed by post curing at 80-100 deg. C for 4 hours.</p> <p>Step 10 - Uninsulated portion of steel pins to be electroplated.</p> <p>Step 11 - Heat shrink PTFE bush as per drg. On the pin by heating the bush at 190-200 deg. C.</p> <p>2.1 <u>Mycalex Insulated Moulding.</u></p> <p>The two part components are to be moulded with Micallex (glass bonded mica with suitable binder) insulation between the two parts under required pressure and temperature, as per thickness of insulation shown in drawing.</p> <p>Testing to be done after removing PTFE bush.</p> <p>For mech-test – see drg.</p> <p>3.0 <u>DIMENSIONS AND TOLERANCES</u></p> <p>Shall be as stated on the order or the drawing accompanying the order.</p> <p>4.0 <u>IDENTIFICATION ON INSULATED PINS</u></p> <p>Suppliers identification mark should be punched / engraved on steel pin at bottom face (threaded side) of the steel pin before insulation moulding. Also identification mark at top face (Insulation portion) is also essential with suitable sticker or paint. Identification mark should be legible.</p>	
		<p>5..0 <u>FINISH</u></p> <p>Moulded insulation portion shall have a reasonably smooth surface finish. The surface shall be even, free from visible defects like blisters, cracks, loose fibres, wrinkles, local deformation, foreign inclusions and dents etc.,</p>	

			PRODUCT STANDARD TME DIVISION, BHOPAL	TM 97246 Rev.09
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		6.0 ROUTINE TEST		
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company	6.1 HV Test to be conducted as follows:			
	<div>- For Traction Machines with 1500 V : 9KV for 1 Min. insulation level.</div> <div>TM4906, TM4907, TM4601, TM4603, TM5002, TM4501, TM4605, MG51 (M), TM3701, MA3501, MA3505, HS15250, TA0659, TM4303, TG10931, TG10919.</div>			
	<div>- For Traction machines with 1000V : 6KV for 1 Min. Insulation level.</div> <div><u>TM3603</u></div>			
	<div>- For Traction machines with 600 V : 4KV for 1 Min. Insulation level</div> <div>TA10102/10106,AG3101,AG3102,AG2702, AG51, AG2513, AG2501, MG51(G), BM2101 DY 3423.</div>			
	6.2 Check insulation resistance by 1KV Meggar the value should be 500 Mega ohm min. at ambient temperature.			
	6.3 On every lot of 100, select 2 pins at random & clamp insulator pins in suitable steel clamp to cover full length of insulation and measure IR. Then heat to 100 ± 5 ⁰ C for 2 hours and measure hot insulation resistance. It should be minimum 60 M. ohms.			

		 PRODUCT STANDARD TME DIVISION, BHOPAL TME/2011	TM 97246 Rev.09 PAGE 04 OF 04
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED It must not be used directly or indirectly in any way detrimental to the interest of the company		<p>7.0 TYPE TEST</p> <p>Following tests to be done in first lot of supplies by a new vendor (i.e. those vendors who are supplying Brush Holder Arms to BHEL for the first time) before commencement of bulk supplies.</p> <p>7.1 Conduct BDV on 2 pins in as received condition, which should >3.0 KV/mm. Insulation thickness to be taken from individual component drawing to find the BDV value.</p> <p>7.2 Subject 2 pins to boiling water at 100 deg.C for 4 hours. Dry the pins in oven at $100 \pm 5^{\circ}\text{C}$ for 4 hours. After conducting 3 cycles check IR in hot condition (i.e $100 \pm 5^{\circ}\text{C}$) which should be 60 M. ohms min. Also conduct BDV at room temperature which should be > 2.0 KV/mm. Insulation thickness to be taken from individual component drawing to find the BDV value.</p> <p>7.3 One pin should be cut across insulation portion for checking consolidation.</p> <p>8.0 MECHANICAL TEST</p> <p>Refer individual component drawings.</p> <p>9.0 TEST CERTIFICATE</p> <p>3 Copies of the routine test certificate shall be supplied with each consignment.</p> <p>10.0 PACKING`</p> <p>Individual pins should be packed in a polythene bag and placed in cardboard box properly sealed to avoid transit/handling damages.</p>	

662964/2022/HEP-TXM20500

BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
QUALITY CONTROL TRANSPORTATION
QUALITY ASSURANCE PLAN(QAP)
REFERENCE DRG:- 439228003

QA PLAN NO : QTM/TXM/VENDOR/CA/192/18-17/TM/439228003/44-HOLDER INSULATION PIN DT. 21.09.18 REV 00

SL. NO.	CHARACTERISTIC	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK (No. of jobs)	REF. DOCUMENT	FORMAT OF RECORD	REMARKS
1.0	Material Test Certificate	A	VR	100%	Dwg. no. 3439228003 and relevant spec.	TR	TEST LAB NABL / EQUIVALENT ACCREDITED / SOURCE MILL TC to be Submitted of following 1. Glass cloth and steel insert 2. Zinc plated certificate 3. All routine test 4. Type test in each lot
2.0	Dimensions as per drg.	A	I	100%	Dwg. no. 3439228003	SR	All dimensions marked in drawing. Report to be Submitted
3.0	Routine and Type test	A	T	As per spec.	TM 9/249	TR	Report to be Submitted and test to be witnessed by TPA
4.0	Identification Vendor Name	A	VR	100%	PO/Drawing	SR	Certificated of compliance is to be submitted
5.0	Packaging suitability for transit & storage	B	VR	100%	-	SR	Packaging shall be such that during transit job is not damaged. Certificate of compliance is to be submitted

PREPARED BY: *[Signature]* APPROVED BY: *[Signature]*

1) All T.R. to be signed by TPA/PAOC (duly signed & sealed) as per above QAP requirement shall be submitted along with consignment.
2) T.R. to be filled in 72 TM Division
3) T.R. to be filled in 72 TM Division
Abbreviation: A - Calcul. B - Major. VR - Verification. Instrument/ Gauges.
T.R. - Test Record. S.R. - Shop Record. T - Test witness

AGENCIES: QC-BHEL Overly Control
TPA - BHEL appointed third Party Inspecting Agency

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