Corrigendum - 06 dated 10/04/2026 to CPC Tender No. BHEL/CPC/KRW/EPC AHP/26/070

Corrigendum - 06 to Tender for the work of "EPC package for Ash Handling Plant at 2x660 MW Korba West."

A): Some of the Bidders had asked queries in the published tender specification. The clarifications issued by BHEL are furnished below

Sl. No..	Clause No	Description	Query	BHEL Response
1	Clause No. 3.7 TECHNICAL CONDITION OF CONTRACT (TCC)	No. of ESP hoppers is indicated as 120 Nos.	Please review & confirm the no. of ESP Hoppers.	The no of ESP hopper is 96. Bidder to refer technical corrigendum-1 issued with Corrigendum 04 dtd 02/04/2026.
2	Clause No. 13.1.3, Sl. No. 5, TECHNICAL CONDITION OF CONTRACT (TCC)	1 No. AWRS pipe of 500 NB is specified. However, as Amendment Clause no. MH-61 of Amendment 03, 70% recirculation of BA Slurry Water is to be considered	Please review & confirm the MOC & Thickness of 500 NB. Moreover, whether Pipe size would be decided by bidder as per 70% water recirculation specified in amendment.	Bidder to consider 500 NB MS Pipe from Terminal point to Clarifier. Bidder to refer Clause 4.010.00 of Sub-Section: A-21 of Technical Specification Section-VI, Part B of Bid Doc. No.:03-05/2X660 MW/T-13/2023 for pipe MOC & Thickness.
3	Sl. No. MH-25, Technical Specification, Section-VI, Ammendment-02	Total BA Slurry Disposal Piping is indicated as 45000 M and Total HCSD piping is indicated as 65000 M	Please confirm that above pipes & fittings are to be supplied upto Plant Boundary. Static Height for above pipes is to be indicated.	Bidder to follow scope matrix for terminal points. For details, bidder to check all the clarification/amendments issued by CSPGCL.
4	Clause No. 7.12.00 (v & vi), Technical Specification, Section-VI, Part B , A-21	Ash Water Pump House shall be Open type & Mobile crane (by others) is applicable. Ash Water Pump House is specified as **Closed RCC** type as per Amendment 03, MH-41.	Please review and confirm the type of Ash Water Pump House to be considered.	All the building will be of closed RCC construction. For handling of equipments in the buildings pendent controlled electrically operated overhead travelling cranes shall be provided by bidder meeting NIT specification A-24 of Section-VI-Part-B.

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Sl. No..	Clause No	Description	Query	BHEL Response
5	Sl. No. 92, Clarification No. 02, Technical Specification, Section-VI	AWRS system from both ash dyke is included in scope of Bidder.	Pls review and confirm that AWRS system is excluded from bidder scope except 500 NB Pipe from Plant Boundary to Ash Water Sump in plant.	Bidder to follow scope matrix for terminal points. For details, bidder to check all the clarification/amendments issued by CSPGCL.
7	Clause No. 1.03.00, Sl. No. (i), (ii) & (iii), Technical Specification, Section-VI , Part A , II-A-16	AWRS system is specified.	Please confirm that AWRS system is excluded from the scope of Bidder.	Bidder to follow scope matrix for terminal points. For details, bidder to check all the clarification/amendments issued by CSPGCL.
8	Clause No. 1.6, A-21, Technical Specification, Section-VI , Part B	HCSD Pump Capacity is specified as " To suit one unit fly ash Generation. Considering 2X50% working pump per unit". However as per Amendment No. 03, MH-57 it is specified that "HCSD Pump Shall be sized for 60% of total fly ash generation for worst coal at BMCR condition of one unit on dry ash basis".	Please review and confirm the criteria to be considered to design HCSD pump capacity.	Bidder to refer the SL no 36 of Corrigendum-04 dated 02/04/2026
9	PU-11, Amendment No. 01, Technical Specification, Section-VI	Duty Factor of Instrument air compressors & Dryers is specified as 0.6 & 0.5 respectively	Refer Guaranteed Auxiliary Power Consumption format (Annexure 13) of NIT Specification , Duty Factor for Instrument air Compressor with is specified as 1.0. Please review and confirm Duty Factor.	The Duty Factor for Instrument Air Compressor with Air Drying Plant shall be 1.00 as mentioned in Sub Section-IV-Functional Guarantees & Liquidated damages (Page-23 & 24 of 78) . Bidder to follow the same.
10	1.04.00, Amendment No. 02, Technical Specification, Section-VI , VI A/II A -16	Ash Dyke Dust Suppression system is specified	Please confirm that Ash Dyke Dust Suppression system at ash pond area is excluded from the scope of bidder.	Bidder to follow scope matrix for terminal points. For details, bidder to check all the clarification/amendments issued by CSPGCL.

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Sl. No..	Clause No	Description	Query	BHEL Response
11	7.12.00 (B) (i), Amendment No. 02, Technical Specification, Section-VI , MH-27, VI B, A-21	Combined Ash Slurry Pump House Shall be shed type	Please review & confirm the type of construction of Combined Ash Slurry Pump House as same is specified in Clause no. 7.12.00, Page 41 of 46, A-21, of Technical Spec. VI, Part B as Shed Type Building.	All the building will be of closed RCC construction.
12	Chapter - 3, 15_Amendment_No_1_Part_1_dtd_19-07-2024 Part2, NIT Specification-Technical	MANDATORY SPARES FOR ASH HANDLING PLANT	All AHS Mandatory Spares marked **deleted** in "Remarks" column. Please review and arrange list of Mandatory Spares to be considered.	Bidder to note that the mandatory Spares related to AHS package alone are deleted from the scope of the bidder. However, the spares for the items which form integral part for the completion of the Ash Handling system like FPS, Electrical Systems, DCS etc. defined under the scope of this package are applicable in line with the list of mandatory spares attached along with the tender document.
13	Chapter - 1,SUB-SECTION-VI (List of Mandatory Spares REV_02),NIT Specification-Technical	List of Mandatory Spares for SG & Auxiliaries	AHS Mandatory Spares not clear in documents. Please review and arrange list of Mandatory Spares to be considered.	
14	Point No- 5, Annexure-3 Electrical and C&I scope Matrix of AHP	Any logic modification during commissioning stage shall be executed by EPC bidder.	Bidder understand that Logic of Ash Handling System shall be provided by EPC Vendor & Logic Developed by BHEL -EDN during commissioning.	Annexure-3 Electrical and C&I scope Matrix of AHP is Clear. Bidder to follow the specifications.
15	Point No- 5, Annexure-3 Electrical and C&I scope Matrix of AHP	Bidder to coordinate with BHEL-EDN before finalisation of field bus-based instruments/actuator regarding communication protocol.	Bidder understand that Filed bus-based instrument applicable for Temperature Transmitter, Pressure Transmitter & Differential Pressure Transmitter only. Please confirm.	Bidder to coordinate with BHEL-EDN before finalisation of field bus-based instruments/actuator regarding communication protocol during detailed engineering.

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Sl. No..	Clause No	Description	Query	BHEL Response
16	23.00.00, SUB-SECTION-IIIC-04, m05_Section_VI_Part_B _Book_3_of_5_C_I	3D type Acoustic Frequency Wave Based Level Scanner System for Coal Bunker, Fly Ash Silo and ESP Hopper (First to Third Field)	Bidder considered - 3D -Radar Type Level Scanner for Fly Ash Silo. Please confirmed.	Bidder to follow the specifications.
17	MH-28, VI-B, A-01, Page 80/96, Clause No 4.01.02 F (a)	Minimum pumping distance – 12.0 Km or as per actual distance for the farthest disposal point in ash dyke whichever is higher	We assume that distance of 12000 meter is the distance to be taken for Lean Slurry Pump Head Calculation. Please Confirm.	Refer CSPGCL clarification and amendments issued in this regard. Ash Corridor survey report & Ash Dyke Layout is also available in NIT specification. Further bidder shall visit the site for any additional information required.
18	VI-B, A-01, Page 81/96, Clause No 4.01.02 F (h)	Minimum pumping distance – 12.0 Km or as per actual distance for the farthest disposal points in ash dyke whichever is higher	We assume that distance of 12000 meter is the distance to be taken for HCSD Pump Head Calculation. Please Confirm.	Refer CSPGCL clarification and amendments issued in this regard. Ash Corridor survey report & Ash Dyke Layout is also available in NIT specification. Further bidder shall visit the site for any additional information required.
19	MH-66, VI-A, IIA-16, Page 8/19, Clause No 1.01.06 (C)(iii)	Two (2) numbers (one (1) working and one (1) standby) instrument air compressors along with its dedicated air-drying plants **for both units** and air receivers complete with motors, valves, pads and pipelines along with supporting steel structures to meet the complete requirement of ESP Hoppers/Buffer Hoppers/HCSD Silos/**Main Fly**	Based on our Experience, we suggest that purchaser needs to consider individual IAC one for each Unit and one common for Silo System so that there is no shortage of IA for the Plant & Silo Area system operation. Keeping this configuration, there shall be three I.A. Compressor working and 1 common stand by. please review.	Requirement mentioned in NIT spec is minimum. In case bidder feels that more nos. of compressor are required to fulfil instrument air requirements of 2 units running simultaneously with all system in operation then same shall be considered by bidder in their scope.

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Sl. No..	Clause No	Description	Query	BHEL Response
		Ash Silo's etc. such as actuation of silo ash inlet valves, segregation valves; various water and air line valves, slurry valves; vent filter cleaning etc.		
20	MH-66, VI-A, IIA-16, Page 9/19, Clause No 1.01.08 €	Two (2) numbers (one (1) working and one (1) standby) I.A.C along with its dedicated air-drying plants and air receivers complete with motors, valves, pads and pipelines along with supporting steel structures to meet the complete requirement of ash storage silos such as actuation of silo ash inlet valves, segregation valves; various water and air line valves, slurry valves; vent filter cleaning etc. Pipe support structures for all Ash conveying lines to be provided. -**Not Required**		

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Sl. No..	Clause No	Description	Query	BHEL Response
21	MH-66, VI-A, IIA-16, Page 25/46, Clause No 2.12.00	**Classifier Silo/Intermediate FA Silo:** Type: Flat bottom/Conical type with proven design with respect to Flowability of ash.	Please confirm whether any Ash Flowability test is to be undertaken in this AHS package as Classification Silo is not applicable in present case and Intermediate silo is not be required in Vacuum-Pressure system supplier.	Bidder to follow specification
22	TS VI/B, Sub Section A-01, Equipment sizing criteria, Page 83/96 Clause 4.01.03(4):	**Water Pumps**: At least 15% (percent) margin shall be provided in the pump capacity over and above the maximum seal water/cooling water and other flow requirements.	We understand that this clause is not applicable on Flushing Pump and we can have the same capacity as of Slurry Pump. Please confirm.	Bidder to follow specification
23		**Elevators:**	Please confirm whether we need to consider the scope of Goods cum Passenger Elevators at Main FA Silo only.	Bidder to follow specification
24		Dust Suppression System:	Please confirm that DSS system is to be supplied at HCSD & Main Silo periphery.	Bidder to follow specification
25	1.04.00, Amendment No. 02, Technical Specification, Section-VI , VI A/II A -16	Ash Dyke Dust Suppression system is specified	Please confirm that Ash Dyke Dust Suppression system at ash pond area is excluded from the scope of bidder.	Bidder to follow scope matrix for terminal points. For details, check the clarification/amendments issued by CSPGCL.
26	7.12.00 (B) (i), Amendment No. 02, Technical Specification, Section-VI , MH-27, VI B, A-21	Combined Ash Slurry Pump House Shall be shed type	Please review & confirm the type of construction of Combined Ash Slurry Pump House as same is specified in Clause no. 7.12.00, Page 41 of 46, A-21 , of Technical Spec. VI , Part B as Shed Type Building.	All the building will be of closed RCC construction.

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Sl. No..	Clause No	Description	Query	BHEL Response
27	TCC Cl. 3.15 pg. 21 of 95	PTP sludge.....135 Cu.M/Hr(-/+20%) on continuous basis	We have noted that this is the only continuous flow to be considered while sizing the BA Slurry Disposal Pump. We feel that the capacity specified is much on the higher side. Please check and confirm as the flow will impact the fixed cost as well as the power consumption.	Technical Specifications in clear in this regard. Bidder to follow technical specifications.

B): Following Annexure of TCC is revised

SL. NO.	Existing	Current
1	Annexure-3 Electrical and C&I scope Matrix	Annexure-03 Rev01 Electrical and C&I Scope Matrix along with additional annexures as:- a) ANNEXURE 3E- QAP FOR CAT-III C&I ITEMS b) ANNEXURE 3F- QAP FOR CAT-III ELECTRICAL ITEMS c) ANNEXURE 3G-GUIDELINES FOR DCS INTERFACING FOR CHP & AHP SYSTEM

Note:

1) **All other terms and conditions against this NIT shall remain unchanged.**
2) **This corrigendum is to be submitted duly signed and stamped along with the Techno-commercial bid (Part- I).**

for BHARAT HEAVY ELECTRICALS LTD
Sr MANAGER / SCT- CPC

ANNEXURE-3-ELECTRICAL, CONTROL AND INSTRUMENTATION SCOPE MATRIX FOR						2X660 MW SCTPP, HTPS, KORBA WEST AHP	Rev: 01 Dated: 08.04.2026
SL. NO.	**SCOPE DETAILS**	**INPUT DETAILS**	**ENGINEERING / DESIGN**	**SUPPLY**	**RECEIPT, UNLOADING, STORAGE, ERECTION, TESTING, COMMISSIONING**	**REMARKS**	
1	**Complete Electrical and C&I System** except for BHEL free issue equipment's as below 1) 11KV Switchboard 2) 6.6KV Switchboard 3) 6.6KV HT Motor (for Water and Slurry Pump application) 4) DCS 5) VMS Note: 1.All AC/DC/UPS/Aux Power supply required for BHEL free issue equipment's shall be in bidders scope. 2.O&M of BHEL Free issue equipment's shall be in bidders scope.	EPC Bidder	EPC Bidder	EPC Bidder	EPC Bidder	Location of BHEL free issue equipments shall be decided based on final layout engineering by successful bidder and space shall be considered by bidder in switchgear building/control Room with all facilities. All other required civil facilities like anchor/kerb angles/insert plates/support structures/base frames/channels etc. shall be considered by bidder . Supply and E&C of all HT/LT power, control, signal and communication cables, Cable trays, supports, earthing, electronic earthing material for BHEL free issue items shall be in Bidder's scope Unloading and storage of BHEL free issue items shall be in the scope of BHEL. BHEL region shall issue these items to EPC bidder. Local loading/unloading /transportation of these materials from BHEL storage to bidders storage/facilities shall be in bidders scope. Bidder shall provide min. 2 Nos. uncabled feeders each of 250A, 100A, 63A, 32A, 16A rating (1 No in in I/C-1 and 1 No in I/C-2) in all 415V PMCC boards supplied by Bidder for BHEL use. Load of 100KVA for each MCC shall be considered for these loads while transformer sizing. Customer requirement of feeders, cables & cabling in bidders area/facilities is in bidders scope. Data Concentrator system or Relay Network for BHEL free issue equipment as applicable up to Central Control room (TG building) shall be in bidders scope . This battery limit is also applicable for LT switchgear. Bidder shall provide the Illumination, Earthing, Lightning protection for all areas where Civil & structural is in bidder scope. Wherever integration of bidder supplied items with BHEL supplied system is involved, necessary integration shall be done by the bidder. Bidder to co-ordinate with BHEL-PEM for the Civil inputs required in Centralised Offsite Control Room for AHP system equipment's. Security of all equipment's including BHEL free supply till handing over to end customer is in scope of bidder. Obtaining Statutory clearance is in Bidders scope including BHEL free issue equipment's.	
2	1. MCC buildings/control rooms/ any other electrical building required as per scope of this pacakge.Any requirement of space in bidders building for customers use as mentioned in Customer specification 2. Cable trestle/rack required as below in is bidders scope. a. For all bidders facilities . b. For BHEL free supply items located in BHEL buildings & bidder buildings c. Any interconnection required for bidder equipment from BHEL buildings/facilities d. Cable rack required for customer use if applicable	EPC bidder	EPC bidder	EPC bidder	EPC bidder	Quantity & location of MCC building marked in plot plan is tentative only . Bidder to decide the Quantity and locations of MCC buildings without disturbing other facilities of BHEL . Connection between oil retention pit(Bidders scope of Transformer) to common oil retention pit located in main plant area is in bidders scope. The interconnection between Bidders earthing and Existing/Main earth grid is in Bidder scope. Please refer plot plan Annexure 1 for further details	
BHEL FREE ISSUE EQUIPMENTS							
3	11KV and 6.6KV Switchboard One number each of 11kV and 6.6kV HT switchboards, with the maximum available outgoing feeders as mentioned in Sl No 11 and 12, shall be provided to the bidder as a BHEL free issue equipment for the entire scope of work.	EPC Bidder	BHEL BHOPAL	BHEL BHOPAL	EPC Bidder	Bidder to refer Sl No 10 for 11kV power supply source availability. Bidder shall submit Electrical load list and transformer sizing within 3 months from LOI All Upstream/downstream tripping and interface/signal exchange between Sl No 10, 11, 12 shall be in the bidder's scope. The bidder shall ensure that the maximum loading at the 11kV level does not exceed the maximum cut-off MVA specified in Sl. No. 10. Bidder shall determine the appropriate rating of the 11/6.6 kV transformer and ensure that the maximum loading at the 11 kV level does not exceed the maximum cut-off MVA specified in Sl. No. 10. **Few additional 11KV/6.6KV feeder will be addded in these boards for BHEL requirement and exact quantity will be decided during detailed engineering. Increase in panel length due to this shall be accommodated by bidder by considering additional space without any commercial implication to BHEL(PEM / CPC to update).** Cable tray/Supports/earthing within the bidders switchgear building is in the scope of bidder. Adequate nos. of trays with support from 6.6kV/11KV switchboard located in bidders building up to bidder's rack planned nearest to respective BHEL 6.6kV/11KV load facility shall be provided by Bidder for the BHEL scope of Cables. During the engineering of the HT bus duct, interconnection between the bidder-supplied 11/6.6 kV transformer and the BHEL free-issued 6.6 kV switchboard, the bidder shall ensure that relevant inputs are obtained from BHEL for the termination of the HT bus duct at the 6.6 kV switchgear end. The bidder shall also ensure that the forward phase sequence, correct CT parameters are maintained during detalied engineering of 11kV and 6.6KV Switchboard. It is the bidder's responsibility to avoid any mismatch in this interface, and any modifications required at a later stage shall be within the bidder's scope without any commercial implication to BHEL	
4	**HT Motors for Water and Slurry Pump application** Bidder to refer **Sl No 13** for List of BHEL free issue HT motors available to bidder Note : HT motor for any other applications other than Water and Slurry Pump is in bidders scope.	EPC Bidder	BHEL BHOPAL	BHEL BHOPAL	EPC Bidder	Bidder shall provide qty, rating, TS curve, speed, GD2 type of mounting and coupling details as input to BHEL within 4 months from LOI. Temperature measuring system, LPBS for all BHEL free issue HT motors shall be in the bidder's scope . The supply of consumables and lubrication for BHEL free issue HT motors is included in the bidder's scope. Before shifting motors from BHEL storage to bidders storage/facilities, the bidder shall conduct motor testing. In case any fault occurs during operation and BHEL recommends repair at the factory premises, the bidder shall decouple/remove the motor and shift it to the BHEL storage. After repair, the bidder shall again unload, erect and test the motor. If any EPC bidder designed equipment requires job motor during inspection of the equipment, then BHEL shall transport directly to manufacturers works. post inspection despatch of motor directly to project site including loading, unloading storage is in bidders scope. Any damage during transit shall be dealt as per BHEL commercial terms and conditions	
5	Main AHP control system (DCS) , software development and other equipment related to DCS (DCS panels, Network panels, LVS, PCs, Printers, furniture desk, Chairs, PC Consoles, Servers, EMS, OWS/OEWS/EWS)	EPC Bidder	BHEL EDN	BHEL EDN	EPC Bidder	Bidder's scope includes the following: 1. Detailed IO list including BHEL free issue items , KKS tagging, P&ID Diagram, set-points, Control Philosophy & write up, block logic diagram & HMI screens (for software development), Functional grouping. 2.Detailed IO list shall be submitted within 6 months of LOI in the format prescribed by BHEL which shall be shared to sucessful bidder . Any addition of IO's at later stage is not acceptable. 3. Bidder shall visit BHEL/Customer during software development, application testing , FAT and ensure the completeness of software for E&C. 4. Any logic modification during commissioning stage shall be executed by EPC bidder. 5. 24V DC and UPS system (UPS load and 24V DC load applicable to BHEL free supplied equipments shall be shared to successful bidder during detailed engineering by BHEL-EDN. Bidder to size the rating of UPS and DC system considering the above load plus any load required for bidder supplied equipments.) 6.Complete PLC system, for HCSD System, DBA and any other PLC operated equipment's, including its HMI, UPS, PC, printers, battery, battery charger etc. 8. Bidder to coordinate with BHEL-EDN before finalisation of field bus based instruments/actuator regarding communication protocol.	
6	Vibration Monitoring/Analysis System (VMS/VMAS)	EPC Bidder	BHEL EDN	BHEL EDN/EPC Bidder	EPC Bidder	Bidder to provide sensor and key phasor mounting arrangement for bidder supplied equipment's as per contractual requirement. Sensors, Prefab Sensor cables from sensor up to Field mounted local JB near Motor and VMS panel shall be supplied as free issue to Bidder. Balance items required for completeness of the system are in the scope of Bidder.	

7	Roof Top Solar System	BHEL-SBD/RUDRAPUR	EPC Bidder	EPC Bidder	EPC Bidder	For estimation, the Bidder may take **50 Kw** capacity of the Solar Plant Defined for this Project as a whole. Further before placement of the order, Bidder to ensure that the items thus procured shall be of the same make as installed in the main Plant area supplied by BHEL.
BHEL Supply items which are to be located in Bidder's scope of buildings in addition to BHEL Free supply Items						
8	CCVM System	BHEL EDN / EPC BIDDER	BHEL EDN	BHEL EDN	BHEL PS REGION	Location of these equipment's shall be decided based on final layout engineering by successful bidder and space shall be considered by bidder in switchgear building, control room, TP's, any other buildings. All other required civil facilities like anchor/kerb angles/insert plates/support structures/base frames/channels etc. shall be considered by bidder as required during Detailed ENGG.
9	PA System	BHEL PEM / EPC BIDDER	BHEL PEM	BHEL PEM	BHEL PS REGION	All AC/DC/UPS/Aux Power supply required for above equipment's shall be arranged by bidder.
Available feeder and motor list to bidder. Below mentioned number is maximum available offered as free supply to bidder, Any additional requirement shall be supplied by bidder as per bidder design requirement without any commercial implication to BHEL.						
10	List of uncabled 11KV source feeders available to bidder. a)Only 2 No of 11KV uncabled Feeder shall be provided by BHEL for Common AHP application at two locations as mentioned below: Location-1: One feeder at MV Switchgear room of Power house building at EL.3.5M from A-row to C-row between grid-2 to Grid-4. Location-2: Second feeder at MV Switchgear room of Power house building at EL.3.5M from A-row to C-row between grid-15 to Grid-17. b)Only 4 No's of 11KV uncabled Feeder shall be provided by BHEL for Unitized AHP 11/0.433kV Transformer application at two locations as mentioned below: Location-1: Two feeders at MV Switchgear room of Power house building at EL.3.5M from A-row to C-row between grid-2 to Grid-4.					a) 11KV Uncabled feeder for 11 kV switchboard at Sl No 3- Maximum MVA Available is 20.5MVA. b) 11KV transformer feeder (11/0.433kV) - Maximum MVA Available is 1.6 MVA for each unitized AHP Board	Adequate nos. of trays and support from Main Power House MV Swgr room to C row Grid- 1 or Grid-26 depending upon the location of bidder's 11 kV switchboard shall be provided for 11kV cable of Ash Handling Package Vendor scope. After that cable trestle upto AHP bidder facility for cables in bidder scope shall be bidder's [Ash Handling Package Vendor] scope. Trays and support for this shall be in Bidder's [Ash Handling Package Vendor] scope. Cable laying is also bidders[Ash Handling Package Vendor] scope.
11	List of 11KV O/G feeders available to bidder. Location of switchboard : To be decided by Bidder					a) 11KV Transformer Feeder (11/6.6kV)- up to 16MVA b) 11KV Transformer Feeder (11/0433kV)- up to 2500KVA	a) 2 Nos b) 7 Nos
12	List of 6.6KV O/G feeders available to bidder. Location of switchboard : To be decided by Bidder					a) 6.6KV Motor feeder b) 6.6KV Transformer Feeder VFD application	a) 38 Nos b) 6 Nos
13	BHEL free issue HT motors available to bidder					6.6KV Motor	18 Nos
	Battery limit for hopper level integration of AHP sytem						
14	**ESP Hopper High And Low Level Switches & Level Scanner(3DLS/NOGS) as applicable**					
14A	ESP Hopper High and Low Level switches Following Information and provision will be made available to Bidder: #1. BHEL Ranipet will provide height of ESP hopper at which High and Low Level switch needs to be erected by bidder. Refer Annexure-3**B** for details. #2. ALI erection drawing for ESP hopper High and Low Level switch shall be provided by BHEL Ranipet, which shall be shared to successful bidder. *3. Provision for mounting (required opening, providing hopper insulation & cladding) of High and Low Level switches and access platform/ladder shall be provided by respective POWER SECTOR region. Power sector shall provide proper approach & clearance for mounting the Instrument / cable trays/ cable conduits	AHP BIDDER/ #BHEL-RANIPET	AHP BIDDER/ #BHEL-RANIPET	AHP BIDDER	AHP BIDDER/ *PS-Region	**The detailed scope of AHP EPC bidder includes.** 1.Design & Supply of High and Low Level switches along with all mounting arrangements. Each instrument shall have the provision to terminate 2 cables and one probe. 2.Design & Supply of 4 No's Local Instrument JB of minimum 120 terminals for each pass. Total No's of JB's shall be 4XNo of passes. These JB's shall be mounted near ESP Hopper platform. 3. 2NO contacts each from ALI High and each ALI Low level switch of each ESP hopper shall be wired upto these JB's. One NO contact of ALI high and ALI low of all fields of one bus-section of one ESP pass shall be wired to JB-1. Similarlty, second NO contact of ALI high and ALI low of all fields of one bus-section of one ESP pass shall be wired to JB-2. The second bus section of each ESP pass shall have similar set of 2 JBs . Hence, 4 Nos of JB will be applicable for every ESP pass. Similar arrangement is applicable for all the ESP passes. 4.Design & Supply of Power, Control / Instrumentation Cable with all accessories, flexible conduits for hooking of Level switch signals from each Level switch to Local Instrument JB. Seperate cable shall be considered for each Level switch. 5.Design & Supply of Control / Instrumentation Cable with all accessories for hooking of Level switch signals from Contact Multiplier at ESP MCC to AHP DCS 6.Design & Supply of supports for installation of instrument /controller / cable trays mounting including layout for cable tray for above cabling activities. 7.Design considering High and Low Level signals in AHP DCS IO list. 8.Installation, Testing & Commissioning at site. 9. Calibration of Level swicthes till handing over of the AHP system 10. The end customer tender specifications shall be referred for compliance wrt system design. **Ranipet/PS Region scope includes.** 1.Design & Supply of Power, Control / Instrumentation Cable with all accessories for hooking of Level switch signals from Local Instrument JB-1 to ESP MCC upto Contact multiplier module 2.Design of Complete Power supply & Distribution From ESP MCC upto Local Instrument JB. 3.Design & Supply of supports for installation of cable trays including layout for cable tray for above cabling activities 1,2 of BHEL scope. 4. Provision of Potential Free contact in contact multiplier module for all the Level switch signal at ESP MCC Module/feeder
14B	ESP Hopper Level Scanner Following Information and provision will be made available to Bidder: #1. BHEL Ranipet will provide hopper drawing / ESP drawing , which shall be shared to successful bidder. #2. The mounting arrangement for 3DLS/ NOGS will be finalised by AHP vendor based on the inputs from 3DLS/NOGS vendor. *3. Provision for mounting (required opening, providing hopper insulation & cladding) of Level Scanner and access platform/ladder shall be provided by respective POWER SECTOR region. Power sector shall provide proper approach & clearance for mounting the Instrument / cable trays.	AHP BIDDER/ #BHEL-RANIPET	AHP BIDDER/ #BHEL-RANIPET	AHP BIDDER	AHP BIDDER/ *PS-Region	**The detailed scope of AHP EPC bidder includes.** 1.Design & Supply of 3DLS / NOGS system along with power supply and all mounting arrangements for mounting in ESP hoppers. 2. Design and supply of local instrument JB at ESP hopper area for termination of the output signals of 3DLS / NOGS. Deriving 24V DC supply from 230 V AC, as per requirement shall be made available in the JB supplied. 3a. 3DLS- In case of 3DLS, two signals from each instrument, one 4-20mA and one serial communication(like RS-485). Both the signals shall be wired to the local JB at ESP hopper area by AHP vendor. One JB for one ESP is generally envisaged . Cabling of 4-20 mA signals from local JB till main plant DCS shall be by BHEL . Required inputs/ details to display the average hopper level at main DCS based on 4-20 mA signal shall be provided by AHP /3DLS vendor. The serial communication signals (such as RS-485) shall be made available at ESP control room. Cabling of serial communication from local JB till ESP Control room shall be by AHP Bidder. AHP/3DLS vendor shall provide the operator PC station with software at ESP MCC to have the 3D visualisation of ESP hopper level. 3b. NOGS- In case of NOGS , the NOGS system provides 4-20 mA signals and relay contacts corresponding to hopper ash level. One local JB for one ESP is generally envisaged for 4-20 mA signals catering to the requirements of one ESP pass. This local JB is to be provided with 4-20 mA isolator which shall multiply each of the 4-20 mA signal into two. Cabling for extending 4-20 mA from local JB till main DCS shall be by BHEL . Required inputs/ details to display the average hopper level at main DCS based on NOGS signal shall be provided by AHP vendor. Further, the second set of 4-20 mA signals would be extended to ESP control room. Cabling from local JB till ESP Control room shall be by BHEL. AHP vendor has to provide the operator PC station with software/ESP Level indicator at ESP control ROOM to display the ESP hopper level. 4.Design of Complete Power supply(230V) & Distribution from AHP MCC upto Local Instrument JB. 5. Power supply cabling from Local instrument JB to each instrument 6.Design & Supply of supports for installation of instrument /controller / cable trays mounting including layout for cable tray for above cabling activities. 7.Installation, Testing & Commissioning of 3DLS/ NOGS at site. 8. Calibration of 3DLS / NOGS , if required, till handing over of the AHP system 9. The end customer tender specifications shall be referred for compliance wrt system design. **Ranipet/PS Region scope includes.** 1.Design & Supply of Power, Control / Instrumentation Cable with all accessories for hooking of Level Scanner signals from Local Instrument JB to ESP MCC/Main Plant DCS (Spare terminals of dual O/P Signal) 2.Design & Supply of supports for installation of cable trays including layout for cable tray for above cabling activities 1 of BHEL scope

15	APH/ECO/DUCT/SCR Hopper High & Low Level switches and Level Transmitters As applicable Following Information and provision will be made available to Bidder: #1. BHEL Trichy will provide quantity, specification and height of hopper at which level switch needs to be erected to bidder. Refer Annexure-3C for details. *2. Provision for mounting (required opening, providing hopper insulation & cladding) of level switches/transmitters and access platform/ladder shall be provided by respective POWER SECTOR region. Power sector shall provide proper approach & clearance for mounting the Instrument / cable trays.	BHEL-TRICHY#/ AHP BIDDER	BHEL-TRICHY#/ AHP BIDDER	AHP BIDDER	AHP BIDDER/ PS-Region*	**The detailed scope of AHP EPC bidder includes.** 1.Design & Supply of level switches & level transmitters(As applicable) along with all mounting arrangements 2.Design & Supply of Local Instrument JB for Wiring all 2 NO/NC contacts / Dual output AI signal (8 wires / 4 Pair F Type) 3.Cabling upto Local Instrument JB from Level Switches/Transmitter and further upto DCS for Hooking the Level switch signals at AHP DCS 4.Design for Complete Power supply & Distribution from AHP UPS. 5.Design & Supply of Power, Control / Instrumentation Cable with all accessories for hooking of Level switch / transmitter signals from Instrument to AHP DCS. 6.Design considering Level High / Level Low & Level Transmitter DI & AI signals in AHP DCS IO list. 7.Design & Supply of supports for installation of instrument /controller / cable trays mounting including layout for cable tray. 8.Installation, Testing & Commissioning at site. 9. Calibration of Level swicthes till handing over of the AHP system **Trichy/PS Region scope includes.** 1.Design & Supply of Control / Instrumentation Cable with all accessories for hooking of Level switch signals from Local Instrument JB to Main Plant DCS 2.Design & Supply of supports for installation of cable trays including layout for cable tray for above cabling activities.

Name of BHEL UNIT for coordination with successful bidder of various system during Engineering

Sl No	System	BHEL-Unit
A	Plot Plan with Switchgear location, cable routing, earthing, illumination	BHEL-ISG/BHEL PEM
B	Electrical and C&I system other than below listed	BHEL-ISG
1	Design and integration of 415V, 3.3KV and 11KV system along with upstream breaker interface **(CPC to confirm)**	BHEL-PEM/ BHEL-BHOPAL
2	DCS, VMS, UPS, 24V DC System	BHEL-EDN
3	HT Motors for Water and Slurry Pump	BHEL-Bhopal
4	CCVM System	BHEL-EDN
5	PA System	BHEL-PEM
6	**HT Busduct (CPC to confirm)**	**BHEL-Rudrapur**
7	Roof Top Solar System	BHEL-SBD/Rudrapur
8	ESP Hopper Level-High, Low Level switches & Level Transmitters As applicable	BHEL-RANIPET
9	APH/ECO/DUCT/SCR Hopper Level-High, Low Level switches & Level Transmitters As applicable	BHEL-TRICHY
10	Fire Fighting and FDA system	BHEL-PE&SD

Annexure-3E

ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP 'PE- ELECTRICAL	QUALITY ASSURANCE PLAN FOR C&I ITEMS	PACKAGE	CHP & AHP
			QAP NO	ISG/C&I/SQP/2026 DATE : 12-02-2026
			QAP REV NO.	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL, DIMENSION AND SHEET THICKNESS	11. EFFICIENCY, REGULATION.	21. IR-HV-IR TEST	31. KV TEST TYPE TEST REPORT	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE MODEL, TYPE, RATING	12. OVERLOAD TEST	22. THICKNESS OF INSULATION AND SHEATHS	32. TYPE TEST REPORT AS PER RELEVANT	D2. FINAL INSPECTION REPORT
3. PROCESS / ELECTRICAL CONNECTION	13. SWITCHING CAPABILITY & SEQUENCE	23. TENSILE STRENGTH AND ELONGATION	33. MANUFACTURER'S STANDARD	D3. CERTIFICATE OF CONFORMANCE
4. CALIBRATION AND ACCURACY TEST	14. RANGE / TILT / ZOOM /	24. FRLS TEST FOR OI, TI, SDR AND HCL EMISSION	34. DROP OUT TEST	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. INSULATION RESISTANCE TEST	15 DEGREE OF PROTECTION TT REPORT	25. CONTINUITY TEST	35. VERIFICATION OF BOM	D5. APPROVED OR AS BULT DRG/DATASHEET/BOM/SCHEDULE
6. MATERIAL TEST CERTIFICATE	16. ASSEMBLY AND FITTING	26. DC RESISTANCE	36. FULL LOAD TEST	
7. HYDRO /HYDRAULIC TEST AS APPLICABLE	17. BOUGHT OUT ITEM TC	27. IMPEDANCE	37. SHORT CIRCUIT TEST	
8. PAINT SHADE AND THICKNESS	18. MFR TC / WARRANTY CERTIFICATE	28. ATTENUATION	38. RIPPLE MEASUREMENT	
9. FUNCTIONAL / OPERATIONAL TEST	19. LEAK TEST	29. CAPACITANCE TEST	39. TRANSFER- RETRANSFER TEST	
10. PROFIBUS/ FIELDBUS COMMUNICATION CHECK	20. CONDUCTOR RESISTANCE	30. OEM RECOMMENDED TEST	40. REVIEW OF DOCUMENTS	

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M	C	N	M	C	N		
			DOC.: D1			DOC.: D2				
1	2	3	4	5	6	7	8	9	10	12
I	**TRANSMITTERS / METERS**									
I.1	TEMPERATURE TRANSMITTER (NON PROFIBUS BASED)	100%	33	Nil	Nil	1, 2, 3, 4, 9, 15, 16	40	Nil	D1, D2, D3,D5	
I.2	TEMPERATURE TRANSMITTER (PROFIBUS BASED)	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 15, 16	40	Nil	D1, D2, D3,D5	
I.3	ULTRASONIC / NOGS LEVEL TRANSMITTER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 15, 16	40	Nil	D1, D2, D3,D5	
I.4	RADAR TYPE LEVEL TRANSMITTER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 15, 16	40	Nil	D1, D2, D3,D5	
I.5	3D LEVEL TRANSMITTER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 15, 16	40	Nil	D1, D2, D3,D5	
I.6	PRESSURE TRANSMITTER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 12, 15, 16	40	Nil	D1, D2, D3,D5	
I.7	DIFFERENTIAL PRESSURE TRANSMITTER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 12, 15, 16	40	Nil	D1, D2, D3,D5	
I.8	VACUUM TRANSMITTER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 12, 15, 16	40	Nil	D1, D2, D3,D5	

(MOHIT RANJAN) PREPARED BY

(Nandita) CHECKED BY

R.K. Majhi

APPROVED BY

NOTES:

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2. This Standard QAP is applicable for items which are listed as CAT-III under inspection categorisation by END CUSTOMER for specific project.
3. BHEL reserves the right to conduct repeat test if required.
4. All Instrument to be used for Testing / Inspection shall have valid ' calibration certificates' to be verified by agencies, Manufacturer & Contractor.
5. Fitment cum Interchangeability certificate (D4) to be submitted for above items if appearing in Mandatory Spares List.

ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP 'PE- ELECTRICAL	QUALITY ASSURANCE PLAN FOR C&I ITEMS	PACKAGE	CHP & AHP
			QAP NO	ISG/C&I/SQP/2026 DATE : 12-02-2026
			QAP REV NO.	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL, DIMENSION AND SHEET THICKNESS	11. EFFICIENCY, REGULATION.	21. IR-HV-IR TEST	31. KV TEST TYPE TEST REPORT	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE MODEL, TYPE, RATING	12. OVERLOAD TEST	22. THICKNESS OF INSULATION AND SHEATHS	32. TYPE TEST REPORT AS PER RELEVANT	D2. FINAL INSPECTION REPORT
3. PROCESS / ELECTRICAL CONNECTION	13. SWITCHING CAPABILITY & SEQUENCE	23. TENSILE STRENGTH AND ELONGATION	33. MANUFACTURER'S STANDARD	D3. CERTIFICATE OF CONFORMANCE
4. CALIBRATION AND ACCURACY TEST	14. RANGE / TILT / ZOOM /	24. FRLS TEST FOR OI, TI, SDR AND HCL EMISSION	34. DROP OUT TEST	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. INSULATION RESISTANCE TEST	15 DEGREE OF PROTECTION TT REPORT	25. CONTINUITY TEST	35. VERIFICATION OF BOM	D5. APPROVED OR AS BULT DRG/DATASHEET/BOM/SCHEDULE
6. MATERIAL TEST CERTIFICATE	16. ASSEMBLY AND FITTING	26. DC RESISTANCE	36. FULL LOAD TEST	
7. HYDRO /HYDRAULIC TEST AS APPLICABLE	17. BOUGHT OUT ITEM TC	27. IMPEDANCE	37. SHORT CIRCUIT TEST	
8. PAINT SHADE AND THICKNESS	18. MFR TC / WARRANTY CERTIFICATE	28. ATTENUATION	38. RIPPLE MEASUREMENT	
9. FUNCTIONAL / OPERATIONAL TEST	19. LEAK TEST	29. CAPACITANCE TEST	39. TRANSFER- RETRANSFER TEST	
10. PROFIBUS/ FIELDBUS COMMUNICATION CHECK	20. CONDUCTOR RESISTANCE	30. OEM RECOMMENDED TEST	40. REVIEW OF DOCUMENTS	

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M DOC.: D1	C	N	M DOC.: D2	C	N		
1	2	3	4	5	6	7	8	9	10	12
I.9	FLOW TRANSMITTER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 15, 16	40	Nil	D1, D2, D3,D5	
I.10	DENSITY TRANSMITTER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 15, 16	40	Nil	D1, D2, D3,D5	
I.11	MASS FLOW METER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 10, 15, 16	40	Nil	D1, D2, D3,D5	
I.12	DEW POINT METER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 15, 16	40	Nil	D1, D2, D3,D5	
I.13	ENCODER	100%	33	Nil	Nil	1, 2, 3, 4, 9, 15, 16	40	Nil	D1, D2, D3,D5	
I.14	ANTI COLLISION SENSOR	100%	33	Nil	Nil	1, 2, 3, 4, 9, 15, 16	40	Nil	D1, D2, D3,D5	
II	**SWITCHES / SENSORS**									
II.1	PRESSURE SWITCH / DP SWITCH / VACUUM SWITCH	100%	33	Nil	Nil	1, 2, 3, 4, 5, 9, 15, 19, 25	40	Nil	D1, D2, D3,D5	
II.2	LEVEL SWITCH (FLOAT TYPE/ DISPLACER TYPE/ CAPACITANCE TYPE)	100%	33	Nil	Nil	1, 2, 3, 4, 5, 7, 9, 15, 19, 25	40	Nil	D1, D2, D3,D5	

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3. BHEL reserves the right to conduct repeat test if required.
4. All Instrument to be used for Testing / Inspection shall have valid ' calibration certificates' to be verified by agencies, Manufacturer & Contractor.
5. Fitment cum Interchangeability certificate (D4) to be submitted for above items if appearing in Mandatory Spares List.

BHEL ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP 'PE- ELECTRICAL	QUALITY ASSURANCE PLAN FOR C&I ITEMS	PACKAGE	CHP & AHP
			QAP NO	ISG/C&I/SQP/2026 DATE : 12-02-2026
			QAP REV NO.	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL, DIMENSION AND SHEET THICKNESS	11. EFFICIENCY, REGULATION.	21. IR-HV-IR TEST	31. KV TEST TYPE TEST REPORT	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE MODEL, TYPE, RATING	12. OVERLOAD TEST	22. THICKNESS OF INSULATION AND SHEATHS	32. TYPE TEST REPORT AS PER RELEVANT	D2. FINAL INSPECTION REPORT
3. PROCESS / ELECTRICAL CONNECTION	13. SWITCHING CAPABILITY & SEQUENCE	23. TENSILE STRENGTH AND ELONGATION	33. MANUFACTURER'S STANDARD	D3. CERTIFICATE OF CONFORMANCE
4. CALIBRATION AND ACCURACY TEST	14. RANGE / TILT / ZOOM /	24. FRLS TEST FOR OI, TI, SDR AND HCL EMISSION	34. DROP OUT TEST	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. INSULATION RESISTANCE TEST	15 DEGREE OF PROTECTION TT REPORT	25. CONTINUITY TEST	35. VERIFICATION OF BOM	D5. APPROVED OR AS BULT DRG/DATASHEET/BOM/SCHEDULE
6. MATERIAL TEST CERTIFICATE	16. ASSEMBLY AND FITTING	26. DC RESISTANCE	36. FULL LOAD TEST	
7. HYDRO /HYDRAULIC TEST AS APPLICABLE	17. BOUGHT OUT ITEM TC	27. IMPEDANCE	37. SHORT CIRCUIT TEST	
8. PAINT SHADE AND THICKNESS	18. MFR TC / WARRANTY CERTIFICATE	28. ATTENUATION	38. RIPPLE MEASUREMENT	
9. FUNCTIONAL / OPERATIONAL TEST	19. LEAK TEST	29. CAPACITANCE TEST	39. TRANSFER- RETRANSFER TEST	
10. PROFIBUS/ FIELDBUS COMMUNICATION CHECK	20. CONDUCTOR RESISTANCE	30. OEM RECOMMENDED TEST	40. REVIEW OF DOCUMENTS	

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M DOC.: D1	C	N	M DOC.: D2	C	N		
1	2	3	4	5	6	7	8	9	10	12
II.3	LEVEL SWITCH (RF TYPE)	100%	33	Nil	Nil	1, 2, 3, 4, 5, 9, 15, 19, 25	40	Nil	D1, D2, D3,D5	
II.4	PROXIMITY SENSORS	100%	33	Nil	Nil	1, 2, 3, 4, 9, 15	40	Nil	D1, D2, D3,D5	
II.5	DUST SENSOR	100%	33	Nil	Nil	1, 2, 3, 4, 9, 15	40	Nil	D1, D2, D3,D5	
II.6	RADAR TYPE LEVEL SENSOR	100%	33	Nil	Nil	1, 2, 3, 4, 9, 15	40	Nil	D1, D2, D3,D5	
II.7	PROXIMITY SWITCH	100%	33	Nil	Nil	1, 2, 3, 4, 5, 9, 15, 25	40	Nil	D1, D2, D3,D5	
II.8	LIMIT SWITCH / HEAVY DUTY LIMIT SWITCH / END LIMIT SWITCHES	100%	33	Nil	Nil	1, 2, 3, 4, 5, 9, 15, 19, 25	40	Nil	D1, D2, D3,D5	
II.9	FLOW SWITCH	100%	33	Nil	Nil	1, 2, 3, 4, 5, 9, 15, 19, 25	40	Nil	D1, D2, D3,D5	
II.10	TEMPERATURE ELEMENTS	100%	33	Nil	Nil	1, 2, 3, 19, 21	40	Nil	D1, D2, D3,D5	
II.11	TEMPERATURE SWITCH	100%	33	Nil	Nil	1, 2, 3, 4, 5, 9, 15, 19, 25	40	Nil	D1, D2, D3,D5	

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NOTES:

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2. This Standard QAP is applicable for items which are listed as CAT-III under inspection categorisation by END CUSTOMER for specific project.
3. BHEL reserves the right to conduct repeat test if required.
4. All Instrument to be used for Testing / Inspection shall have valid ' calibration certificates' to be verified by agencies, Manufacturer & Contractor.
5. Fitment cum Interchangeability certificate (D4) to be submitted for above items if appearing in Mandatory Spares List.

ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP 'PE- ELECTRICAL	QUALITY ASSURANCE PLAN FOR C&I ITEMS	PACKAGE	CHP & AHP
			QAP NO	ISG/C&I/SQP/2026 DATE : 12-02-2026
			QAP REV NO.	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL, DIMENSION AND SHEET THICKNESS	11. EFFICIENCY, REGULATION.	21. IR-HV-IR TEST	31. KV TEST TYPE TEST REPORT	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE MODEL, TYPE, RATING	12. OVERLOAD TEST	22. THICKNESS OF INSULATION AND SHEATHS	32. TYPE TEST REPORT AS PER RELEVANT	D2. FINAL INSPECTION REPORT
3. PROCESS / ELECTRICAL CONNECTION	13. SWITCHING CAPABILITY & SEQUENCE	23. TENSILE STRENGTH AND ELONGATION	33. MANUFACTURER'S STANDARD	D3. CERTIFICATE OF CONFORMANCE
4. CALIBRATION AND ACCURACY TEST	14. RANGE / TILT / ZOOM /	24. FRLS TEST FOR OI, TI, SDR AND HCL EMISSION	34. DROP OUT TEST	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. INSULATION RESISTANCE TEST	15 DEGREE OF PROTECTION TT REPORT	25. CONTINUITY TEST	35. VERIFICATION OF BOM	D5. APPROVED OR AS BULT DRG/DATASHEET/BOM/SCHEDULE
6. MATERIAL TEST CERTIFICATE	16. ASSEMBLY AND FITTING	26. DC RESISTANCE	36. FULL LOAD TEST	
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SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M	C	N	M	C	N		
			DOC.: D1			DOC.: D2				
1	2	3	4	5	6	7	8	9	10	12
II.12	PULL CORD SWITCH AND BELT SWAY SWITCH	100%	33	Nil	Nil	1, 2, 8, 9, 15, 21, 25	40	Nil	D1, D2, D3,D5	
II.13	ZERO SPEED SWITCH / OVERSPEED SWITCH	100%	33	Nil	Nil	1, 2, 8, 9, 15, 21, 25	40	Nil	D1, D2, D3,D5	
II.14	CHUTE BLOCK SWITCH	100%	33	Nil	Nil	1, 2, 8, 9, 15, 21, 25	40	Nil	D1, D2, D3,D5	
II.15	UNDER BELT SWITCH	100%	33	Nil	Nil	1, 2, 8, 9, 15, 21, 25	40	Nil	D1, D2, D3,D5	
III	**GAUGES AND INDICATORS**									
III.1	PRESSURE / VACUUM / DP / TEMP / COMPOUND GAUGE	100%	33	Nil	Nil	1, 2, 3, 4, 7, 9, 15, 19	40	Nil	D1, D2, D3,D5	
III.2	LEVEL GAUGE (FLOAT AND BOARD TYPE)	100%	33	Nil	Nil	1, 2, 4, 7, 9, 15	40	Nil	D1, D2, D3,D5	
III.3	FLOW GAUGE	100%	33	Nil	Nil	1, 2, 4, 7, 9, 15	40	Nil	D1, D2, D3,D5	
III.4	DIGITAL INDICATOR	100%	33	Nil	Nil	1, 2, 4, 9, 15	40	Nil	D1, D2, D3,D5	

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NOTES:

1. Abbreviations Used: M: MANUFACTURER ; C: PACKAGE VENDOR ; N: BHEL
2. This Standard QAP is applicable for items which are listed as CAT-III under inspection categorisation by END CUSTOMER for specific project.
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BHEL ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP 'PE- ELECTRICAL	QUALITY ASSURANCE PLAN FOR C&I ITEMS	PACKAGE	CHP & AHP
			QAP NO	ISG/C&I/SQP/2026 DATE : 12-02-2026
			QAP REV NO.	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL, DIMENSION AND SHEET THICKNESS	11. EFFICIENCY, REGULATION.	21. IR-HV-IR TEST	31. KV TEST TYPE TEST REPORT	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE MODEL, TYPE, RATING	12. OVERLOAD TEST	22. THICKNESS OF INSULATION AND SHEATHS	32. TYPE TEST REPORT AS PER RELEVANT	D2. FINAL INSPECTION REPORT
3. PROCESS / ELECTRICAL CONNECTION	13. SWITCHING CAPABILITY & SEQUENCE	23. TENSILE STRENGTH AND ELONGATION	33. MANUFACTURER'S STANDARD	D3. CERTIFICATE OF CONFORMANCE
4. CALIBRATION AND ACCURACY TEST	14. RANGE / TILT / ZOOM /	24. FRLS TEST FOR OI, TI, SDR AND HCL EMISSION	34. DROP OUT TEST	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. INSULATION RESISTANCE TEST	15 DEGREE OF PROTECTION TT REPORT	25. CONTINUITY TEST	35. VERIFICATION OF BOM	D5. APPROVED OR AS BULT DRG/DATASHEET/BOM/SCHEDULE
6. MATERIAL TEST CERTIFICATE	16. ASSEMBLY AND FITTING	26. DC RESISTANCE	36. FULL LOAD TEST	
7. HYDRO /HYDRAULIC TEST AS APPLICABLE	17. BOUGHT OUT ITEM TC	27. IMPEDANCE	37. SHORT CIRCUIT TEST	
8. PAINT SHADE AND THICKNESS	18. MFR TC / WARRANTY CERTIFICATE	28. ATTENUATION	38. RIPPLE MEASUREMENT	
9. FUNCTIONAL / OPERATIONAL TEST	19. LEAK TEST	29. CAPACITANCE TEST	39. TRANSFER- RETRANSFER TEST	
10. PROFIBUS/ FIELDBUS COMMUNICATION CHECK	20. CONDUCTOR RESISTANCE	30. OEM RECOMMENDED TEST	40. REVIEW OF DOCUMENTS	

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M	C	N	M	C	N		
			DOC.: D1			DOC.: D2				
1	2	3	4	5	6	7	8	9	10	12
IV	**VALVES**									
IV.1	SOLENOID VALVES	100%	33	Nil	Nil	1, 2, 3, 5, 9, 15, 19, 34	40	Nil	D1, D2, D3,D5	
IV.2	CONTROL VALVE	100%	33	Nil	Nil	1, 2, 4, 8, 15, 19, 31	40	Nil	D1, D2, D3,D5	
V	**JUNCTION BOXES / ENCLOSURES**									
V.1	FRP JUNCTION BOX	100%	6, 33	Nil	Nil	1, 2, 8, 15, 21	40	Nil	D1, D2, D3,D5	
V.2	LOCAL INSTRUMENT RACKS	100%	6, 33	Nil	Nil	1, 8, 16	40	Nil	D1, D2, D3,D5	
V.3	LOCAL INSTRUMENT ENCLOSURE	100%	6, 33	Nil	Nil	1, 2, 8, 15	40	Nil	D1, D2, D3,D5	
V.4	INSTRUMENT JUNCTION BOX	100%	6, 33	Nil	Nil	1, 2, 8, 15, 21	40	Nil	D1, D2, D3,D5	
V.5	UPS DB	100%	6, 33	Nil	Nil	1, 2, 8, 9, 15, 21, 25, 35	40	Nil	D1, D2, D3,D5	

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NOTES:

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3. BHEL reserves the right to conduct repeat test if required.
4. All Instrument to be used for Testing / Inspection shall have valid ' calibration certificates' to be verified by agencies, Manufacturer & Contractor.
5. Fitment cum Interchangeability certificate (D4) to be submitted for above items if appearing in Mandatory Spares List.

ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP 'PE- ELECTRICAL	QUALITY ASSURANCE PLAN FOR C&I ITEMS	PACKAGE	CHP & AHP
			QAP NO	ISG/C&I/SQP/2026 DATE : 12-02-2026
			QAP REV NO.	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL, DIMENSION AND SHEET THICKNESS	11. EFFICIENCY, REGULATION.	21. IR-HV-IR TEST	31. KV TEST TYPE TEST REPORT	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE MODEL, TYPE, RATING	12. OVERLOAD TEST	22. THICKNESS OF INSULATION AND SHEATHS	32. TYPE TEST REPORT AS PER RELEVANT	D2. FINAL INSPECTION REPORT
3. PROCESS / ELECTRICAL CONNECTION	13. SWITCHING CAPABILITY & SEQUENCE	23. TENSILE STRENGTH AND ELONGATION	33. MANUFACTURER'S STANDARD	D3. CERTIFICATE OF CONFORMANCE
4. CALIBRATION AND ACCURACY TEST	14. RANGE / TILT / ZOOM /	24. FRLS TEST FOR OI, TI, SDR AND HCL EMISSION	34. DROP OUT TEST	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. INSULATION RESISTANCE TEST	15 DEGREE OF PROTECTION TT REPORT	25. CONTINUITY TEST	35. VERIFICATION OF BOM	D5. APPROVED OR AS BULT DRG/DATASHEET/BOM/SCHEDULE
6. MATERIAL TEST CERTIFICATE	16. ASSEMBLY AND FITTING	26. DC RESISTANCE	36. FULL LOAD TEST	
7. HYDRO /HYDRAULIC TEST AS APPLICABLE	17. BOUGHT OUT ITEM TC	27. IMPEDANCE	37. SHORT CIRCUIT TEST	
8. PAINT SHADE AND THICKNESS	18. MFR TC / WARRANTY CERTIFICATE	28. ATTENUATION	38. RIPPLE MEASUREMENT	
9. FUNCTIONAL / OPERATIONAL TEST	19. LEAK TEST	29. CAPACITANCE TEST	39. TRANSFER- RETRANSFER TEST	
10. PROFIBUS/ FIELDBUS COMMUNICATION CHECK	20. CONDUCTOR RESISTANCE	30. OEM RECOMMENDED TEST	40. REVIEW OF DOCUMENTS	

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M DOC.: D1	C	N	M DOC.: D2	C	N		
1	2	3	4	5	6	7	8	9	10	12
VI	**ELECTRICAL / ELECTRONIC COMPONENTS**									
VI.1	INTERPOSING RELAYS	100%	NA	Nil	Nil	9	40	Nil	D1, D2, D3,D5	
VI.2	UPS	100%	6, 17	Nil	Nil	1, 2, 8, 9, 11, 21, 25, 35, 36, 37, 38, 39	40	Nil	D1, D2, D3,D5	
VI.3	PRINTERS	100%	NA	Nil	Nil	18	40	Nil	D1, D2, D3,D5	
VI.4	EWS/ OWS	100%	NA	Nil	Nil	18	40	Nil	D1, D2, D3,D5	
VI.5	VOLTAGE STABILISER	100%	NA	Nil	Nil	18	40	Nil	D1, D2, D3,D5	
VI.6	ANNUNCIATOR	100%	33	Nil	Nil	1, 2, 3, 9	40	Nil	D1, D2, D3,D5	
VI.7	ANEMOMETER	100%	33	Nil	Nil	1, 2, 3, 9, 15	40	Nil	D1, D2, D3,D5	
VI.8	INCLINOMETER	100%	33	Nil	Nil	1, 2, 3, 9, 15	40	Nil	D1, D2, D3,D5	

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ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP 'PE- ELECTRICAL	QUALITY ASSURANCE PLAN FOR C&I ITEMS	PACKAGE	CHP & AHP
			QAP NO	ISG/C&I/SQP/2026 DATE : 12-02-2026
			QAP REV NO.	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL, DIMENSION AND SHEET THICKNESS	11. EFFICIENCY, REGULATION.	21. IR-HV-IR TEST	31. KV TEST TYPE TEST REPORT	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
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3. PROCESS / ELECTRICAL CONNECTION	13. SWITCHING CAPABILITY & SEQUENCE	23. TENSILE STRENGTH AND ELONGATION	33. MANUFACTURER'S STANDARD	D3. CERTIFICATE OF CONFORMANCE
4. CALIBRATION AND ACCURACY TEST	14. RANGE / TILT / ZOOM /	24. FRLS TEST FOR OI, TI, SDR AND HCL EMISSION	34. DROP OUT TEST	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. INSULATION RESISTANCE TEST	15 DEGREE OF PROTECTION TT REPORT	25. CONTINUITY TEST	35. VERIFICATION OF BOM	D5. APPROVED OR AS BULT DRG/DATASHEET/BOM/SCHEDULE
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7. HYDRO /HYDRAULIC TEST AS APPLICABLE	17. BOUGHT OUT ITEM TC	27. IMPEDANCE	37. SHORT CIRCUIT TEST	
8. PAINT SHADE AND THICKNESS	18. MFR TC / WARRANTY CERTIFICATE	28. ATTENUATION	38. RIPPLE MEASUREMENT	
9. FUNCTIONAL / OPERATIONAL TEST	19. LEAK TEST	29. CAPACITANCE TEST	39. TRANSFER- RETRANSFER TEST	
10. PROFIBUS/ FIELDBUS COMMUNICATION CHECK	20. CONDUCTOR RESISTANCE	30. OEM RECOMMENDED TEST	40. REVIEW OF DOCUMENTS	

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M	C	N	M	C	N		
			DOC.: D1			DOC.: D2				
1	2	3	4	5	6	7	8	9	10	12
VI.9	PHOTO CELL	100%	33	Nil	Nil	1, 2, 3, 9, 15	40	Nil	D1, D2, D3,D5	
VI.10	TELEPHONE / PA SET FOR SCR	100%	33	Nil	Nil	1, 2, 9	40	Nil	D1, D2, D3,D5	
VI.11	BATTERY HEALTH MONITORING SYSTEM	100%	33	Nil	Nil	1, 2, 3, 4, 5, 9, 15	40	Nil	D1, D2, D3,D5	
VI.12	CONDITION MONITORING SYSTEM	100%	33	Nil	Nil	1, 2, 3, 4, 9, 15	40	Nil	D1, D2, D3,D5	
VI.13	FLASHING BEACON	100%	33	Nil	Nil	1, 2, 5, 9, 15	40	Nil	D1, D2, D3,D5	
VI.14	CONSOLES / FURNITURE FOR EWS /OWS	100%	NA	Nil	Nil	33	40	Nil	D1, D2, D3,D5	
VII	**CONFIGURABLE HARDWARE**									
VII.1	FIELD BUS MODULES	100%	33	Nil	Nil	1, 2, 3, 15, 16	40	Nil	D1, D2, D3,D5	
VII.2	SEGMENT PROTECTOR JB	100%	33	Nil	Nil	1, 2, 3, 15, 16	40	Nil	D1, D2, D3,D5	

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BHEL ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP 'PE- ELECTRICAL	**QUALITY ASSURANCE PLAN FOR C&I ITEMS**	PACKAGE	CHP & AHP
			QAP NO	ISG/C&I/SQP/2026 DATE : 12-02-2026
			QAP REV NO.	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL, DIMENSION AND SHEET THICKNESS	11. EFFICIENCY, REGULATION.	21. IR-HV-IR TEST	31. KV TEST TYPE TEST REPORT	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
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3. PROCESS / ELECTRICAL CONNECTION	13. SWITCHING CAPABILITY & SEQUENCE	23. TENSILE STRENGTH AND ELONGATION	33. MANUFACTURER'S STANDARD	D3. CERTIFICATE OF CONFORMANCE
4. CALIBRATION AND ACCURACY TEST	14. RANGE / TILT / ZOOM /	24. FRLS TEST FOR OI, TI, SDR AND HCL EMISSION	34. DROP OUT TEST	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. INSULATION RESISTANCE TEST	15 DEGREE OF PROTECTION TT REPORT	25. CONTINUITY TEST	35. VERIFICATION OF BOM	D5. APPROVED OR AS BULT DRG/DATASHEET/BOM/SCHEDULE
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7. HYDRO /HYDRAULIC TEST AS APPLICABLE	17. BOUGHT OUT ITEM TC	27. IMPEDANCE	37. SHORT CIRCUIT TEST	
8. PAINT SHADE AND THICKNESS	18. MFR TC / WARRANTY CERTIFICATE	28. ATTENUATION	38. RIPPLE MEASUREMENT	
9. FUNCTIONAL / OPERATIONAL TEST	19. LEAK TEST	29. CAPACITANCE TEST	39. TRANSFER- RETRANSFER TEST	
10. PROFIBUS/ FIELDBUS COMMUNICATION CHECK	20. CONDUCTOR RESISTANCE	30. OEM RECOMMENDED TEST	40. REVIEW OF DOCUMENTS	

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M DOC.: D1	C	N	M DOC.: D2	C	N		
1	2	3	4	5	6	7	8	9	10	12
VII.3	CALL STATION, AMPLIFIER, LOUD SPEAKER, POWER SUPPLY MODULE, LAN SWITCH, SERVER, CAMERA	100%	NA	Nil	Nil	1, 2, 14, 18	40	Nil	D1, D2, D3,D5	
VII.4	KEYBOARD, JOYSTICK	100%	NA	Nil	Nil	1, 2, 18	40	Nil	D1, D2, D3,D5	
VII.5	HAND HELD CALIBRATOR	100%	NA	Nil	Nil	18	40	Nil	D1, D2, D3,D5	
VIII	**CABLES AND ACCESSORIES**									
VIII.1	INSTRUMENT CABLE	SAMPLES AS PER IS-1554/8784	6	Nil	Nil	1, 2, 20, 21, 22, 23, 24, 25, 22, 28, 32	40	Nil	D1, D2, D3,D5	TYPE TEST REPORT REQUIREMENT AS PER NIT SPECIFICATIONS
VIII.2	PROFIBUS CABLE	1 SAMPLE / LOT	6	Nil	Nil	1, 2, 20, 21, 22, 23, 24, 25, 22, 28, 32	40	Nil	D1, D2, D3,D5	TYPE TEST REPORT REQUIREMENT AS PER NIT SPECIFICATIONS
VIII.3	OFC CABLE	1 SAMPLE / LOT	6	Nil	Nil	1, 2, 21, 26, 27, 28, 29	40	Nil	D1, D2, D3,D5	

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Annexure - 3F

BHEL ISG, Bengaluru	INDUSTRIAL SYSTEMS GROUP PE- ELECTRICAL	**QUALITY ASSURANCE PLAN FOR ELECTRICAL ITEMS**	PACKAGE	CHP AND AHP
			QAP NO	ISG/ELEC/SQP/2026 DATE : 12-02-2026
			QAP REV NO, .	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL & DIMENSIONAL & THICKNESS	16. DIELECTRIC STRENGTH	33. MANUFACTURER STANDARD PROCEDURE	50. PRE- TREATMENT OF SHEET	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE, TYPE AND RATING	17. IP TEST/ TYPE TEST REPORT	34. BOM CHECK	51. SURFACE FINISH CHECK	D2. FINAL INSPECTION REPORT
3. FITMENT & ALIGNMENT	18. CALIBRATION TEST	35. CONTINUITY TEST	52. GUARANTEE/ WARRANTY CERTIFICATE	D3. CERTIFICATE OF CONFORMANCE
4. PHYSICAL TEST(SAMPLE)	19. ARC RESISTANCE	36. ADHESION TEST	53. RESISTNACE TO MOISTURE TEST/ TTR	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. RAW MATERIAL TC	20. TC FOR BOI	37. PI VALUE	54. PHOTOMETRY TEST/ TTR	D5. APPROVED OR AS BUILT DRG/ DATASHEET/ BOM/SCHEDULE
6. ULTRASONIC TEST	21. CHEMICAL ANALYSIS	38. SETTING OF LIMIT & TORQUE SWITCHES	55. CHECKS ON LED DRIVER- OC-SC / OVERLOAD	
7. MAGNETIC PARTICLE TEST(MPT)	22. PAINT SHADE & THICKNESS VERIFICATION	39. PHASE SEQUENCE CORRECTION TEST	56. LED DRIVER- THD & PF CHECKS	
8. RADIOGRAPHY TEST	23. FLAMMABILITY TEST	40. DISCHARGE TEST	57. BENDING AND COMPRESSION TEST	
9. DYE PENETRATION TEST	24. OPERATIONAL & FUNCTIONAL TEST	41. VERIFICATION OF MARKING	58. VOLUME RESISTIVITY	
10. MEASUREMENT OF IR VALUE :	25. GLASS CONTENT CHECK	42. CONDUCTOR RESISTNACE	59. HOT SET TEST FOR XLPE	
A) BEFORE HV TEST	26. FLAME PROOF TEST	43. INNER AND OUTER SHEATH AND INSULATION THICKNESS	60. OXYGEN INDEX TEST ON OUTER SHEATH	
B) AFTER HV TEST	27. CLEARANCE & CREEPAGE	44. TENSILE STRENGTH TEST	61. SMOKE DENSITY RATING TEST ON OUTER SHEATH	
11. HV TEST/DIELECTRIC TEST	28. ACCEPTANCE TEST	45. ROUTINE TEST AS PER IS 12615	62. ACID GAS GENERATION TEST ON OUTER SHEATH	
12. ROUTINE TEST AS PER RELEVANT IS STANDARD	29. FR/FRLS TEST AS PER RELEVANT IS	46. WINDING RESISTANCE OF HV AND LV SIDE	63. FLAMMABILITY TEST ON COMPLETED CABLE	
13. TYPE TESTS REPORT AS PER RELEVANT IS/ IEC	30. GALVANISATION MASS, THICKNESS AND UNIFORMITY	47. VOLTAGE RATIO TEST	64. REVIEW OF DOCUMENTS/ TEST REPORTS	
14. BULK DENSITY TEST	31. VECTOR GROUP	48. DEFLECTION LOAD TEST		
15. PH TEST	32. TERMINATION, FERRULING AND EARTHING	49. PROOF LOAD TEST		

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M	C	N	M	C	N		
			DOC : D1			DOC: D2				
1	2	3	4	5	6	7	8	9	10	12
I	**EARTHING AND LIGHTNING PROTECTION / SUPPORTS**									
I.1	EARTHING MATERIAL- MS RODS / GI FLATS / GI WIRES	IS-2500/ S-4759	5	Nil	Nil	1, 2, 30, 36, 51	64	Nil	D1, D2, D3,D5	
I.2	RUBBER MATS	20% of each type	5	Nil	Nil	1, 2, 12	64	Nil	D1, D2, D3,D5	
I.3	LIGHTNING PROTECTION MATERIALS	IS-2500/ S-4759	5	Nil	Nil	1, 2, 30, 36, 51	64	Nil	D1, D2, D3,D5	
I.4	MS PIPE / HUME PIPES / GI CONDUITS	IS-9537-II / IS-4736	5	Nil	Nil	1, 2	64	Nil	D1, D2, D3,D5	
I.5	EARTH SHOE	100%	5	Nil	Nil	1, 2	64	Nil	D1, D2, D3,D5	
I.6	STRUCTURAL STEEL FOR EQUIPMENT ERECTION	NA	5	Nil	Nil	1, 2	64	Nil	D1, D2, D3,D5	

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3. **BHEL reserves the right to conduct repeat test if required.**
4. **All Instrument to be used for Testing / Inspection shall have valid ' calibration certificates' to be verified by agencies, Manufacturer & Contractor.**
5. **Galvanization to be carried out at End Customer approved Galvanisers only.**
6. **Fitment cum Interchangeability report (D4) to be submitted for above items if appearing in Mandatory Spares List.**

BHEL ISG Bengaluru	INDUSTRIAL SYSTEMS GROUP PE- ELECTRICAL	**QUALITY ASSURANCE PLAN FOR ELECTRICAL ITEMS**	PACKAGE	CHP AND AHP
			QAP NO	ISG/ELEC/SQP/2026 DATE : 12-02-2026
			QAP REV NO, .	0

LIST OF CHECKS/TEST (TABLE-A):

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6. ULTRASONIC TEST	21. CHEMICAL ANALYSIS	38. SETTING OF LIMIT & TORQUE SWITCHES	55. CHECKS ON LED DRIVER- OC-SC / OVERLOAD	
7. MAGNETIC PARTICLE TEST(MPT)	22. PAINT SHADE & THICKNESS VERIFICATION	39. PHASE SEQUENCE CORRECTION TEST	56. LED DRIVER- THD & PF CHECKS	
8. RADIOGRAPHY TEST	23. FLAMMABILITY TEST	40. DISCHARGE TEST	57. BENDING AND COMPRESSION TEST	
9. DYE PENETRATION TEST	24. OPERATIONAL & FUNCTIONAL TEST	41. VERIFICATION OF MARKING	58. VOLUME RESISTIVITY	
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14. BULK DENSITY TEST	31. VECTOR GROUP	48. DEFLECTION LOAD TEST		
15. PH TEST	32. TERMINATION, FERRULING AND EARTHING	49. PROOF LOAD TEST		

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			M	C	N	M	C	N		
			DOC : D1			DOC: D2				
1	2	3	4	5	6	7	8	9	10	12
II	**LCP / JB / LPBS**									
II.1	POWER JB /CONTROL JB / RTD JB	100%	5, 20	Nil	Nil	1, 2, 10, 11, 17, 22	64	Nil	D1, D2, D3,D5	
II.2	LOCAL PUSH BUTTON STATIONS	100%	5, 20	Nil	Nil	1, 2, 10, 11, 17, 22	64	Nil	D1, D2, D3,D5	
II.3	PCC JB	100%	5, 20	Nil	Nil	1, 2, 10, 11, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	
II.4	INSTRUMENT SUPPLY PANEL	100%	5, 20	Nil	Nil	1, 2, 10, 11, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	

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INDUSTRIAL SYSTEMS GROUP PE- ELECTRICAL	QUALITY ASSURANCE PLAN FOR ELECTRICAL ITEMS	PACKAGE	CHP AND AHP
		QAP NO	ISG/ELEC/SQP/2026 DATE : 12-02-2026
		QAP REV NO, .	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL & DIMENSIONAL & THICKNESS	16. DIELECTRIC STRENGTH	33. MANUFACTURER STANDARD PROCEDURE	50. PRE- TREATMENT OF SHEET	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE, TYPE AND RATING	17. IP TEST/ TYPE TEST REPORT	34. BOM CHECK	51. SURFACE FINISH CHECK	D2. FINAL INSPECTION REPORT
3. FITMENT & ALIGNMENT	18. CALIBRATION TEST	35. CONTINUITY TEST	52. GUARANTEE/ WARRANTY CERTIFICATE	D3. CERTIFICATE OF CONFORMANCE
4. PHYSICAL TEST(SAMPLE)	19. ARC RESISTANCE	36. ADHESION TEST	53. RESISTNACE TO MOISTURE TEST/ TTR	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. RAW MATERIAL TC	20. TC FOR BOI	37. PI VALUE	54. PHOTOMETRY TEST/ TTR	D5. APPROVED OR AS BUILT DRG/ DATASHEET/ BOM/SCHEDULE
6. ULTRASONIC TEST	21. CHEMICAL ANALYSIS	38. SETTING OF LIMIT & TORQUE SWITCHES	55. CHECKS ON LED DRIVER- OC-SC / OVERLOAD	
7. MAGNETIC PARTICLE TEST(MPT)	22. PAINT SHADE & THICKNESS VERIFICATION	39. PHASE SEQUENCE CORRECTION TEST	56. LED DRIVER- THD & PF CHECKS	
8. RADIOGRAPHY TEST	23. FLAMMABILITY TEST	40. DISCHARGE TEST	57. BENDING AND COMPRESSION TEST	
9. DYE PENETRATION TEST	24. OPERATIONAL & FUNCTIONAL TEST	41. VERIFICATION OF MARKING	58. VOLUME RESISTIVITY	
10. MEASUREMENT OF IR VALUE :	25. GLASS CONTENT CHECK	42. CONDUCTOR RESISTNACE	59. HOT SET TEST FOR XLPE	
A) BEFORE HV TEST	26. FLAME PROOF TEST	43. INNER AND OUTER SHEATH AND INSULATION THICKNESS	60. OXYGEN INDEX TEST ON OUTER SHEATH	
B) AFTER HV TEST	27. CLEARANCE & CREEPAGE	44. TENSILE STRENGTH TEST	61. SMOKE DENSITY RATING TEST ON OUTER SHEATH	
11. HV TEST/DIELECTRIC TEST	28. ACCEPTANCE TEST	45. ROUTINE TEST AS PER IS 12615	62. ACID GAS GENERATION TEST ON OUTER SHEATH	
12. ROUTINE TEST AS PER RELEVANT IS STANDARD	29. FR/FRLS TEST AS PER RELEVANT IS	46. WINDING RESISTANCE OF HV AND LV SIDE	63. FLAMMABILITY TEST ON COMPLETED CABLE	
13. TYPE TESTS REPORT AS PER RELEVANT IS/ IEC	30. GALVANISATION MASS, THICKNESS AND UNIFORMITY	47. VOLTAGE RATIO TEST	64. REVIEW OF DOCUMENTS/ TEST REPORTS	
14. BULK DENSITY TEST	31. VECTOR GROUP	48. DEFLECTION LOAD TEST		
15. PH TEST	32. TERMINATION, FERRULING AND EARTHING	49. PROOF LOAD TEST		

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M	C	N	M	C	N		
			DOC : D1			DOC: D2				
1	2	3	4	5	6	7	8	9	10	12
II.5	DCDB/ ACDB/MLDB/WRDB/PDB	100%	5, 20	NIL	NIL	1, 2, 10, 11, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	
II.6	VFD PANEL	100%	5, 20	NIL	NIL	1, 2, 10, 11, 13, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	TYPE TEST REPORT REQUIREMENT AS PER NIT SPECIFICATIONS.
II.7	SEQUENTIAL TIMER PANEL	100%	5, 20	NIL	NIL	1, 2, 10, 11, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	
II.8	BELT WATCH PANEL	100%	5, 20	NIL	NIL	1, 2, 10, 11, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	
II.9	LOCAL CONTROL PANEL / STARTER PANEL	100%	5, 20	NIL	NIL	1, 2, 10, 11, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	

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INDUSTRIAL SYSTEMS GROUP PE- ELECTRICAL	**QUALITY ASSURANCE PLAN FOR ELECTRICAL ITEMS**	PACKAGE	CHP AND AHP
		QAP NO	ISG/ELEC/SQP/2026 DATE : 12-02-2026
		QAP REV NO, .	0

LIST OF CHECKS/TEST (TABLE-A):

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4. PHYSICAL TEST(SAMPLE)	19. ARC RESISTANCE	36. ADHESION TEST	53. RESISTNACE TO MOISTURE TEST/ TTR	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. RAW MATERIAL TC	20. TC FOR BOI	37. PI VALUE	54. PHOTOMETRY TEST/ TTR	D5. APPROVED OR AS BUILT DRG/ DATASHEET/ BOM/SCHEDULE
6. ULTRASONIC TEST	21. CHEMICAL ANALYSIS	38. SETTING OF LIMIT & TORQUE SWITCHES	55. CHECKS ON LED DRIVER- OC-SC / OVERLOAD	
7. MAGNETIC PARTICLE TEST(MPT)	22. PAINT SHADE & THICKNESS VERIFICATION	39. PHASE SEQUENCE CORRECTION TEST	56. LED DRIVER- THD & PF CHECKS	
8. RADIOGRAPHY TEST	23. FLAMMABILITY TEST	40. DISCHARGE TEST	57. BENDING AND COMPRESSION TEST	
9. DYE PENETRATION TEST	24. OPERATIONAL & FUNCTIONAL TEST	41. VERIFICATION OF MARKING	58. VOLUME RESISTIVITY	
10. MEASUREMENT OF IR VALUE :	25. GLASS CONTENT CHECK	42. CONDUCTOR RESISTNACE	59. HOT SET TEST FOR XLPE	
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12. ROUTINE TEST AS PER RELEVANT IS STANDARD	29. FR/FRLS TEST AS PER RELEVANT IS	46. WINDING RESISTANCE OF HV AND LV SIDE	63. FLAMMABILITY TEST ON COMPLETED CABLE	
13. TYPE TESTS REPORT AS PER RELEVANT IS/ IEC	30. GALVANISATION MASS, THICKNESS AND UNIFORMITY	47. VOLTAGE RATIO TEST	64. REVIEW OF DOCUMENTS/ TEST REPORTS	
14. BULK DENSITY TEST	31. VECTOR GROUP	48. DEFLECTION LOAD TEST		
15. PH TEST	32. TERMINATION, FERRULING AND EARTHING	49. PROOF LOAD TEST		

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M	C	N	M	C	N		
			DOC : D1			DOC: D2				
1	2	3	4	5	6	7	8	9	10	12
II.10	WELDING & LIGHTING RECEPTACLES	100%	5, 20	Nil	Nil	1, 2, 10, 11, 17, 22	64	Nil	D1, D2, D3,D5	
II.11	ARM CHAIR CONTROL DESK	100%	5, 20	NIL	NIL	1, 2, 10, 11, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	
III	**LIGHTING AND ACCESSORIES**									
III.1	LIGHTING FIXTURES	20% of each type / rating	20	Nil	Nil	1, 2, 13, 53, 54, 55, 56	64	Nil	D1, D2, D3,D5	TYPE TEST REPORT REQUIREMENT AS PER NIT SPECIFICATIONS.
III.2	LIGHTING JB	20% of each type	5	Nil	Nil	1, 2, 17, 22	64	Nil	D1, D2, D3,D5	

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			QAP NO	ISG/ELEC/SQP/2026 DATE : 12-02-2026
			QAP REV NO, .	0

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6. ULTRASONIC TEST	21. CHEMICAL ANALYSIS	38. SETTING OF LIMIT & TORQUE SWITCHES	55. CHECKS ON LED DRIVER- OC-SC / OVERLOAD	
7. MAGNETIC PARTICLE TEST(MPT)	22. PAINT SHADE & THICKNESS VERIFICATION	39. PHASE SEQUENCE CORRECTION TEST	56. LED DRIVER- THD & PF CHECKS	
8. RADIOGRAPHY TEST	23. FLAMMABILITY TEST	40. DISCHARGE TEST	57. BENDING AND COMPRESSION TEST	
9. DYE PENETRATION TEST	24. OPERATIONAL & FUNCTIONAL TEST	41. VERIFICATION OF MARKING	58. VOLUME RESISTIVITY	
10. MEASUREMENT OF IR VALUE :	25. GLASS CONTENT CHECK	42. CONDUCTOR RESISTNACE	59. HOT SET TEST FOR XLPE	
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			M	C	N	M	C	N		
			DOC : D1			DOC: D2				
1	2	3	4	5	6	7	8	9	10	12
III.3	LIGHTING PANELS	100%	5, 20	NIL	NIL	1, 2, 10, 11, 17, 22, 24, 32, 34,	64	Nil	D1, D2, D3,D5	
III.4	LIGHTING WIRES	IS-694	5	Nil	Nil	1, 2, 10, 11, 29, 42, 43, 44,	64	Nil	D1, D2, D3,D5	
III.5	LIGHTING/ WELDING TRANSFORMER	100%	5, 20	Nil	Nil	1, 2, 10, 11, 13, 31, 46, 47	64	Nil	D1, D2, D3,D5	TYPE TEST REPORT REQUIREMENT AS PER NIT SPECIFICATIONS.
III.6	GI LIGHTING CONDUIT	IS-9537-II	5	Nil	Nil	1, 2, 30, 51, 57	64	Nil	D1, D2, D3,D5	
III.7	LIGHTING POLE	100%	5	Nil	Nil	1, 2, 30, 51	64	Nil	D1, D2, D3,D5	

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			QAP NO	ISG/ELEC/SQP/2026 DATE : 12-02-2026
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			M	C	N	M	C	N		
			DOC : D1			DOC: D2				
1	2	3	4	5	6	7	8	9	10	12
IV	**TRAYS AND CABLES AND ACCESSORIES**									
IV.1	GI CABLE TRAY & ACCESSORIES	20%	5	Nil	Nil	1, 2, 30, 36, 48, 50, 51	64	Nil	D1, D2, D3,D5	DEFLECTION LOAD TEST TO BE PERFORMED FOR ALL VARIANTS
IV.2	FRP CABLE TRAY & ACCESSORIES	20%	5	Nil	Nil	1, 2, 19, 23, 25, 48	64	Nil	D1, D2, D3,D5	DEFLECTION LOAD TEST TO BE PERFORMED FOR ALL VARIANTS
IV.3	CABLE TRAY SUPPORT (BOLTED TYPE)	20%	5	Nil	Nil	1, 2, 30, 36, 49, 51	64	Nil	D1, D2, D3,D5	PROOF LOAD TEST TO BE PERFORMED FOR ALL VARIANTS
IV.4	CABLE TRAY SUPPORT (WELDED TYPE)	20%	5	Nil	Nil	1, 2, 30, 51	64	Nil	D1, D2, D3,D5	
IV.5	LT CABLE GLANDS & LUGS	20 % of each type	5	Nil	Nil	1, 2	64	Nil	D1, D2, D3,D5	
IV.6	TREFOIL CLAMPS	20 % of each type	5	Nil	Nil	1, 2	64	Nil	D1, D2, D3,D5	

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			QAP NO	ISG/ELEC/SQP/2026 DATE : 12-02-2026
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			DOC : D1			DOC: D2				
1	2	3	4	5	6	7	8	9	10	12
IV.7	E CHAIN WITH CABLES	100%	5, 20	Nil	Nil	1, 2, 10, 11, 35, 42	64	Nil	D1, D2, D3,D5	
IV.8	LT POWER CABLE	Each size and type of cable as per sampling plan of IS 1554 (Part-I)/ 7098 (Part-I)	5	Nil	Nil	1, 2, 10, 11, 13, 29, 35, 41, 42, 43, 44, 59, 60, 61, 62, 63	64	Nil	D1, D2, D3,D5	TYPE TEST REPORT REQUIREMENT AS PER NIT SPECIFICATIONS.
IV.9	CONTROL CABLE	Each size and type of cable as per sampling plan of IS 1554 (Part-I)	5	Nil	Nil	1, 2, 10, 11, 13, 29, 35, 41, 42, 43, 44, 59, 60, 61, 62, 63	64	Nil	D1, D2, D3,D5	TYPE TEST REPORT REQUIREMENT AS PER NIT SPECIFICATIONS.
IV.10	HT TERMINATION KITS / STRAIGHT THROUGH JOINTING KITS	20 % of each type	5	Nil	Nil	1, 2, 13, 16, 44, 58	64	Nil	D1, D2, D3,D5	

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			QAP REV NO, .	0

LIST OF CHECKS/TEST (TABLE-A):

1. VISUAL & DIMENSIONAL & THICKNESS	16. DIELECTRIC STRENGTH	33. MANUFACTURER STANDARD PROCEDURE	50. PRE- TREATMENT OF SHEET	D1. RAW MATERIAL TC / IN PROCESS INSPECTION REPORT
2. MAKE, TYPE AND RATING	17. IP TEST/ TYPE TEST REPORT	34. BOM CHECK	51. SURFACE FINISH CHECK	D2. FINAL INSPECTION REPORT
3. FITMENT & ALIGNMENT	18. CALIBRATION TEST	35. CONTINUITY TEST	52. GUARANTEE/ WARRANTY CERTIFICATE	D3. CERTIFICATE OF CONFORMANCE
4. PHYSICAL TEST(SAMPLE)	19. ARC RESISTANCE	36. ADHESION TEST	53. RESISTNACE TO MOISTURE TEST/ TTR	D4. FITMENT CUM INTERCHANGEABILITY CERTIFICATE
5. RAW MATERIAL TC	20. TC FOR BOI	37. PI VALUE	54. PHOTOMETRY TEST/ TTR	D5. APPROVED OR AS BUILT DRG/ DATASHEET/ BOM/SCHEDULE
6. ULTRASONIC TEST	21. CHEMICAL ANALYSIS	38. SETTING OF LIMIT & TORQUE SWITCHES	55. CHECKS ON LED DRIVER- OC-SC / OVERLOAD	
7. MAGNETIC PARTICLE TEST(MPT)	22. PAINT SHADE & THICKNESS VERIFICATION	39. PHASE SEQUENCE CORRECTION TEST	56. LED DRIVER- THD & PF CHECKS	
8. RADIOGRAPHY TEST	23. FLAMMABILITY TEST	40. DISCHARGE TEST	57. BENDING AND COMPRESSION TEST	
9. DYE PENETRATION TEST	24. OPERATIONAL & FUNCTIONAL TEST	41. VERIFICATION OF MARKING	58. VOLUME RESISTIVITY	
10. MEASUREMENT OF IR VALUE :	25. GLASS CONTENT CHECK	42. CONDUCTOR RESISTNACE	59. HOT SET TEST FOR XLPE	
A) BEFORE HV TEST	26. FLAME PROOF TEST	43. INNER AND OUTER SHEATH AND INSULATION THICKNESS	60. OXYGEN INDEX TEST ON OUTER SHEATH	
B) AFTER HV TEST	27. CLEARANCE & CREEPAGE	44. TENSILE STRENGTH TEST	61. SMOKE DENSITY RATING TEST ON OUTER SHEATH	
11. HV TEST/DIELECTRIC TEST	28. ACCEPTANCE TEST	45. ROUTINE TEST AS PER IS 12615	62. ACID GAS GENERATION TEST ON OUTER SHEATH	
12. ROUTINE TEST AS PER RELEVANT IS STANDARD	29. FR/FRLS TEST AS PER RELEVANT IS	46. WINDING RESISTANCE OF HV AND LV SIDE	63. FLAMMABILITY TEST ON COMPLETED CABLE	
13. TYPE TESTS REPORT AS PER RELEVANT IS/ IEC	30. GALVANISATION MASS, THICKNESS AND UNIFORMITY	47. VOLTAGE RATIO TEST	64. REVIEW OF DOCUMENTS/ TEST REPORTS	
14. BULK DENSITY TEST	31. VECTOR GROUP	48. DEFLECTION LOAD TEST		
15. PH TEST	32. TERMINATION, FERRULING AND EARTHING	49. PROOF LOAD TEST		

SN	EQUIPMENT DESCRIPTION	SAMPLING PLAN	RAW MATERIAL CHECKS/ IN PROCESS TEST TO BE PERFORMED BY			FINAL INSPECTION TO BE PERFORMED BY			DOCUMENTS TO BE SUBMITTED TO BHEL	REMARKS
			M	C	N	M	C	N		
			DOC : D1			DOC: D2				
1	2	3	4	5	6	7	8	9	10	12
V	**OTHER ELECTRICAL ITEMS / ACCESSORIES**									
V.1	FIRE EXTINGUISHER	100%	33	Nil	Nil	1, 2, 52	64	Nil	D1, D2, D3,D5	
V.2	CEILING FANS	100%	NA	Nil	Nil	1, 2, 52	64	Nil	D1, D2, D3,D5	
V.3	PIANO SWITCHES	100%	5, 20	Nil	Nil	1, 2, 24	64	Nil	D1, D2, D3,D5	
V.4	ELECTRO HYDRO THRUSTER BRAKES/ RAIL CLAMPS	100%	5, 20	Nil	Nil	1, 2, 24	64	Nil	D1, D2, D3,D5	
V.5	HOOTER/ SIREN	100%	5, 20	Nil	Nil	1, 2, 10, 11, 24	64	Nil	D1, D2, D3,D5	
V.6	LT MOTORS	100%	5, 20	Nil	Nil	13, 45	64	Nil	D1, D2, D3,D5	TYPE TEST REPORT REQUIREMENT AS PER NIT SPECIFICATIONS.
V.7	ELECTRICAL ACTUATOR	100%	5, 20	Nil	Nil	1, 2, 10, 11, 17, 22, 24, 38, 39	64	Nil	D1, D2, D3,D5	
V.8	BATTERY	100%	21	Nil	Nil	1, 2, 40, 41	64	Nil	D1, D2, D3,D5	
V.9	FIRE SEALING SYSTEM	1 per batch	1, 5	Nil	Nil	1, 2, 13, 14, 15	64	Nil	D1, D2, D3,D5	

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NOTES:

1. **ABBREVIATIONS USED: M: MANUFACTURER ; C: PACKAGE VENDOR ; N: BHEL**
2. **This Standard QAP is applicable for items which are listed as CAT-III under inspection categorisation by End Customer for specific project.**
3. **BHEL reserves the right to conduct repeat test if required.**
4. **All Instrument to be used for Testing / Inspection shall have valid ' calibration certificates' to be verified by agencies, Manufacturer & Contractor.**
5. **Galvanization to be carried out at End Customer approved Galvanisers only.**
6. **Fitment cum Interchangeability report (D4) to be submitted for above items if appearing in Mandatory Spares List.**

Annexure-3G:

Design Guidelines for DCS Interfacing with various soft communication for CHP/AHP System

1. Profibus-DP Design Guidelines

Sl. No.	Guidelines
1	Total Profibus-DP cable length (end-to-end for a single loop) shall not exceed **800 meters**
2	Maximum 18 nodes shall be connected in one Profibus-DP segment
3	Profibus-DP communication speed in BHEL DCS is set as **187.5 kbps**

2. Profibus-PA Design Guidelines

Sl. No.	Guidelines
1	Maximum Profibus-PA cable length (Trunk & Spur) shall be limited to maximum **1200 meters**
2	Maximum **10 nodes** shall be connected in one Profibus-PA segment
3	Profibus PA speed in BHEL DCS is set as 31.25 kbps.

Note: Since Foundation Field Bus is not compatible with DCS, Profibus-DP/PA protocol-based Instruments/Actuators shall be selected.

3. Profibus looping / C&I cable allocation as per FG grouping

a. Based on Functional grouping, IMCC feeders/Profibus DP devices (MOV's / Actuators)/ Profibus PA devices(transmitters) are to be looped. Devices belonging to two different Function groups shall not be looped together.

b. IMCC GA with feeder allocation shall be decided considering the Functional Grouping of DCS to avoid any inter panel cabling issues. The number of Y links required for all the modules including spare feeder shall be arrived accordingly.

c. Number of runs of cable and JB's (Profibus DP/PA cable, Instrumentation cable, segments JB's and Instrumentation JB) shall be finalised considering point a & b.

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Annexure-3G:

Design Guidelines for DCS Interfacing with various soft communication for CHP/AHP System

4. DCS - FG (Function Group) finalization Guidelines

Sl. No.	Guidelines
1	Total number of addresses available in a DCS Function group is limited to 160. In each address you can assign a Single IMCC feeder or MOV or PA transmitter
2	For speed Calculation, data to be considered is as below a. Each transmitter / IMCC/MOV – AI/AO signal – 16 bits of data b. Each IMCC / MOV - DI/DO signal – 1 bit each
3	The number of Hardwired signals in each FG is limited to 8 racks x 13 modules (DI module- 8channel, DO/AI/AO modules – 4 channels) All spare cores shall be terminated at both DCS and JB ends. Sufficient spare terminals shall be considered in JB.
4	Above configuration detailed in Sl No 1,2 and 3 are accommodated in approx. 4X800(L)X800(W) DCS panels (CVP, CRC, CRD) excluding relay panel (CTE). 1X800(L)X800(W) relay panel (CTE) can accommodate 120 relays.

5. PLC – Data Speed Calculation:

For vendor supplied PLC systems, Vendor shall provide speed calculation for profibus DP/ IMCC / Profibus PA instruments soft signal data exchange between PLC & devices as per tender specifications, along with the PLC configuration diagram, considering points 1,2,3,4 listed for DCS FG grouping.

6. Numerical Relay (NR) Network Connectivity

- Separate NR network shall be considered for LT & HT switchgears. Along with Numerical relays, Multifunction relays shall also be looped by vendor.
- Accordingly, Vendor shall Loop all LT switchgears & bring to two switches(L3) in Main Control room in TG building.
- Accordingly, Vendor shall Loop all HT switchgears & bring to two switches(L3) in Main Control room in TG building.
- For AWRS (Wherever applicable), separate wireless / ofc network shall be considered for NR Connectivity up to Main Control room in TG building.

Note: This document is issued as a general guideline to vendors without prejudice to their contractual obligations and liabilities and shall not relieve the vendor from complying with the contractual requirements of the specific tender

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