QUALITY PLAN

General points related to Quality Assurance:

1	The inspection & testing of the cooling towers & its various components shall be as per quality plans approved by the purchaser/ Customer. Bidder shall submit the quality plans based on the guidelines given in specification & quality plans enclosed herein. The customer hold points of BHEL/ Customer/Customer nominated agency shall be marked in the QP at the contract stage, in the event of order & inspection/ testing shall be carried out as per same apart from various test certificates/ inspection records etc.
2	Equipments for which quality plan is not covered in the specification, bidder shall submit QP's for same on the basis of similar guidelines & submit for approval in the event of order.
3	Purchaser / Customer or their authorized representatives shall have the right to inspect at any stage of manufacture & construction, all materials, components & workmanship & testing of material. The bidder shall provide all facilities for inspection & testing without any extra cost to the purchaser/ Consultant.
4	The contractor/ manufacturer shall conduct the following minimum specific tests to ensure that the equipment shall conform to the requirements of specification and in full compliance with the requirements spelt out in applicable codes and standards
4.1	Material identification and testing of gear reducers, regulating valve assemblies, screen assemblies, fan blades and hubs, all supporting structural assemblies, fill supports, all nuts and bolts, sluice valves, fan shafts, fills packs, gear sets, nozzles and all other applicable components constituting each cooling tower.
4.2	Oil leakage and oil temperature rise, backlash, noise level & amperage at full load torque with reduced speed shall be checked for each gear reducer assembly.
4.3	Dynamic balancing of drive shaft assembly and all other rotating components.
4.4	Measurement of proof strength and contour for each fan blade.
4.5	Static balancing test, checking of fan blade moment weight and blade track variation of fan blades, with checking of pitching and blade tip variation at site.
4.6	Complete assembly of drive shaft, Fan hub and Fan blades shall be statically balanced at Site
4.7	Visual, dimensional checking of all components of each cooling tower.
4.8	Material testing of all components, hydrostatic testing of all pressure parts at a pressure and duration in compliance with this specification, static and dynamic balancing tests of all rotating components such as pump shaft, line shaft, impeller etc. and complete performance testing as minimum for each sludge pump in each cooling tower.
4.9	Tests for hoists, chain pulley blocks and all other lifting tackle shall be carried out as per relevant Indian/ equivalent international standards.
5	Any other tests deemed necessary for safe, reliable and satisfactory operation of the equipment.

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SECTION-VIII

QUALITY ASSURANCE REQUIREMENTS

1.00.00 QUALITY ASSURANCE PROGRAMME

1.01.00 To ensure that the equipment and services under the scope of Contract whether manufactured or performed within the Successful Contractor's works or at his Sub-Vendor's premises or at the Owner's site or at any other place or work are in accordance with the specifications, the Successful Contractor shall adopt suitable quality assurance programme to control such activities at all points, as necessary. Such programmes shall be outlined by the Successful Contractor and shall be finally accepted by the Owner/ Authorised representative after discussions before the award of contract. A quality assurance programme of the Successful Contractor shall generally cover the following:

a) His organisation structure for the management and implementation of the proposed quality assurance programme.

b) Documentation control system.

c) Qualification data for Contractor's key personnel.

d) The procedure for purchase of materials, parts, components and selection of Sub-Vendor's services including vendor analysis, source inspection, incoming raw-material inspection, verification of materials purchased etc.

e) System for shop manufacturing and site erection control including process controls and fabrication and assembly controls.

f) Control of non-conforming items and system for corrective actions.

g) Inspection and test procedure both for manufacture and all site related works.

h) Control of calibration and testing of measuring and testing equipments.

i) System for quality audit.

j) System for indication and appraisal of inspection status.

k) System for authorising release of manufactured product to the Owner.

l) System for handling storage and delivery.

m) System for maintenance of records.

n) Furnishing of quality plans for manufacturing and field activities detailing out the specific quality control procedure adopted for controlling the quality characteristics relevant to each item of equipment/component as per format enclosed at Annexure-I to this section.

2.00.00 GENERAL REQUIREMENTS - QUALITY ASSURANCE

2.01.00 All materials, components and equipment covered under this specification shall be procured, manufactured and tested at all the stages, as well as Services provided for erection, commissioning and testing shall be as per a comprehensive Quality Assurance Programme. An indicative programme of inspection/tests to be carried out by the Contractor for some of the major items is given in the respective technical specification. This is however, not intended to form a comprehensive programme as it is the Contractor's responsibility to draw up and implement such programme and reviewed by by the Owner/Consultant. The detailed Quality Plans for manufacturing and field activities should be drawn up by the Contractor, separately in the format attached at Annexure-I and will be submitted to Owner/Owner's representative for review. Schedule of finalisation of such quality plans will be finalised before award.

2.02.00 Manufacturing Quality Plan will detail out for all the components and equipment, various tests/inspection, to be carried out as per the requirements of this specification and standards mentioned therein and quality practices and procedures followed by Contractor's Quality Control organisation, the relevant reference documents and standards, acceptance norms, inspection documents raised etc., during all stages of materials procurement, manufacture, assembly and final testing/performance testing.

2.03.00 Field Quality Plans will detail out for all the equipment, the quality practices and procedures etc. to be followed by the Contractor's site Quality Control organisation, during various stages of site activities from receipt of materials/equipment at site.

After pipe lines have been laid and joined, the same shall be tested hydrostatically as specified in this section.

For Welded Joints, Non- Destructive Test (NDT) shall be performed as per relevant codes or mentioned elsewhere in the specification, whichever is stringent.

All the longitudinal and circumferential welded seams shall be subjected to chalk and kerosene test prior to hydraulic testing. This shall be done at the presence of the Owner. In addition to this, test coupons shall have to be provided for each longitudinal seams for mechanical tests (tensile and bend), if considered necessary by the Owner. The test coupons are to be broken in presence of the Owner. Contractor shall satisfy the Owner that work is being carried out in accordance with the specification drawings and other

conditions. Owner shall have full access to the Contractor's working area.

Contractor's scope of supply for fabrication, erection, cleaning, testing and commissioning of the piping systems installed by him shall include the following:-

All welding consumables like welding electrodes, filler rods and wires; gases like oxygen, acetylenes, argon, carbon-dioxide, propane, backing rings etc.

Films for radiographic examination of welds.

X-ray and Gamma -ray equipment including isotopes, dye penetrants, and other required non-destructive testing materials and equipment (all to be taken back by the Contractor after completion of work).

All heating and stress relieving equipment, thermocouples asbestos blankets, cables, temperature recorders, charts heat sensitive chalks and crayons etc. (All to be taken back by Contractor after completion of work).

All machinery, equipment tools and tackles as required for transportation handling, fabrication and erection (All to be taken back by Contractor after completion of work).

All equipment/ materials as required for cleaning, flushing, blowing out and hydro testing of the piping systems; these shall include but not be limited to pumps and compressors with prime movers, instruments, pipe work with supports, valves, strainers and other specialties, blanks, plugs, spool pieces, dummy plates, electrical accessories, etc. (All to be taken back by Contractor after completion of work).

All scaffolding materials and false work (To be taken back by Contractor after completion of work).

2.04.00 The Contractor shall also furnish copies of the reference documents/plant standards/acceptance norms/tests and inspection procedure etc., as referred in Quality Plans along with Quality Plans. These Quality plans and reference documents/standards etc. will be subject to Owner/Consultant approval without which manufacture shall not proceed. In these approved quality plans, Owner/ Consultant shall identify Customer Hold Points (CHP), test/checks which shall be carried out in presence of the Owner/Consultant and beyond which the work will not proceed without consent of Owner/ Consultant in writing.

All deviations to this specification, approved quality plans and applicable standards must be documented and referred to Owner/Consultant for acceptance and dispositioning.

2.05.00 The Contractor shall provide adequate notice to the Owner for inspection before the material is dispatched as per the provisions of the Contract. No material shall be despatched from the manufacturer's works before the same is accepted subsequent to pre-despatch final inspection or verification of records of tests/inspections or verification of certificate of compliance (as the case may

be) as per the approved Quality Plan by Owner/Consultant and duly authorised for despatch issuance of Material Despatch Clearance Certificate (MDCC).

2.06.00 All materials used or supplied shall be accompanied by valid and approved materials certificates and tests and inspection report. These certificates and reports shall indicate the sheet numbers or other such acceptable identification numbers of the material. The material certified shall also have the identification details stamped on it.

2.07.00 All the individual and assembled rotating parts shall be statically and dynamically balanced in the works.

Where accurate alignment is necessary for component parts of machinery normally assembled on site, the Contractor shall allow for trial assembly prior to despatch from place of manufacture.

2.08.00 Castings and forgings used for construction shall be of tested quality. Details of results of chemical analysis, heat treatment record, mechanical property test results shall be furnished.

2.09.00 All welding and brazing shall be carried out as per procedure drawn and qualified in accordance with requirements of ASME Section-IX/BS-4870 or other International equivalent standard acceptable to the Owner. However, all brazers, welders etc. employed on any part of the contract at site shall be qualified as per ASME Section-IX or BS-4871 or equivalent international standard approved by the Owner. Such qualification tests shall be conducted in presence of Owner/his authorised representative.

For welding of pressure parts and high pressure piping the requirements of IBR shall also be complied with.

Under no circumstances any repair or welding of castings be carried out without the consent of the Owner. Proof of the effectiveness of each repair by radiographic and/or other non-destructive testing technique, shall be provided to the Owner.

All pressure parts shall be subjected to hydraulic testing as per the requirements of IBR. Other parts shall be tested for one and half times the maximum operating pressure, for a period not less than thirty (30) minutes.

2.10.00 All non-destructive examination (NDT) shall be carried out in accordance with approved international standard. The NDT operator shall be qualified as per SNT-TC-IA (of American Society of non- destructive examination). Results of NDT shall be properly recorded and submitted for acceptance.

All welding procedures adopted for performing welding work shall be qualified in accordance with the requirements of Section-IX of ASME code or IBR as applicable. All welded joints for pressure parts shall be tested by liquid penetrant examination according to the method outlined in ASME Boiler and Pressure Vessel code. Radiography, magnetic particle examination and ultrasonic testing shall be employed wherever necessary/ recommended by the

applicable code. At least 10% of all major butt welding joints shall be radiographed or as specified elsewhere whichever is stringent. Statutory payments in respect of IBR approvals including inspection shall be made by Contractor. Contractor's scope and responsibility shall also include preparation and submission of all necessary documents in the specific formats and manner stipulated by the statutory bodies, coordination and follow up for above approvals.

2.11.00 All the Sub-Vendors proposed by the Contractor for procurement of major bought out items including castings, forgings, semi-finished and finished components/equipment list of which shall be drawn up as per the stipulation laid elsewhere in the specification. Quality Plans of the successful Sub-Vendors shall be discussed, finalised and accepted by the Owner/Consultant and form part of the Purchase Order between the Contractor and the Sub-Vendor.

2.12.00 All the purchase specifications for the major bought-out items, list of which shall be drawn as per the stipulation laid elsewhere in the specification.

Owner reserves the right to carry out quality audit and quality surveillance of the systems and procedures of the Contractor's or their Sub-Vendor's quality management and control activities. The Contractor shall provide all necessary assistance to enable the Owner carry out such audit and surveillance.

Quality audit/acceptance of the results of tests and inspection will not prejudice the right of the Owner to reject equipment not giving the desired performance after erection and shall not in no way limit the liabilities and responsibilities of the Contractor in earning satisfactory performance of equipment as per specification.

2.13.00 Quality requirements for main equipment shall equally apply for spares and replacement items.

2.14.00 Repair/rectification procedures to be adopted to make any job acceptable shall be subject to the acceptance of the Owner.

2.15.00 For quality assurance of all civil works refer to the specifications for civil works.

3.00.00 QUALITY ASSURANCE DOCUMENTS

3.01.00 The Contractor shall be required to submit two (2) copies and two (2) sets of microfilms of the following Quality Assurance documents within three (3) weeks after despatch of the equipment:

a) Material mill test reports on components as specified by the specification.

b) The inspection plan with verification, inspection plan check points, verification sketches, if used and methods used to verify that the inspection and testing points in the inspection plan were performed satisfactorily.

c) Non-destructive examination results /reports including radiography interpretation reports.

d) Factory tests results for testing required as per applicable codes and standards referred in the specification.

e) Welder identification list listing welder's and welding operator's qualification procedure and welding identification symbols.

f) Sketches and drawings used for indicating the method of traceability of the radiographs to the location on the equipment.

g) Stress relief time temperature charts.

h) Inspection reports duly signed by QA personnel of the Owner and Contractor for the agreed inspection hold points. During the course of inspection, the following will also be recorded :

i) When some important repair work is involved to make the job acceptable.

ii) The repair work remains part of the accepted product quality.

i) Letter of conformity certifying that the requirement is in compliance with finalised specification requirements.

4.00.00 INSPECTION, TESTING AND INSPECTION CERTIFICATES

4.01.00 The Successful Contractor shall give the Owner fifteen (15) days written notice of any material being ready for testing for Indian supply and 1 month for FOB. Such tests shall be to the Successful Contractor's account except for the expenses of the Inspector. The Owner’s Inspector, unless the witnessing of the tests is virtually waived, will attend such tests within fifteen (15) days for Indian supply and 1 month for FOB of the date on which the equipment is notified as being ready for test/inspection failing which the Successful Contractor may proceed with test which shall be deemed to have been made in the Inspector's presence and shall forthwith forward to the Inspector duly certified copies of test reports in six (6) copies.

4.02.00 The Owner’s Engineer or Inspector shall within fifteen (15) days from the date of Inspection as defined herein give notice in writing to the Successful Contractor, or any objection to any drawings and all or any equipment and workmanship which is in his opinion not in accordance with the contract. The Successful Contractor shall give due consideration to such objections and shall either make modifications that may be necessary to meet the said objections or shall confirm in writing to the Owner’s Engineer/Inspector giving reasons therein, that no modifications are necessary to comply with the contract.

4.03.00 When the factory tests have been completed at the Contractor's or sub-Vendor's works, the Owner/Inspector shall issue a certificate to this effect fifteen (15) days after completion of tests but if the tests are not witnessed by the Owner/ Inspectors, the certificate shall be issued within fifteen (15) days of the receipt of the Contractor's test certificate by the Owner/Inspector. Failure of the Owner/Inspector to issue such a certificate shall not prevent the Contractor from proceeding with the works. The completion of these tests, or the issue of the certificates shall not bind the Owner to accept the equipment should it, on further tests after erection be found not to comply with the contract.

4.04.00 The Contractor shall furnish quarterly inspection programme indicating schedule dates of inspection at customer hold point and final inspection stages. Updated quarterly inspection plans will be made for each three consecutive months and shall be furnished before beginning of each calendar month.

ANNEXURE-I : FORMAT OF QUALITY ASSURANCE PROGRAMME

Name of Company/ Successful Contractor	NAME OF CONTRACT PACKAGE			QUALITY PLAN FOR						
	Package No. : _____ Contractor : _____			QP No. : _____ Date _____ Rev.No.: _____ Date _____						
Sl. No.	Component & Operation	Characteristics	Class	Type of Check	Quantum of Check	Reference Document	Acceptance Norm	Format of Record	Agency	Remarks

ANNEXURE-II: FORMAT OF MANUFACTURING QUALITY PLAN

MFGR.'s LOGO	MANUFACTURER'S NAME AND ADDRESS	MANUFACTURING QUALITY PLAN	PROJECT : PACKAGE : CONTRACT NO. : MAIN-SUPPLIER :
		ITEM : SUB-SYSTEM:	QP NO.: REV. NO.: DATE: PAGE: …. OF….

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
										M	C	L	
1.	2.	3.	4.	5.	6.	7.	8.	9.	D*	10.			11.

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) WILL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
** **M:** MANUFACTURER/SUB-SUPPLIER
C: SUPPLIER/NOMINATED INSPECTION AGENCY, L: OWNER
P: PERFORM **W**: WITNESS AND **V:** VERIFICATION. AS APPROPRIATE,

CHP: OWNER WILL IDENTIFIED IN COLUM "N"

DOC. NO.: REV……
CAT…..

MANUFACTURER/ SUB-SUPPLIER	MAIN-SUPPLIER	FOR OWNER USE			
SIGNATURE			REVIEWED BY	APPROVED BY	APPROVAL SEAL

MFGR.'s LOGO	SUPPLIER'S NAME AND ADDRESS	ANNEXURE – III: FORMAT OF FIELD QUALITY PLAN	PROJECT : PACKAGE : CONTRACT NO. : MAIN-SUPPLIER:
		ITEM : SUB-SYSTEM :	QP NO.: REV.NO.: DATE: PAGE: …. OF….

SL. NO	ACTIVITY AND OPERATION	CHARACTERISTICS / INSTRUMENTS	CLASS# OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D*	REMARKS
1.	2.	3.	4.	5.	6.	7.	8.	9.		10.

MANUFACTURER/ SUB-SUPPLIER	MAIN-SUPPLIER
SIGNATURE	

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

FOR OWNER USE	DOC. NO.: REV……		
	REVIEWED BY	APPROVED BY	APPROVAL SEAL

FORMAT NO.:	1/1	Engg. Div. / QA&I

ANNEXURE-IV : FORMAT OF FIELD WELDING SCHEDULE

PROJECT : FWS NO :

CONTRACTOR : REV NO. :

PACKAGE : FIELD WELDING CODE :

SYSTEM : PAGE NO. :

Sl No.	Drawing No. for Weld Locations & Identification mark	Description of parts to be welded	Material specification	Dimensions	Process of Welding	Type of Weld	Electrode Filler Specification	WPS No.	Minimum Preheat Temperature	Heat Treatment Temperature [Holding Time in secs]	NDT Method Quantum	NDT Specification Number	Accep-tance Norm Ref.	Remarks

The Field Welding Schedule should be submitted for :

- Pressure Parts
- Tanks/Vessels
- Piping
- Heavy/Important Structural Steel
- Heat Exchangers
- Bus Ducts

ANNEXURE-V : FORMAT OF INSPECTION REQUEST FORM			
From :			
To :			
Attn :			
Dear Sirs, Items detailed below are ready for inspection. Please arrange inspection and confirm the date of inspection.			
1.	Purchaser	:	
2.	Project	:	
3.	Purchaser's order reference	:	
4.	Consultant's reference	:	
5.	Sub-order reference	:	
6.	Sub-contractor's name and full address	:	
7.	Place of Inspection (full address)	:	
8.	Contact person, telephone no., Mobile No. and email ID.	:	
9.	Description of item and quantity	:	
10.	Nature of inspection required	:	
11.	Proposed date(s)	:	
12.	Weekly holiday	:	
We confirm that the items have been fully inspected/tested by us at all stages, of inspection as per quality plan, and all material test certificates, QC records, test Reports, calibration records of measuring/testing instruments with tractability to national level are available with us.			

Thanking you and awaiting your confirmation.
Yours faithfully, Cc: Sub-contractor
Note : 1. Clear notice period (date of receipt to date of inspection of ..... days) 2. Weekly holidays for Purchaser: Sunday. 3. General Holidays : As per NLC IL / Odisha state government holidays towards local inspection.

COOLING TOWERS(IDCT)

SN	TESTS/CHECK / ITEMS / COMPONENTS	Material Test	WPS/PQR/Welder Qualification	Ultrasonic test	DPT/MPI	Balancing	Assembly Fit up	Dimension	RT	Hydraulic / Water Fill	Test as per relevant Std/ Approved Data Sheets	Other Tests
1	**GEAR BOX**						Y[1]	Y				Y[2]
1.1	Shaft and gear blanks	Y[a]		Y	Y[b]							
1.2	Gear Box Casing	Y[a]								Y		
2	**FAN ASSEMBLY**					Y	Y	Y				Y[3]
2.1	Fan hub	Y[a]	Y		Y[b]				Y[4]			Y[3]
2,2	Fan blades	Y[a]						Y				Y[3]
3A	**DRIVE SHAFT (SS) FOR FAN**	Y[a]	Y	Y	Y[b]	Y		Y				
3B	**CARBON FIBER DRIVE SHAFT**	SEE NOTE - 15										
4	**PVC FILL & DRIFT ELIMINATOR**	Y[5]					Y	Y			Y	Y[6]
5	**GATE/ GLOBE/ CHECK VALVES**	Y[a]			Y[b]		Y			Y	Y	Y[8]
6	**BUTTERFLY VALVES**				Y		Y	Y		Y	Y	Y[9]
6.1	Body (Cast) , Disc (Cast)	Y[a]			Y[b]			Y				
6.2	Body & Disc both fabricated	Y[a]	Y	Y	Y[b]			Y	Y[10]			
6.3	Shaft	Y[a]		Y[c]	Y[b]			Y				
7	**ROLLED & WELDED PIPES.**	Y[a]	**REFER NOTE – 11 FOR ALL CHECKS**									
8	**WRAPPING & COATING OF PIPES**	Y[12]						Y			Y	Y
9	**HOISTS & CHAIN PULLEY BLOCKS**	Y[a]	Y		Y		Y	Y			Y	Y[13]
10	**VENTILATION FANS**	Y[a]	Y	Y[c]	Y[b]	Y	Y	Y			Y	Y[14]
11	**FRP STRUCTURE**											
11.1	**Fibre Glass- Pultruded Structural Products**	See Note- 16 & 18										
11.2	**Fiber Glass- Reinforced Plastic Panels**	See Note 17 & 18										
11.3	**Fiber Glass- Reinforced Pipes**	The FRP pipes shall conform to CTI-154										

COOLING TOWERS(IDCT)

	Legend/ Notes:	
a.	One per Heat/Heat Treatment batch/Lot	
b.	On machined surfaces only of castings and forgings. Also 100% after root run/ back gauging for butt welds and 10% after final butt welds and fillet welds.	
c.	UT shall be done for shafts with Diameter 50 mm or above & Plates of Thickness 25 mm or above.	
1.	Blue Matching and Backlash of the gears shall be checked.	
2.	No load run test for 4 hours to check noise, vibration, oil leakage and temperature rise.	
3.	Proof load test, moment weight test on blades, blade track variation & tip clearances shall be checked. Galvanizing tests as per relevant IS.	
4.	10% RT on Butt welds of Fan Hub only (in case fabricated).	
5.	PVC material shall meet the requirements of CTI Bulletin STD-136. However impact test may be done as per ASTM-D-256 and Flammability test may be done as per ASTM-D-635 with extinguishing type PVC. Density & VICAT softening temperature tests shall also be conducted.	
6.	UV exposure shall be carried out on samples, at reputed third party laboratories as per ASTM -G26 method- C/standard specified in engineering portion of the specification for cooling tower. Impact test before and after UV exposure shall be conducted as per ASTM D-256.	
7.	--NA---.	
8.	Blue matching, Wear travel for Gate valves & reduced pressure test for Check valves shall be conducted as per relevant standards.	
9.	For POD of Butterfly Valves refer respective engineering section of the technical specification.	
10.	In case of fabricated construction of Butterfly Valves and companion flanges, UT on Plates of Thickness 20 mm or above for body and disc, and RT on 100% Butt welds shall also be carried out. Welders and WPS shall be qualified as per ASME section -IX. Stress reliving after complete welding shall be carried out as per ASME Section - IX	
11.	Tests	Quantum of Check
	WPS, PQR, Welder Qualification Test	100%
	DPT on root run	100% on pipes up to 1200 mm diameter
	DPT after back gauging	100% on pipes above 1200 mm diameter
	RT/ UT by TOFD Technique/PAUT	5% (covering 100% of `T'-joints)
	DPT on finished welds	10%
	Hydraulic Test	100%, Test pressure = 1.5 times the design pressure or 2 times the working pressure whichever is higher.
	Note:- After erection, the complete piping system shall be tested at 1.5 times, the design pressure or two times the maximum working pressure whichever greater. No leakage/seepage is acceptable. Butt weld joints which would not be hydro-tested shall be subjected to 100% RT test/ 100% UT by TOFD /PAUT Technique.	
12.	Spark test, adhesion test and material tests for primer & enamel and coal tar tapes as per AWWA-C-203.	

13.	Ropes shall meet relevant Code requirements. All motions & safety features shall be tested at Works. Full load & 25% overload test shall also be conducted at works. At site, Full load test shall be conducted with all motions and safety features.
14.	One Fan of each type & size will be performance tested as per corresponding Code, for Air Flow, Static pressure, Total pressure, Speed, Efficiency, Power Consumption, Noise, and Vibration & Temperature rise. Also, all fans shall be subjected to run test of 4 hours during which Noise, Vibration, Temperature rise & current drawn shall be measured.
15.	In case of Carbon Fiber Shaft, following checks are applicable a. Manufacturer Test Certificate for Carbon Fiber and Resin b. Dimensional Check, Run out Test and Dynamic Balancing Test on Finished Shaft c. Torsional Test on Drive Shaft Assembly along with flange as a type test to verify the factor of safety. d. Type test for bonding strength at joint between shaft & shaft flange. In case of proven design, test reports of the previous test conducted shall be reviewed. e. UV test for demonstrating the compliance with respect to requirement of UV ray stabilization. Acceptance criteria of the above tests shall be mutually discussed during pre-award discussions based on proven practices of the manufacturer or relevant standards as available
16.	The physical and mechanical properties of FRP pultruded sections as specified in CTI- Standard 137 shall be tested. Fire retardant property as specified shall be tested.
17.	The physical properties of FRP Panels as specified in CTI- Standard 131 shall be tested.
18.	The UV test on identified samples of FRP Pultruded Sections, FRP Panels and FRP Pipes shall be carried out.

LOW PRESSURE PIPING

PIPES, FITTINGS, BENDS, VALVES, COATING-WRAPPING, STRAINERS EXPANSION, JOINTS, TANKS, FASTENERS, LINING ETC.

	Tests/Check / Items / Components	Material Test	DPT/MPI / RT	Ultrasonic Test	WPS/ WQS/PQR	Hydraulic / Water Fill Test	Pneumatic Test	Assembly Fit up	Dimensions	Functional/operational Test	Other Tests	All Tests as per relevant Std	REMARKS
1	Pipes & Pipe Fittings	Y[a]	Y[b]			Y1			Y			Y	
2	Diaphragm Valves	Y[a]				Y[5]			Y		Y[6]		
3A	Cast Butterfly Valves (Low Pressure)					Y		Y	Y	Y	Y[7]		
	Body	Y[a]	Y[b]										
	Disc	Y[a]	Y[b]										
	Shaft	Y[a]	Y	Y[c]									
3B	Fabricated Butterfly Valves	**REFER NOTE 14**											
4	Gate/ Globe/Swing Check / Ball Valves	Y[a]	Y[b]	Y[c]		Y[5]	Y	Y	Y	Y	Y[8]		
5	Dual Plate Check Valves	Y[a]	Y[b]	Y[c]		Y	Y	Y	Y	Y	Y[4]		
6	Rolled & Welded Pipes and Mitre Bends	Y[a]	Y[3]		Y	Y[3]			Y		Y[3&15]	Y	
7	Coating & Wrapping of Pipes	Y[2]									Y[2]		
8	Tanks & Vessels	Y[a]	Y[b]		Y	Y			Y		Y[16]		
9	Strainers	Y[a]	Y[b]		Y #	Y					Y[11]		#For Fabricated Strainer
10	Rubber Expansion Joints	Y[a]				Y[12]		Y	Y		Y[13]		
11	Internal Lining of Pipes	Y[a]							Y		Y[9]		
12	Site Welding		Y[10]		Y	Y							

NOTES (MEANING OF SUPERSCRIPTS)

a	One per heat/heat treatment batch/lot.
b	On machined surfaces only for castings and on butt welds.
c	For shaft/spindles > or = 40 mm
1	100% Hydraulic test shall be carried out. Weld joints not subjected to hydraulic test due to some unavoidable reasons, shall be subjected to 100% RT/PAUT.
2	Spark Test, Adhesion Test and Material Test for primer and enameled & Coal Tar Tapes as per AWWA-C-203-91/ IS-10221 & IS 15337 as applicable.
3	Followings are the testing requirements for fabrication of pipes at site

TESTS	**QUANTUM OF CHECKS**
WPS, PQR, Welder Qualification Test	100% Welders and WPS shall be qualified as per ASME- section IX
DPT on root run	100% for pipes up to 1200 mm diameter
DPT after back gauging	100% for pipes above 1200 mm diameter
RT / UT by (TOFD/PAUT) Technique	5% (100% of T Joints)

LOW PRESSURE PIPING

	DPT on finished butt weld joints	10%
	Hydraulic Test	100%, 1.5 times the design pressure or 2 times the working-pressure whichever is higher.
4	Dry Cycle Test on Dual Plate Check valve spring for one lakh Cycles shall be carried out as a type test. If Dry Cycle test carried out earlier for same material & diameter, Test report shall be reviewed.	
5	Seat Leakage Test for Actuator Operated Valves, shall be done with by closing the valves with actuator.	
6	Tests on rubber parts shall be conducted per batch of rubber mix for tensile, Elongation, hardness, adhesion, spark test, bleed resistance test. In addition, type test for 50,000 cycles of each type of diaphragm shall also be conducted.	
7	Hydraulic Test of Body, Seat and disc-strength shall be carried out in accordance with governing design standard in presence of owner / owner's representatives. Actuator operated valves shall be checked for Seat Leakage by closing the valves with actuator. For Proof of Design Test refer respective chapters of engineering portion in the technical specification.	
8	Blue matching, wear travel for gates, valves, pneumatic seat leakage, and reduced pressure test for check valves shall be done as per relevant standard. Maximum allowable vacuum loss is 0.5 mm of Hg abs. for valves to be tested for vacuum operation for internal pressure 25 mm of Hg abs. for a period of 15 minutes. Fire safe test for ball valve shall be done wherever specified. In case of already carried out, the test report shall be submitted for review and acceptance by owner / owner's representatives. Valves shall be offered for hydro test in unpainted condition.	
9	Tensile, Elongation, Hardness, Specific Gravity, Lining Thickness, Humidity Check, Pipe temperature check, Adhesion Test and Holiday Detection Test etc as per applicable standard shall be done for all lining material and application.	
10	10% of welds (Root and finished welds) shall be subjected to DPT. (100% DPT for compressed air line and boiler & deaerator fill line.).	
11	Pressure drop across the strainer for each type and size as a special test shall be carried out. In case of already carried out, the test report shall be submitted for review and acceptance by owner / owner's representatives.	
12	During hydraulic and vacuum tests at 25mm Hg abs in 3 positions, the change in the circumference of arch should not be more than 1.5%. 24 hrs after the test permanent set in dimension should not exceed 0.5%.	
13	Tests on rubber for tensile, elongation, hardness, hydraulic stability check as per ASTM D 471, ozone resistance test as per ASTM D 1149/IS 3400 Part 20 aging test and adhesion strength of rubber to fabric, rubber to metal adhesion shall be carried out.	
14	In addition of all tests as indicated for Cast Butterfly valve being applicable for fabricated butterfly valves, following test shall be done for Fabricated Butterfly Valve: a. UT as per ASTM A-435/IS 11630 & IS 4225 on plate material for body and disc shall be carried out for plate thickness 25mm and above. b. 100% RT and DPT as per ASTM, Section-VIII, Division-I, on butt joins of body and disc. 10% DPT on other welds shall be done. c. Post weld heat treatment as per ASME, Section-VIII, Division-I on butt joints of body and disc. d. Welders and WPS shall be qualified as per ASME- section IX	
15	Maximum number of segments in segmental flanges shall be four (04) only. All butt weld joints in the segmental flanges shall be examined by RT/UT. Segmental flanges exceeding 37.5 mm thickness shall be stress relieved as per norms of ASME Section VIII after welding.	
16	For pressure vessel welds RT shall be done as per design code requirements.	

All Valves shall be offered for inspection in unpainted condition.

No repair welding is permitted on Cast Iron / Alloy Cast Iron Castings.

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-Q-006, REV-02	DATE: 17.04.2020
		PROJECT:		PO NO.:	DATE:
		ITEM: AC ELECT. MOTORS UPTO 55KW (LV (415V))	SYSTEM:	SECTION: II	SHEET 1 of 2

S. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
1	2	3	4	5	6		7	8	9		**			
					M	C/ N				D	M	C	N	
1.0	ASSEMBLY	1.WORKMANSHIP	MA	VISUAL	100%	-	MFG. SPEC.	MFG. SPEC.	LOG BOOK		P	-	-	
		2.DIMENSIONS	MA	VISUAL	100%	-	MFG. DRG./ MFG. SPEC.	MFG. DRG./ MFG. SPEC.	LOG BOOK		P	-	-	
		3.CORRECTNESS COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE	MA	VISUAL	100%	-	MFG.SPEC./	MFG.SPEC.	LOG BOOK		P	-	-	
2.0	PAINTING	1.SHADE	MA	VISUAL	SAMPLE	-	MFG. SPEC/ APPROVED DATASHEET	MFG. SPEC/ APPROVED DATASHEET	LOG BOOK	✓	P	V	-	
3.0	TESTS	1.ROUTINE TEST INCLUDING SPECIAL TEST	MA	VISUAL	100%	-	IS-325 / IS-12615/ APPROVED DATA SHEET	IS-325 / IS-12615/ APPROVED DATA SHEET	TEST/ INSPN. REPORT	✓	P	V *	-	* NOTE -1
		2.OVERALL DIMENSIONS & ORIENTATION	MA	MEASUREMENT & VISUAL	100%	-	APPROVED DRG/ DATA SHEET	APPROVED DRG/ DATA SHEET	TEST/ INSPN. REPORT	✓	P	V *	-	* NOTE -1 & NOTE-2

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ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
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Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	RITESH KUMAR JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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		3.NAMEPLATE DETAILS	MA	VISUAL	100%	-	IS-325 / IS-12615 / APPROVED DATA SHEET	SAME AS COL. 7	TEST/ INSPN. REPORT	✓	P	V	-	
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	AS PER MFG. STANDARD / (#)	AS PER MFG. STANDARD / (#).	INSPC. REPORT	✓	P	W	-	(#) REFER NOTE-8

NOTES:
1. Routine tests on 100% motors shall be done by the vendor. However, BHEL/ Customer shall witness routine tests on random samples. The sampling plan shall be mutually agreed upon.
2. For exhaust/ventilation fan motors of rating up to 1.5 KW, only routine test certificates shall be furnished for scrutiny.
3. In case test certificates for these tests on similar type, size and design of motor from independent laboratory are available, the same is valid for 5 years.
4. BHEL reserves the right to perform repeat test, if required.
5. After packing and prior to issue MDCC, photographs of items to be despatched shall be sent to BHEL for review.
6. In case of any changes in QP commented by customer at contract stage, same shall be carried out by bidder without any implication to BHEL/ Customer.
7. Project specific QP to be developed based on customer requirement.
8. For export job, BHEL technical specification for seaworthy packing to be followed.
9. Packing shall be suitable for storage at site in tropical climate conditions.
10. Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc.) indicated in QP shall be referred.

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

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BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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		CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
		PROJECT:		PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 1 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
1.0	RAW MATERIAL & BOUGHT OUT CONTROL													
1.1	SHEET STEEL, PLATES, SECTION, EYEBOLTS	1.SURFACE CONDITION	MA	VISUAL	100%	-	-	FREE FROM BLINKS, CRACKS, WAVINESS ETC	LOG BOOK		P	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	LOG BOOK		P	-	-	
		3.PROOF LOAD TEST (EYE BOLT)	MA	MECH. TEST	SAMPLE	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	TEST REPORT		P/V	-		
1.2	HARDWARES	1.SURFACE CONDITION	MA	VISUAL	100%	-		FREE FROM CRACKS, UN-EVENNESS ETC.	TEST REPORT		P	-	-	
		2.PROPERTY CLASS	MA	VISUAL	SAMPLES	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	TC		P/V	-	-	PROPERTY CLASS MARKING SHALL BE CHECKED BY THE VENDOR
1.3	CASTING	1.SURFACE CONDITION	MA	VISUAL	100%	-	MANUFACTURER'S DRG./SPEC	FREE FROM CRACKS, BLOW HOLES ETC.	LOG BOOK		P/V	-		
		2.CHEM. & PHY. PROP.	MA	CHEM & MECH TEST	1/HEAT NO.	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	TC		P/V	-		HEAT NO. SHALL BE VERIFIED
		3.DIMENSIONS	MA	MEASUREMENT	100%	-	MANUFACTURER'S DRG.	MANUFACTURER'S DRG.	LOG BOOK		P/V	-		
1.4	PAINT & VARNISH	1.MAKE, SHADE, SHELF LIFE & TYPE	MA	VISUAL	100% CONTINUOUS	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	LOG BOOK		P/V	-		

BHEL					
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Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

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Sign & Date	
Seal	

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MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 2 OF 9

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

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		CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
		PROJECT:		PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 3 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	-	-			
					M	CN				D	M	C	N	
1.7	OTHER INSULATING MATERIALS LIKE SLEEVES, BINDINGS CORDS, PAPERS, PRESS BOARDS ETC.	1. SURFACE COND. ETC.	MA	VISUAL	100%	-	-	NO VISUAL DEFECTS	TEST REPORT		P/V	-	-	
		2.DIMENSION(BORE DIA, WALL THICKNESS, BDV AS RECEIVED, BDV AFTER FOLDING AT 180°	MA	TEST	SAMPLE	-	MANUFACTURER'S STD.	MANUFACTURER'S STD.	LOG BOOK AND OR SUPPLIER'S TC		P/V	-	-	
1.8	SHEET STAMPING (PUNCHED)	1. SURFACE COND.	MA	VISUAL	100%	-	-	NO VISUAL DEFECTS (FREE FROM BURS)	LOG BOOK		P	-	-	
		2.DIMENSIONS INCLUDING BURS HEIGHT	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG. .	MANUFACTURER'S DRG.	LOG BOOK		P/V	-	-	
		3. ACCEPTANCE TESTS	MA	ELECT. & MECH TESTS	SAMPLE	-	MANUFACTURER'S DRG./ STD.	MANUFACTURER'S DRG./ STD.	TC		P/V	-	-	
1.9	CONDUCTORS	1. SURFACE FINISH	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	LOG BOOK		*P/V	-	-	* MOTOR MANUFACTURER TO CONDUCT VISUAL CHECK FOR SURFACE FINISH ON RANDOM BASIS (10% SAMPLE) AT HSI WORKS AND MAINTAIN RECORD FOR VERIFICATION BY
		2.ELECT. PROP, & MECH. PROP	MA	ELECT. & MECH.TEST	SAMPLES	-	MANUFACTURER'S DRG./ SPEC.	MANUFACTURER'S / SPEC.	TC & VENDOR'S TEST REPORTS		P/V	-	-	

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		PROJECT:		PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 4 OF 9

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

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	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 5 OF 9

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

BHEL					
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Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
2.4	SHEET STACKING	1.COMPLETENESS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S STD.	MANUFACTURER'S STD.	LOG BOOK		P	-	-	
		2.COMPRESSION & TIGHTENING	MA	MEASUREMENT	100%	-	MANUFACTURER'S STD.	MANUFACTURER'S STD.	LOG BOOK		P	-	-	
2.5	WINDING	1.COMPLETENESS	CR	VISUAL	100%	-	MANUFACTURER'S STD.APPROVED DATASHEET	MANUFACTURER'S STD.APPROVED DATASHEET	LOG BOOK		P	-	-	
		2.CLEANLINESS	CR	VISUAL	100%	-	MANUFACTURER'S STD.APPROVED DATASHEET	MANUFACTURER'S STD.APPROVED DATASHEET	LOG BOOK		P	-	-	
		3.IR-HV-IR	CR	ELECT. TEST	100%	-	IS-325/IS-12615/IEC-60034 PART-1	IS-325/IS-12615/IEC-60034 PART-1	TEST/INSPC. REPORT	✔	P	V	-	
		4.RESISTANCE	CR	ELECT. TEST	100%	-	IS-325/IS-12615/IEC-60034 PART-1	IS-325/IS-12615/IEC-60034 PART-1	TEST/INSPC. REPORT	✔	P	V	-	
		5.INTERTURN INSULATION	CR	ELECT. TEST	100%	-	IS-325/IS-12615/IEC-60034 PART-1	IS-325/IS-12615/IEC-60034 PART-1	TEST/INSPC. REPORT		P	-	-	
2.9	IMPREGNATION	1.VISCOSCITY	MA	PHY. TEST	AT STARTING	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
		2.TEMP. PRESSURE VACCUM	MA	PROCESS CHECK	CONTINUOUS	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
		3.NO. OF DIPS	MA	PROCESS CHECK	CONTINUOUS	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK	✔	P	V	-	THREE DIPS TO BE GIVEN

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	JITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 7 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	-	-			
					M	C/N				D	M	C	N	
		4.DURATION	MA	PROCESS CHECK	CONTINUOUS	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK	✔	P	V	-	
2.7	COMPLETE STATOR ASSEMBLY	1.COMPACTNESS & CLEANLINESS	MA	VISUAL	100%	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
2.8	BRAZING/COMPRESSION JOINT	1.COMPLETENESS	CR	VISUAL	100%	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
		2.SOUNDNESS	CR	MALLET TEST & UT	100%	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	TEST/INSPC. REPORT	✔	P	V	-	
		3.HV	MA	ELECT. TEST	100%	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	TEST/INSPC. REPORT	✔	P	V	-	
2.9	COMPLETE ROTOR ASSEMBLY	1.RESIDUAL UNBALANCE	CR	DYN. BALANCE	100%	-	MANUFACTURER'S SPEC./ ISO 1940	MANUFACTURER'S DWG.	LOG BOOK		P	-	-	
		2.SOUNDNESS OF DIE CASTING	CR	ELECT. (GROWLER TEST)	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	TEST/INSPC. REPORT	✔	P	V	-	
2.10	ASSEMBLY	1.ALIGNMENT	MA	MEAS.	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		2.WORKMANSHIP	MA	VISUAL	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		3.AXIAL PLAY	MA	MEAS.	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK	✔	P	V	-	
		4.DIMENSIONS	MA	MEAS.	100%	-	MANUFACTURER'S DRG./ MANUFACTURER'S SPEC.	MANUFACTURER'S DRG./ MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		5.CORRECTNESS, COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE	MA	VISUAL	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		6. RTD, BTD & SPACE HEATER MOUNTING.	MA	VISUAL	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK	✔	P	V	-	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
		CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
		PROJECT:		PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 9 OF 9

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

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	ESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
		CUSTOMER :		QP NO.: PE-QP-400-Q-007, REV-04	
		PROJECT:		PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 9 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	AS PER MANUFACT. STANDARD / (#)	AS PER MANUFACT. STANDARD / (#)	INSPC. REPORT	✔	P	W	-	(#): REFER NOTE-8

NOTES:

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

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

3 IN CASE TEST CERTIFICATES FOR THESE TESTS ON SIMILAR TYPE, SIZE AND DESIGN OF MOTOR FROM INDEPENDENT LABORATORY ARE AVAILABLE, THE SAME IS VALID FOR 5 YEARS.

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

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

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

7 PROJECT SPECIFIC QP TO BE DEVELOPED BASED ON CUSTOMER REQUIREMENT.

8 FOR EXPORT JOB, BHEL TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING TO BE FOLLOWED.

9 PACKING SHALL BE SUITABLE FOR STORAGE AT SITE IN TROPICAL CLIMATE CONDITIONS.

10 LATEST REVISION/ YEAR OF ISSUE OF ALL THE STANDARDS (IS/ ASME/ IEC ETC.) INDICATED IN QP SHALL BE REFERRED.

LEGENDS:

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

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

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

MA: MAJOR, MI: MINOR, CR: CRITICAL

D: DOCUMENT

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO:	DATE:
	CUSTOMER:		QP NO.: PE-QP-999-509-E001, R3	DATE:
	PROJECT:		PO NO.:	DATE:
	ITEM: ABOVE GROUND EARTHING MATERIALS	SYSTEM: EARTHING		SHEET 1 OF 2

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					6		7	8	9	*	**		
			4	5	M	B				D	M	B	C
1	2	3											
1.0	RAW MATERIAL:													
1.1	MILD STEEL (FLATS & RODS) AS PER SPECIFICATION	1.CHEMICAL & PHYSICAL PROPERTIES	MA	VERIFICATION OF TC'S	100%	-	IS 2062	IS 2062	MILL TC	✓	P	V	-	REFER REMARKS AT SL. NO. 3.1
		2. DIMENSIONS	MA	MEASUREMENT	100%	-	IS 1730	IS 1730	QC RECORD	✓	P		-	
		3.SURFACE FINISH	MA	VISUAL	100%	-	IS 1079	IS 1079	QC RECORD	✓	P		-	
1.2	ZINC	1.CHEMICAL COMP.	MA	CHEM. TEST	SAMPLE	-	IS 209	IS 209	QC RECORD	✓	P	V	-	
2.0	IN PROCESS:													
2.1	CUTTING, DRILLING	1.DIMENSIONS	MA	MEASUREMENT	100%	-	IS 1730	IS 1730	QC RECORD	✓	P	V	-	
2.2	SURFACE PREPARATION	1. CLEANING, PICKLING, RINSING & FLUXING	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	
		2. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	
2.3	GALVANISING	1.TEMPERATURE OF BATH	MA	MEASUREMENT	CONTINUOUS	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	GALVANIZATION IS TO BE DONE AT GALVANIZATION PLANT LISTED IN ANNEXURE-1 TO QUALITY PLAN.
		2. DROSS	MA	VISUAL	PERIODIC	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	
		3.RATE OF IMMERSION	MA	VISUAL/ MEASUREMENT	100%	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN	QC RECORD	✓	P	-	-	
3.0	FINISHED ITEMS:													
3.1	MS FLATS	1. CHEMICAL COMP.	MA	CHEM. TEST	1 No./LOT/SIZE	-	IS 2026	IS 2026	LAB TC	✓	P	V	-	NOTE: SAMPLE FOR CHEMICAL TEST SHALL BE SELECTED BY BHEL& TESTING SHALL BE DONE AT NABL/ GOVT. APPD. LAB
		2. DIMENSIONS	MA	MEASUREMENT	IS 2500 (PART 1) LEVEL S-4	IS 2500 (PART 1) LEVEL S-4	IS 1730	IS 1730	INSPECTION REPORT	✓	P	W		

BIDDER/SUPPLIER	
Sign &Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:		MANOJ MEGWAL	Checked by:		Suman
Reviewed by:		Sandeep Lodhi	Reviewed by:	22.2.24	Hari

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

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO:	DATE:
	CUSTOMER:		QP NO.: PE-QP-999-509-E001, R3	DATE:
	PROJECT:		PO NO.:	DATE:
	ITEM: ABOVE GROUND EARTHING MATERIALS	SYSTEM: EARTHING		SHEET 2 OF 2

Sl. No	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	**			REMARKS
					M	B				D	M	B	C	
1	2	3	4	5	6		7	8	9					
		3. SURFACE FINISH	MA	VISUAL	IS 2500 (PART 1) LEVEL S-4	IS 2500 (PART 1) LEVEL S-4	-	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN ETC.	QC RECORD	✓	P	W		
		4.MASS OF ZINC COATING	MA	CHEM. TEST	IS 4759	IS 4759	IS-6745	FLATS 5 MM THICK AND OVER 610 GM/SQ.M. FLATS UNDER 5 MM, BUT NOT LESS 2 MM 460 GM/SQ.M.	INSP. REPORT	✓	P	W	-	
		5.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-2633	IS-2633	INSP. REPORT	✓	P	W	-	
		6. THICKNESS OF ZINC COATING	MA	MEASUREMENT	IS-4759	IS-4759	IS-4759	FLATS 5 MM THICK AND OVER=AVG 86 MICRON AND MINIMUM 75 MICRON. FLATS UNDER 5 MM THICK, BUT NOT LESS 2 MM =AVG 65 MICRON	INSP. REPORT	✓	P	W	-	
		7. ADHESION	MA	MECH. TEST	IS-4759	IS-4759	IS 2629	IS 2629	INSP. REPORT	✓	P	W	-	
	NOTE: ITEMS LIKE PIPES/ FLEXIBLE COPPER BRAID/ GI WIRE/ GS ROD/ SHIELDING MAST/ TEST LINK WILL BE CLEARED BASED ON COC (CERTIFICATE OF COMPLIANCE)													
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	BHEL APPROVED DOC	BHEL APPROVED DOC	INSPC. REPORT	✓	P	V	-	

NOTES:

1 LATEST REVISION/ YEAR OF ISSUE OF ALL THE STANDARDS (IS/ASME/IEC ETC.) INDICATED IN QP SHALL BE REFERRED.

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION, D: DOCUMENTATION C CUSTOMER, P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE MA: MAJOR, MI: MINOR, CR: CRITICAL

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

BIDDER/SUPPLIER	
Sign &Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:		MANOJ MEENA	Checked by:		Suman
Reviewed by:		Sandeep Lodhi	Reviewed by:	22.2.24	Harish

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

BHEL	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
		CUSTOMER : -NA-		QP NO.: PE-QP-999-507-E005, REV. 04	DATE: 04.01.2024
		PROJECT: -NA-		PO NO.:	DATE:
		ITEM: CABLE TRAYS & ACCESSORIES	SYSTEM: CABLING		SHEET 1 of 3

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	* D	** M	B	C	
					M	B								
1.0 RAW MATERIAL														
1.1	HOT ROLLED CARBON STEEL SHEET	1 CHEM & PHY PROPERTIES	MA	VERIFICATION OF TCS	100%	100%	IS -1079	IS -1079	TC	√	P/V	V	-	
		2 DIMENSIONS	MA	MEASUREMENT	100%	-	IS-1730	IS-1730	QC RECORD		P	-	-	
		3 SURFACE FINISH	MA	VISUAL	100%	-	IS-1079	IS-1079	QC RECORD		P	-	-	
1.2	ZINC	CHEM COMP	MA	CHEM TEST	EACH HEAT	EACH HEAT	IS-209	IS-209	TC	√	P/V	V	-	
2.0 IN-PROCESS														
2.1	FABRICATION	1 DIMENSIONS	MA	MEASUREMENT	100%	100%	APPD DOCUMENT	APPD DOCUMENT	QC RECORD	√	P	V		
		2 WELDING QUALITY	MA	VISUAL	100%	100%	ASME SEC IX	ASME SEC IX	QC RECORD	√	P	V		Welding is to be done by qualified welders in accordance with ASME SEC IX article III WPS, PQR & WPQ to be reviewed during inspection
		3 SURFACE FINISH	MA	VISUAL	100%	100%	FREE FROM DEFECTS & SLAG	FREE FROM DEFECTS & SLAG	QC RECORD	√	P	V	-	
2.2	SURFACE PREPARATION	1 CLEANING, PICKLING & RINSING & FLUXING	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD		P/V	-	-	
		2 SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD		P/V	-	-	

BIDDER/SUPPLIER		BHEL						FOR CUSTOMER REVIEW & APPROVAL			
Sign & Date		ENGINEERING			QUALITY			Doc No:			
Seal			Sign & Date	Name		Sign & Date	Name		Sign & Date	Name	Seal
		Checked by:	[signature]	MANOJ MEENA	Checked by:	[signature]	Mintoo	Reviewed by:			
		Reviewed by:	[signature]	ALKA KUTHIALA	Reviewed by:	[signature] 22/3/24	Harish	Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER : -NA-		QP NO.: PE-QP-999-507-E005, REV. 04	DATE: 04.01.2024
	PROJECT: -NA-		PO NO.:	DATE:
	ITEM: CABLE TRAYS & ACCESSORIES	SYSTEM: CABLING		SHEET 2 of 3

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	D	**			
					M	B					M	B	C	
2.3	GALVANISING	1.TEMPERATURE OF ZINC BATH	MA	MEASUREMENT	CONTINUOUS	-	IS-2629	IS-2629	QC RECORD		P/V	-	-	Galvanization is to be done at galvanization plant listed in Annexure-I to quality plan
		2.DROSS	MA	VISUAL	PERIODIC	-	IS-2629	IS-2629	QC RECORD		P/V	-	-	
		3.RATE OF IMMERSION	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD		P/V	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG FLUX, STAIN ETC.	QC RECORD		P/V	-	-	
3.0 FINISHED ITEMS														
3.1	(CABLE TRAY, ACCESSORIES &)	1. DIMENSIONS	MA	MEASUREMENT	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	APPD.DRG	APPD. DOCUMENT	INSP.REPORT	√	P	W	-	
		2. SURFACE FINISH	MA	VISUAL	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	APPD. DRG	FREE FROM BURRS, SLAG, ROUGHNESS,FLUX, STAIN ETC.	INSP.REPORT	√	P	W	-	
		3.RIGIDITY (FOR TRAYS)	MA	DEFLECTION TEST	05 No./ LOT/	05 No./ LOT/	APPD. DRG	APPD. DOCUMENT	INSP.REPORT	√	P	W	-	600MM wide Ladder & perforated cable tray to be tested .Maximum deflection shall not exceed 7MM on mid span on uniform loading of 100KG/M

BIDDER/SUPPLIER	
Sign &Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:		MANAS MEENA	Checked by:		
Reviewed by:		HEMA KUSHWAHA	Reviewed by:	20/2/24	

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
		CUSTOMER : -NA-		QP NO.: PE-QP-999-607-1.005, REV. 04	DATE: 04.01.2024
		PROJECT: -NA-		PO NO.:	DATE:
		ITEM: CABLE TRAYS & ACCESSORIES	SYSTEM: CABLING		SHEET 3 of 3

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY **			REMARKS
					M	B				D	M	B	C	
1	2	3	4	5	6		7	8	9					
3.0 FINISHED ITEMS														
		4 MASS OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-6745	APPD DOCUMENT	INSP REPORT	√	P	W	-	
		5 UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-2633	IS-2633	INSP REPORT	√	P	W	-	
		6 THICKNESS OF ZINC COATING	MA	PHYSICAL TEST	IS-4759	IS-4759	APPD DOCUMENT	APPD DOCUMENT	INSP REPORT	√	P	W	-	
		7 ADHESION	MA	MECH TEST	IS-4759	IS-4759	IS-2629	IS-2629	INSP REPORT	√	P	W	-	
		8 COUPLER PLATE	MA	VISUAL	100%	100%	APPD DOCUMENT	APPD DOCUMENT	INSP REPORT	√	P	W	-	Inspector to mention the total number of bags/bundles of coupler plates, nuts, bolts & washer in the inspection report.
		9 NUT & BOLT	MA	VISUAL	100%	100%	APPD DOCUMENT	APPD DOCUMENT	INSP REPORT	√	P	W	-	
		10 WASHER	MA	VISUAL	100%	100%	APPD DOCUMENT	APPD DOCUMENT	INSP REPORT	√	P	W	-	Further manufacturer shall attach the detail of total number of bags/bundles of the respective items with packing list.
		11 PACKING	MA	VISUAL	100%	100%	APPD DOCUMENT	APPD DOCUMENT	INSP REPORT	√	P	W	-	

NOTES:

1. LATEST REVISION/ YEAR OF ISSUE OF ALL THE STANDARDS (IS/ASME/IEC ETC.) INDICATED IN QP SHALL BE REFERRED.

LEGENDS:

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

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

P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE. MA: MAJOR, MI: MINOR, CR: CRITICAL.

BIDDER SUPPLIER	
Sign & Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:			Checked by:		
Reviewed by:			Reviewed by:	22.8.24	

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

MANUFACTURER / BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO: PE-TS-XXX-507-E012	DATE:
	CUSTOMER: -NA-		QP NO.: PE-QP-999-507-E006, REV. 04	DATE:04.01.2024
	PROJECT: -NA-		PO NO.:	
	ITEM: CABLE TRAY SUPPORT SYSTEM-WELDED(GALV)	SYSTEM: CABLING		SHEET 1 OF 2

Sl No	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
					6						**			
					M	B				D	M	B	C	
1	2	3	4	5			7	8	9					
1.0 RAW MATERIAL														
1.1	MILD STEEL SECTIONS (CHANNEL & ANGLES)	1. CHEM. & PHY PROPERTIES	MA	VERIFICATION OF TC's	100%	-	IS -2062	IS -2062	MILL TC	√	P/V	V	-	
		2 DIMENSIONS	MA	MEASUREMENT	100%	-	IS - 808	IS - 808	QC RECORD		P	-	-	
		3 SURFACE FINISH	MA	VISUAL	100%	-	IS-2062	IS-2062	QC RECORD		P	-	-	
1.2	ZINC	CHEM.COMP.	MA	CHEM TEST	EACH HEAT	-	IS-209	IS-209	TC	√	P/V	V	-	
2.0 IN-PROCESS														
2.1	CUTTING	1.DIMENSIONS	MA	MEASUREMENT	100%	-	Refer remarks	Refer remarks	QC RECORD	√	P	V	-	REFER NOTE-1
		2.SURFACE FINISH	MA	VISUAL	100%	-	-	FREE FROM DEFECTS & SLAG	QC RECORD	√	P	V	-	
2.2	SURFACE PREPARATION	1.CLEANING, PICKLING & RINSING & FLUXING	MA	VISUAL	100%	-	IS:2629	IS 2629	QC RECORD		P/V	-	-	
		2. SURFACE FINISH	MA	VISUAL	100%	-	IS.2629	IS 2629	QC RECORD		P/V	-	-	
2.3	GALVANIZING	1.TEMPERATURE OF ZINC BATH	MA	MEASUREMENT	CONTIN UOUS	-	IS-2629	IS-2629	QC RECORD		P/V	-	-	REFER NOTE-2
		2.DROSS	MA	VISUAL	PERIODI C	-	IS-2629	IS-2629	QC RECORD		P/V	-	-	
		3.RATE OF IMMERSION	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD		P/V	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG FLUX, STAIN ETC	QC RECORD		P/V	-	-	

BIDDER/SUPPLIER

Sign & Date

Seal

BHEL

ENGINEERING

	Sign & Date	Name
Checked by:	[illegible]	MANOJ MEENA
Reviewed by:	[illegible]	HEMA KUSHWAHA

QUALITY

	Sign & Date	Name
Checked by:	[illegible]	Mintoo
Reviewed by:	22/2/24	Harish

FOR CUSTOMER REVIEW & APPROVAL

Doc No:

	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER / BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO: PE-TS-XXX-507-E012	DATE:
	CUSTOMER: -NA-		QP NO.: PE-QP-999-507-E006, REV. 04	DATE:04.01.2024
	PROJECT: -NA-		PO NO.:	
	ITEM: CABLE TRAY SUPPORT SYSTEM-WELDED(GALV)	SYSTEM: CABLING		SHEET 2 OF 2

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
					6						**			
					M	B				D	M	B	C	
1	2	3	4	5			7	8	9					
3.0 FINISHED ITEMS														
3.1	**CABLE TRAY SUPPORT SYSTEM-WELDED(GALV)**	1 DIMENSIONS	MA	MEASUREMENT	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	IS - 808	IS - 808	INSP REPORT	√	P	W		REFER NOTE 1
		2 SURFACE FINISH	MA	VISUAL	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	-	FREE FROM BURRS, SLAG, ROUGHNESS,FLUX, STAIN ETC	INSP REPORT	√	P	W		
		3 MASS OF ZINC COATING	MA	CHEM TEST	IS-4759	IS-4759	IS-6745	610 gms/ Sq m	INSP REPORT	√	P	W		
		4 UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-2633	IS-2633	INSP REPORT	√	P	W		
		5 THICKNESS OF ZINC COATING	MA	PHYSICAL TEST	IS-4759	IS-4759	Refer remarks	Refer remarks	INSP REPORT	√	P	W		REFER NOTE 4
		6 ADHESION	MA	MECH TEST	IS-4759	IS-4759	IS-2629	IS-2629	INSP REPORT	√	P	W		
		7 PACKING	MA	VISUAL	100%	100%	BHEL APPD DOCUMENT	BHEL APPD DOCUMENT	INSP REPORT	√	P	√		

NOTES:

1. LENGTH OF ONE MEMBER OF CABLE TRAY SUPPORT SYSTEM-WELDED(GALV) SHALL BE 5.5 MTRS TO 6.5 MTRS
2. GALVANIZATION IS TO BE DONE AT BHEL APPROVED GALVANIZATION PLANTS LISTED IN ANNEXURE-I TO QUALITY PLAN
3. THICKNESS OF ZINC COATING SHALL BE 75 MICRONS (MINIMUM)) & 86 MICRONS (AVERAGE).
4. LATEST REVISION/ YEAR OF ISSUE OF ALL THE STANDARDS (IS/ASME/IEC ETC.) INDICATED IN QP SHALL BE REFERRED

LEGENDS:

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

BIDDER/SUPPLIER	BHEL					FOR CUSTOMER REVIEW & APPROVAL		
Sign &Date	ENGINEERING			QUALITY		Doc No:		
Seal		Sign & Date	Name		Sign & Date	Name		Sign & Date Name Seal
	Checked by:		MANOJ MEENA	Checked by:			Reviewed by:	
	Reviewed by:		HEMA KUSHWAHA	Reviewed by:	22/2/24		Approved by:	

	MANUFACTURER/BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
BHEL		CUSTOMER :		QP NO.: PE-QP-999-558-E002, R-3	DATE:
		PROJECT:		PO NO.:	DATE:
		ITEM: DISTRIBUTION BOARD	SYSTEM:	SECTION:	SHEET 1 OF 4

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**		
					M	B/ C				D	M	B	C
1.0	Raw Material	(a)Material (b)Thickness (c) Surface Finish (d) Chemical Composition	MA	V/M	100%	100%	Manuf. Std / Approved Document	Manuf. Std / Approved Document	Test Certificate	√	P	V	-	
		Verification of make, type, Size & rating of component like indicating lamps, PB's, contactors, relays, switches etc.	MA	Visual	100%	100%	Approved drg. & Datasheet	Approved drg. & Datasheet	Test Certificate	√	P	V	-	Component to be of approved make.
	LIGHTING DISTRIBUTION BOARDS & LIGHTING PANELS													
2.0	Final Inspection	1 Dimensions	MA	Measurement	100%	10%	Approved drg./ Datasheet	Approved drg./ Datasheet	Insp. Report	√	P	W	-	
		2 Paint shade/ Paint Finish & thickness	MA	Visual/ measurement	100%	10%	Approved drg./ Datasheet	Approved drg./ Datasheet	Insp. Report	√	P	W	-	
		3 Verification of GA	CR	Visual	100%	100%	Approved drg.	Approved drg.	Insp. report	√	P	W	-	
		4 Verification of BOM	CR	Visual	100%	100%	Approved drg.	Approved drg.	Insp. report	√	P	W	-	
		5 Functional tests (incl. wiring cont.)	MA	Elect	100%	100%	Approved drg.	Approved drg.	Insp. report	√	P	W	-	
		6 HV/ IR/ HV	MA	Elect	100%	100%	App DataSheet	App DataSheet	Insp. report	√	P	W	-	

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by		Sh VENDRA SINGH	Checked by		MOTOO		
Reviewed by	22/2/24	DEMA KUSHWAHA	Reviewed by	22/2/24	HARISH KUMAR		

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

MANUFACTURER/BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO:	DATE:
	CUSTOMER :		QP NO.: PE-QP-999-558-E002, R-3	DATE:
	PROJECT:		PO NO.:	DATE:
	ITEM: DISTRIBUTION BOARD	SYSTEM:	SECTION:	SHEET 2 OF 4

NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
					M	B/ C				D	M	S	C	
1	2	3	4	5	6		7	8	9					
		7. Degree of protection (including explosion proof if any)	MA	Scrutiny of type test certificates	1/rating	1/rating	IS 13947	IS 13947	Test certificate	√	P	V	-	
		7. Temperature rise test (for complete assembled LDB/ LP)	MA	Scrutiny of type test certificates	1/rating	1/rating	IS 13947	IS 13947	Test certificate	√	P	V	-	
.0	LIGHTING TRANSFORMER													
		1.Routine test	CR	Visual	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	
		a.) Type/ Rating	CR	Test	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	
		b). Winding/ Resistance	CR	Test	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	
		c). Voltage Ratio/ Vector	CR	Test	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	
		d) Z Volt/ Z Sckt	CR	Test	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	

BHEL					BIDDER/ SUPPLIER		FOR CUSTOMER APPROVAL			
ENGINEERING			QUALITY		Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal		Sign & Date	Name	Seal
Prepared by:		DEVENDRA SINGH	Checked by:		MINTOO		Reviewed by			
Reviewed by:		HEMA KUSHWAHA	Reviewed by:		HARISH KUMAR		Approved by			

MANUFACTURER/BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.: PE-QP-999-558-E002, R-3	DATE:
	PROJECT:		PO NO.:	DATE:
	ITEM: DISTRIBUTION BOARD	SYSTEM:	SECTION:	SHEET 3 OF 4

S.NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	* D	** M	B	C	
					M	B/ C								
		e).Load Loss/ Current	CR	Test	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	
		f.) No Load Loss & No Load Current	CR	Test	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	
		g.) Source Withstand	CR	Test	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	
		h) Induced O/ V	CR	Test	100%	100%	IS 11171	IS 11171	Insp. report	√	P	V	-	
		2. Type Test	MA	Verification	------	1/Rating	IS 11171	IS 11171	Test Certificates	√	P	V	-	Type Test Certificate Clearance from BHEL/Customer
4.0	PACKING	As per BHEL Appd. Drg./Packing Procedure	MA	Visual	100%	100%	Appd. Packing Drg./ Packing procedure	Appd. Packing Drg./ Packing procedure	Insp. report	√	P	W	-	

NOTES: -

(A)	THE INSPECTION SHALL BE CARRIED OUT ONCE FOR THE MATERIAL OFFERED FOR INSPECTION IN ONE LOT. FOR SUBSEQUENT LOTS AGAINST THE SAME PROJECT, THE MATERIAL CAN BE ACCEPTED BASED ON CERTIFICATE OF COMPLIANCE FURNISHED BY THE VENDOR.
(B)	BHEL RESERVES THE RIGHT FOR CONDUCTING REPEAT TEST, IF REQUIRED.
(C)	AFTER PACKING AND PRIOR TO ISSUE OF MDCC, PHOTOGRAPHS OF COMPLETE MATERIAL (TO BE DISPATCHED) SHALL BE SENT TO BHEL-PURCHASE GROUP FOR REVIEW.
(D)	IN CASE THERE ARE ANY CHANGES IN QP COMMENTED BY CUSTOMER AT CONTRACT STAGE, THE SAME SHALL BE CARRIED OUT BY THE BIDDER

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	22/2/24	DEVENDRA SINGH	Checked by:		MINTOO
Reviewed by:		HEMA KUSHWAHA	Reviewed by:		HARISH KUMAR

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

MANUFACTURER/BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.: PE-QP-999-558-E002, R-3	DATE:
	PROJECT:		PO NO.:	DATE:
	ITEM: DISTRIBUTION BOARD	SYSTEM:	SECTION:	SHEET 4 OF 4

	WITHOUT ANY IMPLICATION TO BHEL/ CUSTOMER.
(E)	PROJECT SPECIFIC QP TO BE DEVELOPED BASED ON CUSTOMER REQUIREMENT.
(F)	~~FOR EXPORT JOB, PACKING SHALL BE AS PER BHEL SEAWORTHY PACKING SPECIFICATION.~~

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

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	22/2/24	DEVENDRA SINGH	Checked by:	22/2/24	MINTOO
Reviewed by:	22/2/24	HEMA KUSHWAHA	Reviewed by:	22/2/24	HARISH KUMAR

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 1 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	B/ C				D	M	B	C	

1.0 LED TYPE LIGHTING FIXTURES

A	**Bought out items / in-process checks**													
1.1	LED chip	LED chip efficacy	Major	Visual	Manufacturer Standard	-	LM 80 report	Approved GA drawing	LM 80 report	√	P/ V	V	V	At the time of final Inspection
		LED chip CRI & CCT	Major	Visual	Manufacturer Standard	-	LM 80 report	Approved GA drawing	LM 80 report	√	P/ V	V	V	At the time of final Inspection
		Reported TM21 (L80) lifetime of LED chip	Major	Visual	Manufacturer Standard	-	LM 80 report	Approved GA drawing	LM 80 report	√	P/ V	V	V	At the time of final Inspection
1.2	LED Driver	Compatibility with LED module / chip, controls & protection features	Major	Visual	Manufacturer Standard	-	Approved GA drawing	Approved GA drawing	Certificate of Compliance	√	P/ V	V	V	Certificate of Compliance by LED driver manufacturer / lighting fixture supplier that driver meets all requirements as per approved GA Drawing
		THD & pf check	Major	Electrical	Manufacturer Standard	-	Approved GA drawing	THD <10% and pf >=0.9	Inspection report	√	P/ V	-	-	Refer note No. 1

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by	22/2/24	MEET SAGAR SINGH RAJPAL	Checked by	22/02/24	Kundan			Reviewed by			
Reviewed by	22/2/24	HEMA KUSHWAHA	Reviewed by	22.02.24	Harish			Approved by			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 2 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	D	**			
					M	B/ C					M	B	C	
1.3	Castings	Freedom from defects	Major	Visual	Manufacturer Standard	-	Manufacturer Standard	Casting shall be free from any defects such as blow holes , surface blisters , cracks and cravities etc.	Inspection report		P/ V •	-	-	Refer note No. 1
1.4	Sheet metal forming and fabrication	Freedom from defects	Major	Visual	Manufacturer Standard	-	Manufacturer Standard	Manufacturer Standard	Inspection report		P/ V •	-	-	Refer note No. 1
1.5	Pre-treatment and powder coating	Pre-treatment process checks, Powder Coating finish, thickness , uniformity of coating and adhesion	Major	Visual, chemical & mech	Manufacturer Standard	-	Manufacturer Standard	Nominal coating thickness 50 microns or more	Inspection report	√	P/ V •	V		Refer note No. 1

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by	24.02.24	MEET SAGAR SINGH RAJPAL	Checked by		Kundan			Reviewed by			
Reviewed by	24/2/24	HEMA KUSHWAHA	Reviewed by	24/2/24	Harish Kumar			Approved by			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 3 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
					M	B/ C				D	M	B	C	
1	2	3	4	5	6		7	8	9		**			

B	Acceptance Tests on LED Lighting fixtures													
1	LED Lighting fixture	LED chip make	Major	Visual	-		Accepted type test reports (LM80) report	LM80 report	Certificate of compliance	√	V	V	V	
2		Constructional features including: Internal writing , terminal block, earthing terminal, safety chain (if applicable)	Major	Visual	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
3		Degree of protection test in case of lighting fixtures having IP X4 and above rating.	Major	Mechanical	1 Sample per type	1 Sample per type	IS 10322	Approved GA drawing	Certificate of compliance	√	P	W	V	
4		Resistance to dust (applicable if IP5X and above)	Major	Optical	Manufacturer Standard	-	IS 10322	Approved GA drawing	Certificate of compliance	√	P/ V *	V	V	Refer note No. 1
5		Photometry check	Major	Optical	Manufacturer	-	LM79, IS 16106	Approved GA drawing	Certificate of	√	P/ V	V	V	Refer note No. 1

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	22/02/24	MEET SAGAR SINGH RAJPAL	Checked by:		Kundan			Reviewed by:			
Reviewed by:	22/2/24	HEMA KUSHWAHA	Reviewed by:	22/2/24	Hema			Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 4 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	B/ C				D	M	B	C	
					Standard				compliance		*			
6		Dimensions	Major	Visual	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
7		LED driver: THD and pf check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	THD<10% and pf >= 0.9	Inspection report	√	P	W	W	At lighting fixtures supplier test lab.
8		LED driver: Precision current control check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
9		LED driver: Open circuit protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
10		LED driver: short circuit protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
11		LED driver: overload protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
12		LED driver: surge protection	Major	Electrical	1 Sampl	1 Sampl	Approved GA drawing	Certificate of compliance	Certificate of	√	V	V	V	

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by	24/02/24	MEET SAGAR SINGH RAJPAL	Checked by:	Kuldeep	Kuldeep			Reviewed by:			
Reviewed by	24/02/24	HEMA KUSHWAHA	Reviewed by:		Harish			Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 5 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY **			REMARKS
1	2	3	4	5	6		7	8	9	D	M	B	C	
					M	B/ C								
		compliance check			e per type	e per type		that surge protection is provided.	compliance					
3.0 JUNCTION BOXES & RECEPTACLES														
A	**Acceptance Tests**													
1	**Acceptance Tests**	Dimensions	Major	MEASUREMENT	100%	-	Approved GA drawing	Approved GA drawing	Inspection report		P	V	-	Components shall be of approved Make
2		Paint Shade/ Thickness	Major	VISUAL/MEAS.	10%	-	Approved GA drawing	Approved GA drawing	Inspection report		P	V	-	At the time of final Inspection
3		HV/ IR	Major	ELECT.TESTS	100%	-	2KV AC FOR 1 MINUTE	2KV AC FOR 1 MINUTE	Inspection report		P	V	-	
4		Degree Of Protection	Major	TEST	1 Sample/Type	-	IS:2147	IS:2147	TEST CERT.	√	P	V	-	
5		Special tests if any, explosion proof etc.	Major	TEST	1 Sample/Type	-	IS:2148	IS:2148	TEST CERT.	√	P	V	-	
6		Operation Check	Major	TEST	10%	-	Approved GA drawing	Approved GA drawing	Inspection report		P	V	-	
7		Mechanical Interlock	Major	TEST	10%	-	Approved GA drawing	Approved GA drawing	Inspection report		P	V	-	
4.0 PACKING														
	PACKING	Soundness of Packing against transit damage	Major	Visual	100%	10%	Approved Packing procedure	Approved Packing procedure	Inspection report	√	P	W	-	

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:	22/02/24	MEET SAGAR SINGH RAJPAL	Checked by:		Kundan		
Reviewed by:	22/2/24	HEMA KUSHWAHA	Reviewed by:		Harish		

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		S.C. NO	DATE:
		CUSTOMER :		QP NO.:PE-QP-999-548-E001, R05	DATE: 22.02.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 6 OF 9

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
										*	**			
					M	B/ C				D	M	B	C	
1	2	3	4	5	6		7	8	9					

NOTES:

1. P/V"- means test will be performed either by lighting fixture supplier or their sub-vendor and verified by lighting fixture supplier
2. Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc) Indicated in QP shall be referred
3. Items like ceiling fans, emergency lighting unit, flexible conduit, 24V supply module, ladders, hume pipe, switchboxes, exit signs etc. Will be cleared based on COC (certificate of compliance)

LEGENDS:

*Records identified with "Tick"(√) shall be essentially included by supplier in QA Documentation.

** M: Supplier/ Manufacturer/ Sub-Supplier, B: Main supplier/ BHEL/ Third Party Inspection Agency, C: Customer,

P: Perform, W: Witness, V: Verification, as appropriate

MA: Major, MI: Minor, CR: Critical, D: Documentation

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW / APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc. No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by		MEET SAGAR SINGH RUPAL	Checked by					Reviewed by			
Reviewed by		HEMA KUSHWAHA	Reviewed by					Approved by			

भेल BHEL	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-558-E003, R02	DATE: 22.02.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: PVC Wires	SYSTEM: STATION LIGHTING SYSTEM	SECTION: II	SHEET 1 OF 2

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	B/C				D	M	B	C	
1	2	3	4	5	6		7	8	9	*	**			
1.0 RAW MATERIAL/BOUGHT OUT ITEMS														
1.1	CONDUCTOR (COPPER)	1 PHYSICAL PROPERTIES	MA	PHYSICAL TESTS	SAMPLE/ BATCH	-	IS:8130	IS:8130	TEST CERT	✓	✓	V	-	
		2 ELEC. PROPERTIES	MA	ELECTRICAL TESTS	SAMPLE/ BATCH	-	IS:8130	IS:8130	TEST CERT	✓	✓	V	-	
1.2	PVC COMPOUND FOR INSULATION	1 MATERIAL PROPERTIES	MA	PHYSICAL TESTS	SAMPLE/ BATCH	-	IS 5831	IS 5831	TEST CERT	✓	P	V	-	
2.0 ROUTINE/ ACCEPTANCE TEST														
2.1		SURFACE DEFECTS	MA	VISUAL	IS 694 ANNEX A	-	IS:694	IS 694	INSP. & TEST REPORT FROM MANUF	✓	P/ V	V	-	
2.2		CONSTRUCTION OF WIRE	MA	VISUAL/ MEASUREMENT	IS 694 ANNEX A	-	IS-694 (TABLE 3) IS-8130 (TABLE-2) APPROVED DS	IS-694 (TABLE-3) IS-8130 (TABLE-2) APPROVED DS	INSP. & TEST REPORT FROM MANUF	✓	P/ V	V	-	
2.3	PVC WIRES	ROUTINE TESTS a) CONDUCTOR RESISTANCE TEST b) HIGH VOLTAGE TEST OR SPARK TEST	MA	CR	100%	-	IS 694/ IS 8130	IS 10810	TEST REPORT	✓	P/ V	V	-	
2.4		**ACCEPTANCE TESTS** a) ANNEALING TEST b) CONDUCTOR RESISTANCE TEST c) THICKNESS OF INSULATION	MA	CR	IS 694 ANNEX A	IS 694 ANNEX A	IS 694/ IS 8130	IS 10810	TEST REPORT	✓	P	V	-	

BHEL					BIDDER/SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL		
ENGINEERING			QUALITY		Sign & Date		Doc No.		
	Sign & Date	Name	Sign & Date	Name	Seal			Sign & Date	Name
Prepared by	22/02/24	MEET SAGAR SINGH RAJPAL	Checked	22.02.24 Suman			Reviewed by		
Reviewed by	23/2/24	HEMA KUSHWAHA	Reviewed	Harish 23.02.24			Approved by		

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
	CUSTOMER :		QP NO.: PE-QP-999-558-E003, R02	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: PVC Wires	SYSTEM: STATION LIGHTING SYSTEM	SECTION: II	SHEET 2 OF 2

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	B/C				D	M	B	C
1	2	3	4	5	6		7	8	9				
		d) TENSILE STRENGTH AND ELONGATION AT BREAK OF INSULATION e) IR TEST f) HV TEST g) FLAMMABILITY TEST h) OXYGEN INDEX TEST i) TEMPERATURE INDEX j) HALOGEN ACID GAS (ONLY FOR FRLSH WIRE) k) SMOKE DENSITY (ONLY FOR FRLSH WIRE											
2.5		MARKING	MA	VISUAL	IS 694 ANNEX A	IS 694 ANNEX A	APPD DS	APPD DS	INSP. REPORT		P/ V	W	
3.0	PACKING												
	PACKING	SOUNDNESS OF PACKING AGAINST TRANSIT DAMAGE	MAJOR	VISUAL	100%	100%	BHEL APPROVED DOCUMENT	BHEL APPROVED DOCUMENT	INSPECTION REPORT		P	V	

NOTE: Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc.) indicated in QP shall be referred

LEGENDS

*RECORDS IDENTIFIED WITH TICK (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.

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

P PERFORM W WITNESS V VERIFICATION AS APPROPRIATE

MA MAJOR MI MINOR CR CRITICAL D DOCUMENTATION

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by	23/02/24	MEET SAGAR SINGH RAJPAL	Checked by	23.02.24	Suman			Reviewed by			
Reviewed by	23/2/24	HEMA KUMAWAT	Reviewed by	23.02.24	Manch			Approved by			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-558-E001, R05	DATE: 22.02.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: RIGID STEEL CONDUITS	SYSTEM: STATION LIGHTING SYSTEM	SECTION: II	SHEET 1 OF 2

SL NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	B/ C				D	M	B	C	
1	2	3	4	5	6		7	8	9	*	**	*		
1.0 RAW MATERIAL/BOUGHT OUT ITEMS														
1.1		HOT ROLLED STEEL STRIP	MA	VISUAL, MECH. & CHEMICAL	MFR STD	-	IS10748	IS10748	TEST CERT.	√	V	V	-	AS APPLICABLE
1.2		COLD ROLLED STEEL SHEET	MA	VISUAL, MECH. & CHEMICAL	MFR STD	-	IS513	IS513	TEST CERT.	√	V	V	-	AS APPLICABLE
2.0 ACCEPTANCE TESTS														
2.1		DIMENSIONS	MA	MEASUREMENT	IS 9537-II	IS 9537-II	IS:9537/ APPROVED DATA SHEET	APPROVED DATA SHEET	INSP. REPORT	√	P	W	-	
2.2		MECH. PROPERTIES												
		a) BENDING TEST	CR	MECH. TEST	IS 9537-II	IS 9537-II	IS 9537-II	IS 9537-II	INSP. REPORT	√	P	W	-	
		b) COMPRESSION TEST	CR	MECH. TEST	IS 9537-II	IS 9537-II	IS 9537-II	IS 9537-II	INSP. REPORT	√	P	W	-	
2.3	RIGID STEEL CONDUITS	GALVANISATION TEST												
		a) UNIFORMITY OF ZINC COATING	CR	CHEMICAL TEST	IS 9537-II	IS 9537-II	IS-2633/ APPD DS	IS-2633/ APPD DS	INSP. REPORT	√	P	W	-	
		b) MASS OF ZINC COAT.	CR	CHEMICAL TEST	IS 9537-II	IS 9537-II	IS-6745/ APPD DS	IS-6745/ APPD DS	INSP. REPORT	√	P	W	-	
		c) EPOXY THICKNESS	MA	VISUAL	IS 9537-II	IS 9537-II	APPD DS	APPD DS	INSP. REPORT	√	P	W	-	AS APPLICABLE
2.4		MARKING	CR	VISUAL	IS 9537-II	IS 9537-II	APPROVED	APPROVED	INSP.		P	W	-	

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by	22/02/24	MEET SAGAR SINGH RAJPAL	Checked by	23.02.24	SUMAN			Reviewed by:			
Reviewed by	23/2/24	HEMA KUSHWAHA	Reviewed by	23/2/24	Harish			Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-558-E001, R05	DATE: 22.02.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: RIGID STEEL CONDUITS	SYSTEM: STATION LIGHTING SYSTEM	SECTION: II	SHEET 2 OF 2

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9		**			
					M	B/C				D	M	B	C	
							DATA SHEET	DATA SHEET	REPORT					
3.0 PACKING														
	PACKING	SOUNDNESS OF PACKING AGAINST TRANSIT DAMAGE	MA	VISUAL	100%	100%	BHEL APPROVED DOCUMENT	BHEL APPROVED DOCUMENT	INSP. REPORT		P	V		

NOTE: Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc.) indicated in QP shall be referred.

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

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by	23/04/24	MEET SAGAR SINGH RAJPAL	Checked by	23.4.24	Sanjay			Reviewed by			
Reviewed by	23/4/24	HEMA KUSHWAHA	Reviewed by		Harish			Approved by			

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.	CONTROL CODE	REMARKS	LOAD No.
	NAME PLATE	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

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)
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 (dc): 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)

भेल BHEL	LOAD DATA (ELECTRICAL)	JOB NO.		ORIGINATING AGENCY		PEM (ELECTRICAL)
		PROJECT TITLE		NAME		DATA FILLED UP ON
		SYSTEM / S	IDCT	SIGN.		DATA ENTERED ON
		DEPTT. / SECTION		SHEET 1 OF 1	REV. 00	DE'S SIGN. & DATE

Note: This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted alongwith relevant supporting documents.

MEASURING INSTRUMENTS

Item Components / Sub System Assembly	Dimensions (R)	Make, Model, Type, Rating (R)	Process / Electrical connection (R)	Calibration (R)	Test as per standard(R)	Insulation Resistance (R)	IBR Certification (As applicable)(R)	Hydro Test(R)	Material Test certificate (R)	Degree of Protection Test
Pressure Gauge (IS-3624 and IS-3624)	Y	Y	Y	Y	Y					Y
Temperature Gauge (IS-2147)	Y	Y	Y	Y	Y					
Level Switch (IS-2147)	Y	Y	Y	Y	Y					Y

R-Routine Test A- Acceptance Test Y – Test applicable

PROCESS CONNECTION AND PIPING

Tests / Items	Visual & Dimensions ®	GA, BOM, Layout of component & construction feature, Paint Shade/thickness ®	Flattening,flaring,hydrotest,hardness check as per ASTM standard (A)	Component Ratings ®	Wiring ®	Make, Model, Type, Rating®	IR & HV ®	Review of TC for instrument/devices (R)	Accessability of TBs/Devices Illumination,grounding ®	Tubing ®	Leak/Hydro test(A)	Chemical/physical properties of material (A)	Proof pressure test,Dismantling & reassembly test,Hydrulic impulse and vibration test (R)	Tests as per standards & specification
Junction Box (IS-2147)	Y	Y*		Y		Y	Y							
Impulse pipes and tubes	Y		Y			Y						Y		
Socket weld fittings ANSI B-16.11	Y					Y						Y		Y
Compression fittings	Y					Y					Y	Y	Y	
Instrument valves & Valve manifolds	Y					Y					Y	Y		
*-applicable for painted junction boxes.														

®-Routine Test A-Acceptance Test Y – Test applicable

PAINTING REQUIREMENT

Sl no	Condition	Surface Preparation	Primer Coat	No. of Coats	DFT (in Microns)	Intermediate Coat	No. of Coats	DFT (in Microns)	Final Coat	No. of Coats	DFT (in Microns)	Total DFT
EXTERNAL SURFACE - OVER GROUND PIPING												
1	Clarified Water	Surface preparation shall be done by means of sand blasting, which shall conform to SSPC SA10/NACE 2/SA2½ Standard.	Primer coat shall consist of one coat (Minimum DFT of 100 Microns) of Epoxy Resin Based Zinc Phosphate Primer.			Intermediate coat (or under coat) shall consist of one coat (Minimum DFT of 100 Microns) Epoxy Resin Based Paint Pigmented with Titanium Dioxide.			Top coat shall consist of one coat (Minimum DFT of 75 Microns) of Epoxy Paint of approved shade and colour with glossy finish. Additional one coat (Minimum DFT of 25 Microns) of finish coat of Polyurethane shall be provided.			Total DFT of paint system shall not be less than 300 microns.
INTERNAL SURFACE (FOR PIPE 450 NB AND ABOVE)												
2	Clarified Water	Surface Preparation by Means of Sand Blasting Which Shall Conforms to SSPC SP10/NACE2/SA2½ Standard.	-	-	-	-	-	-	Internally coated with coal tar epoxy coating	With minimum two (2) coats.	250	Minimum 500 microns
BURRIED CW PIPING												
3	All underground pipe shall be provided with wrapping and coating as per IS- 10221 / anticorrosive protection Coal-tar tapes as per IS15337 (however, thickness shall be as per IS10221), along with Cathodic protection depending of soil resistivity. A minimum soil cover of 1.5 m shall be provided for underground pipes. Wherever road crossings are encountered for pipelines, RCC box culverts (or) RCC encasing with suitable design requirement considered in selection of piping like axle loads etc. along with the earth cover mentioned elsewhere in this specification.											

DOCUMENTATION REQUIREMENT

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY ALL THE BIDDERS ALONG WITH THE BID		
Sl. No.	**DOCUMENT TITLE**	
1	PQR CREDENTIALS	
2	COMPLIANCE SHEET (DULY SIGNED AND STAMPED)	
7	PERFORMANCE GUARANTEE SCHEDULE (DULY SIGNED AND STAMPED)	
3	GENERAL ARRANGEMENT DRAWING FOR COOLING TOWER, INCORPORATING ALL RELEVANT DIMENSIONS, COLD WATER CHANNELS / SLUDGE CHAMBER/ SCREENS/ GATES IN THE COLD WATER CHANNEL, STAIRCASE ETC.	
4	PUMPING HEAD CALCULATIONS	
5	THERMAL DESIGN CALCULATIONS	
6	TOWER PERFORMANCE CURVES	
8	TECHNICAL DEVIATION SCHEDULE (IF ANY)	
9	UNPRICED COPY OF THE PRICE SCHEDULE (INDICATING “QUOTED” FOR THE LISTED ITEMS).	
DRAWINGS & DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT ALONG WITH SUBMISSION SCHEDULE		
Sl. No.	**DOCUMENT TITLE**	**SUBMISSION SCHEDULE**
A	**BASIC DRAWINGS / DOCUMENTS**	
1	GENERAL ARRANGEMENT OF INDUCED	6 WEEKS FROM LOI
2	GA OF C.W. BASIN OF COOLING TOWER	6 WEEKS FROM LOI
3	THERMAL DESIGN & FRICTION LOSS	6 WEEKS FROM LOI
4	CIVIL DESIGN BASIS OF IDCT	8 WEEKS FROM LOI
5	LAYOUT AND DETAILS OF FOUNDATION	15 WEEKS FROM LOI
6	GA OF FOUNDATION, POND WALL AND	15 WEEKS FROM LOI
7	METHODOLOGY STATEMENT FOR PILING	12 WEEKS FROM LOI
8	STRUCTURAL DESIGN OF 760 MM DIA. BORED	12 WEEKS FROM LOI
9	LOCATION OF BORED CAST IN SITU TEST	12 WEEKS FROM LOI
10	NUMERATION AND RC DETAILS OF TEST PILE	12 WEEKS FROM LOI
11	DESIGN CALCULATION OF SUB STRUCTURE	16 WEEKS FROM LOI
12	DESIGN CALCULATION FOR SUPER	16 WEEKS FROM LOI
13	ANALYSIS & DESIGN OF POND WALL, POND	15 WEEKS FROM LOI
14	LAYOUT AND DETAILS OF PILE/FOUNDATION	16 WEEKS FROM LOI

15	LAYOUT AND DETAILS OF POND FLOOR AND	16 WEEKS FROM LOI
16	R.C. DETAILS OF PILECAP/FOUNDATION, POND	16 WEEKS FROM LOI
B	**DETAILED DRAWINGS / DOCUMENTS**	
1	SCHEMATIC ARRANGEMENT OF FILL & FILL	21 WEEKS FROM LOI
2	SCHEMATIC ARRANGEMENT OF INTERNAL DISTRIBUTION SYSTEM FOR COOLING TOWER	21 WEEKS FROM LOI
3	SCHEMATIC ARRANGEMENT OF EXTERNAL HW DISTRIBUTION SYSTEM OF COOLING TOWER	30 WEEKS FROM LOI
4	SCHEMATIC ARRANGEMENT OF DRIFT	31 WEEKS FROM LOI
5	SCHEMATIC ARRANGEMENT OF MECHANICAL	31 WEEKS FROM LOI
6	TDS FOR DRIFT ELIMINATOR FOR IDCT	31 WEEKS FROM LOI
7	TDS FOR FILL FOR IDCT	31 WEEKS FROM LOI
8	TDS FOR DISTRIBUTION PIPES	31 WEEKS FROM LOI
9	GAD AND DATA SHEET OF DRIVE SHAFT ASSY.	31 WEEKS FROM LOI
10	SLUDGE PUMPS-GA & DATA SHEET .	42 WEEKS FROM LOI
11	CHAIN PULLEY BLOCKS-DATA SHEET AND GA	42 WEEKS FROM LOI
12	TDS FOR FAN MAINTENANCE FACILITIES FOR	42 WEEKS FROM LOI
13	GAD AND DATA SHEET FOR BFV'S	42 WEEKS FROM LOI
14	GA & TDS FOR CI GATE VALVE .	42 WEEKS FROM LOI
15	GAD AND DATA SHEET OF FAN ASSY FOR IDCT	31 WEEKS FROM LOI
16	GAD AND DATA SHEET OF GEARBOX FOR IDCT	31 WEEKS FROM LOI
17	R.C. DETAILS OF COLD WATER BASIN COLUMN	15 WEEKS FROM LOI
18	ANALYSIS & DESIGN OF PRECAST BEAMS	21 WEEKS FROM LOI
19	ANALYSIS AND DESIGN OF COLUMNS FOR	21 WEEKS FROM LOI
20	GA OF FILL SUPPORTING STRUCTURE	21 WEEKS FROM LOI
21	DETAILS OF DIAGONAL COLUMNS FOR	21 WEEKS FROM LOI
22	DESIGN OF LOWER TIER AND TIE BEAMS	21 WEEKS FROM LOI
23	DESIGN OF UPPER TIER BEAMS	21 WEEKS FROM LOI
24	R.C DETAILS OF TRANS BEAM AT ELIMINATOR	21 WEEKS FROM LOI
25	R.C DETAILS OF LONG BEAM AT ELIMINATOR	21 WEEKS FROM LOI
26	RC DETAILS OF END WALLS & PARTITION WALL	21 WEEKS FROM LOI
27	LAYOUT PLAN OF CT AT FANDECK LEVEL &	25 WEEKS FROM LOI
28	RC DETAILS OF FAN DECK SLAB	21 WEEKS FROM LOI
29	RC DETAILS OF LONG & TRANS BEAMS AT FAN	21 WEEKS FROM LOI
30	DETAILS OF ACCESS DOOR	25 WEEKS FROM LOI
31	RC DETAILS OF FAN CYLINDER	25 WEEKS FROM LOI
32	DETAILS OF C.W. OUTLET, HOIST SUPPORT	25 WEEKS FROM LOI
33	RC DETAILS OF PIPE SUPPORT	25 WEEKS FROM LOI
34	DESIGN CALCULATION FOR STAIRCASE FOR CT	25 WEEKS FROM LOI
35	ANALYSIS & DESIGN OF STAIRCASE	25 WEEKS FROM LOI

36	DETAILS OF STAIRCASE	25 WEEKS FROM LOI
37	R.C. DETAILS OF ACCESS STAIRWAY	25 WEEKS FROM LOI
38	R.C. DETAILS OF GRDR PLINTH SUPPORTING	28 WEEKS FROM LOI
39	DESIGN CALCULATION FOR OUTLET, SLUDGE	25 WEEKS FROM LOI
40	ANALYSIS & DESIGN OF COLD WATER OUTLET	25 WEEKS FROM LOI
41	R. C. DETAILS OF CW OUTLET, EMBEDMENT	25 WEEKS FROM LOI
42	ANALYSIS & DESIGN OF DESLUDGE CHAMBER	25 WEEKS FROM LOI
43	R.C. DETAILS OF DRAIN SUMP AND DRAIN BOX	25 WEEKS FROM LOI
44	R.C. DETAILS OF MAIN HOT WATER DUCT	25 WEEKS FROM LOI
45	ANALYSIS & DESIGN OF PLATFORM	25 WEEKS FROM LOI
46	DETAILS OF INTERMEDIATE ACCESS/	25 WEEKS FROM LOI
47	DETAILS OF EXTERNAL TRESTLES FOR HOT	25 WEEKS FROM LOI
48	RC DETAILS OF INTERMEDIATE TIER BEAMS	25 WEEKS FROM LOI
49	DETAILS OF PRECAST BEAM AT DRIFT	25 WEEKS FROM LOI
50	NUMERATION AND RC DETAILS OF COLUMN BRACKETS SUPPORTING PRECAST GRID BEAMS	25 WEEKS FROM LOI
51	WIND TUNNEL TESTING : METHODOLOGY AND	25 WEEKS FROM LOI
52	DESIGN OF PEDESTALS FOR HOT WATER	25 WEEKS FROM LOI
53	DESIGN OF TEST SETUP ARRANGEMENT FOR	25 WEEKS FROM LOI
54	DESIGN OF INTERMEDIATE TIER BEAMS	25 WEEKS FROM LOI
55	DESIGN OF COLUMN BRACKETS	25 WEEKS FROM LOI
56	ANALYSIS & DESIGN OF MISCELLANEOUS ITEMS (STOP LOG GATES, TRASH RACKS, ETC)	25 WEEKS FROM LOI
57	DESIGN CALCULATION FOR STOP LOG GATE/	25 WEEKS FROM LOI
58	DETAILS OF SCREEN TRASH RACK AT OUTLET	42 WEEKS FROM LOI
59	DETAILS OF EXTERANL M.S. LADDER	25 WEEKS FROM LOI
60	PITOT TUBE INSTALLATION & PIT DETAILS FOR	30 WEEKS FROM LOI
61	CONTROL & OPERATION PHILOSOPHY	31 WEEKS FROM LOI
62	PG TEST PROCEDURE	50 WEEKS FROM LOI
63	QAP- DRIVES SHAFT FOR IDCT	37 WEEKS FROM LOI
64	QAP-GEARBOX FOR IDCT	37 WEEKS FROM LOI
65	QAP- SPLASH FILL FOR IDCT	37 WEEKS FROM LOI
66	QAP- PVC ELIMINATOR FOR IDCT	37 WEEKS FROM LOI
67	QAP- DESLUDGE PUMP	45 WEEKS FROM LOI
68	QAP- FAN FOR IDCT	37 WEEKS FROM LOI
69	QAP OF BF VALVE	37 WEEKS FROM LOI
70	QAP OF GATE VALVE/SLUICE VALVE	45 WEEKS FROM LOI
71	QAP OF HOT WATER MANIFOLD	45 WEEKS FROM LOI
72	ELECTRICAL LOAD LIST	10 WEEKS FROM LOI
73	CABLE SCHEDULE AND CABLE INTERCONNECTION	15 WEEKS FROM LOI

74	I/O LIST	15 WEEKS FROM LOI
75	INSTRUMENT CABLE SCHEDULE	15 WEEKS FROM LOI
76	INSTRUMENT SCHEDULE	15 WEEKS FROM LOI
77	CONTROL SCHEME/LOGIC DIAGRAM (TO BE IMPLEMENTED IN DDCMIS)	15 WEEKS FROM LOI
78	FIELD JB TERMINATIONS	15 WEEKS FROM LOI

MDL for IDCT shall be finalized after award of contract.

DRAWINGS & DOCUMENTS TO BE SUBMITTED AS FINAL/AS-BUILT DOCUMENT

Sl. No.	DOCUMENT TITLE
1	APPROVED DOCUMENTS
2	CALIBRATION CERTIFICATES
3	O&M MANUAL
4	ALL TEST CERTIFICATES

COMPLIANCE CERTIFICATE	
1	It is hereby confirmed that the technical specification has been read and understood. We confirm compliance to the tender specification including any prebid clarification and amendments issued prior to techno-commercial bid opening without any deviation.
2	It is hereby declared that any technical submittals which was not specifically asked by BHEL in NIT shall not to be considered as part of bid and shall not be evaluated by BHEL.

Signature of authorised Representative

Name and Designation :

Name & Address of the Bidder

Date

PRE QUALIFICATION REQUIREMENT (TECHNICAL)

ENQUIRY NO.:

PROJECT: 3 X 800 MW NLC TALABIRA

3.02.03.01 The Bidder should have designed by itself, engineered, constructed and commissioned at least one (01) number Induced Draught Cooling Tower in RCC Construction of capacity not less than 13000m3/ hr which should have been in successful operation for at least one (1) year as on 15.03.2022.

The reference Cooling Towers should be of the same type i.e. counter flow as is being offered by the Bidder and of the same construction type i.e. RCC construction as being offered by the Bidder (Refer Annexure V).

(OR)

3.02.03.02 The Bidder should be a wholly or partially (with minimum 51% holding) held Indian subsidiary of a firm who in turn meets the requirements of clause 3.02.03.01 above. Further, the Bidder on its own or along with its holding company should have executed/ be executing at least one contract involving design, engineering, construction and commissioning of at least one (1) number Induced Draft Cooling Tower in RCC Construction of capacity not less than 13000m3/hr.

In such a case, the Bidder shall be required to furnish a letter of technical support from Holding company for successful performance of Cooling Towers, as per the format enclosed (Refer Annexure V). This letter of technical support should be submitted to BHEL along with Bid.

Notes:
“design by itself” means that tower(s) of reference plant must have been designed by the Bidder’s own engineers. Tower(s) designed by Consultant/ collaborator/ associate of the Contractor shall not be considered.

General notes of the PQR are as under:

1. Bidder to submit 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.

2. Notwithstanding anything stated above, BHEL/Customer reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in overall interest of BHEL/Customer.

3. Consideration of offer shall be subject to customer's approval of bidder.

4. After satisfactory fulfilment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all other terms of the tender.

Annexure V

FORMAT FOR LETTER OF SUPPORT FOR SATISFACTORY PERFORMANCE OF COOLING TOWER (Name of Equipment/system*) FOR NLC TALABIRA THERMAL POWER PROJECT- (3X800MW)

TO

[The Purchaser Name & Address]

Technology provider* / Licensor* / Holding Company*) undertaking the responsibility for satisfactory performance of .....(Name of the equipment/system)

Dear Sirs,

1. In accordance with the Award of the Contract by ……. (Name of the Contractor) to M/s. ……. (Name of the sub-contractor), we the aforesaid Associate*/Collaborator*/ Licensor*/Technology provider*/ Holding company, (M/s.....) shall be fully responsible for the satisfactory performance of the .....(Name of the equipment/ system).

2. Further, the manner of achieving the objective set forth in point 1 above shall be as follows

For .....(Name of the equipment/system):

(a) We shall be fully responsible for design, engineering & commissioning and extending all necessary support for putting in to satisfactory operation and carrying out the Guarantee test for ..... (Name of the equipment/system*) to the satisfaction of the Purchaser.

(b) We shall depute technical experts to Contractor's/sub-contractor work for supervision during manufacturing, assembly, inspection, as and when required by Purchaser. We shall participate in site erection, commissioning and final testing (as and when necessary) of the ....(Name of the equipment/ system).

(c) We shall participate in Technical Co-ordination meetings (TCMs) from time to time, as and when required by Purchaser.

(d) We shall promptly carry out all the corrective measures and shall promptly provide corrected design and shall undertake replacements, rectifications or modifications to the equipment/system* as and when required by Purchaser in case the equipment/system* fails to demonstrate successful performance as per contract at site.

3. We, the Associate*/Collaborator*/Technology provider*/Licensor*/Holding company* do hereby undertake and confirm that this Letter of Technical Support shall be valid for a period of seven (7) years or up to the end of defect liability period of the contract, whichever is later.

Signature of the Authorised Representatives:……..…
For M/s ……
(Associate*/Collaborator*/Technology provider*/Licensor*/Holding company)
Name: …….....
Designation: ……
Date: ……

Common Seal of the Company

*: Strike off whichever is not applicable.

Signature of authorized signatory.....

Annexure to Sub QR for IDCT – Details of reference Cooling Tower

QR / PROVENNESS OF COOLING TOWER

I. (A) Details of RCC Induced draught Cooling Towers (as per clause 3.02 .03.01 of Section-II, Vol-IIA of Bidding Documents

In support of Sub-Qualifying Requirements of Clause 3.02 .03.01 of Section-II, Vol-IIA of Bidding Document, we confirm that We/our Sub-contractor have designed by itself, engineered, constructed and commissioned at least one (1) number of Induced Draft Cooling tower in RCC construction of capacity not less than 13,000 m³/h and which has been in successful operation for at least one (1) year as on 15.03.2022.

We/our Sub-contractor further confirm that the reference cooling tower is of the same type, i.e. counter flow type cooling tower as is being offered by us/our sub-contractor.

We/our sub-contractor also confirm that "design by itself" means that tower(s) of reference plant have been designed by ours or our sub-contractor's own engineers.

The details of the reference cooling tower is furnished below:

Sl.	Description/Details PlantNo.	
1.	Description of Work and Name of Client	.....
2.	Location/Address of the Plant/works	.....
3.	Address of the Client (including Contact Person Name, TelephoneNo, e-mail etc.)	.....
4.	No. of Cooling Towers	.....
5.	Capacity of each Cooling Tower (Cu.M/hr.)	.....
6.	Type of Cooling Towers	.....
7.	Type of Construction	.....
8.	Whether scope of works included	
	(a) Design of Cooling Towers by Contractor/its Sub-contractor	YES*/NO*

Signature of authorized signatory.....

(b) Construction of Cooling towers — YES*/NO*

(c) Commissioning of Cooling towers — YES*/NO*

9. Date of Commissioning of theCooling tower

10. Certificate from client to YES*/NO* substantiate Contractor's QR data is enclosed at Annexure .....

11. Whether the reference cooling tower at sl no:1 is designed by the Contractor's own engineers — YES*/NO*

12. Whether the reference cooling tower YES*/NO* at sl. No. 1 is designed by Sub-contractor's own engineers

13. Whether Documentary evidence/ certificate(s) from client enclosed for the above data — Yes* / No*

- * Strike off whichever is not applicable.

Date : (Signature).....

Place : (Printed Name).....

(Designation).....

(Common Seal).....

Signature of authorized signatory.....

I.(B)

In terms of clause no. 3.02.03.02 of Section-II, Vol-IIA, we/our sub-contractor confirm that, we/our sub-contractor a wholly or partially (with minimum 51% holding) held Indian subsidiary of a firm who in turn meets the requirements of clause 3.02.03.01 of Sub-Section-II,Vol-IIA. Further, we/our sub-contractor either on its own or along with its holding company have executed/be executing at least one contract involving design, engineering, construction and commissioning of at least one (1) number Counter flow Induced Draught Cooling Tower in RCC Construction of capacity not less than 13000 m3/hr and meets the requirements stipulated at 3.02.03.01 of Section-II, VOl-IIA above as per following details:

We/our Sub-contractor further confirm that the reference cooling tower is of the same type, i.e. counter flow type cooling tower as is being offered by us/our sub-contractor.

We/our sub- contractor also confirm that "design by itself" means that tower(s) of reference plant have been designed y associate's own engineers.

We/our sub-contractor also enclose letter of technical support from holding company for successful performance of Induced draught Cooling Towers as per the format enclosed.

The details of the reference cooling tower is furnished below :

Sl.	Description/Details PlantNo.	
1.	Description of Work and Name of Client	.....
2.	Location/Address of the Plant/works	.....
3.	Address of the Client (including Contact Person Name, TelephoneNo, e-mail etc.)	.....
4.	No. of Cooling Towers	.....
5.	Capacity of each Cooling Tower (Cu.M/hr.)	.....
6.	Type of Cooling Towers	.....
7.	Type of Construction	.....
8.	Whether scope of works included	
	(a) Design of Cooling Towers by Contractor/its Sub-contractor YES*/NO*	

Signature of authorized signatory.....

(b)	Construction of Cooling towers	YES*/NO*
(c)	Commissioning of Cooling towers	YES*/NO*

9. Date of Commissioning of theCooling tower

10. Certificate from client to YES*/NO* substantiate Contractor's QR data is enclosed at Annexure .....

11. Whether the reference cooling tower at sl no:1 is designed by the Contractor's own engineers YES*/NO*

12. Whether the reference cooling tower */NO*at sl. No. 1 is designed by Sub-contractor own engineers YES

13. Whether Documentary evidence/ certificate(s) from client enclosedfor the above data Yes* / No*

.....

- * Strike off whichever is not applicable.

Date : (Signature).....

Place : (Printed Name).....

(Designation).....

Signature of authorized signatory.....