

**SECTION: 4**  
**GENERAL TECHNICAL CONDITIONS (GTC)**

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**GENERAL TECHNICAL CONDITIONS**

**1.0 GENERAL TECHNICAL CONDITONS**

- 1.1 The following provisions shall supplement all the detailed technical specifications and requirements brought out in the accompanying Technical Specifications. The Contractor's proposal shall be based on the use of equipment and materials complying fully with the requirements, specified herein.

The Contractor shall furnish clause-by-clause commentary (with detailed technical data as required) on the Technical Specifications demonstrating the goods substantial responsiveness to the specifications or deviation and exceptions to the provisions of the Technical Specification unless and until advised contrary to this in the contract document.

**1.2 Engineering Data**

- 1.2.1 The furnishing of engineering data by the Contractor shall be in accordance with the appropriate Schedule appended to this document. The review of these data by the Owner/Employer will cover only general conformance of the data to the specifications and drawings. This review by the Owner may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated or the accuracy of the information submitted. This review and / or approval by the Owner shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirement, specified under these Specifications and documents.

- 1.2.2 All engineering data submitted by the Contractor after final process including review and approval by the Owner shall form part of the Contract Document and the entire works performed under these Specifications shall be performed in strict conformity, unless otherwise expressly requested by the owner in writing.

**1.3 Approval of Vendors**

Contractor shall procure any supply materials for this work from any Vendors approved by Power & Electricity Department, Govt. of Mizoram, if the specifications of supply materials match with approved TS.

**1.4 Design Co-ordination**

**1.5 Manufacturing Schedule**

The Contractor shall submit to the Owner his various items within twenty (20) days from the date of the Letter of Award in accordance with the delivery requirements stipulated in related to this work. Schedules shall also include the materials and items purchased from outside Contractors, if any.

## 1.6 Reference Standards

**The following IS STANDARDS will be followed for execution and testing of R&M works to the extent applicable and feasible.**

- 1.6.1 IEC - 60041 (1991): “Field Acceptance Tests to Determine the Hydraulic Performance of Turbines, Storage Pumps and Pump Turbines”.
- 1.6.2 IS/IEC - 41 (1994): “Field Acceptance Tests to Determine the Hydraulic Performance of Turbines, Storage Pumps and Pump Turbines”.
- 1.6.3 IEC - 61116 (1992): “Electromechanical Equipment Guide for Small Hydroelectric Installations”.
- 1.6.4 IEC - 60545 (1976): “Guide for Commissioning, Operation and Maintenance of Hydraulic Turbines”.
- 1.6.5 IS - 12800 (1991): “Guidelines for Selection of Hydraulic Turbine, Preliminary Dimensioning and Layout of Surface Hydroelectric Power Houses - Part 3: Small, Mini and Micro Hydroelectric Power Houses”.
- 1.6.6 IEC - 60308 (1970): “International Code for Testing of Speed of Governing Systems for Hydraulic Turbines”.
- 1.6.7 IEEE- 421(1972), “Criteria and Definitions for Excitation Systems for Synchronous Machines”.
- 1.6.8 IEEE - 421A (1978): “IEEE Guide for Identification, Testing and Evaluation of the Dynamic Performance of Excitation System”.
- 1.6.9. IEC- 60308(1970), “International Code for Testing of Speed Governing Systems for Hydraulic Turbines”.
- 1.6.10. ASME PTC- 29(2005), “Performance Test Code for Speed-Governing Systems for Hydraulic Turbine-Generator Units”.
- 1.6.11. IEC- 34-1 (1983), “Rotating Electrical Machines: Part-1: Rating and Performance”.
- 1.6.12. IS 4722 (2001): Specification for Rotating Electrical Machines.
- 1.6.13. IS - 3231 (1965): “Specification of Electrical Relays for Power System Protection”.
- 1.6.14. IS- 8686(1977): “Specification of Static Protective Relays”.
- 1.6.15. BS-142 (1966): “Specification of Electrical Protective Relays”.
- 1.6.16. IS - 11726 (1985) / ISO 2954 (1975): “Requirements for Instruments for Measuring Vibration Severity of Rotating and Reciprocating Machines”.
- 1.6.17. ISO-10816-1 (1995), “Mechanical Vibration – Evaluation of Machine Vibration by Measurements on Non-Rotating Part-1: General Guidelines”
- 1.6.18. IS - 11727 (1985, Reaffirmed 1966): “Measurement and Evaluation of Vibration Severity in Situ of Large Rotating Machines with Speed Range from 10 to 200 rev/s”.
- 1.6.19. ISO-2954 (1975): “Mechanical Vibration of Rotating and Reciprocating Machinery - Requirements for Instruments for Measuring Vibration Severity”.
- 1.6.20. IEC- 60034-9 (1997), “Rotating Electrical Machines – Part 9: Noise Limits”.
- 1.6.21. IS - 2705 (1992, Reaffirmed 1997): “Specifications of Current Transformers: Part 1: General Requirements, Part 2: Measuring Current Transformers, Part 3: Protective Current Transformers, and Part 4: Protective Current Transformers for Special Purpose Applications”.
- 1.6.22. IEC- 60185(1987), “Current Transformers”.
- 1.6.23. IS - 3156 (1992): “Specification of Voltage Transformers”.
- 1.6.24. IEC- 186 (1987): “Voltage Transformers”.

- 1.6.25. IEC - 62271 (2008): High-Voltage Switchgear and Controlgear - Part 100: Alternating Current Circuit-Breakers.
- 1.6.26. IEC - 61362 (1998): "Guide to Specification of Hydraulic Turbine Control Systems".
- 1.6.27. IS - 2026 (1997): "Power Transformers: Part 1 – General".
- 1.6.28. IEC- 60255-6 (1988): "Electrical Relays - Part 6: Measuring Relays and Protection Equipment".
- 1.6.29. The codes and/or Standard referred to in Specifications shall govern, in all cases wherever such references are made. In case of a conflict between such codes and/or Standards and the specifications, latter shall govern. Such codes and/or Standards, referred to shall mean the latest revisions, amendments/changes adopted and published by the relevant agencies. Any anomalies, ambiguities of this specification if arises, REC's standard specifications will govern without any escalation in item price.
- 1.6.30. Other internationally acceptable Standards which ensure equivalent or better performance than those specified shall also be accepted.

## **1.7 Quality Assurance**

- 1.7.1 To ensure that the equipment under the scope of this Contract whether manufactured within the Contractor's Works or at his Sub-Contractor's premises is in accordance with the specifications, the Contractor shall adopt suitable Quality Assurance Programme to control such activities at all points necessary.

Such programme shall be outlined by the Contractor and shall be finally approved by the Owner.

Quality Assurance Programme of the Contractor shall generally cover but not limited to the following:

- a) His organization structure for the management and implementation of the proposed Quality Assurance Programme.
- b) Documentation control system.
- c) Qualification data for key personnel.
- d) The procedure for purchases of materials. Parts/components and selection of sub-Contractor's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases etc.
- e) System for shop manufacturing including process controls.
- f) Control of non-conforming items and system for corrective action.
- g) Control of calibration and testing of measuring and testing equipments.
- h) Inspection and test procedure for manufacturing.
- i) System for indication and appraisal of inspection status.
- j) System for Quality audits.
- k) System for authorizing release of manufactured product to the Purchasers.
- l) System for maintenance of records.
- m) System for handling storage and delivery and

- n) A Quality Plan detailing out the specific quality control procedure adopted for controlling the quality characteristic of the product.

The Quality Plan shall be mutually discussed and approved by the Owner after incorporating necessary corrections by the Contractor as may be required.

### **1.7.2 Quality Assurance Documents**

The Contractor shall be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of Owner's inspection of equipment/material.

- 1.7.3 The owner or his duly authorized representatives reserves the right to carry out Quality Audit and Quality surveillance of the systems and procedures of the Contractor's/his vendor's Quality Management and Control Activities.

### **1.8 Owner's Supervision**

- 1.8.1 To eliminate delays and avoid disputes and litigation it is agreed between the parties to the Contract that all matters and questions shall be resolved in accordance with the provisions of this documents.

- 1.8.2 The manufacturing of the product shall be carried out in accordance with the specifications. The scope of the duties of the Owner, pursuant to the contract, will include but not be limited to the following:

- a) Interpretation of all the terms and conditions of these Documents and Specifications.
- b) Review and interpretation of all the Contractor's drawings, engineering data etc.
- c) Witness or authorize his representative to witness tests at the manufacturer's works or at site, or at any place where work is performed under the Contract.
- d) Inspect, accept or reject any equipment, material and work under the Contract, in accordance with the Specifications.
- e) Issue certificate of acceptance and / or progressive payment and final payment certificate.
- f) Review and suggest modification and improvement in completion schedules from time to time; and
- g) Supervise the Quality Assurance Programme implementation at all stages of the Works.

### **1.9 Inspection, Testing & Inspection Certificate**

- 1.9.1 The Owner, his duly authorized representative and/or outside inspection agency acting on behalf of the Owner shall have at the reasonable times access to the Contractor's premises or Works and shall have the power at all reasonable times to inspect and examine the materials and workmanship of the product during its manufacture and if part of the product

is being manufactured or assembled at other premises or works, the Contractor shall obtain from the Owner and/or his duly authorized representative permission to inspect as if the equipment/materials were manufactured or assembled on the Contractor's own premises or works.

- 1.9.2 The Contractor shall give the Owner/Inspector fifteen (15) days written notice of any material being ready for testing. Such tests shall be to the Contractor's account except for the expenses of the Inspector. The Owner/Inspector, unless witnessing of the tests is virtually waived, will attend

such tests within fifteen (15) days of the date of which the equipment is notified as being ready for test/inspection or on a mutually agreed date, failing which the Contractor may proceed with the test which shall be deemed to have been made in the Inspector's presence and he shall forthwith forward to the Inspector duly certified copies of tests in triplicate.

- 1.9.3 The Owner/Inspector shall, within fifteen (15) days from the date of inspection as defined herein give notice in writing to the Contractor, of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the Contract. The Contractor shall give due consideration to such objections and shall make the modifications that may be necessary to meet the said objections.
- 1.9.4 When the factory tests have been completed at the Contractor's or Sub-Contractor's works, the Purchaser Inspector shall issue a certificate to this effect within fifteen (15) days after completion of tests but if the tests are not witnessed by the Owner/Inspector, the certificate shall be issued within fifteen (15) days of receipt of the Contractor's Test certificate by the Owner/Inspector. The completion of these tests or the issue of the certificate shall not bind the Owner to accept the equipment should it, on further tests after erection, be found not to comply with the Contract.
- 1.9.5 In all cases where the Contract provides for tests whether at the premises or works of, the Contractor, the Contractor except where otherwise specified shall provide free of charge such item as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Owner/inspector or his authorized representative to carry out effectively such tests of the equipment in accordance with the Contract and shall give facilities to the Owner/Inspector or to his authorized representative to accomplish testing.
- 1.9.6 The inspection by Owner and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed Quality Assurance Programme forming a part of the Contract.

## **2.0 TECHNICAL DESCRIPTION**

- 2.1 The technical description of various materials/equipment has been specified in the respective volumes of technical specifications. Further technical descriptions if necessary after actual site visits, may be included in consultation with the engineers – in - charge in writing.

## **3.0 TEST AND STANDARD**

- 3.1.1 All equipment offered/supplied should have been type tested as per the relevant standards and certificates of the same shall be submitted to the owner/ employer. In case any equipment is not type tested, the bidder shall carry out the type testing at his own cost and provide the necessary certificates to the owner for approval.
- 3.1.2 Acceptance Tests shall mean those tests, which are to be carried out on samples taken from each lot offered for pre-dispatch inspection, for the purposes of acceptance of that lot.
- 3.1.3 Routine Tests shall mean those tests, which are to be carried out on the material to check requirements, which are likely to vary during production.
- 3.1.4 Test During Manufacturing shall mean those tests, which are to be carried out during the process of manufacture and end inspection by the Contractor to ensure the desired quality of the end product to be supplied by him
- 3.1.5 The norms and procedure of sampling for these tests will be as per the Quality Assurance Programme to be mutually agreed to by the Contractor and the Owner or as per relevant I.S.S.
- 3.1.6 The standards and norms to which these tests will be carried out are listed against them. Where a particular test is a specific requirement of this Specification, the norms and procedure of the test shall be as specified separately or as mutually agreed to between the Contractor and the Owner in the Quality Assurance Programme.

- 3.1.7 For all type and acceptance tests, the acceptance values shall be the values specified in the Specification or guaranteed by the Bidder, as applicable. The test and standards for various materials/equipment has been specified in the respective volume of technical specification.

**3.2 Testing Expenses**

No testing expenses will be borne by the Owner.

**3.3 Additional/ Alternative Tests**

- 3.3.1 The Owner reserves the right if required necessary arrangements have to be done by contractor out of his own expenses. Any other test(s) of reasonable nature carried out at contractor's premises, at site, or in any other place in addition to the specified type, acceptance and routine tests to satisfy himself that the materials/equipment comply with the Specifications.

- 3.3.2 The Owner also reserves the right to conduct all the tests mentioned in this specification at his own expense on the samples drawn from the site at Contractor's premises or at any other test center. In case of evidence of non compliance, it shall be binding on the part of contractor to prove the compliance of the items to the technical specifications by repeat tests, or correction of deficiencies, or replacement of defective item all without any extra cost to the Owner.

**3.4 Sample Batch for Testing**

- 3.4.1 The contractor is required to carry out at the Acceptance tests as specified/as per I.S.S norms successfully in presence of Owner's representative.

**4.0 CLIMATIC CONDITIONS**

- 4.1 All Equipment / Material to be supplied against this specification shall suitable for satisfactory continuous operation under tropical conditions of Mizoram.