

HINDUSTAN SHIPYARD LIMITED :: VISAKHAPATNAM

**TECHNICAL SPECIFICATION FOR FABRICATION / ERECTION, TESTING
AND COMMISSIONING OF PIPING SYSTEMS ON BOARD THE VESSELS
UNDER CONSTRUCTION (RATE CONTRACT)**

1. The Systems as assigned from time to time are to be fabricated, erected onboard and commissioned as per the specifications. The drawings required for fabrication will be issued by HSL.
- 1.1 The scope of work covers, fabrication of pipe spools, tank fittings etc., as per the schematic detailed drawings, installing the same on board the Ship and testing to be shown as per required pressures / standards specified by Quality Control Dept. of HSL and presenting the same to survey by Q.C Dept. of HSL / Surveyors / Owners representatives etc., as per testing schedule and commissioning of the Systems.
- 1.2 Piping systems / spools are to be tested as per "Quality Plan (Part-II) Piping" of Q.C. Dept. of HSL. (As per test pressures indicated in the relevant drgs. or as specified by Q.C. Dept.)
- 1.3 Damage to materials, machinery, equipment and other properties of HSL during material handling shall be accounted and the amount for the damaged portion will be deducted from the bills.

2. SCOPE OF WORK OF CONTRACTOR

- 2.1 After studying the schematic drawings, the contractor shall plan the total scope of work involved and estimate the quantum of work to be carried out. The plan prepared for completion of work is to be submitted to the plumbing department. Since the piping materials involved are of carbon steel pipes and non ferrous material, qualified and experienced persons in piping works shall handle the job. The piping system comprises of ferrous and non-ferrous pipes, fittings and involves welding of flanges and end fittings (Weldable and Non weldable fittings). All welding works are to be carried out by qualified welders approved by HSL, QA/QC Dept./Class Surveyors.
- 2.2 Necessary weld procedures prepared by QA Dept. to be collected from HSL QA Dept./plumbing dept. and welding is to be carried out as per procedure.
- 2.3 Required tools and equipment shall be arranged by the Contractors.
- 2.4 Collection of required materials from HSL Stores/Plumbing Dept., as per the Material lists /B.O.M for the scheduled works proposed to be carried out under the guidance/supervision of Plumbing Dept.'s assigned Officers / Supervisors.
- 2.5
 - a) Fabrication, processing, dimensional check, erection testing and commissioning as per plans to the entire satisfaction of Quality Control Dept./Class/Owners.
 - b) Welding is to be carried out as per Q.A. Standards.

- c) TIG Welding is to be carried for L.O system pipes / hydraulic system piping works etc.,
 - d) Quality Plans/latest revised drawings are to be obtained from Plumbing Dept., for strict implementation during fabrication, welding, radiography examination, testing, inspection etc. All Survey Reports are to be properly documented after obtaining approvals from QC/Class/Owners.
 - e) NCRR's are to be raised as per Q.A. Standards through Plumbing Dept., for any feed back/resolving through Q.C. Dept. Necessary formats will be supplied by Q.C./Plumbing Dept.
- 2.6 If any fabrication sketches which are required as per the system drawings but not covered in the pipe layout & pipe piece drawings the same are to be prepared by the contractor to suit at site conditions in consultation with Plumbing department by lifting the dimensions on board the vessel and carryout fabrication. Pipe Laying should be carried out after obtaining necessary clearance from Plumbing Dept's Officers.
- 2.7 The contractors has to clean / flush the pipes as required after fabrication of piping spools, and then the ends are to be protected to avoid entry of dust/foreign particles and identification tallies are to be tagged/punched on each spool and the weight of each spools, system wise, is to be recorded and (to get system-wise weight record finally) be submitted to Plumbing Dept. also to maintain fool proof documentation containing identification of valves, pipe fittings etc. and to maintain perfect material usage record / material reconciliation report along with left over materials to be submitted after completion of Assignment to Plumbing dept.
- 2.8 Pipes are to be installed on board after thorough cleaning as per the drawings/sketches and bolted properly using the packing material supplied and they are to be suitably supported and clamped. The in completed system pipe spool ends are to be blanked to avoid entry of dust / foreign particles at the end of the days work
- 2.9 Required no. of pipe clamps (other than standard clamps) shall be made by Contractor with the materials supplied by HSL.
- 2.10 Storing of the materials drawn from Stores and preserving them properly shall be contractor's responsibility.
- 2.11 The Carbon Steel Pipe Joints welded shall have to be primed immediately after testing in consultation with concerned Yard Departments.
- 2.12 Making of openings in structures (deck/bulkhead/girder and cutting the openings) are to be carried out after taking clearance from Yard Departments.
- 2.13 Necessary staging is to be arranged by the Contractor including transportation to work area. (Staging material will be supplied by yard) and staging is to be removed after completion of the respective jobs.

- 2.14 Additional modifications required (if any) due to site conditions over and above the drawings, defects noticed, damages, Owners/Surveyors/Q.C. remarks/requirements are to be carried out without any extra cost to HSL.
- 2.15 STANDARDISED DECK/BULKHEAD FITTINGS shall be supplied by HSL as per B.O.M. wherever required. If any other DECK / BHD fittings which are required as per drawing but not covered in bill of material the same are to be fabricated / assembled by the Contractor as per standard drawing to suit at site conditions without any extra cost.
- 2.16 Qualified Engineers, Supervisors and plumbers/Fitters are to be deployed as required and their identification is to be submitted prior to the allocation of job.
- 2.17 Sufficient manpower & Equipment should be made available to meet the schedules.
- 2.18 Safety norms shall be followed and surroundings are to be maintained neat and clean.
- 2.19 Stiffening is to be provided wherever openings are cut in bulkheads/girders/beams as per quality standards to avoid distortions/undulations in surrounding areas.
- 2.20 **NAME PLATES:** Material for name plates of VALVES and FITTINGS shall be supplied by HSL making and fitment of name plates for the above in the contractor scope as per drawing / DRG. / VALVE LIST supplied by Plumbing Dept. / Drawing Office.
- 2.21 **PACKING :** Necessary Packing material shall be supplied by HSL and required No. of Gaskets are to be made by the contractor.
- 2.22 **THREADING:** Threading of pipes / pads / nipples and sockets wherever required are to be carried out by the Contractors. However Standard fittings such as pipe nipples / sockets etc. are to be collected from Plumbing dept. / General stores.
- 2.23 **FLUSHING:** Flushing of pipe lines /systems is to be carried out as per the requirement /Plumbing Dept's instructions.
- 2.24 The Contractors shall fabricate the pipe spools with all necessary fittings for pressure gauges/thermometers sockets, alarm points. OBD stub pipes etc.
- 2.25 All works described above are to be shown to Plumbing Dept. officers on day to day basis to avoid rework.
- 2.26 Pressure testing of all systems is to be done by the Contractors, to the satisfaction of Owners/Surveyors/Q.C. Required equipment like pumps with pressure gauges blank flanges etc., are to be arranged by Contractor.
- 2.27 All piping systems are to be cleaned / washed before commissioning, as per Plumbing/Q.C. instructions.
- 2.28 Bending of Pipes (required of any (size / radius / shape (heat or cold process shall be done by respective contractors only).

- 2.29 Cold Bending of pipes NW65 and above size will be carried out by HSL as per Machine standards.
- 2.30 Collection of materials from HSL stores / Plumbing Dept. as per B.O.M. / Material List per the scheduled works proposed to be carried out under the guidance / supervision of Plumbing Dept.
- 2.31 Drain pipes are to be lead to drain tank from all trays. Trays / coaming where ever required the same is to be fabricated by contractor by lifting dimensional to suit at site condition in consulting with Engg. / Plumbing dept. on board.
- 2.32 In other words it is the responsibility of the contractor to fabricate complete pipe spools as per layout drawing fabrication sketches / schematic drawing and the same are to be installed on board the vessel including survey / pressure testing and commissioning of the entire system to the entire satisfaction of owners / class / Q.C. and to obtain satisfactory survey reports.
- 2.33 The contractor is responsible for the material issued by the yard. Any material pilfered missing the same needs to be replaced by the contractor or the same will be arranged by yard at contractor cost. Frequent repetition of missing of material will be treated as negligence and suitable action will be initiated as per procedure on such contractors.

3. **SCOPE OF WORK OF SHIPYARD**

- 3.1 Materials: All required pipes / fittings etc. shall be supplied by HSL as per BOM. Any missing /not covered in BOM material required for installation or to suit at site conditions the same are to be fabricated by the contractor.
- 3.2 Fabrication sketches / pipe layouts shall be supplied for fabrication of spools. If any pipe spools are missing /not covered in the drawings but required as per layout / Schematic diagrams the same are to be prepared by the contractor by lifting dimensions to suit at site conditions.
- 3.3 Piping spools / fabrication sketches and pipe layouts along with schematic drawings shall be supplied by HSL.
- 3.4 Required materials such as all pipes / valves & Flanges and other standard fittings such as Elbows, reducers, tees, bolts, nuts, standard bhd fittings, standard DK fittings, OBD Stub pipes etc. & Pipe support clamps shall be supplied by HSL as per BOM. Non-standard fittings, pipe support brackets are to be fabricated to suit at site condition (if the same are not supplied by Plumbing / General Stores at free of cost) with HSL supplied material.
- 3.5 Shipyard shall provide required number of approved type of electrodes and gas as per Estimates.
- 3.6 Galvanizing of pipes wherever necessary will be arranged at free of cost by HSL. Transportation from and to Galvanizing Shop to be organized by the Contractor (if the Galvanization is carried out with in the yard). Loading and unloading of material in to the lorry / from the lorry inside the yard is to be organized by the contractor.

- 3.7. Pickling of pipes where ever necessary, will be arranged at free of cost by HSL. Transportation to / and from pickling shop to be arranged by the contractor.

4. INSPECTION

- 4.1 HSL, reserves the right to inspect the job while in progress during execution of the Contract by the representatives of Shipyard/Class/Owners. Contractor shall provide required facilities for such inspection.
- 4.2 Survey/testing shall be done in presence of the concerned Yard Departments / Q.C/ Owners / Class / MMD.
- 4.3 In case of test failure/remarks of surveyors/owners, the same are to be rectified and re-offered for survey without any extra cost.

5. GUARANTEE

The contractor shall guarantee the quality of workmanship for a period of 12 months from the date of delivery of the vessel. Any defects noticed during this guarantee period, shall be rectified by the Contractor at free of cost. If the party fails to attend to rectify the defects, the same will be organized by the yard and the amount incurred will be adjusted from the guaranty amount retained.

6. SCHEDULE

- 6.1 The works are to be completed as per schedules.
- 6.2 HSL has the right / Authority to cancel the sub contracting works of any individual system or part their midway to take up the same system departmentally or by other contractor as situation warrants.
- 6.3 The sequence of work is to be followed as per Plumbing Dept's instructions to meet the Schedules

7. GENERAL

Rates shall be quoted per mm dia. (NB/NW) x 1 mtr. (length) for carbon steel and as per standard dimensions for SS and non ferrous piping, for pipe fabrication, erection, testing and commissioning per unit. For other items in the price **format** given for execution of the entire system/work as per the technical specification.

MANAGER (PDO)