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## **GENERAL TECHNICAL CONDITIONS**

### **1.0 GENERAL :**

This part covers technical conditions pursuant to the Contract and will form an integral part of the Contract. The following provisions shall supplement all the detailed technical specifications and requirements brought out for each equipment in Volume II.

### **2.0 LIMIT OF CONTRACT:**

Equipment furnished shall be new and complete with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and / or needed for the erection, testing, commissioning, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the respective specifications and unless included in the list of exclusions. Terminal points as clearly defined in the drawings together with the list of inclusions and exclusions in the contract documents shall define the scope of the Contract. All similar standard components/parts of similar standard equipment provided shall be interchangeable with one another.

### **3.0 TECHNICAL DOCUMENTS:**

#### **3.1 General**

Technical Documents comprise all drawings, calculations, catalogues and engineering data to be submitted to the Engineer by the Contractor in accordance with the Specifications.

#### **3.2 Drawing Detail**

All drawings submitted by the Contractor shall be in sufficient detail to indicate the type, size, arrangement, weight of each component, breakdown for packing and shipment, the external connections, fixing arrangements required, dimensions required for installation and interconnections with other equipment and materials, clearances and spaces required between various portions of equipment and any other information specifically requested in the drawing schedules.

#### **3.3 Drawing Marking**

Each drawing submitted by the Contractor shall be clearly marked with the name of the purchaser, the unit designation, the specification title, contract number and the name of the project. If standard catalogue pages are submitted, the applicable items shall be indicated therein. All titles, noting, marking and writings on the drawing shall be in English. All the dimensions shall be in Metric units.

#### **3.4 Review of Technical Documents by the Engineer**

##### **3.4.1 Time and manner of submission**

The submissions of Technical Documents for review by the Engineer/Purchaser shall be in accordance with the schedule to be mutually agreed upon by the Engineer/Purchaser and

the Contractor before signing the Contract Agreement. Technical Documents shall be submitted such as to allow review by the Engineer, revision by the Contractor and subsequent further review by the Engineer, and in any case not less than 90 (ninety) days before the drawings are required, to meet the agreed program of work. The drawings sent for approval to the Engineer/Purchaser shall be in accordance with the “Document Distribution Schedule”.

### **3.4.2 Review and modification**

The drawings submitted by the Contractor shall be reviewed by the Engineer/Purchaser and shall be modified by the Contractor if any modifications and / or corrections are required by the Engineer/Purchaser. One print of such drawing will be returned to the Contractor by the Engineer marked “Approved”. “Approved with corrections” or “Rejected”. The Contractor shall make modifications and or incorporate such corrections as may be requested by the Engineer and resubmit the drawings for approval within the scheduled time. After the drawings are “Approved” the Contractor shall thereupon furnish the Purchaser with the drawings, documents and manuals as per the “Document Distribution Schedule”. The time for drawing approval by the Engineer/Purchaser will be 45 days from receipt to dispatch. The Contractor and the Engineer shall use an express mail delivery system.

### **3.4.3 Contractor’s responsibilities not limited by Engineer’s Review**

The review of these Technical Documents by the Engineer/Purchaser will cover only general conformance of the data to the specification and documents interfaces with the equipment provided under the specification, external connections and of the dimensions which might affect plant layout. This review by the Engineer 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 Engineer/Purchaser shall not be considered by the Contractor, as limiting any of his responsibilities and liabilities for mistakes and deviation from the requirement specified under these specification and documents.

### **3.5 Incorporation into the Contract**

All Technical Documents submitted by the Contractor after final process including review and approval by the Engineer/Purchaser shall form part of the Contract Documents and the entire works performed under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the Engineer/Purchaser in writing.

### **3.6 As Built Drawings**

The Contractor shall submit to the Engineer, for approval “As-built Drawings” showing all works as completed under the Contract, incorporating all changes, revisions, deviations or corrections from the previously issued Drawings by reason of, supplementary instructions during construction, assembly and erection of equipment, so that such drawings accurately represent each component of the works.

Before issuing the “Taking-Over Certificate” the specified number of complete sets of the approved drawings of the works as completed shall be submitted to the Purchaser. The Works shall not be considered complete for purposes of taking over under the terms of the General Technical Conditions of the Contract until the above documents have been supplied by the Contractor.

### **3.7 Distribution**

The distribution of various drawings/data sheets and instruction manuals etc. shall be arranged by the Contractor as per the “Document Distribution Schedule” given in the annexure to this section.

### **4.0 INSTRUCTION MANUALS:**

The Contractor shall submit to the Engineer/Purchaser for approval, instruction manuals for all the equipment covered under the Contract at least 60 (sixty) days prior to commencement of installation of the respective equipment. The instruction manuals shall contain full details and drawings of all the equipment furnished, the erection procedures, commissioning and testing procedures, operation and maintenance procedures of the equipment in separate volumes in accordance with the requirements of the Technical Specifications. These instruction manuals shall be submitted in accordance with the “Document Distribution Schedule”.

If after the commissioning/initial operation of the plant, the instruction manuals require any modifications/additions/changes, the same shall be incorporated and the updated final instruction manual in accordance with the “Document Distribution Schedule” shall be submitted by the Contractor to the Purchaser.

### **5.0 FIRST FILL OF CONSUMABLES, OILS AND LUBRICANTS:**

The first fill of consumables such as oils, lubricants and essential chemicals, etc. which will be required to put the equipment covered under the scope of the contract into successful trial operation shall be furnished by the contractor. In case of imported oils, lubricants and other consumables, the contractor shall indicate the indigenous equivalents to enable the purchaser to arrange subsequent fills. Preference should be given to indigenous oils and lubricants during first filling itself. Short shelf life items, if any may be supplied in a phased manner keeping in view of the actual use and shelf life.

### **6.0 MANUFACTURING AND ERECTION SCHEDULE:**

The Contractor shall submit a detailed PERT network, duly considering the time frame agreed above consisting of all activities, covering all activities covering various key phases of the work such as, but limited to, design, drawings, procurement, manufacturing, shipment, erection, testing, commissioning activities within 30 (thirty) days from the date of Letter of Intent. The Contractor shall discuss the network so submitted with the Engineer-in-Charge and the agreed network which may be in the form as submitted or in revised form in line with the outcome of discussions shall form part of the Contract Agreement.

### **7.0 REFERENCE STANDARDS:**

The codes and /or standards referred to in these specifications shall govern. In all the cases wherever such references are made in case of conflict between such codes and/or standards and the specification, the latter shall govern. Such codes and/or standards referred to shall mean the latest revisions, amendments/changes adopted and published by the relevant agencies up to the date of submission of the bid. Any change thereafter shall be mutually agreed. In case of any further conflict in this matter, the same shall be referred to the Engineer/Purchaser, whose decision, if given in writing, shall be implemented. Other internationally acceptable standards which ensure equal or higher performance than those specified shall also be accepted.

#### **8.0 DESIGN IMPROVEMENTS:**

The Engineer/Purchaser may propose changes in the specifications of the equipment or quality thereof and if the parties agree upon any such changes the specification shall be modified accordingly.

If any such agreed upon change is such that it affects the price and schedule of completion, the parties shall agree in writing as to the extent of any change in the price and/or schedule of completion before the contractor proceeds with the change. Following such agreement, the provisions thereof shall be deemed to have been amended accordingly.

It is, however understood that no extra payment will accrue to the Contractor on this account if the change asked for is for an equipment found to be inadequate in operation or not operating properly.

#### **9.0 QUALITY ASSURANCE PROGRAMME:**

The Contractor shall prepare, submit and discuss with the purchaser and based on the discussions, finalise within thirty (30) days from the date of letter of award, a detailed Quality Assurance Programme, for all components of the equipment manufactured by Contractor setting out during the various stages of manufacture, the quantity practices and procedures to be followed by his quality control organisation, the relevant reference documents/standards, acceptance level, inspection documentation raise, etc. in these quality plans the Purchaser will identify "Hold Points" beyond which work will not progress without his consent in writing. For the components/equipment, purchased by the Contractor for purpose of this contract, his purchase specifications and enquiry shall call for such quality plans along with their proposals. The Quality Assurance Programme of the Contractor shall be discussed and finalised in the aforesaid manner and shall form part of this purchase order on his sub-vendor. The Purchaser also reserves the right to carry out quality audit and quality surveillance of the system and procedures of Contractor's /his vendor's quality audit and quality management and control activities. The Contractor shall extend all facilities to the Purchaser for the purpose, however, such audit and quality surveillance by the Purchaser shall not relieve the Contractor of any of his responsibilities under the terms of Contract.

At least ninety (90) days prior to commencement of installation, the Contractor shall furnish the field quality manuals for the various field activities detailing the procedures and inspection check list for transportation storage/preservation, erection, pre-commissioning and commissioning activities.

The field quality manuals shall indicate the various assembly/erection/operation tolerances and the limits of deviations for each individual equipment and system.

#### **10.0 ENGINEERS SUPERVISION:**

To eliminate delays and avoid disputes and litigation it is to be agreed between the parties to the contractor that all matter and question shall be referred to the Engineer and his decision given in writing shall be implemented by both the parties.

The work shall be performed under the direction and supervision of the Engineer. The scope of the duties of the Engineer pursuant to the Contract will include but not to be limited to the following:

- a) Interpretation of all the terms and conditions of these documents and specifications.
- b) Review and interpretation of the Contractors drawing, Engineering data, etc.
- c) Witness or authorise his representative to witness tests and trials either at manufacturers' works or at site, or at any other place where work is performed under the contract.
- d) Inspect, accept or reject any equipment and materials under the Contract.
- e) Issue certificates of inspection, testing, acceptance and progressive and final payment.
- f) Review and suggest modifications and improvements in completion schedules from time to time, and
- g) Supervise the quality assurance programme implementation at all stages of the work.

#### **11.0 INSPECTION / TESTING AND ENGINEER'S INSPECTION / TEST CERTIFICATE:**

The Engineer and / or his duly authorised representative shall have at all reasonable times access to the Contractor's premises or works and shall have the power to inspect or examine the material or workmanship of the work during its manufacture and erection and if part of the work is being manufactured or assembled on other premises or works, the Contractor shall obtain for the Engineer and for duly authorised representative permission to inspect as if the works were manufactured and assembled on the Contractor's own premises or works.

The Contractor shall give the Engineer/inspector fifteen (15) days written notice of any material being ready for testing. The Engineer/Inspector unless the inspection of the tests is in writing waived, shall attend such tests within fifteen (15) days of the date of which the equipment is notified by the contractor as being ready for test/inspection failing which, the Contractor may proceed with the tests which shall be deemed to have been made in the inspector's presence and he shall forthwith forward to the Engineer duly certified copies of test results in quadruplicate, for approval of the Engineer. However, waiver accorded by the Engineer will not absolve the contractor towards the execution of the contract in conformity with the contract agreement.

The Engineer or Inspector shall within 15 (fifteen) days from the date of inspection as defined herein give notice in writing to the Contractor, of any objection to any drawings (unless already approved earlier), testing procedures and testing facilities 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 objection and shall make the modifications that may be necessary to meet the said objection at no extra cost to the Purchaser.

When the factory tests have been completed at the Contractor's or sub-contractor's works, the Engineer/Inspector shall issue a certificate to this effect within 20 (twenty) days after completion of tests but if the tests are not witnessed by the Engineer/Inspector, the certificate shall be issued within twenty (20) days of receipt of the contractor's test certificate by the Engineer/Inspector only when the tests have been carried out as per relevant codes/standard. The completion of these tests, or the issue of the certificate shall not bind the Purchaser to accept the equipment, should it on further tests after erection, be found not to comply with the contract.

In all cases where the Contract provides for tests, whether at the premises/works of the Contractor or of any sub-contractor of the Contractor, the contractor shall provide free of charge such items as labour, materials, electricity, fuel, water, stories, apparatus and instruments as may reasonably be demanded by the Engineer/Inspector or his authorised representative(s) to carry out effectively, such tests of the equipment in accordance with the contract and shall give facilities to the Engineer/Inspector or to his authorised representative to accomplish testing.

The inspection by Engineer and issue of certificate thereon, waiver of inspection & testing and approval of inspection/test certificates 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.

At least thirty (30) days prior to the requested date for inspection/testing, the Contractor shall submit four copies of un-priced factory or shop orders for major items of materials purchased/to be purchased for use in the works or in the manufacture of major items of plant/ equipment which will require inspection/testing by the Purchaser at the places other than the Contractor's works before shipment. In such cases all the above mentioned clauses will apply.

When the inspection/test has been satisfactorily completed the Engineer will issue an inspection/test certificate to that effect.

## **12.0 TESTS ON COMPLETION:**

### **12.1 General**

The Contractor shall give to the Engineer 21 (twenty-one) days notice of the date after which he will be ready to make the Tests on Completion. Unless otherwise agreed, the test shall take place within 14 (fourteen) days after the said date on such day or days as the Engineer shall notify the Contractor.



The tests on Completion shall comprise pre-commissioning tests and commissioning tests to be performed during the start-up period and the Trail Run.

The contractor shall provide necessary instruments, special equipment, tools and appliances and start-up Engineers, Technicians etc. Utilities (fuel, water etc.) and operators and supporting staff wherever felt required shall be provided by the Purchaser at free of cost.

The Contractor's commissioning/start-up engineer specifically identified shall be responsible for carrying out all the pre-commissioning and commissioning tests and the trial run.

As soon as the works or any section or part thereof has passed the tests on completion, the engineer shall issue a taking over certificate to the contractor.

## **12.2 Pre-commissioning**

On completion of erection of the equipment and before start-up, each of the equipment shall be thoroughly cleaned and then inspected jointly by the Engineer and the Contractor for correctness and completeness of installation and acceptability for start-up, leading to pre-commissioning test at site. The lists of pre-commissioning tests to be performed shall be as per the guideline provided by the manufacturer of the equipment/national/international standard and included in the Contractor's Quality Assurance Programme.

Pre-commissioning tests shall include all "dry/no load" tests and the tests of all electrical parts.

## **12.3 Commissioning**

Commissioning tests shall be carried out under the sole responsibility of the Contractor and shall include "wet/full load" tests and /or "automatic run" tests. They shall be carried out in accordance with the Specifications once all the conditions required for such tests are satisfied. As part of the commissioning tests the contractor shall prepare and obtain the Engineer's approval to the interim commissioning test report that sets out the results of all commissioning tests.

### **~~12.3.1 1<sup>st</sup> Stage Commissioning~~**

~~On completion of inspection, checking and after the pre-commissioning tests are satisfactorily over, the first stage commissioning tests will be performed.~~

### **~~12.3.2 2<sup>nd</sup> Stage Commissioning~~**

~~After completion of the first stage commissioning tests the complete equipment shall be placed in initial operation during which period the complete equipment shall be operated integral with sub-system and supporting equipment as complete plant and the second stage and commissioning test completed.~~



The plant shall then be on initial operation with due permission from the Purchaser during which all necessary adjustments shall be made by the Contractor while operating, overall full-load range enabling the plant to be made ready for the trial run.

#### **12.4 — Trial Run**

~~The duration of trial operation of the complete equipment shall be six (6) days out of which at least Seventy Two (72) hours shall be for continuous operation on full load or any other duration as may be agreed to, by the Engineer. The trial operation shall be considered successful provided that each item of the equipment can operate continuously at the specified period of trial run.~~

~~For the period of trial operational the time of operation with any load shall be counted. Minor interruptions not exceeding 2 (two), of up to 1 (one) hour at a time, caused during the continuous operation shall not effect the total duration of trial operation. However, if in the opinion of the Engineer, the interruption is long, the trial operation shall be extended for the period of interruption.~~

~~A trial operation report comprising observations and recordings of various parameters to be measured in respect of the above trial operation shall be prepared by the contractor. This report besides recording the details of the various observations during trial run shall also include the dates of start and finish of the trial operations and shall be signed by the representatives of both the parties. The report shall have sheets, recording of all the details of interruption occurred, adjustment made and any minor repairs done during the trial operation. Based on the observations necessary modifications/ repairs to the plant shall be carried out by the contractor to the full satisfaction of the Engineer to enable the latter to accord permission to carry out performance guarantee tests on the plant.~~

~~After successful completion of the Trial Run the Engineer shall issue a certificate to the contractor to that effect.~~

#### **13.0 TAKING OVER:**

Upon successful completion of the Tests on completion and trial run and the fulfilment of all other specified requirements for issue of a taking over certificate, the Engineer shall issue to the contractor, a taking over certificate. Such certificate shall not unreasonably be withheld nor will the Engineer delay the issuance thereof on account of minor omissions or defects that do not affect the commercial operation and/or cause any serious risk to the equipment. Such certificate shall not relieve the Contractor of any of his obligations which otherwise survive by the terms and conditions of the Contract after issuance of such certificate.

#### **14.0 — COMMERCIAL OPERATION:**

~~Once the unit is taken over by the Engineer, the same will be on Commercial Operation, after obtaining necessary permission from the concerned Authority. During this period and up to the Performance Guarantee Test the Contractor shall continue to assist the Engineer in providing the necessary technical assistance, if any. However, all fuel, water and consumables necessary, along with Shift Engineer, Operator and supporting staff will be provided by the Purchaser.~~

## **15.0 PERFORMANCE GUARANTEE TEST:**

The final test as the performance guarantee test shall be conducted at site, by the Contractor in association with the Purchaser. The contractor's commissioning and start-up Engineer shall make the unit ready for such tests and assist the Purchaser in conducting such tests free of cost. Such test shall be commenced within a period of six (6) months after the date of successful completion of trial operation. Any extension of time beyond the above six (6) months shall be mutually agreed upon but not later than eight (8) months from the date of completion of successful trial operation of last unit.

These tests shall be binding on both the parties of the contract to determine compliance of the equipment with the performance guarantee offered along with the bid.

All the special instruments which will require proper calibration before conducting such performance guarantee tests shall be provided by the Contractor and same shall be allowed to be taken back only after completion of these tests. The tests will be conducted at the specified load points as per the specified cycle condition as practicable. The Engineer will apply proper corrections in calculations, to take into account the conditions that do not correspond to the specified cycle.

Any special equipment tools and appliances including special instruments required for the successful completion of the performance and guarantee tests shall be provided by the Contractor free of cost.

The Guaranteed performance figures of the equipment shall be proved by the contractor during these performance and guarantee tests. Should the result of these tests show any decrease from the guaranteed values of the contractor, the contractor shall modify the equipment as required to enable it to meet the guarantees. In such case, performance and guarantee tests shall be repeated within one month from the date the equipment is ready for re-test and all cost for modifications including labour, materials and the cost of additional testing to prove that the equipment meets the guarantees, shall be borne by the contractor. Even after carrying out the modifications, if the guaranteed figures are not established, the Purchaser may either reject the equipment and recover the payments already made or accept the equipment after assessing the liquidated damages payable by the contractor.

## **16.0 FINAL ACCEPTANCE:**

Upon successful completion of performance guarantee tests of the units carried out at site, the Engineer will issue the Final Acceptance Certificate as proof of the final acceptance of the units. However issue of such certificate will not absolve the contractor from any of his obligations which, as per the terms of the contract indicated elsewhere, will continue beyond the issue of the Final Acceptance Certificate.

## 17.0 DETAILS OF DOCUMENT DISTRIBUTION SCHEDULE

SI No	Document	Total numbers of copies	Details of distribution							
			H.Q.	D&E	HOP	E-in-C (EMG)	E-in-C (Civil)	Site-i/c (E/M)	Site-i/c (Civil)	Contractor's copy
1	PERT Network, Network Schedules, Bar Charts	11	1	3	1	1	1	1	1	1
2	Data, Drawings, documents, write-ups --- Preliminary --- Revised	9	1	5	1	1		1	--	--
		11	1	5	1	1	1	1	--	1
3	Approved drawings, documents etc.	11	1	4	1	1	1	1	1	1
4	Instruction Manuals for erection, O&M	10	1	2	1	2	1	1	1	1
5	Reproducible of Approved drawings and Instruction Manuals	4	1	1	1	1	--	--	--	--
6	As built drawings after execution	11	1	3	2	2	1	2	--	--
7	Reproducible of as built drawings after execution	4	1	1	1	1	--	--	--	--

**Note:** Distribution detail given above is illustrative only. To be modified as required.

### Address for Despatch:

Sl. No.	Copies for	Address
1	H.Q.	Executive Director (Contracts and Procurement). NEEPCO. Brookland Compound. Lower New Colony. Shillong- 793 003, Meghalaya, India.
2	Site i/c (Civil and Electrical)	Head of Project, 240 MW Heo Hydro Electric Project, NEEPCO.
3	Design & Engg. Wing, NEEPCO.	Executive Director, Design & Engineering, NEEPCO BHAWAN. R. G. Baruah Road, Guwahati: 781 005. Assam. India.
4	Head of Project / Engineer-in-Charge	Head of Project / Engineer-in-Charge 240 MW Heo Hydro Electric Project, NEEPCO. .