

the drawings and contract specifications which may be more rigid than, but not contrary to, the above mentioned rules nor from providing such constructions as may be required by the above mentioned rules and regulations, even though it may not be shown on the drawings or in the specifications. In case of variance of the drawings and/or contract specifications from the laws, ordinances, rules and regulations governing the work, the Contractor shall immediately notify the Purchaser. It is the sole responsibility of the Contractor, however to determine that such variance exists. Additional costs, if any, due to such revision and / or variation in the rules, regulations and enactment of Governmental Authorities governing such supplies, codes and standard from that existing arising after the Base Date of the Contract shall be mutually discussed and agreed upon. Wherever required by regulations, the Contractor shall also obtain relevant statutory authorities approval (e.g. the Boiler Inspector's, Factory Inspector, etc.) for the plant, machinery and equipment supplied by the Contractor. The Purchaser to the extent possible shall provide the reasonable support to the Contractor for obtaining such approval.

- 15.5 Codes and standards referred to in the Contract documents shall be followed. Necessary codes and standards of suitable Indian or International standard can be followed, with the prior Approval of the Purchaser, provided materials and equipment according to these standards are equal to, or better than the corresponding standards specified in the Contract. In the absence of codes & standards of any item in the contract, codes and standards of suitable Indian or International standard can be followed.
- 15.6 In general, the materials and workmanship shall meet the requirements of standards and specifications in the contract documents. In any case materials shall be of best grade and quality and most suitable for the purpose intended, in accordance with modern practice and as per the Contract Specification. All materials shall be new. Substitutions for specified materials or variations from designed processes or methods of fabrication will be permitted only if approved by the Purchaser. Such approval may be granted only if a compelling reason exists for making a substitution. Before any defect in materials or workmanship is repaired, the Contractor shall outline the procedure proposed for rectification of the defect and obtain Approval of the Purchaser.
- 15.7 All meters, gauges, recorders and other types of indicating, integrating or recording devices shall be calibrated in the metric system and degrees Celsius. Where Vernier attachments are related to the English system, gearing must be changed to produce results on a true decimal (Metric) basis. Functional and instruction plates shall be in the English language.
- 15.8 Brand name mentioned in the Contract documents is for the purpose of establishing the type and quality of products to be used. Competitive products of equal or better quality and function may be substituted, if approved by the Purchaser. All such products and equipments shall be used or installed in strict accordance with the manufacturer's instructions / recommendations.

As far as practicable, manufactured materials and equipment shall be delivered to the Site of the Work or the place of destination as the case may be as may be applicable, in the original shipping containers or packing boxes bearing the manufacturer's names and brands. The Contractor shall provide the Purchaser with copies of all manufacturer's instructions for all products used in the work.

## **16.0 COMMISSIONING AND OPERATIONAL SPARES, SPECIAL MAINTENANCE TOOLS AND CONSUMABLES**

### **16.1 Commissioning Spares:**

The Contractor shall supply with the plant, machinery and equipment, sufficient quantity of commissioning spares required for Installation, start-up and commissioning of the plant, machinery and equipment and for its efficient operation and Provisional Acceptance upon PG Test. These items shall be based on the Contractor's experience in commissioning similar plant and shall be available at Site along with the plant, machinery and equipment. The Contractor shall be responsible for having the required items at Site in sufficient quantities before the commencement of the start-up operation and commissioning. The prices of the same shall be included in the supply price of the plant, machinery and equipment. The list of commissioning spares included, with quantities, shall be indicated in the offer. If the quantities supplied are found to be inadequate, further quantity as may be required shall be supplied without any extra cost and without affecting the Work and in relation thereto if any taxes or duties are leviable the same shall be borne by the Contractor. Commissioning spares shall be the property of the Purchaser even if the same is not used in the commissioning. Left out spares, if any, after the Provisional Acceptance upon successful completion of the PG Test, out of those indicated in the list, shall be handed over to the Purchaser.

### **16.2 Maintenance Spares:**

16.2.1 The Contractor shall submit with the tender an itemized list showing the unit cost and recommended number of spare parts for the first two (2) years of operation. The Contractor shall also submit drawings as required under Clause 17.6.1.7 of the General Conditions of Contract within six(6) months from the date of the award of the Contract or one half of the delivery period, whichever is earlier, to enable the Purchaser to scrutinize the spare parts list.

16.2.2 The Contractor shall also undertake that supplies of necessary spare parts will be made available at any time later at least during the life of the plant, machinery and equipment at reasonable price.

16.2.3 Spare parts not manufactured directly by the Contractor shall be properly identified and description/catalogues, etc. given in sufficient detail to enable the Purchaser to procure these directly from the manufacturers, if he so desires.

### **16.3 Special Maintenance Tools**

The Contractor shall submit with the tender an itemized list of special maintenance tools and supply special maintenance tools required for the operation and maintenance of the plant, machinery and equipment supplied by him. The Contractor shall also undertake that supplies of necessary maintenance tools will be made available at any time later during the life of the plant, machinery and equipment at reasonable prices.

#### 16.4 Consumables

The Contractor shall inform the Purchaser of the specifications including equivalent brand names and quantities of all consumable materials, such as lubricants, flushing oil, hydraulic fluids, chemicals, lumber, paper, etc. required during the start-up, commissioning, initial filling and yearly requirement for normal operation. Binding information on these shall be furnished to the Purchaser sufficiently in advance of the start-up and commissioning date of any equipment to plan procurement of these materials in time to meet all needs, but not later than six (6) months after the award of the Contract. Should the Contractor feel necessary to modify any of the data furnished by him, this should in any case be furnished at least six (6) months before the start-up and commissioning of the plant, machinery and equipment. The Purchaser shall ask the Contractor to supply such materials as set out in the Technical Specification required for start-up, commissioning, initial filling and performance test and the Contractor shall supply the same.

### **17.0 CONTRACT DRAWINGS, DOCUMENTS AND MANUALS**

#### **17.1 Scope**

- 17.1.1 In as much as the Contractor is required to supply drawings, documents and manuals, he shall furnish the same free of charge to the Purchaser as part of the Contract. These shall include but not restricted to, design drawings, details and construction drawings, specifications bills of materials, manuals etc. unless otherwise defined in the Contract.
- 17.1.2 The Contractor shall be responsible and liable for any discrepancies, errors, or omissions in the drawings and other particulars supplied by him, whether such drawings and particulars have been approved by the Purchaser or not, provided that such discrepancies, errors or omissions are not due to incorrect information or particulars furnished in writing to the Contractor by the Purchaser or the Engineer unless the Contractor as designer and manufacturer of such equipment could have known or discovered the said discrepancies, errors and omissions. The Contractor shall pay for any extra cost incurred by the Purchaser due to any alterations necessitated by reasons of any discrepancy, error or omission in the drawings and particulars supplied by the Contractor.
- 17.1.3 The Contract Specifications and drawing shall be coordinated by the Contractor in such a manner that any work shown in the drawings, and not specified in the Contract, or specified in the Contract and not shown on the drawings is to be done without extra charge; unless such work is specifically exempted, it is to be executed in accordance with the Contract and in the same manner as if fully specified and shown in detail.
- 17.1.4 Drawings furnished by the Contractor shall be certified as correct for use and shall bear the signature of an authorized person of the Contractor.
- 17.1.5 Drawings, documents, manuals, spare parts list, audio visual training tutor in e-form for the benefit of operational and maintenance personal etc. shall be supplied in neat bound volumes and one soft format. All reproducible CAD format or linen/polythene films

transparencies shall be sent in mailing tubes and CDs or any other electronic form as mutually agreed upon. The quality of reproducible linen/polythene films/CDs to be used for supply of reproducible prints will have to be approved by the Purchaser. The drawings, documents etc. shall be mailed to the address of the Purchaser and the Contractor will be informed of these in time by the Purchaser.

## **17.2 Drawing Format**

- 17.2.1 All drawings shall be dimensioned in the Metric System. Where drawings are usually made in the English (or other) systems, they shall also have Metric System dimensions in parenthesis or below the dimensions line. Titles and written notations shall be in English. While preparing the drawings, the drafting standards adopted such that good, clean and legible e-form of the drawings can be obtained. Drawings prepared by the Contractor shall be suitable for transmitting electronically and digitization for preservation.
- 17.2.2 All drawings prepared by the Contractor shall be of a reasonable scale and size of drawings and as per the Indian/ International standard and Contract Specifications. While preparing the drawings, the drafting standards adopted shall be such that good clean and legible e-form of the drawings can be obtained. Drawings prepared by the Contractor shall be suitable for transmitting electronically and digitization for preservation. In general, it is desired to keep all drawings the same size for ease of filing and reference. All design drawings shall be oriented to match the plant, machinery and equipment arrangement drawings and shall have a key plan identifying the plant area to which they apply. All drawings shall be made with the north arrow pointing to the top of the sheet or to the left. There shall be sufficient reference notes on the drawings to permit identification of all the drawings which are required for a proper understanding. Drawings and bills of materials shall show take-off quantities of all materials required for the work.
- 17.2.3 Bills of materials and drawings shall be cross referenced for easy identification. Altering on drawings shall be sufficiently large to be clearly legible.
- 17.2.4 The Contractor's standard drawings used on his contract shall have information pertaining to the specific item under consideration properly identified to distinguish it from information pertaining to other items which may be contained on the same drawing.
- 17.2.5 When a drawing is revised by the Contractor, every change made shall be identified on the drawing by circling the changes made and placing the revision number in a small triangle so as to be easily recognizable. When a subsequent revision is made, the circles made for the previous revision shall be erased and the current changes circled. However all revision numbers in the small triangle shall be retained. In addition a record of revisions, along with the co-ordinates showing the location of revisions shall be indicated at the left hand bottom corner of the drawings as per standard practice. In case of revisions of a drawing, for which a different number is allotted, the new drawings shall clearly indicate the number of the drawing which it supersedes.

17.2.6 All drawings/prints shall bear a stamp/indication at a prominent place indicating whether the drawings are preliminary, for approval or certified as final.

17.2.7 The Contractor shall prepare and furnish drawings exclusively against the Contract. Even standard drawings of the Contractor shall bear a reference in the drawings to the present Contract only. References pertaining to other contracts entered into with other parties shall not appear in the drawings submitted to the Purchaser.

### **17.3 Numbering System**

Identification number or symbols that the Contractor elects to use for his own purpose are permissible. Bills of materials must be such that the Purchaser will be able to identify and purchase any needed replacement and spares. The method of numbering drawings specifications and bills of materials used by the Contractor shall be submitted to the Purchaser to enable the Purchaser to plan its archives. The above information shall be submitted along with the drawings submission schedule within three (3) months of the award of the Contract.

### **17.4 Working documents and drawings list with schedule**

#### 17.4.1 Drawings list and schedule

Within one (1) month of the award of the contract, the Contractor shall supply to the Purchaser five (5) copies of a complete list of all drawings by the title which the Contractor expects to supply against the contract, together with a detailed schedule for the submission of the drawing. The detailed schedule shall take into account the schedule for submission of the different types of drawings as outlined in Clause 17.14 and shall be in conformity with the overall time schedule established by the contractor in his tender, with subsequent modification if any, which has been made part of the contract.

#### 17.4.2 General arrangement and layout drawings

17.4.2.1 Within one (1) month of the award of the Contract, the Contractor shall submit general arrangement and layout drawings including cross-sections for approval prior to the commencement of detailing and manufacture. In the layout drawings, the scope of supply of the Contractor shall be indicated in darker outlines to distinguish them from these items not in the Contractor's scope. The general arrangement and layout drawings referred to herein shall include the following:-

- (i) For plant, machinery and equipment this category shall include equipment outline and overall dimensions locations of equipment centerlines and working point elevations, functional and clearance requirements and important clearance dimensions. The particulars of refractory and other lining work. If any, and of all auxiliaries shall also be included.

- (ii) For piping, this category shall include the flow diagram of all utilities and process fluids showing flow quantities, temperatures and pressures, all pumps, valves and instrumentation. The general arrangement and layout drawings for piping and duct work shall include physical location of equipment and general pipeline/duct routings to avoid equipment and electrical interferences and to make units requiring servicing and maintenance accessible. Both the flow sheets and pipe/duct routings drawings shall show inter-connecting pipelines ducts, and terminal points of the contractor's piping/ducting. This category shall also include diagrams of hydraulic, pneumatic, lubricating, ventilation and air conditioning systems. Where necessary, the Contractor shall also give diagrams and drawings showing waste disposal system.
- (iii) For electrical, this category shall include layout drawings showing locations of all electrical equipment including motors, controls, limit, switches, solenoid valves, etc. motor list, list of electromagnetic valves, single line, inter-locking and sequence diagrams with instruction diagrams for control signaling and communication systems, location of devices on switch-gear, control panels, desks etc. including sectional views. The details furnished shall include complete cabling drawings giving, details of power and control cables, and terminal detail layout of trenches and cable racks/tunnels, conduits etc.
- (iv) For instrumentation, this category shall include the control scheme and instrumentation flow diagrams and general arrangement drawings of instrument and control panels.
- (v) Drawings for approval of the statutory authorities such as Indian Boiler Inspectorate, Inspectorate of Explosives, Electrical Inspectorate, Factory Inspectorate, environmental clearances and from other statutory and regulatory bodies, etc., as may be required under the applicable laws with reasonable assistance from Purchaser as may be deemed necessary.

17.4.2.2 The details furnished shall include necessary calculations and data required for demonstrating that all part of the plant, machinery and equipment to be furnished shall conform to the provisions of the Contract.

## **17.5 Foundation outline drawings and load data:**

Certified foundation outline drawings including dimensional anchor/foundations Bolt location plan and loading drawings for all foundations and structures together with details drawings giving the size and specification of all foundation/anchor Bolts, sleeves, inserts, supports and other materials which have to be embedded in concrete. These drawings/data shall be furnished within three (3) months of the award of the contract or one-fourth of the delivery period, whichever is earlier.

## **17.6 Equipment details and other drawings and documents**

- 17.6.1 The Contractor shall submit within the time limits indicated in Clause 17.14.3 detailed drawings, covering such drawings, bills of materials or other documents required for the manufacture, fabrication or supply of parts, site installation of piping and ductwork, Site installation of cabling, wiring, buswork, both overhead and underground, conduct, cable trays and supports, and for all refractory work as well as any other lining work. The detailed drawings shall include, but not be limited to, the following:
- 17.6.1.1 Dimension drawings showing dimensions required for the location of each individual equipment including, where necessary, its auxiliaries and control panels being supplied under the Contract, the method and size of the connections to the Purchaser's other equipment within three (3) months of the award of the contract or one-fourth of the delivery period whichever is earlier.
- 17.6.1.2 Assembly, sub-assembly and sectional drawings, as well as detailed drawings showing details of components, required for assembly before three (3) months prior to the first shipment or three-fourth of the delivery period, whichever is earlier. These shall be suitably cross referred to other drawings as required. The drawings shall be sufficiently detailed such that, if the purchaser so desires, it can procure spares and replacements from any competent manufacturer in India or abroad. Details of mechanical equipment shall include grades of finish, heat treatment, clearances (tolerances,) etc. and for electrical equipment these shall include, for example coil dimensions, size and section of conductors, type and size of insulation, process of impregnation etc.
- 17.6.1.3 Performance data, including graphs, efficiency and characteristic curves and other pertinent information of the individual/composite items of plant, machinery and equipment, within three (3) months of the award of the Contract or one- fourth of the delivery period which is earlier.
- 17.6.1.4 Drawing for the approval of statutory authorities, such as the Indian Boiler Inspectorate, Inspectorate of Explosives, etc. at least six (6) months prior to the first shipment.
- 17.6.1.5 Schematic drawings and inter-connecting wiring diagrams, showing, points where connections have to be made by the Purchaser, within three (3) months of the award of the contract or one-fourth of the delivery period, whichever is earlier.
- 17.6.1.6 Drawings showing refractory work and lining, with details of types and grades of refractories, size and shapes of bricks, complete bills of materials for all refractories, specifications including chemical and physical properties of all types of refractory materials, before six (6) months prior to the first shipment or three- fourth of the delivery period, whichever is earlier.
- 17.6.1.7 The manufacturing drawings required for the items in spare parts quotations to assess the requirements of spare parts before the placement of orders for spare parts and drawings of wearing parts showing materials of all components which require replacements due to wear in normal operation. A list of wearing parts, such as bearings, retainers, gaskets, Bolts chains etc., shall be furnished showing quantities furnished and installed, dimensions, materials used and expected useful life. The information furnished shall include complete specifications for

all wearing parts including grades of finish, heat treatment, tolerances etc. Further, drawings of components of proprietary items of the Contractor and his Sub-Contractor which can be manufactured by general engineering practice shall be furnished. If required, the Purchaser will give an undertaking that such items of proprietary nature will not be used for commercial purposes but will be exclusively used only for the maintenance purposes of the plant, machinery and equipment. All these drawings/information shall be supplied within six (6) months of the award of the Contract or one half of the delivery period, whichever is earlier.

17.6.1.8 Other drawings, specifications and data including those not described above but required by other agencies to perform their work/engineering. These shall be furnished during the execution of the Contract.

#### **17.7 Bills of Materials:**

Bills of materials shall be submitted along with the drawings to which they pertain and shall include listing of materials being supplied showing piece mark, description and reference drawing numbers. Packing lists described in the marking and shipping instructions covered in these general conditions must have the same identifications as shown on the applicable bills of materials.

#### **17.8 Assembly and Erection Instructions and Drawings**

17.8.1 The Contractor shall furnish Four (4) copies of the following:

17.8.1.1 Descriptive literature and drawings to illustrate the working principles, method of assembles and dismantling.

17.8.1.2 Instruction books for proper erection, assembly of all equipment and necessary instruction for checking and recording proper assembly of the plant.

17.8.1.3 Instruction sheets for proper balancing, alignment, checking and calibration as may be necessary.

17.8.1.4 Erection drawings showing all details and particulars, in sequence, required for the erection and installation of the plant. In addition, the contractor's recommended time schedule and a chart showing the sequence of erection for the erection of equipment may also be furnished.

17.9 The documents, drawings, etc. referred to in Clause 17.8 shall be submitted in the time so as to be available at Site prior to the shipment of plant, machinery and equipment, but in any case at least three (3) months before the first shipment of plant, machinery and equipment or three-fourth of the delivery period, whichever is earlier.

#### **17.10 Final Drawings**

17.10.1 Along with the supply of the plant, machinery and equipment, sufficient set of prints shall be furnished for the original drawings, specifications, bills of materials, calculation sheets etc. made by the Contractor. These shall include but not restricted to the following:

- (i) General arrangement, assembly, sub assembly and section drawings as well as detailed drawing showing details of components required for assembly with bills of materials and schedule of parts of each complete plant, machinery and equipment giving part numbers with reference to the assembly drawings and the total number of each part. These drawings shall be suitably cross referred to other drawing as may be required. The drawings shall be sufficiently detailed such that, if the Purchaser so desires, he can procure the spares and replacement from any competent supplier/manufacturer in India or abroad.
- (ii) Performance data including graphs, efficiency and characteristic curves and other pertinent information of the individual/composite items of the plant, machinery and equipment as may be applicable.
- (iii) Operation manual of the plant, machinery and equipment.
- (iv) Maintenance manual covering all phases of both preventive and repair maintenance giving clear instructions regarding expected faults, method of detection and elimination, lubrication charts etc.
- (v) Flow diagrams and layouts of instrumentation, hydraulic, pneumatic, lubrication systems and utilities with all necessary dimensions and specifications.
- (vi) Complete electrical, schematic and erection and inter connecting wiring diagrams for power distribution, control and instrumentation and logic circuits for the plant, machinery and equipment.
- (vii) The Contractor shall supply the complete list of commissioning spares. In addition, the Contractor shall supply spares list giving complete list of replaceable parts for two (2) years normal operation indicating clearly operational, consumable, maintenance, replacement spares etc. In the maintenance spares the fast wearing spares shall be clearly identified. The spare parts list shall include necessary catalogues and manufacturing drawings and shall be supplied in the form of a table giving item designations and application, name of the manufacturer, manufacturer's specifications, type and form, reference drawing number, standards used, quantity installed and recommended for two (2) years normal operation, expected useful life, unit cost and in addition for electrical equipment the item designation shall show the entire module to be replaced in case of defect in any component. Detailed instructions both for original installation and future replacements shall be furnished.
- (viii) Manufacturing drawings for fast wearing parts which require replacements due to wear and tear in the normal operation. The information furnished shall include

complete specifications giving materials of construction, heat treatment, grade of finish, tolerance etc. for mechanical items and coil/cable dimensions, size and section of conductors, type and size of insulation etc. for electrical items.

17.10.2 The Contractor shall submit all stability certificate duly signed as required under the Factories Act, 1948 and amendments thereof etc. for the new building and structures under their scope.

17.10.3 Further drawing and specifications, datae not mentioned herein above specifically but required by the Purchaser in connection with the Contract and possible alterations shall also be supplied by the Contractor as and when required.

17.10.4 All drawings, specifications, materials and designs, if any, furnished by the Purchaser or his authorized representatives shall be treated as confidential and shall be the property of the Purchaser and shall be returned to the Purchaser upon completion of the work or upon termination of the Contract. No copies or duplications thereof shall be retained by the Contractor without the prior consent of the Purchaser. All drawing, specifications or manuals furnished by or through the Contractor shall be fully owned by the Purchaser who is entitled to use them for all purposes of execution of the Contract and operation and maintenance of the Plant being subject to the Contract. However, the registered intellectual property right for the drawings and documents as stated above furnished by or through the Contractor shall remain with the Contractor.

#### **17.11 Spares List, Maintenance and Operational Manuals**

17.11.1 The Contractor shall supply Four (4) sets of spare parts list giving the complete list of all parts required as commissioning spares, which shall be supplied along with the equipment in addition, the Contractor shall supply spares list giving complete list of replaceable parts for two years, normal operation, indicating clearly operational, consumable, maintenance replacements spares, etc. In the maintenance spares, fast wearing and insurance spares shall be clearly identified. The spare parts list shall include necessary catalogues and manufacturing drawings and shall be supplied in the form of a table giving items designation and application, name of manufacturer, manufacturer's specification., type and form, reference drawing number, standard used, quantity installed, quantity recommended for two years normal operation, unit price and in addition for electrical equipment the item designation shall show the entire module to be replaced in case of defect in any component. Detailed instructions both for original installation and future replacements shall be furnished.

17.11.2 Four (4) copies of maintenance manuals covering all phases of both preventive and repair maintenance shall be supplied, including lubricating charts, showing every point requiring lubrication, grade of lubricant, schedule for lubrication, and, where required, the correct amount and grade of oil or grease necessary for refill after drainage.

17.11.3 Four (4) copies of operating instructions shall be provided, including all details necessary to ensure proper procedure and sequence of operation.

17.11.4 The documents, drawings, etc. referred to in this Clause shall be submitted at least three (3) months prior to the first shipment of equipment by the Contractor or three-fourth of the delivery period, whichever is earlier.

17.11.5 All manuals, documents, spare parts, lists etc. shall be supplied in neat bound volumes in indicated copies along with one soft copy.

## **17.12 Approval of drawings**

17.12.1 The Contractor shall submit such drawings, specification and bills of materials as the Purchaser or Engineer may require in accordance with the time schedule which is part of the Contract or any other reasonable schedule which the Purchaser or Engineer may require. The Contractor shall submit such drawings and documents singly or in small batches as fast as they are available for shipment so as to prevent large accumulations of work from delaying approval procedures.

17.12.2 Approval of the Contractor's drawings, specifications and bills of materials will be mailed within four (4) weeks of the receipt of drawings etc. In case, a delay is anticipated, the Contractor will be notified.

17.12.3 Approval of the Contractor's drawings, specifications and bill of materials means that these will be checked for conformity with applicable specification and general conformity with the engineering requirements for the area covered in the Contract. It is understood that approval by the Purchaser does not include checking for drafting and other errors, but only review of basic concepts and general principles involved.

17.12.4 The Contractor shall make any changes in the design, with the prior Approval of the Purchaser, which are necessary to make the equipment conform to the provisions and intents of the Contract without additional cost to the Purchaser. The Purchaser's approval of the Contractor's drawings, specifications and bills of materials shall not relieve the Contractor of responsibility to comply with the intent of the Contract. Fabrication or Procurement without approved drawings or prior to approval of drawings shall be at the Contractor's risk.

17.12.5 When the Contractor has a drawing ready for approval, he shall send two (2) prints to the Purchaser and two (2) paper re-producibles to the Engineer. The paper reproducible shall be of a quality approved by the Purchaser. If the drawing is "Not approved" or "Approved as noted" one marked up print with appropriate comments will be returned to the Contractor for correction and re-submission. The Contractor shall resubmit the final drawings incorporating all the changes within two (2) weeks after the receipt of the drawings with the Purchaser's comments. The final drawings shall be re-submitted in three (3) paper re-producibles and two (2) prints to the Engineer and Purchaser as above. One (1) print of final approved drawing will be furnished to the Contractor.

17.12.6 Upon approval by the Purchaser, the drawings shall become Contract drawings and thereafter the Contractor shall not depart from them in any way whatsoever except with the written permission of the Purchaser.

17.12.7 All drawings and documents shall be sent by first class air mail. In case, these are sent by air freight, all expenses incurred by the Purchaser and Engineer for customs, handling and forwarding shall be payable by the Contractor. All reproducible / linen transparencies shall be sent in mailing tubes.

### **17.13 Drawings/ Documents at delivery of Equipment**

17.13.1 With the delivery of equipment, the Contractor shall submit three (3) sets of all test certificates.

17.13.2 In addition one (1) set of drawings and documents, covered under Clause 17.11 shall be supplied along with the first shipment of plant, machinery and equipment.

### **17.14 Drawings and Documents at Completion of Work:**

17.14.1 At the completion of PG Test and issuance of the PAC, the Contractor shall supply for all items being supplied by him and his sub- contractors one (1) reproducible on CAD format on CD along with five (5) prints of each original drawings, specification, bills of materials, calculation sheets, etc. made by the Contractor and his Sub-Contractors, incorporating all changes made during the execution of the work, including those made at site during erection, assembly and start-up, indicating the authorities who made the changes.

In addition three (3) sets of schedule of parts of each complete equipment, giving part numbers with reference to assembly drawings and the total number of each part, as shall be furnished.

17.14.2 Until such time as the supply of drawings, documents and information required as per Clause 17 is completed, the Purchaser will not finally accept the plant as supplied by the Contractor.

17.14.3 The Contractor shall submit the various drawings and documents covered in this Clause as per the following tentative schedule:

<b>Clause No.</b>	<b>Brief description of type of drawings/documents</b>	<b>Time of submission</b>
17.3	Details of numbering system	Within three (3) weeks of award of Contract.
17.4.1	Drawing list and schedule.	Within one (1) month of award of Contract.
17.4.2	General arrangement and layout drawings	Within one (1) month of award of Contract.

<b>Clause No.</b>	<b>Brief description of type of drawings/documents</b>	<b>Time of submission</b>
17.5	Certified foundation outline drawings, data, etc.	Within three (3) months of the award of Contract or one fourth of the delivery period, whichever is earlier.
17.6.1.3	Performance data, etc.	Within three (3) months of the award of Contract or one fourth of the delivery period, whichever is earlier.
17.6.1.1	Dimension drawings.	Within three (3) months of the award of Contract or one fourth of the delivery period, whichever is earlier.
17.6.1.5	Schematic drawings, etc.	Within three (3) months of the award of Contract or one fourth of the delivery period, whichever is earlier.
17.6.1.7	Wearing parts drawings, spare parts drawings, drawing of components of proprietary items	Within six (6) months of the award of Contract or one half of the delivery period, whichever is earlier.
17.6.1.4	Drawings for approval of statutory authorities.	Six (6) months prior to first shipment of equipment.
17.6.1.6	Drawings and documents for refractory and lining work.	Six (6) months prior to first shipment of equipment or three-fourth of delivery period, whichever is earlier.
17.6.1.2	Detailed drawings for assembly, sub-assembly, components etc.	Three (3) months prior to first shipment of equipment or three-fourth of delivery period whichever is earlier.
17.8 and 17.9	Assembly and erection instructions and drawings.	Three (3) months prior to first shipment of equipment or three-fourth of delivery period whichever is earlier.
17.11	Spare parts, maintenance and operational manuals.	Three (3) months prior to first shipment of equipment or three-fourth of delivery period whichever is earlier.
17.13	Test Certificates.	With first shipment of equipment delivery.
17.14.1	Completion drawings and documents.	At the time of issue of provisional acceptance Certificate.

## **18.0 CONTRACT PRICE**

The contract price will include the aggregate of the price for imported plant, machinery and equipment, foreign services (including design and drawings, training) and all indigenous supplies and services (including indigenous design and drawings, if any), including Installation and Erection, Commissioning, PG test and the price towards all the obligations agreed to be performed which are covered in the scope of Work and elsewhere in the Contract. The contract price will exclude the Indian taxes, duties, levies, etc. for imported equipment and services but will include all Indian taxes, duties, levies, etc. on indigenous supplies and services. Delivery of all imported drawings and documents is on DDP (delivery duty paid) basis as per INCOTERMS at ex-site and the delivery of indigenous Drawings and Documents shall be at Purchaser's office.

The Contractor's prices for materials to be supplied under the Contract shall include charges for packing of a kind and quality suitable for shipment overseas and tropical conditions for imported equipment and as customary for indigenous equipment for delivery in good condition.

#### **19.0 ASSIGNING OF CLAIMS AND INTEREST IN THE CONTRACT**

The Contractor shall not assign his claim or interest in the Contract without the written permission of the Purchaser which shall not be unreasonably withheld. However, if it is mandatorily and statutorily required as per the applicable laws of the Contractor/s home country, the Contractor's request to assign/or subrogation, as the case may be, its rights and obligations under the Contract to a Credit Insurance company or to its parent company may be considered by the Purchaser after it is satisfied about the real need thereof, on such terms and conditions as the Purchaser thinks due and proper, provided however that the assignee / subrogee agrees to perform the Contract signed by the Contractor mutatis-mutandis

#### **20.0 INSPECTION AND TESTS DURING MANUFACTURE**

- 20.1 The Purchaser or his authorized representative shall have the right of inspecting and testing the Contract work or any part thereof at any time during the manufacture as per approved Quality Assurance Plan (QAP) and the Contractor on demand from the Purchaser shall carry out such tests in an appropriate manner in the presence of and free of charge to the Purchaser. Should the Contractor, himself not be in a position to carry out the tests, he shall, on the Purchaser's demand, prepare specimens or samples and send them at his own cost, to such testing stations as the Purchaser may specify and the cost for the tests so effected shall be to the Contractor's account. Should a part of the plant, machinery and equipment be manufactured not on the Contractor's own premises but on other premises, the Contractor shall likewise obtain permission for the Purchaser to inspect and test the work as if the said plant were being manufactured on the Contractor's premises. The inspection, examination or testing carried out at the presence of the Purchaser shall not release the Contractor from any of the obligations and responsibilities under the Contract.
- 20.2 The inspection and tests shall be so conducted as not unreasonably to impede the progress of manufacture.
- 20.3 The Purchaser shall have the right to be present at all tests carried out by the Contractor. The Contractor, on being requested so to act, shall present sufficient documentary evidence as per the approved QAP that the materials used will meet the requirements of good engineering practice. With respect of materials used for the construction of the plant and equipment, such as, structural steel, mild steel, cast iron, cast steel, etc., the Contractor shall produce the requisite test certificates along with specimen and test pieces on which tests were carried out by the manufacturer, at the time of examination as per the QAP. With respect to large castings or forgings, the Contractor shall arrange for the necessary X-Ray and ultrasonic tests to be carried out at his own cost if called for, the samples and specimens shall become the Purchaser's property. The Contractor shall notify the Purchaser in an appropriate manner as to the Contract work particularly before any assembly in order that the Inspections or tests can be carried out as

may be required to ascertain, without prejudice to the Contractor's liability, whether the materials and/or services are in conformity with the requirements of the Contract.

- 20.4 The Purchaser shall, on giving reasonable notice in writing to the Contractor setting out any grounds of objections which he may have in respect of the work, be at liberty to reject all or any plant or workmanship on the basis of any grounds of objection, which are not in accordance with the Contract or do not fulfill the requirements of the Contract.
- 20.5 Within four (4) weeks of the award of the Contract, the Contractor shall communicate to the Purchaser details of the tests to be conducted and obtain his approval for the same. Approval for the above will be generally given by the Purchaser within four (4) weeks of the receipt of the information.

The Contractor shall also furnish a list of various components, sub-assemblies and assemblies which the Contractor proposes to put up against the plant, machinery and equipment for inspection. The Purchaser has a right to make modifications in this list to ensure that the minimum amount of assembly work is done at Site.

The Contractor shall give the Purchaser a minimum of three (3) weeks' notice of any material being ready for testing, specifying the period likely to be required for such testing, and the Purchaser or his said representative shall, (unless the inspection or test is voluntarily waived), on giving 24 (twenty four) hours previous notice in writing to the Contractor, attend at the Contractor's or Sub-Contractor's premises (as the case may be) and complete the testing as soon as possible in a period, normally of not more than eight (8) days, from the date on which the material is notified as being ready for testing or inspection, failing which visit the Contractor may proceed with the tests which shall be deemed to have been made in the Purchaser's presence and shall forthwith forward to the Purchaser duly certified copies of the test reports. In cases where the Purchaser is requested to carry out inspection when in fact the equipment is not ready for testing, the cost of such visits, including incidental expenses, shall be to the Contractor's account.

- 20.6 The Contractor shall be responsible to perform or to have performed by others any and all tests and inspections requested by the Purchaser or his authorized representative as part of his duties under the Contract. The Contractor shall inspect the work for which he is responsible to ensure proper performance. To this end, he shall prepare and submit all pre-inspection forms, releases, post-inspection reports, test reports and such other documentation in such details and at such interval as the Purchaser or his authorised representative may request.
- 20.7 If the Purchaser has reasons to suspect the existence of hidden defects due to faulty materials and workmanship, he will have the right to order the removal and rebuilding of the doubtful parts of the work or of carrying out additional tests as required. The costs involved in such operation shall be to the account of the Contractor if the existence of such defect is proved; otherwise the costs involved shall be to the account of the Purchaser.
- 20.8 Failure on the part of the Inspector to inspect or to reject after inspection, Work which later proves to be defective, shall not relieve the Contractor from warranties, commitments and

obligations which he undertakes under this Contract. The Contractor is solely responsible for the accuracy, quality and completeness of his work and supply.

- 20.9 On the completion of shop fabrication, the Contractor shall assemble in his shop all fabricated and procured parts in to sub-assemblies and complete assemblies as stated in Clause 20.5 to ensure proper field erection or as directed by the Purchaser. All parts shall be match-marked by the Contractor to facilitate reassembly at site.
- 20.10 In all cases whether at the premises or work of the Contractor or of any sub-contractor, the Contractor, except where otherwise specified, shall provide, free of charge to the Purchaser, such labour, materials, electricity, fuel, water stores, apparatus, instruments, shop drawings and performance data, including graphs, efficiency and characteristic curves and other pertinent information as may reasonably be demanded, to carry out efficiently such tests of the plant, machinery and equipment in accordance with the Contract and shall give facilities to the Purchaser or his representative to accomplish such testing.
- 20.11 When the tests have been satisfactorily completed at the Contractor's or Sub-Contractors work, the Purchaser or his representative shall forthwith issue a certificate to that effect. If a final certificate cannot be issued, preliminary or provisional certificate shall be issued. If the tests were not witnessed by the Purchaser or his representative, the certificate may be issued on receipt of the test report from the Contractor but not later than 15 (fifteen) days after the receipt of the test reports by the Purchaser. No plant shall be shipped or dispatched before the certificate of acceptance for shipment as per Clause 23.4 has been issued. The Purchaser has a right to withhold such certificates if the sub-assemblies and assemblies covered in the list are not as per the approved list in Clause 20.5. The satisfactory Completion of these tests or the issue of the certificate shall not bind the Purchaser to accept the plant, should it, on further tests, after erection be found not to comply with the Contract.
- 20.12 Where the Contract is concluded for the supply of main plant, machinery and equipment as well as for spare parts, the Contractor shall tender for inspection the spare parts only after the main equipment has been tendered for inspection and accepted.

## **21.0 TESTS ON COMPLETION**

Where possible all tests / inspection shall be carried out before shipment or dispatch. Should however, it become necessary for some tests / inspection to be carried out after Installation, they shall be carried out in the presence of the Contractor's representative. Should however, it becomes necessary for final test as to performance and guarantees to be held over until the plant is erected at Site, they shall be carried out in the presence of the Purchaser's representative within such time as may be considered reasonable by the Purchaser. Should the results of the tests not come within the margin specified, the test shall be repeated within 10 (ten) days from the date the plant, machinery and equipment is ready for re-test. If the results are still not satisfactory, further test, to the extent permissible by the terms of the Contract and at the sole discretion of the Purchaser, shall be conducted by the Contractor in the presence of the Purchaser's representatives after executing the necessary adjustments, repairs, rectifications and modifications etc., the cost of which shall be borne by the Contractor.

## **22.0 REJECTION OF DEFECTIVE PLANT, MATERIALS AND WORKMANSHIP**

22.1 If the completed plant, machinery and equipment or any portion thereof at any time before it is finally accepted by issue of Final Acceptance Certificate be defective or fails to fulfill the requirements of the Contract, the Purchaser shall be at liberty to reject any such work done or plant, machinery and equipment supplied or materials used by the Contractor or Sub-Contractor.

The Purchaser shall give the Contractor notice as soon as reasonably practicable, setting forth particulars of such defects or failure, and, in so far as may be necessary, place the plant at the Contractor's disposal. The Contractor shall, with all speed and at his own expense, make it comply with the requirements of the Contract. Should he fail to do so within a reasonable time as may be determined by the Purchaser, the Purchaser reserves the right to reject and replace at the cost of the Contractor, the whole or any portion of the plant, machinery and equipment, as the case may be, which is defective or fails to fulfill the requirements of the Contract.

Such replacement, shall be carried out by the Purchaser within a reasonable time and at a reasonable price, and where reasonably possible to the same Contract Specification and under competitive conditions. The Contractor's liability under this Clause shall be satisfied by the payment to the Purchaser immediately on demand of all moneys paid by the Purchaser to the Contractor in respect of such plant, machinery and equipment plus the ascertained difference, if any, between the replacement documented price of the plant, machinery and equipment, including charges for installation and the original contract price, including the charges for installation in respect of such defective plant including all incidental charges incurred in relation thereto. Should the Purchaser not get the rejected plant, machinery and equipment so replaced within a reasonable time as may be determined by the Purchase, the Contractor's liability under this Clause will be satisfied by the repayment of all moneys paid by the Purchaser to him in respect of such rejected plant, machinery and equipment. In addition to the above, the Purchaser reserves the right to exercise all its right under this Contract and those available under the applicable law in relation to claim damages and losses that the Purchaser may incur in relation thereto.

22.2 In the event of rejection, the Purchaser shall be entitled to the use of the plant, machinery and equipment in a reasonable and proper manner for a time reasonably sufficient to enable him to obtain other replacement plant, machinery and equipment.

22.3 Subject to Clause 22.2 hereinabove, the Contractor may be entitled to remove and retain all plant, machinery and equipment which the Purchaser may have replaced at the Contractor's cost. If the Contractor fails to remove such rejected / replaced plant within mutually agreed time period, the Purchaser shall be entitled to cause the removal thereof and all expenses incurred by the Purchaser in connection, therewith shall be to the Contractor's account.

## **23.0 PACKING, PROTECTIVE PAINTING, MARKING AND SHIPPING**

### **23.1 PACKING AND PROTECTIVE PAINTING:**

- 23.1.1 The Contractor shall include and provide for securely protecting and packing the plant, machinery and equipment in accordance with the best established practices so as to protect the contents from damage during transit from point of manufacture until after arrival at the installation Site under conditions which may involve multiple handling, transport by ship, rail and road, re-shipment, storage, exposure to heat, moisture, rain etc. and possibility of pilferage. The packing standards shall be as per Technical Specification, if specified and as may be accepted by the Purchaser or its representative and wherever considered necessary, the Purchaser or his representative may check the packing before dispatch and may ask for modifications to the extent considered necessary to be carried out in the packing and the Contractor shall carry out the same. Special precautions as outlined in Clause 23.1.3 to Clause 23.1.8 below shall be taken into consideration. All packing shall allow for easy removal and checking to the extent practicable at Site. All packing cases, packing and other similar materials shall be new and supplied free by the Contractor and the same will not be returned, unless otherwise stated in the Contract.
- 23.1.2 The Contractor shall properly clean and/or shot blast the plant, machinery and equipment and apply one coat of rust inhibitor and a shop coat of paint. Shop finished plant, machinery and equipment shall be supplied finish painted. All primer, paints and colours shall be mutually agreed.
- 23.1.3 Heavy machinery shall be mounted and bolted to skids which shall be of sufficient strength to support and prevent distortion to the machine. All openings of pipes, large valves and machinery must be protected by wooden covers or plugs and machined threads must be covered by caps to protect against damage in transit.
- 23.1.4 All equipment and parts susceptible to corrosion by exposure to moisture and all electrical equipment shall be thoroughly protected against damage during transit and storage. Machine-finished surfaces shall be coated with approved anti-rust compound and all unfinished surfaces of machinery are to be given one coat of rust protective paint. In addition to normal packing, all electrical equipment shall be wrapped in polyethylene or polypropylene plastic sheet and openings in electrical equipment shall be sealed with water proof tapes. A protective grease proof paper shall be inserted between the brushes and armature motors and generators.
- 23.1.5 The Contractor shall deliver the following stores in individual separate packages, having markings, corresponding to the equipment.
- 23.1.5.1 Foundation Bolts, embedments, etc.
  - 23.1.5.2 Commissioning spares.
  - 23.1.5.3 Special tools for repair and maintenance.
  - 23.1.5.4 Refractory and lining materials
  - 23.1.5.5 Specialized installation tools, tackle, instruments and appliances.
  - 23.1.5.6 Consumables.
  - 23.1.5.7 Spare parts and accessories.

- 23.1.6 Fragile items shall be wrapped in crepe cellulose wadding or some equally efficient cushioning material and stuffed / floated in excelsior and packed in substantial wooden cover with special precaution against risk breakage.
- 23.1.7 The shipment dimensions of each package shall not exceed the maximum dimension of packing which can be accepted for transport over the roads or broad gauge system of the Indian Railways or vessel. If, however, over size consignments are unavoidable, the Contractor shall give proper notice to the Purchaser to arrange for the movement of over-size consignment.
- 23.1.8 Each equipment or parts of equipment shall, when shipped or dispatched, be tagged with reference to the assembly drawings and corresponding part number.
- 23.1.9 Notwithstanding anything stated in this Clause, the Contractor shall be entirely responsible for loss, damage or deterioration to the, materials occasioned by faulty, defective or insecure packing, or due to improper or insufficient protective measures.

## **23.2 MARKING:**

- 23.2.1 The following shipping mark, giving the purchase order number shall be clearly stenciled with good quality non-fading paint on one side of the shipping package in characters at least 150 mm high where size of package will permit:

MISHRA DHATU MIGAM LIMITED, TELANGANA, INDIA.

PACKAGE No.

Contract No.

Package number as given above is to be followed sequentially in ascending order. There is to be no duplication of package numbers on any individual order.

- 23.2.2 On the top and one end the following shall be marked:

MISHRA DHATU NIGAM LIMITED

Package No.

- 23.2.3 On one end the following information shall be marked:

MISHRA DHATU NIGAM LIMITED

GROSS WEIGHT (KILOGRAMS)

NET WEIGHT (KILOGRAMS)

LENGTH (METERS)

WIDTH (METERS)

HEIGHT (METERS)

Made in (Country of Origin)

- 23.2.4 On the side opposite the main packing shown in Clause 23.2.1 above, the name of the Contractor, contract number, Contractor's bill of material item number-or other identifying data shall be clearly marked.
- 23.2.5 For the identification of unloading areas at the plant, machinery and equipment collared bands shall be painted encircling all packages, crates or boxes. Colour code for Contracts will be mutually agreed.
- 23.2.6 In the case of bundles or metal base, the proper markings, as here in designated, are to be placed on metal tags which are to be securely attached to the bundle or bar as conspicuously as possible.
- 23.2.7 If necessary, packages must be marked on all four sides with arrows pointing to the top.
- 23.2.8 Easily damaged material or radioactive or perishable goods must be marked on all sides with appropriate cautionary symbols.
- 23.2.9 When required due to length of unbalanced weight, the container or pieces shall have locations of cables or hooks and the center of balance indicated by proper markings.
- 23.2.10 Fabricated sections of structures and equipment must have their respective piece marks permanently stamped into the piece to a depth of not less than one mm, and the stamped area painted with rust preventive paint to a radial distance of fifty mm on the surrounding area.

### **23.3 SHIPPING**

- 23.3.1 The Contractor shall prepare and furnish the Purchaser within three (3) months before the date of first shipment a shipping schedule showing the breakdown of the complete plant, machinery and equipment into various shipment units, with approximate weight and dimensions and the respective dates upon which such units will be ready for dispatches from the point of manufacture. This schedule shall be taken into consideration, for Installation. The Contractor shall promptly give written notice to the Purchaser of any anticipated delay in maintaining the said schedule, stating the reasons therefore. The Purchaser will book space on available vessels scheduled to sail on dates as soon as practicable, after the respective dates on which the shipment units are to be ready for shipment at the indicated port and inform the Contractor accordingly.
- 23.3.2 Shipping details shall be submitted in 10 (ten) sets and shall specifically quote the shipping marking, designation of contents and dimension in metric units, itemized net weight and total gross weight of each package. One (1) complete set of negotiable shipping documents shall be forwarded to the Purchaser immediately after shipment. Complete shipping documents shall be made available to the Purchaser at least 3 weeks in advance of the arrival of the ship at the port of unloading. Further details of shipping schedules, shipping notes and documents will be finalized at the time of the contract or thereafter.