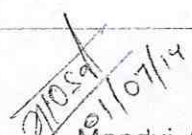


 BHEL-EMRP MUMBAI	TECHNICAL SPECIFICATION PART-I FOR ELECTRICAL WORKSHOP EQUIPMENTS TESTING DEVICES		SPECIFICATION NO. EM-MHDA-MAN-00	
			Rev. No	00
	4 x 180 MW MANGDECHHU HEP		Date	01.07.2014

GENERAL TECHNICAL SPECIFICATIONS

 Sumit dhiman 01/07/14 Engineer BOP	 Mandvi Gupta Manager BOP
PREPARED BY	APPROVED BY

 BHEL-EMRP MUMBAI	TECHNICAL SPECIFICATION PART-I FOR ELECTRICAL WORKSHOP EQUIPMENTS TESTING DEVICES		SPECIFICATION NO. EM-MHDA-MAN-00	
			Rev. No	00
	4 x 180 MW MANGDECHHU HEP		Date	01.07.2014

SECTION 1 – SCOPE OF ENQUIRY

1. This Specification covers the design, manufacture, inspection and testing at vendors work, if required, proper packing and delivery to site of ELECTRICAL WORKSHOP EQUIPMENTS as mentioned in different SECTION of this specification for **4 X 180 MW MANGDECHHU HEP**
2. It is not intent to specify herein all the details of design and manufacture. However the equipment shall conform in all respect to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation up to vendors guarantee.
3. The general terms and conditions, instructions to tender and other attachment referred to elsewhere be hereby made part of the tender specification.
4. The tenderer shall be responsible for and governed by all requirements stipulated herein after.
5. **Deviation**, if any should be brought out very clearly on deviation sheet Part II of the specification. Otherwise it would be presumed that the tender offer is in line with what has been stated/asked for in this specification.
6. The offer should be complete with technical data, catalogue, brochures and drawings, as applicable.
7. The bid shall be in English language and MKS system of unit.

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	4 x 180 MW MANGDECHHU HEP		Date	01.07.2014

SECTION 2 – General Conditions

1. SCOPE OF SUPPLY

The scope of supply indicating technical specification & Bill of quantity shall be as per Annexure -I (Details of Equipments) along with all essential accessories required for the successful operation of the equipments.

2. CODES AND STANDARDS

All relevant National and International standards shall be specified and followed.

3. DESIGN CRITERIA

- 3.a. Electrical Workshop Equipment shall be used for testing various electrical equipment/ devices during Commissioning, Operation and Maintenance of plant.
- 3.b. The equipment will be kept in a clean but hot, humid and tropical atmosphere when not in use. Equipment will be placed in dust laden, hot, humid atmosphere during its use.
- 3.c. For continuous operation at specified rating, temperature rise of various equipment/ components shall be limited to the permissible value stipulated in the relevant standards and this specification.
- 3.d. The equipment and component thereof shall be capable of withstanding the mechanical forces and thermal stresses of the short circuit current without any damage and deterioration of material.

4. SPECIFIC REQUIREMENTS & RATINGS

- 4.a. The bidder may note that the equipment ranges, ratings, quantities as detailed herein, are the minimum requirement only. The equipment shall be furnished in strict accordance with the same. All accessories for the equipment not covered here, but are necessary for satisfactory and trouble free operation of the equipment, shall be supplied by the Bidder. Bidder may also quote for optional accessories.
- 4.b. The instrument shall be designed suitably for satisfactory operation and storage in wide range of temperature variations prevailing at projects sites:

Mangdechhu: (-) 7°C to 36°C.

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- 4.c. Analog instruments shall be provided with knife-edge pointer and anti-parallax mirror.
- 4.d. Instrument/meters suitable for DC supply should be provided with re-chargeable batteries, charger and low battery charge indication.
- 4.e. The portable instruments shall be suitable for hand held operation, rugged in construction and suitable for field use.
- 4.f. Power supply for AC operation Instrument shall be 240 V AC, 50 Hz single phase.
- 4.g. All electrical instruments shall be dust and moisture proof.
- 4.h. Calibration tests shall be done on all instruments, wherever applicable and calibration certificates are to be furnished with instruments.
- 4.i. Equipments shall be of shock proof.
- 4.j. Instruments shall meet National or International relevant safety standards.
- 4.k. Manufacturers name plate:
The following data shall be shown in accordance with the relevant standard
- Manufacturers name and address
 - Works serial number and date of manufacture
 - Main technical data
- 4.l. Warning Plates:
Warning plates / caution for the safety of instrument & human beings with Dos and Don'ts to be inscribed on the instruments / Recorders / all electrical equipment in English.

5. TESTING & INSPECTION

- 5.a. The Sample Quality Assurance Plan (QAP) is attached as per Annex. II for reference. The QAP shall be finally approved by BHEL /customer (MHDA) and the same shall be applicable for testing & inspection requirement.
- 5.b. The manufacturer shall carry out all acceptance and routine tests as per relevant standards and specification in line with BHEL /customer (MHDA) approved QAP. Charges for all these routine and acceptance tests for all the equipments shall deem to be included in the bid price. Additional Charges shall not be applicable/paid in lieu of QAP Approval at later stage.

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			Rev. No	00
	4 x 180 MW MANGDECHHU HEP		Date	01.07.2014

5.c Equipment shall be completely assembled, wired, adjusted and tested in factory as per the latest edition of relevant standards.

5.d The Bidder shall submit the Test Certificates/Reports for all the acceptance and routine tests as per relevant standards, specifications and in line with QAP for BHEL /customer (MHDA) approval. Based on approved Test Certificates/ Reports, the customer (MHDA) will issue the Material Dispatch Clearance Certificates (MDCCs). Only after receipt of MDCC vendor can dispatch the material.

5.e Bidder shall also submit the Test Certificates for all the acceptance and routine tests as per relevant standards, specifications along with the equipment as per TABLE-2, Annexure - I.

6. Documentation

6.a. To be submitted with bid:

The Bidder shall submit all documents as per TABLE-1, Annexure - I along with the bid.

The Bidder shall ensure that the all-necessary information required to fully describe the equipment are submitted with the bid.

6.b. To be submitted after award of order:

The Bidder shall submit all documents as per TABLE-2, Annexure - I.

After award of contract for BHEL and/ or end customer approval (MHDA) and also along with equipment

7. DELIVERY

The delivery of Equipment shall be completed as per NIT (Notice Inviting Tender)

8. While quoting Bidder shall have to furnish unit rate for each item. Purchaser reserves the rights to add/delete quantity of any item during detailed engineering as finally required for the project. Unit rate quoted shall be applicable for price adjustment in such cases.

9. All the equipment shall be procured from reputed manufacturers and make of equipment shall be subjected to the approval of BHEL/ BHEL's Customer.

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			Rev. No	00
	4 x 180 MW MANGDECHHU HEP		Date	01.07.2014

10. Demonstration & Handing over to BHEL / BHEL's Customer

The bidder shall be responsible for demonstration of the supplied equipment at site to BHEL / BHEL's customer and ensure handing over the same to the satisfaction of BHEL / BHEL's customer.

11. Performance Guarantee

The bidder shall guarantee that the equipment offered shall meet the requirement as stipulated in this specification and as confirmed by them in annexure - I, (Duly filled in). In case the performance of equipment is not as per performance guarantee, the bidder will have to replace the equipment at site free of cost.

12. Deviation

The Bidder shall indicate the deviation, if any, in Schedule of Technical Deviation as per Page 4, Specific technical Specifications, along with the justification for the deviation.

13. Package & Consignment Data

The Bidder shall pack all the equipment, their accessories and spares in road - worthy package. Bidder to indicate the number of packages of consignment together with the size (L x W x H) and weight for transporting the equipment along with their bid.

Each package shall be legibly marked with the following information:

ELECTRICAL WORKSHOP EQUIPEMENTS for 4 X 180 MW MANGDECHHU HEP

BHEL Purchase Order No:

Job No: **2912-11**

Supplier's Name:

Manufacturer's Name:

Name of the Equipment:

Item Code of the equipment:

Quantity:

Weight:

 BHEL-EMRP MUMBAI	TECHNICAL SPECIFICATION PART-I FOR ELECTRICAL WORKSHOP EQUIPMENTS TESTING DEVICES		SPECIFICATION NO. EM-MHDA-MAN-00	
			Rev. No	00
	4 x 180 MW MANGDECHHU HEP		Date	01.07.2014

Annexure-I

Table 1

LIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH BID

Sl.No	Documents	No of copies
1	Details of Equipments as per Specific technical Specifications (Duly Filled)	2 copies
2	Product Catalogue for all equipments/ instruments referred in Specific technical Specifications	2 copies
3	Schedule of Deviation as per Specific technical Specifications	2 copies

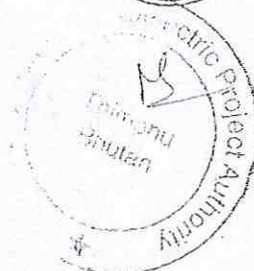
NOTE: All above documents to be submitted strictly, failing which the offer may likely be rejected.

Table 2

LIST OF DOCUMENTS TO BE SUBMITTED AFTER AWARD OF ORDER FOR BHEL / END CUSTOMER APPROVAL and ALONG WITH EQUIPMENT

Sl.No	Documents	No of copies
1	Product catalog with complete specifications, model nos. physical dimensions etc.	3 copies (2 for MHDA + 1 for BHEL)
2	Quality Assurance Plan along with test certificates and calibration certificates for MDCCs	4 copies (3 for MHDA + 1 for BHEL)
2	Test Certificates of all acceptance and routine tests as applicable.	3 copies (2 for MHDA + 1 for BHEL)
3	Calibration certificates as applicable.	3 copies (2 for MHDA + 1 for BHEL)
4	Guarantee certificate as per NIT.	2 copies (1 for MHDA + 1 for BHEL)
5	Instruction manual of individual equipment shall clearly indicate in English the installation and connection method. Operating, Maintenance and Calibration methods shall be provided in the manual.	7 copies (6 for MHDA + 1 for BHEL)

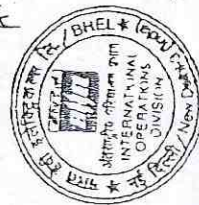
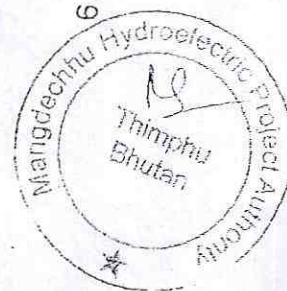
MODEL QUALITY ASSURANCE PLAN (QAP) FOR ELECTRICAL WORKSHOP



19. MODEL QUALITY ASSURANCE PLAN (QAP) FOR ELECTRICAL WORKSHOP

Special Instructions: -

1. Contractors/Manufacturers/Sub-suppliers are advised to submit QAP for equipments/ system/ materials after incorporating all tests for bought out items, in process inspection and final inspections as per their latest manufacturing practice and Indian/ International Standards (with latest amendments, if any).
2. Contractors/Manufacturers/Sub-suppliers are required to use properly calibrated instruments / equipments during testing/inspection, for which necessary calibration certificates are required to be provided/presented to the Inspecting Officer.
3. Contractors/Manufacturers/Sub-suppliers have to make on their own all arrangements for testing facilities at their works for testing of equipments/materials.
4. One set of complete test certificates as per the requirement of QAP be made available to the MHPA for acceptance.
5. All the records, as per the requirement of QAP may be made available for review by the Inspecting Officer during inspection.
6. Field tests are to be carried out as per the requirements of the contract/purchase order.



QUALITY ASSURANCE PLAN (MODEL)

PROJECT : MANGDECHHU HE PROJECT, BHUTAN
NAME OF
EQUIPMENT : ELECTRICAL WORKSHOP EQUIPMENT

CLIENT: MANGDECHHU HYDROELECTRIC PROJECT AUTHORITY,
VENDOR NAME & ADDRESS:
NIT/P.O. REFERENCE :

Page: 19-2

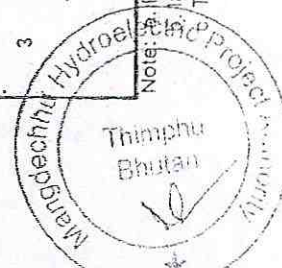
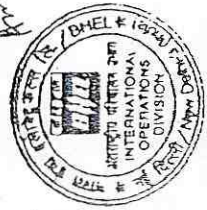
SL. NO.	ITEM / COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS / ACCEPTANCE NORMS	RECORD FORMAT	INSP. AGENCY			REMARKS
						Perform	Witness	Verify	
1	General Equipment Universal Vice for Bench, Electronic Tools, Cable-Shoe Pressing Pliers Set, Spirit Level, Hydraulic Crimping Machine, Vacuum Cleaner & Hot Air Blower	Test Visual	100% -do-	Tech. Spec./Appd.drg./IEC:Code -do-	TC TC	3-2 3-2	- -	1 1	TC TC
a) b)	Routine Test Checking of Rating, Make & Model								
2	Accessories L.V. Short-Circuiting device, Voltage Tester, High Freq. Welding Set, Extension Cable.								
a) b)	Routine Test Checking of Rating, Make & Model	Test Visual	-do- -do-	-do- -do-	TC TC	3-2 3-2	- -	1 1	TC TC
3	Measuring Devices Megger (A.C. & D.C.), Portable Universal Bridge, Portable Power Measuring								

Note: a) In 'Inspection Agency' column figure 1, 2, or 3 to be filled. 1- will indicate 'supplier' & 3- will indicate 'sub-supplier'.
b) In 'Remarks' column following abbreviations shall be used - RR-Review of Records, T.C. - Test Certificate Submission & CHP - Customer Hold Point.
Test certificates shall be submitted at the time of final inspection.

Signature
MHPA (Client)

Signature
NHPC (Consultant)

Signature & Seal
Vendor



QUALITY ASSURANCE PLAN (MODEL)

PROJECT : MANGDECHHU HE PROJECT, BHUTAN
NAME OF
EQUIPMENT : ELECTRICAL WORKSHOP EQUIPMENT

CLIENT: MANGDECHHU HYDROELECTRIC PROJECT AUTHORITY.
VENDOR NAME & ADDRESS:
NIT/P.O. REFERENCE :

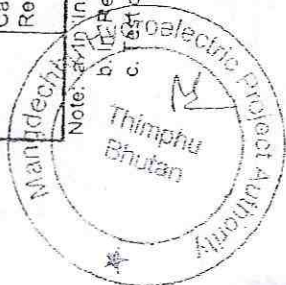
Page: 19.3

SL. NO.	ITEM /COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS / ACCEPTANCE NORMS	RECORD FORMAT	INSP. AGENCY		REMARKS
						Perform	Witness	
1	Device, Digital Multimeter (A.C. & D.C.), Analog Multimeter (A.C. & D.C.), High Frequency Generator, Decade Resistor, Connection Leads, Constant Current Supply Unit, Volt Meter, Ammeter, Single Phase Toroidal Transformer, Universal Digital Voltmeter, Universal Instrument, Phase Sequence Indicator, P.F. Measuring Instrument, Digital Frequency Meter, Temp. Measuring Instrument, Sound Level Meter, Digital Mechanical Revolution Counter, Tan Delta Measuring Instrument, Transformer Turn Ratio Meter, Stop-Watch, Hook-on Volt-Ammeter, Vibration Meter, Ohm & Capacitance Meters, Earth Resistance Measuring							

Note: a) In Inspection Agency column figure 1,2, or 3 to be filled. 1- will indicate 'MHPA', 2- will indicate 'supplier' & 3- will indicate 'sub-supplier'.
b) In Remarks' column following abbreviations shall be used - RR-Review of Records, T.C. - Test Certificate Submission & CHP - Customer Hold Point.
c) Test certificates shall be submitted at the time of final inspection.



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Signature
MHPA (Client)

Signature
NHPC (Consultant)



Signature & Seal
Vendor

QUALITY ASSURANCE PLAN (MODEL)

PROJECT : MANGDECHHU HE PROJECT, BHUTAN
NAME OF
EQUIPMENT : ELECTRICAL WORKSHOP EQUIPMENT

CLIENT: MANGDECHHU HYDROELECTRIC PROJECT AUTHORITY.
VENDOR NAME & ADDRESS:
NIT/P.O. REFERENCE :

Page: 10-4

SL. NO.	ITEM/COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS	ACCEPTANCE / NORMS	RECORD FORMAT	INSP. AGENCY		REMARKS
							Perform	Witness	
a) b)	Devices, Stroboscope, CRO, Voltage Source with Varying Frequency Output, Micro-Ohm Meter, Routine Test Checking of Make & Model	Electrical Visual	100% -do-	Tech. Spec./Appd.drg./IEC:Code -do-		TC TC	3-2 3-2	- -	TC TC
a) b)	Testing Devices Primary Current Injection Kit, Relay Testing Unit, H.V. Testing Kit (AC & DC), H.V. Insulation Oil Testing, Device, DC Rectifier, Silcagel & Motor Drying Oven								
a) b)	Routine Test Checking of Rating, Make & Model	Electrical Visual	100% -do-		-do- -do-	TC TC	3-2 3-2	- -	TC TC
5	Instrument Testing & Calibrating Devices Pressure Transmitter, Differential Transmitter, Ammeter, Voltmeter, Ohm Meter (Bridge principle), Temperature Meter,								

Note: a) in 'Inspection Agency' column figure 1,2,or 3 to be filled. 1- will indicate 'MHPA', 2- will indicate 'supplier' & 3- will indicate 'sub-supplier'.
b) in 'Remarks' column following abbreviations shall be used - RR-Review of Records, T.C. - Test Certificate Submission & CHP - Customer Hold Point.
c) Test certificates shall be submitted at the time of final inspection.

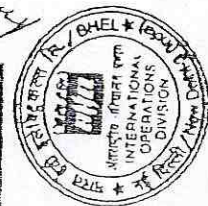
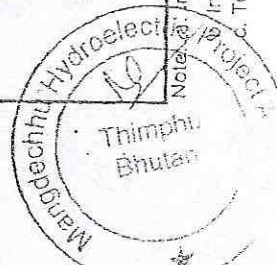
Signature
MHPA (Client)

Signature
NHPC (Consultant)

Signature & Seal
Vendor



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QUALITY ASSURANCE PLAN (MODEL)

PROJECT : MANGDECHHU HE PROJECT, BHUTAN
NAME OF
EQUIPMENT : ELECTRICAL WORKSHOP EQUIPMENT

CLIENT: MANGDECHHU HYDROELECTRIC PROJECT AUTHORITY.
VENDOR NAME & ADDRESS:
NIT/P.O. REFERENCE :

Page: 19-5

SL. NO.	ITEM / COMPONENTS & CHARACTERISTICS	NATURE OF CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD FORMAT	INSP. AGENCY			REMARKS
							Perform	Witness	Verify	
a) b)	Hygrometer, Drilling-machine Rheostats. Routine Test Checking of Rating, Make & Model	Electrical Visual	100% -do-	Tech. Spec./Appd.drg./IEC:Code -do-		TC TC	3-2	-	1	TC
							3-2	-	1	TC
6 a) b)	Silica Gel Drying Oven Routine Test Checking of Rating, Make & Model.	Electrical Visual	-do- -do-	-do- -do-		TC TC	3-2	-	1	TC
							3-2	-	1	TC
7 a)	Workbenches, Lockers & Instrument Check of BOM	Visual	100%	-do-		TC	3-2	-	1	TC

Note: a. In Inspection Agency column figure 1, 2, or 3 to be filled. 1- will indicate 'MHPA', 2- will indicate 'supplier' & 3- will indicate 'sub-supplier'.
b. In 'Remarks' column following abbreviations shall be used - RR-Review of Records, T.C. - Test Certificate Submission & CHP - Customer Hold Point.
c. Test certificates shall be submitted at the time of final inspection.

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Signature & Seal
Vendor



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