

ANNEXURE D

**REVISED APPROVED QUALITY ASSURANCE
PLAN OF MAJOR EQUIPMENTS USED IN
DISTRIBUTION SYSTEM**

QUALITY ASSURANCE PLAN

The Utility shall be solely responsible & accountable for assuring quality in the project works. Utility shall formulate a detailed comprehensive Quality Assurance (QA) plan for the works to be carried out with an objective to create quality infrastructure works. The QA Plan shall be an integral part of the contract agreement with the contractor/ equipment supplier and erection agency as the case may be, in case of turnkey/ partial turnkey or departmental execution of works. Utility has to ensure that the quality of materials/ equipment supplied at site and execution of works carried out at field is in accordance to Quality Assurance Plan/ Guaranteed Technical Particulars (GTP) and Technical specifications/ Approved Drawings/ Data Sheets etc.

The Utility, through Contractor/ Project Monitoring Agency (PMA)/ Third Party appointed by Utility, shall strictly ensure Quality Assurance checks during the day to day course of project execution, and ensure the quality of material and equipment as per Quality Plan/ Approved Drawings/ Technical Specifications/ Data sheet/ GTP/ applicable national & international standards etc.

The Utility should ensure that Quality Assurance Plan should be prepared keeping in view the following:

- All equipment/ materials shall comply with the relevant Indian Standard/ International Standards, if Indian Standards are not available.
- All Type Tests, Routine tests & Acceptance tests shall be as per relevant IS.
- Pre-Dispatch Inspection at factory site shall be limited to Power Transformers only. The Power transformers, of all capacities of primary voltage level of 33kV and above, shall be subjected to Pre-Dispatch Inspection at factory site.
- Random sampling of material/ equipment from field site/ stores shall be taken up for testing at NABL accredited labs (3rd Party or Utility owned). The minimum sample size for the material/ equipment shall be as specified in Annexure – II of these guidelines.
- The Utility / Contractor (*to be specified in tender document*) shall be responsible for safe handling, packing and transportation of the sealed sample material up to the identified testing laboratory and back to field site/ store. However, in the event the Utility requests to test the material/ equipment after it has been commissioned at site, all applicable costs shall be borne by the Utility.
- The choice of lot and random sampling shall be done by the Utility in the presence of the manufacturer/ supplier, the Contractor and any third party, if applicable.

- Utility shall endeavor to pick the random samples from a lot within ten (10) days of receipt of such lot at the field site/ stores and send it for testing, failing which such lot shall be treated as accepted by the Utility. Further, it should be ensured that testing reports are made available within 2 weeks of submission of samples. However, during the period of random sampling and testing, the installation and commissioning of material/ equipment at the field site may continue.
- In case, the NABL lab test report for random sample from field site/ stores are found significantly mismatched with Routine Test report submitted by manufacturer/ supplier, the entire lot of materials/ equipment supplied by the defaulting manufacturer/ supplier shall be rejected whether supplied materials/ equipment is lying in site stores, in transit or under erection, testing & commissioning or has already been commissioned. All costs related to removal of such rejected materials/ equipment and replacement with new materials/ equipment shall be borne by Contractor/ Manufacturer/ Supplier without any cost implication to the Utility.
- Applicable norms for failure rate of equipment/ material supplied by vendors should be prescribed in the tender documents in case of turnkey/ partial turnkey/ departmental execution of works. Non adherence to such norms should cause black listing of such vendors.
- Further, a system of reporting should be put in place by the Utility to monitor failure rates of key equipment. Suppliers/ vendors/ contractors whose equipment have failed (repeatedly in last 2-3 years with a failure rate of more than 10%) and their promoters shall be blacklisted for a period of 5 years from participating in future tenders for similar works
- All coordination activities including reporting etc. should be through an IT based solution rather than deploying manpower for this purpose.
- The cost of quality monitoring may be optimized including the manpower cost for coordination activities.

TYPE TEST & ROUTINE TESTS:

All the Type Tests & Routine Tests shall be carried out as per Indian Standards. The validity of Type Tests of major equipment/ materials shall be as per Annexure-I.

SITE ACCEPTANCE TEST:

Random sampling of following material/ equipment shall be picked from field site/stores for testing at third party NABL accredited laboratory. Minimum sample size shall be as specified in Annexure-II:

1. Distribution Transformer
2. Ring Main Unit
3. CT/PT Unit (Outdoor) & Metering Cubicle (Indoor)
4. Circuit Breaker
5. Insulators
6. Cables
7. Control & Relay Panel
8. Overhead Conductor
9. Energy Meter
10. Poles
11. Capacitor
12. Distribution Box

The Utility may add any other important material in the above list. The site acceptance tests shall be as per approved Drawings/ Technical Specifications/ Data sheet/ GTP/QA Plan and applicable national & international standard.

In case of power transformer, after installation and commissioning at site, the power transformers shall be further tested to demonstrate satisfactory operation at full load/ as per field requirements, for minimum duration of 5 days without any breakdown or fault. If the power transformer fails within such duration, the same shall be replaced by the manufacturer/ bidder/ supplier without any additional cost to the Utility.

PRE-COMMISSIONING TESTS

On completion of erection of the equipment and before charging, each item of the equipment shall be thoroughly cleaned and then inspected jointly by the Utility and the contractor for correctness and completeness of installation and acceptability for charging, leading to initial pre- commissioning tests at Site. The list of pre-commissioning tests to be performed should be included in the Contractor's quality assurance programme.

COMMISSIONING TESTS

The contractor will use all required instrumentation and control equipment during commissioning tests and such measuring equipment and devices should be duly calibrated as far as practicable. The tests will be conducted at the specified load points and as near the specified cycle condition as practicable. The contractor will apply proper corrections in calculation, to take into account conditions, which do not correspond to the specified conditions. Any special equipment, tools and tackles required for the successful completion of the Commissioning tests shall also be provided by the contractor.

The specific tests to be conducted on equipment should be included in the technical specifications. However, where the pre-commissioning tests have not been specified specifically, they shall be as per relevant IS code of practice or as mutually agreed. The Contractor shall also be responsible for ensuring compliance to all statutory requirements for commissioning and successful operation of the system.

FIELD QUALITY PLAN

The Utility should prepare a separate Field Quality Plan (FQP) for civil, electrical, mechanical etc. works supported with drawings which shall be approved by their competent authority and may be uploaded at web portal. The contractor should adhere to FQP while carrying out physical works. The Utility should also prepare a comprehensive FQP for testing & commissioning of Grid Substations, Distribution transformer Substation, 33 KV, 11 KV line, LT line etc. The system should be energized only after performing all tests as described in the FQP and after clearance from Electrical Inspector. Proper records in this regard, including tests on earth resistance, insulation resistance of 11 kV line & Distribution Transformer etc. shall be maintained, jointly signed by Utility and contractor. All the quality assurance checks conducted in the field should be documented properly and signed by the quality engineer of the contractor & Utility and shall be kept for future reference. These documents shall be maintained by the Utility in proper order and shall be made available at site for verification during inspection.

QUALITY ASSURANCE PROGRAMME OF THE BIDDER/ CONTRACTOR

To ensure that the equipment and services under the scope of the tender, whether manufactured or performed within the Contractor's Works or at his Sub-contractor's

premises or at the Utility site or at any other place of work, are in accordance with the specifications/ tender conditions, the Contractor shall adopt a suitable 'Quality Assurance Programme'. Such programme shall be broadly outlined by the contractor and finalized after discussions with the Utility before the award of the contract. The detailed programme shall be submitted by the contractor after the award of contract and acceptance by the Utility.

A Quality Assurance Programme of the contractor shall generally cover the following:

- Organization structure of the Contractor for management and implementation of the proposed quality assurance program
- Documentation control system
- Qualification data for bidder's key personnel
- The procedure for purchases of materials, parts components and selection of sub- Contractor's services including vendor analysis.
- System for shop manufacturing and site erection controls including process controls and fabrication and assembly control
- Control of non-conforming items and system for corrective actions
- Test procedure for field activities
- Control of calibration and testing of measuring instruments and field activities
- System for indication and appraisal of field inspection status
- System for quality audits
- System for authorizing release of manufactured product
- System for maintenance of records
- System for handling storage and delivery
- A manufacturing quality plan detailing out the specific quality control measures and procedures adopted for controlling the quality characteristics relevant to each item of equipment furnished and/ or services rendered.
- A Field quality Plan covering field activities

The Utility or his duly authorized representative like PMA reserves the right to carry out quality audit and quality surveillance of the system and procedure of the Contractor/ his vendor's quality management and control activities.

The Contractor would be required to submit all the Quality Assurance documents as stipulated in the Quality Plan. The contractor shall supply the materials/ equipment of type & design which has already been Type Tested. Contractor/ Manufacturer shall provide copy of such tests at the time of bidding and also at site in support of type-tested materials supplied under the contract.

The Utility should share their Quality Assurance Plan/ Field Quality Plan (FQP) with the Contractor. The schedule for submission/ approval of document as per QAP/ FQP shall be finalized before placement of the contract, keeping in view the overall project schedule. The Contractor shall be responsible for any time delay, misinterpretation, error and conflict during design, manufacturing, testing and erection of the Works resulting from non-compliance with the requirements of the approved Specification.

Annexure-I**Proposed Validity of Type Test Certificate–Distribution**

| S. No. | Name of Equipment | Validity Period (in years) |
|--------|--|-------------------------------|
| i. | Power Transformer | 5 |
| ii. | Distribution Transformers (Single Phase and Three phase) | 5 |
| iii. | Circuit Breaker | 5 |
| iv. | Air Break Switches | 5 |
| v. | Isolators | 5 |
| vi. | Lightning Arrester | 5 |
| vii. | Instrument Transformers (CT/ PT/ CVT) | 5 |
| viii. | Control and Relay Panel (LV and MV) | 5 |
| ix. | XLPE Cable and Aerial Bunched Cables. | 5 |
| x. | 11 kV Capacitor/ Capacitor Bank | 5 |
| xi. | Energy Meters <ul style="list-style-type: none">• Electronic Meter• Smart Meter | 5 3 |
| xii. | Batteries and Charger. | 5 |
| xiii. | Conductors (ACSR/AAAC) | 5 |
| xiv. | Insulators | 5 |

Annexure – II

Sample size for random sampling of material/ equipment to be picked from field site/ stores for testing at third party NABL accredited laboratory:

1. Distribution Transformer: 5% of each Lot
2. Ring Main Unit: 5% of each Lot
3. CT/PT Unit(Outdoor) & Metering Cubicle (Indoor): 5% of each Lot
4. Circuit Breaker: 5% of each Lot
5. Insulators: 1% of each Lot
6. Cables/ABC: 1 sample (as per applicable standard) from each Lot (Lot limited to 25 Drums)
7. Control & Relay Panel: 5% of each Lot
8. Overhead Conductor: 1 sample (as per applicable standard) from each Lot (Lot limited to 25 Drums)
9. Energy Meter: 1% or 32 meters per Lot whichever is lower
10. Poles: 1% of each Lot
11. Capacitor: 5% of each Lot
12. Distribution Box: 1% or 32 nos. per Lot whichever is lower