	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN .		SPEC. NO :	DATE:27.02.2020
		CUSTOMER :		QP NO.: PED-506-00-Q-006, REV-02	
		PROJECT:		PO NO.:	
		ITEM: AC ELECT. MOTORS UPTO 55KW (LV (415V))	SYSTEM:	SECTION: II	SHEET 1 OF 2

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
1.0	ASSEMBLY	1.WORKMANSHIP	MA	VISUAL	100%	-	MFG. SPEC.	MFG. SPEC.	-DO-		P	-	-	
		2.DIMENSIONS	MA	-DO-	-DO-	-	MFG. DRG./ MFG. SPEC.	MFG. DRG./ MFG. SPEC.	-DO-		P	-	-	
		3.CORRECTNESS COMPLETENESS TERMINATIONS/ MARKING/COLOUR CODE	MA	VISUAL	100%	-	MFG.SPEC./	MFG.SPEC.	-DO-		P	-	-	
2.0	PAINTING	1.SHADE	MA	VISUAL	SAMPLE	-	MFG. SPEC/ APPROVED DATASHEET	SAME AS COL.7	LOG BOOK		P	-	-	
3.0	TESTS	1.ROUTINE TEST INCLUDING SPECIAL TEST	MA	-DO-	100%	100%	IS-325 / IS-12615/ APPROVED DATA SHEET	SAME AS COL.7	TEST/ INSPN. REPORT		P	W	W	NOTE -1 & NOTE-2
		2.OVERALL DIMENSIONS & ORIENTATION	MA	MEASUREMENT & VISUAL	100%	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET	TEST/ INSPN. REPORT		P	W	W	NOTE -1 & NOTE-2

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:	27/2/2020	Hema K.	Checked by:	27/2/2020	KUNAL GANDHI		
Reviewed by:	02/3/2020	P. Dutta	Reviewed by:				

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Doc No:			
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	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	
		CUSTOMER :		QP NO.: PED-506-00-Q-006, REV-02	DATE:27.02.2020
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		ITEM: AC ELECT. MOTORS UPTO 55KW (LV (415V))	SYSTEM:	SECTION: II	SHEET 2 OF 2

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					M	C/N				D	M	C	N	
		3.NAMEPLATE DETAILS	MA	VISUAL	100%	100%	IS-325 / IS-12615 / APPROVED DATA SHEET	SAME AS COL.7	TEST/ INSPN. REPORT		P	W	W	
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	AS PER MFG. STANDARD / APPROVED PACKING DRAWING.(#)	AS PER MFG. STANDARD / APPROVED PACKING DRAWING.(#).	INSPC. REPORT		P	W	-	(#) APPLICABLE FOR EXPORT JOBS

NOTES:

1 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL/CUSTOMER SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON

2 FOR EXHAUST/VENTILATION FAN MOTORS OF RATING UPTO 1.5KW , ONLY ROUTINE TEST CERTIFICATES SHALL BE FURNISHED FOR SCRUTINY.

3 IN CASE TEST CERTIFICATES FOR THESE TESTS ON SIMILAR TYPE, SIZE AND DESIGN OF MOTOR FROM INDEPENDENT LABORATORY ARE AVAILABLE, THESE TEST MAY NOT BE REPEATED.

4 BHEL RESERVES THE RIGHT TO PERFORM REPEAT TEST, IF REQUIRED.

5 AFTER PACKING AND PRIOR TO ISSUE MDCC, PHOTOGRAPHS OF ITEMS TO BE DESPATCHED SHALL BE SENT TO BHEL FOR REVIEW.

6 IN CASE , ANY CHANGES IN QP COMMENTED BY CUSTOMER AT CONTRACT STAGE SHALL BE CARRIED OUT BY BIDDER WITHOUT ANY IMPLICATION TO BHEL/ CUSTOMER.

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,
** **M:** SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, **B:** MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, **C:** CUSTOMER,
P: PERFORM, **W:** WITNESS, **V:** VERIFICATION, AS APPROPRIATE
MA: MAJOR, **MI:** MINOR, **CR:** CRITICAL
D: DOCUMENT

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	27/2/2020	Hema K.	Checked by:	27/2/20	KUNAL GANDHI
Reviewed by:	02/3/2020	P. Dutta	Reviewed by:		

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	
		CUSTOMER :		QP NO.: PED-506-00-Q-007, REV-04	DATE:27.02.2020
		PROJECT:		PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 1 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
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					M	C/N				D	M	C	N	
1.0	RAW MATERIAL & BOUGHT OUT CONTROL													
1.1	SHEET STEEL, PLATES, SECTION, EYEBOLTS	1.SURFACE CONDITION	MA	VISUAL	100%	-	-	FREE FROM BLINKS, CRACKS, WAVINESS ETC	LOG BOOK		P	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	-DO-		P	-	-	
		3.PROOF LOAD TEST (EYE BOLT)	MA	MECH. TEST	-DO-	-	-DO-	-DO-	TEST REPORT		P/V	-		
1.2	HARDWARES	1.SURFACE CONDITION	MA	VISUAL	100%	-		FREE FROM CRACKS, UN-EVENNESS ETC.	-DO-		P	-	-	
		2.PROPERTY CLASS	MA	VISUAL	SAMPLES	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	SUPPLIERS TC & LOG		P/V	-	-	PROPERTY CLASS MARKING SHALL BE CHECKED BY THE VENDOR
1.3	CASTING	1.SURFACE CONDITION	MA	VISUAL	100%	-		FREE FROM CRACKS, BLOW HOLES ETC.	LOG BOOK		P/V	-		
		2.CHEM. & PHY. PROP.	MA	CHEM & MECH TEST	1/HEAT NO.	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	SUPPLIER'S TC		P/V	-		HEAT NO. SHALL BE VERIFIED
		3.DIMENSIONS	MA	MEASUREMENT	100%	-	MANUFACTURER'S DRG.	MANUFACTURER'S DRG.	LOG BOOK		P/V	-		
1.4	PAINT & VARNISH	1.MAKE, SHADE, SHELF LIFE & TYPE	MA	VISUAL	100% CONTINUOUS	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	LOG BOOK		P/V	-		

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	27/3/2020	Hema K.	Checked by:	27/3/20	MUNAF GODDATE
Reviewed by:	2/3/2020	P. Dutta	Reviewed by:		

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:27.02.2020
	CUSTOMER :		QP NO.: PED-506-00-Q-007, REV-04	
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 2 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
1.5	SHAFT (FORGED OR ROLLED)	1. SURFACE COND.	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	-DO-		P	-	-	VENDOR'S APPROVAL IDENTIFICATION SHALL BE MAINTAINED
		2. CHEM. & PHYSICAL PROPERTIES	MA	CHEM. & PHYSICAL TESTS	1/HEAT NO. OR HEAT TREATMENT BATCH NO	-	MANUFACTURER'S DRG./ SPEC.	MANUFACTURER'S DRG./ STD.	SUPPLIER'S TC		P/V	-		
		3. DIMENSIONS	MA	MEASUREMENT	100%	-	-DO-	MANUFACTURER'S DRG.	LOG BOOK		P/V	-		
		4.INTERNAL FLAWS	CR	ULTRASONIC TEST	100%	100%	ASTM-A388	MANUFACTURER'S STD.	-DO-	✓	P/W	V	-	FOR DIA OF 55 MM & ABOVE
1.6	SPACE HEATERS, CONNEC-TORS, TERMINAL BLOCKS, CABLES, CABLE LUGS, CARBON BRUSH TEMP. DETECTORS, RTD, BTD'S	1. MAKE & RATING	MA	VISUAL	-DO-	-	MANUFACTURER'S DRG./STD.	MANUFACTURER'S DRG./STD.	-DO-		P/V	-	-	
		2. PHYSICAL COND.	MA	-DO-	-DO-	-	-	NO PHYS. DAMAGE, NO ELECTRICAL DISCONTINUITY	-DO-		P/V	-	-	
		3.DIMENSIONS (WHEREVER APPLICABLE)	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG./ STD	MANUFACTURER'S DRG. / STD.	-DO-		P/V	-	-	
		4.PERFORMANCE/ CALIBRATION	MA	TEST	100%	-	-DO-	-DO-	TEST REPORT		P/V	-	-	

BHEL					
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Prepared by:	27/3/2020	Hema K.	Checked by:	27/3/20	KUNAL GANDHI
Reviewed by:	27/3/2020	P. Dutta	Reviewed by:		

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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बीएचईएल BHEL	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN	SPEC. NO :	DATE:27.02.2020
		CUSTOMER :	QP NO.: PED-506-00-Q-007, REV-04	
		PROJECT:	PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V)) SYSTEM:	SECTION: II	SHEET 3 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
1.7	OTHER INSULATING MATERIALS LIKE SLEEVES, BINDINGS CORDS, PAPERS, PRESS BOARDS ETC.	1. SURFACE COND. ETC.	MA	VISUAL	100%	-	-	NO VISUAL DEFECTS	TEST REPORT		P/V	-	-	
		2. OTHER CHARACTERISTICS	MA	TEST	SAMPLE	-	MANUFACTURER'S STD.	MANUFACTURER'S STD.	LOG BOOK AND OR SUPPLIER'S TC		P/V	-	-	
1.8	SHEET STAMPING (PUNCHED)	1. SURFACE COND.	MA	VISUAL	100%	-	-	NO VISUAL DEFECTS (FREE FROM BURS)	LOG BOOK		P	-	-	
		2.DIMENSIONS INCLUDING BURS HEIGHT	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG. .	MANUFACTURER'S DRG.	-DO-		P/V	-	-	
		3. ACCEPTANCE TESTS	MA	ELECT. & MECH TESTS	-DO-	-	MANUFACTURER'S DRG./ STD.	MANUFACTURER'S DRG./ STD.	SUPPLIER'S TC		P/V	-	-	
1.9	CONDUCTORS	1. SURFACE FINISH	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	LOG BOOK		*P/V	-	-	* MOTOR MANUFACTURER TO CONDUCT VISUAL CHECK FOR SURFACE FINISH ON RANDOM BASIS (10% SAMPLE) AT HIS WORKS AND MAINTAIN RECORD FOR VERIFICATION BY BHEL/CUSTOMER.
		2.ELECT. PROP, & MECH. PROP	MA	ELECT. & MECH.TEST	SAMPLES	-	MANUFACTURER'S DRG./ SPEC.	MANUFACTURER'S / SPEC.	SUPPLIERS TC & VENDOR'S TEST REPORTS		P/V	-	-	

BHEL					
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Prepared by:	27/2/2020	Hema K.	Checked by:	27/2/20	KUNAL GANDHI
Reviewed by:	02/3/2020	P. Dutta	Reviewed by:		

BIDDER/ SUPPLIER	
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बीएचईएल BHEL	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN	SPEC. NO :	DATE:27.02.2020
		CUSTOMER :	QP NO.: PED-506-00-Q-007, REV-04	
		PROJECT:	PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V)) SYSTEM:	SECTION: II	SHEET 4 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
		3.DIMENSIONS	MA	MEASUREMENT	-DO-	-	-DO-	-DO-	Log Book		P/V	-	-	
									-DO-					
1.10	BEARINGS	1.MAKE & TYPE	MA	VISUAL	100%	-	MANUFACTURER'S DRG./ APPROVED DATASHEET	MANUFACTURER'S DRG./ APPROVED DATASHEET			P/V	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	APPROVED DATASHEET	APPROVED DATASHEET/ BEARING MANUF'S CATALOGUES	-DO-		P/V	-	-	
		3.SURFACE FINISH	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	-DO-		P/V	-	-	
1.11	SLIP RING (WHEREVER APPLICABLE)	1.SURFACE COND.	MA	VISUAL	100%	-	-	-DO-	-DO-		P	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG	MANUFACTURER'S DRG	-DO-		P	-	-	
		3.TEMP.WITH-STAND CAPACITY	MA	ELECT.TEST	-DO-	-	MANUFACTURER'S STD./ APPROVED DATASHEET	MANUFACTURER'S STD./ APPROVED DATASHEET	-DO-		P/V	-	-	
		4.HV/IR	MA	-DO-	100%	-	-DO-	-DO-	-DO-		P/V	-	-	
1.12	OIL SEALS & GASKETS	1.MATERIAL OF GASKET	MA	VISUAL	100%	-	MANUFACTURER'S DRG/SPECS	MANUFACTURER'S DRG./ SPECS.	-DO-		P	-	-	
		2.SURFACE COND.	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	-DO-		P	-	-	
		3.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG	MANUFACTURER'S DRG	-DO-		P	-	-	

BHEL					
ENGINEERING			QUALITY		
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Prepared by:	27/2/2020	Hema K.	Checked by:	27/2/20	KUNAL CHANDRA
Reviewed by:	02/3/2020	P. Dutta	Reviewed by:		

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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बीएच ई एल BHEL	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN	SPEC. NO :	DATE:27.02.2020
		CUSTOMER :	QP NO.: PED-506-00-Q-007, REV-04	
		PROJECT:	PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V)) SYSTEM:	SECTION: II	SHEET 5 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
2.0	IN PROCESS													
2.1	STATOR FRAME WELDING (IN CASE OF FABRICATED STATOR)	1.WORKMANSHIP & CLEANNESS	MA	VISUAL	100%	-	-DO-	GOOD FINISH	LOG BOOK		P/W	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	-	MANUFACTURER'S DRG	MANUFACTURER'S DRG	-DO-		P	-	-	
2.2	MACHINING	1.FINISH	MA	VISUAL	100%	-	-DO-	GOOD FINISH	LOG BOOK		P	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	-	MANUFACTURER'S DRG	MANUFACTURER'S DRG	-DO-		P	-	-	
		3.SHAFT SURFACE FLOWS	MA	PT	100%	100%	MANUFACTURER'S STD./ ASTM-E165	MANUFACTURER'S STD./ APPROVED DATASHEET.	-DO-	✓	P	V	-	
2.3	PAINTING	1.SURFACE PREPARATION	MA	VISUAL	100%	-	MANUFACTURER'S STD./APPROVED DATASHEET	SAME AS COL.7	LOG BOOK		P	-	-	
		2.PAINT THICKNESS (BOTH PRIMER & FINISH COAT)	MA	MEASUREMENT BY ELCOMETER	SAMPLE	-	-DO-	-DO-	-DO-		P	-	-	
		3.SHADE	MA	VISUAL	-DO-	-	-DO-	-DO-	LOG BOOK		P	-	-	
		4.ADHESION	MA	CROSS CUTTING & TAPE TEST	-DO-	-	-DO-	-DO-	LOG BOOK		P	-	-	

BHEL					
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Reviewed by:	02/3/2020	P. Dutta	Reviewed by:		

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Sign & Date	
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		PROJECT:	PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V)) SYSTEM:	SECTION: II	SHEET 6 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
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					M	C/N				D	M	C	N	
2.4	SHEET STACKING	1.COMPLETENESS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S STD.	MANUFACTURER'S STD.	LOG BOOK		P	-	-	
		2.COMPRESSION & TIGHTENING	MA	MEASUREMENT	100%	-	-DO-	-DO-	LOG BOOK		P	-	-	
2.5	WINDING	1.COMPLETENESS	CR	VISUAL	100%	-	MANUFACTURER'S STD./APPROVED DATASHEET	MANUFACTURER'S STD./APPROVED DATASHEET	LOG BOOK		P	-	-	
		2.CLEANLINESS	CR	-DO-	-DO-	-	-DO-	-DO-	LOG BOOK		P	-	-	
		3.IR-HV-IR	CR	ELECT. TEST	100%	100%	IS-325/IS-12615/IEC-60034 PART-1	IS-325/IS-12615/IEC-60034 PART-1	LOG BOOK	✓	P	V	-	
		4.RESISTANCE	CR	-DO-	100%	100%	IS-325/IS-12615/IEC-60034 PART-1	IS-325/IS-12615/IEC-60034 PART-1	LOG BOOK	✓	P	V	-	
		5.INTERTURN INSULATION	CR	-DO-	-DO-	-	-DO-	-DO-	LOG BOOK		P	-	-	
2.6	IMPREGNATION	1.VISCOSCITY	MA	PHY. TEST	AT STARTING	-	MANUFACTURER'S STANDARD	MANUFR'S STANDARD	LOG BOOK		P	-	-	
		2.TEMP. PRESSURE VACCUM	MA	PROCESS CHECK	CONTINUOUS	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
		3.NO. OF DIPS	MA	-DO-	CONTINUOUS	CONTINUOUS	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK	✓	P	V	-	THREE DIPS TO BE GIVEN

BHEL					
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Reviewed by:	02/3/2020	P.Dutta	Reviewed by:		

BIDDER/ SUPPLIER	
Sign & Date	
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					M	C/N				D	M	C	N	
		4.DURATION	MA	-DO-	CONTINUOUS	CONTINUOUS	-DO-	-DO-	LOG BOOK	✓	P	V	-	
2.7	COMPLETE STATOR ASSEMBLY	1.COMPACTNESS & CLEANLINESS	MA	VISUAL	100%	-	-DO-	-DO-	LOG BOOK		P	-	-	
2.8	BRAZING/COMPRESSION JOINT	1.COMPLETENESS	CR	-DO-	-DO-	-	-DO-	-DO-	LOG BOOK		P	-	-	
		2.SOUNDNESS	CR	MALLET TEST & UT	100%	100%	-DO-	-DO-	LOG BOOK	✓	P	V	-	
		3.HV	MA	ELECT. TEST	100%	100%	-DO-	-DO-	LOG BOOK	✓	P	V	-	
2.9	COMPLETE ROTOR ASSEMBLY	1.RESIDUAL UNBALANCE	CR	DYN. BALANCE	-DO-	-	MANUFACTURER'S SPEC./ ISO 1940	MANUFACTURER'S DWG.	LOG BOOK		P	-	-	
		2.SOUNDNESS OF DIE CASTING	CR	ELECT. (GROWLER TEST)	100%	100%	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK	✓	P	V	-	
2.10	ASSEMBLY	1.ALIGNMENT	MA	MEAS.	-DO-	-	-DO-	-DO-	LOG BOOK		P	-	-	
		2.WORKMANSHIP	MA	VISUAL	-DO-	-	-DO-	-DO-	LOG BOOK		P	-	-	
		3.AXIAL PLAY	MA	MEAS.	100%	100%	-DO-	-DO-	LOG BOOK	✓	P	V	-	
		4.DIMENSIONS	MA	-DO-	-DO-	-	MANUFACTURER'S DRG./ MANUFACTURER'S SPEC.	MANUFACTURER'S DRG/ RELEVANT IS	LOG BOOK		P	-	-	
		5.CORRECTNESS, COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE	MA	VISUAL	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		6. RTD, BTD & SPACE HEATER MOUNTING.	MA	VISUAL	100%	100%	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK	✓	P	V	-	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	27/2/2020	Hema K.	Checked by:	27/2/20	KUNAL GANDHI
Reviewed by:	02/3/2020	P. Dutta	Reviewed by:		

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

बीएचईएल BHEL	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN	SPEC. NO :	DATE:27.02.2020
		CUSTOMER :	QP NO.: PED-506-00-Q-007, REV-04	
		PROJECT:	PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V)) SYSTEM:	SECTION: II	SHEET 8 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
3.0	TESTS	1.TYPE TESTS INCLUDING SPECIAL TESTS	MA	ELECT.TEST	1/TYPE/SIZE	1/TYPE/SIZE	IS-325//IS-12615/APPROVED DATASHEET	IS-325/IS-12615/APPROVED DATASHEET	TEST REPORT		P	W*	W*	* NOTE - 1
		2.ROUTINE TESTS INCLUDING SPECIAL TEST	MA	-DO-	100%	100%	-DO-	-DO-	-DO-		P	V /W$	V /W$	$ NOTE - 2
		3.VIBRATION & NOISE LEVEL	MA	-DO-	100%	100%	IS: 12075 / IEC 60034-14 & IS-12065	IS: 12075 / IEC 60034-14 & IS-12065	-DO-		P	V /W$	V /W$	$ NOTE - 2
		4.OVERALL DIMENSIONS AND ORIENTATION	MA	MEASUREMENT & VISUAL	100%	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET &	TEST/INSPC. REPORT		P	W	-	
		5.DEGREE OF PROTECTION	MA	ELECT. & MECH. TEST	1/TYPE/ SIZE	1/TYPE/ SIZE	IEC 60034-5/IS-12615	APPROVED DATASHEET	TC	✓	P	V	V	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		6. MEASUREMENT OF RESISTANCE OF RTD & BTD	MA	-DO-	100%	100%	IS-325//IS-12615/IEC-60034 PART-1/IS: 12802	IS-325/IS-12615/IEC-60034 PART-1/IS: 12802	-DO-		P	V /W$	V /W$	$ NOTE - 2
		7. MEASUREMENT OF RESISTANCE, IR OF SPACE HEATER	MA	-DO-	100%	100%	IS-325//IS-12615/IEC-60034 PART-1	IS-325/IS-12615/IEC-60034 PART-1	-DO-		P	V /W$	V /W$	$ NOTE - 2
		8. NAME PLATE DETAILS	MA	VISUAL	100%	100%	IS-325//IS-12615& DATA SHEET	IS-325//IS-12615 & DATA SHEET	TEST/INSPC. REPORT		P	V /W$	V /W$	$ NOTE - 2
		9.EXPLOSION FLAME PROOF NESS (IF SPECIFIED)	MA	EXPLOSION FLAME PROOF TEST	1/TYPE	1/TYPE	IS 2148 / IEC 60079-1	IS 2148 / IEC 60079-1	TC	✓	P	V	V	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		10. PAINT SHADE, THICKNESS & FINISH	MA	VISUAL & MEASUREMENT BY ELKOMETER	SAMPLE	SAMPLE	APPROVED DATASHEET	APPROVED DATASHEET	TC		P	W$	W$	SAMPLING PLAN TO BE DECIDED BY INSPECTION AGENCY $ NOTE - 2

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	3/2/2020	Heena K.	Checked by:	2/3/20	KUNAL GANDHI
Reviewed by:	03/2/2020	P. Dutt	Reviewed by:		

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:27.02.2020
		CUSTOMER :		QP NO.: PED-506-00-Q-007, REV-04	
		PROJECT:		PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 9 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	AS PER MANUFACT. STANDARD / APPROVED CROSS SECTION DRAWING.	AS PER MANUFACT. STANDARD / APPROVED CROSS SECTION DRAWING.	INSPC. REPORT		P	W	-	IF APPLICABLE, REFER SEAWORTHY PACKING ALSO.

NOTES:

1 DEPENDING UPON THE SIZE AND CRITICALLY, WITNESSING BY BHEL SHALL BE DECIDED.

2 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL/CUSTOMER SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON.

3 IN CASE TEST CERTIFICATES FOR THESE TESTS ON SIMILAR TYPE, SIZE AND DESIGN OF MOTOR FROM INDEPENDENT LABORATORY ARE AVAILABLE, THESE TEST MAY NOT BE REPEATED.

4 BHEL RESERVES THE RIGHT TO PERFORM REPEAT TEST, IF REQUIRED.

5 AFTER PACKING AND PRIOR TO ISSUE MDCC, PHOTOGRAPHS OF ITEMS TO BE DESPATCHED SHALL BE SENT TO BHEL PURCHASE GROUP FOR REVIEW.

6 IN CASE , ANY CHANGES IN QP COMMENTED BY CUSTOMER AT CONTRACT STAGE SHALL BE CARRIED OUT BY BIDDER WITHOUT ANY IMPLICATION TO BHEL/ CUSTOMER.

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,

** M: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, B: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, C: CUSTOMER,

P: PERFORM. W: WITNESS. V: VERIFICATION. AS APPROPRIATE

MA: MAJOR, MI: MINOR, CR: CRITICAL

D: DOCUMENT

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	2/3/2020	Hema K.	Checked by:	2/3/20	KUNAL GANDHI
Reviewed by:	02/3/2020	P. Dutta	Reviewed by:		

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

SUB-SECTION-V-QE1

MOTORS

MOTOR

TESTS/CHECKS / TEMS/COMPONENTS	Visual	Dimensional	Make/Type/Rating /General Physical Inspection	Mech/Chem. Properties	NDT /DP/MPI/UT	Metallography	Electrical Characteristics	Welding/Brazing(WPS/PQR)	Heat Treatment	Magnetic Characteristics	Hydraulic/Leak/Pressure Test	Thermal Characteristics	Run out	Dynamic Balancing	Routine & Acceptance tests as per IS-325/IS-4722 /IS- 9283/IS 2148/IEC60034\IEC 60079-I/ IS-12615	vibration	Over speed	Tan delta, shaft voltage & polarization index test	Paint shade, thickness & adhesion
Plates for stator frame, end shield, spider etc.	Y	Y	Y	Y	Y				Y										
Shaft	Y	Y	Y	Y	Y	Y			Y										
Magnetic Material	Y	Y	Y	Y			Y			Y		Y							
Rotor Copper/Aluminium	Y	Y	Y	Y			Y		Y										
Stator copper	Y	Y	Y	Y			Y		Y			Y							
SC Ring	Y	Y	Y	Y	Y		Y	Y	Y										
Insulating Material	Y		Y	Y			Y					Y							
Tubes, for Cooler	Y	Y	Y	Y	Y				Y		Y								
Sleeve Bearing	Y	Y	Y	Y	Y				Y		Y								
Stator/Rotor, Exciter Coils	Y	Y	Y				Y	Y											
Castings, stator frame, terminal box and bearing housing etc.	Y	Y	Y	Y	Y			Y											
Fabrication & machining of stator, rotor, terminal box	Y	Y			Y			Y	Y										

Wound stator	Y	Y					Y	Y											
Wound Exciter	Y	Y					Y	Y											
Rotor complete	Y	Y					Y						Y	Y					
Exciter, Stator, Rotor, Terminal Box assembly	Y	Y					Y												
Accessories, RTD, BTD,CT, Space heater, antifriction bearing, gaskets etc.	Y	Y	Y																
Complete Motor	Y	Y	Y												Y	Y	Y	Y1	Y

Note: 1. This is an indicative list of tests/checks. The manufacture is to furnish a detailed Quality Plan indicating the practices & Procedure followed along with relevant
supporting documents during QP finalization. However, following methodology to be followed for Inspection Categorisation:

a) Up to 50 KW: Cat-III: Acceptance of Motor up to 50 KW is based on COC of the manufacturer & the Main Contractor confir specifications.

b.i) Above 50 KW and up to 75KW: Cat-III : For manufacturers who have already supplied this range of motors to NTPC which have b no adverse feedback has been reported from RIO/project-site AND for skid mounted motor supplied with the driven equipment. Acce of Routine Test Inspection report as per IS-325 along with COC of the Manufacturer and Main Contractor confirming NTPC's technical

b.ii) Above 50 KW and up to 75KW: Cat-I: For Other Manufacturers, as per NTPC approved Quality Plan

c) Above 75 KW: Cat-I: as per NTPC approved Quality Plan

2. Additional routine tests for Flame proof motors shall be applicable as per relevant standard
3. Makes of major bought out items for HT motors will be subject to NTPC approval.
4. Y1 = for HT Motor / Machines only.

ANNEXURE-I

LIST OF MAKES OF SUB-VENDOR ITEMS

Sl.no.	Item	Category of Inspection	Sub-vendor	Place	Remarks
1.	PAINT	III	ASIAN PAINT		
		III	BERGER		
		III	KANSAI NEROLAC		
		III	JOTUN		
		III	SHALIMAR		
		III	JENSON & NICHOLSON (I) LTD		
		III	CDC CARBOLINE (I) LTD.		
		III	ADDISON PAINTS LTD		
		III	GRAND POLYCOAT		

NOTES: INSPECTION CATEGORIZATION

CAT I: INSPECTION BY OWNER, BHEL/BHEL NOMINATED TPIA & VENDOR. MDCC WILL BE ISSUED BASED ON INSPECTION REPORT IN LINE ITH APPROVED QAP.

CAT II: INSPECTION BY BHEL/BHEL NOMINATED TPIA & VENDOR. MDCC WILL BE ISSUED BASED ON INSPECTION REPORT IN LINE ITH APPROVED QAP.

CAT III: MDCC WILL BE ISSUSED BASED COC & MTC ISSUSD BY VENDOR AND VERIFICATION BY BHEL / OWNER IN LINE WITH APPROVED QAP/CHECK LIST

- The list of all bought out items like gearbox, coupling, bearings etc. with makes and country of origin and contact details of the manufacturers to be mentioned along with offer to be submitted in the format attached in Section II, Annexure-6 as information to BHEL.
- Acceptance of makes shall be subject to BHEL/ End customer acceptance during the detailed engineering without cost and delivery implication to BHEL.
- Bidder has to submit the sub-vendor questionnaire (attached herewith) along with necessary credentials in case the proposed sub-vendor is not as per the list provided.
- Make of any unlisted items shall be subject to customer / BHEL approval during detail engineering. For such items, bidder to furnish list of sub-vendors during detail engineering stage for Customer / BHEL's review and approval. Bidder shall furnish following supporting documentation within 1 month of placement of LOI. Thereafter no request for additional sub-vendor shall be entertained.

  a) Documentation to show that the equipment /system has been supplied for a plant of similar or higher capacity.

  b) Documentation in the form of certificate that the equipment/system has been operating satisfactorily for two years as on the scheduled date of bid opening.
- The complete list will be necessarily submitted within one month of placement of LOI to ensure timely placement of order for BOIs. Bidder to assess the capability of their proposed sub-vendors in terms of preparation of drawings, calculations, documents, quality assurance, supply of material etc. as per project schedule before placing the order on them.

CORPORATE QUALITY ASSURANCE

SUB-VENDOR QUESTIONNAIRE

i.	**Item/Scope of Sub-contracting**			
ii.	**Address of the registered office**	**Details of Contact Person (Name, Designation, Mobile, Email)**		
iii.	**Name and Address of the proposed Sub-vendor's works where item is being manufactured**	**Details of Contact Person: (Name, Designation, Mobile, Email)**		
iv.	**Annual Production Capacity for proposed item/scope of sub-contracting**			
v.	**Annual production for last 3 years for proposed item/scope of sub-contracting**			
vi.	**Details of proposed works**			
1.	**Year of establishment of present works**			
2.	**Year of commencement of manufacturing at above works**			
3.	**Details of change in Works address in past (if any)**			
4.	**Total Area**			
	Covered Area			
5.	**Factory Registration Certificate**	**Details attached at Annexure – F2.1**		
6.	**Design/ Research & development set-up (No. of manpower, their qualification, machines & tools employed etc.)**	**Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design) Details attached at Annexure – F2.2 (if applicable)**		
7.	**Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc)**	**Details attached at Annexure – F2.3**		
8.	**After sales service set up in India, in case of foreign sub-vendor (Location, Contact Person, Contact details etc.)**	**Applicable / Not applicable Details attached at Annexure – F2.4**		
9.	**Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any**	**Details attached at Annexure – F2.5**		

CORPORATE QUALITY ASSURANCE

SUB-VENDOR QUESTIONNAIRE

10.	**Quality Control exercised during receipt of raw material/BOI, in-process , Final Testing, packing**	**Details attached at Annexure – F2.6**
11.	**Manufacturing facilities** **(List of machines, special process facilities, material handling etc.)**	**Details attached at Annexure – F2.7**
12.	**Testing facilities** **(List of testing equipment)**	**Details attached at Annexure – F2.8**
13.	**If manufacturing process involves fabrication then-** **List of qualified Welders** **List of qualified NDT personnel with area of specialization**	**Applicable / Not applicable** **Details attached at Annexure – F2.9** **(if applicable)**
14.	**List of out-sourced manufacturing processes with Sub-Vendors' names & addresses**	**Applicable / Not applicable** **Details attached at Annexure. –F2.10** **(if applicable)**
15.	**Supply reference list including recent supplies**	**Details attached at Annexure – F2.11** **(as per format given below)**

Project/ package	*Customer Name*	*Supplied Item (Type/Rating/Model /Capacity/Size etc)*	*PO ref no/date*	*Supplied Quantity*	*Date of Supply*

16.	**Product satisfactory performance feedback letter/certificates/End User Feedback**	**Attached at annexure - F2.12**
17.	**Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product (similar or higher rating)** **Note:- Reports need not to be submitted**	**Applicable / Not applicable** **Details attached at Annexure – F2.13** **(if applicable)**
18.	**Statutory / mandatory certification for the proposed product**	**Applicable / Not applicable** **Details attached at Annexure – F2.14** **(if applicable)**
19.	**Copy of ISO 9001 certificate** **(if available)**	**Attached at Annexure – F2.15**
20.	**Product technical catalogues for proposed item (if available)**	**Details attached at Annexure – F2.16**

Name:		**Desig:**		**Sign:**		**Date:**	

Company's Seal/Stamp:-

ITEM CODE	ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
ES11	CABLE GLANDS	1	E1201	ALLIED TRADERS & EXPORTERS	C-124 A, SECTOR-2, NOIDA -201 301, UTTAR PRADESH, INDIA	Mr. Vijay Mohan Sood +(91)-(120)-2525694 +(91)-(120)-3052594 +(91)-(11)-23287156 vijay_mohansood@yahoo.com	
	CABLE GLANDS	2	E1017	ARUP ENGG & FOUNDARY WORKS	391/119,PRINCE ANWAR SHAH ROAD, CALCUTTA-700068	033 2473 0850	
	CABLE GLANDS	3	E1206	BALIGA LIGHTING EQPT.PVT.LTD.	63A,CP RAMASWAMY ROAD, ALWARPET,P.B.No 6910, CHENNAI-600018	44-24995505,22680990-4	
	CABLE GLANDS	4	E1036	COMMET BRASS PRODUCTS	NUTAN CHEMICAL COMPOUND, WALBHAT ROAD, GOREGAON, MUMBAI-400063	91-022-26852961/62/63 comet@vsnl.net	
	CABLE GLANDS	5	DW08	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGOAN (EAST). MUMBAI 400 063.	CEO : Mr. Jayantibhai S. Patel TEL:022-32504770./022-29270876/ 022-29270878.	
	CABLE GLANDS	6	E1044	ELECTROMAC INDUSTRIES	27/28AF NEW EMPIRE IND.ESTT., R.KRISHNA MANDIR RD.JB NGR ,ANDHERI(E),MUMBAI-400059	91-22-28324829 / 66919034 devang@electromacglands.com	
	CABLE GLANDS	7	I01	INCAB	HARE STREET,KOLKATA,WEST BENGAL-700001	91-33-2480161/62/63/64 Fax : 91-33-2485766	
ES12	CABLE LUGS	1	E1040	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGOAN (EAST).	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/	
	CABLE LUGS	2	E1149	UNIVERSAL MACHINES LTD.	4,B.B.D.BAG (EAST) 90,STEPHEN HOUSE,5TH FLR CALCUTTA-700001	033 2282 2540	
ES53	LV MOTORS (NON FLAME PROOF)	1	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
	LV MOTORS (NON FLAME PROOF)	2	E1027	BHARAT BIJLEE LTD.	BHARAT BIJLEE LIMITED, 1ST FLOOR, 7-B, RAJINDRA PARK, PUSA ROAD, NEW DELHI - 110 060.	Tel.: + 91 (11) 25816931-33, 35 & 36| DT: +91 25724318 Fax: + 91 (11) 25819640| M:+ 91	
	LV MOTORS (NON FLAME PROOF)	3	C02	CROMPTON GREAVES	3RD FLOOR, EXPRESS BUILDING,9-10, BAHADUR SHAH ZAFAR MARG, NEAR ITO CROSSING,NEW DELHI-110002, INDIA	91 11 23460700 - 999 Sunil.Das@cgglobal.com	
	LV MOTORS (NON FLAME PROOF)	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
	LV MOTORS (NON FLAME PROOF)	5	K01	KIRLOSKAR ELECTRIC CO LTD.	P.O. BOX 5555 , MALLESWARAM WEST ,BANGALORE 560055	Tel: +91-80-23374865 Fax: +91-80-23377706	
	LV MOTORS (NON FLAME PROOF)	6	L04	LAXMI HYDRAULICS PVT. LTD	129/130, INDUSTRIAL ESTATE PATIL NAGAR, HOTGI ROAD SOLAPUR-413003, MAHARASHTRA	0217- 2357001-005	APPROVED UPTO 200KW
	LV MOTORS (NON FLAME PROOF)	7	M01	MARATHON	MARATHON ELECTRIC INDIA PRIVATE LTD.SECTOR - 11, MODEL TOWN, FARIDABAD - 121006	Ph: +91-129-2286421, 2265340, 4006601 to 4006610	

ITEM CODE	ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
ES53	LV MOTORS (NON FLAME PROOF)	8	A35	NGEF	POCKET NO.10, FLAT NO. 37 & 38, EXPANDABLE DDA FLATS, NASIRPUR DWARKA, PHASE-I NEW	Ph: (011) 2539 7763	
	LV MOTORS (NON FLAME PROOF)	9	E1115	RAJINDRA ELECT INDUSTRIES	14 SHAH IND.ESTATE VEERA DESAI RD,ANDHERI(W) MUMBAI-400053	91-22-26730823, 26730789; 91)-(22)-26730154	
	LV MOTORS (NON FLAME PROOF)	10	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	

एनटीपीसी NTPC	PROJECT: FGD PACKAGE: FGD PACKAGE CONTRACT NO.:	LIST AND STATUS OF ITEM REQUIRING QP AND SUB-SUPPLIER APPROVAL Sub systems: Mechanical				NTPC DOC NO REVISION NO DATE	
Sl No.	Item	QP/ Insp. Cat.	QP No.	Proposed sub-supplier	Place	Sub-suppliers approval status / category	Remarks
1	Hammer Mill Crusher (Upto 150 TPH rated capacity)	I		Macnally Sayaji Engineering Ltd	Vadodara	A	
		I		Ecoman India	Vadodara	A	
		I		L&T	Kanshbahal	A	
		I		Elecon Engineering Co.	V.V.Nagar	A	
		I		Thyssenkrupp Industries India Pvt Ltd	PUNE	A	
2	FABRIC BELTING (FR GRADE) (Cat-III for sealing belt) Upto 2200 MM Belt Width	I		PHOENIX CONVEYOR BELT	KOLKATA	A	UPTO 2200 MM WIDTH
		I		IMASS S.A	GREECE	A	
		I		SOMI CONVEYOR BELTINGS LIMITED	JODHPUR	A	UPTO 2000 MM WIDTH
		I		SEMPELTRAN NIRLON (P) Ltd	MUMBAI	A	UPTO 1600 MM WIDTH
		I		HINDUSTAN RUBBER	SILVASA	A	UPTO 1600 MM WIDTH
		I		NORTHLAND RUBBER	SONEPAT	A	UPTO 1800 MM WIDTH
		I		RAVASCO TRANSMISSION LTD.	VAPI	A	UPTO 2200 MM WIDTH
		I		ORIENTAL RUBBER	PUNE	A	UPTO 2200 MM WIDTH
		I		FORECH	CHENNAI	A	UPTO 2200 MM WIDTH
		I		YOKOHAMA	JAPAN	A	
3	GEARBOX- HELICAL & BEVEL	I		SHANTI GEARS	COIMBATORE	A	Upto size 560
		I		ELECON	V V NAGAR	A	
		I		SIEMENS (FLENDER)	CHENNAI	A	
		I		PREMIUM TRANMISSION LTD	PUNE/FALTA	A	Up to size 710 / 400
		I		NEW ALLENBURY WORKS	KOLKATA	A	
4	PLANETARY GEARBOX	I		ELECON	V V NAGAR	A	
		I		SIEMENS (FLENDER)	CHENNAI	A	
		I		PREMIUM TRANMISSION LTD	PUNE/FALTA	A	UPTO SIZE 710/450
		I		SEW EURODRIVE	GERMANY	A	UPTO SIZE 560
5	FLUID COUPLING (SCOOP TYPE AS WELL AS TRACTION TYPE)	I		PREMIUM TRANMISSION LTD	AURANGABAD	A	FOR SCOOP UPTO PST-1150
		I		ELECON	VV NAGAR	A	FOR SCOOP UPTO ESC-760
		I		FLUIDOMAT	INDORE	A	FOR SCOOP UPTO SC-1330
		I		VOITH(INDIA)	HYDERABAD	A	FOR SCOOP UPTO SVNL-1330
		I		VOITH	GERMANY	A	
6	LIMESTONE SAMPLING UNIT	I		ADVANCE SYSTEMS SAMPLING UNIT PVT LTD	KOLKATA	A	
		I		ERIEZ MAG EUROPE LTD	UK	A	

एनटीपीसी NTPC	PROJECT: FGD PACKAGE: FGD PACKAGE CONTRACT NO.:	LIST AND STATUS OF ITEM REQUIRING QP AND SUB-SUPPLIER APPROVAL Sub systems: Mechanical				NTPC DOC NO REVISION NO DATE 	
Sl No.	Item	QP/ Insp. Cat.	QP No.	Proposed sub-supplier	Place	Sub-suppliers approval status / category	Remarks
		I		SIEVE TECHNIK	GERMANY	A	MANUFACTURING OF PRIMARY & SECONDARY SAMPLER AN BOTLLE COLLECTOR AT MULTOTEC SA
		I		Thermo Ramsay INC	USA	A	
		I		EASTMAN CRUSHER CO. PVT LTD.	KOLKATA	A	
7	VIBRATING SCREENING FEEDER / GRIZZLY SCREENS (UPTO 150 TPH RATED CAPACITY)	I		ELECON ENGINEERING CO.	V.V. NAGAR	A	
		I		ECOMAN INDIAN	VADODARA	A	
		I		MCNALLY SAYAJI ENGINEERING LTD	VADODARA	A	

LEGENDS

1. SYSTEM SUPPLIER/SUB-SUPPLIER APPROVAL STATUS CATEGORY (SHALL BE FILLED BY NTPC)

A – For these items proposed vendor is acceptable to NTPC. To be indicated with letter "A" in the list alongwith the condition of approval, if any.

DR – For these items "Detailed required" for NTPC review. To be identified with letter "DR" in the list.

NOTED – For these items vendors are approved by Main Supplier and accepted by NTPC without specific vendor approval from NTPC. To be identified with "N'

2. QP/INSPN CATEGORY:

CAT-I : For these items the Quality Plans are approved by NTPC and the final acceptance will be on physical inspection witness by NTPC.

CAT-II : For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP.

CAT-III : For these items Main Supplier approves the Quality Plans. The final acceptance by NTPC shall be on the basis certificate of conformance by the main supplier.

(BHEL)

ANNEXURE-II

REFERENCE QUALITY PLANS

MANUFACTURER/BIDDER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN		SPEC. NO : PE-TS-XXX-167-A001	DATE: XX.XX.XX
	CUSTOMER :		QP NO.: PE-QAP-XXX-167-A001(PI)	DATE: 11.02.2020
	PROJECT:		PO NO.: LATER	DATE: XX.XX.XX
	ITEM: PIPE FITTINGS ,FLANGES & ACCESSORIES	SYSTEM: MISC.TANKS (SITE FABRICATED)	SECTION:	SHEET 1 OF 1

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	**			
					M C/ N			*D	M	C	N	
1	Pipes Fittings, Flanges & Accessories	Check for Type, Model No., Tag No.,	MI	Visual	100%	As per Approved Data Sheet/ Tech spec.	As per Approved Data Sheet/ Tech spec.	Inspection Report	P	V	V	
2		Dimensions	MI	Dimensional	100%	As per Approved Data Sheet/ Tech spec.	As per Approved Data Sheet/ Tech spec.	Inspection Report	P	V	V	
3		Physical and chemical Properties	MI	Review of TC	For Lot	As per Approved Data Sheet/ Tech spec.	As per Approved Data Sheet/ Tech spec.	Mfgr. TC	P	V	V	
4		Hydro test	MA	Hydro Test	100%	As per Approved Data Sheet/ Tech spec.	As per Approved Data Sheet/ Tech spec.	Inspection Report	P	V	V	

NOTES:

1. BHEL reserves the right for conducting repeat test, if required.
2. Photographs of packing of material before final dispatch is to submitted.

LEGENDS:
*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,
** **M**: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, **C**: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, **N**: CUSTOMER,
P: PERFORM, **W**: WITNESS, **V**: VERIFICATION, AS APPROPRIATE
MA: MAJOR, **MI**: MINOR, **CR**: CRITICAL

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	11.2.2020	S. K. YADAV	Checked by:	11.02.2020	ASHISH PANIGRAHI
Reviewed by:	11.02.2020	SAYAN ROY	Reviewed by:	11/2/2020	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN		SPEC. NO : PE-TS-XXX-167-A001	DATE: XX.XX.XX 117
	CUSTOMER :		QP NO.: PE-QAP-XXX-167-A001(PL)	DATE: 11.02.2020
	PROJECT:		PO NO.: LATER	DATE: XX.XX.XX
	ITEM: MS PLATES	SYSTEM: MISC.TANKS (SITE FABRICATED)	SECTION:	SHEET 1 OF 1

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	*				
					M / C/ N				D	M	C	N	
1.0 RAW MATERIAL													
1	STEEL PLATES	Chemical composition and Mechanical test	MA	Review of corelated MTC	one/heat	IS:2062	IS:2062	Mfgr. TC	√	P	V	V	Refer Note below
2		Visual and dimensional check	MA	Visual and measurement	100%	Mfg.TC	Mfg.TC IS1852	Mfgr. TC	√	P	** W	** W	
3		Identification/ marking	MA	Corelation establish	100%	As per manufacturing practice	As per manufacturing practice IS 2062	Mfgr. TC	√	P	V	** W	

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,
M: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, **C**: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, **N**: CUSTOMER,
P: PERFORM, **W**: WITNESS, **V**: VERIFICATION, AS APPROPRIATE
MA: MAJOR, **MI**: MINOR, **CR**: CRITICAL

** **NOTE:** i) In case material is dispatched directly from Approved sub-vendor plant/stockyard or procured from dealer against co related TC's witnessing by BHEL is waived off and material will be accepted based on MTC of approved sub vendor.

** ii) In case material is procured from dealer and co related TC's are not available, check on 100% quantity of plates will be performed on sample drawn from them at NABL certified/approved laboratory for chemical & physical properties, however dimensional check shall be witnessed by BHEL.

iii) BHEL reserves the right for conducting repeat test, if required.

iv) Photographs of packing of material before final dispatch is to submitted.

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	11.2.2020	S. K. YADAV	Checked by:	11.2.2020	ASHISH PANIGRAHI			Reviewed by:			
Reviewed by:	11.02.2020	SAYAN ROY	Reviewed by:	11/2/2020	R K JAISWAL			Approved by:			

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BHEL	CONTRACTOR'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN		PROJECT
		ITEM : RUBBER LINING OF PIPING	Q.P.No:7374QPC01	PACKAGE
		CONFORMING TO Tech Spec.	REV-01	CONTRACT No.:
		BHEL Customer No. : 7374,7391& 7392	Dt- 13.02.2019	MAIN-SUPPLIER

S.No	COMPONENT & OPERATIONS	CHARACTRISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1	2	3	4	5	6	7	8	9	10	** 11			12
1.0	**RAW MATERIAL**												
1.1	Rubber Mix	a. Tensile Strength b. % Elongation c. Specific Gravity d. Hardness e. Thickness of Sheet	Major	Verfication	1 sample/lot	As per Tech Spec./Relevant IS , Material Spec.		TC	√	P	V	-	TC - Test Certificate
		f. Resistance to Bleeding #	Major	Chemical	1 sample/lot	Immersion for 24 hours @40 deg C in 10% of H2SO4 and 10% of HNO3	No discoloration and Weight change -0% +4%	TC	√	P	V	-	# TC shall be from NABL approved lab.
2.0	**INPROCESS INSPECTION**												
2.1	Surface Preparation	Cleanliness & Uniformity	Major	Visual	100%	IS 4682 Part I , Sa 2.5 Grade Surface Finish		TC	-	P	V	-	
2.2	Continuity of Lining at Uncured stage	Spark test	Major	Visual	100%	IS 4682 Part I		TC	-	P	V	-	
2.3	Curing of Rubber Lining	Control of Pressure,Temperature & Time	Major	Visual	100%	IS 4682 Part I and Manufacturer's Procedure		Log Book	-	P	V	-	
3.0	**FINAL INSPECTION**												
3.1	Complete Lining	a. Surface Defects	Major	Visual	100%	IS 4682 Part I		IR	√	P	W	-	
		b. Shore Hardness	Major	Measurement	Random	IS 4682 Part I		IR	√	P	W	-	
		c. Spark Test	Critical	Visual	100%	IS 4682 Part I		IR	√	P	W	-	
		d. Rubber lining Thickness	Major	Measurement	Random	IS 4682 Part I		IR	√	P	W	-	
		e. Adhesion Test	Critical	Peel-Off test	One sample per Vulc. Lot	IS 4682 Part I		IR	√	P	W	-	
4.0	**Documentation**	Review of Reports	Major	Verification	100%	All reports required as per QP.				P	V	-	

PREPARED BY	APPROVED BY	LEGEND:		DOC.NO. 6130-109-QVM-Q-012 Rev 01 CAT...		
MAIN-SUPPLIER		* RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.				
SIGNATURE	PAGE 01 OF 02	** M:MANUFACTURER/SUB-SUPPLIER,C: BHEL/BHEL AUTHORISED AGENCY, N: NTPC, P: PERFORM W: WITNESS AND V: VERIFICATION	FOR NTPC USE:	REVIEWED BY	APPROVED BY	APPROVAL SEAL
		CHP: NTPC SHALL IDENTIFY IN COLOUM 'N' AS 'W'				

बी एच ई एल BHEL	CONTRACTOR'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN		PROJECT :
		ITEM : RUBBER LINING OF PIPING CONFORMING TO IS 4682 PART I.	Q.P.No:7374QPC01 REV-01	PACKAGE CONTRACT No.:
		BHEL Customer No. : 7374,7391& 7392	Dt- 13.02.2019	MAIN-SUPPLIER

S.No	COMPONENT & OPERATIONS	CHARACTRISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	D*	AGENCY M	AGENCY C	AGENCY N	REMARKS
1	2	3	4	5	6	7	8	9	10	** 11			12

NOTES:

1. **Rubber Lining Vendor's Name & Address
a. M/s Lebracs Rubber Linings Private Limited ; Works Address : No16, Sedrapet, Puducherry-605111
b. M/s Jasmino Polymertech Pvt Ltd ; Works Address : L-61, MIDC Industrial Area, Taloja, Dist-Raigad, Maharashtra -410208
2. NTPC Inspection Category : Cat III
3. Repair, if any, should be carried out by same as per original rubber.
4. Adhesion test coupon shall be as prepared as per governing code.
5. NTPC Surveillance check may be carried out, if required.

PREPARED BY	APPROVED BY	LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER, C: BHEL / BHEL AUTHORISED AGENCY, N: NTPC, P: PERFORM W: WITNESS AND V: VERIFICATION		DOC.NO. 6130-09-RVM-R-012 REV01.	CAT...
MAIN-SUPPLIER					
SIGNATURE	PAGE 02 OF 02		FOR NTPC USE:	REVIEWED BY	APPROVED BY / APPROVAL SEAL

-Above quality plan is tentative. Final QAP shall be decided during detailed engineering.

एनटीपीसी NTPC

SYSTEM EQUIPMENT

Misc. Tanks

STANDARD FIELD QUALITY PLAN

CONFORMING TO CODE: IS:803-1976

QP NO.: 0000-999-QOM – I -001			
Rev. No	0	Date	15-02-2005
Page 1 Of 1			
VALID UPTO : 14-02-2008			

REVIEWED BY:

APPROVED BY

अनुमोदित APPROVED

अनिल गुप्ता ANIL GUPTA अपर महाप्रबंधक (गुणवत्ता आश्वासन) Addl. General Manager (QA) एन टी पी सी लि./NTPC LTD.

SL. NO	ACTIVITY AND OPERATION	CHARACTERISTICS / INSTRUMENTS	CLASS # OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D *	REMARKS
1.	2.	3.	4.	5.	6.	7.	8.	9.		10.
1	**RAW MATERIAL INSPECTION**									
1.1	MS Plates	Mechanical & Chemical	B	Mechanical & Chemical	1 sample per Heat	Appd Drg./ Data Sheet	Relevant Material Specs	TC		In absence of Correlated TCs, Check Testing shall be witnessed by NTPC.
		Surface Defects	B	Visual	100%	No Pitting/ Corrosion	Damaged Plates not to be used	IR		
		Thickness	B	Measure	100%	Appd Drg.	Appd Drg.	IR		
2	**IN PROCESS INSPECTION**									
2.1	Welding	WPS/PQR/WQR	A	Qualification / Verification	100%	ASME Sec-IX	ASME Sec-IX	WPS/ PQR		See Note # 1.
		Marking, Cutting, Rolling, Joint Set-up	C	Visual & Measure	100%	Appd Drg.	Appd Drg.	IR		
		NDT on Back Gauging	B	DPT	100%	ASTM E-165	No Indications	IR		Except for Bottom Plates.
		NDT on Root Run	B	DPT	100%	ASTM E-165	No Indications	IR		For Bottom Plates only.
		NDT on Finished Welds	A	Vacuum Testing	100%	IS:803	No Leakage	IR		For Bottom Plates only.
3	**FINAL INSPECTION**									
3.1	Finished Tank	Finish, Orientation	B	Visual	100%	IS:803 & Appd. Drg.	IS:803 & Appd. Drg.	IR		
		Dimensions including Verticality, Ovality	B	Visual & Measure	100%	IS:803 & Appd. Drg.	IS:803 & Appd. Drg.	IR		
		NDT on Final Welding	A	DPT	100%	ASTM E-165	No Indications	IR		Except for Bottom Plates. See Note # 2.
		Leak Proof ness	A	Water Fill Test	100%	IS:803 & Appd. Drg.	No Leakage	IR		For 24 Hours
3.2	Painting	Surface Preparation	B	Visual	100%	IS:803, Appd. Drg., NTPC Specs	IS:803, Appd. Drg., NTPC Specs	IR		
		Coating Thickness, Colour	B	Visual & DFT	100%	IS:803, Appd. Drg., NTPC Specs	IS:803, Appd. Drg., NTPC Specs	IR		

Note : - 1. Only Qualified Welders are to be used. If Welders qualified by NTPC/ BHEL/ LRQA/ BVQI are available & continuously doing the job, then re-qualification is not necessary.
2. NDT on Finished weld shall also include Spot RT (10%), if Joint efficiency is taken as 0.85, in line with requirements of Code.

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
LEGEND TO BE USED: CLASS #: A = CRITICAL, B = MAJOR, C = MINOR; 'A' SHALL BE WITNESSED BY NTPC FQA, **'B'** SHALL BE WITNESSED BY NTPC ERECTION/ CONSTRUCTION DEPTT AND **'C'** SHALL BE WITNESSED BY MAIN SUPPLIER (A & B CHECK SHALL BE NTPC CHP STAGE)

FORMAT NO.: QS-01-QAI-P-10/F4-R1

1/1

ENGG. DIV./QA&I

Ranipet	MANUFACTURER'S NAME AND ADDRESS M/S BHEL: BAP: RANIPET 632 406 TAMIL NADU	STANDARD QUALITY PLAN ITEM: AGITATOR SYSTEM: FGD	QP NO	FGS: 720
			REV. NO:	00
			DATE:	12.02.2019
			PAGE NO:	Page 1 of 2

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	B					M	C	N	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D *	** 10.			11.
1.0	**Raw Material Inspection**													
1.1	All materials including casting & forgings	Chem. & Mech. Dimensions Surface Defects	MA MA MA	Review of MTC Measurement Visual	1/Heat 100% 100%	1/Heat - -	As per spec. & Appd. Dwg		TC IR IR	√	P P P	V - -	V - -	
2.0	**Motor : Review Of Manufacture Test Certificate**													
3.0	**In Process Inspection**													
3.1	Welding Qualifications	WPS & PQR	MA	WPS, PQR & WPQ	100%		ASME Sec IX		IR	√	P	V	V	Recent qualified WPS, PQR and WPQ shall be submitted for review during inspection
3.2	Marking, Cutting, Edge Preparation Tacking	Dimensions	MA	Measurement	100%	-	Appd.Dwg.		IR		P	-	-	
3.3	Welds	Dimensions & Surface Quality	MA	Measurement	100%		Appd.Dwg.& ASME Sec VIII		IR	√	P	W	V	
3.4	Machining of Components	Dimensions Surface Defects	MA	Measurement Visual	100% 100%	- -	Appd. Dwg.		IR		P P	- -	- -	
3.5	Impeller	Static balance test	MA	Measurement	100%		As per Specs.		TR	√	P	V	V	
3.6	Rubber Lining	Hardness test & Spark test	MA	Measurement	100%		As per Specs.	Appd. Drg	TR	√	P	W	V	
3.7	Assembly	Dimensions Completeness	MA	Measurement Visual	100% 100%		Appd.Drg.		IR	√	P P	V V	V V	
4.0	**Final Inspection**													
4.1	Final Assembly	Overall Dimensions & Completeness	MA MA	Measurement Visual	100%	10%	Appd. Dwg		IR	√	P	W	V	*10% pf each type (Vertical /

LEGEND: * RECORD, IDENTIFIED WITH "TICK" (√) UNDER COLUMN 'D' SHALL BE SUBMITTED TO CUSTOMER AS A QA DOCUMENTATION PACKAGE.
M: MANUFACTURER / SUB SUPPLIER, **C:** MAIN CONTRACTOR.
N: CUSTOMER/CONSULTANT **P:** PERFORM **W:** WITNESS **V:** REVIEW OF RECORDS
MA: MAJOR AND **MI:** MINOR

PREPARED BY

Rakesh Kumar Madhu,(SEr/QA)

REVIEWD & APPROVED BY

K C Gandhi Parimalam,(DGM/QA)

Agitator inspection requirement-Please note that attached QP is indicative only. Stage inspection and Quantum of check may vary during final approval by customer (NTPC).

Ranipet	MANUFACTURER'S NAME AND ADDRESS **M/S BHEL: BAP: RANIPET 632 406 TAMIL NADU**	**STANDARD QUALITY PLAN** **ITEM: AGITATOR** **SYSTEM: FGD**	**QP NO**	**FGS: 720**
			REV. NO:	**00**
			DATE:	**12.02.2019**
			PAGE NO:	**Page 2 of 2**

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	B					M	C	N	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D *	** 10.			11.
														Horizontal
4.2	Free Air Run Test of complete assembly	Measurement Current, RPM, Noise & Vibration	MA	Measurement	100%	10%	Vendor Standard / Approved Drawing / Data Sheet		IR	√	P	W	W	
4.3	Review of QA Documents	Verification of QA Documents	MA	Verification	100%	100%	As per Appd. MQP		IR		P	V	V	
5.0	**Painting & Preservation**													
5.1		Painting Material	MI	Review of MTC	100%		Appd. "Painting Procedure"/Approved Painting Schedule		IR	√	P	V	-	
5.2		Surface treatment and inspection	MI	Visual	100%	-	-do-		IR	√	P	-	-	
5.3		DFT Check	MI	Measurement	10%		-do-		IR	√	P	V	-	
5.4		Painting Surface Quality	MI	Visual	100%		-do-		IR	√	P	V	-	
6.0	**Inspection before Delivery**													
6.1	Packing	Size, appearance & firmness	MI	Measurement & Visual	100%		As per "Packing Procedure"		IR	√	P	V	-	
6.2	Deliver Documents	Markings, Packing List & Details Packing List, etc., Check	MI	Verification	100%		As per "Packing Procedure"		IR	√	P	V	-	

NOTES:

1. For Agitator Motor rating is 45KW and motor make NTPC/BHEL Approved source.
2. Routine test report duly witnessed by main contractor as per applicable standard shall be reviewed during inspection (more than 30 KW Rating).

LEGEND: * RECORD, IDENTIFIED WITH "TICK" (√) UNDER COLUMN 'D' SHALL BE SUBMITTED TO CUSTOMER AS A QA DOCUMENTATION PACKAGE. **M:** MANUFACTURER / SUB SUPPLIER, **C:** MAIN CONTRACTOR. **N:** CUSTOMER/CONSULTANT **P:** PERFORM **W:** WITNESS **V:** REVIEW OF RECORDS **MA:** MAJOR AND **MI:** MINOR	**PREPARED BY** **Rakesh Kumar Madhu,(SEr/QA)**	**REVIEWD & APPROVED BY** **K C Gandhi Parimalam,(DGM/QA)**

QUALITY REQUIREMENT

(a) Since this items comes under Sub-QR Category, hence inspection at vendor works is applicable by BHEL/BHEL TPI and NTPC as per NTPC Approved Quality plan.

(b) Supplier shall submit the MQP in NTPC Format (Sample QP attached herewith) for approval of NTPC. Please note that attached QP is indicative and minimum requirement only. Stage inspection and Quantum of check may vary during final approval by customer (NTPC).

(c) Painting : Painting details in the specification are minimum requirement. Painting shall be as per approved schedule which will be submitted by successful bidder during detail engg.

(d) In case of order placed on foreign vendors, vendor has to finalize Inspection agency at their own cost and carry out inspection as per the approved Quality plan . Further, the list of third party insection agencies (as applicable) shall be provided by BHEL during detail engineering.Vendor has to furnish BHEL the inspection reports and other documents required as per approved Quality plan duly signed by the Inspection Agency after their witness for BHEL's review and acceptance.

ANNEXURE-III

TANK SCHEDULE

TANK SCHEDULE (Signed and Stamped copy to be sumbmitted with the offer by Bidder)												
Sl.no.	**Description**	**Primary Hydrocyclone feed tank**	**Filtrate water tank**	**Secondary Hydrocyclone feed tank**	**Waste water Tank**	**Limestone Slurry Storage tank**	**Auxiliary Absorbent Tank**	**Process Water tanks**	**Belt filter wash tank**	**Cake wash(clarified water) tank**	**Absorber Area Drain Pit**	**Gypsum Area Drain Pit**
1	**Tank Sl No.**	1	2	3	4	5	6	7	8	9	10	11
2	**Type of agitator**	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)	Marine Propeller – Horizontal Type (Side Entry),	Not applicable	Not applicable	Not applicable	Vertical Type – (Center Mounted)	Vertical Type – (Center Mounted)
3	**Medium to be handled**	Gypsum slurry	Gypsum slurry	Gypsum slurry	Gypsum slurry	Limestone slurry	Gypsum slurry	Process Water	Process Water	Process Water	Gypsum slurry	Gypsum slurry
4	**Agitator Location**	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Not applicable	Not applicable	Not applicable	Outdoor	Outdoor
5	**Agitator Operation**	Continuous	Continuous	Continuous	Continuous	Continuous	Whenever FGD is under maintenance	Not applicable	Not applicable	Not applicable	Continuous	Continuous
6	**Tank details**											
a)	Tank Shape	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Vertical cylindrical	Rectangular (RCC sump)	Rectangular (RCC sump)
b)	Tank Material	**IS:2062 E250 GR.BR**	**IS:2062 E250 GR.BR**	**IS:2062 E250 GR.BR**	**IS:2062 E250 GR.BR**	**IS:2062 E250 GR.BR**	**IS:2062 E250 GR.BR**	**IS:2062 E250 GR.BR**	**IS:2062 E250 GR.BR**	**IS:2062 E250 GR.BR**	**RCC (refer note-1)**	**RCC (refer note-1)**
c)	Tank name	Primary Hydrocyclone feed tank	Filtrate water tank	Secondary Hydrocyclone feed tank	Waste water Tank	Limestone Slurry Storage tank	Auxiliary Absorbent Tank	Process water tanks	Belt filter wash tank	Cake wash(clarified water) tank	Absorber Area Drain Pit	Gypsum Area Drain Pits
d)	Tank/Sump Quantity (in No.)	1	1	1	1	2	1	2	2	2	2	1
	Capacity of Tank (in m3)											
e)	Capacity (Hold Volume)	161.0	76.0	98.0	216.0	226.0	1300.0	118.0	22.0	22.0	56.0	56.0
f)	Capacity (Effective)	127.0	57.0	75.0	176.0	186.0	1164.0	82.0	13.0	13.0	33.6	33.6
	Dimension (in m)											
g)	Diameter	REFER GA DRWGS OF TANKS UNDER ANNEXURE-V, SUB-SECTION-D, SECTION -I OF SPECIFICATION									-	-
h)	Length										4	4
i)	Breadth										4	4
j)	Height										4	4
7	**Quantity of Agitator per tank**	1	1	1	1	1	3 (Refer note-2)	Not applicable	Not applicable	Not applicable	1	1
8	**Total quantity of Agitators (for two units)**	1	1	1	1	2	3 (Refer note-2)	Not applicable	Not applicable	Not applicable	2	1
9	**Agitator Loads**											
a)	Static Load (per agitator assembly) (in Tonnes) (Refer Note-5)	1.3	0.51	1.2	1.3	1.3	1.1	Not applicable	Not applicable	Not applicable	0.5	0.5
b)	Dynamic load (per agitator assembly) (in Tonnes)(Refer Note-5)	3.50	1.35	3.14	3.69	3.59	2.2	Not applicable	Not applicable	Not applicable	1	1
10	**Tentative Nozzle size for Agitator (in NB) (Refer Note-6)**	450	450	450	450	450	450	-	-	-	-	-
11	**Slurry Analysis**											
a)	Slurry to be handled	Gypsum slurry	Gypsum slurry	Gypsum slurry	Gypsum slurry	Limestone slurry	Gypsum slurry	Water	Water	Water	Gypsum slurry	Gypsum slurry
b)	Maximum solid particle size	200 mesh (75 µ)	6-7 mm	200 mesh (75 µ)	200 mesh (75 µ)	200 mesh (75 µ)	200 mesh (75 µ)	-	-	-	6-7 mm	6-7 mm
c)	Normal solid particle size, d50	325 mesh (43 µ)	325 mesh (43 µ)	325 mesh (43 µ)	325 mesh (43 µ)	325 mesh (43 µ)	325 mesh (43 µ)	-	-	-	325 mesh (43 µ)	325 mesh (43 µ)

d)	Solid to be handled	gypsum along with Limestone & other impurities	gypsum along with Limestone & other impurities	gypsum along with Limestone & other impurities	gypsum along with Limestone & other impurities	Limestone + impurities	gypsum along with Limestone & other impurities	-	-	-	gypsum along with Limestone & other impurities	gypsum along with Limestone & other impurities
e)	Chloride concentration	max 25000 ppm	max 25000 ppm	max 25000 ppm	max 25000 ppm	max 1000 ppm	max 25000 ppm	-	-	-	max 25000 ppm	max 25000 ppm
f)	Hardness of particle	5-7 mho scale	5-7 mho scale	5-7 mho scale	5-7 mho scale	5-7 mho scale	5-7 mho scale	-	-	-	5-7 mho scale	5-7 mho scale
g)	Slurry concentration, wt%	30 wt%	11%	16.60%	3%	30 wt%	30%	-	-	-	30%	30%
h)	Sp. Gravity of slurry	1.212	1.066	1.108	1.02	1.215	1.212	-	-	-	1.212	1.212
i)	Sp. Gravity of Lime Stone & Gypsum	2.32(avg)	2.32(avg)	2.32(avg)	2.32(avg)	2.32(avg)	2.32(avg)	-	-	-	2.32(avg)	2.32(avg)
j)	Viscosity of Slurry	10 cP	4 cP	4 cP	3 cP	30 cP	10 cP	-	-	-	10 cP	10 cP
k)	pH	4 to 8	4 to 8	4 to 8	4 to 8	5 to 8	4 to 8	-	-	-	4 to 8	4 to 8
l)	SiO_2 Content	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l	4 to 6 g/l	-	-	-	4 to 6 g/l	4 to 6 g/l
m)	Temperature	Normal -62 deg C; Design-70 deg C.	Normal -58deg C; Design-70 deg C.	Normal -62 deg C; Design-70 deg C.	Normal -62 deg C; Design-70 deg C.	Normal -45 deg C; Design-55deg C.	Normal -62 deg C; Design-70 deg C.	-	-	-	Normal -62 deg C; Design-70 deg C.	Normal -62 deg C; Design-70 deg C.
12	**Process water Analysis**											
a)	Calcium as CaCO3 (mg/l)	-	-	-	-	-	-	256	256	256	-	-
b)	Magnesium as CaCO3 (mg/l)	-	-	-	-	-	-	70	70	70	-	-
c)	Sodium + Potassium as CaCO3 (mg/l)	-	-	-	-	-	-	125	125	125	-	-
d)	Total Cations as CaCO3 (mg/l)	-	-	-	-	-	-	451	451	451	-	-
e)	Chlorides as CaCO3 (mg/l)	-	-	-	-	-	-	75	75	75	-	-
f)	Sulphate as CaCO3 (mg/l)	-	-	-	-	-	-	197.5	197.5	197.5	-	-
g)	Nitrate as CaCO3 (mg/l)	-	-	-	-	-	-	0	0	0	-	-
i)	Total Anions as CaCO3 (mg/l)	-	-	-	-	-	-	451	451	451	-	-
j)	Iron(total) as Fe (mg/l)	-	-	-	-	-	-	1.5	1.5	1.5	-	-
k)	Total Silica as SiO2 (mg/l)	-	-	-	-	-	-	55	55	55	-	-
l)	pH	-	-	-	-	-	-	7.8-8.2	7.8-8.2	7.8-8.2	-	-
m)	Turbidity (NTU)	-	-	-	-	-	-	100	100	100	-	-
13	**Inside Lining of tank/sumps**											
a)	Lining specification / Painting specification of interior surface	Bromobutyl rubber lining with Shore A hardness as 55±5 and min5 mm thickness .	Vinyl ester-based Glass Flake lining of min 3 mm thickness.			Bromobutyl rubber lining with Shore A hardness as 55±5 and min 5 mm thickness		Epoxy lining of minimum 150 micron thickness (3 coats of 50 micron each)			PolyPropylene Homogeneous grade (PP-H) minimum 4 mm thkplus 2mm FRV (fiberglass with vinyl Easter resin)or Acid/Alkali Resistant (AR) Tiles.	
14	**Size and Number of Anchor Bolts per tank**	REFER GA DRWGS OF TANKS UNDER ANNEXURE-V, SUB-SECTION-D, SECTION -I OF SPECIFICATION									-	-
15	**Mateial Specification**	For material of construction for Plates, Structure, Pipes, Fitings, Flanges, Gasket, Anchor bolts amd Fasteners, refer Annexure-IX, Sub Section-D, Section-I.										
16	**Nozzles required on tanks**	REFER GA DRWGS OF TANKS UNDER ANNEXURE-V, SUB-SECTION-D, SECTION -I OF SPECIFICATION										
Notes												
1	**Supply, E&C of the agitators for the slurry tanks shall be in bidder's scope.**											
2	**Steel plates (Only for Roof, Bottom, Baffles and Shell of Tank) shall be provided as free issue by BHEL.**											

3	The absorber area Drain Pit, Gypsum area Drain Pit (both of RCC construction) is exluded from bidder scope of work. However, the supply, erection and commissioning of the Glass flake lining within the pit shall be in bidder's scope. Further the supply & erection of the agitators within the mentioned pits shall be in bidder's scope of work.
4	For detailed scope of work refer the technical specification.
5	The outside surface of the tanks shall be coated with paint as approved by the BHEL/Customer.
6	Agitator loads provided at S.N.9 are indicative and for ease of tendering & estimation. The details furnished by the OEM shall be considered as final.
7	The Nozzle sizes provided for Agitators at S.N. 10 are indicative and for ease of tendering & estimation. The details furnished by the OEM shall be considered as final.

ANNEXURE-IV

MASTER DRAWINGS LIST WITH SCHEDULE OF SUBMISSION

	TITLE:	SPEC. NO.: PE-TS-491-167-A001
	2X500MW NTPC SIPAT STPP, STAGE-II TECHNICAL SPECIFICATIONS FOR MISC. TANKS (SITE FABRICATED) AND AGITATORS	SECTION-I, SUB-SECTION- D, ANNEXURE-IV
		REV. NO.: 00 DATE NOV 2022

DRAWINGS/ DOCUMENTS REQUIRED DURING DETAIL ENGINEERING

The successful bidder shall submit the following drawings / documents during detail engineering for approval / information / reference (as the case may be): -

Sl. No.	BHEL Drawing / Document No.	Title	Schedule Submission Date from LOI	Resubmission after incorporating comments	Drawing Classification
1	PE-V0-463-167-A001	DESIGN CALCULATION OF PRIMARY HYDRO CYCLONE FEED TANK INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary
2	PE-V0-463-167-A002	DESIGN CALCULATION OF FILTERATE WATER TANK INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary
3	PE-V0-463-167-A003	DESIGN CALCULATION OF SECONDARY HYDRO CYCLONE FEED TANK INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary
4	PE-V0-463-167-A004	DESIGN CALCULATION OF WASTE WATER TANK INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary
5	PE-V0-463-167-A005	DESIGN CALCULATION OF LIMESTONE SLURRY STORAGE TANKS INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary
6	PE-V0-463-167-A006	DESIGN CALCULATION OF AUXILIARY ABSORBENT TANK INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary
7	PE-V0-463-167-A007	DESIGN CALCULATION OF PROCESS WATER TANKS INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary
8	PE-V0-463-167-A008	DESIGN CALCULATION OF BELT FILTER WASH TANKS INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary
9	PE-V0-463-167-A009	DESIGN CALCULATION OF CAKE WASH (CLARIFIED WATER) TANK INCLUDING STAAD CALCULATION OF ROOF STRUCTURE	3 weeks	Within 1 week	Primary

	TITLE: 2X500MW NTPC SIPAT STPP, STAGE-II TECHNICAL SPECIFICATIONS FOR MISC. TANKS (SITE FABRICATED) AND AGITATORS	SPEC. NO.: PE-TS-491-167-A001 SECTION-I, SUB-SECTION- D, ANNEXURE-IV REV. NO.: 00 DATE NOV 2022

10	PE-V0-463-167-A101	GA DRAWING OF PRIMARY HYDRO CYCLONE FEED TANK	4 weeks	Within 1 week	Primary
11	PE-V0-463-167-A102	GA DRAWING OF FILTERATE WATER TANK	4 weeks	Within 1 week	Primary
12	PE-V0-463-167-A103	GA DRAWING OF SECONDARY HYDRO CYCLONE FEED TANK	4 weeks	Within 1 week	Primary
13	PE-V0-463-167-A104	GA DRAWING OF WASTE WATER TANK	4 weeks	Within 1 week	Primary
14	PE-V0-463-167-A105	GA DRAWING OF LIMESTONE SLURRY STORAGE TANKS	4 weeks	Within 1 week	Primary
15	PE-V0-463-167-A106	GA DRAWING OF AUXILIARY ABSORBENT TANK	4 weeks	Within 1 week	Primary
16	PE-V0-463-167-A107	GA DRAWING OF PROCESS WATER TANKS	4 weeks	Within 1 week	Primary
17	PE-V0-463-167-A108	GA DRAWING OF BELT FILTER WASH TANKS	4 weeks	Within 1 week	Primary
18	PE-V0-463-167-A109	GA DRAWING OF CAKE WASH (CLARIFIED WATER) TANK	4 weeks	Within 1 week	Primary
19	PE-V0-463-167-A110	GA DRAWING OF DRAIN PIT (TYP) FOR ABSORBER AREA, GYPSUM AREA AND LIMESTONE AREA	4 weeks	Within 1 week	Secondary
20	PE-V0-463-167-A201	DATASHEET & GA DRAWING OF RUBBER LINING FOR MISC. FGD TANKS	6 weeks	Within 1 week	Secondary
21	PE-V0-463-167-A202	DATASHEET & GA DRAWING OF GLASS FLAKE LINING FOR MISC. FGD TANKS	6 weeks	Within 1 week	Secondary
22	PE-V0-463-167-A203	DATASHEET FOR PIPES, FITTINGS, PLATES & STRUCTURE FOR MISC. FGD TANKS	6 weeks	Within 1 week	Secondary
23	PE-V0-463-167-A204	SURFACE PREPARATION AND RUBBER LINING PROCEDURES FOR MISC. FGD TANKS	7 weeks	Within 1 week	Secondary
24	PE-V0-463-167-A205	SURFACE PREPARATION AND GLASS FLAKE LINING PROCEDURES FOR MISC. FGD TANKS	7 weeks	Within 1 week	Secondary
25	PE-V0-463-167-A301	QAP OF RUBBER LINING FOR MISC. FGD TANKS	6 weeks	Within 1 week	Primary

	TITLE: 2X500MW NTPC SIPAT STPP, STAGE-II TECHNICAL SPECIFICATIONS FOR MISC. TANKS (SITE FABRICATED) AND AGITATORS	SPEC. NO.: PE-TS-491-167-A001 SECTION-I, SUB-SECTION- D, ANNEXURE-IV REV. NO.: 00 DATE NOV 2022

26	PE-V0-463-167-A302	QAP OF GLASS FLAKE LINING FOR MISC. FGD TANKS	6 weeks	Within 1 week	Primary
27	PE-V0-463-167-A303	QAP/CHECKLIST OF PIPES, FITTINGS, PLATES & STRUCTURE FOR MISC. FGD TANKS	6 weeks	Within 1 week	Secondary
28	PE-V0-463-167-A304	SUB VENDOR LIST WITH INSPECTION CATEGORY FOR MISC. FGD TANKS	3 weeks	Within 1 week	Primary
29	PE-V0-463-167-A401	FABRICATION DRAWINGS OF PRIMARY HYDRO CYCLONE FEED TANK	5 weeks	Within 1 week	Secondary
30	PE-V0-463-167-A402	FABRICATION DRAWINGS OF FILTERATE WATER TANK	5 weeks	Within 1 week	Secondary
31	PE-V0-463-167-A403	FABRICATION DRAWINGS OF SECONDARY HYDRO CYCLONE FEED TANK	5 weeks	Within 1 week	Secondary
32	PE-V0-463-167-A404	FABRICATION DRAWINGS OF WASTE WATER TANK	5 weeks	Within 1 week	Secondary
33	PE-V0-463-167-A405	FABRICATION DRAWINGS OF LIMESTONE SLURRY STORAGE TANKS	5 weeks	Within 1 week	Secondary
34	PE-V0-463-167-A406	FABRICATION DRAWINGS OF AUXILIARY ABSORBENT TANK	5 weeks	Within 1 week	Secondary
35	PE-V0-463-167-A407	FABRICATION DRAWINGS OF PROCESS WATER TANKS	5 weeks	Within 1 week	Secondary
36	PE-V0-463-167-A408	FABRICATION DRAWINGS OF BELT FILTER WASH TANKS	5 weeks	Within 1 week	Secondary
37	PE-V0-463-167-A409	FABRICATION DRAWINGS OF CAKE WASH (CLARIFIED WATER) TANK	5 weeks	Within 1 week	Secondary
38	PE-V0-463-167-A501	O&M MANUAL FOR RUBBER LINING OF MISC. FGD TANKS	8 weeks	Within 1 week	Secondary
39	PE-V0-463-167-A502	O&M MANUAL FOR GLASS FLAKE LINING OF MISC. FGD TANKS	8 weeks	Within 1 week	Secondary
40	PE-V0-463-167-A503	O&M MANUAL FOR MISC. FGD TANKS	8 weeks	Within 1 week	Secondary
41	PE-V0-491-571-A001	GA DRAWING, EXPLODED VIEW, SECTIONAL VIEW WITH MATERIAL OF CONSTRUCTION, MECHANICAL SEAL, GEARBOX	2 weeks	Within 1 week	Primary

		FOR ALL AGITATOR MODELS			
42	PE-V0-491-571-A002	DATA SHEET FOR ALL AGITATOR	2 weeks	Within 1 week	Primary
43	PE-V0-491-571-A003	AGITATOR PERFORMANCE CURVE OF ALL AGITATORS	2 weeks	Within 1 week	Primary
44	PE-V0-491-571-A004	ELECTRICAL MOTOR GA DRAWING & DATA SHEET AND PERFORMANCE CURVES OF ALL MOTORS	2 weeks	Within 1 week	Primary
45	PE-V0-491-571-A005	QUALITY PLAN & INSPECTION AND TEST PROCEDURE	2 weeks	Within 1 week	Primary
46	PE-V0-491-571-A006	AGITATOR AND MOTOR SIZING CALCULATION	2 weeks	Within 1 week	Primary
47	PE-V0-491-571-A007	O&M MANUAL FOR AGITATOR	4 weeks	Within 1 week	Secondary
48	PE-V0-491-571-A008	UTILITY CONSUMPTION	4 weeks	Within 1 week	Secondary
49	PE-V0-491-571-A009	FOUNDATION DATA INCLUDING ANCHOR PLAN	4 weeks	Within 1 week	Secondary
50	PE-V0-491-571-A010	LUBRICATING OIL LIST	4 weeks	Within 1 week	Secondary
51	PE-V0-491-571-A011	SPECIAL TOOLS LIST, START-UP & COMMISSIONING SPARES	4 weeks	Within 1 week	Secondary
52	PE-V0-491-571-A012	INSTALLATION AND ASSEMBLY PROCEDURE INCLUDING PRE-COMMISSIONING CHECK LIST	4 weeks	Within 1 week	Secondary

NOTE:

1. Bidder to note that BHEL reserves the right for drawing/document submission through web based Document Management System. Bidder would be provided access to the DMS for drawing/document approval and adequate training for the same. Detailed methodology would be finalized during the kick-off meeting. Bidder to ensure following at their end.
   - Internet explorer version – Minimum Internet Explorer 7.
   - Internet speed – 2 mbps (Minimum preferred).
   - Pop ups from our external DMS IP (124.124.36.198) should not be blocked.

	TITLE:	SPEC. NO.: PE-TS-491-167-A001
	2X500MW NTPC SIPAT STPP, STAGE-II TECHNICAL SPECIFICATIONS FOR MISC. TANKS (SITE FABRICATED) AND AGITATORS	SECTION-I, SUB-SECTION- D, ANNEXURE-IV
		REV. NO.: 00 DATE NOV 2022

•Vendor's internal proxy setting should not block DMS application's link (http://dmsserver.bhelpem.com/Wrench%20Web%20Access/Login.aspx.).

2. Any other drwgs/docs indicated else where in the specification shall be submitted by vendor for approval of BHEL/customer.

COMPANY SEAL

SIGNATURE: _____

NAME : _____

DESIGNATION: _____

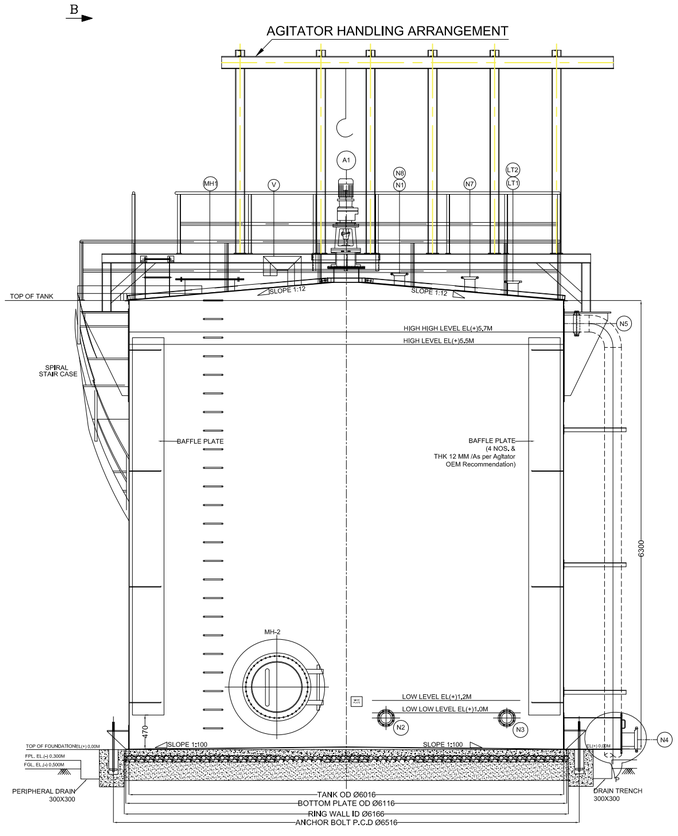
COMPANY: _____

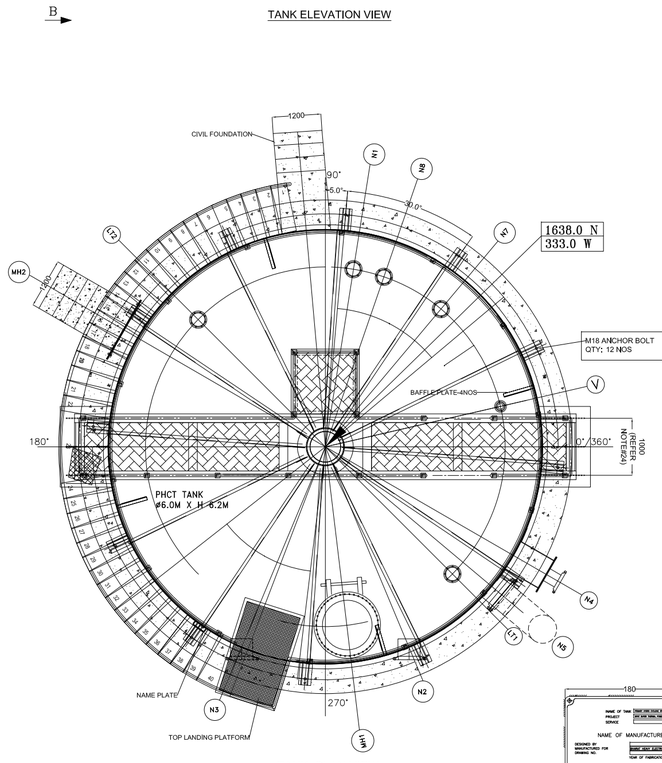
DATE: _____

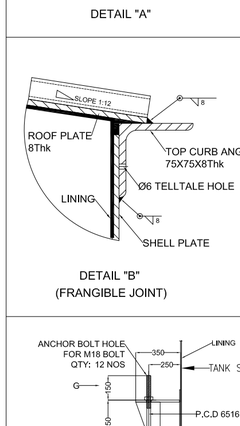
ANNEXURE-V

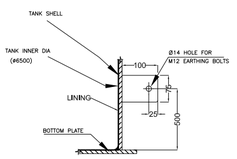
GA DRAWINGS OF MISC. FGD TANKS

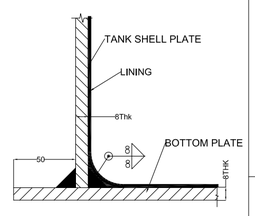
NORTH

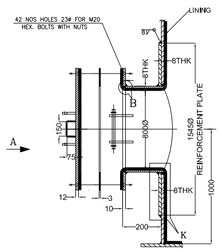


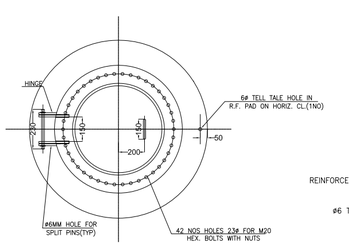


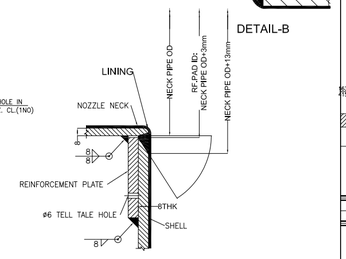


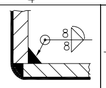


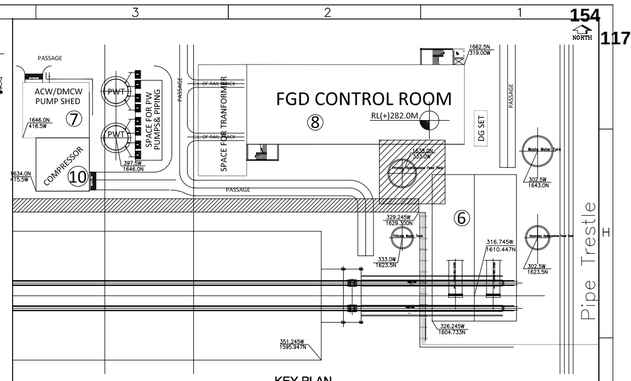


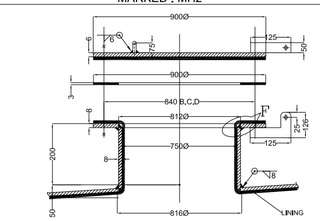


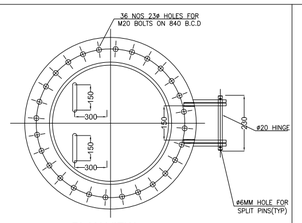


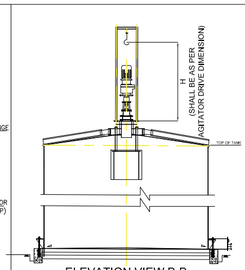


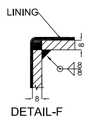


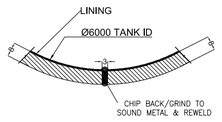


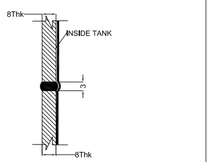


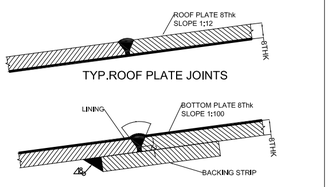


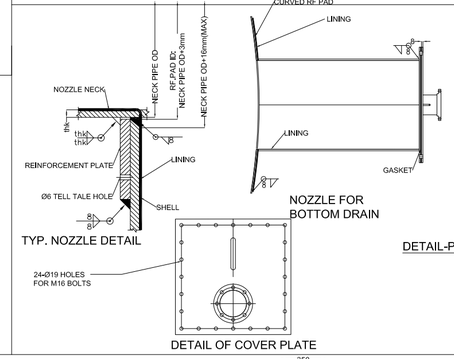


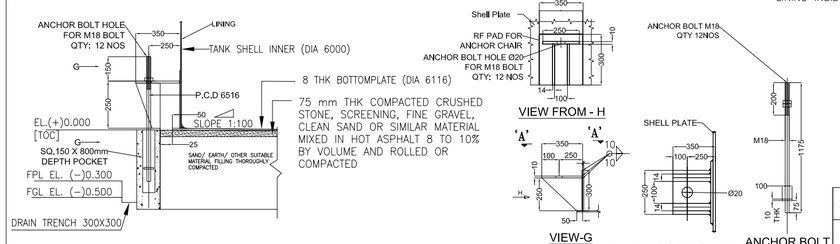


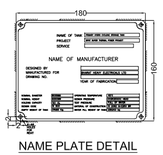


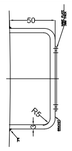












LOAD DETAILS FOR TANK CIVIL FOUNDATION

1.	TANK EMPTY WEIGHT	– 19682 Kgs
2.	TEST WEIGHT(FILLED TO TOP)	– 255243 Kgs
3.	OPERATING WEIGHT	– 245396 Kgs
4.	WIND MOMENT	– 221 KN–M
5.	RING WALL MOMENT	– 820 KN–M
6.	SEISMIC BASE SHEAR	– 38 KN/M
7.	WIND LOAD HORIZONTAL	– 73.0 KN

DESIGN DATA		
DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE CAPACITY	M^3	GYPSUM SLURRY
NOMINAL CAPACITY	M^3	175.0
MAXIMUM HOLDING CAPACITY	M^3	161.0
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	62
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1839–PART–1
NO. OF TANKS	NO.	01
DIAMETER (INSIDE DIAMETER)	MM	6000
HEIGHT (UP TO CURB ANGLE)	MM	6200
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	8
BOTTOM PLATE THICKNESS	MM	8
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	REPLACEABLE CHLOROBUTYL/ BROMOBUTYL RUBBER LINING OF MIN THICK 5 MM

MATERIAL SPECIFICATION	
ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE	150NB & BELOW – IS:1239(H), 200NB & ABOVE – IS:3589 Gr.410 ERW
PIPES	IS: 2062 GR. E250 BR
MANHOLE	VERTICAL CYLINDRICAL FIXED CONE ROOF
NOZZLE FLANGES	IS:2062 Gr.b (plate) SOFF ASME B16.5 CL:150 FOR 25NB TO 600NB IS:2062 Gr.b (plate) SOFF AWWA–C207 CL.D FOR 650NB TO 1800NB
HAND RAILING	IS: 1239 PART(1) MED.GR, PIPE (32NB) GALVANIZED TO IS:4736
GASKETS	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
BOLTING (NUTS & BOLTS)	IS: 1367 CLASS 4.6
STRUCTURALS	IS: 2062 GR.E 250 A
FITTINGS	500 NB AND BELOW BW A 234 –WPB,ASME–B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME–B16.9
STAIRWAY & PLATFORM	IS: 2062 GR. E250 A
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

SHELL NOZZLE SCHEDULE

NOZZLE			FLANGE		QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N2	200NB	SOFF	₱150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	200NB	SOFF	₱150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N4	150NB	SOFF	₱150	ASME B16.5	01	200	BOTTOM DRAIN
N5	350NB	SOFF	₱150	ASME B16.5	01	200	TANK OVERFLOW
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE

NOZZLE			FLANGE		QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N1	200NB	SOFF	₱150	ASME B16.5	01	200	INLET TO TANK
N7	125NB	SOFF	₱150	ASME B16.5	01	200	INLET TO TANK
N8	125NB	SOFF	₱150	ASME B16.5	01	200	INLET TO TANK
LT1	100NB	SOFF	₱150	ASME B16.5	01	200	LEVEL TRANSMITTER
LT2	100NB	SOFF	₱150	ASME B16.5	01	200	LEVEL TRANSMITTER
A1	450NB	SOFF	₱150	ASME B16.5	01	200	AGITATOR NOZZLE ON ROOF
V	100NB	SOFF	₱150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	750NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

PAINTING SPECIFICATION

S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDIATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED OF APPROVED SHADE AND COLOUR WITH GLOSSY FINISH. ADDTIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	VINYL ESTER BASED FLAKE GLASS LINING,3MM THK.	---	---
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK – 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							

NOTES:–

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED–OUT AFTER HYDRO ~TEST.
11. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
12. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER JOINT UNLESS ~SPECIFIED OTHERWISE. ALL WELD JOINTS TO BE ROUNDED OFF WHEREVER RUBBER LINING IS THERE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT REQUIREMENT.
14. ALL SHARP CORNERS TO BE ROUNDED OFF TO AVOID ANY DAMAGE OF RUBBER LINING
15. RAFTERS TO BE WELDED ON THE TOP OF ROOF FOR ENABLING RUBBER LINING INSIDE ROOF ~SURFACE.
16. ALL WELDING TO BE COMPLETED BEFORE STARTING THE RUBBER LINING.
17. NOZZLES AND STAIRCASE ORIENTATION AND ELEVATION & AGITATOR AND AGITATOR BRIDGE ~DETAILS IS INDICATIVE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
18. CIVIL STAIR CASES FOR THE MAIN STAIR CASE AND MANHOLE SHALL BE 'ON HOLD' AND SHALL BE FINALISED AFTER FINALIZATION OF NOZZLES AND STAIR CASE ORIENTATION.
19. MAXIMUM RELATIVE DEFLECTION ALLOWED SHALL BE 3–6 MM FOR AN AGITATOR BRIDGE OF TANK.
20. PAD PLATES ON TANK SURFACE FOR SUPPORTING OF THE SLURRY PIPES/CABLE TRAYS SHALL BE IN THE SCOPE OF BIDDER. THE DETAILS SHALL BE DECIDED DURING DETAIL ENGINEERING
21. SUPPLY, ERECTION & COMMISSIONING OF THE AGITATORS SHALL BE IN BIDDERS SCOPE. FOR DETAILS OF AGITATOR PLEASE REFER TECHNICAL SPECIFICATION. DESIGN SUPPLY AND ERECTION OF OF AGITATOR HANDLING ARRANGMENT STRUCTURES SHALL BE IN BIDDER'S SCOPE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
22. AGITATOR SHAFT LENGTH SHALL BE DECIDED DURING DETAILE ENGINEERING AFTER PROVISION OF SUITABLE FREE BOARD AND FINALIZING THE LOCATION OF THE AGITATOR PLATFORM BASED ON THE RECOMMENDATIONS OF AGITATOR OEM.
23. FINAL NOS., SIZE & THICKNESS OF THE BAFFLE PLATES SHALL BE AS PER AGITATOR OEM RECOMMENDATIONS.
24. THE MINIMUM WIDTH OF THE AGITATOR BRIDGE SHALL BE 1000MM. HOWEVER, FINAL WIDTH SHALL BE DECIDED DURING DETAIL ENGINEERING BASED ON THE AGITATOR DIMENSIONS.
25. THE DETAILS FURNISHED IN THE DRAWING ARE MINIMUM REQUIREMENTS. ALL DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE DESIGN CALCULATIONS SUBMITTED BY THE SUCCESSFUL BIDDER.

REFERENCE DRAWING NO		
S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE-V0-491-167-A107
2	LAYOUT OF FGD SYSTEM	PE-DG-491-100-M001

JOB NO. 491					
STATUS CONTRACT					
DISTRIBUTION					
TO					
No.OFF					
REV	DATE	ALTD	CHD	APPD	
0	15.11.22	AS	PKR	SK	

PROJECT: SIPAT SUPER THERMAL POWER PROJECT

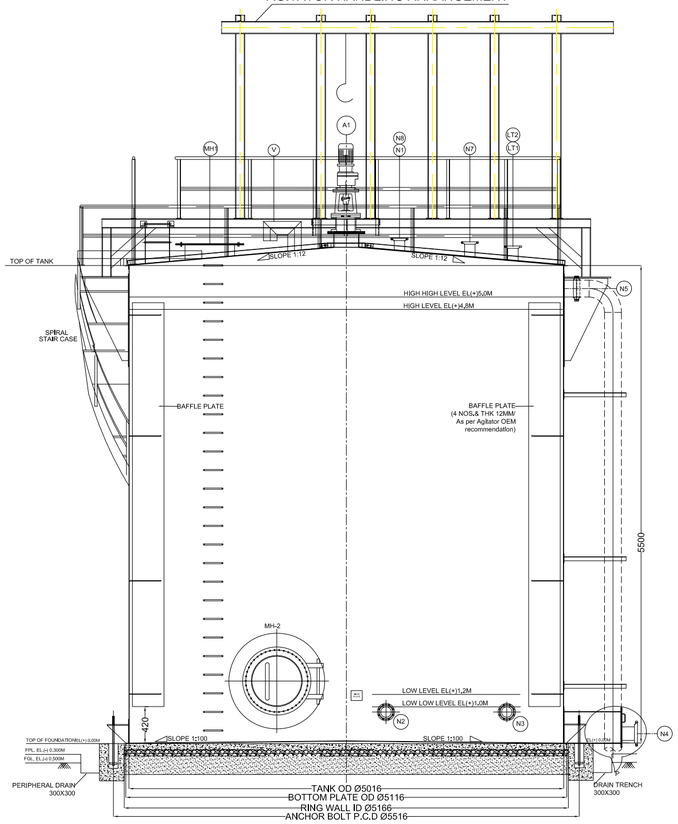
OWNER:
एन टी पी सी NTPC
NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

EPC CONTRACTOR:
भेल BHEL
BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NEW DELHI

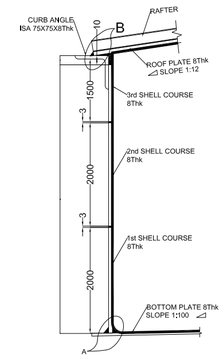
DATE 15.11.2022	TITLE: GA DRAWING FOR PRIMARY HYDRO CYCLONE FEED TANK		REV.
			0
SIZE A2	SCALE	BHEL DRG NO.: PE-V0-491-167-A107	0
		NTPC DRG NO.: --	0
DRN: YS		CHD: PK APPD: SR	SHEET 1 of 1

NORTH

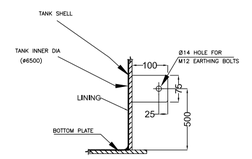
AGITATOR HANDLING ARRANGEMENT



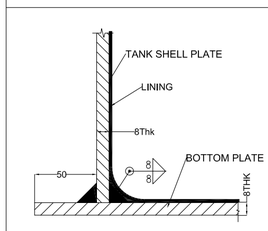
TANK ELEVATION VIEW



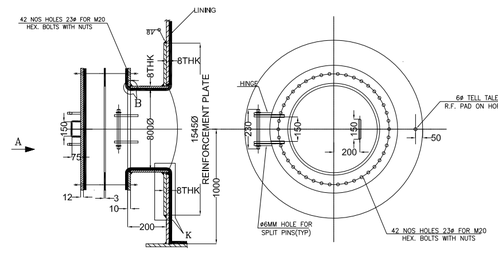
SHELL ARRANGEMENT FOR 1 TO 03 COURSE



EARTHING CLEAT

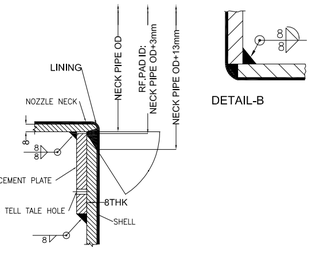


DETAIL "A"

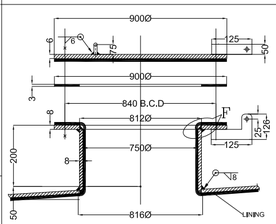


DETAIL OF SHELL MANHOLE MARKED : MH2

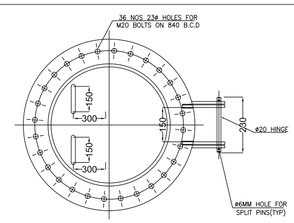
VIEW FROM-A



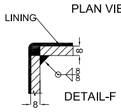
DETAIL-K
TYP. REINFORCEMENT DETAIL



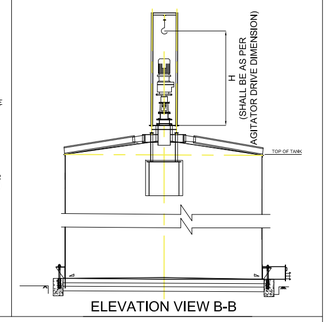
DETAIL OF ROOF MANHOLE MARKED : MH1



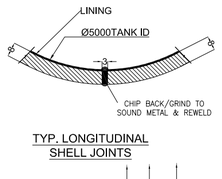
PLAN VIEW



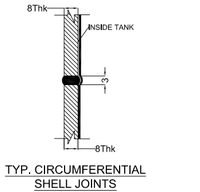
DETAIL-F



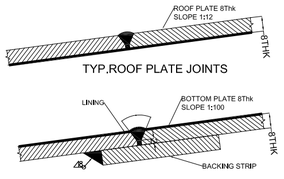
ELEVATION VIEW B-B



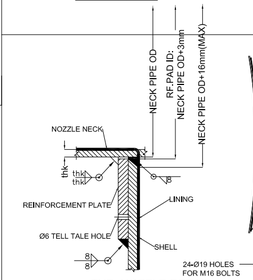
TYP. LONGITUDINAL SHELL JOINTS



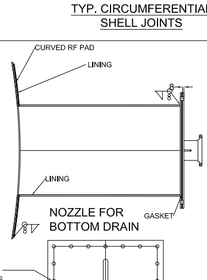
TYP. CIRCUMFERENTIAL SHELL JOINTS



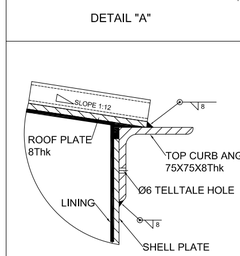
TYP.BOTTOM PLATE JOINTS



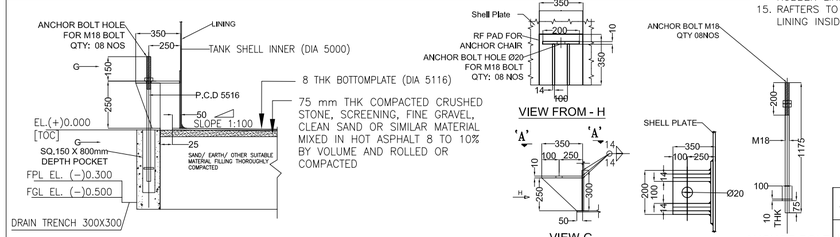
TYP. NOZZLE DETAIL



DETAIL-P
DETAIL OF COVER PLATE



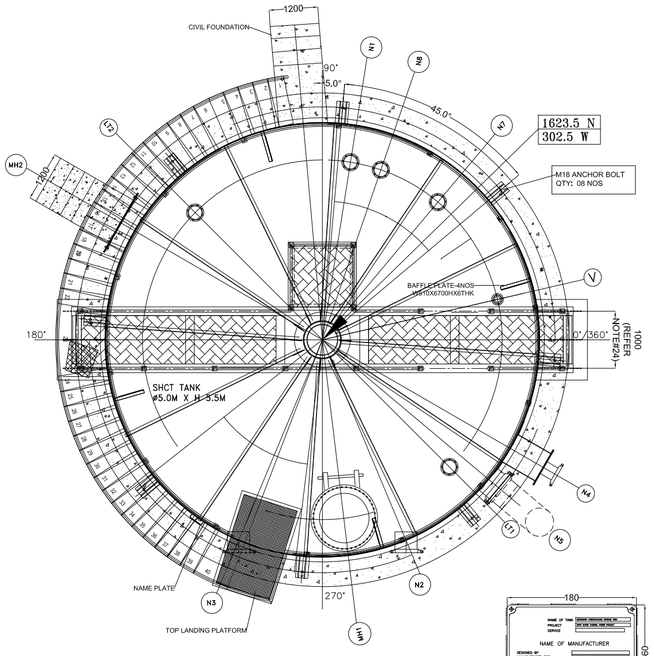
DETAIL "B" (FRANGIBLE JOINT)



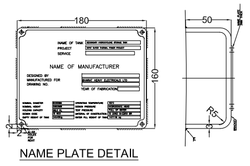
DETAIL D
ANCHOR CHAIR DETAILS

VIEW-G
ANCHOR CHAIR DETAILS

VIEW-'A-A'



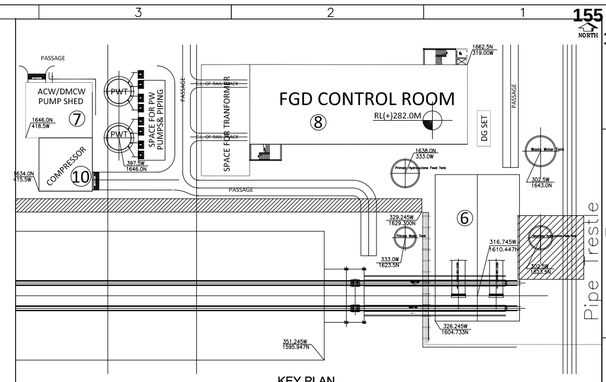
TANK- PLAN VIEW



NAME PLATE DETAIL

LOAD DETAILS FOR TANK CIVIL FOUNDATION	
1. TANK EMPTY WEIGHT	− 14149 Kgs
2. TEST WEIGHT(FILLED TO TOP)	− 147118 Kgs
3. OPERATING WEIGHT	− 140047 Kgs
4. WIND MOMENT	− 145 KN−M
5. RING WALL MOMENT	− 402 KN−M
6. SEISMIC BASE SHEAR	− 26 KN/M
7. WIND LOAD HORIZONTAL	− 54 KN

REFERENCE DRAWING NO		
S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE-V0-491-167-A108
2	LAYOUT OF FGD SYSTEM	PE-DG-491-100-M001



DESIGN DATA		
DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	--	GYPSUM SLURRY
NOMINAL CAPACITY	M^3	108.0
MAXIMUM HOLDING CAPACITY	M^3	98.0
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	62
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1839-PART-1
NO. OF TANKS	NO.	01
DIAMETER (INSIDE DIAMETER)	MM	5000
HEIGHT (UP TO CURB ANGLE)	MM	5500
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	8
BOTTOM PLATE THICKNESS	MM	8
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	VINYL ESTER BASED GLASS FLAKE LINING, THK. 3MM

MATERIAL SPECIFICATION	
ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE	150NB & BELOW − IS:1239(H), 200NB & ABOVE − IS:3589 Gr.410 ERW
PIPES	
MANHOLE	IS: 2062 GR. E250 BR
NOZZLE FLANGES	IS:2062 Gr.A (plate) SOFF ASME B16.5 CL.150 FOR 25NB TO 600NB IS:2062 Gr.A (plate) SOFF ANWA−C207 CL.D FOR 650NB TO 1800NB
HAND RAILING	IS: 1239 PART(1) MED.GR, PIPE (32NB) GALVANIZED TO IS:4736
GASKETS	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
BOLTING (NUTS & BOLTS)	IS: 1367 CLASS 4.6
STRUCTURALS	IS: 2062 GR.E 250 A
FITTINGS	500 NB AND BELOW BW A 234 −WPB,ASME−B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME−B16.9
STAIRWAY & PLATFORM	IS: 2062 GR. E250 A
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

SHELL NOZZLE SCHEDULE							
NOZZLE			FLANGE		QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N2	150NB	SOFF	₱150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	150NB	SOFF	₱150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N4	100NB	SOFF	₱150	ASME B16.5	01	200	BOTTOM DRAIN
N5	300NB	SOFF	₱150	ASME B16.5	01	200	TANK OVERFLOW
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE							
NOZZLE			FLANGE		QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N1	150NB	SOFF	₱150	ASME B16.5	01	200	INLET TO TANK
N7	250NB	SOFF	₱150	ASME B16.5	01	200	INLET TO TANK
N8	250NB	SOFF	₱150	ASME B16.5	01	200	INLET TO TANK
LT1	100NB	SOFF	₱150	ASME B16.5	01	200	LEVEL TRANSMITTER
LT2	100NB	SOFF	₱150	ASME B16.5	01	200	LEVEL TRANSMITTER
A1	450NB	SOFF	₱150	ASME B16.5	01	200	AGITATOR NOZZLE ON ROOF
V	100NB	SOFF	₱150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	750NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

PAINTING SPECIFICATION								
S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDIATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED OF APPROVED SHADE AND COLOUR WITH GLOSSY FINISH. ADDITIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT. OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	VINYL ESTER BASED FLAKE GLASS LINING,3MM THK.	---	---
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK − 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							

NOTES:−

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED−OUT AFTER HYDRO ~TEST.
11. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
12. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER JOINT UNLESS ~SPECIFIED OTHERWISE. ALL WELD JOINTS TO BE ROUNDED OFF WHEREVER RUBBER LINING IS THERE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT REQUIREMENT.
14. ALL SHARP CORNERS TO BE ROUNDED OFF TO AVOID ANY DAMAGE OF RUBBER LINING
15. RAFTERS TO BE WELDED ON THE TOP OF ROOF FOR ENABLING RUBBER LINING INSIDE ROOF ~SURFACE.
16. ALL WELDING TO BE COMPLETED BEFORE STARTING THE RUBBER LINING.
17. NOZZLES AND STAIRCASE ORIENTATION AND ELEVATION & AGITATOR AND AGITATOR BRIDGE ~DETAILS IS INDICATIVE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
18. CIVIL STAIR CASES FOR THE MAIN STAIR CASE AND MANHOLE SHALL BE 'ON HOLD' AND SHALL BE FINALISED AFTER FINALIZATION OF NOZZLES AND STAIR CASE ORIENTATION.
19. MAXIMUM RELATIVE DEFLECTION ALLOWED SHALL BE 3−6 MM FOR AN AGITATOR BRIDGE OF TANK.
20. PAD PLATES ON TANK SURFACE FOR SUPPORTING OF THE SLURRY PIPES/CABLE TRAYS SHALL BE IN THE SCOPE OF BIDDER. THE DETAILS SHALL BE DECIDED DURING DETAIL ENGINEERING
21. SUPPLY, ERECTION & COMMISSIONING OF THE AGITATORS SHALL BE IN BIDDERS SCOPE. FOR DETAILS OF AGITATOR PLEASE REFER TECHNICAL SPECIFICATION. DESIGN SUPPLY AND ERECTION OF OF AGITATOR HANDLING ARRANGMENT STRUCTURES SHALL BE IN BIDDER'S SCOPE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
22. AGITATOR SHAFT LENGTH SHALL BE DECIDED DURING DETAILE ENGINEERING AFTER PROVISION OF SUITABLE FREE BOARD AND FINALIZING THE LOCATION OF THE AGITATOR PLATFORM BASED ON THE RECOMMENDATIONS OF AGITATOR OEM.
23. FINAL NOS., SIZE & THICKNESS OF THE BAFFLE PLATES SHALL BE AS PER AGITATOR OEM RECOMMENDATIONS.
24. THE MINIMUM WIDTH OF THE AGITATOR BRIDGE SHALL BE 1000MM. HOWEVER, FINAL WIDTH SHALL BE DECIDED DURING DETAIL ENGINEERING BASED ON THE AGITATOR DIMENSIONS.
25. THE DETAILS FURNISHED IN THE DRAWING ARE MINIMUM REQUIREMENTS. ALL DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE DESIGN CALCULATIONS SUBMITTED BY THE SUCCESSFUL BIDDER.

PROJECT: SIPAT SUPER THERMAL POWER PROJECT

OWNER:

एन टी पी सी NTPC

NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

EPC CONTRACTOR:

भेल BHEL

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NEW DELHI

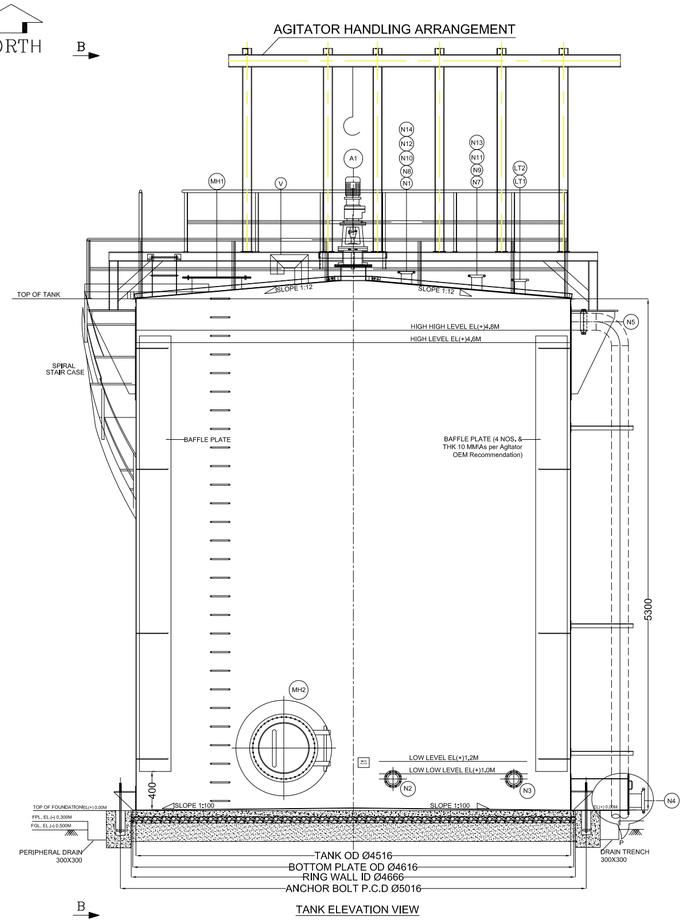
JOB NO. 491				
STATUS	CONTRACT			
DISTRIBUTION				
TO				
No.OFF				
REV	DATE	ALTD	CHD	APPD
0	15.11.22	AS	PKR	SK

DATE 15.11.2022	TITLE: GA DRAWING FOR SECONDARY HYDRO CYCLONE TANK	REV.
SIZE A2 / SCALE	BHEL DRG NO.: PE-V0-491-167-A108	O
	NTPC DRG NO.: --	O
DRN: YS	CHD: AS APPD: SR	SHEET 1 of 1

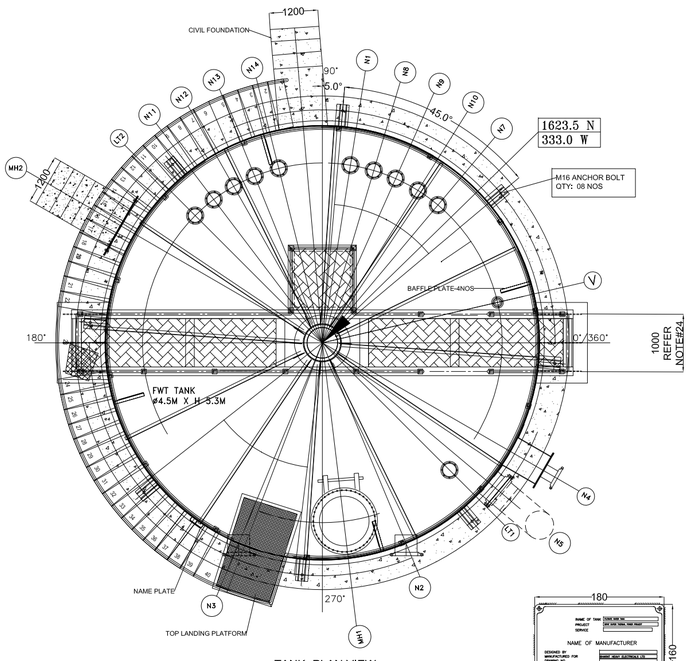
301

NORTH

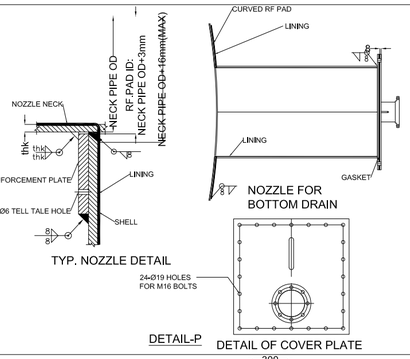
AGITATOR HANDLING ARRANGEMENT



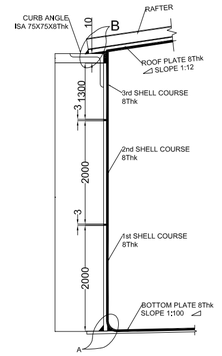
TANK ELEVATION VIEW



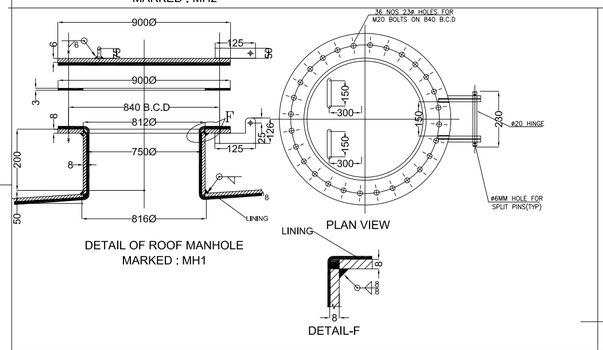
TANK- PLAN VIEW



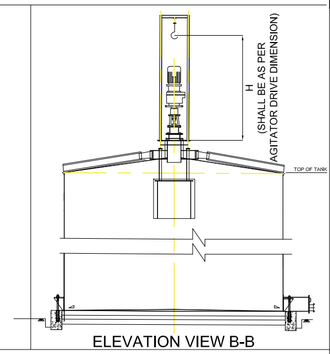
DETAIL OF SHELL MANHOLE MARKED : MH2 | VIEW FROM-A | DETAIL-K TYP. REINFORCEMENT DETAIL | DETAIL-B



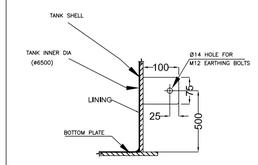
SHELL ARRANGEMENT FOR 1 TO 03 COURSE



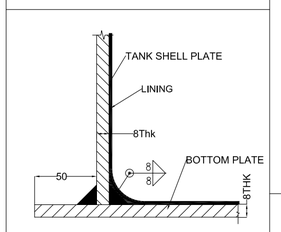
DETAIL OF ROOF MANHOLE MARKED : MH1 | PLAN VIEW | DETAIL-F



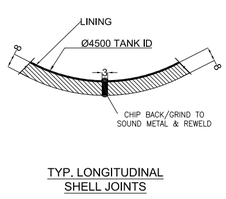
ELEVATION VIEW B-B



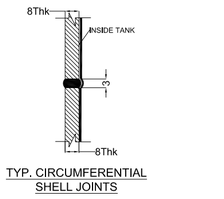
EARTHING CLEAT



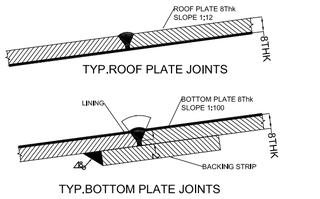
DETAIL "A"



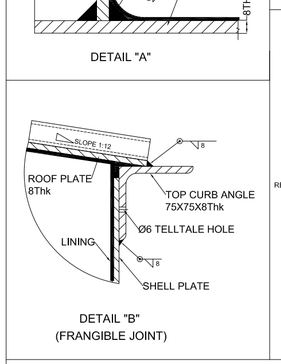
TYP. LONGITUDINAL SHELL JOINTS



TYP. CIRCUMFERENTIAL SHELL JOINTS

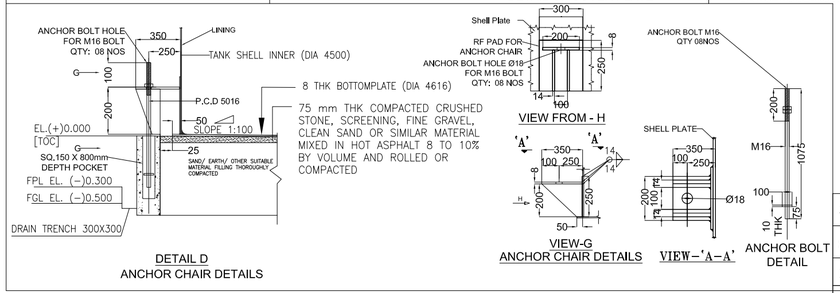


TYP.ROOF PLATE JOINTS | TYP.BOTTOM PLATE JOINTS

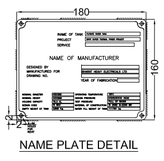


DETAIL "B" (FRANGIBLE JOINT)

TYP. NOZZLE DETAIL | NOZZLE FOR BOTTOM DRAIN | DETAIL-P | DETAIL OF COVER PLATE



DETAIL D ANCHOR CHAIR DETAILS



NAME PLATE DETAIL

LOAD DETAILS FOR TANK CIVIL FOUNDATION

1.	TANK EMPTY WEIGHT	– 11818 Kgs
2.	TEST WEIGHT(FILLED TO TOP)	– 111791 Kgs
3.	OPERATING WEIGHT	– 106002 Kgs
4.	WIND MOMENT	– 124 KN–M
5.	RING WALL MOMENT	– 318 KN–M
6.	SEISMIC BASE SHEAR	– 22.0 KN/M
7.	WIND LOAD HORIZONTAL	– 48.0 KN

REFERENCE DRAWING NO

S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE-V0-491-167-A109
2	LAYOUT OF FGD SYSTEM	PE-DG-491-100-M001

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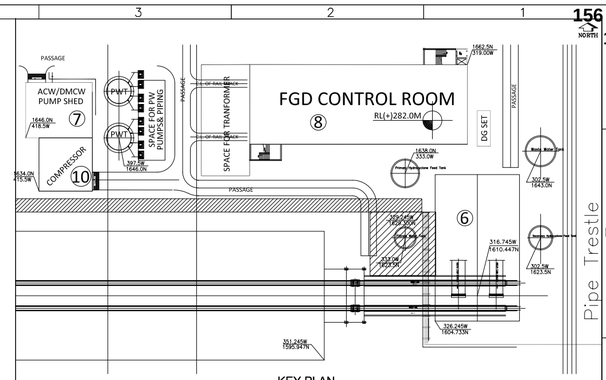

KEY PLAN

DESIGN DATA

DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	--	GYPSUM SLURRY
NOMINAL CAPACITY	M^3	84.0
MAXIMUM HOLDING CAPACITY	M^3	76.0
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	58
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1839-PART-1
NO. OF TANKS	NO.	01
DIAMETER (INSIDE DIAMETER)	MM	4500
HEIGHT (UP TO CURB ANGLE)	MM	5300
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	8
BOTTOM PLATE THICKNESS	MM	8
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	VINYL ESTER BASED GLASS FLAKE LINING, THK. 3MM

MATERIAL SPECIFICATION

ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE	150NB & BELOW – IS:1239(H), 200NB & ABOVE – IS:3589 Gr.410 ERW
PIPES	IS: 2062 GR. E250 BR
MANHOLE	IS:2062 Gr.b (plate) SOFF ASME B16.5 CL.150 FOR 25NB TO 600NB IS:2062 Gr.b (plate) SOFF ANWA–C207 CL.D FOR 650NB TO 1800NB
NOZZLE FLANGES	IS: 1239 PART(1) MED.GR. PIPE (32NB) GALVANIZED TO IS:4736
HAND RAILING	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
GASKETS	IS: 1367 CLASS 4.6
BOLTING (NUTS & BOLTS)	IS: 2062 GR.E 250 A
STRUCTURALS	500 NB AND BELOW BW A 234 –WPB,ASME–B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME–B16.9
FITTINGS	IS: 2062 GR. E250 A
STAIRWAY & PLATFORM	IS: 2062 GR. E250 BR
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

SHELL NOZZLE SCHEDULE

NOZZLE MARKED	NOZZLE SIZE	NOZZLE TYPE	FLANGE RATING	FLANGE STANDARD	QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
N2	200NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	200NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N4	100NB	SOFF	#150	ASME B16.5	01	200	BOTTOM DRAIN
N5	350NB	SOFF	#150	ASME B16.5	01	200	TANK OVERFLOW
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE

NOZZLE MARKED	NOZZLE SIZE	NOZZLE TYPE	FLANGE RATING	FLANGE STANDARD	QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
N1	200NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N7	100NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N8	150NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N9	150NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N10	200NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N11	200NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N12	80NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N13&14	150NB	SOFF	#150	ASME B16.5	02	200	INLET TO TANK
LT1&2	100NB	SOFF	#150	ASME B16.5	02	200	LEVEL TRANSMITTER
A1	450NB	SOFF	#150	ASME B16.5	01	200	AGITATOR NOZZLE ON ROOF
V	100NB	SOFF	#150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	800NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

PAINTING SPECIFICATION

S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDIATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED OF APPROVED SHADE AND COLOUR WITH GLOSSY FINISH. ADDITIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	VINYL ESTER BASED FLAKE GLASS LINING,3MM THK.	---	---
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK – 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							

NOTES:–

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED–OUT AFTER HYDRO ~TEST.
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JOB NO. 491					
STATUS	CONTRACT				
DISTRIBUTION					
TO					
No.OFF					
REV	DATE	ALTD	CHD	APPD	
0	15.11.22	AS	PKR	SK	

PROJECT: SIPAT SUPER THERMAL POWER PROJECT

OWNER:
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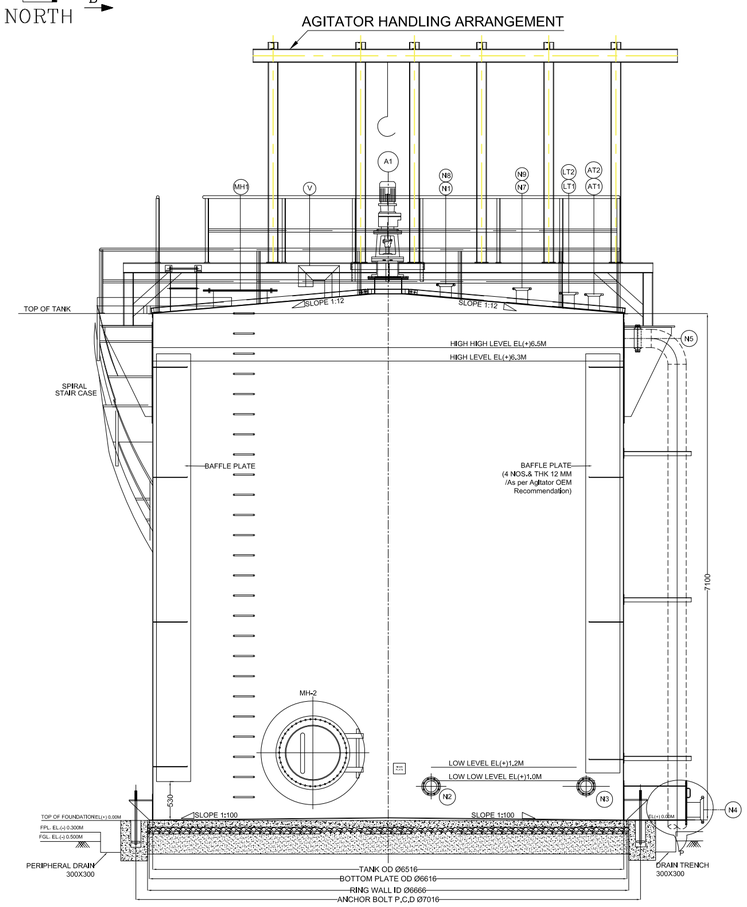
NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

EPC CONTRACTOR:
भेल BHEL
BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NEW DELHI

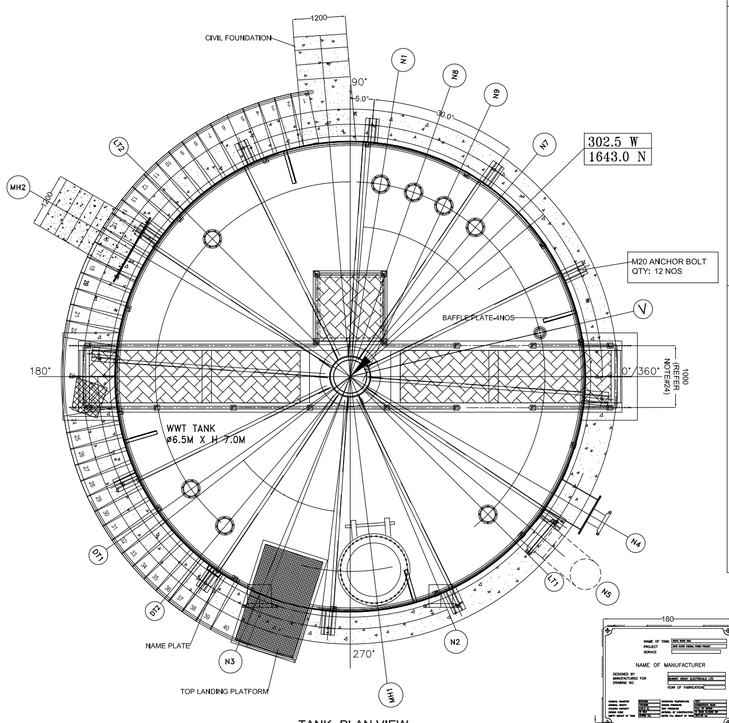
DATE 15.11.2022	TITLE: GA DRAWING FOR FILTERATE WATER TANK	REV.
		O
SIZE A2 / SCALE	BHEL DRG NO.: PE-V0-491-167-A109	O
	NTPC DRG NO.: --	O
DRN: YS	CHD: AS APPD: SR	SHEET 1 of 1

NORTH

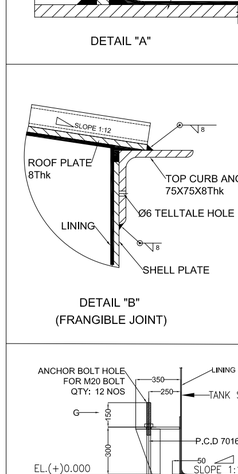
AGITATOR HANDLING ARRANGEMENT



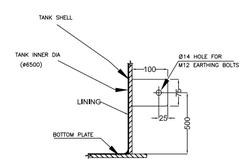
TANK ELEVATION VIEW



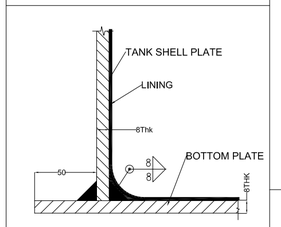
TANK- PLAN VIEW



SHELL ARRANGEMENT FOR 1 TO 04 COURSE

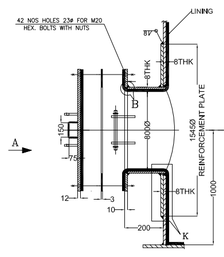


EARTHING CLEAT



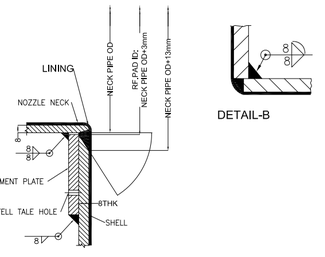
DETAIL "A"

DETAIL "B" (FRANGIBLE JOINT)

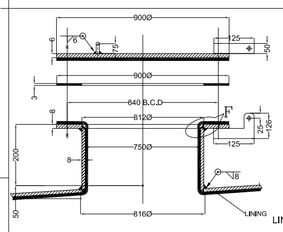


DETAIL OF SHELL MANHOLE MARKED : MH2

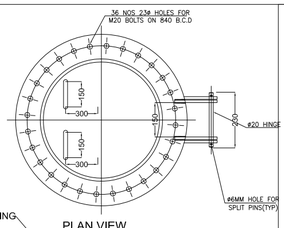
VIEW FROM-A



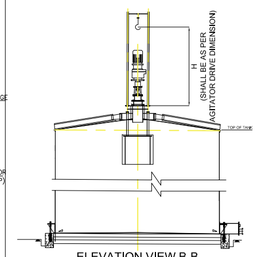
DETAIL-K
TYP. REINFORCEMENT DETAIL



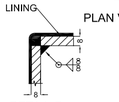
DETAIL OF ROOF MANHOLE MARKED : MH1



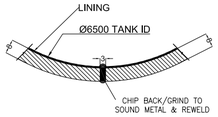
PLAN VIEW



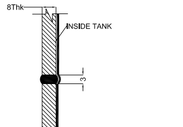
ELEVATION VIEW B-B



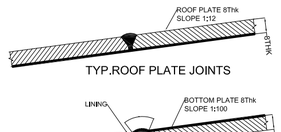
DETAIL-F

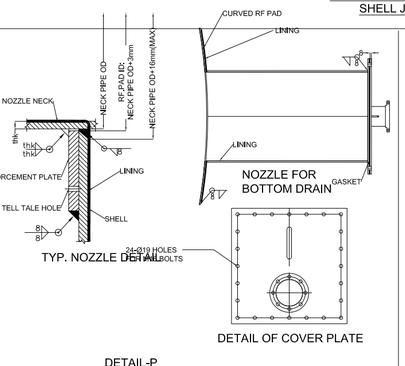


TYP. LONGITUDINAL SHELL JOINTS

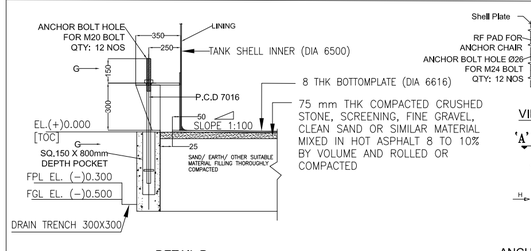


TYP. CIRCUMFERENTIAL SHELL JOINTS

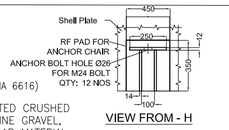




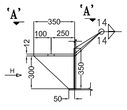
DETAIL-P



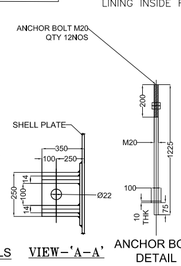
DETAIL D
ANCHOR CHAIR DETAILS



VIEW FROM - H



VIEW-G
ANCHOR CHAIR DETAILS



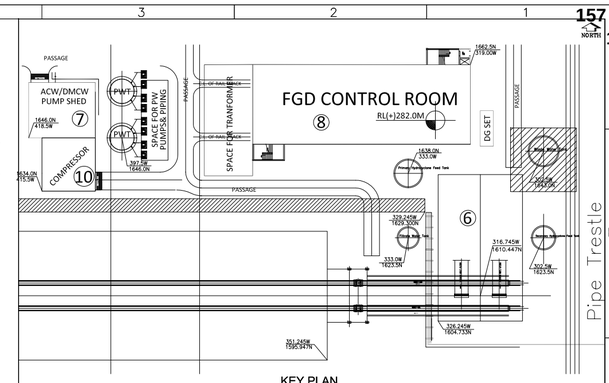
VIEW-'A-A'

ANCHOR BOLT DETAIL

NAME PLATE DETAIL

LOAD DETAILS FOR TANK CIVIL FOUNDATION

1.	TANK EMPTY WEIGHT	– 23506 Kgs
2.	TEST WEIGHT(FILLED TO TOP)	– 286344 Kgs
3.	OPERATING WEIGHT	– 274624 Kgs
4.	WIND MOMENT	– 306 KN–M
5.	RING WALL MOMENT	– 1079 KN–M
6.	SEISMIC BASE SHEAR	– 40 KN/M
7.	WIND LOAD HORIZONTAL	– 89.0 KN



KEY PLAN

DESIGN DATA		
DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	--	GYPSUM SLURRY
NOMINAL CAPACITY	M^3	232.0
MAXIMUM HOLDING CAPACITY	M^3	216.0
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	62
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1839-PART-1
NO. OF TANKS	NO.	01
DIAMETER (INSIDE DIAMETER)	MM	6500
HEIGHT (UP TO CURB ANGLE)	MM	7000
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	8
BOTTOM PLATE THICKNESS	MM	8
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	VINYL ESTER BASED GLASS FLAKE LINING, THK. 3MM

MATERIAL SPECIFICATION	
ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE	150NB & BELOW – IS:1239(H), 200NB & ABOVE – IS:3589 Gr.410 ERW
PIPES	IS: 2062 GR. E250 BR
MANHOLE	IS: 2062 GR. E250 BR
NOZZLE FLANGES	IS:2062 Gr.A (plate) SOFF ASME B16.5 CL.150 FOR 25NB TO 600NB IS:2062 Gr.A (plate) SOFF ANWA–C207 CL.D FOR 650NB TO 1800NB
HAND RAILING	IS: 1239 PART(1) MED.GR, PIPE (32NB) GALVANIZED TO IS:4736
GASKETS	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
BOLTING (NUTS & BOLTS)	IS: 1367 CLASS 4.6
STRUCTURALS	IS: 2062 GR.E 250 A
FITTINGS	500 NB AND BELOW BW A 234 –WPB,ASME–B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME–B16.9
STAIRWAY & PLATFORM	IS: 2062 GR. E250 A
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

SHELL NOZZLE SCHEDULE

NOZZLE			FLANGE		QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N2	125NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	125NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N4	200NB	SOFF	#150	ASME B16.5	01	200	BOTTOM DRAIN
N5	200NB	SOFF	#150	ASME B16.5	01	200	TANK OVERFLOW
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE

NOZZLE			FLANGE		QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N1	100NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N7	80NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N8	200NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N9	200NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
LT1&2	100NB	SOFF	#150	ASME B16.5	02	200	LEVEL TRANSMITTER
AT1&2	80NB	SOFF	#150	ASME B16.5	02	200	AIR TRAP
A1	450NB	SOFF	#150	ASME B16.5	01	200	AGITATOR NOZZLE ON ROOF
V	100NB	SOFF	#150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	750NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

PAINTING SPECIFICATION

S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDIATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED OF APPROVED SHADE AND COLOUR WITH GLOSSY FINISH. ADDITIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	VINYL ESTER BASED FLAKE GLASS LINING,3MM THK.	---	---
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK – 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							

NOTES:–

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED–OUT AFTER HYDRO ~TEST.
11. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
12. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER JOINT UNLESS ~SPECIFIED OTHERWISE. ALL WELD JOINTS TO BE ROUNDED OFF WHEREVER RUBBER LINING IS THERE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT REQUIREMENT.
14. ALL SHARP CORNERS TO BE ROUNDED OFF TO AVOID ANY DAMAGE OF RUBBER LINING
15. RAFTERS TO BE WELDED ON THE TOP OF ROOF FOR ENABLING RUBBER LINING INSIDE ROOF ~SURFACE.
16. ALL WELDING TO BE COMPLETED BEFORE STARTING THE RUBBER LINING.
17. NOZZLES AND STAIRCASE ORIENTATION AND ELEVATION & AGITATOR AND AGITATOR BRIDGE ~DETAILS IS INDICATIVE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
18. CIVIL STAIR CASES FOR THE MAIN STAIR CASE AND MANHOLE SHALL BE 'ON HOLD' AND SHALL BE FINALISED AFTER FINALIZATION OF NOZZLES AND STAIR CASE ORIENTATION.
19. MAXIMUM RELATIVE DEFLECTION ALLOWED SHALL BE 3–6 MM FOR AN AGITATOR BRIDGE OF TANK.
20. PAD PLATES ON TANK SURFACE FOR SUPPORTING OF THE SLURRY PIPES/CABLE TRAYS SHALL BE IN THE SCOPE OF BIDDER. THE DETAILS SHALL BE DECIDED DURING DETAIL ENGINEERING
21. SUPPLY, ERECTION & COMMISSIONING OF THE AGITATORS SHALL BE IN BIDDERS SCOPE. FOR DETAILS OF AGITATOR PLEASE REFER TECHNICAL SPECIFICATION. DESIGN SUPPLY AND ERECTION OF OF AGITATOR HANDLING ARRANGMENT STRUCTURES SHALL BE IN BIDDER'S SCOPE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
22. AGITATOR SHAFT LENGTH SHALL BE DECIDED DURING DETAILE ENGINEERING AFTER PROVISION OF SUITABLE FREE BOARD AND FINALIZING THE LOCATION OF THE AGITATOR PLATFORM BASED ON THE RECOMMENDATIONS OF AGITATOR OEM.
23. FINAL NOS., SIZE & THICKNESS OF THE BAFFLE PLATES SHALL BE AS PER AGITATOR OEM RECOMMENDATIONS.
24. THE MINIMUM WIDTH OF THE AGITATOR BRIDGE SHALL BE 1000MM. HOWEVER, FINAL WIDTH SHALL BE DECIDED DURING DETAIL ENGINEERING BASED ON THE AGITATOR DIMENSIONS.
25. THE DETAILS FURNISHED IN THE DRAWING ARE MINIMUM REQUIREMENTS. ALL DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE DESIGN CALCULATIONS SUBMITTED BY THE SUCCESSFUL BIDDER.

REFERENCE DRAWING NO		
S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE-V0-491-167-A106
2	LAYOUT OF FGD SYSTEM	PE-DG-491-100-M001

303

JOB NO. 491					
STATUS	CONTRACT				
DISTRIBUTION					
TO					
No.OFF					
REV	DATE	ALTD	CHD	APPD	
0	15.11.22	AS	PKR	SK	

PROJECT: SIPAT SUPER THERMAL POWER PROJECT

OWNER:

एन टी पी सी NTPC

NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

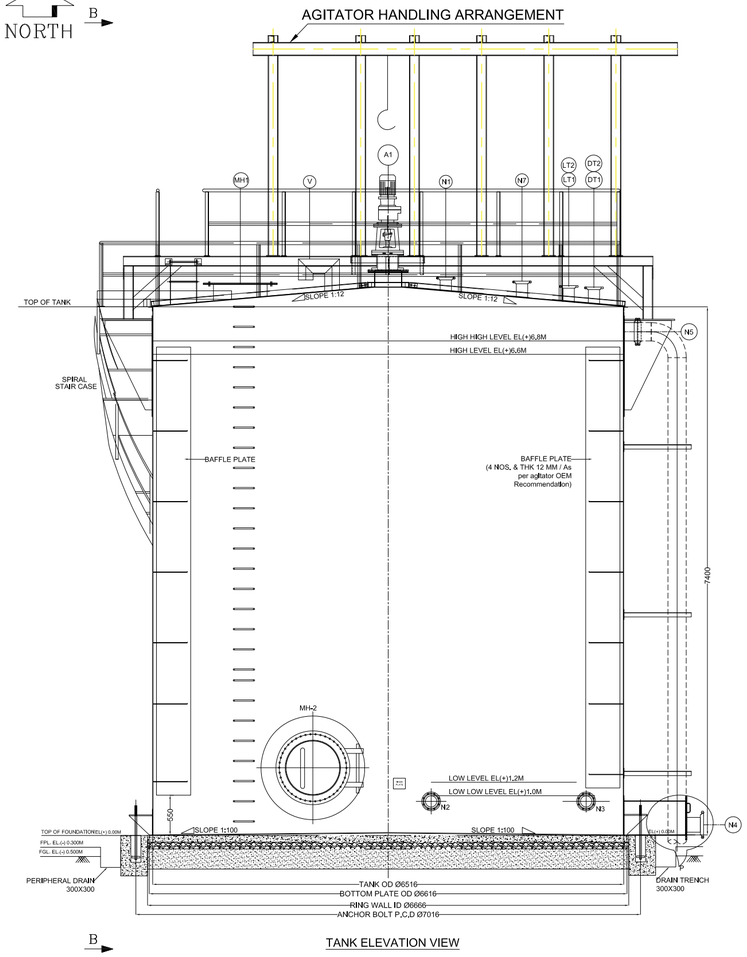
EPC CONTRACTOR:

BHEL

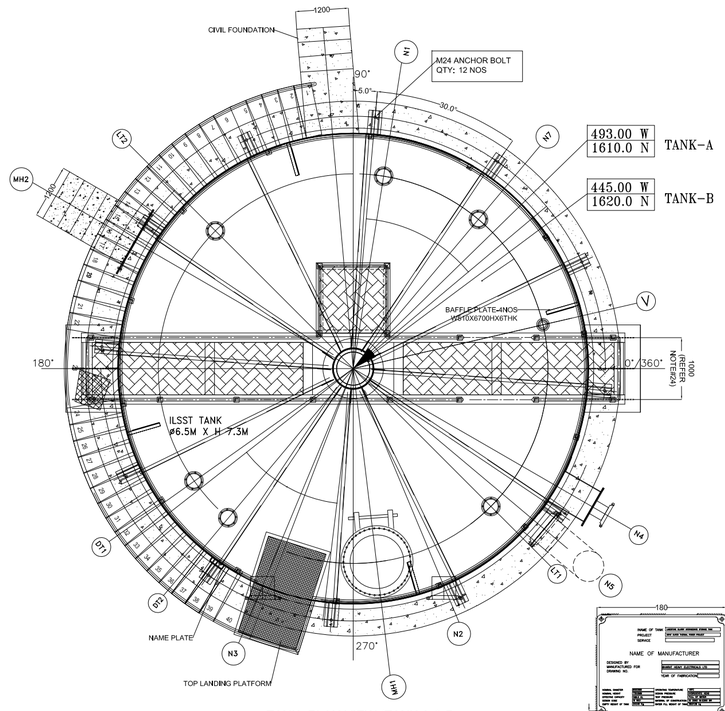
BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DATE 15.11.2022	TITLE: GA DRAWING FOR WASTE WATER TANK	REV.
SIZE A2 / SCALE		0
	BHEL DRG NO.: PE-V0-491-167-A106	0
	NTPC DRG NO.: --	0
DRN: YS	CHD: AS APPD: SR	SHEET 1 of 1

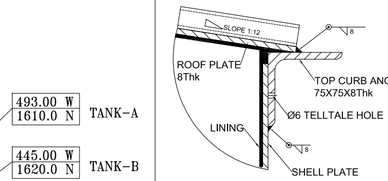
AGITATOR HANDLING ARRANGEMENT



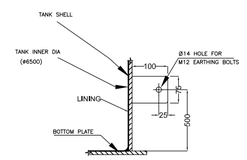
TANK ELEVATION VIEW



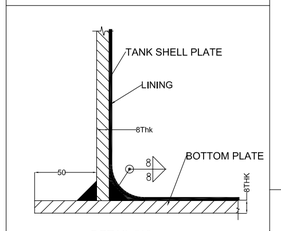
TANK- PLAN VIEW (TANK A & B)



SHELL ARRANGEMENT FOR 1 TO 04 COURSE

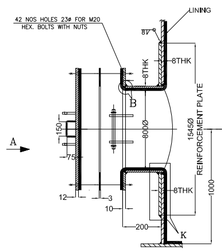


EARTHING CLEAT

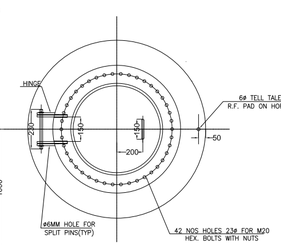


DETAIL "A"

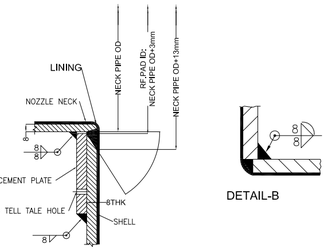
DETAIL "B" (FRANGIBLE JOINT)



DETAIL OF SHELL MANHOLE MARKED : MH2

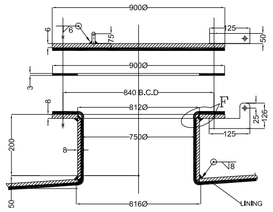


VIEW FROM-A

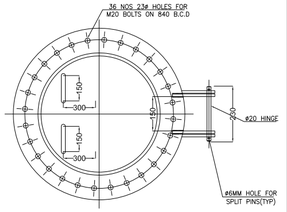


DETAIL-K TYP. REINFORCEMENT DETAIL

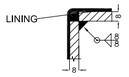
DETAIL-B



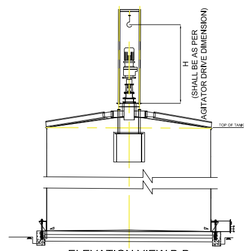
DETAIL OF ROOF MANHOLE MARKED : MH1



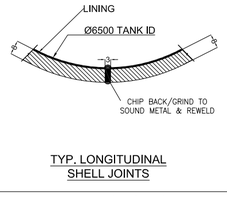
PLAN VIEW



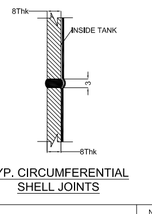
DETAIL-F



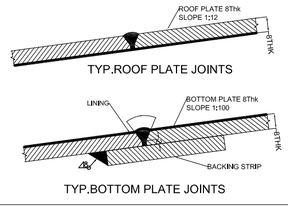
ELEVATION VIEW B-B



TYP. LONGITUDINAL SHELL JOINTS

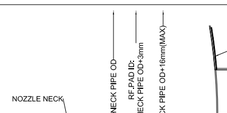


TYP. CIRCUMFERENTIAL SHELL JOINTS

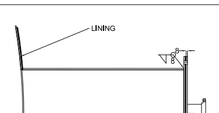


TYP.ROOF PLATE JOINTS

TYP.BOTTOM PLATE JOINTS



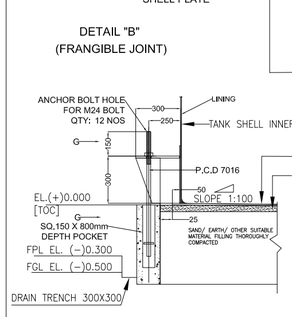
TYP. NOZZLE DETAIL



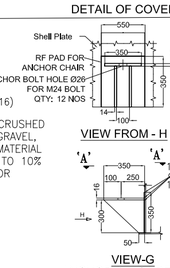
NOZZLE FOR BOTTOM DRAIN

DETAIL-P

DETAIL OF COVER PLATE

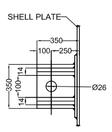


DETAIL D ANCHOR CHAIR DETAILS



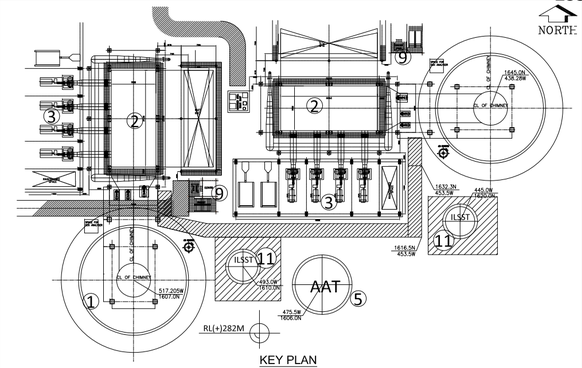
VIEW FROM - H

VIEW-G ANCHOR CHAIR DETAILS



VIEW-'A-A'

ANCHOR BOLT DETAIL



KEY PLAN

DESIGN DATA		
DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	--	LIMESTONE SLURRY
NOMINAL CAPACITY	M^3	242
EFFECTIVE CAPACITY	M^3	226
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	45
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1839-PART-1
NO. OF TANKS	NO.	02
DIAMETER (INSIDE DIAMETER)	MM	6500
HEIGHT (UP TO CURB ANGLE)	MM	7300
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	8
BOTTOM PLATE THICKNESS	MM	8
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	REPLACEABLE CHLOROBUTYL/BROMOBUTYL RUBBER LINING OF MIN. 5MM THK.

MATERIAL SPECIFICATION	
ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE	150NB & BELOW – IS:1239(H), 200NB & ABOVE – IS:3589 Gr.410 ERW
PIPES	IS: 2062 GR. E250 BR
MANHOLE	IS: 2062 GR. E250 BR
NOZZLE FLANGES	IS:2062 Gr.b (plate) SOFF ASME B16.5 CL.150 FOR 25NB TO 600NB IS:2062 Gr.b (plate) SOFF AWWA-C207 CL.D FOR 650NB TO 1800NB
HAND RAILING	IS: 1239 PART(1) MED.GR, PIPE (32NB) GALVANIZED TO IS:4736
GASKETS	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
BOLTING (NUTS & BOLTS)	IS: 1367 CLASS 4.6
STRUCTURALS	IS: 2062 GR.E 250 A
FITTINGS	500 NB AND BELOW BW A 234 –WPB,ASME–B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME–B16.9
STAIRWAY & PLATFORM	IS: 2062 GR. E250 A
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

SHELL NOZZLE SCHEDULE

NOZZLE MARKED	SIZE	TYPE	FLANGE RATING	FLANGE STANDARD	QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
N2	100NB	SOFF	₹150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	100NB	SOFF	₹150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N4	200NB	SOFF	₹150	ASME B16.5	01	200	BOTTOM DRAIN
N5	200NB	SOFF	₹150	ASME B16.5	01	200	TANK OVERFLOW
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE

NOZZLE MARKED	SIZE	TYPE	FLANGE RATING	FLANGE STANDARD	QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
N1	150NB	SOFF	₹150	ASME B16.5	01	200	INLET TO TANK
N7	100NB	SOFF	₹150	ASME B16.5	01	200	INLET TO TANK
LT1&2	100NB	SOFF	₹150	ASME B16.5	02	200	LEVEL TRANSMITTER
DT1&2	80NB	SOFF	₹150	ASME B16.5	02	200	DENSITY TRANSMITTER
A1	450NB	SOFF	₹150	ASME B16.5	01	200	AGITATOR NOZZLE ON ROOF
V	100NB	SOFF	₹150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	750NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

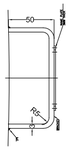
PAINTING SPECIFICATION

S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED OF APPROVED SHADE AND COLOUR WITH GLOSSY FINISH. ADDITIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT. OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	REPLACEABLE CHLOROBUTYL/BROMOBUTYL RUBBER LINING OF MIN. 5MM THK.	---	120
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK – 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							

NOTES:–

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED–OUT AFTER HYDRO ~TEST.
11. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
12. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER JOINT UNLESS ~SPECIFIED OTHERWISE. ALL WELD JOINTS TO BE ROUNDED OFF WHEREVER RUBBER LINING IS THERE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT REQUIREMENT.
14. ALL SHARP CORNERS TO BE ROUNDED OFF TO AVOID ANY DAMAGE OF RUBBER LINING
15. RAFTERS TO BE WELDED ON THE TOP OF ROOF FOR ENABLING RUBBER LINING INSIDE ROOF ~SURFACE.
16. ALL WELDING TO BE COMPLETED BEFORE STARTING THE RUBBER LINING.
17. NOZZLES AND STAIRCASE ORIENTATION AND ELEVATION & AGITATOR AND AGITATOR BRIDGE ~DETAILS IS INDICATIVE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
18. CIVIL STAIR CASES FOR THE MAIN STAIR CASE AND MANHOLE SHALL BE 'ON HOLD' AND SHALL BE FINALISED AFTER FINALIZATION OF NOZZLES AND STAIR CASE ORIENTATION.
19. MAXIMUM RELATIVE DEFLECTION ALLOWED SHALL BE 3–6 MM FOR AN AGITATOR BRIDGE OF TANK.
20. PAD PLATES ON TANK SURFACE FOR SUPPORTING OF THE SLURRY PIPES/CABLE TRAYS SHALL BE IN THE SCOPE OF BIDDER. THE DETAILS SHALL BE DECIDED DURING DETAIL ENGINEERING
21. SUPPLY, ERECTION & COMMISSIONING OF THE AGITATORS SHALL BE IN BIDDERS SCOPE. FOR DETAILS OF AGITATOR PLEASE REFER TECHNICAL SPECIFICATION. DESIGN SUPPLY AND ERECTION OF OF AGITATOR HANDLING ARRANGMENT STRUCTURES SHALL BE IN BIDDER'S SCOPE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
22. AGITATOR SHAFT LENGTH SHALL BE DECIDED DURING DETAILE ENGINEERING AFTER PROVISION OF SUITABLE FREE BOARD AND FINALIZING THE LOCATION OF THE AGITATOR PLATFORM BASED ON THE RECOMMENDATIONS OF AGITATOR OEM.
23. FINAL NOS., SIZE & THICKNESS OF THE BAFFLE PLATES SHALL BE AS PER AGITATOR OEM RECOMMENDATIONS.
24. THE MINIMUM WIDTH OF THE AGITATOR BRIDGE SHALL BE 1000MM. HOWEVER, FINAL WIDTH SHALL BE DECIDED DURING DETAIL ENGINEERING BASED ON THE AGITATOR DIMENSIONS.
25. THE DETAILS FURNISHED IN THE DRAWING ARE MINIMUM REQUIREMENTS. ALL DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE DESIGN CALCULATIONS SUBMITTED BY THE SUCCESSFUL BIDDER.

NAME PLATE DETAIL



LOAD DETAILS FOR TANK CIVIL FOUNDATION

1.	TANK EMPTY WEIGHT	– 24140 Kgs
2.	TEST WEIGHT(FILLED TO TOP)	– 350139 Kgs
3.	OPERATING WEIGHT	– 338102 Kgs
4.	WIND MOMENT	– 335 KN–M
5.	RING WALL MOMENT	– 1414.21 KN–M
6.	SEISMIC BASE SHEAR	– 49 KN/M
7.	WIND LOAD HORIZONTAL	– 93.0 KN

REFERENCE DRAWING NO		
S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE-V0-491-167-A105
2	LAYOUT OF FGD SYSTEM	PE-DG-491-100-M001

304

JOB NO. 491				
STATUS	CONTRACT			
DISTRIBUTION				
TO				
No.OFF				
REV	DATE	ALTD	CHD	APPD
0	15.11.22	AS	PKR	SK

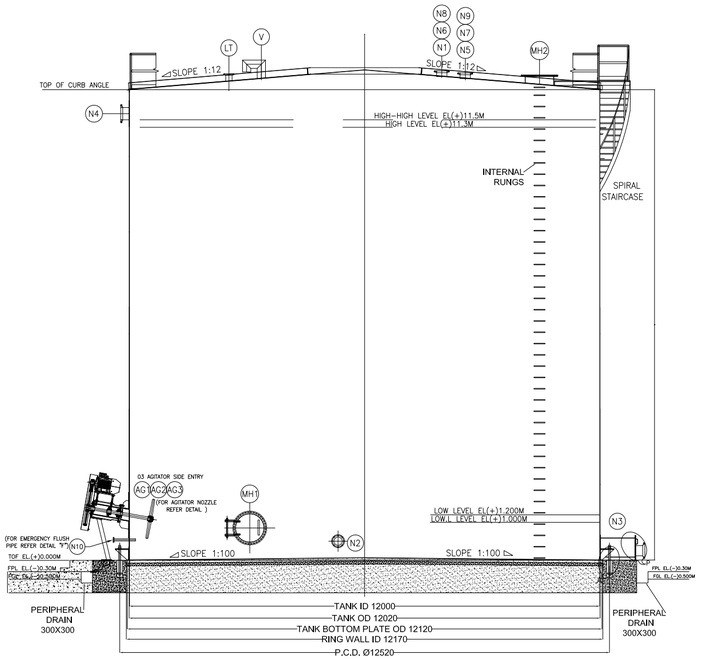
PROJECT: SIPAT SUPER THERMAL POWER PROJECT

OWNER: एन टी पी सी NTPC — NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE)

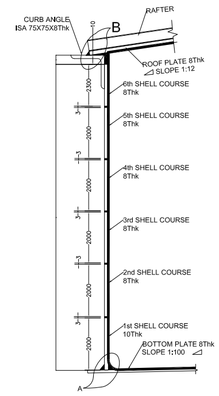
EPC CONTRACTOR: BHEL — BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR PROJECT ENGINEERING MANAGEMENT, NEW DELHI

DATE 15.11.2022	TITLE: GA DRAWING FOR LIMESTONE SLURRY INTERMEDIATE STORAGE TANK	REV.
		0
SIZE A2 / SCALE	BHEL DRG NO.: PE-V0-491-167-A105	0
	NTPC DRG NO.: --	0
DRN: AS	CHD: PK APPD: SR	SHEET 1 of 1

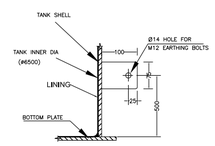
NORTH



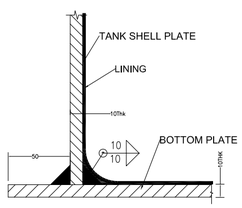
ELEVATION VIEW



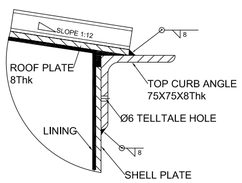
SHELL ARRANGEMENT FOR 1 TO 06 COURSE (TANK HEIGHT 12.3)



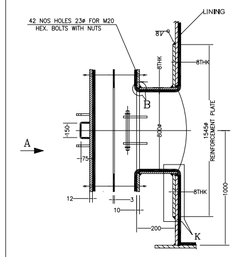
EARTHING CLEAT



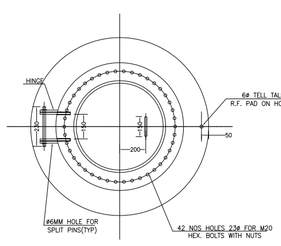
DETAIL "A"



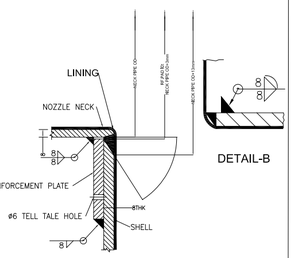
DETAIL "B" (FRANGIBLE JOINT)



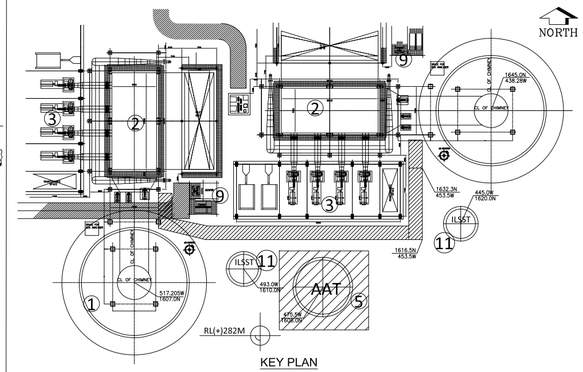
DETAIL OF SHELL MANHOLE MARKED : MH2



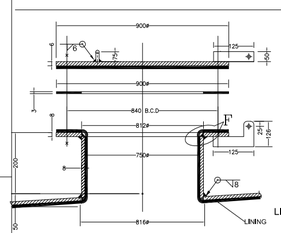
VIEW FROM-A



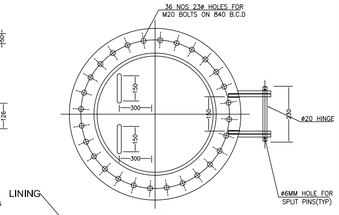
DETAIL-K
TYP. REINFORCEMENT DETAIL



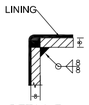
KEY PLAN

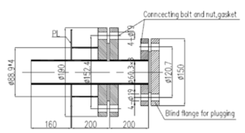


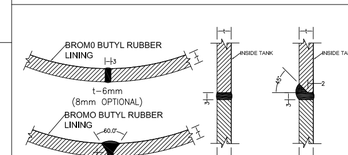
DETAIL OF ROOF MANHOLE MARKED : MH1

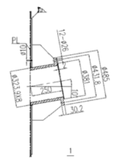


PLAN VIEW

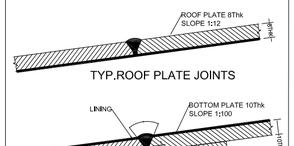








NOZZLE DETAIL FOR AGITATOR



TYP. NOZZLE DETAIL

DETAIL-P

NOTES:–

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED–OUT AFTER HYDRO ~TEST.
11. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
12. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER JOINT UNLESS ~SPECIFIED OTHERWISE. ALL WELD JOINTS TO BE ROUNDED OFF WHEREVER RUBBER LINING IS THERE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT REQUIREMENT.
14. ALL SHARP CORNERS TO BE ROUNDED OFF TO AVOID ANY DAMAGE OF RUBBER LINING
15. RAFTERS TO BE WELDED ON THE TOP OF ROOF FOR ENABLING RUBBER LINING INSIDE ROOF ~SURFACE.
16. ALL WELDING TO BE COMPLETED BEFORE STARTING THE RUBBER LINING.
17. NOZZLES AND STAIRCASE ORIENTATION AND ELEVATION & AGITATOR ~DETAILS IS INDICATIVE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
18. CIVIL STAIR CASES FOR THE MAIN STAIR CASE AND MANHOLE SHALL BE 'ON HOLD' AND SHALL BE FINALISED AFTER FINALIZATION OF NOZZLES AND STAIR CASE ORIENTATION.
19. VOID.
20. PAD PLATES ON TANK SURFACE FOR SUPPORTING OF THE SLURRY PIPES/CABLE TRAYS SHALL BE IN THE SCOPE OF BIDDER. THE DETAILS SHALL BE DECIDED DURING DETAIL ENGINEERING
21. SUPPLY, ERECTION & COMMISSIONING OF THE AGITATORS SHALL BE IN BIDDERS SCOPE. FOR DETAILS OF AGITATOR PLEASE REFER TECHNICAL SPECIFICATION. DESIGN SUPPLY AND ERECTION OF OF AGITATOR SUPPORTING ARRANGEMENT STRUCTURES SHALL BE IN BIDDER'S SCOPE AND SHALL BE FINALIZED DURING DETAIL ENGINEERING.
22. VOID.
23. THE DETAILS FURNISHED IN THE DRAWING ARE MINIMUM REQUIREMENTS. ALL DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE DESIGN CALCULATIONS SUBMITTED BY THE SUCCESSFUL BIDDER.

DESIGN DATA		
DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	--	GYPSUM SLURRY
NOMINAL CAPACITY	M^3	1356
EFFECTIVE CAPACITY	M^3	1300
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	62
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1839-PART-1
NO. OF TANKS	NO.	01
DIAMETER (INSIDE DIAMETER)	MM	12000
HEIGHT (UP TO CURB ANGLE)	MM	12000
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	Course1~10mmthick,Course 2 to 6~8mm thick
BOTTOM PLATE THICKNESS	MM	10
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	REPLACEABLE BROMOBUTYL RUBBER LINING OF MIN. 4MM THK.HARDNESSOF RUBBER LINING 55 ±5 DUROMETER (SHORE –A)

MATERIAL SPECIFICATION	
ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE	150NB & BELOW – IS:1239(H), 200NB & ABOVE – IS:3589 Gr.410 ERW
PIPES	
MANHOLE	IS: 2062 GR. E250 BR
NOZZLE FLANGES	IS:2062 Gr.A (plate) SOFF ASME B16.5 CL.150 FOR 25NB TO 600NB IS:2062 Gr.A (plate) SOFF AWWA–C207 CL.D FOR 650NB TO 1800NB
HAND RAILING	IS: 1239 PART(1) MED.GR, PIPE (32NB) GALVANIZED TO IS:4736
GASKETS	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
BOLTING (NUTS & BOLTS)	IS: 1367 CLASS 4.6
STRUCTURALS	IS: 2062 GR.E 250 A
FITTINGS	500 NB AND BELOW BW A 234 –WPB,ASME–B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME–B16.9
STAIRWAY & PLATFORM	IS: 2062 GR. E250 A
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

SHELL NOZZLE SCHEDULE

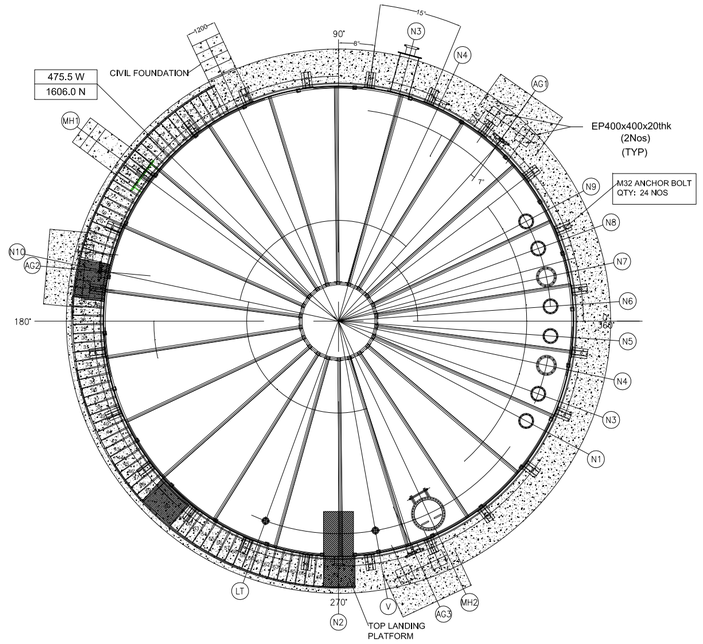
NOZZLE			FLANGE		QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N2	200NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	200NB	SOFF	#150	ASME B16.5	01	200	BOTTOM DRAIN
N4	300NB	SOFF	#150	ASME B16.5	01	200	TANK OVERFLOW
A1/2/3	450NB	SOFF	#150	ASME B16.5	03	200	AGITATOR NOZZLE ON SHELL
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE

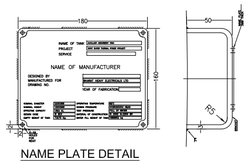
NOZZLE			FLANGE		QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N1&N5	200NB	SOFF	#150	ASME B16.5	02	200	INLET TO TANK
N6&N7	200NB	SOFF	#150	ASME B16.5	02	200	INLET TO TANK
N8&N9	300NB	SOFF	#150	ASME B16.5	02	200	INLET TO TANK
N10	80NB	SOFF	#150	ASME B16.5	03	200	EMERGENCY FLUSH
LT1	100NB	SOFF	#150	ASME B16.5	01	200	LEVEL TRANSMITTER
V	250NB	SOFF	#150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	750NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

PAINTING SPECIFICATION

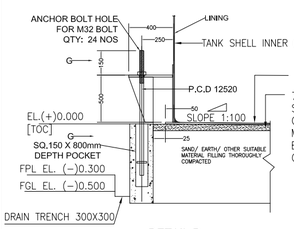
S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED OF APPROVED SHADE AND COLOUR WITH ADDITIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	REPLACEABLE BROMOBUTYL RUBBER LINING OF MIN. 4MM THK. (HARDNESS OF RUBBER LINING SHALL BE 55 ±5 DUROMETER (SHORE A)	---	120
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK – 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							



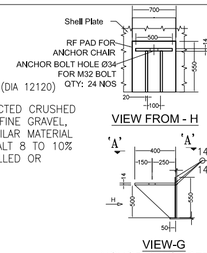
PLAN VIEW



NAME PLATE DETAIL



DETAIL D
ANCHOR CHAIR DETAILS



VIEW-G
ANCHOR CHAIR DETAILS

LOAD DETAILS FOR TANK CIVIL FOUNDATION

1.	TANK EMPTY WEIGHT	– 73175 Kgs
2.	TEST WEIGHT(FILLED TO TOP)	– 1888952 Kgs
3.	OPERATING WEIGHT	– 1866833 Kgs
4.	WIND MOMENT	– 1722 KN–M
5.	RING WALL MOMENT	– 12680 KN–M
6.	SEISMIC BASE SHEAR	– 146 KN/M
7.	WIND LOAD HORIZONTAL	– 292 KN

REFERENCE DRAWING NO		
S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE–V0–491–167–A110
2	LAYOUT OF FGD SYSTEM	PE–DG–491–100–M001

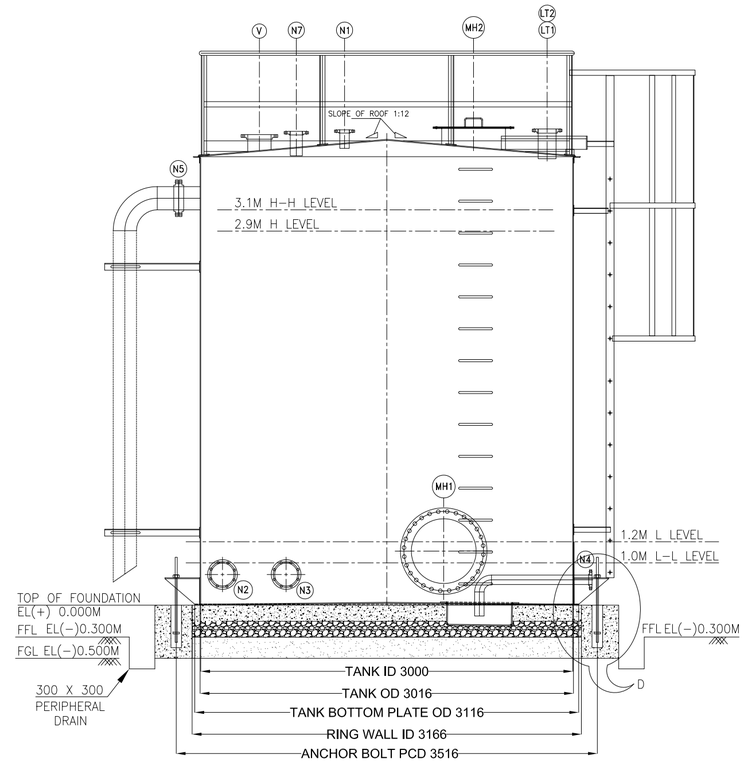
JOB NO. 491					
STATUS	CONTRACT				
DISTRIBUTION					
TO					
No.OFF					
REV	DATE	ALTD	CHD	APPD	
0	15.11.22	AS	PKR	SK	

PROJECT: SIPAT SUPER THERMAL POWER PROJECT

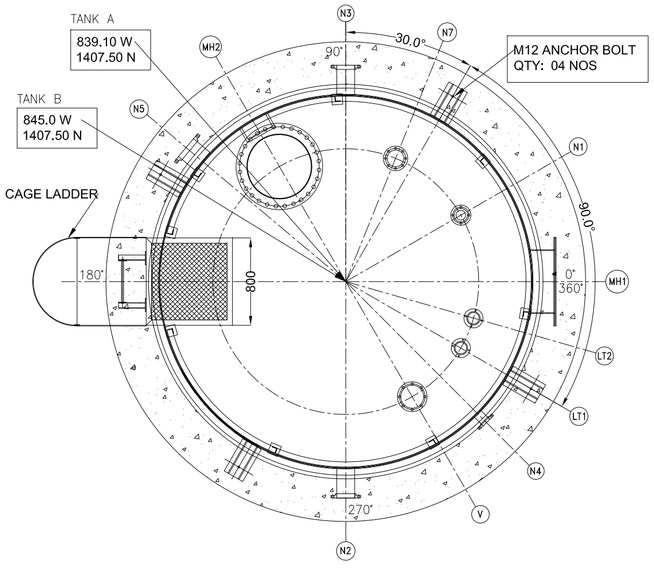
OWNER:
एन टी पी सी NTPC
NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

EPC CONTRACTOR:
भेल BHEL
BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NEW DELHI

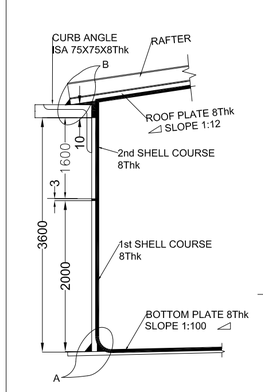
DATE 15.11.2022	TITLE: GA DRAWING FOR AUXILARY ABSORBER TANK		REV.
			0
SIZE A2	SCALE	BHEL DRG NO.: PE-V0-491-167-A110	0
		NTPC DRG NO.: --	0
DRN: YS	CHD: PK	APPD: SR	SHEET 1 of 1



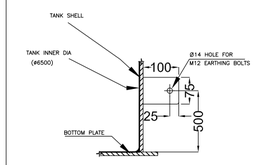
TANK ELEVATION VIEW



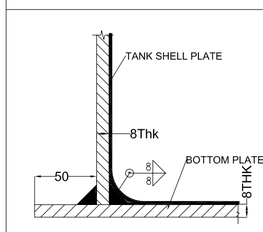
PLAN VIEW OF TANK-A&B



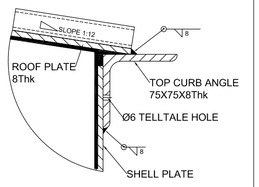
SHELL ARRANGEMENT
FOR 1 TO 02 COURSE



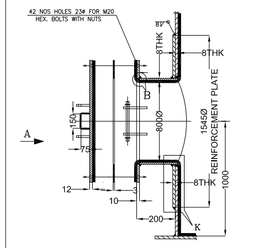
EARTHING CLEAT



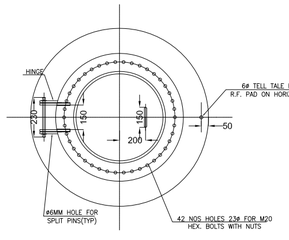
DETAIL "A"



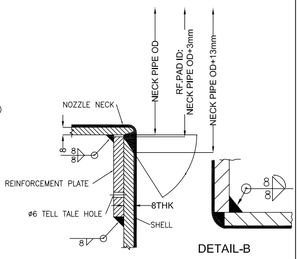
DETAIL "B"
(FRANGIBLE JOINT)



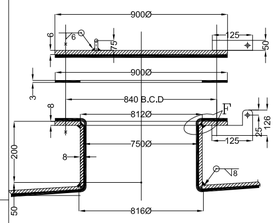
DETAIL OF SHELL MANHOLE
MARKED : MH2



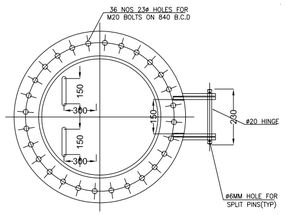
VIEW FROM-A



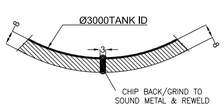
DETAIL-K
TYP. REINFORCEMENT DETAIL



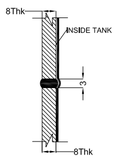
DETAIL OF ROOF MANHOLE
MARKED : MH1



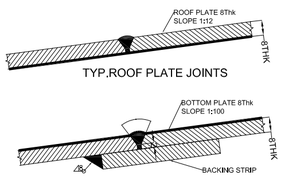
PLAN VIEW



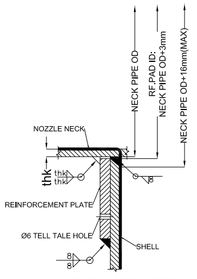
TYP. LONGITUDINAL
SHELL JOINTS



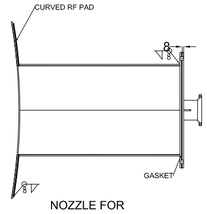
TYP. CIRCUMFERENTIAL
SHELL JOINTS



TYP.BOTTOM PLATE JOINTS

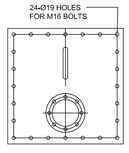


TYP. NOZZLE DETAIL

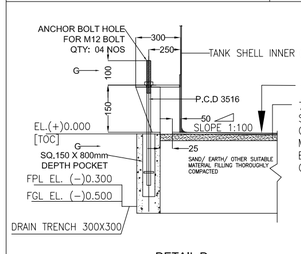


NOZZLE FOR
BOTTOM DRAIN

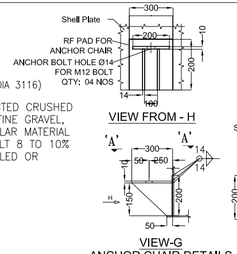
DETAIL-P

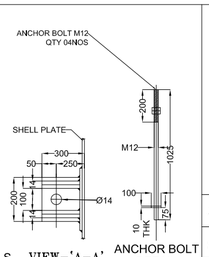


DETAIL OF COVER PLATE

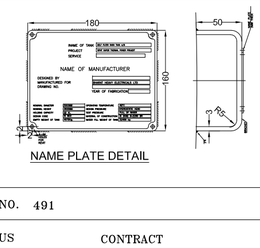


DETAIL D
ANCHOR CHAIR DETAILS

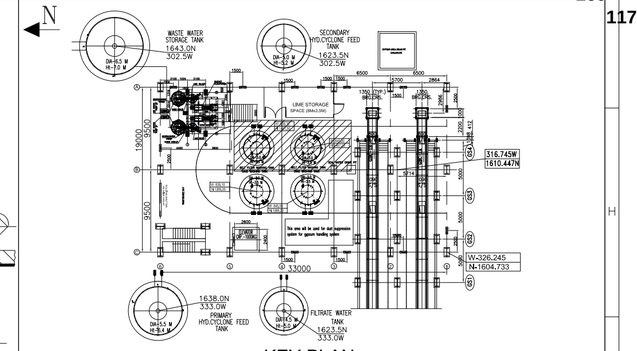




ANCHOR BOLT
DETAIL



NAME PLATE DETAIL



KEY PLAN

DESIGN DATA		
DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	--	PROCESS WATER
NOMINAL CAPACITY	M^3	25
MAXIMUM HOLDING CAPACITY	M^3	22
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	62
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1893-PART-1
NO. OF TANKS	NO.	02
DIAMETER (INSIDE DIAMETER)	MM	3000
HEIGHT (UP TO CURB ANGLE)	MM	3600
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	8
BOTTOM PLATE THICKNESS	MM	8
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	EPOXY LINING MINIMUM THREE COATS OF 150MICRON THICKNESS.

MATERIAL SPECIFICATION	
ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE PIPES	150NB & BELOW – IS:1239(H), 200NB & ABOVE – IS:3589 Gr.410 ERW
MANHOLE	IS: 2062 GR. E250 BR
NOZZLE FLANGES	IS:2062 Gr.A (plate) SOFF ASME B16.5 CL.150 FOR 25NB TO 600NB IS:2062 Gr.A (plate) SOFF AWWA-C207 CL.D FOR 650NB TO 1800NB
HAND RAILING	IS: 1239 PART(1) MED.GR. PIPE (32NB) GALVANIZED TO IS:4736
GASKETS	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
BOLTING (NUTS & BOLTS)	IS: 1367 CLASS 4.6
STRUCTURALS	IS: 2062 GR.E 250 A
FITTINGS	500 NB AND BELOW BW A 234 -WPB,ASME-B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME-B16.9
STAIRWAY & PLATFORM	IS: 2062 GR. E250 A
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

SHELL NOZZLE SCHEDULE

NOZZLE			FLANGE		QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N2	65NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	65NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N4	80NB	SOFF	#150	ASME B16.5	01	200	BOTTOM DRAIN
N5	100NB	SOFF	#150	ASME B16.5	01	200	TANK OVERFLOW
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE

NOZZLE			FLANGE		QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N1	65NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
N7	32NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
LT1&LT2	100NB	SOFF	#150	ASME B16.5	02	200	LEVEL TRANSMITTER
V	100NB	SOFF	#150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	750NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

PAINTING SPECIFICATION

S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDIATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED OF APPROVED SHADE AND COLOUR WITH GLOSSY FINISH. ADDITIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT. OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	EPOXY LINNG MINIMUM THREE COATS OF 150 MICRON THICKNESS	---	---
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK – 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							

NOTES:-

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED-OUT AFTER HYDRO ~TEST.
11. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
12. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER JOINT UNLESS ~SPECIFIED OTHERWISE. ALL WELD JOINTS TO BE ROUNDED OFF WHEREVER RUBBER LINING IS THERE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT REQUIREMENT.
14. VOID
15. VOID.
16. VOID.
17. NOZZLES AND STAIRCASE ORIENTATION AND ELEVATION ~DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING.
18. CIVIL STAIR CASES FOR THE MAIN STAIR CASE AND MANHOLE SHALL BE 'ON HOLD' AND SHALL BE FINALISED AFTER FINALIZATION OF NOZZLES AND STAIR CASE ORIENTATION.
19. THE DETAILS FURNISHED IN THE DRAWING ARE MINIMUM REQUIREMENTS. ALL DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE DESIGN CALCULATIONS SUBMITTED BY THE SUCCESSFUL BIDDER.

LOAD DETAILS FOR TANK CIVIL FOUNDATION

1.	TANK EMPTY WEIGHT	– 4072 Kgs
2.	TEST WEIGHT(FILLED TO TOP)	– 32456 Kgs
3.	OPERATING WEIGHT	– 31285 Kgs
4.	WIND MOMENT	– 39 KN-M
5.	RING WALL MOMENT	– 55 KN-M
6.	SEISMIC BASE SHEAR	– 8.1KN/M
7.	WIND LOAD HORIZONTAL	– 22 KN

REFERENCE DRAWING NO

S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE-V0-491-167-A103
2	LAYOUT OF FGD SYSTEM	PE-DG-491-100-M001

306

JOB NO. 491

STATUS CONTRACT

DISTRIBUTION

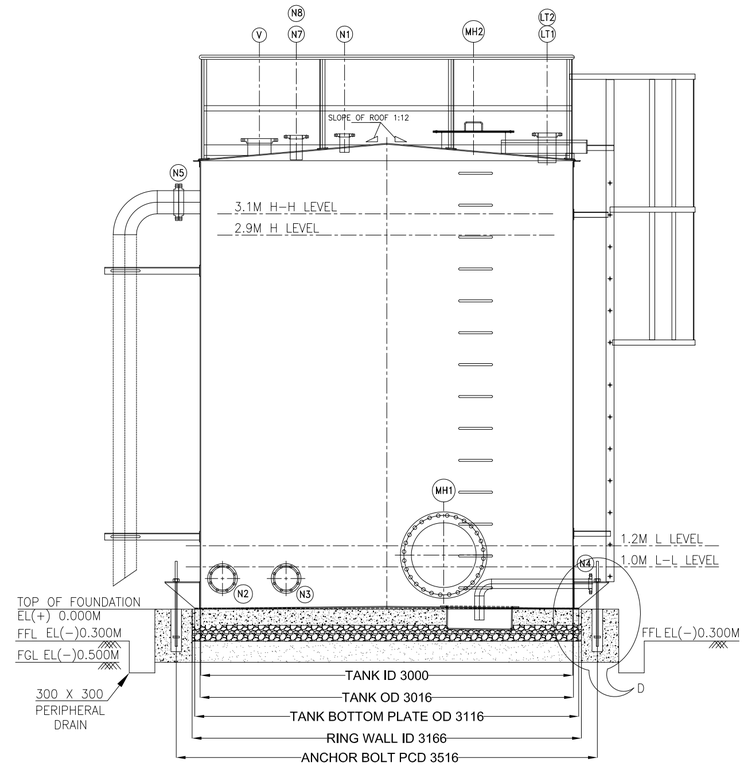
TO					
No.OFF					
REV	DATE	ALTD	CHD	APPD	
0	15.11.22	AS	PKR	SR	

PROJECT: SIPAT SUPER THERMAL POWER PROJECT

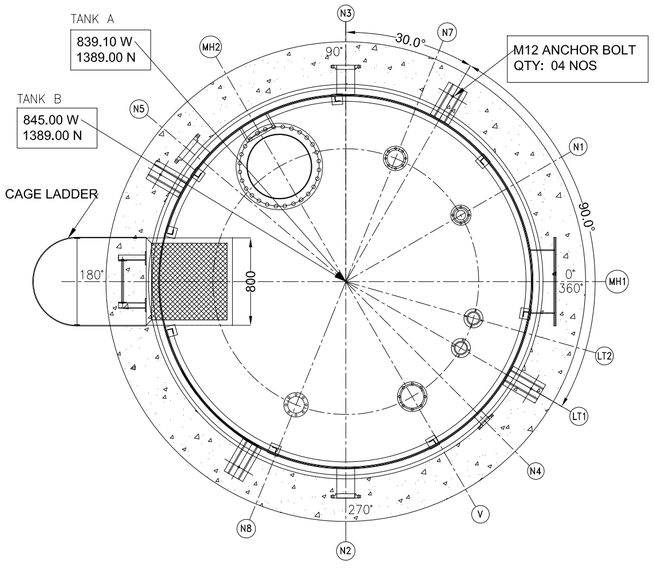
OWNER:
एन टी पी सी NTPC
NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

EPC CONTRACTOR:
भेल BHEL
BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NEW DELHI

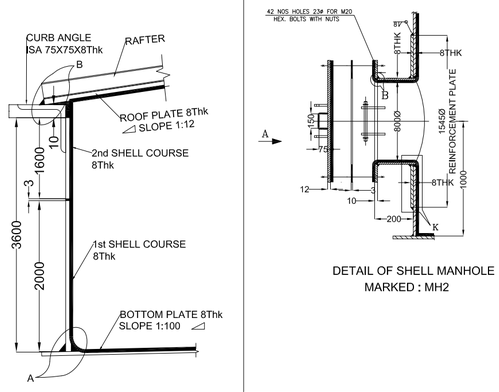
DATE 15.11.2022	TITLE: GA DRAWING FOR BELT FILTER WASH TANK	REV.
		0
SIZE A2 / SCALE	BHEL DRG NO.: PE-V0-491-167-A103	0
	NTPC DRG NO.: --	0
DRN: AS	CHD: PK APPD: SR	SHEET 1 of 1



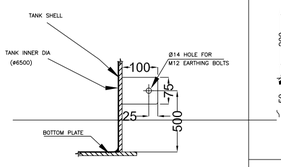
TANK ELEVATION VIEW



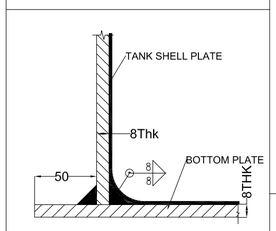
PLAN VIEW OF TANK-A&B



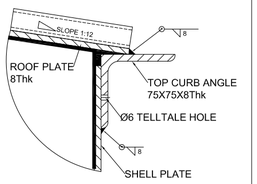
SHELL ARRANGEMENT
FOR 1 TO 02 COURSE



EARTHING CLEAT

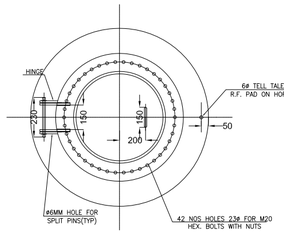


DETAIL "A"

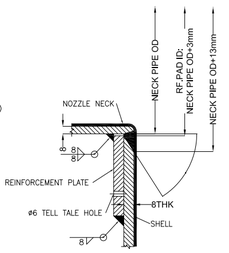


DETAIL "B"
(FRANGIBLE JOINT)

DETAIL OF SHELL MANHOLE
MARKED : MH2

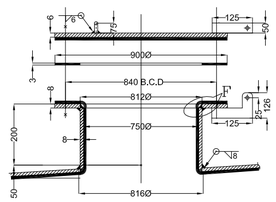


VIEW FROM-A

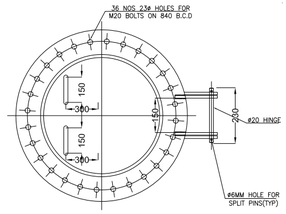


DETAIL-K
TYP. REINFORCEMENT DETAIL

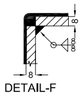
DETAIL-B



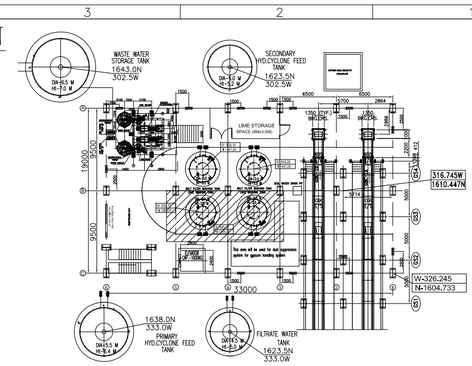
DETAIL OF ROOF MANHOLE



PLAN VIEW



DETAIL-F



KEY PLAN

DESIGN DATA		
DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	--	PROCESS WATER
NOMINAL CAPACITY	M^3	25
MAXIMUM HOLDING CAPACITY	M^3	22
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	62
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1893-PART-1
NO. OF TANKS	NO.	02
DIAMETER (INSIDE DIAMETER)	MM	3000
HEIGHT (UP TO CURB ANGLE)	MM	3600
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	8
BOTTOM PLATE THICKNESS	MM	8
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	EPOXY LINING MINIMUM THREE COATS OF 150MICRON THICKNESS.

MATERIAL SPECIFICATION	
ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE	150NB & BELOW – IS:1239(HI), 200NB & ABOVE – IS:3589 Gr.410 ERW
PIPES	IS: 2062 GR. E250 BR
MANHOLE	IS: 2062 GR. E250 BR
NOZZLE FLANGES	IS:2062 Gr.A (plate) SOFF ASME B16.5 CL:150 FOR 25NB TO 600NB IS:2062 Gr.A (plate) SOFF AWWA-C207 CL.D FOR 650NB TO 1800NB
HAND RAILING	IS: 1239 PART(1) MED.GR, PIPE (32NB) GALVANIZED TO IS:4736
GASKETS	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
BOLTING (NUTS & BOLTS)	IS: 1367 CLASS 4.6
STRUCTURALS	IS: 2062 GR.E 250 A
FITTINGS	500 NB AND BELOW BW A 234 –WPB,ASME–B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME–B16.9
STAIRWAY & PLATFORM	IS: 2062 GR. E250 A
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

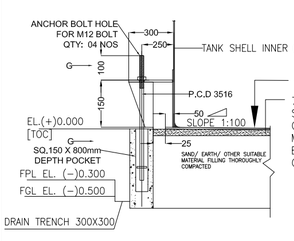
SHELL NOZZLE SCHEDULE							
NOZZLE			FLANGE		QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N2	100NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	100NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N4	80NB	SOFF	#150	ASME B16.5	01	200	BOTTOM DRAIN
N5	100NB	SOFF	#150	ASME B16.5	01	200	TANK OVERFLOW
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE							
NOZZLE			FLANGE		QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N1&N7	80NB	SOFF	#150	ASME B16.5	02	200	INLET TO TANK
N8	50NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
LT1&LT2	100NB	SOFF	#150	ASME B16.5	02	200	LEVEL TRANSMITTER
V	100NB	SOFF	#150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	750NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

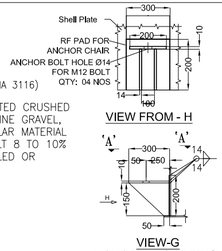
PAINTING SPECIFICATION								
S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED, OF APPROVED SHADE AND COLOUR WITH GLOSSY FINISH. ADDITIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT. OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	EPOXY LINING MINIMUM THREE COATS OF 150 MICRON THICKNESS	---	---
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK – 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							

NOTES:-

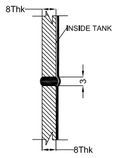
1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED–OUT AFTER HYDRO –TEST.
11. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
12. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER JOINT UNLESS –SPECIFIED OTHERWISE. ALL WELD JOINTS TO BE ROUNDED OFF WHEREVER RUBBER LINING IS THERE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT REQUIREMENT.
14. VOID
15. VOID.
16. VOID.
17. NOZZLES AND STAIRCASE ORIENTATION AND ELEVATION –DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING.
18. CIVIL STAIR CASES FOR THE MAIN STAIR CASE AND MANHOLE SHALL BE 'ON HOLD' AND SHALL BE FINALISED AFTER FINALIZATION OF NOZZLES AND STAIR CASE ORIENTATION.
19. THE DETAILS FURNISHED IN THE DRAWING ARE MINIMUM REQUIREMENTS. ALL DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE DESIGN CALCULATIONS SUBMITTED BY THE SUCCESSFUL BIDDER.



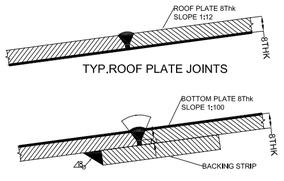
DETAIL D
ANCHOR CHAIR DETAILS



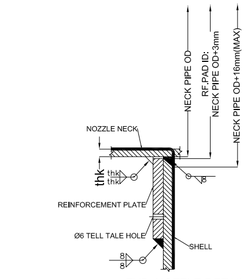
TYP. LONGITUDINAL
SHELL JOINTS



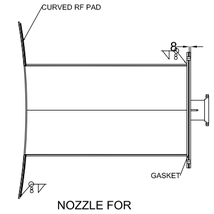
TYP. CIRCUMFERENTIAL
SHELL JOINTS



TYP.ROOF PLATE JOINTS
TYP.BOTTOM PLATE JOINTS

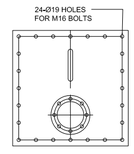


TYP. NOZZLE DETAIL

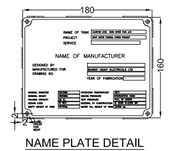


NOZZLE FOR
BOTTOM DRAIN

DETAIL-P



DETAIL OF COVER PLATE



NAME PLATE DETAIL

LOAD DETAILS FOR TANK CIVIL FOUNDATION		
1.	TANK EMPTY WEIGHT	– 4072 Kgs
2.	TEST WEIGHT(FILLED TO TOP)	– 32456 Kgs
3.	OPERATING WEIGHT	– 31285 Kgs
4.	WIND MOMENT	– 39 KN–M
5.	RING WALL MOMENT	– 55 KN–M
6.	SEISMIC BASE SHEAR	– 8.1KN/M
7.	WIND LOAD HORIZONTAL	– 22 KN

REFERENCE DRAWING NO		
S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE-V0-491-167-A104
2	LAYOUT OF FGD SYSTEM	PE-DG-491-100-M001

307

JOB NO. 491					
STATUS	CONTRACT				
DISTRIBUTION					
TO					
No.OFF					
REV	DATE	ALTD	CHD	APPD	
0	15.11.22	AS	PKR	SR	

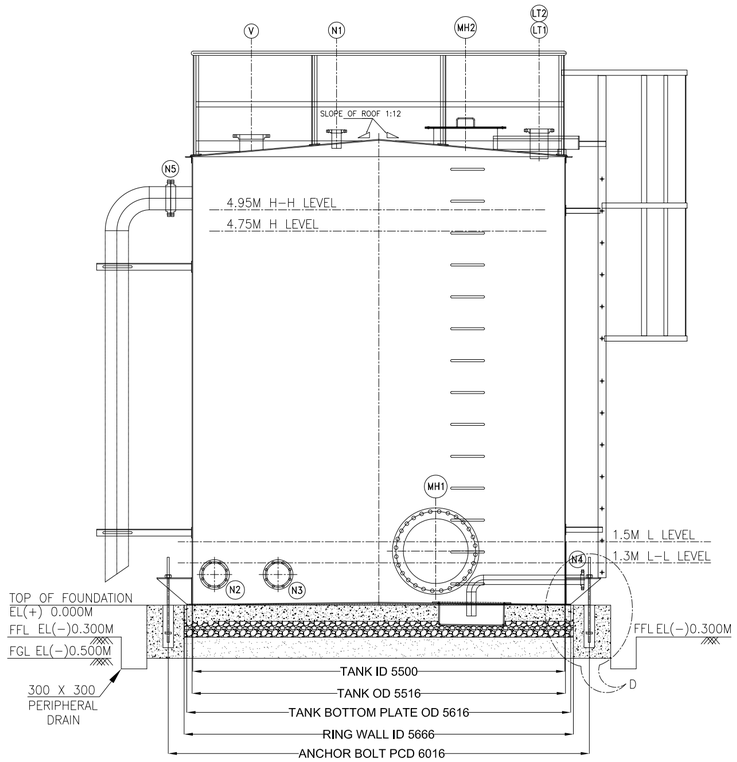
PROJECT: SIPAT SUPER THERMAL POWER PROJECT

OWNER:
एन टी पी सी NTPC
NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

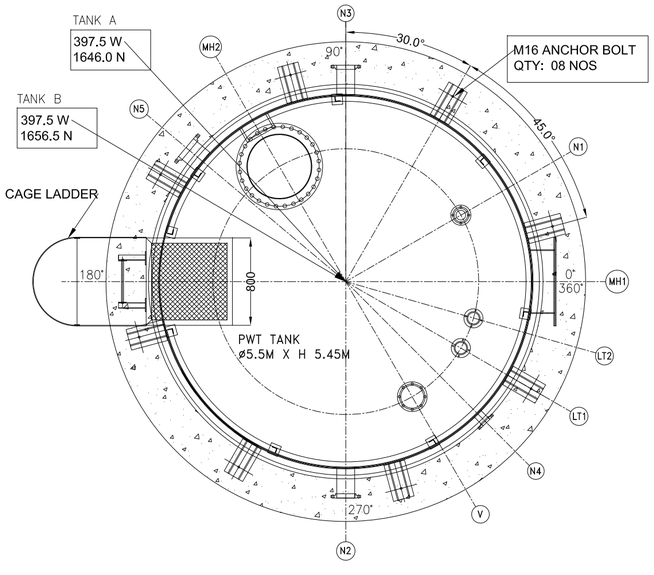
EPC CONTRACTOR:
भेल BHEL
BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DATE 15.11.2022	TITLE: GA DRAWING FOR CLARIFIED CAKE WASH WATER TANK	REV.
		0
SIZE A2 / SCALE	BHEL DRG NO.: PE-V0-491-167-A104	0
	NTPC DRG NO.: --	0
DRN: AS	CHD: PK APPD: SR	SHEET 1 of 1

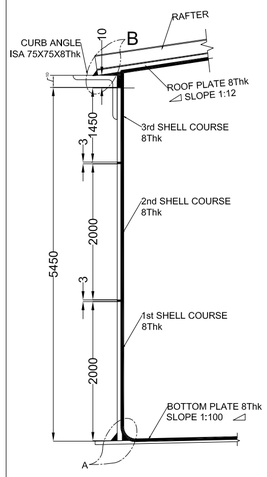
NORTH



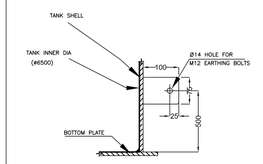
TANK ELEVATION VIEW



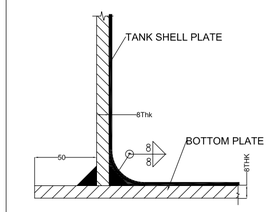
PLAN VIEW OF TANK-A&B



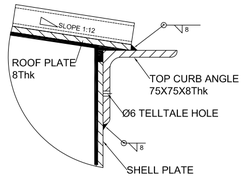
SHELL ARRANGEMENT
FOR 01 TO 03 COURSE



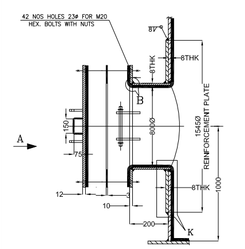
EARTHING CLEAT



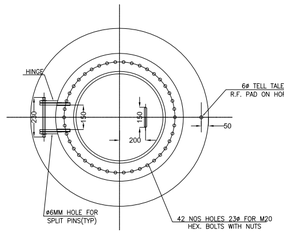
DETAIL "A"



DETAIL "B"
(FRANGIBLE JOINT)

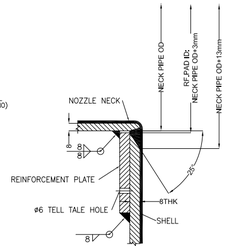


DETAIL OF SHELL MANHOLE
MARKED : MH2

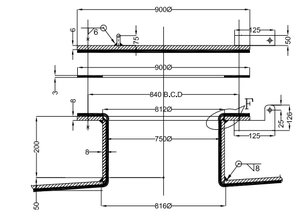


VIEW FROM-A

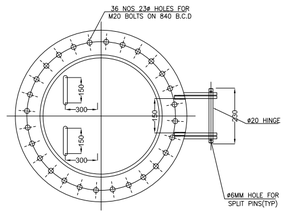
DETAIL-B



DETAIL-K
TYP. REINFORCEMENT DETAIL

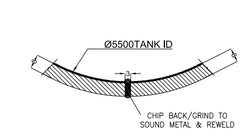


DETAIL OF ROOF MANHOLE
MARKED : MH1

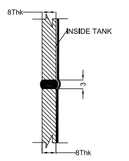


PLAN VIEW

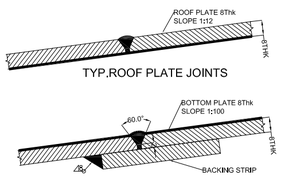
DETAIL-F



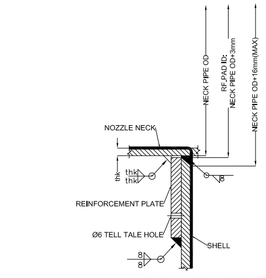
TYP. LONGITUDINAL
SHELL JOINTS



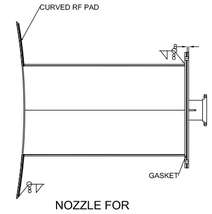
TYP. CIRCUMFERENTIAL
SHELL JOINTS



TYP.BOTTOM PLATE JOINTS

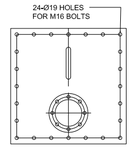


TYP. NOZZLE DETAIL

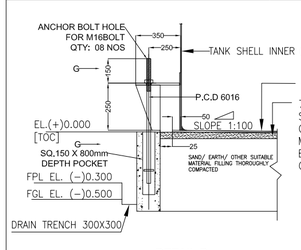


NOZZLE FOR
BOTTOM DRAIN

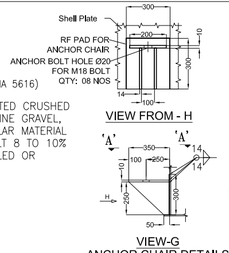
DETAIL-P

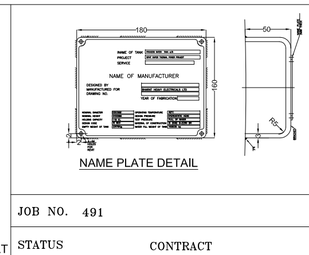


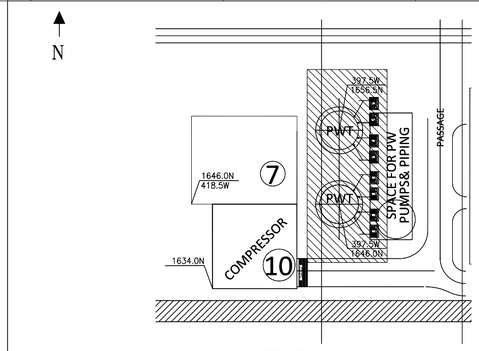
DETAIL OF COVER PLATE



DETAIL D
ANCHOR CHAIR DETAILS







KEY PLAN

DESIGN DATA		
DESIGN CODE	--	IS 803 1976 (REAFFIRMED 2013)
STORAGE PRODUCT	--	PROCESS WATER
NOMINAL CAPACITY	M^3	129
MAXIMUM HOLDING CAPACITY	M^3	118
TYPE OF ROOF	--	VERTICAL CYLINDRICAL FIXED CONE ROOF
ROOF SLOPE	--	5°
DESIGN PRESSURE	--	HYDROSTATIC HEAD
OPERATING PRESSURE	--	ATMOSPHERIC
OPERATING TEMPERATURE	°C	60
HYDRO TESTING	--	WATER FILLED HEAD UPTO OVERFLOW NOZZLE
JOINT EFFICIENCY	--	0.7
RADIOGRAPHY	--	NOT APPLICABLE
CORROSION ALLOWANCE	MM	1.5mm FOR SHELL AND BOTTOM PLATE
WIND CODE	--	IS 875 PART-3
SEISMIC CODE	--	IS 1839-PART-1
NO. OF TANKS	NO.	02
DIAMETER (INSIDE DIAMETER)	MM	5500
HEIGHT (UP TO CURB ANGLE)	MM	5450
ROOF PLATE THICKNESS	MM	8
SHELL PLATE THICKNESS	MM	8
BOTTOM PLATE THICKNESS	MM	8
INSULATION	--	NOT APPLICABLE
INSIDE LINING	--	EPOXY LINING MINIMUM THREE COATS OF 150 MICRON THICKNESS

MATERIAL SPECIFICATION	
ITEM	MATERIAL
PLATES FOR SHELL, BOTTOM & ROOF	IS: 2062 GR. E250 BR
NOZZLE	150NB & BELOW – IS:1239(H), 200NB & ABOVE – IS:3589 Gr.410 ERW
PIPES	IS: 2062 GR. E250 BR
MANHOLE	IS: 2062 GR. E250 BR
NOZZLE FLANGES	IS:2062 Gr.A (plate) SOFF ASME B16.5 CL.150 FOR 25NB TO 600NB IS:2062 Gr.A (plate) SOFF AWWA-C207 CL.D FOR 650NB TO 1800NB
HAND RAILING	IS: 1239 PART(1) MED.GR, PIPE (32NB) GALVANIZED TO IS:4736
GASKETS	ABOVE 50NB PTFF (TEFLON) & UP TO 50NB CNAF
BOLTING (NUTS & BOLTS)	IS: 1367 CLASS 4.6
STRUCTURALS	IS: 2062 GR.E 250 A
FITTINGS	500 NB AND BELOW BW A 234 –WPB,ASME–B16.9, 550 NB & ABOVE 1S 2062 Gr.b(plate formed),ASME–B16.9
STAIRWAY & PLATFORM	IS: 2062 GR. E250 A
RF PAD PLATE & GUSSETS	IS: 2062 GR. E250 BR
EARTHING LUG	IS: 2062 GR. E250 BR
ANCHOR BOLT	IS: 2062 GR. E250 A

SHELL NOZZLE SCHEDULE							
NOZZLE			FLANGE		QTY (Nos)	PROJECTION (FROM SHELL)	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N2	250NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N3	250NB	SOFF	#150	ASME B16.5	01	200	TANK OUTLET ON SHELL
N4	150NB	SOFF	#150	ASME B16.5	01	200	BOTTOM DRAIN
N5	300NB	SOFF	#150	ASME B16.5	01	200	TANK OVERFLOW
MH2	800NB	AS PER ISO 803			01	200	MANHOLE ON SHELL

ROOF NOZZLE SCHEDULE							
NOZZLE			FLANGE		QTY (Nos)	PROJECTION FROM ROOF TO FLANGE FACE	SERVICE
MARKED	SIZE	TYPE	RATING	STANDARD			
N1	250NB	SOFF	#150	ASME B16.5	01	200	INLET TO TANK
LT1&LT2	100NB	SOFF	#150	ASME B16.5	02	200	LEVEL TRANSMITTER
V	250NB	SOFF	#150	ASME B16.5	01	200	VENT WITH BIRD SCREEN
MH1	750NB	AS PER ISO 803			01	200	MANHOLE ON ROOF

PAINTING SPECIFICATION								
S.No.	LOCATION	SURFACE PREPARATION	PRIMER	DFT/ COAT	INTERMEDIATE	DFT/ COAT	FINISH	DFT	TOTAL DFT
1.	OUTSIDE(SHELL)	BLASTING SA2.5	2 COAT EPOXY RESIN BASED ZINC PHOSPHATE	50	EPOXY RESIN BASED TIO PIGMENTED	100	TOP COAT SHALL CONSIST OF ONE COAT OF EPOXY PAINT SUITABLE PIGMENTED OF APPROVED SHADE AND COLOUR WITH GLOSSY FINISH ADDITIONALLY FINISHING COAT OF POLYURETHANE OF MIN. DFT. OF 25 MICRONS.	100	300
2.	OUTSIDE(ROOF)	BLASTING SA2.5							
3.	INSIDE	BLASTING SA2.5	2 COATS OF RED OXIDE ZINC PHOSPHATE PRIMER	60	---	---	EPOXY LINING MINIMUM THREE COATS OF 150 MICRON THICKNESS.	---	---
4.	UNDER NEATH BOTTOM PLATE	UNDER SIDE OF BOTTOM PLATE(IN CONTACT WITH SOIL) OF TANK – 2 COATS OF HIGH BUILD COAL TAR EPOXY SUITABLY PIGMENTED, DFT:80-100 MICRONS EACH COAT.							

NOTES:–

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METER UNLESS OTHER WISE SPECIFIED.
2. ALL ELEVATION ARE REFERRED TO THE FINISHED FLOOR LEVEL OF POWER HOUSE BUILDING AS EL (+)0.00 M WHICH CORRESPONDS TO RL(+) 280.5 M
3. OUT SIDE NOZZLE PROJECTION IS 200MM UNLESS OTHERWISE SPECIFIED.
4. NOZZLE REINFORCEMENT SHALL BE AS PER API 650.
5. NOZZLE PROJECTION ARE MEASURED FROM TANK SHELL INNER TO THE FLANGE FACE AS APPLICABLE.
6. ALL REINFORCEMENTS PADS SHALL BE PROVIDED WITH 6MM TELLTALE HOLE.
7. NOZZLE AND FLANGE DETAILS SHALL BE AS PER API 650.
8. ALL BOLTS HOLES SHALL STRADDLE CENTERLINES OF THE SHELL .
9. ALL PROTRUSIONS,SHARP EDGE AND SPATTER,ETC SHALL BE REMOVED FROM THE SURFACE AND ALL WELDS GROUND SMOOTH WITHOUT ANY CAVITIES AND IMPERFECTION BEFORE LINING.
10. HYDRO TEST SHALL BE AS PER API 650. LINNING SHALL BE CARRIED–OUT AFTER HYDRO ~TEST.
11. ALL LONGITUDINAL JOINTS SHALL BE STAGGERED.
12. BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THE MINIMUM SIZE OF WELD SHALL BE EQUAL TO THE THICKNESS OF THINNER JOINT UNLESS ~SPECIFIED OTHERWISE. ALL WELD JOINTS TO BE ROUNDED OFF WHEREVER RUBBER LINING IS THERE.
13. EARTHING LUG SHALL BE WELDED TO TANK BODY AT SITE TO SUIT REQUIREMENT.
14. VOID
15. VOID.
16. VOID.
17. NOZZLES AND STAIRCASE ORIENTATION AND ELEVATION ~DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING.
18. CIVIL STAIR CASES FOR THE MAIN STAIR CASE AND MANHOLE SHALL BE 'ON HOLD' AND SHALL BE FINALISED AFTER FINALIZATION OF NOZZLES AND STAIR CASE ORIENTATION.
19. THE DETAILS FURNISHED IN THE DRAWING ARE MINIMUM REQUIREMENTS. ALL DETAILS SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE DESIGN CALCULATIONS SUBMITTED BY THE SUCCESSFUL BIDDER.

LOAD DETAILS FOR TANK CIVIL FOUNDATION

1.	TANK EMPTY WEIGHT	– 155535 Kgs
2.	TEST WEIGHT(FILLED TO TOP)	– 152060 Kgs
3.	OPERATING WEIGHT	– 11978 Kgs
4.	WIND MOMENT	– 151 KN–M
5.	RING WALL MOMENT	– 407 KN–M
6.	SEISMIC BASE SHEAR	– 22 KN/M
7.	WIND LOAD HORIZONTAL	– 52 KN

REFERENCE DRAWING NO		
S.NO	DESCRIPTION	DRAWING NO
1	DESIGN CALCULATION OF PROCESS WATER TANK	PE-V0-491-167-A101
2	LAYOUT OF FGD SYSTEM	PE-DG-491-100-M001

308

JOB NO. 491					
STATUS	CONTRACT				
DISTRIBUTION					
TO					
No.OFF					
REV	DATE	ALTD	CHD	APPD	
0	15.11.22	AS	PKR	SR	

PROJECT: SIPAT SUPER THERMAL POWER PROJECT

OWNER:
एन टी पी सी NTPC
NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

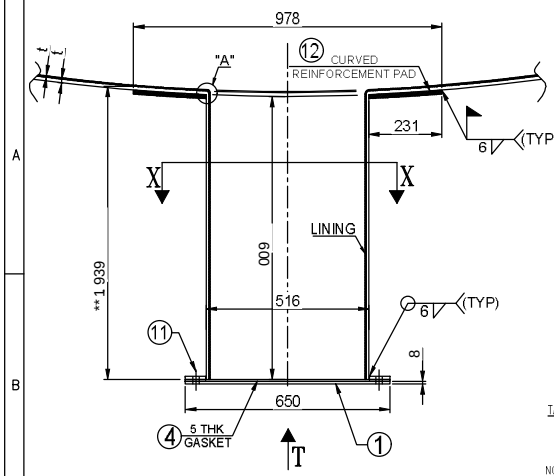
EPC CONTRACTOR:
भेल BHEL
BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DATE 15.11.2022	TITLE: GA DRAWING FOR PROCESS WATER TANK A&B	REV.
		0
SIZE A2 / SCALE	BHEL DRG NO.: PE-V0-491-167-A101	0
	NTPC DRG NO.: --	0
DRN: AS	CHD: PKR APPD: SR	SHEET 1 of 1

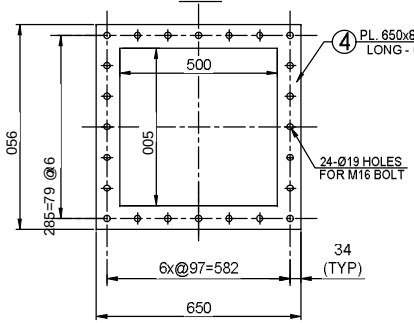
ANNEXURE-VI

DETAILS OF 500MM BOX NOZZLE FOR BOTTOM DRAIN

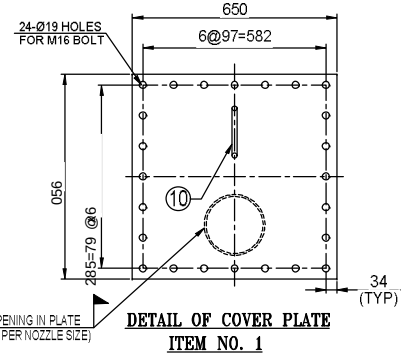
DRAWING NO. 3-FW-750-05101



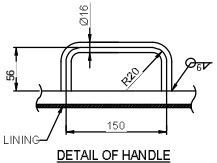
PLAN



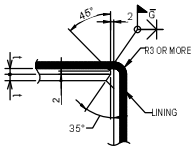
VIEW - T



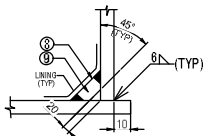
DETAIL OF COVER PLATE ITEM NO. 1



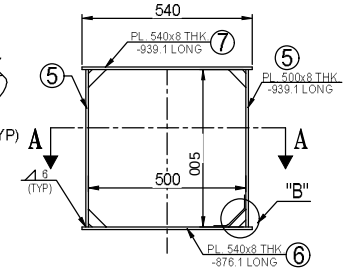
DETAIL OF HANDLE ITEM NO. 10



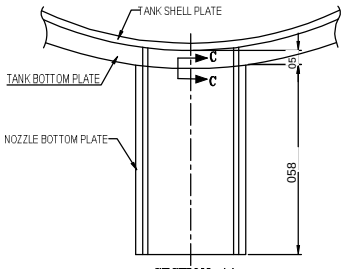
DETAIL OF -"A"



DETAIL OF -"B"

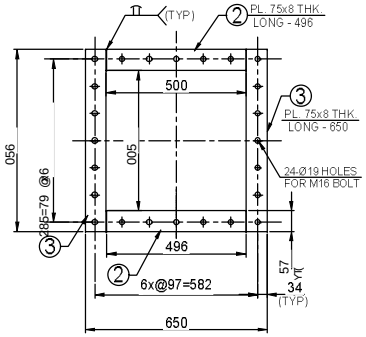


SECTION - XX

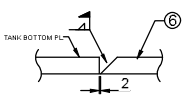


SECTION-AA

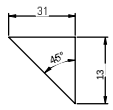
(NOZZLE BOTTOM PLATE DETAILS FOR CONNECTION WITH TANK BOTTOM PLATE)



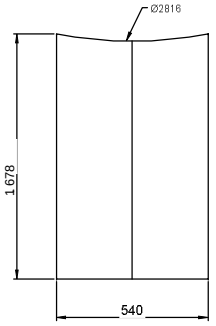
DETAIL OF ITEM NO.2 & 3



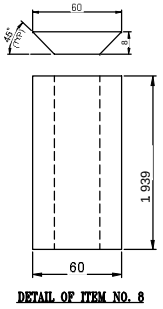
SECTION-CC



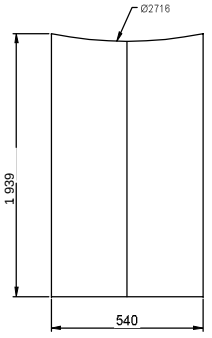
DETAIL OF ITEM NO.9



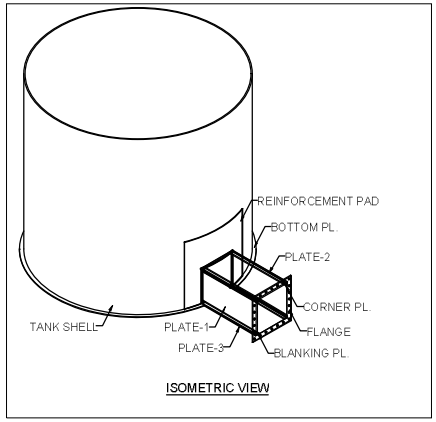
DETAIL OF ITEM NO. 6



DETAIL OF ITEM NO. 8



DETAIL OF ITEM NO. 7



ISOMETRIC VIEW

BILL OF MATERIALS

SL NO.	ERECTION MKD.	ITEM NO.	SECTION	LENGTH	Qty FOR ONE ASSEMBLY	UNIT WT. (KGS/M2)	WEIGHT FOR ONE ASSEMBLY (Kgs.)	NOS. OF ASSEMBLY	TOTAL WEIGHT
01	COVER PLATE	1	PL 650x8	650	1	78.50	26.53		
							26.53	1	26.53
02	FLANGEPL-1	2	PL 75x10	650	2	78.50	7.65		
							7.65	1	7.65
03	FLANGEPL-2	3	PL 75x10	496	2	78.50	5.85		
							5.85	1	5.85
04	GASKET	4	650x5	650	1	39.25	3.50		
							3.50	1	6.5
05	PLATE-1	5	PL 500x8	939.1	2	62.80	29.50		
							29.50	1	29.5
06	PLATE-2	6	PL 540x8	876.1	1	62.80	29.71		
							29.71	1	29.71
07	PLATE-3	7	PL 540x8	939.1	1	62.80	31.80		
							31.80	1	31.8
08	CORNER PL.	8	PL 60x8	939.1	4	62.80	12.30		
							12.30	1	12.3
09	BLANKING PL.	9	PL 31x8	31.0	8	62.80	0.25		
							0.25	1	0.25
10	HANDLE	10	ROD 16 DIA	283	1	1.573	0.42		
							0.42	1	0.415
11	HEX BOLT & NUT	11	BOLT M16x60	60	24	0.157	3.77		
							3.77	1	3.768
TOTAL WEIGHT =									154.273

** EXTRA PROJECTION INSIDE TANK (DUE TO CURVATURE) TO BE TRIMMED SUITABLY AFTER ERECTION.

NOTES:-

01. ALL DIMENSIONS ARE IN mm.
02. ALL PLATE WELDING SHALL BE 5 MM FILLET U.N.O.
03. FOR ITEM NO. 12; REFER DWG NO. 3-FW-750-05106.
04. FOR STANDARD FABRICATION NOTES REFER 4-00-000-32487.
05. MATERIAL
    A. MATERIAL SHALL BE CARBON STEEL (C.S).
    B. NECK SHALL BE MADE WITH C.S PLATE. REINFORCING PADS SHALL BE OF THE SAME MATERIAL AND THICKNESS AS BOTTOM SHELL PLATE.
    C. GASKET SHALL BE MADE OF RUBBER AS PER SPECIFICATION. COTTON PIN SHALL BE MADE OF C.S.
    D. BOLTS AND NUTS SHALL BE MADE OF GALVANISED STEEL.
06. REMOVE ALL EXCESS WELD METAL AND SPATTER FROM METAL SURFACE TO BE LINED. FINESH METAL SURFACE SMOOTH.
07. FOR LOCATION REFER RESPECTIVE GA DRAWING.
08. ITEM NO.9 (BLANKING PL.) TO BE SUITABLE PLACE IN TRIANGULAR AREA FOR BLANKING & TO BE GRINDED FOR LINING.
09. FASTENERS RELEASED IN GMS ARE TO BE USED FOR ASSEMBLY OF NOZZLE, GASKET & COVER PL. DURING TRANSPORT.

REV	DATE	ALTERED
		CHECKED
ZONE		

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: BOILER AUXILIARIES PLANT.
RANIPET - 632 406.

	NAME	SIGN	DATE	NO OF VAR.
DRN	DINESH/S.SARKAR		10.02.21	-
CHD	MOHAHAK/SAHANI		12.02.21	
APPD	K.B.PADHI		12.02.21	

DEPT	GRADE OF UNTOL.DIM	SCALE	WEIGHT (KG).	REF. TO ASSY/OLD DRG.	ITEM NO.	NO. OF ITEMS
AQCS				3-FW-000-03832/00	-	010
CODE 862	PR: AQ: 500	N.T.S				

TITLE	CARD	DRAWING NO.	REV
DETAILS OF 500 SQ. NOZZLE FOR BOTTOM DRAIN	U 01	3-FW-750-05101	0