

**TENDER SPECIFICATION
BHE/PW/PUR/SKT-CWP/1192**

FOR

COLLECTION OF MATERIALS FROM BHEL/CLIENT'S STORES/STORAGE YARD;
TRANSPORTATION TO SITE OF WORK; ERECTION; TESTING INCLUDING PU
COATING (SUPPLY & APPLICATION); ASSISTANCES FOR COMMISSIONING & TRIAL
OPERATION; HANDING OVER AND ASSISTANCE FOR PERFORMANCE GUARANTEE
TEST FOR CW & ACW PIPING AND AUX. WORKS OF 2x270 MW TPS (UNIT Nos. 3 & 4)

AT

SIKKA THERMAL POWER STATION
GUJARAT STATE ELECTRICITY CORPORATION LIMITED
DISTT- JAMNAGAR
GUJARAT

SPECIFICATION FOR PU COATING

2 X 250 MW SIKKA SITE

1.0 SCOPE

This procedure covers the materials (paints), application and procedure for internal lining of pipes with Durathane 100 EAB - 100 % Solid Elastomeric Polyurethane Co

2.0 REFERENCES

a) BHEL Specification no. PC:E:PU:001 Rev 00

ISO 8501 – I Preparation of steel substrates before application of paints and related products visual

b) Assessment of Surface Cleanliness

SSPC – PA – 2 Paint Application Specification No. 2 – Measurement of dry film thickness with magnetic gauges.

c) ASTM D 4541 – Method of pull off strength of coating using adhesion tester.

3.0 RESPONSIBILITY

Supervisor shall be responsible for coating and painting equipment maintenance & operation, Quality assurance of paint application.

4.0 COATING MATERIAL STORAGE CONDITION

All incoming materials to be used in the coating shall be certified by the manufacture ,accordingly to the required standards by mean of test certificates for each material. Test Certificates will be made available to clients for verification and records. All paints shall be checked for following basic information, Viz :

- a) Manufacture's Name**
- b) Batch No. & Qty.**
- c) Date of Manufacturing**
- d) Shelf Life**

Visual inspection shall be carried out on both the components of paints when it is operated for use.

Acceptability -:

Uniform Colour, Homogeneous , No floating foreign material.

Material found with non-uniform colour, lumps, floating foreign material etc not to be used

5.0 SURFACE PREPARATION

The surface preparation of internal surface is to be carried out at the place where pipes are Made available for painting. Visual inspection is performed on each pipe so that steel surface shall be free of water, oil, grease and other kind of contamination. Any pipe found with contaminat shall be blasted after drying.

The cleaned internal surface shall be blasted using steel grits/shots/non-metallic abrasive to a grade of SA 2 ½ as per pictorial representation of ISO 8501 -1 or SIS – 055900 or SSPC SP-10/NACE No.2 Near white blast cleaning. Thus a near white blast clean surface, when viewed without magnification, shall be free of all visible oil, grease, dust, dirt, mill scale, rust-coating, oxidized corrosion product and other foreign matter except for staining, light shadows, slight streaks or minor discolourations caused by stains of rust, stains mill scale, mill off abrasion marks and difference in blast patterns. Roughness/anchor profile shall be 50 to 100 micron peak to trough and shall be checked for each pipe length randomly by profile gauge/comparator & for future record Press-O-Film shall be used at one number for 100 sqm approx. If any defects like silvers or fins are exposed after blast cleaning filing or grinding shall remove the same. Care shall be taken so that the surface shall not be blued.

Steel grit/cooper slag shall be checked visually for contamination of impurities like dust dirt, etc. The blower used for cleaning of the substrate shall be checked twice per shift for water contamination. Care shall be taken to avoid water contamination is blown air by providing water traps/separators. The blasted pipe shall be taken up for coating application at the earliest (<2 Hr.) In case of some time lapse between blasting and coating, if surface oxidation occurs it shall be reblasted.

In addition to the above requirements, the pipe surface shall be at least 3 deg C above the dew point.

After blast cleaning all dust, residues and debris left at the surface shall be removed by brushing or dry blown air from one end and inspected.

5.0 APPLICATION

Primer -ACPC 60 – Two component Polyurethane Coating shall be applied using single component Airless spraying equipment. (Minimum curing time of primer is 6 hrs and maximum time gap between primer application & top coat is 48 hrs.) Primer shall be applied using single component Airless spray after mixing Part A and Part B of ACPC 60 thoroughly and letting air bubble escape by allowing the mix to stand for few minutes before starting spray application. As the surface profile is 50 to 100 micron, application of primer would be done on volume (of material) : area (of application) based consumption to get the desired DFT.

Top Coat :- Internal lining of Durathane 100 EAB shall be carried out by plural feed airless spraying method over primer applied surface. Flanged pipes shall be painted for the full length including flange joint. In case of welded joint, on each end of the pipe 7500 mm to be kept unpainted for field joint and painting after welding. In this method, the base component (if ambient temp. is below 20 deg C) shall be heated using either of the combination of the following method :

- 1) The base component shall be heated with individual drums heaters/induction heaters attached with agitator to ensure uniform heating OR
- 2) The base shall be heated using in-line heaters fitted to the line

The base and activator shall be pumped separately to the airless 3:1 proportioning pump and recirculated either through the base and activator containers or back into the tank.

Application of paint on smaller component may be done manually ensuring the mixing of base and activator in prescribed proportions.

The coating shall be applied to a dry film thickness (DFT) of a minimum 2000 micron. The thickness shall be measured randomly at 05 points minimum along the length of pipe. Waviness (undulations/ripples), and/or minor amount of sagging, dimpling, and curtailing not to be considered cause of rejection.

To prevent wind blown or sand from sticking on the wet film coating, polythene sheet shall be tied at the ends.

6.0 INSPECTION & TESTING

All inspection and testing shall be carried out by site supervisor /experienced personnel.

6.1 COATING THICKNESS

Thickness of the dry film shall be checked using magnetic thickness gauge or digital thickness gauge Microtest, Elcometer etc. which shall be calibrated once every shift. Dry film thickness of the coating shall be minimum 2000 micron. Wet film thickness of the coating shall be monitored to ensure the expected dry film thickness of the coating. Thickness shall be randomly checked at 05 points on the pipe body per one pipe length or 100 sq. mtr.

6.2 HARDNESS (Durometer)

Cured film (7 Days) shall be tested for hardness using Durometer (Shore D) as per ASTM D 2240 With the same frequency as the adhesion test.

6.3 HOLIDAY DETECTION

Holiday detection shall be carried out after 100 % curing (7 days) of the coating on all pipes as per NACE RP 0188-90. The voltage shall be set to 05 Volt per micron of coating thickness and shall be set by detecting a deliberate pinhole in the coating at a location where the coating is at least 2000 micron. The calibration of holiday detector shall be done once per shift.

All holiday shall be marked and repaired manually and the repair area shall be holiday tested.

6.4 ADHESION

The test shall be carried out in accordance with ASTM D-4541 (Elcometer Pull Off) on fully cured (7 days) coating. One test would comprise 03 reading from randomly selected spots per 500 sq. Mtr. Of surface coated. Average of three reading shall be at least 10 N/sq.mm. Pull off adhesion Shall not be checked on the pipe body (being a curved surface) but on representative flat surface Per 500 sq.mtr. of coated surface. Pull off adhesion shall be checked only on flat surface in line with clause no.6.1.1 of ASTM d 4541

MACHINERY /EQUIPMENT LIST IN GENERAL DEPLOYED FOR BLASTING & COATING

S.N.	PARTICULARS	NUMBERS	REMARKS
	Surface Preparation Equipment		
01	Air Compressor	01	
02	Blast Cleaning hopper with all accessories for blasting	01	
03	Power tool grinding	02	
	Primer Coating Equipment		
01	Single component airless spray equipment with all accessries	01	
	Top Coating (PU 2000 micron) Equipment		
01	Two component airless spray equipment with all accessries	01	
	Testing Equipments		
01	Surface profile Gauge/Comparator & Press-O-Film	01	
02	Hygrometer (Dry & Wet Bulbtype)/Digital	01	
03	Magnetic mil gauge (DFT tester)	01	
04	Adhesion Tester	01	
05	High Voltage Holiday Detector/Spark tester	01	
06	Thermometer for ambient temperature	01	
07	Infra red Non-contact/Contact type Surface Thermometer	01	
08	Durometer (For Shored-D Hardness	01	

