

TD-106-1 Rev No. 5	Form No.		PRODUCT STANDARD OIL FIELD EQUIPMENT HYDERABAD		OE 56100 Rev No. 01 PAGE 1 of 7
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company. MANUFACTURE AND SUPPLY OF BOLTED STRUCTURES OF AHP/LHP/GHP FOR MAITREE 2X660 STPP 1. OBJECTIVE: The objective of this specification is to manufacture and supply of BOLTED STRUCTURES of AHP/LHP/GHP for 2x660 STPP Maitree project, Bangladesh. 2. SCOPE: The scope comprises of manufacturing of bolted structures as per BHEL detailed drawings, quality plan, marking and dispatch. Total scope is split into various categories mentioned in Annexure I. RFC/GA drawings of each category item is provided along with the tender for understanding of the structure. Each structure is made of various DU's which will be within the transportable limits. These DU's have bolted connections for assembly of the structure at site. Typical work includes fabrication of these DU's which include welding, drilling, rolling, bending etc, inspection (as per approved quality plan), grit blasting and painting. (Rolling required only in category vi, vii) Detailed fabrication drawings will be provided by BHEL after placement of PO. Vendor to manufacture exactly as per BHEL detailed fabrication drawings and specifications mentioned in Clause 3 of this specification. Nothing in this specification shall be construed to relieve the Vendor of his responsibility for compliance with the applicable documents/standards. Any conflict between the applicable documents and this specification shall be brought to the attention of BHEL Engineering for resolution. 3. BHEL SPECIFICATIONS AND DOCUMENTATION a. Categorization of Bolted structures – Refer Annexure I b. Quality plan for AHP structures - QP NO.: MAIT:C&AHP: R4R5-R4R6 QP NO.: MAIT:AHP SILO: R4R5-R4R6 QP NO : STR 751 c. Painting schedule - PS:MAIT:PG:R676&R4R5. d. General Tolerances - AA0230208, AA0621104, AA0621105 4. FABRICATION DETAIL REQUIREMENTS: Fabrication should be strictly as per BHEL detailed fabrication drawings and QAP. Wherever trial assembly is envisaged, those items will be clearly indicated. For all trial-assembled components, match marking should be done.					

TD-106-2 Rev No. 5		Form No.	बी एच ई एल BHEL		PRODUCT STANDARD OIL FIELD EQUIPMENT HYDERABAD		OE 56100 Rev No. 01 PAGE 2 of 7																						
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.			All the components fabricated should comply with the following tolerance standards. 1. For drilled holes locating dimensions – AA0230208 (Medium Class) 2. Welded Structure Length & Angles – AA0621104 (Class A) 3. Welded Structures Form & Position – AA0621105 (Class E) Completion Structural scope is categorized into 7 groups as per annexure I. For Each category item its RFC/GA drawing is provided for understanding of the structure. Bolted connections and DU’s details will be available in detailed fabrication drawings, which shall be shared only after placement of PO. For better understanding of the work involved Sample drawings are provided against each category .These drawings are only for understanding purpose of the various bolted structure connections. Final fabrication should be strictly as per respective BHEL detailed drawings provided to vendors after placement of PO, the work content like structural members used, bolted connection details may vary from the details specified in the sample drawings. 5. MATERIALS Materials used in the fabrication of AHP/LHP/GHP BOLTED STRUCTURES shall be new, clean, rust free and straightened if necessary before being worked. a) All structural steel material – E350GR SA/IS 2062 as per BHEL standard HY10170. b) Chequered plate – DIN 5922 / BS EN 10363 or Equivalent c) STAINLESS STEEL AISI 304 (Only used in Category VI,VII) d) Transport stiffeners for Silo Segments– ERW TUBE 50NB , IS1239 or equivalent (Only used in Category VI,VII) 6. GRIT BLASTING AND PAINTING OF ALL STRUCTURES: As per following table <table><tr><th colspan="6">For all structural elements, Packing Crates & Transport stiffeners</th></tr><tr><th rowspan="2">Surface preparation & surface profile</th><th colspan="2">Primer coat</th><th colspan="2">Intermediate coat</th><th rowspan="2">Total DFT μ (min)</th></tr><tr><th>Paint</th><th>No of coats/DFT</th><th>Paint</th><th>No of coats/DFT</th></tr><tr><td>Blast cleaning to SA 2½</td><td>Epoxy zinc phosphate IS 13238</td><td>01/ DFT=80μ/ coat</td><td>Epoxy based polyamide cured MIO pigmented intermediate coat</td><td>02/ DFT=80μ/ Coat Total=160μ</td><td>240 μ</td></tr></table> *No painting is required for stainless steel items. *Vendor to ensure Primer and intermediate coat is of same paint supplier. Customer approved Paint suppliers for structural works follow as : 1) M/s Shalimar Paints 2) M/s Jenson and Nicholson 3) M/s Kansai Nerolac 4) M/s Akzo Nobel 5) M/s Asian paints					For all structural elements, Packing Crates & Transport stiffeners						Surface preparation & surface profile	Primer coat		Intermediate coat		Total DFT μ (min)	Paint	No of coats/DFT	Paint	No of coats/DFT	Blast cleaning to SA 2½	Epoxy zinc phosphate IS 13238	01/ DFT=80μ/ coat	Epoxy based polyamide cured MIO pigmented intermediate coat	02/ DFT=80μ/ Coat Total=160μ	240 μ
			For all structural elements, Packing Crates & Transport stiffeners																										
			Surface preparation & surface profile	Primer coat		Intermediate coat		Total DFT μ (min)																					
				Paint	No of coats/DFT	Paint	No of coats/DFT																						
Blast cleaning to SA 2½	Epoxy zinc phosphate IS 13238	01/ DFT=80μ/ coat	Epoxy based polyamide cured MIO pigmented intermediate coat	02/ DFT=80μ/ Coat Total=160μ	240 μ																								
Ref. Doc																													

TD-106-2 Rev No. 5		Form No.		PRODUCT STANDARD OIL FIELD EQUIPMENT HYDERABAD	OE 56100 Rev No. 01 PAGE 3 of 7				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.			7. SUBMITTALS The vendor shall supply the following documentation to BHEL after the job completion a. One set of complete manufacturing inspection records (after completion of manufacture) as per enclosed quality plan. b. Deviation, if any, resulting in a fabrication process shall be submitted to BHEL Engineers for review and approval.						
			8. WELDING a) Welders carrying out the fabrication activities, shall be AWS D1.1(Latest revision)-qualified b) Welding procedures shall be qualified as per AWS D1.1(Latest revision)-PQR, WQR, WPS. *For Silos(category VI,VII) welding as per ASME Sec. IX is also acceptable. c) Full penetration welds/ Butt Welds shall undergo RT/UT as per QAP. d) Fillet welds shall undergo LPI/MPI as per QP.						
			9. MARKING & PACKING MARKING a. PGMA, DU number and erection mark shall be marked by hard punching and also by painting at both ends of each DU (deliverable unit/ PO item). Ex: For PO with following item.						
			<table><tr><td>MATERIAL CODE</td><td>DESCRIPTION</td></tr><tr><td>09613210002-DU01</td><td>PLATFROM BEAM : "PB-20"</td></tr></table> Marking should be : 96132-DU01 PB-20 Here PGMA is 96132, DU is 01 and erection mark is PB-20.			MATERIAL CODE	DESCRIPTION	09613210002-DU01	PLATFROM BEAM : "PB-20"
			MATERIAL CODE	DESCRIPTION					
09613210002-DU01	PLATFROM BEAM : "PB-20"								
b. Small DU's which cannot be marked as above shall have metal tags with the necessary markings on them. The metal tags shall be securely attached to the packages with strong steel binding wire. Each piece shipped separately shall be labelled or tagged properly									
PACKING a. DU's which are less than 1.6MT should be packed in metal crates. Crates shall be manufactured as per BHEL drawings. b. Packing list should contain detailed contents of the package. c. Two 50mm wide Green & Red touching bands around perimeter of package positioned at two locations should be provided.									
Ref. Doc									

TD-106-2 Rev No. 5	Form No.		PRODUCT STANDARD OIL FIELD EQUIPMENT HYDERABAD	OE 56100																																																																																																	
				Rev No. 01																																																																																																	
				PAGE 4 of 7																																																																																																	
10. WARRANTY By acceptance of a purchase order based on this specification, the supplier represents that he has examined and evaluated this specification and that all the information needed for the manufacture and supply of AHP/LHP/GHP BOLTED STRUCTURES is included in this specification. If the supplier needs more technical information he will contact, in writing, BHEL Engineering or the concerned BHEL Purchase officer. While installing the component(s) at customer works, any problem arises due to poor workmanship, vendor has to rectify or replace the component(s) free of cost. 11. ANNEXURE I <table><tr><th>CATEGORY</th><th>Sl.No</th><th>STRUCTURE DESCRIPTION</th><th>RFC DRAWING</th><th>WEIGHT (MT)</th></tr><tr><td rowspan="6">CATEGORY - I TRANSFER POINTS</td><td>1</td><td>TRANSFER POINT-2</td><td>Maitree-00-UEF-LC-177320-ISG</td><td>155</td></tr><tr><td>2</td><td>TRANSFER POINT-17</td><td>Maitree-00-UEF-LC-177331-ISG Maitree-00-UEF-LC-177332-ISG</td><td>155</td></tr><tr><td>3</td><td>TRANSFER POINT-16</td><td>Maitree-00-UEF-LC-177324-ISG Maitree-00-UEF-LC-177325-ISG</td><td>160</td></tr><tr><td>4</td><td>TRNASFER POINT -15</td><td>Maitree-00-UEU-LC-177517-ISG Maitree-00-UEU-LC-177518-ISG</td><td>191</td></tr><tr><td>5</td><td>TRANSFER POINT-14</td><td>Maitree-00-UEU-LC-177509-ISG Maitree-00-UEU-LC-177510-ISG</td><td>191</td></tr><tr><td>6</td><td>TRANSFER POINT-18</td><td>Maitree-00-UEF-LC-177338-ISG Maitree-00-UEF-LC-177339-ISG</td><td>195</td></tr><tr><td rowspan="9">CATEGORY - II PIPE RACKS</td><td>1</td><td>FLY ASH PIPE RACK - PART 1</td><td>Maitree-00-UGY-LC-177493-ISG</td><td>500</td></tr><tr><td>2</td><td>FLY ASH PIPE RACK - PART 2</td><td>Maitree-00-UGY-LC-177493-ISG</td><td>400</td></tr><tr><td>3</td><td>FLY ASH PIPE RACK - PART 3</td><td>Maitree-00-UGY-LC-177493-ISG</td><td>300</td></tr><tr><td>4</td><td>FLY ASH PIPE RACK - PART 4</td><td>Maitree-00-UGY-LC-177493-ISG</td><td>230</td></tr><tr><td>5</td><td>FLY ASH PIPE RACK NEAR SILO</td><td>Maitree-00-UGY-LC-177585-ISG</td><td>300</td></tr><tr><td>6</td><td>FLY ASH PIPE RACK NEAR JETTY</td><td>Maitree-0-UET-LC-177551-ISG</td><td>150</td></tr><tr><td>7</td><td>Cable Rack - jetty slab</td><td>Maitree-00-UGY-LC-177595-ISG</td><td>10</td></tr><tr><td>8</td><td>AWRS PUMP cable rack</td><td>Maitree-00-UGY-LC-177601-ISG</td><td>40</td></tr><tr><td>9</td><td>HCS D PUMP HOUSE - TUBE SETTLER</td><td>Maitre-UEU-LC-177590-ISG-0</td><td>10</td></tr><tr><td rowspan="7">CATEGORY -III PIPE/BELT CONVEYORS</td><td>1</td><td>LS PIPE CONVEYOR-1 A/B</td><td>Maitree-00-UED-LC-177353-ISG</td><td>756</td></tr><tr><td>2</td><td>BA PIPE CONVEYOR-3 A/B:</td><td>Maitree-00-UEU-LC-177430-ISG</td><td>500</td></tr><tr><td>3</td><td>GYPSUM PIPE CONVEYOR -2 A/B</td><td>Maitree-00-UED-LC-177586-ISG</td><td>144</td></tr><tr><td>4</td><td>LIME STONE (LS) BELT CONVEYOR-1 (LSBC-1)</td><td>Maitree-00-UED-LC-177358-ISG</td><td>70</td></tr><tr><td>5</td><td>GYPSUM PIPE CONVEYOR -1 A/B</td><td>Maitree-00-UED-LC-177368-ISG</td><td>100</td></tr><tr><td>6</td><td>BOTTOM ASH(BA) BELT CONVEYOR-1 & 2</td><td>Maitree-00-UEU-LC-177420-ISG</td><td>130</td></tr><tr><td>7</td><td>GYPSUM PIPE CONVEYOR -3 A/B</td><td>MAITREE-00-UED-LC-177569-ISG</td><td>50</td></tr></table>						CATEGORY	Sl.No	STRUCTURE DESCRIPTION	RFC DRAWING	WEIGHT (MT)	CATEGORY - I TRANSFER POINTS	1	TRANSFER POINT-2	Maitree-00-UEF-LC-177320-ISG	155	2	TRANSFER POINT-17	Maitree-00-UEF-LC-177331-ISG Maitree-00-UEF-LC-177332-ISG	155	3	TRANSFER POINT-16	Maitree-00-UEF-LC-177324-ISG Maitree-00-UEF-LC-177325-ISG	160	4	TRNASFER POINT -15	Maitree-00-UEU-LC-177517-ISG Maitree-00-UEU-LC-177518-ISG	191	5	TRANSFER POINT-14	Maitree-00-UEU-LC-177509-ISG Maitree-00-UEU-LC-177510-ISG	191	6	TRANSFER POINT-18	Maitree-00-UEF-LC-177338-ISG Maitree-00-UEF-LC-177339-ISG	195	CATEGORY - II PIPE RACKS	1	FLY ASH PIPE RACK - PART 1	Maitree-00-UGY-LC-177493-ISG	500	2	FLY ASH PIPE RACK - PART 2	Maitree-00-UGY-LC-177493-ISG	400	3	FLY ASH PIPE RACK - PART 3	Maitree-00-UGY-LC-177493-ISG	300	4	FLY ASH PIPE RACK - PART 4	Maitree-00-UGY-LC-177493-ISG	230	5	FLY ASH PIPE RACK NEAR SILO	Maitree-00-UGY-LC-177585-ISG	300	6	FLY ASH PIPE RACK NEAR JETTY	Maitree-0-UET-LC-177551-ISG	150	7	Cable Rack - jetty slab	Maitree-00-UGY-LC-177595-ISG	10	8	AWRS PUMP cable rack	Maitree-00-UGY-LC-177601-ISG	40	9	HCS D PUMP HOUSE - TUBE SETTLER	Maitre-UEU-LC-177590-ISG-0	10	CATEGORY -III PIPE/BELT CONVEYORS	1	LS PIPE CONVEYOR-1 A/B	Maitree-00-UED-LC-177353-ISG	756	2	BA PIPE CONVEYOR-3 A/B:	Maitree-00-UEU-LC-177430-ISG	500	3	GYPSUM PIPE CONVEYOR -2 A/B	Maitree-00-UED-LC-177586-ISG	144	4	LIME STONE (LS) BELT CONVEYOR-1 (LSBC-1)	Maitree-00-UED-LC-177358-ISG	70	5	GYPSUM PIPE CONVEYOR -1 A/B	Maitree-00-UED-LC-177368-ISG	100	6	BOTTOM ASH(BA) BELT CONVEYOR-1 & 2	Maitree-00-UEU-LC-177420-ISG	130	7	GYPSUM PIPE CONVEYOR -3 A/B	MAITREE-00-UED-LC-177569-ISG	50
CATEGORY	Sl.No	STRUCTURE DESCRIPTION	RFC DRAWING	WEIGHT (MT)																																																																																																	
CATEGORY - I TRANSFER POINTS	1	TRANSFER POINT-2	Maitree-00-UEF-LC-177320-ISG	155																																																																																																	
	2	TRANSFER POINT-17	Maitree-00-UEF-LC-177331-ISG Maitree-00-UEF-LC-177332-ISG	155																																																																																																	
	3	TRANSFER POINT-16	Maitree-00-UEF-LC-177324-ISG Maitree-00-UEF-LC-177325-ISG	160																																																																																																	
	4	TRNASFER POINT -15	Maitree-00-UEU-LC-177517-ISG Maitree-00-UEU-LC-177518-ISG	191																																																																																																	
	5	TRANSFER POINT-14	Maitree-00-UEU-LC-177509-ISG Maitree-00-UEU-LC-177510-ISG	191																																																																																																	
	6	TRANSFER POINT-18	Maitree-00-UEF-LC-177338-ISG Maitree-00-UEF-LC-177339-ISG	195																																																																																																	
CATEGORY - II PIPE RACKS	1	FLY ASH PIPE RACK - PART 1	Maitree-00-UGY-LC-177493-ISG	500																																																																																																	
	2	FLY ASH PIPE RACK - PART 2	Maitree-00-UGY-LC-177493-ISG	400																																																																																																	
	3	FLY ASH PIPE RACK - PART 3	Maitree-00-UGY-LC-177493-ISG	300																																																																																																	
	4	FLY ASH PIPE RACK - PART 4	Maitree-00-UGY-LC-177493-ISG	230																																																																																																	
	5	FLY ASH PIPE RACK NEAR SILO	Maitree-00-UGY-LC-177585-ISG	300																																																																																																	
	6	FLY ASH PIPE RACK NEAR JETTY	Maitree-0-UET-LC-177551-ISG	150																																																																																																	
	7	Cable Rack - jetty slab	Maitree-00-UGY-LC-177595-ISG	10																																																																																																	
	8	AWRS PUMP cable rack	Maitree-00-UGY-LC-177601-ISG	40																																																																																																	
	9	HCS D PUMP HOUSE - TUBE SETTLER	Maitre-UEU-LC-177590-ISG-0	10																																																																																																	
CATEGORY -III PIPE/BELT CONVEYORS	1	LS PIPE CONVEYOR-1 A/B	Maitree-00-UED-LC-177353-ISG	756																																																																																																	
	2	BA PIPE CONVEYOR-3 A/B:	Maitree-00-UEU-LC-177430-ISG	500																																																																																																	
	3	GYPSUM PIPE CONVEYOR -2 A/B	Maitree-00-UED-LC-177586-ISG	144																																																																																																	
	4	LIME STONE (LS) BELT CONVEYOR-1 (LSBC-1)	Maitree-00-UED-LC-177358-ISG	70																																																																																																	
	5	GYPSUM PIPE CONVEYOR -1 A/B	Maitree-00-UED-LC-177368-ISG	100																																																																																																	
	6	BOTTOM ASH(BA) BELT CONVEYOR-1 & 2	Maitree-00-UEU-LC-177420-ISG	130																																																																																																	
	7	GYPSUM PIPE CONVEYOR -3 A/B	MAITREE-00-UED-LC-177569-ISG	50																																																																																																	
Ref. Doc																																																																																																					

TD-106-2 Rev No. 5		Form No.			PRODUCT STANDARD OIL FIELD EQUIPMENT HYDERABAD		OE 56100	
							Rev No. 01	
							PAGE 5 of 7	
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.			CATEGORY - IV STRUCTURAL HOUSES	1	COMPRESSOR HOUSE-1	Maitree-00-UEU-LC-177456-ISG	185	
				2	HCSD PUMP HOUSE 1	Maitree-00-UEU-LC-177447-ISG	75	
				3	DH-5 FOR LS	Maitree-00-UEF-LC-177345-ISG	40	
			CATEGORY - V SUPPORT STRUCTURES WITH CONCRETE SILO	1	BOTTOM ASH SILO NEAR JETTY-1	Maitree-00-UGY-LC-177582-ISG	250	
				2	GYPSUM SILO-1	Maitree-00-UEB-ED-177399-ISG	250	
				3	FLY ASH SILO NEAR JETTY 1,2 & 3	Maitree-00-UGY-ED-177581-ISG	400	
			CATEGORY - VI SUPPORT STRUCTURE WITH SS SILO	1	LIME STONE INTERMEDIATE STEEL SILO-1 & 2	Maitree-00-UEB-LC-177384-ISG	750	
				2	LIMESTONE UNDERGROUND HOPPER	Maitree-00-UEA-LC-177378-ISG	50	
			CATEGORY - VII SUPPORT STRUCTURES WITH MS SILO WITH SS LINER	1	FLY ASH INTERMEDIATE SILO 1&2	Maitree-00-UET-LC-177408-ISG	510	
				2	BOTTOM ASH INTERMEDIATE SILO 1&2	Maitree-00-UET-LC-177414-ISG	250	
			Note:					
1. Category V – Scope of supply is only Steel structural work. Silos are made of concrete and is not part of scope of supply.								
2. Category VI – Only silo is made up of SS 10Thk sheet, all remaining structures are of CS.								
3. Category VII – Cylindrical portion of Silo is of CS, whereas Conical portion of Silo is made of CS segments with SS liner.								
Ref. Doc								

TD-106-2 Rev No. 5	Form No.		PRODUCT STANDARD OIL FIELD EQUIPMENT HYDERABAD	OE 56100																																																						
				Rev No. 01																																																						
				PAGE 6 of 7																																																						
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	TABLE OF COMPLIANCE: OE56100 Vendor to fill up table of compliance, attest and submit along with technical bid.																																																									
	<table><thead><tr><th>CLAUSE NO</th><th>CONFIRMS (YES/NO)</th><th>REMARKS</th></tr></thead><tbody><tr><td>1.0</td><td></td><td></td></tr><tr><td>2.0</td><td></td><td></td></tr><tr><td>3.0)a</td><td></td><td></td></tr><tr><td>3.0)b</td><td></td><td></td></tr><tr><td>3.0)c</td><td></td><td></td></tr><tr><td>3.0)d</td><td></td><td></td></tr><tr><td>4.0)</td><td></td><td></td></tr><tr><td>5.0)</td><td></td><td></td></tr><tr><td>6.0)</td><td></td><td></td></tr><tr><td>7.0)a</td><td></td><td></td></tr><tr><td>7.0)b</td><td></td><td></td></tr><tr><td>8.0)a</td><td></td><td></td></tr><tr><td>8.0)b</td><td></td><td></td></tr><tr><td>8.0)c</td><td></td><td></td></tr><tr><td>8.0)d</td><td></td><td></td></tr><tr><td>9.0)</td><td></td><td></td></tr><tr><td>10.0)</td><td></td><td></td></tr><tr><td>11.0)</td><td></td><td></td></tr></tbody></table>	CLAUSE NO	CONFIRMS (YES/NO)	REMARKS	1.0			2.0			3.0)a			3.0)b			3.0)c			3.0)d			4.0)			5.0)			6.0)			7.0)a			7.0)b			8.0)a			8.0)b			8.0)c			8.0)d			9.0)			10.0)			11.0)		
CLAUSE NO	CONFIRMS (YES/NO)	REMARKS																																																								
1.0																																																										
2.0																																																										
3.0)a																																																										
3.0)b																																																										
3.0)c																																																										
3.0)d																																																										
4.0)																																																										
5.0)																																																										
6.0)																																																										
7.0)a																																																										
7.0)b																																																										
8.0)a																																																										
8.0)b																																																										
8.0)c																																																										
8.0)d																																																										
9.0)																																																										
10.0)																																																										
11.0)																																																										
Ref. Doc																																																										

