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COMPANY STANDARDS

PR1031-C

TITLE:

RUST PREVENTION BY PROCESS PRIMER APPLICATION- CODES

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DATE: 2017 - 03-03

0. GENERAL INFORMATION :

- a) This revision supersedes Issue-01 of PR1031-C dated 2007-08-31
- b) This issuance is necessitated by :
The reclassification of codes for Paint and Paint related materials listed in table-1 of company standard C6001 (Paint and Paint related materials).
The colour shade code for Paint / Primer is newly introduced in-line with Indian standard (IS) and RAL standard and listed in table-2 of company standard C6001.
- c) Epoxy based zinc phosphate primer provides good adhesion to substrata, resistance to moisture and superior corrosion resistance characteristics than PU primer. The Epoxy based zinc phosphate primer coating is intended to serve as first undercoat for finish paints and also it is intended to serve as barrier against adhesion of weld spatters because of high zinc content.
- d) The epoxy primer is used as under coat for both
 - i) Epoxy paint top coats and
 - ii) Polyurethane (PU) paint top coat.
- e) In view of the above, BEML painting system is updated to Epoxy primer as undercoat and Polyurethane Finish paint as top coat, in preference to other paints.
- f) The colour shade of the undercoat primer shall match approximate to the top coat colour shade when colour shade is mentioned in the drawing or wherever required. Even though, all the colour shades used in BEML are listed in colour shade table given in company standard C6001, for general practice usage : The preferred colour shade for under coat primer shall be **Middle buff** to colour shade code 359 and designation is C6001-36-359 (Epoxy primer with Middle buff colour shade).

Wherever the parts to be top coated with dark colour shades as indicated in drawing / specific requirement the preferred colour shade for undercoat primer shall be **Dark admiralty gray** to colour shade code 632 and designation is C6001-36-632 (Epoxy primer with **Dark admiralty gray** colour shade) .

1. SCOPE :

This standard defines the codes used in BEML drawings, process sheets to denote the sequence of operations for different categories of components and parts of Construction and Mining equipments for application of primer for in-process corrosion prevention. The primer coating is also intended to serve as barrier against adhesion of weld spatter and as first under coat for finishing top coat.

PREPARED BY :
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ISSUE No. :
02

REPLACES:

REF : MOM , Ref :
GES/21/PAINT/326A
Dt.12.06.2015

APPROVED BY :

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2. APPLICABILITY :

The following codes identify the procedure applicable to the different categories of components and parts. Appropriate codes as indicated in Table-1 shall be referred in part drawings in the surface treatment column.

Table-1, Process codes:

SL NO	CODE	APPLICABILITY
01	PCS	Parts cut or formed from cold rolled steel sheets
02	PHS	Parts cut from hot rolled steel sheets
03	PSP	Parts cut from steel plates
04	PHF	Hot formed parts
05	PCF	Castings & Forgings
06	PST	Structural's, Pipes & Tubes
07	PWP	Welded parts
08	PSW	Stress relieved welded structures
09	PGP	General parts
10	PSC	Parts with special coatings

Designation of code in drawing :

Applicable process code followed by “,” and company standard number to be indicated in Surface treatment column provided.

Example : for Parts cut or formed from cold rolled steel sheets, Epoxy primer application process code as follows:

Primer application Code : PCS, PR1031-C

3. PROCESS CODES AND SEQUENCE OF OPERATIONS FOR APPLICATION OF EPOXY BASED ZINC PHOSPHATE PRIMER (C6001-36) :**3.1 PROCESS CODE - 'PCS':****3.1.1 APPLICABILITY :**

This process is applicable to components made from cold rolled sheets. This process also applies to parts cut from cold rolled sheets which have been cold formed to the required shapes.

Note : The individual sheet components shall be free of sharp edges, burrs, dents deep scratches etc. and surfaces shall be clear of oxide and rust films.

3.1.2 PROCESS :

Following is the recommended sequence of operations for assemblies / sub assemblies fabricated from the above sheet components or fully finished component :

3.1.2.1. DEGREASING AND DERUSTING :

Degreasing shall be carried out by any one or combinations of the following (Ref. IS:6049) :

- a) Wire brushing
- b) Chemical derusting (rust remover)
- c) Petroleum solvent (dip or swab)
- d) Ultrasonic cleaning
- e) Emulsion
- f) Steam blasting

3.1.2.2 ZINC PHOSPHATING :

Provide zinc phosphate coating (PZ-M) to a thickness of 10 micrometer min. per sq meter as per company standard PR1008-C as undercoat for Epoxy based Zinc Phosphate Primer.

3.1.2.3 PRIMER COATING :

Apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based Zinc Phosphate Primer to company standard C6001-36 to a coating thickness of 60 to 80 micrometer of DFT by spray immediately after degreasing and derusting / phosphating. Allow 10~15 minutes between 1st coat to 2nd coat. Allow the primer coating to dry completely for at least 8 hours.

3.2. PROCESS CODE – ‘PHS’**3.2.1 APPLICABILITY :**

This process is applicable to parts cut from hot rolled sheets.

NOTE : There is possibility of the hot rolled sheets being supplied without adequate blast cleaning and rust / corrosion preventive coating. Therefore the surfaces of the sheets are likely to have mill scale and light rust. Individual components shall be free of these surface defects before being taken up for fabrication of assemblies.

3.2.2 PROCESS :

Following is the recommended sequence of operations for sheet metal components cut from hot rolled sheet :

3.2.2.1 DESCALING AND DERUSTING (Ref. IS : 6049) :

Descaling and derusting of the parts shall be carried out by any one or combination of the following :

- a) Wire brushing
- b) Emerying
- c) Alkali / Acid pickling
- d) Application of rust remover (chemical derusting)



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3.2.2.2 PHOSPHATING :

Provide zinc phosphate coating (PZ-M) to a thickness of 10 micrometer minimum per sq meter as per Company Standard PR1008-C as undercoat for Epoxy base Zinc Phosphate Primer to Company standard C6001-36.

3.2.2.3 PRIMER COATING :

Apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based Zinc Phosphate Primer to company standard C6001-36 to a coating thickness of 60 to 80 micrometer of DFT by spray immediately after degreasing and derusting / phosphating. Allow 10-15 minutes between 1st coat to 2nd coat. Allow the primer coating to dry completely for at least 8 hours.

3.3. PROCESS CODE - 'PSP'

3.3.1 APPLICABILITY :

This process is applicable to parts cut from hot rolled steel plates.

- 1) If hot rolled steel plates are received without any surface coating for corrosion prevention after hot rolling / normalizing, the surfaces of the plates are likely to have mill scales and light rust. The plates may also have rust due to long storage in house.
- 2) The plates from overseas sources are normally supplied as blast cleaned and coated with corrosion preventive for sea freight. After gas / flame cutting in house, the cut pieces will have light oxide film and damaged surface coating due to gas cutting.

3.3.2 PROCESS :

Following is the recommended sequence of operations :

3.3.2.1 DESCALING AND DERUSTING :

Descaling and derusting of the parts cut from the plates shall be carried out by one or combination of the following :

- a) Shot blasting
- b) Wire brushing (in case of light rust and no scale)
- c) Alkali / Acid picking. (in case of heavy mill scale if shot blasting facility is not available).
- d) Chemical derusting (in case of no mill scale, for light / medium – rust removal).
Rinse with water (with suitable corrosion inhibitor) or with suitable solvent (M.T.O. / Petroleum solvent) for degreasing, if necessary).

3.3.2.2 PRIMER COATING :

Apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based Zinc Phosphate Primer to company standard C6001-36 to a coating thickness of 60 to 80 micrometer of DFT by spray immediately after degreasing and derusting / phosphating. Allow 10-15 minutes between 1st coat to 2nd coat. Allow the primer coating to dry completely for at least 8 hours.

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3.4 PROCESS CODE – ‘PHF’**3.4.1 APPLICABILITY :**

This process is applicable to parts cut from hot-rolled steel plates and hot-formed for obtaining the desired shape.

Some of the hot-formed parts are also heat-treated by normalizing / hardening and tempering etc., to obtain the desired mechanical properties before machining.

3.4.2 PROCESS :

Following is the recommended sequence of operations :

3.4.2.1 DESCALING AND DERUSTING :

Descaling and derusting of the hot-formed parts shall be carried out by blast cleaning preferably by shot blasting. Where shot blasting is not feasible, alkali / acid pickling may be resorted to clean the surface by using clean and dry compressed air after shot blasting or clean with suitable solvent (by swabbing with cotton cloth soaked in the solvent) to remove the surface contaminants.

3.4.2.2 PRIMER COATING :

Apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based Zinc Phosphate Primer to company standard C6001-36 to a coating thickness of 60 to 80 micrometer of DFT by spray immediately after degreasing and derusting / phosphating. Allow 10-15 minutes between 1st coat to 2nd coat. Allow the primer coating to dry completely for at least 8 hours.

3.5 PROCESS CODE – ‘PCF’ :**3.5.1 APPLICABILITY :**

This process code pertains to castings and forgings.

For supply conditions of castings and forgings, refer Company Standard PR1029-C, in which process primer application is specified wherever applicable. In addition to this, the applicable procedure for castings and forgings which need to be painted after heat treatment is as follows :

- a) Blast cleaning – As required.
- b) Apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based Zinc Phosphate Primer to company standard C6001-36 to a coating thickness of 60 to 80 micrometer of DFT by spray immediately after degreasing and derusting / phosphating. Allow 30 minutes between 1st coat to 2nd coat. Allow the primer coating to dry completely for at least 8 hours.
- c) Corrosion preventive coating on other surfaces and on machine surfaces as required.

NOTE : The requirements in regard to blast cleaning and application of suitable corrosion / rust preventive to be used shall be as specified in the applicable process sheet.



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3.6 PROCESS CODE - 'PST' :

3.6.1 APPLICABILITY :

This process code is applicable to structurals such as angles, channels, beams, bars, tubes & pipes etc., used for fabricated structures.

Wherever the Pipes / Tubes are used for Hydraulic application, Zinc Phosphating is compulsory and Phosphating process shall be conducted as per PR1031-C. The Zinc Phosphating codes shall to be indicated additionally in the drawing / wherever required.

3.6.2 PROCESS :

Following is the recommended sequence of operations :

3.6.2.1 DESCALING AND DERUSTING :

Descaling and derusting of the parts shall be carried out by one or combination of the following :

- a) Shot blasting.
- b) Wire brushing (In case of light rust and no scale)
- c) Alkali / Acid pickling (in case of heavy mill scale if shot blasting facility is not available).
- d) Chemical derusting (In case of no mill scale, for light / medium – rust removal). Rinse with water (with suitable corrosion inhibitor) or with suitable solvent (M.T.O. / Petroleum solvent) for degreasing, if necessary.

3.6.2.2 PHOSPHATING : (Applicable for the structurals, tubes & pipes used for Hydraulic application).

Provide zinc phosphate coating (PZ-M / PZ-H) suitable for application as per company standard PR1008-C as undercoat for Epoxy base Zinc Phosphate Primer.

3.6.2.3 PRIMER COATING :

Apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based Zinc Phosphate Primer to company standard C6001-36 to a coating thickness of 60 to 80 micrometer of DFT by spray immediately after degreasing and derusting / phosphating. Allow 10~15 minutes between 1st coat to 2nd coat. Allow the primer coating to dry completely for at least 8 hours.

3.7 PROCESS CODE -- 'PWP' :

3.7.1 APPLICABILITY :

This process is applicable to welded parts which do not undergo thermal stress relieving. Components of the welded parts should have been provided with Epoxy based Zinc phosphate primer to Company Standard C6001-36 before welding.

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3.7.2 PROCESS :

Following is the recommended sequence of operations :

3.7.2.1 REMOVAL OF SPATTER :

Adherent welding spatter shall be removed by wire brushing, chipping and /or hand grinding immediately after welding.

3.7.2.2 The earlier process primer coating removed or damaged during welding, spatter removal and handling needs to be touched up by brushing.

3.8. PROCESS CODE - 'PSW' :**3.8.1 APPLICABILITY :**

This process is applicable to thermally stress relieved welded structures made of steel plates, castings and structurals.

The detail parts used in the fabricated structure are expected to have been surface cleaned and provided with process primer coating before fabrication. The epoxy based zinc phosphate primer coating gets damaged during thermal stress relief and needs to be replaced. The weld spatters adherent on the surface adjacent to the welds (despite epoxy based zinc phosphate primer coating and / or anti spatter spray used, if any) needs to be removed by chipping and hand grinding.

3.8.2 PROCESS :

Following is the recommended sequence of operations :

3.8.2.1 REMOVAL OF SPATTER :

Adherent welding spatter shall be removed by wire brushing, chipping and / or hand grinding immediately after welding.

3.8.2.2 BLAST CLEANING :

The initial epoxy based zinc phosphate primer / rust preventive coatings applied prior to fabrication and thermal stress relief shall be removed by grit blasting or light shot blasting. After blast cleaning the surfaces shall be cleaned with clean dry compressed air.

3.8.2.3 SURFACE PREPARATION :

Surface contaminants such as adherent dust, oil / grease – films, if any shall be removed by wiping with cotton cloth soaked in M.T.O / petroleum solvent.

3.8.2.4 PRIMER APPLICATION :

To the surfaces prepared as above, apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based zinc phosphate primer to Company Standard C6001-36 to thickness of 60 to 80 micrometer DFT by spray. Allow 10~15 minutes between 1st coat to 2nd coat. Allow the coating to dry completely (at least 8 hours) before further processing.

NOTE : Wherever thermal stress relieving is needed, the same must be mentioned as a note in the drawing.



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3.9 PROCESS CODE - 'PGP' :

3.9.1 APPLICABILITY :

This process code is applicable to general parts not covered by any of the above processes machined components and welded parts which require a part of their machined / un machined surfaces to be painted also fall in to this category.

3.9.2 PROCESS :

Following is the recommended sequence of operations.

3.9.2.1 CLEANING AS REQUIRED :

Following are the options available :

- a) Rinse to remove dirt and dust on surface.
- b) Degrease by vapour or by dipping in a suitable solvent. Use recommended solvent to remove temporary rust preventive coating, if any.
- c) In case of rust, use chemical derusting (rust remover) : protect machined surfaces by masking.
- d) Blast cleaning.

3.9.2.2 ZINC PHOSPHATING, IF SPECIFIED :

Provide zinc phosphate coating (PZ-M) to a thickness of 10 micrometer minimum per sq meter as per Company Standard PR1008-C as undercoat for Epoxy base Zinc Phosphate Primer to Company standard C6001-36.

3.9.2.3. PRIMER COATING :

Apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based Zinc Phosphate Primer to company standard C6001-36 to a coating thickness of 60 to 80 micrometer of DFT by spray immediately after degreasing and derusting / phosphating. Allow 10~15 minutes between 1st coat to 2nd coat. Allow the primer coating to dry completely for at least 8 hours.

Note : Surfaces not to be primed shall be masked suitably.

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3.10.0 PROCESS CODE - 'PSC' :**3.10.1 APPLICABILITY :**

This process is applicable to parts with special purpose coatings, metallic or non metallic, functional or decorative.

Many parts which have been provided with metallic coating (such as hard chrome plating, galvanizing etc.,) or non metallic coatings (powder coatings, special purpose paints) may require a part of their surfaces to be primed for subsequent application of finish paint.

3.10.2.1 PROCESS :

Following is the recommended sequence of operations:

3.10.2.2 CLEANING AS REQUIRED :

Cleaning to remove surface contaminants, so as not to damage the existing special purpose coating, by any one or combination of the following :

- a) Water rinse
- b) Degreasing by application (dipping / swabbing) of suitable solvent.
- c) Ultrasonic cleaning
- d) Application of detergent
- e) Chemical derusting

3.10.2.3 PRIMER APPLICATION :

Apply two coats (each coat of 30 to 40 micrometer DFT) of Epoxy based Zinc Phosphate Primer to company standard C6001-36 to a coating thickness of 60 to 80 micrometer of DFT by spray immediately after degreasing and derusting / phosphating. Allow 10~15minutes between 1st coat to 2nd coat. Allow the primer coating to dry completely for at least 8 hours.

NOTE :

- 1) Shot blasting is preferred to sand blasting in regard to surface finish and health safety. However, blast cleaning is not recommended where thin sections are used.
- 2) Use rust preventives and corrosion inhibitors as per applicable process standards and shop practice in co-ordination with process planning department.
- 3) Latest Issuances of the cited standards shall be referred.

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