

SECTION-II

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**TECHNICAL SPECIFICATION
SECTION-II**

1.0 General Technical Conditions

1.1 General

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

1.2 Engineering Data

1.2.1 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 Owner 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 Owner 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.

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

1.3 Drawings

In addition to those stipulated in clause regarding drawings in GCC/SCC, the following also shall apply in respect of Contractor Drawings.

1.3.1 All drawings submitted by the Contractor including those submitted at the time of Bid shall be with 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 these specifications.

1.3.2 Each drawing submitted by the Contractor shall be clearly marked with the name of the Owner, 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.

1.3.3 The drawings submitted by the Contractor shall be reviewed by the Owner as far as practicable within 15 days and shall be modified by the Contractor

if any modifications and/or corrections are required by the Owner. 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.

1.3.4 The drawings submitted for approval to the Owner shall be in quadruplicate. One print of such drawings shall be returned to the Contractor by the Owner marked "approved/approved with corrections". The contractor shall there upon furnish the Owner additional prints as may be required along with one reproducible in original of the drawings after incorporating all corrections.

1.3.5 The work shall be performed by the Contractor strictly in accordance with these drawings and no deviation shall be permitted without the written approval of the Owner, if so required.

1.3.6 All manufacturing, fabrication and erection 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 Owner.

1.3.7 The approval of the documents and drawings by the Owner shall mean that the Owner 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 Owner of any document does imply compliance with all technical requirements nor 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.

1.3.8 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, shop sketches and tower accessories drawings) shall be submitted to the Owner in CDs/DVDs.

A copy of each drawing reviewed will be returned to the Contractor as stipulated herein.

- 1.3.9 Copies of drawings returned to the Contractor will be in the form of a print with the Owner's marking, or a print made from a microfilm of the marked up drawing.
- 1.3.10 The following is the general list of the documents and drawings that are to be approved by the Owner.
- 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) Tower structural drawing and bill of materials.
 - e) Soil Investigation report .
 - f) Foundation working drawings/excavation Plan.
 - g) Tower footing earthing drawing.
 - h) Stub and stub-setting template drawings.
 - 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, etc.
 - m) Line material drawings.
 - n) Type test report for line materials.
- 1.3.11 All rights of the design/drawing for all types of towers and foundations shall be strictly reserved with the Owner only and any designs/drawings/data sheets submitted by the contractor from time to time shall become the property of the Owner. 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 Owner. Any deviation to above is not acceptable and may be a cause for rejection of the bid.

1.4 **Design Improvements**

1.4.1 The Owner 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.

1.5 **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.

1.6 **Design Review Meeting**

The contractor will be called upon to attend design review meetings with the Owner, and the consultants of the Owner during the period of Contract. The contractor shall attend such meetings at his own cost at the Corporate Office of the Owner or at mutually agreed venue as and when required. Such review meeting will be held generally four times in a year.

1.7 **Quality Assurance, Inspection & Testing**

1.7.1 **Quality Assurance**

To ensure that the supply 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 site or at any other place of work are 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 broadly outlined by the Contractor and shall be finalised after discussions before the award of Contract. The detailed programme shall be submitted by the contractor after the award of contract and finally accepted by the Owner after discussion. A 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 Contractor's key personnel.

- (d) The procedure for purchase 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 and fabrication and assembly 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 manufacture.
- (i) System for indication and appraisal of inspection status.
- (j) System for quality audits.
- (k) System for authorizing release of manufactured product to the Owner.
- (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 characteristics relevant to critical and important items of supply.

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

1.7.1.1 **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.

1.7.1.2 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.

1.7.2 **Owner'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 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.

1.8 Inspection and Tests

1.8.1 Inspection

1.8.1.1 The Owner, his duly authorized representative and/or outside inspection agency acting on behalf of the Owner shall have, at all reasonable times, access to the premises and /or works of the contractor and/or their sub-contractor(s)/sub-vendors and shall have the right, at all reasonable times, to inspect and examine the materials and workmanship of the product during its manufacture.

1.8.1.2 The Contractor shall give the Owner's Inspector fifteen (15) days (in case of domestic testing and thirty (30) days (in case of foreign testing), as the case may be, written notice of any material being ready for testing. In case of turnkey contract, the turnkey contractor shall give the notice for inspection and shall associate in the inspection with Employee's inspector. All such inspections shall be to the Contractor's account except for the expenses of the Owner's inspector. The Owner's inspector, unless witnessing of the tests is virtually waived, will attend such tests within fifteen (15) days (in case of domestic testing) and thirty (30) days in (in case of foreign testing) 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 in accordance with the technical specification after informing the Owner's in writing and he shall forthwith forward to the inspector duly certified copies of test reports / certificates in triplicate.

1.8.1.3 The Owner's Inspector shall, within fifteen (15) days from the date of inspection, 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.

- 1.8.1.4 When the factory tests have been completed at the Contractor's or Sub-Contractor's works, the Owner's 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's inspector, the certificate shall be issued within fifteen (15) days of receipt of the Contractor's Test Certificate by the Owner's Inspector. The completion of these tests or the issue of the certificate shall not bind the Owner's to accept the equipment should it, on further tests after erection, be found not to comply with the Contract.
- 1.8.1.5 In all cases where the Contract provides for test 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 item as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the Owner's 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 Owner's Inspector or to his authorised representative to accomplish testing.
- 1.8.1.6 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.
- 1.8.1.7
- a) The Contractor shall keep the Owner informed in advance about the time of starting and of the progress of manufacture and fabrication of various tower parts at various stages, so that arrangements could be made for inspection.
 - b) The acceptance of any part of items shall in no way relieve the Contractor of any part of his responsibility for meeting all the requirements of the Specification.
- 1.8.1.8 The Owner or his representative shall have free access at all reasonable times to those parts of the Contractor's works which are concerned with the fabrication of the Owner's material for satisfying himself that the fabrication is being done in accordance with the provisions of the Specification.
- 1.8.1.9 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.
- 1.8.1.10 Should any member of the structure be found not to comply with the supplied design, it shall be liable to rejection. No member once rejected shall be resubmitted for inspection, except in cases where the Owner or his authorized representative considers that the defects can be rectified.

- 1.8.1.11 Defect which may appear during fabrication shall be made good with the consent of, and according to the procedure proposed by the Contractor and approved by the Owner.
- 1.8.1.12 All gauges and templates necessary to satisfy the Owner shall be supplied by the contractor.
- 1.8.1.13 The specified grade and quality of steel shall be used by the Contractor. To ascertain the quality of steel 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. The Bidder shall indicate his schedule for carrying out these tests.
- 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 by him.
- 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 Owner.
- 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 Owner 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.

1.9 **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.

2.0 **Owner '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.

Owner'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, Owner has evolved its Environmental and Social Policy and Procedures (ESPP). The key principles of Owner'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 Owner'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/ kutchcha road/approach shall be used for the construction.
- 2.9 The Contractor will ensure supply of stone chips/sand from authorized/approved quarry areas.
- 2.10 Proper documentation of above, if any.