

PROJECT: 2X660 MW UDANGUDI STPS STAGE-I**PACKAGE : WORKSHOP EQUIPMENT****BOQ CUM UNPRICE SCHEDULE**

Sl.No	DESCRIPTION OF EQUIPMENT / ITEM	UNIT	QTY	No of Days at site excluding travel time	No. of Visit at site	Quoted (Y/N)	Freight percentage w.r.t. total ex-works	GST percentage on supply and services
1	Heavy Duty Lathe	Nos	1	2	1			
2	Heavy Duty Lathe M/c-1	Nos	1	2	1			
3	Shaper	Nos	1	2	1			
4	Slotting machine	Nos	1	2	1			
5	Universal Milling machine	Nos	1	2	1			
6	Radial Drilling Machine	Nos	1	2	1			
7	Pedestal Drilling Machine	Nos	1	1	1			
8	Grinder	Nos	1	1	1			
9	Tube bending Machine	Nos	1	Nil	Nil			
10	Power Hacksaw Machine	Nos	1	1	1			
11	A/C Welding Machine	Nos	2	Nil	Nil			
12	D/C Welding Machine	Nos	1	Nil	Nil			
13	Argon Arc Welding Sets	Nos	2	Nil	Nil			
14	Soldering Iron	Nos	4	Nil	Nil			
15	Welding Tables	Nos	3	Nil	Nil			
16	Pneumatic Hammer	Nos	1	Nil	Nil			
17	Work Benches	Nos	6	Nil	Nil			
18	Fitter Vice	Nos	6	Nil	Nil			
19	Marking off Table	Nos	1	Nil	Nil			
20	Portable Screen	Nos	1	Nil	Nil			
21	Corrugating rollers	Nos	1	Nil	Nil			
22	Industrial vaccum cleaner	Nos	1	Nil	Nil			
23	Set of measuring tools	Set	1	Nil	Nil			
24	General Tools	Set	1	Nil	Nil			

PROJECT: 2X660 MW UDANGUDI STPS STAGE-I


PACKAGE : WORKSHOP EQUIPMENT

BOQ CUM PRICE SCHEDULE

SLNo	DESCRIPTION OF EQUIPMENT / ITEM	UNIT	QTY	SUPPLY PRICE					PRICE FOR SUPERVISION OF ERECTION & COMMISSIONING									Total F.O.R. Price including Total price of Supervision of E & C (Rs.)	
				Unit Ex. Works including Packing & Forwarding Rs.	Total Ex. Works including Packing & Forwarding Rs.	Freight@.....% on Ex-works	GST@.....% of Ex-works and Freight	Total F.O.R. Price Rs.	No of Days at site excluding travel time	LUMP SUM DAILY CHARGES FOR ENGINEER	LUMP SUM CHARGES FOR ENGINEER FOR DAYS MENTIONED	GST@.....%	TOTAL LUMP SUM CHARGES FOR ENGINEER FOR DAYS MENTIONED, WITH GST	No. of Visit at site	LUMP SUM CHARGES PER VISIT FOR ENGINEER EXCEPT DAILY CHARGES	GST@.....%	LUMP SUM CHARGES PER VISIT FOR ENGINEER EXCEPT DAILY CHARGES, WITH GST		Total Lumpsum cost for Supply & Supervision of E&C (if applicable)
Column no.			1	2	3=2x1	4=3x...%	5=(3+4)x....	6=3+4+5	7	8	9=7x8	10=9x.....%	11=9+10	12	13	14=13 x.....%	15=13+14	16=11+15	17=6 + 16
Price of equipment / item for SUPPLY PART comprising of design (i.e. preparation and submission of drawing /documents including "As Built" drawings and O&M manuals), engineering, manufacture, fabrication, assembly, inspection / testing at vendor's & sub-vendor's works, painting, cutting tools and cutting tool mounting accessories (as applicable), maintenance tools & tackles (as applicable), fill of lubricants & consumables, alongwith spares for erection, startup and commissioning as required, foundation bolts, nuts, lock nuts, washers, levelling pads, forwarding, proper packing, shipment and delivery at site (at site or port, as per NIT conditions) and Supervision of Erection and Commissioning (for applicable equipment / machines)for project and package specified above complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.																			
1	Heavy Duty Lathe	Nos	1						2					1					
2	Heavy Duty Lathe M/c-1	Nos	1						2					1					
3	Shaper	Nos	1						2					1					
4	Slotting machine	Nos	1						2					1					
5	Universal Milling machine	Nos	1						2					1					
6	Radial Drilling Machine	Nos	1						2					1					
7	Pedestal Drilling Machine	Nos	1						1					1					
8	Grinder	Nos	1						1					1					
9	Tube bending Machine	Nos	1						Nil					Nil					
10	Power Hacksaw Machine	Nos	1						1					1					
11	A/C Welding Machine	Nos	2						Nil					Nil					
12	D/C Welding Machine	Nos	1						Nil					Nil					
13	Argon Arc Welding Sets	Nos	2						Nil					Nil					
14	Soldering Iron	Nos	4						Nil					Nil					
15	Welding Tables	Nos	3						Nil					Nil					
16	Pneumatic Hammer	Nos	1						Nil					Nil					
17	Work Benches	Nos	6						Nil					Nil					
18	Fitter Vice	Nos	6						Nil					Nil					
19	Marking off Table	Nos	1						Nil					Nil					
20	Portable Screen	Nos	1						Nil					Nil					
21	Corrugating rollers	Nos	1						Nil					Nil					
22	Industrial vaccum cleaner	Nos	1						Nil					Nil					
23	Set of measuring tools	Set	1						Nil					Nil					
24	General Tools	Set	1						Nil					Nil					

Note:
1) Evaluation shall be done itemwise for item no. 1 to 24 and price quoted at Column no. 17 shall be used for evaluation of each item.

BHEL-PEM-MAUX
PRE-QUALIFICATION CRITERIA

	PROJECT: 2X660 MW UDANGUDI TPS PACKAGE: WORKSHOP EQUIPMENTS PRE-QUALIFICATION REQUIREMENT	PE-PQ-435-568-A001	
		DATE	17.08.2023
		REV NO	00

1.0	<p>Supplier should have capability of manufacturing and having in-house facility for testing of at least one of the following Machines:</p> <ol style="list-style-type: none"> 1) Lathe Machine SOB- 575 mm, DBC -1500 mm. 2) Shaper Machine Stroke- 600 mm. 3) Slotter Stroke- 300 mm. 4) Universal Milling Machine Table size-1000 mm X225 mm 5) Radial Drilling Machine Drilling Capacity in mild steel -50mm and radius of drilling arm-950 mm. 6) A/C Welding Machine / D/C Welding Machine / Argon Arc Welding Machine.
2.0	<p>The supplier has to submit either of following supporting documents meeting above mentioned pre-qualifying requirement</p> <ol style="list-style-type: none"> a. Copy of minimum one (1) performance certificate in English from end user along with copy of related Purchase Order (PO) or letter of intent (LOI) or letter of award (LOA) or work order (WO) specifying that the product/ equipment is running successfully for one (1) year from date of commissioning meeting the minimum pre-qualifying requirement. OR b. Minimum two PO/ LOI /LOA/ WO placed with a minimum gap of six (6) months from same purchaser meeting the minimum pre-qualifying requirement. OR c. Minimum one PO/ LOI /LOA/ WO after commissioning of first order from same purchaser meeting the minimum pre-qualifying requirement. OR d. Minimum three customer's/ third party's inspection reports/ test certificates/commissioning certificates meeting the minimum pre-qualifying requirement.
3.0	<p>Minimum one (1) no. Purchase order, shall be submitted which should not be more than Seven (7) years old as on date of bid submission, for establishing continuity in business. This is over and above the requirement of PO mentioned of PQR clause at S. no. 2.0 above.</p>
4.0	<p>Indian stockiest/ trader/ distributor/ dealer/ authorized agent/ channel partner/ Indian sales office or subsidiary of principal - with aftersales service agreement with OEM/principal are also acceptable provided OEM/principal meets the minimum pre-qualification criteria stipulated above at S.no 1.</p>
5.0	<p>Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.</p>
6.0	<p>Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.</p>
7.0	<p>Consideration of offer shall be subject to customer's approval of bidders, if applicable.</p>
8.0	<p>After satisfactory fulfilment of all the above criteria / requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.</p>



**TAMILNADU GENERATION & DISTRIBUTION CORPORATION
LIMITED. (TANGEDCO)**

2X660 MW UDANGUDI STPS, STAGE-I

VOLUME IIB & III

**TECHNICAL SPECIFICATION
FOR
WORKSHOP EQUIPMENT**

SPECIFICATION NO.: PE-TS-435-568-A001



**BHARAT HEAVY ELECTRICALS LIMITED
(A Govt. of India Undertaking)
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, U.P
INDIA**



TITLE

**2X660 MW UDANGUDI STPS
TECHNICAL SPECIFICATION
FOR
WORKSHOP EQUIPMENT**

SPECIFICATION NO. PE – TS – 435 - 568 – A001

VOLUME IIB

SECTION I

REV 0

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1630073/2023/PS-PEM-MAX

PEM-6666-0



TITLE
2X660 MW UDANGUDI TPS
TECHNICAL SPECIFICATION
FOR
WORKSHOP EQUIPMENT

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SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS

SUB-SECTION IA – Specific Technical Requirement (Mechanical)

SUB-SECTION IB – Specific Technical Requirement (Electrical)



TITLE **2X660 MW UDANGUDI STPS**
TECHNICAL SPECIFICATION FOR
WORKSHOP EQUIPMENTS

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1.0 INTENT OF SPECIFICATION

- 1.1 This specification includes, but not limited to design (i.e. preparation and submission of drawing /documents including "As Built" drawings and O&M manuals), engineering, manufacture, fabrication, assembly, inspection / testing at vendor's & sub-vendor's works, painting, maintenance tools & tackles , fill of lubricants & consumables, along with spares for erection, start up and commissioning, forwarding, proper packing, shipment and delivery at site of **WORKSHOP EQUIPMENTS** for 2X660 MW UDANGUDI STPS specified as above complete with all accessories for the total scope defined as per BHEL NIT & technical specification, amendment & agreements till placement of order.
- 1.2 The contractor shall be responsible for providing all material, equipment & services, which are required to fulfil the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification, irrespective of whether it has been specifically listed herein or not. Omission of specific reference to any component / accessory necessary for proper performance of the equipment shall not relieve the vendor from the responsibility of providing such facilities to complete the supply of **WORKSHOP EQUIPMENTS**.
- 1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material which in his judgement is not in full accordance herewith.
- 1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the drawing.
- 1.5 The general term and conditions, instructions to tenderer and other attachment referred to elsewhere are made part of the tender specification. The equipment materials and works covered by this specification is subject to compliance to all attachments referred to in the specification. The bidder shall be responsible for and governed by all requirements stipulated herein.
- 1.6 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information, ensure completeness of specification, to bring out any contradictory / conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Vol-III of the specification. In absence of any such clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of Purchaser/Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Purchaser/ Customer as and when brought to their notice either by the bidder or by purchaser/ customer themselves. However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.
- 1.7 The bidder's offer shall not carry any sections like clarification, interpretations and /or assumptions.
- 1.8 Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule; otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification.
- 1.9 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.
- 1.10 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder /vendor and Customer/ Purchaser/Employer will mean BHEL and /or Customer including their consultant as interpreted by BHEL in the relevant context.



TITLE: 2X660 MW UDANGUDI STPS

TECHNICAL SPECIFICATION

FOR

WORKSHOP EQUIPMENT

SPECIFICATION NO. PE – TS - 435 - 568 – A001

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Specific Technical Requirement (Mechanical)



2X660 MW UDANGUDI STPS
SPECIFIC TECHNICAL REQUIREMENTS FOR
WORKSHOP EQUIPMENT

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1.0 SYSTEM DESCRIPTION AND SCOPE OF WORK

1.1 The **WORKSHOP EQUIPMENT'S** shall be complete in every respect & suitable for satisfactory operation of the power plant. The list of minimum equipment to be supplied is furnished below. The sizes of equipment and their capacity shall be selected based on the requirement specific to the equipment and systems being proposed by the bidder. Bidder shall also provide base plates, support plates, anchor bolts, foundation bolts and nuts, lifting lugs, eye bolts etc, Maintenance tools and tackles, in steel tool box for all equipment's, commissioning spares for various equipment's as applicable, first fill lubricant / coolant for each equipment & five (5) metres of power cable (spare) along with each equipment. Bidder shall also provide service of supervision of Erection & Commissioning of equipment's as indicated in price schedule.

The various components of workshop Equipment shall be capable of easy installation and removal / replacement. The noise and vibration from Equipment shall be minimized and not be greater than that from high quality modern plant of comparable size. Special attention shall be paid to the appropriate regulations for accident prevention. It must be assumed that in the operation of the Equipment's even inexperienced personnel shall be satisfactorily protected. All equipment and Equipment's with moving, hot or electrically energized parts shall be provided with reliable protective equipment. Where necessary, erection openings / access shall be provided. Suitable safety interlocks, limit switches for longitudinal travel and cross traverse of saddles and emergency brakes shall be provided as required. Emergency brake control shall be easily approachable to the operator. The Equipment's, tools and equipment will be in accordance with ISO standards as well as accident prevention regulations. The various Equipment, shall be so designed and arranged as to present a functional and pleasing appearance.

S. N.	EQUIPMENT NAME	TECHNICAL SPECIFICATION	ACCESSORIES	QTY.
1.0	Heavy Duty Lathe	900 mm SOB, 2000 mm DBC. Other parameters of the Equipment shall be as per manufacturer's standard	Square tool post, two (2) nos. dead centres, rotating centre, quick change tool post with set of tool holder, 3 jaw self-centering chuck, complete coolant system, oil gun & oil can, rear splash guard, steady rest and follow rest, one set (10 nos.) of carbide turning tools (standard), work light without bulb, chip tray, longitudinal stop.	1
2.0	Heavy Duty Lathe M/c-1	600 mm SOB, 1500 mm DBC. Other parameters of the Equipment shall be as per manufacturer's standard	Square tool post, two (2) nos. dead centres, rotating centre, quick change tool post with set of tool holder, 3 jaw self-centering chuck, complete coolant system, oil gun & oil can, rear splash guard, steady rest and follow rest, one set (10 nos.) of carbide turning tools (standard), work light without bulb, chip tray, longitudinal stop.	1
3.0	Shaper	Stroke-610 mm, other parameters of the Equipment shall be as per manufacturer's standard	Crank handle, tool holder attachment, Ram length adjustment control, one (1) no. high speed steel (HSS) cutting tool, Equipment vice, pulleys & v-belts as required, electric motor, starter, automotive lubricating pump, Equipment lamp without bulb.	1
4.0	Slotting Equipment	Stroke - 300 mm, other parameters of the Equipment shall be as per manufacturer's standard	Complete coolant system / equipment, lighting equipment, 3 jaw self-centring chuck of diameter 300 mm with back plate (steel body).	1
5.0	Universal Milling Equipment	Table - 1600 mm X 300 mm, other parameters of the Equipment shall be as per manufacturer's standard	Complete coolant equip. work light without bulb, indexing head. One (1) no. high speed steel milling cutter.	1
6.0	Radial Drilling Equipment	Capacity drilling in steel 50 mm diameter, Radius of drilling arm: 1500 mm, other parameters of the Equipment shall be as per manufacturer's standard	Box table (500 mm X 500mm X 500 mm), complete coolant equipment with pump, motor, piping etc. Work light without bulb	1
7.0	Pedestal drill	16 mm diameter in steel, size of table – 600mm x 600 mm	Nil	1



2X660 MW UDANGUDI STPS
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S. N.	EQUIPMENT NAME	TECHNICAL SPECIFICATION	ACCESSORIES	QTY.
8.0	Grinder	600 mm wheel diameter. Double wheel pedestal grinder	Eye protection shield, tool rest bracket, adjustable tool rest, One coarse grinding wheel and one fine grinding wheel, Equipment lamp.	1
9.0	Tube bending Equipment	1/2" to 4" NB, other parameters of the Equipment shall be as per manufacturer's standard	Formers of different sizes suiting Equipment capacity.	1
10.0	Power hacksaw	Job diameter - 225 mm, other parameters of the Equipment shall be as per manufacturer's standard	One (1) no. hacksaw blade, Equipment lamp without bulb.	1
11.0	A/C welding Equipment	Current range - 60 to 400 Amps, AC Welding Transformer, other parameters of the Equipment shall be as per manufacturer's standard	Welding cable with electrode holder (5 metres length), Earthing cable assembly (5 metres), Protective helmet with glass, pair of hand gloves, chisel, wire brush, Ammeter- voltmeter attachment	2
12.0	D/C welding Equipment	MG set, current range : 35 – 320 Amps, Rectifier welding sets other parameters of the Equipment shall be as per manufacturer's standard	Welding cable with electrode holder (5 metres length), Earthing cable assembly (5 metres), Protective helmet with glass, pair of hand gloves, chisel, wire brush.	1
13.0	Argon Arc welding set	Max continuous welding current @ 60% duty cycle 170 amps, welding current range: 5 to 220 Amps.	Nil	2
14.0	Soldering iron	25 Watts, 250 Volts	Nil	4
15.0	Welding tables	Size - 750 mm (length) X 500 mm (width) X 1000 mm (Height)	Nil	3
16.0	Pneumatic hammer	As per manufacturer standard.	Nil	1
17.0	Work benches	Carpenter type work bench, size – 750 mm x 500 mm x 1000 mm height	Nil	6
18.0	Fitter vice	Size – 150 mm.	Nil	6
19.0	Marking-off table	Size – 2000mm x 2000 mm, material of construction – cast iron.	Nil	1
20.0	Portable screens	Fabricated screen, size 6 ft high and 8 ft length	Nil	1
21.0	Corrugating rollers	Size 900mm & Sheet thickness 18 SWG.	Nil	1
22.0	Industrial Vacuum cleaner	Wet & dry type vacuum cleaner of tank capacity 40 Litter along with all accessories required for function of equipment.	Nil	1
23.0	Set of measuring tools		Nil	One (1) set of each measuring tool
a	Vernier Calliper	Size 0 to 300mm, least count 0.02mm.	Nil	-
b	Vernier depth gauge	Size 0 to 300mm, least count 0.02mm.	Nil	-
c	Inside calliper	0 to 150 mm	Nil	-
d	Outside calliper	0 to 150 mm	Nil	-



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S. N.	EQUIPMENT NAME	TECHNICAL SPECIFICATION	ACCESSORIES	QTY.
e	Inside Micrometre	Size 0 to 25mm, least count 0.01mm.	Nil	-
f	Outside Micrometre	Size 0 to 150mm, 0.01mm accuracy.	Nil	-
g	Dial gauge with magnetic stand.	Size 0 to 10mm, least count 0.01mm	Nil	-
h	V block	100 mm x 45 mm x 60 mm	Nil	-
i	Snap Gauges	As per manufacturer standard	Nil	-
j	Feeler Gauge	As per manufacturer standard	Nil	-
k	Thread Pitch Gauge	NTPC, Metric- As per manufacturer standard.	Nil	-
l	Slip Gauge block	As per manufacturer standard	Nil	-
m	Precision Level	As per manufacturer standard.	Nil	-
n	Steel measuring tape	5m long.	Nil	-
o	Steel Rule	150 mm , 300 mm, 600 mm, 1000mm	Nil	-
24.0	General Tools (one set consist as "a" to "t").		-	-
a	Screw drivers	Dimension & Blade length (mm)- 3.2x0.5x200; 4.3x0.6x200; 5x0.6x125; 5x0.8x200.	Nil	1
b	Double ended spanners (mm x mm)	10x11; 12x13; 14x15; 16x17;18x19; 20x22; 21x23; 24x26; 24x27; 25x28; 30x32.	Nil	1
c	Hammer Set	Ball Peen Hammer in 1 lb, 2 Lbs, Mallet Hammer 1 Lbs, Wooden Hammer	Nil	1
		Sledge Hammer	Nil	1
		10 Lbs Sledge Hammer	Nil	1
d	Hack Saw frame with blades	As per manufacturer standard.	Nil	1
e	Socket set	1/2" Sq Drive socket in size mm (10, 12, 14, 16, 18, 20, 22, 24 ,26, 28 30,32)	Nil	1
f	Precision Level	As per manufacturer standard.	Nil	1
g	File set	Flat- 100,150,200,250 mm Round file - 150 mm Half Round file - 200 mm, 250 mm	Nil	10
h	Pipe Cutter	½" – 2"	Nil	1
i	Long nose plier	170 mm(L)	Nil	1
j	Round nose plier	25 mm(L)	Nil	1
k	Universal Plier & Cutter Plier	As per manufacturer standard	Nil	1

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S. N.	EQUIPMENT NAME	TECHNICAL SPECIFICATION	ACCESSORIES	QTY.
l	Cir Clip Plier (Inside /Outside)	As per manufacturer standard	Nil	1
m	Pipe wrench	Each - 0-3/4", 1½", 0-2½"	Nil	1
n	Right angle	12" Size	Nil	1
o	Chisel Set	Flat Chisel of 1/2", ¾", 1" tip size	Nil	1
p	Bearing Puller set	Universal Puller Twin Grip of 6" opening size - 1	Nil	1
		Puller triple grip of 8" opening size -1 No.	Nil	1
q	Centre Punch	As per manufacturer standard.	Nil	1
r	Gasket Punch set	Punches of various sizes 6, 8, 10, 12, 16, 20, 22, 24 mm in a case.	Nil	1
s	Hand Lamps, without Bulbs, Sockets, Plugs &Cables	As per manufacturer standard.	Nil	1
t	Box for above tools	As per manufacturer standard.	Nil	1

2.0 Painting:

Following painting specification shall be followed for above Workshop Equipment's except for item no. 11.0, 12.0, 13.0, 14.0, 16.0, 18.0, 20.0, 21.0, 22.0, 23.0 & 24.0, for which, manufacture's standard painting specification shall be followed. All paintings shall be suitable for sea atmosphere.

Surface Preparation:	Degreasing and surface preparation to SA 2 1/2.
Prime coat:-	Solvent based IZS - VS of 60%. Zn Dust - 1.77 kg/ltr minimum. Zn dust by weight - minimum 85%. Pot life 12 hrs / 21 Deg.- Paint to meet compositional & performance specifications for SSPC Paint 20 , Level 1.
Intermediate coat:	Two component Zinc rich Primer meeting performance and compositional specifications of SSPC Paint 20 Level2
Sealer	Single pack Heat Resistant Silicon Acrylic Finish paint.
Finish	Single pack Heat Resistant Silicon Acrylic Finish paint
Total system:	Dry film thickness 150 microns.

Final shade of paint shall be as per manufacturer's standard.

Bidder shall also supply adequate quantity of loose touch up paint along with the equipment so that damage in transition, if any, can be taken care.

Painting specification and schedule shall be provided by the bidder for each Equipment as indicated in the NIT specification.

However, painting specification of those items / equipment's which are not covered (as indicated above), bidder to prepare the painting specification and submit to BHEL / CUSTOMER for approval after placement of order and any changes required by BHEL / CUSTOMER for the same shall be incorporated and adhered by the bidder without any commercial implications.

3.0 CODES & STANDARD

The Equipment's covered under the scope of work shall be new, of streamlined construction, rugged and vibration free in line with the Indian / International standard/ISO standard and practices.



2X660 MW UDANGUDI STPS
SPECIFIC TECHNICAL REQUIREMENTS FOR
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4.0 General Technical Requirement

- 4.01 Design of Equipment's shall be such that no cooling water, air from external source are required for cooling of any part of Equipment. Necessary cooling arrangement, if required, shall be provided by the bidder in their Equipment's.
- 4.02 Noise level for each Equipment at a horizontal distance of 1.0 metre from the edge of the Equipment and at a height of 1.5 metres from the ground shall be limited to 85 dbA.
- 4.03 Guards, covers, devices, tools & other means that will effectively protect all personnel from any accidental or injury shall be provided and shown in the drawings to be submitted during detail engineering.
- 4.04 Hand wheels shall be polished / Nickel - Chrome plated.
- 4.05 Equipment's shall be suitable for the electrical conditions like voltages, frequencies, variations etc. as indicated in Electrical specification.
- 4.06 BHEL, will provide one (1) no. feeder for each Equipment. Terminal points shall be the panels in respective Equipment's at which BHEL shall terminate it's power cable. However suitable cable glands and lugs shall be in bidder's scope. Bidder will distribute the power requirement of various motors from their Equipment's panel.
- 4.07 Earthing studs with cables / strips for the Equipment shall be provided by the bidder.
- 4.08 All Equipment's shall be provided with DOL starter.
- 4.09 Cable Glands shall be double compression tinned brass type and the cable glands shall be supplied as a part of each Equipment.
- 4.10 All cable lugs shall be heavy-duty tin-plated crimping type the cable lugs.
- 4.11 The electrical equipment supplied as a part of Equipment shall include isolating switch for power supply isolation incorporating mechanical safety as required.

5.0 INSPECTION & TESTING

- 5.1 The Equipment offered shall conform to the latest relevant Indian / international Codes / Standards, their electrical drives shall conform to the latest Indian Electricity Rules and shall comply for the currently applicable statutory regulations and safety codes for the locality where the equipment shall be installed.
- 5.2 Each Equipment before despatch shall be shop assembled & tested for its performance in the presence of purchaser's representative. Vendor to ensure the proper quality checks during manufacturing & assembly of Equipment, including identification, co-relation & verification of material test certificates for critical components like gears, shafts, spindles, sleeves etc. and radiographic tests for welds and ultrasonic tests on forging/castings to ensure defects free components and furnish test procedure, reports & test certificates on shop tests.

6.0 EXCLUSION

- 6.1 Draining arrangement of liquid coolant from source to the nearest drain.
- 6.2 Construction of Workshop building.
- 6.3 Pipe trench & cable trenches, doors / windows, rolling shutter, ramp and glass partition wall, if any.
- 6.4 Power supply feeders, Cable termination.
- 6.5 One no. EOT crane of 10 tonnes capacity however bidder to ensure that the heaviest part of individual Equipment shall not exceed 10 Tonnes.
- 6.6 Erection and commissioning.



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ANNEXURE - I**MAKES OF SUB VENDORS ITEMS OF WORKSHOP EQUIPMENT**

S. NO.	ITEM	SUPPLIERS	PLACE	REMARKS
1.	BEARINGS	SKF	-	
		FAG	-	
		TATA	-	
		NBC	-	
2.	V- BELT	FENNER	-	
		DUNLOP	-	
3.	HYDRAULIC POWER PACK	VICKERS-PERRY	-	
		REXROTH	-	
4.	PVC POWER CABLES	APAR INDUSTRIES LTD.	MUMBAI	
		CORDS CABLE INDUSTRIES LTD.	NEW DELHI	
		DIAMOND POWER INFRASTRUCTURE LTD	VADODARA	
		GOYOLENE FIBRES (INDIA) PVT.LTD	MUMBAI	
		GOVIND CABLE INDUSTRIES	KOLKATA	
		GUPTA POWER INFRASTRUCTURE LIMITED	BHUBNESWAR	
		HAVELLS INDIA LIMITED	NOIDA	
		KEI INDUSTRIES LTD.	NEW DELHI	
		KRISHNA ELECTRICAL INDUSTRIES LTD	GWALIOR	
		KEC INTERNATIONAL LIMITED	MUMBAI	
		MANSFIELD CABLES COMPANY LTD.	NOIDA	
		NICCO CORPORATION LTD.	KOLKATA	
		PARAMOUNT COMMUNICATIONS LTD.	NEW DELHI	
		POLYCAB WIRES PVT. LTD.	MUMBAI	
		RADIANT CORPORATION PRIVATE LIMITED	HYDERABAD	
		RAVIN CABLES LIMITED	MUMBAI	
		SUYOG ELECTRICALS LTD.	VADODARA	
		SRIRAM CABLES PVT. LTD.	NEW DELHI	
SCOT INNOVATION WIRES AND CABLES PVT. LTD.	SOLAN			
SAM CABLES & CONDUCTORS (P) LTD	UDHAM SINGH NAGAR			
THERMO CABLES LTD	HYDERABAD			
5.	PVC CONTROL CABLES	ADVANCE CABLE TECHNOLOGIES (P) LTD	BANGALORE	
		APAR INDUSTRIES LTD., CMI LTD	MUMBAI	
		CMI LIMITED	FARIDABAD	
		CORDS CABLE INDUSTRIES LTD	NEW DELHI	
		CRYSTAL CABLE INDUSTRIES LTD	KOLKATA	
		DELTON CABLES LTD	NEW DELHI	
		DIAMOND POWER INFRASTRUCTURE LTD	VADODARA	
		ELKAY TELELINKS LTD	NEW DELHI	
		GEMSCAB INDUSTRIES LTD	NEW DELHI	
		GOVIND CABLE INDUSTRIES	KOLKATA	
		GUPTA POWER INFRASTRUCTURE LIMITED	BHUBNESWAR	
		HAVELLS INDIA LIMITED	NOIDA	
		INCOM CABLES (P) LTD	NEW DELHI	
		KEI INDUSTRIES LTD	NEW DELHI	
		KRISHNA ELECTRICAL INDUSTRIES LTD	GWALIOR	
		KEC INTERNATIONAL LIMITED	MUMBAI	
		MANSFIELD CABLES COMPANY LTD	NOIDA	
		NICCO CORPORATION LTD	KOLKATA	



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S. NO.	ITEM	SUPPLIERS	PLACE	REMARKS
		PARAMOUNT COMMUNICATIONS LTD	NEW DELHI	
		POLYCAB WIRES PVT. LTD	MUMBAI	
		RAVIN CABLES LIMITED	MUMBAI	
		SUYOG ELECTRICALS LTD	VADODARA	
		SPECIAL CABLES PVT. LTD	NEW DELHI	
		SCOT INNOVATION WIRES AND CABLES PVT. LTD	SOLAN	
		SAM CABLES & CONDUCTORS (P) LTD	UDHAM SINGH NAGAR	
		SPM POWER & TELECOM PVT. LTD	HYDERABAD	
		TORRENT CABLES LTD	AHMEDABAD	
		THERMO CABLES LTD	HYDERABAD	
		TIRUPATI PLASTOMATICS PVT. LTD	JAIPUR	
		UNIVERSAL CABLES LTD	SATNA	
6.	XLPE POWER CABLES	APAR INDUSTRIES LTD	MUMBAI	
		CORDS CABLE INDUSTRIES LTD	NEW DELHI	
		CRYSTAL CABLE INDUSTRIES LTD	KOLKATA	
		DIAMOND POWER INFRASTRUCTURE LTD	VADODARA	
		GEMSCAB INDUSTRIES LTD	NEW DELHI	
		GOVIND CABLE INDUSTRIES	KOLKATA	
		GUPTA POWER INFRASTRUCTURE LIMITED	BHUBNESWAR	
		HAVELLS INDIA LIMITED	NOIDA	
		KEI INDUSTRIES LTD	NEW DELHI	
		KRISHNA ELECTRICAL INDUSTRIES LTD	GWALIOR	
		KEC INTERNATIONAL LIMITED	MUMBAI	
		MANSFIELD CABLES COMPANY LTD	NOIDA	
		PARAMOUNT COMMUNICATIONS LTD	NEW DELHI	
		POLYCAB WIRES PVT. LTD	MUMBAI	
		RAVIN CABLES LIMITED	MUMBAI	
		SUYOG ELECTRICALS LTD	VADODARA	
		SPECIAL CABLES PVT. LTD	NEW DELHI	
		SCOT INNOVATION WIRES AND CABLES PVT. LTD	SOLAN	
		SRIRAM CABLES PVT. LTD	NEW DELHI	
		TORRENT CABLES LTD	AHMEDABAD	
THERMO CABLES LTD	HYDERABAD			
TIRUPATI PLASTOMATICS PVT. LTD	JAIPUR			
7.	XLPE CONTROL CABLES	APAR INDUSTRIES LTD	MUMBAI	
		CABLE CORPORATION OF INDIA LTD	MUMBAI	
		CRYSTAL CABLE INDUSTRIES LTD	KOLKATA	
		DIAMOND POWER INFRASTRUCTURE LTD	VADODARA	
		GEMSCAB INDUSTRIES LTD	NEW DELHI	
		HAVELLS INDIA LIMITED	NOIDA	
		KEI INDUSTRIES LTD	NEW DELHI	
		KRISHNA ELECTRICAL INDUSTRIES LTD	GWALIOR	
		KEC INTERNATIONAL LIMITED	MUMBAI	
		PARAMOUNT COMMUNICATIONS LTD	NEW DELHI	
		POLYCAB WIRES PVT. LTD	MUMBAI	
		RADIANT CORPORATION PRIVATE LIMITED	HYDERABAD	
		RAVIN CABLES LIMITED	MUMBAI	



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		SUYOG ELECTRICALS LTD	VADODARA	
		SRIRAM CABLES PVT. LTD	NEW DELHI	
		TORRENT CABLES LTD	AHMEDABAD	
		UNIVERSAL CABLES LTD	SATNA	
8.	PUMP FOR COOLANT	PHULSONS		
		RAJPURA / RAJAMANE INDUSTRIES PVT. LTD.	BANGLORE	
9.	LT MOTORS	SIEMENS	-	
		NGEF (up to 15KW)	-	
		CROMPTON	-	
		KIRLOSKAR	-	
		BHARAT BIJLI	-	
		ABB	-	
		GE	-	
		LAXMI HYDRAULICS PVT. LTD	-	
		MARATHON	-	
		RAJINDRA ELECT INDUSTRIES	-	
		HAVELS INDIA LTD	-	
10.	PAINT	ASIAN PAINTS (I) LTD.	-	
		BERGER PAINTS INDIA LTD	-	
		GOODLASS NEROLAC	-	
		JENSON & NICHOLSON (I) LTD	-	
		CDC CARBOLINE (I) LTD.	-	
		SHALIMAR PAINTS LTD.	-	
		ADDISON PAINTS LTD	-	
		GRAND POLYCOAT	-	
		BOMBAY PAINTS	-	
		HEMPLE PAINTS (SINGAPORE)	-	
		JOTUN PAINTS	-	
11.	Cable Glands	ALLIED TRADERS & EXPORTERS ARUP ENGG & FOUNDRY WORKS BALIGA LIGHTING EQPT.PVT.LTD. COMMET BRASS PRODUCTS DOWELLS ELECTROMAC INDUSTRIES INCAB		
12.	CABLE LUGS	DOWELLS UNIVERSAL MACHINES LTD.		

NOTE:

1. THE SUB VENDOR LIST ABOVE IS INDICATIVE ONLY AND IS SUBJECT TO CUSTOMER APPROVAL DURING DETAILED ENGINEERING STAGE WITHOUT ANY COMMERCIAL & DELIVERY IMPLICATION TO BHEL. BIDDER WILL SEEK APPROVAL FROM BHEL DURING DETAILED ENGINEERING STAGE FOR THOSE ITEMS WHICH ARE NOT APPEARING IN THE LIST BUT REQUIRED FOR THE EQUIPMENT. HOWEVER, BIDDER SHALL NOT APPROACH BHEL FOR APPROVAL OF ADDITIONAL MAKE OF ANY ITEM WHICH IS ALREADY APPEARING IN THE LIST.
2. BIDDER TO PROPOSE SUB VENDOR WITHIN 4 WEEKS OF PLACEMENT OF LOI. THEREAFTER NO REQUEST FOR ADDITIONAL SUB-VENDOR SHALL BE ENTERTAINED.
3. DEALERS ARE NOT ACCEPTABLE FOR ANY ITEM OF THE PACKAGE. BIDDER SHALL PROCURE ALL ITEMS INCLUDING PLATES, STRUCTURAL, FLANGES; COUNTER FLANGES ETC. FROM APPROVED SUB VENDOR ONLY.
4. THE INSPECTION CATEGORY WILL BE INTIMATED AFTER AWARD OF CONTRACT BY BHEL/CUSTOMER. HOWEVER, THE SAME WILL BE ADHERED BY THE BIDDER WITHOUT ANY COMMERCIAL AND DELIVERY IMPLICATION TO BHEL/ CUSTOMER.



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ANNEXURE-II**DRAWINGS, DATA / DOCUMENTS TO BE FURNISHED BY THE SUCCESSFUL BIDDER**

The successful bidder shall submit the following drawings / documents for each Equipment, during detail engineering for approval /information: The drawing list is tentative and shall be finalized with the successful bidder after placement of order.


LIST OF PRIMARY DRAWING / DOCUMENTS:

Sl. No.	BHEL DRG.NO	DRAWING TITLE	REMARKS	SUBMISSION SCHEDULE - WEEK NUMBER FROM DATE OF LOI
1.	PE-V0-435-568-A001	Inspection Check List / Manufacturing Quality Plan of Equipment/equipment	APPROVAL	4
2.	PE-V0-435-568-A002	Data sheet of machine/equipment with detailed BOM WORKSHOP EQUIPMENT	APPROVAL	4
3.	PE-V0-435-568-A003	GA of machine / equipment (indicating overall dimensions, Foundation Detail, total weights, and bill of material for all types of Equipment's including requirement of withdrawal space)	APPROVAL	4

List of Secondary dwg. /doc for each Equipment after approval of basic dwg. / doc:

Sl. No.	BHEL DRG.NO	DRAWING TITLE	REMARKS	SUBMISSION SCHEDULE - WEEK NUMBER FROM DATE OF LOI
1.	PE-V0-435-568-A005	O & M Manual for EQUIPMENTS	INFORMATION	2 weeks after approval of primary dwg/doc.
2.	PE-V0-435-568-A006	Erection Procedure for WORKSHOP EQUIPMENT	INFORMATION	2 weeks after approval of primary dwg/doc.
3	PE-V0-435-568-A007	Motor Data Sheet "C" (including characteristic curve of motor for torque, speed, current & voltage)	INFORMATION	3 weeks after approval of primary dwg/doc.
4.	PE-V0-435-568-A004	Field Quality Plan (facilitate handling of equipment, erection & commissioning)	APPROVAL	4 weeks after approval of primary dwg/doc.

- BHEL shall comments on first submission within 14 days. Every repeat submission shall be within Seven (7) days. Primary drawings shall be commented/approved within 15 days and secondary drawing within 3 days of resubmission.
- All the drawings and documents including general arrangement drawing, data sheet, calculation etc shall include the following details for clarity w.r.t. Inspection, construction, erection and maintenance etc.: -
 - All drawings shall include plan view, elevation view, side view, cross - section, skin section, blow - up view.
 - All the drawings shall include technical parameters, details of painting, lubrication, hardness and BOQ / BOM in tabular form indicating all major components including bought out items and their quantity, material of construction indicating its applicable code / standard, weight, make etc.
 - Details of motors (Equipment wise) indicating guaranteed power consumption as per BHEL's format.
 - Manual calculation for selection of Equipment's including authentic supporting literature (e.g. handbook / standards).
 - Manual calculation for requirement of air / water quantity and pressure including authentic supporting literature (e.g. handbook / standards).

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- f) Inspection checklist / quality plan and recommended field quality plan for each Equipment. Any changes required by BHEL / CUSTOMER for the same shall be incorporated and adhered by the bidder without any commercial implications. Quality assurance plan / Inspection checklist shall include for all items of each type of Equipment starting from raw material to final product including routine and type test being conducted at works. Bidder to furnish the signed & stamped copy of quality plan for motors attached with the NIT specification during detail engineering stage.
- g) Operational write - up on working principle and special safety features envisaged for each type of Equipment's.
- h) List of commissioning spares.
- i) List of Tools and Tackles.
- j) Schedule of lubricants indicating quantity, make and trade name of at-least three manufacturers.
- k) GA drawing indicating Civil foundation shall include scope of work by BHEL and vendor which shall be indicated with different legend or in the form of note. Weight of moving parts, its frequency and its height from floor shall be furnished. Recommended location of cable trench for feeding cable to Equipment shall be furnished along with the details of cable entry. Civil loads per bolt (static and dynamic) shall be furnished in tabular form considering weight of maximum size of job and worst cutting force.
- l) Extreme location of various items / assembly due to operation shall be shown in dotted lines indicating the dimensions of the same from the extreme point of idle location.
- m) Location of motor (s), control panel along with dimensions shall be shown in the drawing.
- n) Space required for the door opening of panel shall be shown in dotted lines with dimensions in all the general arrangement drawing. Details of job feeding and withdrawal direction with arrow and its required space shall be shown in dotted lines with dimensions from some reference point like edge / centre of the Equipment.
- o) Location of operator and required space for his movement shall be shown in the general arrangement drawing in dotted lines with dimensions from some reference point like edge / centre of the Equipment.
- p) Requirement of withdrawal space for maintenance, if any, shall be shown in the general arrangement drawing in dotted lines with dimensions from the reference point like edge /center of the Equipment.
- q) Distance between the mounting holes and distances of the same from some reference point like centre line of Equipment / edge of the Equipment to ensure correct construction of foundation and to know maximum space required for civil foundation and mechanical equipment.
- r) Technical parameters of the Equipment shall be furnished (gearbox details, job rpm, vibration limit, noise level at a distance of 1.0 metre at a level of 1.5 metres above ground, V - belt details, details of pulley, details of all motors and hydraulics, whether the Equipment will be dispatched / delivered in the assembled condition or dismantled condition indicating the weight as the case may be, recommended capacity of E.O.T Crane, weight of heaviest (single) part / component of the Equipment, weight of Equipment along with accessories, job and total weight shall be furnished separately etc.) in all the general arrangement drawing and those shall be indicated in the drawing with dimensions to the extent possible. Details of electrical panel, wiring diagram, other relevant electrical and control & instrumentation details as applicable shall also be furnished.
- s) Details of cable entry for each Equipment shall be shown in all the 3 views (plan, elevation and side view).
- t) Hardness and type / method of hardening of various parts of each Equipment shall be indicated in the general arrangement drawing.
- u) Separate drawing for lifting arrangement of Equipment during erection shall be furnished to BHEL for approval indicating dimensions and details of lifting lugs, rope etc.
- v) Competent designer (s) of each Equipment shall be deputed at BHEL's office during detailed engineering stage to discuss drawings and other technical documents as and when required by BHEL. However, minimum 7 days notice shall be served for the same

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ANNEXURE - III**Drawings / documents distribution schedule**

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Distribution of documents

The source, distribution, no. of copies etc shall be as per the following document distribution schedule.

Document Distribution Schedule - After Placement of Order

Sl.No.	Document	Total Copies	Distribution		
			Owner		Consultant
			HQ	SITE	
1.	PERT Network, work schedules, Bar charts, Layout drawings in 2D & 3 D of all building, plant, pump house, control room etc	12	4	6	2
2.	Data, drawings, documents, write-ups, calculation				
	- Preliminary	12	5	5	2
	- Revised	12	4	6	2
3.	Approved drawings, documents etc.	12	4	6	2
4.	Instruction manuals for erection and O&M	12	5	6	1
5.	As built drawings including O &M manual				
	- Hard Copy	12	5	6	1
	- Soft Copy	5	2	2	1

Note: Supplier is required to submit hardcopies of O&M manual after 30 days of release of MDCC.

Soft copy in CD Rom and Reproducible Tracings of all drawings / documents shall be submitted along with Final / As-Built submission.

Medium for Documents submission.

"Bidder to note that BHEL reserve the right for drg/doc submission through web based Document Management System. Bidder would be provided access to the DMS for drg/doc 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
- Vendor's Internal proxy setting should not block DMS application's link
(<https://pem.bhel.com/wrenchweb>)

DMS user manuals to be used by BHEL PEM vendors for uploading, viewing, revising, commenting and tracking documents on PEM's DMS have been uploaded on PEM internet website (www.bhelpem.com) under the Vendor session.

For quick access bidder may refer the link

https://pem.bhel.com/Dms_Manuals

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TITLE 2X660 MW UDANGUDI STPP

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TECHNICAL SPECIFICATION

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Specific Technical Requirement (Electrical)

ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR (FOR EPC PROJECTS)

PACKAGES : WORKSHOP EQUIPMENT

SCOPE OF VENDOR: SUPPLY

PROJECT: 2 X 660 MW UDANGUDI STPP STAGE-I

<u>S.NO</u>	<u>DETAILS</u>	<u>SCOPE SUPPLY</u>	<u>SCOPE E&C</u>	<u>REMARKS</u>
1	Power Supply	BHEL	BHEL	240 V AC (supply feeder)/415 V AC (3 PHASE 4 WIRE) supply shall be provided by BHEL based on load data provided by vendor at contract stage for all equipment supplied by vendor as part of contract. Any other voltage level (AC/DC) required will be derived by the vendor.
12	Motors	Vendor	Vendor	

NOTES:

1. Make of all electrical equipments/items supplied shall be reputed make & shall be subject to approval of BHEL/customer after award of contract without any commercial implication.
2. All QPs shall be subject to approval of BHEL/customer after award of contract without any commercial implication.

S.No.	Parameters	Requirement
1	Applicable Standards	1) Three phase induction motors : IS:325, IEC:60034, IS:12615 2) Single phase AC motors : IS:996, IEC:60034 3) Energy Efficient motors : IS 12615, IEC:60034-30
2	Rated voltage	415V, 3 Phase
3	Frequency (Hz)	50Hz
4	Permissible variations for	
	a) Voltage	+/-10%
	b) Frequency	+3% & -5%
	c) Combined	10% (Sum of absolute values)
	System fault level at rated voltage	50KA for 1 sec
	Short time rating for terminal boxes	50KA for .25 sec
5	Type of motors	Continuous duty squirrel cage induction motor suitable for direct-on-line starting
6	Efficiency class	IE3
7	Design margin over continous max. demand of the driven equipment (min)	10%
8	Starting requirement	
	a) Minimum permissible voltage as a percentage of rated voltage, at start to bring the driven equipment upto the driven equipment upto rated speed	(a) Below 110KW : Up to 85% of rated voltage (b) From 110 KW & upto 200 KW : Up to 80% of rated voltage
	b) Maximum locked rotor current	as per IS 12615
	c) Starting duty	Two hot starts in succession, with motor initially at normal running temperature.
	d) the locked rotor withstand time under hot condition at highest voltage limit	a) atleast 2.5 secs. more than starting time(for motors with starting time upto 20 secs. at minimum permissible voltage during starting b)atleast 5 secs. more than starting time(for motors with starting time more than 20 secs. and upto 45 secs. at minimum permissible voltage during starting c) more than starting time by at least 10% of the starting time(For motors with starting time more than 45 secs.at minimum permissible voltage during starting d) Speed switches mounted on the motor shaft shall be provided in cases where above requirements are not met.
	e)The ratio of locked rotor KVA at rated voltage to rated KW	(a) Below 110KW : 11.0 (b) From 110 KW & upto 200 KW : 9.0
9	Torque (percent of full load torque)	1] Accelerating torque at any speed with the lowest permissible starting voltage shall be at least 10% motor full load torque. 2]Pull out torque at rated voltage shall not be less than 205% of full load torque. It shall be 275% for crane duty motors.
10	Noise level (max.)	85dB(A)
11	Vibration shall be limited within the limits	as per IS:12075 / IEC 60034-14
12	Construction Features	
(i)	Enclosure Details	
	a) Degree of protection	i) Indoor motors - IP 55 ii) Outdoor motors - IP 55 (Additional Canopy to be provided)
	b) Method of ventilation	Totally enclosed fan cooled (TEFC) or totally enclosed tube or ventilated (TETV) or Closed air circuit air cooled (CACA) type.
(ii)	Insulation	Class F temperature rise limited to class -B
(iii)	Bearings	Grease lubricated ball or roller bearings for Horizontal motors Grease lubricated ball or roller bearings or combined trust and guide beaing for Vertical motors
(iv)	Winding Type	Electrolytic grade Copper conductor, Non hygroscopic, oil resistant, flame resistant Insulation.
13	Main terminal box	
	Type	-Motor terminal box shall be detachable type and located in accordance with Indian Standards clearing the motor base- plate/ foundation. -Terminals shall be stud or lead wire type, substantially constructed and thoroughly insulated from the frame. - The terminals shall be clearly identified by phase markings, with corresponding direction of rotation marked on the non-driving end of the motor.
	DOP	same as motor
	Position when veiwed from the non driving end	- Left hand side
	Rotation	360 Deg in steps of 90 Deg.
	Space heater	Motors rated 30KW and above sapce heater required.Separate terminal box for space heaters & RTDs shall be provided.
	Cable glands and lugs	-Motor terminal box shall be furnished with suitable cable lugs and double compression brass glands to match with cable used.
	Minimum clearances to be provided between phase to phase and phase to earth	25MM
14	Earthing points 2 nos. suitable for connection	Size shall be informed during Detail engineering
15	Paint shade	RAL 5012 (Blue)/Light grey finish No. 631 as per IS: 5 (subject to customer approval)

DATA TO BE FURNISHED BY SUCCESSFUL BIDDER AFTER ORDERING


1. GENERAL		
i)	Manufacturer & Country of origin.	
ii)	Equipment driven by motor)	
iii)	Motor type	
iv)	Country of origin	
v)	Quantity	
2. DESIGN AND PERFORMANCE DATA		
i)	Frame size	
ii)	Type of duty	
iii)	Type of enclosure and method of cooling	
vi)	Type of mounting	
vii)	Direction of rotation as viewed from DE END	
viii)	Standard continuous rating at 40 deg.C. ambient temp. as per Indian Standard (KW)	
ix)	(A) Derated rating for specified normal condition i.e. 50 deg. C ambient temperature (KW)	
	(B) Rating as specified in load list/Maximum continuous load demand of driven equipment	
xi)	Rated speed at rated voltage and frequency	
xii)	At rated Voltage and frequency	
xiii)	a) Full load current (Amps)	
	b) No load current (Amps)	
xiv)	Power Factor at	
	a) 100% load	
	b) At duty point	
	c) 75% load	
	d) 50% load	
	e) NO load	
xv)	Efficiency at rated voltage and frequency	
	a) 100% load	
	b) At duty point	
	c) 75% load	
xvi)	Starting current (amps) at	
	a. 100 % voltage	
	b. 85% voltage	
xvii)	Starting time with minimum permissible voltage	
	a. Without driven equipment coupled	
	b. With driven equipment coupled	
xviii)	Safe stall time with 110% of rated voltage	
	a. From hot condition	
xix)	From cold condition	
	Torques :	
	a. Starting torque at min. permissible voltage(kg-mtr.)	
	b. Pull up torque at rated voltage.	
	c. Pull out torque	
xx)	d. Min accelerating torque (kg.m) available	
	e. Rated torque (kg.m)	
	Stator winding resistance per phase (ohms at 20 Deg.C.)	
	GD ² value of motors	
	Locked rotor KVA input (at rated voltage)	
xxi)	Locked rotor KVA/KW.	
xxii)	Bearings	
	a. Type	
	b. Manufacturer	
	c. Self Lubricated or forced Lubricated	
	d. Recommended Lubricants	
	e. Guaranteed Life in Hours	
	f. Whether Dial Type thermometer provided	
	g. Oil pressure Gauge/switch	
	i. Range	
	ii. Contact Nos. & ratings	
	iii. Accuracy	
	xxiii)	Vibration
		a) Velocity (mm/s)
xxiv)	b) Displacement (microns)	
	Noise level (DB)	
3. CONSTRUCTIONAL FEATURES		
i)	Stator winding insulation	
	a. Class & Type	
	b. Tropicalised (Yes/No)	
	c. Temperature rise over specified max.	
	i. Cold water temperature of 38 DEG. C.	
	ii. Ambient Air 50 DEG. C.	
ii)	d. Method of temperature measurement	
	e. Stator winding connection	
	f. Number of terminals brought out	


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	Type of Terminal Box for	
	a. stator leads	
	b. space heater	
	c. Temperature detectors	
	d. Instrument switch etc.	
iii)	For main terminal box	
	a. Location	
	b. Entry of cables	
	c. Recommended cable size	
	d. Fault level (MVA)	
	e. No. of Eathing Pads	
iv)	Temperature detector for stator winding	
	a Type	
	b. Nos. provided	
	c. Location	
	d. Make	
	e. Resistance value at 0 deg. C. (ohms)	
vi)	Paint shade	
vii)	Weight of(approx)	
	a. Motor stator (KG)	
	b. Motor Rotor (KG)	
	c. Total weight (KG)	


NOTE :


1. THESE DETAILS ARE IN ADDITION TO THE DETAILS MENTIONED IN SHEET - I OF DATASHEET. SHEET - 2 & 3 SHOULD BE READ IN CONJUCTION TO SHEET - I
2. DURING CONTRACT STAGE : SUCCESSFUL BIDDER TO STAMP & SIGN SHEET - I OF DATASHEET, AND APPEND DULY FILLED UP STAMPED & SIGNED SHEET -2 & 3 OF DATASHEET FOR BHEL/CUSTOMER'S APPROVAL.


		QUALITY PLAN	CUSTOMER :			PROJECT			SPECIFICATION :			
			BIDDER/ VENDOR :			TITLE			NUMBER :			
SHEET 1 OF 2		SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-006, REV-01			SPECIFICATION TITLE				
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION VOLUME III			
1	2	3	4	5	6	7	8	9	P	W	V	REMARKS
1.0	ASSEMBLY	1.WORKMANSHIP 2.DIMENSIONS 3.CORRECTNESS COMPLETENESS TERMINATIONS/ MARKING/COLOUR CODE	MA MA MA	VISUAL -DO- VISUAL	100% -DO- 100%	MANUF'S SPEC MFG. DRG./ MFG. SPEC. MFG.SPEC./ RELEVANT IS	MANUF'S SPEC MFG. DRG./ MFG. SPEC. MFG.SPEC. RELEVANT IS	-DO- -DO- -DO-	2 2 2	- - -	- - -	
2.0	PAINTING	1.SHADE	MA	VISUAL	SAMPLE	MANUFR'S SPEC/BHEL SPEC./RELEVANT STANDARD	BHEL SPEC. SAME AS COL.7	LOG BOOK	2	-	-	
3.0	TESTS	1.ROUTINE TEST INCLUDING SPECIAL TEST AS PER BHEL SPEC. 2.OVERALL DIMENSIONS & ORIENTATION	MA MA	-DO- MEASUREMENT & VISUAL	100% 100%	IS-325/ BHEL SPEC./ DATA SHEET APPROVED DRG/DATA SHEET	SAME AS COL.7 APPROVED DRG/DATA SHEET & RELEVANT IS	TEST REPORT INSPN. REPORT	2 2	1 1	- -	NOTE -1 & NOTE-3 NOTE -1 & NOTE-3
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									


	QUALITY PLAN		CUSTOMER :			PROJECT			SPECIFICATION :			
	SHEET 2 OF 2		BIDDER/ :			TITLE			NUMBER :			
			VENDOR			QUALITY PLAN			SPECIFICATION :			
		SYSTEM			NUMBER PED-506-00-Q-006, REV-01			TITLE :				
					ITEM AC ELECT. MOTORS BELOW 55KW (LV)			SECTION		VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
		3.NAMEPLATE DETAILS	MA	VISUAL	100%	IS-325 & DATA SHEET	IS-325 & DATA SHEET	INSPN. REPORT	2	1	-	
<p>NOTES:</p> <p>1 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON</p> <p>2 WHERE EVER CUSTOMER IS INVOLVED IN INSPECTION, (1) SHALL MEAN BHEL AND CUSTOMERS BOTH TOGETHER.</p> <p>3 FOR EXHAUST/VENTILATION FAN MOTORS OF RATING UPTO 1.5KW , ONLY ROUTINE TEST CERTIFICATES SHALL BE FURNISHED FOR SCRUTINY.</p> <p><u>Legends for Inspection agency</u></p> <p>1. BHEL/CUSTOMER 2. VENDOR (MOTOR MANUFACTURER) 3. SUB-VENDOR (RAW MATERIAL/COMPONENTS SUPPLIER)</p> <p>P. PERFORM W. WITNESS V. VERIFY</p>												
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			


		QUALITY PLAN SHEET 1 OF 9			CUSTOMER :		PROJECT		SPECIFICATION :			
					BIDDER/ VENDOR :		TITLE		NUMBER :			
SYSTEM		QUALITY PLAN		TITLE			SPECIFICATION :					
ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)		NUMBER PED-506-00-Q-007, REV-03		SECTION			VOLUME III					
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
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	3	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANFR'S DRG./SPEC	MANFR'S DRG./SPEC	-DO-	3	-	-	
		3.PROOF LOAD TEST (EYE BOLT)	MA	MECH. TEST	-DO-	-DO-	-DO-	INSPEC. REPORT	3	-	2	
1.2	HARDWARES	1.SURFACE CONDITION	MA	VISUAL	100%		FREE FROM CRACKS, UN-EVENNESS ETC.	-DO-	3	-	-	
		2.PROPERTY CLASS	MA	VISUAL	SAMPLES	MANFR'S DRG./SPEC BOOK	RELEVENT IS/SPEC.	SUPPLIERS TC & LOG	3	-	2	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	3	-	2	
		2.CHEM. & PHY. PROP.	MA	CHEM & MECH TEST	1/HEAT NO.	MANFR'S DRG./SPEC	RELEVENT IS/	SUPPLIER'S TC	3	-	2	HEAT NO. SHALL BE VERIFIED
		3.DIMENSIONS	MA	MEASUREMENT	100%	MANUFR'S DRG.	MANUFR'S DRG.	LOG BOOK	3	-	2	
1.4	PAINT & VARNISH	1.MAKE, SHADE, SHELF LIFE & TYPE	MA	VISUAL	100% CONTINUOUS	MANFR'S DRG./SPEC	MANFR'S DRG./SPEC	LOG BOOK	3	-	2	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			


		QUALITY PLAN			CUSTOMER :			PROJECT			SPECIFICATION :		
					BIDDER/ VENDOR			TITLE			NUMBER :		
SHEET 2 OF 9		SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE			SECTION VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
1.5	SHAFT (FORGED OR ROLLED)	1. SURFACE COND.	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	-	VENDOR'S APPROVAL IDENTIFICATION SHALL BE MAINTAINED	
		2. CHEM. & PHYSICAL PROPERTIES	MA	CHEM. & PHYSICAL TESTS	1/HEAT NO. OR HEAT TREATMENT BATCH NO	MFG. DRG. SPEC.	RELEVANT IS	SUPPLIER'S TC	3	-	2		
		3. DIMENSIONS	MA	MEASUREMENT	100%	-DO-	MANUFR'S DRG.	LOG BOOK	3	-	2		
		4.INTERNAL FLAWS	CR	UT	-DO-	ASTM-A388	MANUFR'S SPEC. BHEL SPEC.	-DO-	3	2	1		FOR DIA OF 55 MM & ABOVE
1.6	SPACE HEATERS, CONNNECTORS, TERMINAL BLOCKS, CABLES, CABLE LUGS, CARBON BRUSH TEMP. DETECTORS, RTD, BTD'S	1. MAKE & RATING	MA	VISUAL	-DO-	MANUFR'S DRG. SPEC.	MANUFR'S DRG. SPEC.	-DO-	3	-	2		
		2. PHYSICAL COND.	MA	-DO-	-DO-	-	NO PHYS. DAMAGE, NO ELECTRICAL DISCONTINUITY	-DO-	3	-	2		
		3.DIMENSIONS (WHEREVER APPLICABLE)	MA	MEASUREMENT	SAMPLE	MANUFR'S DRG./ SPEC.	MANUFR'S DRG. / SPEC.	-DO-	3	-	2		
		4.PERFORMANCE/ CALIBRATION	MA	TEST	100%	-DO-	-DO-	INSP. REPORT	3	-	2		
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				


		QUALITY PLAN			CUSTOMER :			PROJECT			SPECIFICATION :		
					BIDDER/ VENDOR			TITLE			NUMBER :		
SHEET 3 OF 9		SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION			VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
1.7	OTHER INSULATING MATERIALS LIKE SLEEVES, BINDINGS CORDS, PAPERS, PRESS BOARDS ETC.	1. SURFACE COND. ETC. 2. OTHER CHARACTERISTICS	MA MA	VISUAL TEST	100% SAMPLE	- MANUF'S SPEC.	NO VISUAL DEFECTS MANUF'S SPEC.	INSPT. REPORT LOG BOOK AND OR SUPPLIER'S TC	3 3	- -	2 2		
1.8	SHEET STAMPING (PUNCHED)	1. SURFACE COND. 2. DIMENSIONS INCLUDING BURS HEIGHT 3. ACCEPTANCE TESTS	MA MA MA	VISUAL MEASUREMENT ELECT. & MECH TESTS	100% SAMPLE -DO-	- MANUFR'S DRG. . MANUF'S SPEC./ RELEVANT IS	NO VISUAL DEFECTS (FREE FROM BURS) MANUFR'S DRG. RELEVANT IS	LOG BOOK -DO- SUPPLIER'S TC	3 3 3	- -	- 2 2	FOR MV MOTOR INSULATION/VARNISH THICKNESS SHALL BE MORE THAN THE BURS HEIGHT	
1.9	CONDUCTORS	1. SURFACE FINISH 2. ELECT. PROP, & MECH. PROP	MA MA	VISUAL ELECT. & MECH. TEST	100% SAMPLES	- RELEVANT IS/ BS OR OTHER STANDARDS	FREE FROM VISUAL DEFECTS RELEVANT IS/ BS OR OTHER STANDARDS	LOG BOOK SUPPLIERS TC & VENDOR'S INSPN. REPORTS	3* 3	- -	2* 2	* 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.	
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE			BIDDER'S/VENDORS COMPANY SEAL							


		QUALITY PLAN SHEET 4 OF 9			CUSTOMER :		PROJECT			SPECIFICATION :			
					BIDDER/ VENDOR :		TITLE			NUMBER :			
SL. NO.		COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION VOLUME III			
1		2	3	4	5	6	7	8	9	10			11
										P	W	V	
1.10	BEARINGS	3.DIMENSIONS	MA	MEASUREMENT	-DO-	-DO-	-DO-	Log Book	3	-	2		
		1.MAKE & TYPE	MA	VISUAL	100%	MANFR'S DRG./ APPROVED DATASHEET	MANFR'S DRG./ APPROVED DATASHEET	-DO-	3	-	2		
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	BHEL DATA SHEET	BHEL DATA SHEET BEARING MANUF'S CATALOGUES	-DO-	3	-	2		
		3.SURFACE FINISH	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	2		
1.11	SLIP RING (WHEREVER APPLICABLE)	1.SURFACE COND.	MA	VISUAL	100%	-	-DO-	-DO-	3	-	-		
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANUF'S DRG	MANUF'S DRG	-DO-	3	-	-		
		3.TEMP.WITH-STAND CAPACITY	MA	ELECT.TEST	-DO-	MANUF'S SPEC./ BHEL SPEC.	MANUF'S SPEC./ BHEL SPEC.	-DO-	3	-	2		
		4.HV/IR	MA	-DO-	100%	-DO-	-DO-	-DO-	3	-	2		
1.12	OIL SEALS & GASKETS	1.MATERIAL OF GASKET	MA	VISUAL	100%	MANUF'S DRG/SPECS	MANUF'S DRG./ SPECS.	-DO-	3	-	-		
		2.SURFACE COND.	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	-		
		3.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANUF'S DRG	MANUF'S DRG	-DO-	3	-	-		
BHEL				PARTICULARS		BIDDER/VENDOR							
				NAME									
				SIGNATURE									
				DATE					BIDDER'S/VENDORS COMPANY SEAL				

		QUALITY PLAN SHEET 5 OF 9			CUSTOMER :		PROJECT		SPECIFICATION :			
					BIDDER/ VENDOR :		TITLE		NUMBER :		TITLE	
SYSTEM		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)		SECTION		VOLUME III			REMARKS			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			
1	2	3	4	5	6	7	8	9	P	W	V	11
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	3/2	2	-	
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	MANUF'S DRG	MANUF'S DRG	-DO-	2	-	-	
2.2	MACHINING	1.FINISH	MA	VISUAL	100%	-DO-	GOOD FINISH	LOG BOOK	2	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	MANUF'S DRG	MANUF'S DRG	-DO-	2	-	-	
		3.SHAFT SURFACE FLOWS	MA	PT	-DO-	RELEVANT SPEC./ ASTM-E165	MANUF'R'S SPEC./ BHEL SPEC./	-DO-	2	-	1	
2.3	PAINING	1.SURFACE PREPARATION	MA	VISUAL	100%	MANFR'S SPEC/BHEL SPEC./ RELEVANT STAND	BHEL SPEC. SAME AS COL.7	LOG BOOK	2	-	-	
		2.PAINT THICKNESS (BOTH PRIMER & FINISH COAT)	MA	MEASUREMENT BY ELCOMETER	SAMPLE	-DO-	-DO-	-DO-	2	-	-	
		3.SHADE	MA	VISUAL	-DO-	-DO-	-DO-	Log Book	2	-	-	
		4.ADHESION	MA	CROSS CUTTING & TAPE TEST	-DO-	-DO-	-DO-	Log Book	2	-	-	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN				CUSTOMER :			PROJECT			SPECIFICATION :		
						TITLE			NUMBER :					
SHEET 6 OF 9		BIDDER/ VENDOR				SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION			REMARKS		
									AGENCY	VOLUME III				
1	2	3	4	5	6	7	8	9	P	W	V	11		
2.4	SHEET STACKING	1.COMPLETENESS	MA	MEASUREMENT	SAMPLE	MANUFR'S SPEC.	MANUFR'S SPEC.	Log Book	2	-	-			
		2.COMPRESSION & TIGHTENING	MA	MEASUREMENT	100%	-DO-	-DO-	Log Book	2	-	-			
		3.CORE LOSS & HOTSPOT	MA	ELECT.TEST	-DO-	-DO-	-DO-	Log Book	2	1*	1			
2.5	WINDING	1.COMPLETENESS	CR	VISUAL	100%	MANUFR'S SPEC./BHEL SPEC.	MANUFR'S SPEC./BHEL SPEC.	Log Book	2	-	-	(FOR MOTORS OF 2MW AND ABOVE) * ON 10% RANDOM SAMPLE		
		2.CLEANLINESS	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-			
		3.IR-HV-IR	CR	ELECT. TEST	-DO-	-DO-	-DO-	Log Book	2	-	1			
		4.RESISTANCE	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1			
		5.INTERTURN INSULATION	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-			
		6.SURGE WITH STAND AND TAN. DELTA TEST	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	FOR MV MOTOR		
2.6	IMPREGNATION	1.VISCOSITY	MA	PHY. TEST	AT STARTING	-DO-	-DO-	Log Book	2	-	-			
		2.TEMP. PRESSURE VACCUM	MA	PROCESS CHECK	CONTINUOUS	-DO-	-DO-	Log Book	2	-	-			
		3.NO. OF DIPS	MA	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	THREE DIPS TO BE GIVEN		
BHEL			PARTICULARS			BIDDER/VENDOR								
			NAME											
			SIGNATURE											
			DATE						BIDDER'S/VENDORS COMPANY SEAL					

		QUALITY PLAN SHEET 7 OF 9			CUSTOMER :		PROJECT TITLE			SPECIFICATION : NUMBER :			
					BIDDER/ VENDOR		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE			
		SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	P	W	V	11	
2.7	COMPLETE STATOR ASSEMBLY	4.DURATION 1.COMPACTNESS & CLEANLINESS	MA	-DO- VISUAL	-DO- 100%	-DO- -DO-	-DO- -DO-	Log Book Log Book	2	-	1		
2.8	BRAZING/COMPRESSION JOINT	1.COMPLETENESS 2.SOUNDNESS	CR	-DO- MALLETT TEST & UT	-DO- -DO-	-DO- -DO-	-DO- -DO-	Log Book Log Book	2	-	-		
2.9	COMPLETE ROTOR ASSEMBLY	3.HV 1.RESIDUAL UNBALANCE	MA	ELECT. TEST DYN. BALANCE	-DO- -DO-	-DO- MFG SPEC./ ISO 1940	-DO- MFG. DWG.	Log Book Log Book	2	-	1	VERIFICATION FOR MV MOTOR ONLY	
2.10	ASSEMBLY	2.SOUNDNESS OF DIE CASTING 1.ALIGNMENT 2.WORKMANSHIP 3.AXIAL PLAY 4.DIMENSIONS 5.CORRECTNESS, COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE 6. RTD, BTD & SPACE HEATER MOUNTING.	CR	ELECT. (GROWLER TEST) MA MEAS. MA VISUAL MA -DO- MA VISUAL MA VISUAL	-DO- -DO- -DO- -DO- -DO- 100% 100%	-DO- -DO- -DO- -DO- MFG.DRG./ MFG SPEC. MFG SPEC. RELEVANT IS MFG SPEC. RELEVANT IS	-DO- -DO- -DO- -DO- MFG. DRG/ RELEVANT IS MFG SPEC. RELEVANT IS MFG SPEC. RELEVANT IS	Log Book Log Book Log Book Log Book Log Book Log Book Log Book	2	-	-	1	
BHEL			PARTICULARS		BIDDER/VENDOR								
			NAME										
			SIGNATURE										
			DATE		BIDDER'S/VENDORS COMPANY SEAL								

		QUALITY PLAN			CUSTOMER :			PROJECT		SPECIFICATION :		
					BIDDER/ VENDOR :			TITLE		NUMBER :		
		SHEET 8 OF 9		SYSTEM			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03		SPECIFICATION : TITLE			SECTION
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
3.0	TESTS	1.TYPE TESTS INCLUDING SPECIAL TESTS AS PER BHEL SPEC.	MA	ELECT.TEST	1/TYPE/SIZE	IS-325/ BHEL SPEC./ DATA SHEET	IS-325/ BHEL SPEC./ DATA SHEET	TEST REPORT	2	1*	1	* NOTE - 1
		2.ROUTINE TESTS INCLUDING SPECIAL TEST AS PER BHEL SPEC.	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1 ^{\$}	1	^{\$} NOTE - 2
		3.VIBRATION & NOISE LEVEL	MA	-DO-	100%	IS-12075 & IS-12065	IS-12075 & IS-12065	-DO-	2	1 ^{\$}	1	^{\$} NOTE - 2
		4.OVERALL DIMENSIONS AND ORIENTATION	MA	MEASUREMENT & VISUAL	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET & RELEVANT IS	INSPC. REPORT	2	1	-	
		5.DEGREE OF PROTECTION	MA	ELECT. & MECH. TEST	1/TYPE/ SIZE	RELEVANT IS	BHEL SPEC. AND DATA SHEET	TC	2	-	1	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		6. MEASUREMENT OF RESISTANCE OF RTD & BTD	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1 ^{\$}	1	^{\$} NOTE - 2
		7. MEASUREMENT OF RESISTANCE, IR OF SPACE HEATER	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1 ^{\$}	1	^{\$} NOTE - 2
		8. NAMEPLATE DETAILS	MA	VISUAL	100%	IS-325 & DATA SHEET	IS-325 & DATA SHEET	INSPC. REPORT	2	1 ^{\$}	1	^{\$} NOTE - 2
		9.EXPLOSION FLAME PROOF NESS (IF SPECIFIED)	MA	EXPLOSION FLAME PROOF TEST	1/TYPE	IS-3682 IS-8239 IS-8240	IS-3682 IS-8239 IS-8240	TC	2	-	1	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		10. PAINT SHADE, THICKNESS & FINISH	MA	VISUAL & MEASUREMENT BY ELKOMETER	SAMPLE	BHEL SPEC. & DATA SHEET	BHEL SPEC. & DATA SHEET	TC	2	1 ^{\$}	1	SAMPLING PLAN TO BE DECIDED BY INSPECTION AGENCY ^{\$} NOTE - 2
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE		BIDDER'S/VENDORS COMPANY SEAL							

		QUALITY PLAN			CUSTOMER :			PROJECT TITLE			SPECIFICATION : NUMBER :		
					BIDDER/ VENDOR :			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE		
SHEET 9 OF 9		SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
<p>NOTES:</p> <p>1 DEPENDING UPON THE SIZE AND CRITICALLY, WITNESSING BY BHEL SHALL BE DECIDED.</p> <p>2 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON.</p> <p>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.</p> <p>4 WHEREVER CUSTOMER IS INVOLVED IN INSPECTION, AGENCY (1) SHALL MEAN BHEL AND CUSTOMERS BOTH TOGETHER.</p> <p><u>Legends for Inspection agency</u></p> <p>1. BHEL/CUSTOMER 2. VENDOR (MOTOR MANUFACTURER) 3. SUB-VENDOR (RAW MATERIAL/COMPONENTS SUPPLIER)</p> <p>P. PERFORM W. WITNESS V. VERIFY</p>													
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				



7.0.0 TESTING AND INSPECTION

7.1.0 Equipment offered shall be of type tested and proven type. Type test certificates for test conducted earlier on similar rating shall be furnished for the motors rated 30 kW and above.

7.2.0 The following type tests shall be conducted on LT motors.

- Measurement of resistance of windings of stator and wound rotor.
- No load test at rated voltage to determine input current power and speed
- Full load test to determine efficiency power factor and slip.
- Temperature rise test.
- Momentary excess torque test.
- High voltage test.
- Test for vibration severity of motor.
- Test for noise levels of motor
- Test for degree of protection
- Over speed test.

7.3.0 The following additional type tests shall be conducted on HT motors.

- No load saturation and loss curves up to approximately 115% of rated voltage
- Measurement of noise at no load.
- Momentary excess torque test
- Full load test
- Temperature rise test at rated conditions.
- Lightning Impulse withstand test on the sample coil shall be as per IEC-60034, part-15
- Surge-withstand test on interturn insulation shall be as per clause no. 5.1.2 of IEC 60034, part-15
- Degree of protection test for the enclosure followed by IR, HV and no load run test.
- Terminal box-fault level withstand test for each type of terminal box.

7.4.0 The following routine tests shall be carried out for the motors as per applicable standards.

- IR of Winding before and after HV tests
- HV test on main winding space heater, RTD, BTD
- Resistance measurement
- No load run test Major Electrical
- Phase sequence and direction of rotation
- Vibration check Major Electrical
- Reduced voltage running test
- Locked rotor test at reduced voltage
- Record of RTD & BTD resistance at the end of no load test
- Test on space heater & RTD
- Visual Control of terminal box and verification of construction with respect to short tested terminal box

7.5.0 The following minimum tests/ checks shall be conducted at site. Any other tests/ checks as per the manufacturer's recommendation shall also be carried out

- Measurement of vibration.
- Measurement of insulation resistance and polarization index.
- Measurement of full load current.
- Test running of the motors, checking the temperature rise and identifying the hot spot etc.

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TITLE 2X660 MW UDANGUDI STPP
TECHNICAL SPECIFICATION
FOR
WORKSHOP EQUIPMENT

SPECIFICATION NO. PE - TS - 435 - 568 - A001

VOLUME III

SECTION II

REV 0

SHEET OF

SECTION-II

DOCUMENTS TO BE SUBMITTED ALONG WITH BID



TITLE 2X660 MW UDANGUDI STPP
TECHNICAL SPECIFICATION
FOR
WORKSHOP EQUIPMENT

SPECIFICATION NO. PE – TS - 435 - 568 – A001

VOLUME III

SECTION IIA

REV 0

SHEET OF

DOCUMENTS TO BE FURNISHED WITH OFFER FOR TECHNICAL EVALUATION

- 1) Schedule of technical deviation (if any)


or

'No deviation certificate' – clearly mentioning that bidder has considered 'No - deviation' from the technical specification provided by BHEL.

- 2) Signed and stamped copy of compliance cum confirmation certificate.
- 3) Copy of electrical scope between BHEL & vendor duly signed and stamped.
- 4) Electrical equipment specification for Workshop equipment duly signed and stamped.
- 5) Compliance to electrical load list, duly signed and stamped.
- 6) Un priced copy of price format indicating quoted/ not applicable against each row/column.

NOTE:

- i) No other documents other than those listed above are required to be submitted for technical evaluation. in case any other document is furnished, the same will not be taken into consideration for technical evaluation.
- ii) The bid shall be evaluated based on the price quoted for main Equipment, commissioning spares, tools and tackles, manufacturer's standard accessories and special accessories as per specification and any technical loading due to non adherence to the technical specification. However, the price for recommended spares and other special / optional accessories which are not included in bidder's scope of work shall not be considered for evaluation purpose.
- iii) Bid may be rejected if the data which have asked above is not properly filled-up and submitted along with the bid with company seal.

	TECHNICAL SPECIFICATION FOR WORKSHOP EQUIPMENT 2X660 MW UDANGUDI STPP COMPLIANCE CUM CONFIRMATION CERTIFICATE	SPEC. NO.: PE-TS-435-568-A001
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		Date:


COMPLIANCE CUM CONFIRMATION CERTIFICATE

The bidder shall confirm compliance with following by signing/ stamping this compliance certificate (every sheet) and furnish same with the offer.

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions other than those mentioned under "exclusion" in section C and those resolved as per 'Schedule of Deviations', if applicable, with regard to same.
- b) There are no other deviations w.r.t. specifications other than those furnished in the 'Schedule of Deviations'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the 'Schedule of Deviations'.
- c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL/ CUSTOMER approval & customer hold points for inspection/ testing shall be marked in the QP at the contract stage. Inspection/ testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc. This shall be within the contracted price with no extra implications to BHEL after award of the contract.
- d) All drawings/ data-sheets/ calculations etc. submitted along with the offer shall be considered for reference only, same shall be subject to BHEL/ CUSTOMER approval in the event of order.
- e) The offered materials shall be either equivalent or superior to those specified in the specification & shall meet the specified/ intended duty requirements. In case the material specified in the specifications is not compatible for intended duty requirements then same shall be resolved by the bidder with BHEL during the pre - bid discussions, otherwise BHEL/ Customer's decision shall be binding on the bidder whenever the deficiency is pointed out.

For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.

- f) The commissioning spares shall be supplied on 'As Required Basis' & prices for same included in the base price itself.
- g) All sub vendors shall be subject to BHEL/ CUSTOMER approval in the event of order.
- h) Guarantee for plant /equipment shall be as per relevant clause of GCC /SCC /Other Commercial Terms & Conditions.
- i) In the event of order, all the material required for completing the job at site shall be supplied by the bidder within the ordered price and within purview of the tender specification even if the same are additional to approved billing break up, approved drawing or approved Bill of quantities.
- j) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL's/ Customer's/ Consultant's office for across the table resolution of issues and to get documents approved in the stipulated time.

	TECHNICAL SPECIFICATION FOR WORKSHOP EQUIPMENT 2X660 MW UDANGUDI STPP COMPLIANCE CUM CONFIRMATION CERTIFICATE	SPEC. NO.: PE-TS-435-568-A001
		VOLUME: III
		SECTION: IIB
		REV. NO. 0
		Date:
<p>k) As built drawings shall be submitted as and when required during the project execution.</p> <p>l) The bidder has not tempered with this compliance cum confirmation certificate and if at any stage any tempering in the signed copy of this document is noticed then same shall be treated as breach of contract and suitable actions shall be taken against the bidder.</p>		

LOAD TITLE	RATING (KW / A)		UNIT (U)/STN (S)	Nos.		VOLTAGE CODE*	FEEDER CODE**	EMER. LOAD (Y)	CONT.(C)/INTT.(I)	STARTING TIME >5 SEC (Y)	LOCATION	BOARD NO.	CABLE		BLOCK CABLE DRG. No.	CONT ROL CODE	REMA RKS	LOAD No.	VERIFICATI ON FROM MOTOR DATASHEET (Y/N)	KKS NO
	NAME PLATE (Range of Load)	MAX. CONT. DEMAND (MCR)		RUNNING	STANDBY								SIZE CODE	Nos						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Heavy Duty Lathe	6 KW- 9 KW		S	1		D	S													
Heavy Duty Lathe M/c-1	3 KW- 5 KW		S	1		D	S													
Shaper	2 KW- 4 KW		S	1		D	S													
Slotting Machine	1.5 KW- 2.5 KW		S	1		D	S													
Universal Milling Machine	6 KW- 10 KW		S	1		D	S													
Radial Drilling Machine	4 KW – 7.5 KW		S	3		D	S													
Pedestal Drill	1 KW- 1.5 KW		S	1		D	S													
Grinder	3 KW- 6 KW		S	1		D	S													
Power Hacksaw Machine	1 KW - 3 KW		S	1		D	S													
A/C Welding Machine	15 KVA – 20 KVA		S	1		D	S													
D/C Welding Machine	12 KVA – 15 KVA		S	1		D	S													

NOTES: 1. COLUMN 1 TO 12 & 18 SHALL BE FILLED BY THE REQUISITIONER (ORIGINATING AGENCY); REMAINING COLUMNS ARE TO BE FILLED UP BY PEM (ELECTRICAL)/ CUSTOMER
 2. ABBREVIATIONS : * VOLTAGE CODE (7):- (ac) A=11 KV, B=6.6 KV, C=3.3 KV, D=415 V, E=240 V (1 PH), F=110 V (cc): G=220 V, H=110 V, J=48 V, K=+24V, L=-24 V
 **: FEEDER CODE (8):- U=UNIDIRECTIONAL STARTER, B=BI-DIRECTIONAL STARTER, S=SUPPLY FEEDER, D=SUPPLY FEEDER (CONTACTER CONTROLLED)

LOAD DATA (ELECTRICAL)	JOB NO.	435		ORIGINATING AGENCY		PEM (ELECTRICAL)	
	PROJECT TITLE	2X660 MW UDANGUDI STPP		NAME	DATA FILLED UP ON		
	SYSTEM			SIGN.	DATA ENTERED ON		
	DEPTT. / SECTION	MAX Page 37 of 39		SHEET 1 OF 2	REV. 00	DE'S SIGN. & DATE	

LOAD TITLE	RATING (KW / A)		UNIT (U)/STN (S)	Nos.		VOLTAGE CODE*	FEEDER CODE**	EMER. LOAD (Y)	CONT.(C)/INTT.(I)	STARTING TIME >5 SEC (Y)	LOCATION	BOARD NO.	CABLE		BLOCK CABLE DRG. No.	CONT ROL CODE	REMA RKS	LOAD No.	VERIFICATI ON FROM MOTOR DATASHEE T (Y/N)	KKS NO
	NAME PLATE (Range of Load)	MAX. CONT. DEMAND (MCR)		RUNNING	STANDBY								SIZE CODE	Nos						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Argon Arc Welding Machine	4 KVA-10 KVA		S	1		D	S													
Soldering Iron	220 V		S	1		F	S													
Industrial Vacuum cleaner	1 KW – 5 KW		S	1		F	S													

NOTES:	<p>1. COLUMN 1 TO 12 & 18 SHALL BE FILLED BY THE REQUISITIONER (ORIGINATING AGENCY); REMAINING COLUMNS ARE TO BE FILLED UP BY PEM (ELECTRICAL)/ CUSTOMER</p> <p>2. ABBREVIATIONS : * VOLTAGE CODE (7):- (ac) A=11 KV, B=6.6 KV, C=3.3 KV, D=415 V, E=240 V (1 PH), F=110 V (cc): G=220 V, H=110 V, J=48 V, K=+24V, L=-24 V</p> <p>: ** FEEDER CODE (8):- U=UNIDIRECTIONAL STARTER, B=BI-DIRECTIONAL STARTER, S=SUPPLY FEEDER, D=SUPPLY FEEDER (CONTACTER CONTROLLED)</p>
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LOAD DATA (ELECTRICAL)	JOB NO.	435	ORIGINATING AGENCY	PEM (ELECTRICAL)	
	PROJECT TITLE	2X660 MW UDANGUDI STPP	NAME	DATA FILLED UP ON	
	SYSTEM		SIGN.	DATA ENTERED ON	
	DEPTT. / SECTION	MAX Page 38 of 39	SHEET 2 OF 2	REV. 00	DE'S SIGN. & DATE

