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	CORPORATE PURCHASING SPECIFICATION	AA 561 34
		Rev. No. 04
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HEAT RESISTANT ALUMINIUM PAINT - Gr: 2
(TEMPERATURE UPTO 400^0 C)

1.0 GENERAL:

This specification governs the quality requirements of Heat Resistant Aluminium Paint which shall be capable to withstand temperature upto 400° C and possible to paint by brush or air spray methods without reduction in viscosity.

2.0 APPLICATION

The paint shall be suitable for heat resistant application on the surfaces of steam/gas turbine components and other machine parts which are exposed to a operating temperature of 400° C as well as to protect against moderate corrosion.

3.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall conform to the requirements of following national standard and also shall meet other requirements of this specification.

IS:13183-1991, Gr. 2: Aluminium Paint, Heat Resistant-Specification.

4.0 COLOR: That of metallic Aluminium

5.0 FINISH: Bright, smooth & lustrous

6.0 FREEDOM FROM DEFECTS:

The paint shall remain free from defects like hard settling of pigments, skinning when kept in a closed container and livering (excessive viscosity build up) during its rated shelf life.

The dried coating of paint shall be free from defects like bittyness, floating of pigments, leafing/flaking of film from substrate etc.

Revisions : C 33.11.42 of MOM of MRC-CPO			APPROVED : INTERPLANT MATERIAL RATIONALISATION COMMITTEE-MRC (C)		
Rev. No.04	Amd.No.	Reaffirmed	Prepared	Issued	Dt. of 1st Issue
Dt: 01.02.2005	Dt :	Year :	HARDWAR	Corp. R&D	January, 1980

7.0 CHEMICAL COMPOSITION:

The paint shall be based on special heat resistant silicone binder pigmented with fine grade of aluminium paste and extender pigments in suitable proportion so as to meet the requirements of this specification.

The supplier of the material has to certify that the paint supplied is free from natural resins and free from lead or its compound to meet requirements of ISO:14001. The supplier should provided IR-Spectrograph in support of above composition.

8.0 TEST SAMPLES:

Tender samples will not be required when once the type approval is given and the supplier /manufacturer declares that the materials for which tender is given is of the same quality and composition as that of type approved sample. Representative sample of the homogenised paint shall be drawn in accordance with IS:101.

9.0 TEST METHODS:

When tested in accordance with IS : 101 and Appendix of this specification, the test samples shall show the following properties:

10.0 PROPERTIES :

10.1 Drying Time :
(a) Surface dry: 1hr, max.
(b) Hard dry: 18hrs, max.

10.2	**Consistency**	:	20 sec. min.
10.3	**Non-volatile matter content:**		30% by mass, min.
10.4	**Volume solids**	:	20%, min.
*10.5	**Scratch hardness**	:	To pass the test 6 H pencil hardness.

*10.6 **Flexibility & adhesion:**
To pass the test when tested after 48 hrs of air drying.

*10.7	**Water resistance (IS:13183)**	:	To pass the test.
*10.8	**Salt spray resistance (IS:13183)**	:	To pass the test.
10.9	**MASS IN kg/10 litres**	:	10.3 ± 0.5

10.10 **Resistance to heat:**
Film of paint when tested as per Appendix, shall show no cracking, blistering, flaking or peeling.

NOTE: * These texts shall be conducted after full cure.

11.0 KEEPING PROPERTY:

When stored in a covered dry place in the original sealed container under normal temperature conditions, the material shall retain the properties prescribed in this specification for a period of 12 months after the date of manufacture which shall be subsequent to the date of placing the order.

12.0 TEST CERTIFICATES

Unless otherwise specified, three copies of test certificates shall be supplied along with each consignment.

In addition, the supplier shall ensure to send one copy of test certificates along with the despatch documents to facilitate quick clearance of the material.

The test certificates shall bear the following information:

AA 56134 (Rev.No. 04) : Heat Resistant Aluminium Paint Gr. 2.
BHEL Order No. & Date
Manufacturer's/Supplier's Name.
Trade Mark, if any.
Batch/Lot No.
Date of Manufacture & Expiry.
Quantity supplied
Test results of 7.0 and 10.0.

13.0 PACKING AND MARKING

The paint shall be supplied in sealed and leak proof metal containers in size as per BHEL order. Each container shall bear the following information neatly written or pasted at suitable location on it.

AA 56134: Heat Resistant Aluminium paint -Gr 2
BHEL Order No.
Manufacturer's/Supplier's Name.
Trade Mark, if any.
Batch/Lot No.
Date of Manufacture & Expiry.
Quantity supplied.

14.0 REFERRED STANDARDS (Latest Publications Including Amendments)

1. IS : 101
2. IS: 13183

Appendix (10.10)

TESTING OF HEAT RESISTANCE

Prepare and clean the test panels made from hot rolled steel . Apply the paint uniformly on the test panels. Air dry the panels for 30 minutes and bake subsequently at 250±10^{O} C for 1 hour. Cool the test panels for room temperature. Place the panels in the oven / furnace maintained at following schedule:

4 hours at 300^{O} C
1 hour at 400^{O} C

Remove the panels from oven/furnace, cool and examine the coating for any cracking, blistering. Flaking, peeling or leafing of paint film.

In absence of above surface defects, the material is deemed to have passed the heat resistance test.

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	CORPORATE PURCHASE SPECIFICATION	AA 561 12
		Rev. No. 02
		PAGE 1 OF 4

HIGH BUILD INTERMEDIATE EPOXY PAINT

1.0 GENERAL

This specification governs the quality requirements of cold cured two pack high build intermediate epoxy paint suitable for application by brushing or spraying.

2.0 APPLICATION

This material shall be used as an intermediate coat on epoxy primed surfaces to provide high build up coating thickness so as to protect the steel and other equipment's against corrosion due to humidity, saline environment and corrosive atmosphere.

3.0 COMPLIANCE WITH NATIONAL STANDARDS

There is no national standard covering this material.

4.0 COLOUR

Dark brown

5.0 FINISH

Smooth and matt.

6.0 FREEDOM FROM DEFECTS

The components of the paint shall remain free from defects like hard settling of pigments, skinning when kept in closed container and livering (excessive viscosity build up) during its rated shelf life.

The dried surface shall be free from defects like brittyness, floating of pigments, wrinkles, orange peel, blisters , hard particles, pin holes etc.,

Revisions : Cl 37.1.05 of MOM of MRC-CPO			APPROVED : INTERPLANT MATERIAL RATIONALISATION COMMITTEE-MRC (CPO)		
Rev. No. 02	Amd.No.	Reaffirmed	Prepared HARDWAR	Issued Corp. R&D	Dt. of 1st Issue JUNE, 2001
Dt.:01.09.2009	Dt :	Year :2009			

7.0 CHEMICAL COMPOSITION

The material shall be based on two components epoxy system and supplied as catalysed epoxy resin pigmented with MIO & TiO_2 and polyamide as an accelerator or hardener for cold curing. The mixing ratio of base and accelerator shall be as per supplier's recommendations. The type and content of the binding material i.e., epoxy resin, as determined by infrared spectrography or thin layer chromatography shall be strictly same as that of "Type Approved Sample".

The supplier should provide IR-Spectrograph in support of above composition.

The supplier of the material has to certify that the paint supplied is free from natural resins and free from lead or its compound to meet requirements of ISO 14001.

8.0 TEST SAMPLE

Tender sample will not be required when once the type approval is given and the supplier concerned has to declare that the material for which the tender is given is of the same quality as the type approved sample.

Representative sample of the material shall be drawn and tested as per IS 101, RA 2007

9.0 PROPERTIES

Unless otherwise specified, when tested in accordance with relevant parts of IS : 101 (RA 2007), the test samples shall show the following properties:

9.1 Consistency

Smooth and homogenous.

9.2 Drying Time

Touch dry : 6 hours, max.

Hard dry : 12 hours, max.

9.3 Mass per ten litres

12.5-13.5 kgs.

9.4 Non volatile matter

48 - 52% by weight.

9.5 Volume Solids:

55%, min.

9.6 Resistance to salt spray

The panels prepared from the material shall show no sign of corrosion after continuos exposure to salt spray for a period of 7 days in the salt spray cabinet.

9.7 Flexibility & Adhesion

The film shall show no sign of damage, detachment or cracking when tested after 7 days curing at RT or 2 hours drying at 70 - 80℃after 24 hours air drying.

9.8 Scratch Hardness

The film shall show no sign of scratch so as to show the bare metal at a load of 1000 grams when tested after 7 days curing at RT or 2 hours drying at 70 - 80℃ after 24 hours air drying.

9.9 Flash Point

Not below 25℃.

9.10 Dry film thickness

75-100 microns per coat as per BHEL standard AA 067 41 05.

9.11 Pot life

4-6 hours, when mixed.

10.0 TEST CERTIFICATE

Unless otherwise stated, three copies of test certificates shall be supplied along with each consignments, giving the following information.

In addition, the supplier shall ensure to send one copy of the test certificates along with the despatch documents to facilitate quick clearance of the material.

AA 561 12, Rev 02: High Build Intermediate Epoxy paint
BHEL Order No.
Manufacturers/ Supplier's name :
Trade name / mark , if any :
Batch/Lot No. :
Date of manufacture and expiry :
Test results of clause 7.0 to 9.0 :
T.C. No & date
Mixing ratio

11.0 KEEPING PROPERTY

When stored in covered dry place in the original sealed containers under normal temperature conditions, the material shall retain the properties prescribed in this specification for a period of six months after the date of manufacture which shall be subsequent to the date of placement of BHEL order.

12.0 ENVIRONMENTAL REQUIREMENTS:

The supplier shall furnish Material Safety Data Sheet **(MSDS)** covering all information relating to human safety and environmental impacts of the hazardous materials particularly during their transportation, storage, handling and disposal alongwith each supply.

Each container shall be marked with corresponding symbol and minimum worded cautionary notice for flammable / corrosive / toxic / harmful / irritant and oxidizing etc. as applicable.

13.0 PACKING AND MARKING

Unless otherwise stated, base & hardener shall be packed separately in steel containers of 4 litres capacity.

Each container shall bear the following information:

AA 561 12: High build Intermediate Epoxy Paint
BHEL Order No.
Manufacturers/ Supplier's name:
Trade name / mark , if any:
Batch/Lot No.:
Name of components:
Mixing ratio:
Quantity supplied:
Date of manufacture & expiry:

14.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS : 101 2. AA 067 41 05

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	CORPORATE PURCHASE SPECIFICATION	AA 561 13
		Rev. No. 02
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INORGANIC ETHYL ZINC SILICATE PRIMER

1.0 GENERAL

This specification prescribes the quality requirements and application procedure for two components, air drying, Inorganic Zinc Ethyl Silicate priming paint. This priming paint when applied on steel structures provides excellent resistance to temperature, soil chemicals, salts, water, and chemical resistance under marine conditions and outside weather ability.

2.0 APPLICATION

The material shall be intended for use as a primer coat in the painting system on new steel structures internally and externally. Normally, for best performance, the surface to be coated shall be ensured free from oil, loose rust/dust etc., followed by blast cleaning to Sa 2 ½ min. with a surface profile of 35 to 50 microns. This shall be followed by application of single coat of the priming paint by spray method so as to achieve dry film thickness t of 65-75 microns. The surface profile after blasting shall be 20 –35 microns.

3.0 COMPLIANCE WITH NATIONAL STANDARDS

The material shall comply with the requirements of following Indian standard and also, meet other requirements of this specification.

IS: 14946-2001, Main coat: Zinc Ethyl Silicate Primer, Two Components

4.0 COLOUR

The colour of the material shall be Grey.

5.0 FINISH

Smooth and Matt.

6.0 COMPOSITION

The material shall be two components moisture and self cured Inorganic Ethyl Silicate Binder pigmented with zinc metal powder conforming to IS: 14355 and having a purity of 99% and particle size of 4-5 microns, in the recommended proportion. The coating of this material attains water resistance within 30 minutes of application and remains unaffected by rains, condensation or dew etc. The manufacturer shall specify the principal type of binder used.

The supplier of the material shall declare that components of paint supplied shall meet the legislative requirements ISO: 14001.

Revisions:			APPROVED: INTERPLANT MATERIAL RATIONALISATION COMMITTEE-MRC (CPO)		
As per 40th MOM of MRC-CPO					
Rev. No. 02	Amd.No.	Reaffirmed	Prepared	Issued	Dt. of 1st Issue
Dt:26.05.2012	Dt :	Year:	HARDWAR	Corp. R&D	JUNE, 2001

7.0 MIXING RATIO:

The components of paints are to be mixed in the proportion as recommended by supplier of the material.

8.0 TEST METHODS:

Unless specified otherwise, tests shall be conducted as prescribed in relevant parts and section of Indian standard IS: 101 and IS: 14946. The test panels shall preferably be prepared on blast cleaned surface.

9.0 PROPERTIES:

The material shall meet the following technical requirements:

9.1 DRYING TIME:

Surface dry	: 15 minutes, max.
Hard dry	: 2 hrs., min.
Time to topcoat	: 24 hrs., min.

9.2 CONSISTENCY:

The liquid component mixed with powder shall be suitable for application by spray as such or when thinned in the proportions at specified by the manufacturer.

9.3 FLASH POINT: Not below 15° C

9.4 MASS PER TEN LITRES: 20 kgs., min.

9.5 VOLUME SOLIDS: 60.0 % , min.

9.6 POT LIFE OF MIX (ANNEXURE D OF IS: 14946): 4 hrs., min. at 30^0 C

9.7 DRY FILM THICKNESS:

65-75 microns per cot when measured after 72 hrs. of curing.

9.8 RESISTANCE TO SALT SPRAY TEST (TYPE TEST):

The material shall pass resistance to salt spray test, when test panels cured for 72 hrs. are subjected to continuous exposure for 2000 hrs.

9.9 PROTECTION AGAINST CORROISION UDNER CONDITIONS OF CONDENSATION (TYPE TEST):

The material shall pass the test, when test panels cured for 72 hrs., are subjected to exposure at specified conditions for 2000 hrs.

9.10 HEAT RESISTANCE TEST:

The film shall not show signs of cracking, blistering or flaking when coated test panels air dried for 48 hrs., are kept at 400 ± 10^0C for 6 hrs followed by plunging in cold water-three cycles, min.

9.11 COMPOSITION:

9.11.1 SOLID CONTENT:

68%, min. by weight of mixed paint.

9.11.2 TOTAL METALLIC ZINC CONTENT (ANNEXURE B OF IS : 14946):

75%, min. by weight in non-volatile portion of the paint.

9.12 MUD-CRACKING TEST:

The coating applied to dry film thickness of 120 microns minimum, shall not show any mud cracking when viewed under 10 X magnification.

9.13 SEDIMENTATION TEST:

There shall not be any segregation of zinc powder form the base material within 2 hrs in the mixed paint.

9.14 CURE TEST:

The coated test panels air dried for 48 hrs shall pass the cure test when tested according to test procedure given in ASTM D 4752.

10.0 KEEPING PROPERTY

When stored in covered dry place in the original sealed containers under normal ambient conditions, the liquid portion shall not show thickening, curdling, gelling or hard caking and also retain the properties of mixed paint prescribed in this specification for a period of six months from date of delivery.

11.0 TEST CERTIFICATES

Unless otherwise stated, three copies of test certificates and product data sheet shall be supplied along with each consignment giving following information:

In addition, the supplier shall ensure to send one copy of test certificate along with the dispatch documents to facilitate quick clearance of the materials.

AA 561 13, Rev 02: Inorganic ethyl zinc silicate primer
BHEL order No. & Date
Manufacturers/suppliers Name:
Trade name/mark, if any:
Batch/Lot No.;
Quality supplied:
Date manufacture & expiry:
Test results as per 9.0
Mixing ratio
Technical information, if any:

12.0 PACKING AND MARKING:

Unless otherwise stated, the components of paint shall be supplied separately in moisture and leak proof containers in packing size as specified in the BHEL order.

Each container of the consignment shall bear the following information printed or pasted at suitable place so as to protect it from damage during transportation and handling.

AA 561 13: Inorganic ethyl zinc silicate primer.
BHEL order No. & Date
Manufacturers/ Supplier's name:
Trade name / mark , if any:
Batch/Lot No.:
Name of contents:
Mixing ratio:
Quantity in container:
Date of manufacture & expiry:
Technical information, If any:

13.0 ENVIRONMENTAL REQUIREMENTS:

The supplier shall furnish Material Safety Data Sheet **(MSDS)** covering all information relating to human safety and environmental impacts of the hazardous materials particularly during their transportation, storage, handling and disposal alongwith each supply.

Each container shall be marked with corresponding symbol and minimum worded cautionary notice for flammable / corrosive / toxic / harmful / irritant and oxidizing etc. as applicable.

14.0 PRECAUTIONS

a) Use off the mixed paints within stipulated pot life i.e., 4 hrs after mixing and should be continuously agitated during application.
b) Inorganic Zinc silicate primer should not be applied at relative humidity below 50 % and the surface should remain free from condensation at the time of application.
c) After completion of the work, the application equipment must be cleaned thoroughly immediately with thinner and kept safely for next use.
d) The surface to be painted must be blast cleaned to Sa 2 ½, min. and the painting shall be done by spray method uniformly. However, brush may be used for touch up of local areas only.

15.0 REFERRED STANDARDS (Latest Publications Including Amendments)

1) IS: 101 2) IS: 14355 3) IS: 14946

3) AA 067 41 01 5) ASTM D 4752

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TD-106-1 Rev No. 5 / Form No.	PRODUCT STANDARD PULVERISERS HYDERABAD	Product STD NO. BA07002
		Rev No 01
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Description :

Two-component polyamide adducts cured, high build epoxy paint which combines a relatively high volume solids content with a short drying time.

Application:

Finishing coat on bowl mill components. It shall be compatible to intermediate coat of Polyamide cured High build epoxy base paint.

Service Temperature : Maximum, dry exposure only: 140°C

PHYSICAL CONSTANTS:

Shade	:	RAL 9002
Finish:		Semi-gloss
Volume solids, %:		60 ± 1
Theoretical spreading rate: 5.6 m2/l - 125 micron/5 mils		
Flash point:		23 °C [73.4 °F]
Specific gravity:		1.5 kg/litre [12.9 lbs/US gallon]
Dry to touch:		2 approx. hour(s) 20°C/68°F
Fully cured:		7 day(s) 20°C/68°F
VOC content:		298 g/l [2.5 lbs/US gallon

Revisions: Refer to record of revisions:	Prepared: Aman Surin	Approved: Satish Ghatge	Date: 27.11.13

RECORD OF REVISIONS

REV. NO	DATE	REVISION DETAILS	REVISED	APPROVED
01	8/7/14	High build epoxy was High build MIO epoxy	Aman	S Ghatge