

TAMIL NADU ELECTRICITY BOARD
2 x 600 MW NORTH CHENNAI THERMAL POWER STATION
UNIT #1&2

TECHNICAL SPECIFICATION
FOR
ASH SLURRY DISPOSAL PIPING
VOLUME- II B

SPECIFICATION NO: PE-TS-307/318-162A-A002



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA (INDIA)



TITLE
TAMIL NADU ELECTRICITY BOARD
2 X 600 MW NORTH CHENNAI UNIT #2
ASH SLURRY DISPOSAL PIPING

SPECIFICATION NO. PE-TS-307-162A-A002
VOLUME-II B
SECTION
REV 0 DATE 22-Dec-12
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TAMIL NADU ELECTRICITY BOARD

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1.0 INTRODUCTION

2X600 MW North Chennai TPS – Phase II is being set up by Tamilnadu State Electricity Board (TNEB) at Puluthivakkam villages in Ponneri Taluk of Thiruvallur district in the state of Tamil Nadu, India.

2.0 APPROACH TO SITE**Location:**

The site is located adjacent to Ennore Port. The site is located between latitude, 13°13' to 13°18' North and Longitude 80°19' to 80°21' East, on the northern side of Ennore Creek, covering Ennore and Puluthivakkam villages in Ponneri Taluk of Thiruvallur district in the state of Tamil Nadu. It is flanked on east by Bay of Bengal, West by the Buckingham Canal and north of Kattupadi village.

Major distances to project site:

Distance from Chennai	-	35 km North of Chennai, District - Thiruvallur
Distance from Manali	-	20 km
Nearest road	-	All weather road from Pattamandiri, 5 km from Site on Chennai – Ponneri district highway
Nearest Railway Station	-	Athipattu Pudunagar on Chennai Howrah mainline, 8 km from Site
Nearest Sea Port	-	Ennore Port – 3 km and Chennai Port – 35 km from Site
Nearest Air Port	-	Chennai

3.0 Meteorological**1. Ambient Air Temperature**

- | | |
|------------|----------|
| a. Maximum | 45 Deg.C |
| b. Minimum | 15 Deg.C |

2. Relative Humidity

- | | |
|------------|------|
| a. Maximum | 100% |
| b. Minimum | 36% |

3. Annual Rain fall

- | | |
|------------|-----------|
| a. Average | 1600 mm |
| b. Maximum | 2540.8 mm |
| c. Minimum | 1175.7 mm |



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SCOPE OF WORK

The specification covers supply, inspection and testing at supplier's works, dispatch including freight for ash slurry disposal pipes / spool pieces of various lengths confirming to technical details as under for 2 x 600 MW North Chennai Thermal power stations (Stage II) -Unit # 1&2

1. Application: Ash slurry with sea water.
2. 350 Nb MS ERW steel pipe confirming to IS 3589, Grade Fe 410
3. Pipe shell Thickness : 6 mm thk
4. Cast Basalt Cylinder Thickness : 20 mm thick (no negative tolerance)
5. Pipe ID: 288mm
6. Grout: 8 mm thick
7. Pipe length & Number of Pieces : As per attached BOQ (Annexure I)
8. Pipe end- preparation: Plain ends.
9. Pipe flanges: Slip-On, Flat face type as per ANSI B 16.5 150 Lbs. MS, IS 2062 Gr A/B.

Thickness : 33.4 mm
ID : 359.9 mm
OD : 533.4 mm
No. of Holes : 12
Hole Dia : 28.4 mm
P.C.D : 476 mm

Requirement of flanges (both ends flanged or single end flanged) shall be as per attached BOQ.

10. Painting details as under
 - a. Degreasing and surface preparation to Sa 2 ½ (As per Swedish standard SIS – 05-5900).
 - b. Primer Coat : Two coat of Plasticized Chloro-rubber medium/Polyamide HB zinc phosphate epoxy primer – 75 microns per coat
11. Cast Basalt lining details
 - c. Hardness : 8 mhos(min)
 - d. Bending strength : 300 kg/sq cm (Minimum)
 - e. Compressive strength: 4500 kg/sq cm (Minimum)
 - f. Bulk density : 2.9-3.1 gm/cc
12. Chemical Composition
 - a. SiO₂ : 44-48 %
 - b. Al₂O₃ : 13-16 %



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c. CaO : 10-12 %

d. MgO : 10-11%

e. Fe₂O₃ : 12-14%

13. Cast Basalt shall be joined together with a suitable epoxy chemically compound.

14. Basalt Lined pipes shall not have retainer ring/sleeve likely to be exposed to sea water.

15. Suitable lifting Lugs shall be provided.

16. Bidder shall ensure safe transportation of the cut-pieces through proper packing. Packing procedure shall be submitted to BHEL by successful bidder after award of contract for reference/approval. Further, drawing-wise packing of the pieces shall be done (based on the reference layout drawing numbers furnished by BHEL in the BOQ) after marking / stamping length of each spool piece on the pipe.

17. Make of pipes: SAIL/Jindal/TISCO/MSL/Surya Roshni/Indian Tube Company/Welspun

Quality Plan for inspection and testing of pipes/spool pieces is attached along with specification.


2 X 600 MW NORTH CHENNAI TPS - BOQ FOR CAST BASALT LINED PIPE CUT-PIECES (Part of Technical Specification no. PE-TS-307/318-162-A002)							
			Slurry cut pieces		Recovery Cut pieces		
Sl. No.	BHEL LAYOUT DRG. No. (FOR INTERNAL REFERENCE BY BHEL)	Sht. No.	FF	FP	FF	FP	
A)	Slurry Piping around dyke						
1	PE-VO-307/318-162-A032	1	0	0	0	0	
2	PE-VO-307/318-162-A032	2	3023	0	0	0	
			4000	0	0	0	
			4975	0	0	0	
3	PE-VO-307/318-162-A032	3	4396	937	0	0	
			4465	942	0	0	
			4533	946	0	0	
4	PE-VO-307/318-162-A032	4	4974	4962	0	0	
			5214	5131	0	0	
			5454	4792	0	0	
5	PE-VO-307/318-162-A032	5	3670	2200	0	0	
			2520	2435	0	0	
			5154	4848	0	0	
			5577	4848	0	0	
			2841	0	0	0	
			2793	0	0	0	
			2890	0	0	0	
			3437	0	0	0	
			1937	0	0	0	
			3900	0	0	0	
			3471	0	0	0	
6	PE-VO-307/318-162-A032	6	3900	5500	0	0	
			3900	2388	0	0	
			3675	3766	0	0	
			5500	3766	0	0	
			5600	5000	0	0	
			4200	0	0	0	
			3680	0	0	0	
			2289	0	0	0	

7	PE-VO-307/318-162-A032	7	0	0	0	0	
8	PE-VO-307/318-162-A032	8	1000	1371	0	0	
			1000	1371	0	0	
			1000	1371	0	0	
			1000	1371	0	0	
			1000	1371	0	0	
			1000	1371	0	0	
			1000	1371	0	0	
			1000	1371	0	0	
			3045	0	0	0	
			3045	0	0	0	
			3045	0	0	0	
			3045	0	0	0	
			3045	0	0	0	
			3045	0	0	0	
			3045	0	0	0	
			3045	0	0	0	
			3045	0	0	0	
			3045	0	0	0	
			377	0	0	0	
			217	0	0	0	
			4903	0	0	0	
			5702	0	0	0	
			5613	0	0	0	
			2807	0	0	0	
			4587	0	0	0	
			2531	0	0	0	
			4794	0	0	0	
B)	Slurry p/h to Plant boundary						
1	PE-VO-307/318-162-A028	1	5100	0	1138	0	
			4400	0	700	0	
			3700	0	1000	0	
			0	0	1000	0	
			0	0	4550	0	
			0	0	4550	0	
			0	0	250	0	
			0	0	250	0	
			0	0	2500	0	
			0	0	2500	0	
2	PE-VO-307/318-162-A028	2	1446	0	4445	0	
			2446	0	5445	0	


			3446	0	4519	0	
			3119	0	3819	0	
			2419	0	3935	0	
			1719	0	3961	0	
			3909	0	2806	0	
			3857	0	2806	0	
			3883	0	0	0	
			2806	0	0	0	
			2806	0	0	0	
			2806	0	0	0	
C)	Plant boundary to Recovery Water Pump House						
1	PE-VO-307/318-162- A029	1	0	3375	0	3375	
			0	3375	0	3375	
			0	3375	0	0	
2	PE-VO-307/318-162- A029	2	3650	0	3650	0	
			3650	0	3650	0	
			3650	0	0	0	
3	PE-VO-307/318-162- A029	3	0	1670	0	1670	
			0	1670	0	1670	
			0	1670	0	0	
4	PE-VO-307/318-162- A029	4	0	0	0	0	
5	PE-VO-307/318-162- A029	5	0	5100	0	5100	
			0	5100	0	5100	
			0	5100	0	0	
6	PE-VO-307/318-162- A029	6	0	0	0	0	
7	PE-VO-307/318-162- A029	7	0	0	0	0	
8	PE-VO-307/318-162- A029	8	0	0	0	0	
9	PE-VO-307/318-162- A029	9	0	0	0	0	

10	PE-VO-307/318-162-A029	9A	0	0	0	0	
11	PE-VO-307/318-162-A029	10	4319	3353	4505	0	
			4381	4756	4567	0	
			4443	0	1482	0	
			1296	0	4624	0	
			1358	0	5133	0	
			1420	0	1544	0	
			4367	0	5592	0	
			4367	0	5592	0	
			4776	0	0	0	
			4776	0	0	0	
			5184	0	0	0	
			5184	0	0	0	
			1600	0	0	0	
			1600	0	0	0	
			1600	0	0	0	
12	PE-VO-307/318-162-A029	10A	0	0	0	0	
13	PE-VO-307/318-162-A029	11	0	0	0	0	
14	PE-VO-307/318-162-A029	12	0	0	0	0	
D)	At rail crossing						
1	PE-VO-307/318-162-A030		3475	1308	3000	500	
			3475	1712	4000	904	
			3475	2117	450	3648	
	A054		1000	2735	5183	3952	
			2000	3039	3854	0	
			4255	3344	4158	0	
			2990	0	2450	0	
			1720	0	2965	0	
			2941	0	0	0	
			3245	0	0	0	
			3549	0	0	0	
			915	0	0	0	
			1425	0	0	0	
			1940	0	0	0	
D)	At Recovery water pump house						
1	PE-VO-307/318-162-A054	1	1290	0	0	0	
			1035	0	0	0	


			1035	0	0	0	
			3830	0	0	0	
			930	0	0	0	
			914	0	0	0	
			1320	0	0	0	
			1614	0	0	0	
			516	0	0	0	
			516	0	0	0	
			516	0	0	0	
			516	0	0	0	
			1217	0	0	0	
			1217	0	0	0	
			342258	117599	116573	29294	
	FF = BOTH END FLANGED PIPE						
	FP = ONE END FLANGED, OTHER END PLANE						
	PP = BOTH END PLANE						

CLIENT		MANUFACTURER'S NAME & ADDRESS		CHECK LIST				DETAILS					
TAMIL NADU ELECTRICITY BOARD. 		Manufacturer: Approved Make		Item : CAST BASALT LINED PIPES			QP NO: QAP – 001 REV.: 0 DATE: 22.12.12 PAGE NO: 1 to 4	PROJECT: 2 x 600 MW, NORTH CHENNAI TPS PACKAGE: ASH SLURRY DISPOSAL PIPING					
SL.NO	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	D *	10			11
1.0	Materials												
1.1	MS Pipe for Casing	Chemical composition	MA	Chem. Analysis	sample	IS:3589 Gr.Fe410	IS3589	MTC	✓	P	V	V	Note – 1
		Mechanical properties	MA	Tensile test	1/heat		Gr.Fe410	MTC	✓	P	V	V	
1.2	MS flanges	Chemical composition	MA	Chem. Analysis	sample	IS: 2062 Gr. A/B	IS: 2062 Gr. A/B	MTC	✓	P	V	V	Note – 1
		Mechanical Properties	MA	Tensile	2/heat			MTC	✓	P	V	V	
1.3	Cast Basalt	Mechanical Properties	MA	Hardness	Sample/ Batch	Moh’s Scale	As per technical specification	Mfgs. TC	✓	P	V	V	Note - 2
			MA	Specific Gravity	-do-	IS:1124,1974, Part - I/	As per technical specification	-do-	✓	P	V	V	
			MA	Water Absorption	-do-		0.0%.	-do-	✓	P	V	V	
			MA	Compressive	-do-		As per technical	-do-	✓	P	V	V	

MANUFACTURER/ SUBCONTRACTOR	CONTRACTOR	LEGEND: * RECORDS IDENTIFIED WITH *TICK* SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. **M: MANUFACTURER/ SUBCONTRACTOR C: BHEL/ NOMINATED INSPECTION AGENCY, N: TNEB/ Customer Nominated Inspection Agency, “P”- PERFORM “W”- WITNESS AND “V”- VERIFICATION.	FOR BHEL USE :		DOC. NO. : PE-DC-307/318-162A-Q002	
SIGNATURE			REVIEWED BY	NAME & SIGN. OF APPROVING AUTHORITY & SEAL .		

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			MA	Strength	-do-	IS:1706-1972/As per appd data sheet	specification	-do-	✓	P	V	V	
			MA	Abrasion Resistance	-do-		0.7mm max.	-do-					
			MA	Bending Strength	-do-		As per technical specification		✓	P	V	V	
		Chemical Properties	MA	Chemical Composition	-do-	As per appd. Data sheet	As per appd. Data sheet	-do-	✓	P	V	V	
1.4	Cast Basalt cylinder	Surface Defect	MA	VISUAL	100%	Approved.Drg	Free from defects	Mfg. TC	✓	P	V	V	
		Dimension (ID & Thickness)	MA	Measurement	100%	Approved Drg,	Approved Drg.	IR	✓	P	V	V	
1.5	Welder Qualification	WPS & PQR	CR	WPS & PQR	100%	ASME, Sec IX	ASME, Sec.IX	Mfg. TC	✓	P	W	V	Note –3
2.0	<u>In-process Inspection</u>												
2.1	Pipes & Flanges (Before Lining)	Dimensional check On layout	MA	Measurement/ Degree	100%	As per Apprd. Drg.	As per Apprd. Drg.	Mfg's IR	✓	P	V	V	

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SL.NO	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD		AGENCY			REMARKS
										M	C	N	
		Welding	MA	DP test	100%	-do-	-do-	-do-	✓	P	V	V	Note - 4
		Hydro-Test	MA	Hydro	100%	32 kg/sqcm for 30 min.	No Leakage	-do-	✓	P	V	V	
		Grouting of Cast Basalt	MA	Visual	100%	As per appd. drawing	Mfgs Drg.	-do-	✓	P	V	V	
3.0	<u>Final Inspection</u>												
3.1	Pipes (After Lining)	Dimensional Check on Layout	MA	Measurement/Degree	100%	As per Apprd. Drg./ Datasheet 20 kg/sqcm for 30 min	As per Apprd. Drg./Data Sheet -do- No Leakage	Mfgs. TC/IR	✓	P	W*	V	* 1 out of 10 pieces offered of each length of spool piece.
		Lining of Cast Basalt	MA	Visual	100%				✓	P	W*	V	
		Completeness	MA	Visual	100%				✓	P	W*	V	
		Hydro-test (after lining)	CR	Hydro – test	100%				✓	P	W*	W*	
3.2	Painting	Painting & Finish	MA	Visual	100%	As per Order	As per Order	IR		P	V	V	

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ANNEXURE – QA-1

1. *Correlated Mill T.C. will be furnished. In case correlated T.C. is not available, then Govt approved lab TC will be furnished.*
2. *Basalt manufacturer's test certificate adhering to reputed standard shall be submitted for verification. However, witness of these tests, if insisted by TNEB during contract execution, shall be arranged by bidder without any commercial implication to BHEL.*
3. *Welding shall be done by qualified welders approved by BHEL/NTPC/Lloyds/BVQI. In case welders are not qualified, welders shall be got qualified as per ASME IX.*
4. *100% DP test on root run & 10 % DP test on final run –Acceptance norms – No liner Indications.*
5. *Wooden end pieces shall be provided to protect the basalt surface from damage during transit & handling.*
6. *Painting will be done as per order after Inspection.*

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