

SECTION-II

GENERAL TECHNICAL CONDITIONS

TECHNICAL SPECIFICATIONS

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TECHNICAL SPECIFICATIONS

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TECHNICAL SPECIFICATIONS

SECTION-II

GENERAL TECHNICAL CONDITIONS

1.1 General Technical Conditions

1.1 General

The following provisions shall supplement all the detailed technical specifications and requirements brought out herein. The contractor's submission shall be based on the use of materials complying fully with the requirements specified herein.

1.2 Drawings

1.2.1 All relevant standard drawings for all the towers/ stubs and their extensions shall be furnished to the Contractor by the Employer which shall include structural drawings/erection drawings and/ or shop fabrication drawings, Bill of Materials for all the towers and their extensions as well as construction drawings for foundations.

1.2.2 The tower members can be directly fabricated from the structural/erection drawings wherever the required fabrication details are provided on the same or shop fabrication drawings. However, if the contractor is required to prepare shop fabrication drawings, of their own, in addition to the structural/ erection drawings with required fabrication details, they may prepare the same without any additional financial implication to Employer.

1.2.3 Apart from the standard drawings mentioned above, some other drawings and documents, such as BOM, Shop drawings, structural drawings for towers/extensions may need to be developed based on single line diagram given by the Employer, which are required for the project. These drawings, BOM, shop sketches shall be developed by the Contractor. However, no extra cost on this account shall be payable to the Contractor.

1.2.4 After development, these drawing shall be submitted to the Employer in triplicate for approval. In ordinary circumstances, the contractor should submit these drawings for approval within 15 days of receipt of the single line drawing from the employer.

1.2.5 Such drawings/ documents developed by the Contractor shall necessarily have sufficient detail to indicate the type, size, arrangement, dimensions, material description, Bill of Materials, weight of each component break-up for packing and shipment, fixing arrangement required, the dimensions

required for installation and any other information specifically requested in the specifications.

- 1.2.6 Each drawing developed by the Contractor shall be clearly marked with the name of the Employer, the specification title, the specification number and the name of the Project. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be to the scale and in S.I. units.
- 1.2.7 The drawings submitted by the Contractor shall be reviewed by the Employer as far as practicable within 15 days and shall be modified by the Contractor if any modifications and/or corrections are required by the Employer. The Contractor shall incorporate such modifications and/or corrections and submit the final drawings for approval. Any delays arising out of failure by the Contractor to rectify the drawings in good time shall not alter the contract completion date.
- 1.2.8 The drawings submitted for approval to the Employer shall be in triplicate. One print of such drawings shall be returned to the Contractor by the Employer marked “approved/ approved with corrections”. The contractor shall there upon furnish the Employer additional prints as may be required along with soft copy (in PDF/AutoCAD format) of the drawings after incorporating all corrections.
- 1.2.9 The work shall be performed by the Contractor strictly in accordance with the standard/approved drawings and no deviation shall be permitted without the written approval of the Employer, if so required.
- 1.2.10 All manufacturing, fabrication work under the scope of Contractor, prior to the approval of the drawings shall be at the Contractor’s risk. The contractor may incorporate any changes in the design, which are necessary to conform to the provisions and intent of the contract and such changes will again be subject to approval by the Employer.
- 1.2.11 The approval of the documents and drawings by the Employer shall mean that the Employer is satisfied that:

- (a) The Contractor has completed the part of the Works covered by the subject document (i.e. confirmation of progress of work).
- (b) The Works appear to comply with requirements of Specifications.

In no case the approval by the Employer of any document does imply compliance with all technical requirements or the absence of errors in such documents.

If errors are discovered any time during the validity of the contract, then the Contractor shall be responsible for consequences.

- 1.2.12 All drawings shall be prepared using AutoCAD software version 2000 or later only. Drawings, which are not compatible to AutoCAD software version 2000 or later, shall not be accepted. After final approval all the drawings (structural drawings, BOMs and shop sketches shall be submitted to the Employer in CDs.
- A copy of each drawing reviewed will be returned to the Contractor as stipulated herein.
- 1.2.13 Copies of drawings returned to the Contractor will be in the form of a print with the Employer's marking, or a print made from a microfilm of the marked-up drawing.
- 1.2.14 The following is the general list of the documents and drawings that are to be approved by the Employer.
- a) Work Schedule (Master Network) Plan.
 - b) Detailed survey report and profile drawings showing ground clearance and tower locations (as applicable).
 - c) Tower schedule and foundation classification for individual tower locations.
 - d) All drawings/ documents which are developed by the contractor based upon the single line drawing given by the Employer.
 - e) Soil Investigation report.
 - g) Tower footing earthing drawing.
 - i) Stringing procedure.
 - j) Tower accessories drawings like danger plate, name plate etc.
 - k) Quality plans for fabrication and site activities including Quality System.
 - l) Sub-vendors approval.
 - m) Line material drawings.
 - n) Type test report for line materials.
- 1.2.15 All rights of the design/ drawing for all types of towers shall be strictly reserved with the Employer only and any designs/ drawings/ data sheets submitted by the contractor from time to time shall become the property of the Employer. Under no circumstances, the Contractor shall be allowed to user/ offer above designs/ drawings/ data sheets to any other authority

without prior written permission of the Employer. Any deviation to above is not acceptable and may be a cause for rejection of the bid.

1.3 Design Improvements

The Employer or the Contractor may propose changes in the specification and if the parties agree upon any such changes and the cost implication, the specification shall be modified accordingly.

1.4 Design Co-ordination

Wherever, the design is in the scope of Contractor, the Contractor shall be responsible for the selection and design of appropriate material/item to provide the best coordinated performance of the entire system. The basic design requirements are detailed out in this Specification. The design of various components, sub-assemblies and assemblies shall be so done that it facilitates easy field assembly and maintenance.

1.5 Design Review Meeting

The contractor may be called upon to attend design review meetings with the Employer, and the consultants of the Employer during the period of Contract. The contractor shall attend such meetings at his own cost at the Corporate Office of the Employer or at mutually agreed venue as and when required.

1.6 Engineering Data

1.6.1 The furnishing of engineering data by the Contractor shall be in accordance with the Schedule as specified in the Bidding Document. The review of these data by the Employer will cover only general conformance of the data to the specifications and not a thorough review of all dimensions, quantities and details of the materials, or items indicated or the accuracy of the information submitted. This review by the Employer shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications.

1.6.2 All engineering data submitted by the Contractor after review by the Employer shall form part of the contract document.

1.7 Quality Assurance programme

1.7.1 To ensure that the equipment and services under the scope of this Contract, whether manufactured or performed within the Contractor's Works or at his Sub-Contractor's premises or at the Employer's site or at any other place of Work as applicable, are in accordance with the specifications, the Contractor shall ensure suitable quality assurance

programme to control such activities at all points necessary. A quality assurance programme of the Contractor shall be in line with ISO requirements & shall generally cover the following:

- a) The organisation structure for the management and implementation of the proposed quality assurance programme.
- b) System for Document and Data Control.
- c) Qualification and Experience data of Bidder's 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 and site erection controls including process controls, fabrication and assembly control.
- f) System for Control of non-conforming products including deviation dispositioning, if any and system for corrective and preventive actions based on the feedback received from the Customers and also internally documented system for Customer complaints.
- g) Inspection and test procedure both for manufacture and field activities.
- h) System for Control of calibration of testing and measuring equipment and the indication of calibration status on the instruments.
- i) System for indication and appraisal of inspection status.
- j) System of Internal Quality Audits, Management review and initiation of corrective and Preventive actions based on the above.
- k) System for authorising release of manufactured product to the Employer.
- l) System for maintenance of records.
- m) System for handling, storage and delivery.
- n) A quality plan detailing out the specific quality control measures and procedure adopted for controlling the quality characteristics

relevant to each item of equipment furnished and /or service rendered.

- o) System for various field activities i.e. unloading, receipt at site, proper storage, erection, testing and commissioning of various equipment and maintenance of records. In this regard, the Employer has already prepared Standard Field Quality Plan for transmission line/ substation equipments as applicable, Civil/ erection Works which is required to be followed for associated works.

The Employer or his duly authorised representative 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.

1.7.1.1 Quality Assurance Documents

The Contractor shall ensure availability of the following Quality Assurance Documents:

- a) All Non-Destructive Examination procedures, stress relief and weld repair procedure actually used during fabrication, and reports including radiography interpretation reports.
- b) Welder and welding operator qualification certificates.
- c) Welder's identification list, welding operator's qualification procedure and welding identification symbols.
- d) Raw Material test reports on components as specified by the specification and in the quality plan.
- e) The Manufacturing Quality Plan (MQP) indicating Customer Inspection Points (CIPs) at various stages of manufacturing and methods used to verify that the inspection and testing points in the quality plan were performed satisfactorily.
- f) Factory test results for testing required as per applicable quality plan/technical specifications/GTP/Drawings etc.
- g) Stress relief time temperature charts/oil impregnation time temperature charts, wherever applicable.

1.7.2 Employer's Supervision

- 1.7.2.1 To eliminate delays and avoid disputes and litigation to the Contract, all matters and questions shall be resolved in accordance with the provisions of this document.

- 1.7.2.2 The manufacturing of the product shall be carried out in accordance with the specifications. The scope of the duties of the Employer, 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.

1.8 Inspection, Testing & Inspection Certificate

- 1.8.1.1 Contractor shall procure bought out items from sub-vendors as per the list in "Compendium of Vendors" available on POWERGRID website www.powergrid.in after ensuring compliance to the requirements/conditions mentioned therein. Contractor shall explore first the possibilities of procuring the bought-out items from POWERGRID approved existing vendors. In case of their unavailability/ non-response, Contractor may approach POWERGRID for additional sub-vendor approval. In that case, the assessment report of proposed sub vendor by Contractor along with the enclosures as per Annexure-I shall be submitted within 60 days of the award. The proposal shall be reviewed and approval will be accorded based on the verification of the document submitted and/or after the physical assessment of the works, as the case may be. The physical assessment conducted by POWERGRID, if required, shall be on chargeable basis. Charges shall be as per the POWERGRID norms prevailing at that time, which shall be intimated by POWERGRID separately. If proposal for sub-vendor is submitted after 60 days, the Contractor's proposal normally will not be considered for current LOA. However, POWERGRID may process the case for developing more vendors for referred items, if found relevant. In all cases, it is the responsibility of

the Contractor that Project activities do not suffer on account of delay in approval/non-approval of a new sub-vendor.

The responsibility and the basis of inspection for various items & equipment is placed at Annexure-II along with the requirement of MQP (Manufacturing Quality Plan), ITP (Inspection & Test Plan), FAT (Factory Acceptance Test) which should be valid & POWERGRID approved and Level of inspection envisaged against each item.

Contractor shall ensure that order for items where MQP/ ITP/ FAT is required will be placed only on vendors having valid MQP/ITP/FAT and where the supplier's MQP/ITP/FAT is either not valid or has not been approved by POWERGRID, MQP shall be generally submitted as per POWERGRID format before placing order. A Copy of MQP format is placed at **Annexure-III**.

Items not covered under MQP/ITP/FAT shall be offered for inspection as per POWERGRID LOA/ technical Specifications/ POWERGRID approved data sheets/ POWERGRID approved drawings and relevant Indian/ International standards.

Inspection Levels: For implementation of projects in a time bound manner and to avoid any delay in deputation of POWERGRID or its authorized representative, involvement of POWERGRID for inspection of various items / equipment will be based on the level below:

Level-I: Contractor to raise all inspection calls and review the report of tests carried out by the manufacturer, on his own, as per applicable standards/ POWERGRID specification, and submit to concerned POWERGRID inspection office/Inspection Engineer. CIP/MICC will be issued by POWERGRID based on review of test reports/certificates of manufacturers.

Level-II: Contractor to raise all inspection calls and carry out the inspection on behalf of POWERGRID on the proposed date of inspection as per applicable standards/ specification. However, in case POWERGRID wishes to associate itself during inspection, the same would be intimated to Contractor and CIP/MICC will be issued by POWERGRID. Else, Contractor would submit their test reports/ certificates to POWERGRID. CIP/ MICC will be issued by POWERGRID based on review of test reports/ certificates.

Level-III: Contractor to raise inspection calls for both, stage (as applicable) & final inspection and carry out the stage inspections (if applicable) on behalf of POWERGRID on the proposed date of inspection as per

applicable standards/ specification. However, in case POWERGRID wishes to associate itself during stage inspection, the same would be intimated to Contractor and CIP will be issued by POWERGRID. Else, Contractor would submit the test reports/ certificates of stage inspection after their own review and CIP will be issued by POWERGRID based on review of test reports/ certificates. Final inspection will be carried out by POWERGRID and CIP/MICC will be issued by POWERGRID.

Level-IV: Contractor to raise inspection calls for both, stage (as applicable) & final inspections. POWERGRID will carry out the inspection for both stage & final inspection as per applicable standards/ specification and CIP/MICC will be issued by POWERGRID.

- 1.8.1.2 Contractor shall ensure that to implement the above inspection levels, particularly for the quality control and inspection at sub-vendor's works, they would depute sufficient qualified & experienced manpower in their Quality Control and Inspection department. Further, to assure quality of construction, Contractor shall have a separate workforce having appropriate qualification & experience and deploy suitable tools and plant for maintaining quality requirement during construction in line with applicable Field Quality Plan (FQP).
- 1.8.1.3 The Employer, his duly authorised representative and/or outside inspection agency acting on behalf of the Employer shall have at all reasonable times access to the Contractor's premises or Works and shall have the power at all reasonable times to ensure that proper Quality Management practices/ norms are adhered to, inspect and examine the materials & workmanship of the Works, to carry out Quality/ Surveillance Audit during manufacture or erection and if part of the Works is being manufactured or assembled at other premises or works. The Contractor shall obtain for the Employer and for his duly authorised representative permission to inspect as if the works were manufactured or assembled on the Contractor's own premises or works. The item/ equipment, if found unsatisfactory with respect to workmanship or material is liable to be rejected. The observations for improvements during product/ process inspection by POWERGRID shall be recorded in Quality Improvement Register (available & maintained at works) for review & timely compliance of observations.
- 1.8.1.4 Contractor shall submit inspection calls over internet through POWERGRID website. The required vendor code and password to enable raising inspection call will be furnished to the main Contractor with in 30 days of award of contract on submission of documents by Contractor. After raising the inspection calls, Contractor shall then proceed as per the message of that particular call which is available on the message board.

- 1.8.1.5 The Employer reserves the right to witness any or all type, acceptance and routine tests specified for which the Contractor shall give the Employer/ Inspector Twenty-one (21) days written notice of any material being ready for testing for each stage of testing as identified in the approved quality plan as customer inspection point (CIP) for indigenous inspections. All inspection calls for overseas material shall be given at least forty-five (45) days in advance. Such tests shall be to the Contractor's account except for the expenses of the Inspection Engineer. The Employer/ inspector, unless witnessing of the tests is waived by Employer, will attend such tests within Twenty one (21) days of the date of which the equipment is notified as being ready for test/ inspection, 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 three copies of tests, duly certified. Contractor shall ensure, before giving notice for type test, that all drawings and quality plans have been got approved. The equipment shall be dispatched to site only after approval of Routine and Acceptance test results and Issuance of Dispatch Clearance in writing by the Employer. CIP/Material Inspection clearance certificate (MICC) shall be issued by the Employer after inspection of the equipment or review of test reports as applicable. Employer may waive off the presence of Employer's inspecting engineer. In that case test will be carried out as per approved QP and test certificate will be furnished by the supplier for approval. CIP/MICC will be issued only after review and approval of the test reports.
- 1.8.1.6 Contractor shall generally offer material for inspection as per supply bar chart approved by POWERGRID and not before 30 days from schedule indicated in the bar chart. In case Contractor offers material(s) for inspection prior to 30 days from the scheduled date with necessary approval of POWERGRID, POWERGRID shall inspect the material and issue CIP only. However, in such an exceptional case, MICC shall be issued only as per provision of original/ revised approved supply schedule.
- 1.8.1.7 Contractor shall minimize the number of inspection calls by offering optimum quantities in each inspection call at the respective manufacturer's works.
- 1.8.8.8 Contractor shall inspect the material themselves and only after they are fully convinced about the Quality, they shall offer the material for POWERGRID inspection and shall also ensure that relevant portion of LOA /NOA, approved drawing and data sheets along with applicable Quality Plans are available at the works of Contractor or their Sub-vendor before the material is offered for inspection.

- 1.8.8.9 Contractor shall ensure that material which has been cleared for dispatch after inspection will be dispatched within 30 days in case of domestic supplies and within 60 days in case of Off-shore supplies from the date of issuance of CIP. Material which is not dispatched within stipulated time as above will be reoffered for POWERGRID inspection or specific approval of POWERGRID QA&I shall be obtained for delayed dispatch.
- 1.8.8.10 The Employer or IE shall give notice in writing to the Contractor, of any objection either to conformance to any drawings or to 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 either make the modifications that may be necessary to meet the said objections or shall confirm in writing to the Employer/ Inspection Engineer giving reasons therein, that no modifications are necessary to comply with the Contract.
- 1.8.1.11 All Test Reports and documents to be submitted in English during final inspection of equipment by POWERGRID or as and when required for submission.
- 1.8.1.12 When the factory tests have been completed at the Contractor's or Sub-Contractor's works, the Employer/ Inspection Engineer (IE) shall issue a certificate to this effect within fifteen (15) days after completion of tests & submission of documents by Contractor/ manufacturer but if the tests are not witnessed by the Employer/ IE, the certificate shall be issued within fifteen (15) days of receipt of the Contractor's Test certificate by the Employer/IE. Contractor shall, on completion of all tests, submit test reports within Ten (10) days to POWERGRID IE. Failure of the Employer/IE to issue such a certificate shall not prevent the Contractor from proceeding with the Works. The completion of these tests or the issue of the certificate shall not bind the Employer to accept the equipment should, it, on further tests after erection, be found not to comply with the Contract.
- 1.8.1.13 In all cases, where the Contract provides for tests whether at the premises or works of the Contractor or of any Sub- Contractor, the Contractor, except where otherwise specified, shall provide free of charge such items as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Employer/ Inspector or his authorised representative to carry out effectively such tests of the equipment in accordance with the Contract and shall give facilities to the Employer/ Inspection Engineer or to his authorised representative to accomplish testing.

- 1.8.1.14 The inspection and acceptance by Employer 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, or if such equipment is found to be defective at a later stage.
- 1.8.1.15 The Employer will have the right of having at his own expenses any other test(s) of reasonable nature carried out at Contractor's premises or at site or in any other place in addition of aforesaid type and routine tests, to satisfy that the material complies with the specification.
- 1.8.1.16 The Employer reserves the right for getting any additional field tests conducted on the completely assembled equipment at site to satisfy that material complies with specifications.
- 1.8.1.17 Re-work/ Re-engineering, if any, on any item/ equipment shall be carried out only after mutual discussions and in accordance with mutually agreed procedure. Contractor shall submit Joint Inspection Report of equipments under Re-Work/ Re-Engineering alongwith procedure for the same to POWERGRID for approval, before taking up the Re-Work/ Re-Engineering, failing which POWERGRID reserves the right to reject the equipment.
- 1.8.1.18 Contractor may establish a field test Laboratory to execute Civil Construction testing requirements at site with the condition that all testing equipment shall be calibrated from POWERGRID approved accredited Testing laboratories, with calibration certificates kept available at site and all testing personnel employed in the Field-Testing Laboratories to be qualified and experienced Engineers or testing to be carried out at POWERGRID approved Third Party Laboratories.
- 1.8.1.19 Contractor shall ensure that all possible steps are taken to avoid damages to the equipment during transport, storage and erection.
- 1.8.1.20 The Employer reserves the right to increase or decrease their involvement in inspections at Contractor's Works or at his Sub-Contractor's premises or at the Employer's site or at any other place of Work based on performance of Contractor/ Sub Contractor.
- 1.8.1.21 Unless specified otherwise, inspection shall be made at the place of manufacture prior to dispatch and shall be concluded so as not to interfere unnecessarily with the operation of the work.
- 1.8.1.22 Should any item being supplied be found not to comply with the supplied design, it shall be liable to rejection. No item once rejected shall be resubmitted for inspection, except in cases where the Employer or his

authorised representative considers that the defects can be rectified. All rejected material shall be disposed-off/ destroyed under intimation to Employer QA&I representative as per laid down procedures.

1.8.1.23 The specified grade and quality of material from approved source shall be used by the Contractor. To ascertain the quality of material used, the inspector may at his discretion get the material tested at an approved laboratory.

1.8.2 Tests

1.8.2.1 The type, acceptance and routine tests and tests during manufacture shall be carried-out on the material and shall mean as follows:

1.8.2.2 **Type Tests** shall mean those tests which are to be carried out to prove the process of manufacture and general conformity of the material to this Specification. These tests shall be carried out on samples prior to commencement of commercial production against the order.

1.8.2.3 **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.

1.8.2.4 **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.

1.8.2.5 **Tests during Manufacture** 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.

1.8.2.6 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 Employer.

1.8.2.7 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 in **Annexure-A** or as mutually agreed to between the Contractor and the Employer in the Quality Assurance Programme.

1.8.2.8 For all type and acceptance tests, the acceptance values shall be the values specified in this Specification or guaranteed by the Bidder, as applicable.

1.8.2.9 In case of any failure or defect/ deficiency observed in material supplied Employer reserves the right to carry out any tests on the material supplied to site, if required to prove conformity of material to the specification for which testing charges shall be borne by contractor/ manufacturer.

1.9 Standard Technical Particulars

1.9.1 The Standard Technical Particulars of the various items are given in the relevant schedule of the specification, the bidder is required to comply with the same.

1.10 Packing

1.10.1 All the materials shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. The Contractor shall be responsible for any loss or damage during transportation, handling and storage due to improper packing.

1.10.2 The Contractor shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during transport by air, sea, rail and road.

1.10.3 All packing shall allow for easy removal and checking at site. Wherever necessary, proper arrangement for attaching slings for lifting shall be provided. All packages shall be clearly marked for with signs showing 'up' and 'down' on the sides of boxes, and handling and unpacking instructions as considered necessary. Special precaution shall be taken to prevent rusting of steel and iron parts during transit by sea.

1.10.4 The cases containing easily damageable material shall be very carefully packed and marked with appropriate caution symbols, i.e. fragile, handle with care, use no hook etc. wherever applicable.

1.10.5 Each package shall be legibly marked by the Contractor at his expenses showing the details such as description and quantity of contents, the name of the consignee and address, the gross and net weights of the package, the name of the Contractor etc.

1.10.6 Angle section shall be wire bundled.

1.10.7 Cleat angles, gusset plates, brackets, fillet plate, hanger and similar loose pieces shall be tested and bolted together in multiples or securely wired through holes.

1.10.8 Bolts, nuts washers and other attachments shall be packed in double gunny bags accurately tagged in accordance with the contents.

1.10.9 The packing shall be properly done to avoid losses & damages during transit. Each bundle or package shall be appropriately marked.

1.11 Storage of Material under Transmission Line Package

Brief guidelines including typical drawing for storage of different type of construction material used in the transmission line projects are as under:

1.11.1.1 Cement Storage

Cement received at site should be stored in a building or shed which is dry, leak proof and moisture proof. The building should have minimum numbers of windows. Cement bags stored and stacked off the floor on wooden planks in such a way so as to keep about 150 mm to 200 mm clearance from the ground. The floor may be of lean cement concrete or two layers of dry bricks laid on well consolidated earth. A minimum space of 600 mm shall be kept around and between the exterior walls and the stacks. In stacks, bags shall be kept close together to reduce air circulation. The height of the stack shall not be more than 12 bags and the width of the stack shall not be more than four bags or 3 meters. For extra safety during monsoon, or when it is expected to store for an unusually long period, the stack shall be completely enclosed by a waterproofing membrane such as polyethylene etc. Different type and make of cement shall be stacked and stored separately.

1.11.2 Aggregates

Aggregates shall be stored at site on a hard dry and level patch of ground. If such a surface is not available, a platform of planks or old corrugated iron sheets, or floor bricks or a thin layer of lean concrete shall be made so as to prevent contamination with clay, dust, vegetable and other foreign matter.

The stacks of fine and coarse aggregates shall be kept in separate stock piles sufficiently removed from each other to prevent the material at the edges of the piles from getting intermixed. Fine aggregate shall be stacked in a place where loss due to the effect of wind is minimum.

1.11.3.1 Reinforcement Steel

For each classification of steel, separate areas shall be earmarked. It is desirable that ends of bars and sections of each class be painted in distinct separate colors. Steel reinforcement shall be stored in such a way as to avoid distortion and to prevent deterioration and corrosion. It is desirable to coat reinforcement with cement wash before stacking to prevent scaling and rusting in case of storage time exceeding one month. In store, reinforcement bars shall be stacked above ground level by at least 150 mm either on brick/ cement/ stone platform or concrete/bricks planks.

1.11.4 Structural Steel for Tower Parts

The structural steel of different classification, sizes and lengths shall be stored separately. These shall be stored above ground level at least 150 mm upon platforms, skids or any other suitable supports to avoid any distortion of sections. Also, in order to prevent white rust formation

sufficient care should be exercised while storing, handling and transporting galvanized products. The structural steel/ tower parts shall be stored in an adequately ventilated area. The article shall be stored with spacers in between them and kept at an inclination to facilitate easy drainage of any water collected on the structural steel/ tower parts.

1.11.5 Conductor & Earthwire Drums

It is essential to save the conductor drums from damage during storage and transportation and the wooden battens and main wheel should be intact so that same can be successfully mounted on the conductor jacks to release the conductor during stringing. All the conductor and earthwire drums should be stored on a proper hard platform above ground to avoid deterioration of the drum and further avoiding the damage of conductor. The conductor & earthwire drums should be stored in such a manner that each drum can be accessed at any time for inspection purposes.

1.11.6 Hardware fitting, Accessories & Insulators

All the hardware fittings, accessories and insulators should be stored on raised platform above ground so as not to damage the packaging and to avoid further damage or denting on the fittings and chipping of insulators. All the aluminum parts should be stored on a plain/ raised platform under a cover shed in such a way that the aluminum fittings cannot be distorted during storage.

2.0 Employer's Environment and Social Policy and its Implementation

2.1 Development and growth of mankind through Industrialization and unwarranted use of natural resources has inflicted considerable impact on Environment and Society. As a result, Environmental and Social issues have emerged as the focal point of global debate.

Employer's activities by their inherent nature and flexibility have negligible impacts on environmental and social attributes. In order to address these issues and to match the rising expectations of a cleaner, safer and healthier environment, Employer has evolved its Environmental and Social Policy and Procedures (ESPP). The key principles of Employer's Environmental and Social Policy are: -

- i) Avoidance of environmentally and socially sensitive areas while planning project activities.
- ii) Minimisation of impacts when project activities occur in environmentally and socially sensitive areas.

- iii) Mitigation of any unavoidable adverse impacts arising out of its projects.
- 2.2 Basic issues to be kept in mind while carrying out construction activities are to
- i) Avoid socially sensitive areas with regard to human habitations and areas of cultural significance.
 - ii) Secure the interest of people affected by Employer's projects.
 - iii) Involve local people affected by transmission line projects as per requirement and suitability.
 - iv) Consult affected people in decisions having implication to them if considered necessary.
 - v) Apply, efficient and safe technology/ practices.
 - vi) Keep abreast of all potential dangers to people's health, occupational safety and safety of environment and the respective mitigatory measures.
 - vii) Establish preventive mechanisms to guarantee safety.
 - viii) Mitigation measures in case of accidents.
 - ix) Avoid unwarranted cutting of trees in forest area.
- 2.3 While constructing the lines through forest stretches the contractor will provide alternate fuel to its employee e.g. working labours/ supervisors etc. in order to avoid cutting of forest woods.
- 2.4 Contractor will ensure safety to the wild life, during working/ camping near to the National park.
- 2.5 Contractor during construction of lines in agricultural fields will ensure minimum damages to the crops, trees, bunds, irrigation etc. If the same is un-avoidable, the decision of Engineer- in-charge shall be final.
- 2.6 The waste/ excess material/ debris should be removed from the construction site including agricultural field, forest stretches, river etc. immediately after construction work.
- 2.7 The Contractor will ensure least disturbance to the hill slope and natural drainage so as to avoid soil erosion. Natural drainage in plain area if disturbed is to be trained to the satisfaction of Engineer- in-charge.
- 2.8 As far as possible existing path/ kutchha road/ approach shall be used for the construction.
- 2.9 The Contractor will ensure supply of stone chips/sand from authorised/ approved quarry areas.

- 2.10 Proper documentation of above, if any.
- 2.11 The Environment & Social Policy and Procedures (ESPP) evolved by POWERGRID is available at the POWERGRID's website, www.powergrid.in, which shall be referred by the Bidder for further information.

2.12 Facilities to be incorporated for labourers

The Contractor shall provide his/ their laborer with sufficient number of the following facilities with the indicated specifications:

A) Tents:

- i) Tent should be with double layer canvas, outer layer being water-proof. The size/ number should be sufficient to accommodate required number of people comfortably.
- ii) The preferred size of tent should be 20ft x 20ft with Centre height of 7 ft and side height of 2.5 ft.
- iii) Tent windows should have arrangement for mosquito net with waterproof outer covering.
- iv) Doors of the tents shall have Velcro or any other closing system.
- v) The site selected for the camp shall be on high ground, removed from Jungle.
- vi) Efficient arrangement for draining away stagnant water should be provided so as to keep the camp neat and tidy.
- vii) The tents should have illumination at night by providing battery operated LED lanterns or equivalent lighting system.

B) Portable (tyre- mounted) Bio toilet

- i) The toilet seats should be 'Indian'.
- ii) The number of Toilets should be not less than 2 per 50 laborers with separate toilets for female laborers.
- iii) Bio-tank should be of sufficient capacity to allow bacteria present to decompose.
- iv) the excreta and only waste water (odourless and harmless) gets discharged out of the toilet through a sewerage channel away from the tent areas and working areas.
- v) Water tank of adequate capacity should be installed with the Portable Toilet.

Bidder shall quote for the above facilities in the BPS, wherever indicated.

Assessment report from Contractor for proposed sub-vendor along with following enclosures (to the extent available):

1. Registration / License of the works
2. Organization chart with name and qualification of key persons
3. List of Plant and Machinery.
4. List of testing equipment with their calibration status.
5. List of Raw material, bought out items with sourcing details
6. List of out-sourced services with sourcing details.
7. List of supply in last three years.
8. Third party approval, if any (viz. ISO, BIS),
9. Pollution clearance wherever applicable
10. Energy Conservation & Efficiency report (Applicable to industries having contract load more than 100 KVA)
11. Formats for RM, in process and acceptance testing
12. Type test approvals conducted in last 5 years, if applicable
13. Performance Certificates from customers
14. Photographs of factory, plant and machinery & testing facilities

Annexure-II

MQP & INSPECTION LEVEL REQUIREMENT

Sl. No.	Item / Equipment	Requirement of MQP/ITP/FAT	Inspection Level
N.28	Fibre Optic Cable	MQP	III
N.29	Hardware Fittings for Fibre Optic Cable	MQP	III
O.01	Re-rollers of MS/ HT Angle Section and galvanized tower parts	MQP	IV
O.02	Conductor	MQP	IV
O.03	Hardware Fittings and Accessories for Conductor and Earthwire	MQP	IV
O.04	Earthwire	MQP	IV
O.05	Insulator	MQP	IV
O.06	Bolts & Nuts of Grade 8.8/8	MQP	IV
O.07	Mono Pole	POWERGRID TS	IV
O.08	Foundation Bolts & Anchor Bolts	MQP	III
O.09	D-Shackle/ Hanger/ Links and associated Special bolts & Nuts	MQP	III
O.10	Span Marker, Obstruction Light and Wind Measuring Equipment	POWERGRID TS	III
O.11	MS Rod rolled by Approved Re-Roller of POWERGRID	MQP	III
O.12	MS Rod rolled by Approved steel producers of POWERGRID	POWERGRID TS	I
O.13	Spring Washers & Pack Washers	POWERGRID TS	II
O.14	Bolts & Nuts Grade upto 5.6/5	POWERGRID TS	II
O.15	ACD & barbed wire of ACD/ Bird Guard	POWERGRID TS	II
O.16	Danger Plate/ Phase Plate/ Number Plate/ Circuit plate	POWERGRID TS	I
O.17	Sub-station Structure (Lattice/pipe type)	MQP	III
O.18	Clamps & Connectors (including equipment connectors)	MQP	III
O.19	MS/ GI F/at, rod type, pipe type and other earthing material	POWERGRID TS	II
O.20	Aluminium Tube & Busbar materials	POWERGRID TS	II
O.21	Pipe Type & Counter Poise Earthing	POWERGRID TS	II

Note: For Equipment where requirement of MQP is envisaged, ITP/FAT will be followed if sourced from off shore. For items required in S/S or T/L or TELECOM/LD&C , same inspection level as specified shall be followed for all the cases.



MANUFACTURING QUALITY PLAN

Manufacturers Details (Name, Works Address etc.)	Customer POWERGRID	Vendor's Code:	Item:	Q.P. No.	Valid From:
				Rev. No.	
			Date:		

Sr. No.	Components / Operations & Description of Test	Type of check	Quantum of Check / Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	

A. Section: RAW MATERIAL INSPECTION														
B. Section : IN PROCESS INSPECTION														
C. Section: FINAL TESTING														
D. Section: PACKING & DISPATCH														



Code 1	Indicates place where testing is planned to be performed i.e. Inspection location			Code 2	Indicates who has to perform the tests i.e. Testing Agency								
A	At Equipment Manufacturer's works			J	The Equipment Manufacturer								
B	At Component Manufacturer's works			K	The Component Manufacturer								
C	At Authorised Distributor's place			L	The Third Party								
D	At Independent Lab			M	The Turnkey Contractor								
E	At Turn Key Contractor's location												
F	Not specified												
Code 3	Indicates who shall witness the tests i.e. Witnessing Agency			Code 4	Review of Test Reports/ Certificates								
P	Component Manufacturer itself			W	By Equipment manufacturer during raw material/bought out component Inspection.								
Q	Component Manufacturer and Equipment Manufacturer			X	By Contractor during product/process inspection								
R	Component Manufacturer, Equipment Manufacturer and Contractor			Y	By POWERGRID during product/process inspection								
S	Equipment Manufacturer itself			Z	By Contractor and/or POWERGRID during product/process inspection								
T	Equipment Manufacturer and Contractor												
U	Equipment Manufacturer, Contractor and POWERGRID												
V	Third Party itself												
Code 5	Whether specific approval of sub-vendor / Component make is envisaged?			Code 6	Whether test records required to be submitted after final inspection for issuance of CIP/MICC								
E	Envisaged			Y	Yes								
	Not Envisaged			N	No								