

HINDUSTAN SHIPYARD LIMITED

VISAKHAPATNAM-530005

TECHNICAL SPECIFICATION FOR OFF LOADING OF ELECTRICAL WORKS. VESSEL-11139.

1. DESCRIPTION AND SCOPE OF WORK:

The following works pertaining to the electrical distribution installations located in the ship of yard construction No.11139. The scope includes Engine room and Main Deck complete fwd, aft and mid ship, pipe duct, holds and tanks, 1st & 2nd Accom. Deck and Funnel inside and outside.

1.1. Fabrication and erection of foundations for all Electrical equipments, Group Control Panels, Starters, DBS, JBS, etc and erection of respective equipment.

1.2. Erection of Cable Ways

1.3. Erection of Cable coamings and Piercing.

1.4. Cutting, Laying, Clamping of Electrical Cables for all equipments on board, connecting up, sealing of coamings with specified compound / putty. Testing, commissioning and offering surveys to MMD/Class/Owners of all equipment as per standards.

1.5 The list of drawings at Annexure "A" gives the details of the work. All the drawings as received from the designer, the same to be studied/planned/worked out for their installation on board shall be supplied through the Authorized Officer of Electrical Department. Any additional drawings over and above the mentioned in annexure 'A' which may be issued by E.D.O through Electrical department / or Advance copy given to Contractor directly regarding the location/wiring of Electrical items in future also form a part and parcel of the Electrical job to be carried out by the contractor for the completion of Electrical job on the ship without extra cost. As such the contractor has to carry out such type of jobs without raising any objection. For the completion of job.

Note: - 1) HSL will carryout jobs in 3rd, 4th, 5th Accommodation Decks, Bridge Deck and Bridge Top- Noting 2.2a to be continued.

2) A pre-bid meeting is to be conducted with all the interested parties.

2. GENERAL INSTRUCTIONS & CATEGORIES:

Category-"A"	Hot Works
Category-"B"	Cable Installations
Category-"C"	Sealing with Compound
Category-"D"	Erection of Equipments
Category-"E"	Connecting up of Cables
Category-"F"	Commissioning & Testing/Offering Surveys to QC/Owners/Class/MMD at Jetty and during Sea Trial.

2.1. CATEGORY - "A" - HOT WORKS. (FABRICATION AND ERECTION)

2.1.1. FOUNDATIONS:

Foundations for all types of electrical / electronic equipment like Switch Boards, Control Panels, Distribution Boards, Junction Boxes, other equipment etc, shall be fabricated, primer applied, transported and welded on board as required and shown in the drawings. Further fixing of the cable ways/trays for laying various cables in the ship as per the relevant drawings shall be carried out by the contractors which include welding of necessary angle iron supports etc.

ISSUE OF MATERIALS

M.S. Angles, M.S. Flats, cable trays etc. will be issued as standard lengths / cut pieces from steel stores / Sub- stores, to the contractor by HSL, the M.S. Scrap left after completion of job shall be returned to the scrap by the contractor as directed by the Engineer.

2.1.2 PENETRATIONS:

All penetrations in Decks, Bulkheads, girders for gland Pipes, coamings etc., to be marked, cut and erected, and full welded.

ISSUE OF MATERIALS:

Comings, Glands, Pipes, etc., will be issued from sub stores by H.S.L. Pipes shall be cut from standard lengths/available pieces this issued by HSL to the contractor.

2.2. CATEGORY- "B" -CABLE INSTALLATION

Cutting of cables, preparation (Numbering) of Cable Tags, tagging to cables, transporting of cables, laying and clamping of all categories of cables right up

to the point of entry into various electrical equipment, consoles, motors, control panels, heaters, D.B' s, J.B s, and light fittings etc.

2.2 a The cables coming from above 3rd deck to 2nd deck and below are to be measured by electrical dept. and laid up to the coming in the 2nd deck. Thereafter the cable is to be laid by the contractor up to the end point and terminated.

ISSUE OF MATERIALS:

Cables in the form of drums will be issued by HSL at Bond Stores/Sub- Stores. The cable lengths are to be measured correctly on board on the basis of schematic drawings, cut and used and the left over cables to be handed over in Electrical Department, under the guidance of Authorized Officer of Electrical Department. Cable clamping and cable tag materials will also be issued by HSL. The actual cable cut-lengths are to be recorded and informed to the authorized Officer (Dept.Store), in turn to be informed to Electrical D.O.

2.3. CATEGORY- "C"-SEALING WITH COMPOUNDS:

All types of Fire & Water tight penetrations shall be sealed with appropriate sealing compounds such as KVM compound, white putty, etc. supplied by H.S.L, and as directed by Authorized Officer of Electrical Department.

2.4. CATEGORY- "D"- ERECTION OF EQUIPMENTS

Erection of all types of electrical equipments, consoles, automation equipment, lighting and power distribution boards, group control panels, control panels,galley,pantry and laundry equipment, battery charging panel, junction boxes, light fittings etc, as per the instruction manuals/drawings supplied by HSL. The items which are to be fixed from all the suppliers on engine room console, main engine console, main switch board, ESB, any other electrical consoles to be fixed and necessary wiring has to be carried out. The necessary fabrication to be carried out by the contractor for the equipment.

ISSUE OF MATERIALS

Equipment and fastening materials will be issued in sub-stores/general stores/bond stores as available/required by HSL.

2.5 CATEGORY- "E" -CONNECTING UP OF CABLES.

Dressing of cables, entering into equipments (including fixing of cable glands and knock outs where necessary) and proper terminations and connecting up as per the drawings under the guidance of Authorized officer of Electrical department or the service engineers of the equipment suppliers. Also cold checking of cables for continuity, insulation and proper cabling shall be carried out by the contractor.

ISSUE OF MATERIALS&TOOLS:

Necessary materials for terminations like PVC Sleeves, Tapes, Cable Lugs, etc. shall be issued by Electrical Department sub stores of H.S.L. All tools required for cable connections and fixing including cable lug crimping tools shall be arranged by the contractor.

3. GENERAL RULES

- 3.1** All the Electrical installations are required to be tested, commissioned and presented to HSL authorized officer/Q.C./ Owners / Classification Societies / MMD, if any Improvements / modifications / remarks are suggested by HSL representatives / Owners / Surveyors, the same shall be carried out by the contractor, promptly and to be presented again for final survey/acceptance without claiming any extra cost.
- 3.2** All work are to be executed strictly according to workmanship standards of HSL / Drawings / Instructions / Manufacturers Manuals under the overall guidance and instructions of HSL Engineers.
- 3.3** The Contractor shall work in close coordination with other departments working on the ship and effect minor modifications, etc. Whenever required without claiming any additional charges.
- 3.4** The contractor shall assist / coordinate with the Service Engineers of various Electrical equipments.

4. THE SCOPE OF HSL

- 4.1.** The consumables like Gas, welding Electrodes, Paint, as required, will be supplied by HSL. Any misuse of the same would be viewed seriously and cost of such misuse as assessed by HSL shall be recovered from the contractor.
- 4.1.1** Welding Rods will be supplied to the Contractor as per estimate and the consumption shall be accounted properly by the Contractor.
- 4.2.** Power supply shall be arranged by HSL, free of Cost at few selected locations for the welding Transformers and Tools etc of the contractor. Laying of further distribution lines as per IE Rules from the selected sources shall be the responsibility of the contractor.
- 4.3.** The contractor shall make his own arrangements for providing necessary staging for various works to be carried out by him, making use of the available staging material in HSL. However, the contractor shall be permitted to make use of the existing staging, wherever available.
- 4.4.** The transportation of material from the Stores,/Sub- stores, /Bond stores to the ship shall be. the responsibility of the Contractor. However, for major lifts, if necessary, services of fork lifts, mobile cranes or Jetty cranes shall be made available by HSL.
- 4.5.** All necessary drawings shall be supplied by Electrical Department which are to be carefully preserved and returned back to Electrical Department immediately after completion of the job by the contractor.
- 4.6.** For all works concerning to this specification, one officer of Electrical Department shall be nominated, and referred as Authorized **Officer** with whom the contractor shall interact at every stage of the works.

5. SCOPE OF WORK OF CONTRACTOR

- 5.1.** Contractor shall. Carry out the works as per the general instructions and categories.
- 5.2.** Presentation of survey to QC / owners / surveyors as per QC format and satisfactory report to be obtained from surveyors, Owners.
- 5.3.** However, the entire work to be done independently in totality by the contractor.
- 5.4.** Fabrication, processing, erection of various items of electrical systems should be as per drawings, to the satisfaction of Shipyard, MMD Surveyor, Classification Society Surveyors namely ABS/IRS and the ship owners.
- 5.5.** It is the responsibility of the contractor to, coordinate the work at site with other systems such as structural, ventilation and piping installations on board.
- 5.6.** a) The contractor shall engage competent welders who must be appropriately qualified and all others contractor personnel should be in possession of proper identification Badges.
b) The contractor shall employ sufficient number of qualified skilled workmen and supervisors and organize sufficient number of welding equipment with necessary accessories and tools for simultaneous progress of work at various areas.
- 5.7.** Cable routing to be worked out by the contractor from the relevant drawings. The cable lengths shall be measured on board as per the route and should take concurrence from the authorized officer prior to cutting of each cable. The length of each cable cut accordingly shall be noted on cable lists and submitted to the authorized Officer which in turn shall be passed on to EDC.
- 5.8.** Sealing with compounds for each fire and W.T. penetrations to be done only after intimation from the authorized Officer and to be done as per his directions. Preparation of the compounds (mixing of powder and hardener etc.) shall be made as per manufacturer's recommendations and instructions from authorized Officer. Every care must be taken not to waste the compound materials.
- 5.9.** While executing the above jobs, every care must be taken by the contractor to ensure good workmanship, and careful handling of the equipment fixtures and to organize for due coordination with the authorized officer at every stage of work. Equipment /accessories if any damaged, due to wrong connections/wrong handling are to be made good by the contractor at his cost within reasonable time, otherwise the same shall be carried out by HSL at contractor's cost.
- 5.10.** The location of respective items to be studied from the relevant drawings and marked at site. On confirmation of the same by the HSL authorized officer, the actual work shall be carried out as directed as per the relevant drawing.
- 5.11.** In case of shortage of minor foundation /channel details noticed in the drawings/ work spots, the contractor has to fabricate and erect the same on board, in order to complete the work, without any extra cost. The

necessary materials required shall be arranged by the authorized officer to the contractor in this regard.

- 5.12. The contractor shall arrange necessary equipment for transportation at his cost like hand trolley push cart etc.
- 5.13. The contractor shall acknowledge in writing, the receipt of all the equipments material and consumables taken by him from HSL and return the left over material/ consumables to the respective stores. Storing of equipments and material drawn from the HSL shall be contractor's responsibility. Storing of all lamps / globes, switches knobs / handles etc. removed from equipment shall be contractor's responsibility and to be replaced on completion of the same during the time of commissioning of the respective installation.
- 5.14. The Contractor shall arrange the necessary tools like drilling M/C, drill bits, Hacksaws, stripping screw drivers, hand cutters, crimping tools etc. or the contractors shall obtain the written permission of the department for using the department equipment (in case of emergency only) so as to meet the schedules in time through AID cell.
- 5.15. The contractor shall be held responsible for any loss or damage to the equipment /fixtures, etc. supplied to them for carrying out the works. The contractor shall also be held responsible for any loss or damage caused by them to other adjacent equipment installations already erected or completed on board the vessel earlier or to the HSL's property. In all the above cases, the contractor shall reimburse the cost as assessed by HSL.
- 5.16. **The weights of each and every material / equipment shall be properly recorded before erection on board,** and the copies of the recorded weight shall be submitted periodically to the authorized Officer, which in turn shall be passed on to Electrical Design Office.
- 5.17. All the works approved in the inspection shall be recorded and got certified from the authorized Officer, and the same shall be enclosed to the respective bills, before their submission failing which the bills shall not be considered for payment.
- 5.18. Any damage caused to the property of HSL & other department equipment on board due to negligence of the employees of the contractor shall be made good by the contractor at his cost.
- 5.19. The contractor shall be responsible for the safety of his employees and all safety appliances wherever reqd. shall be provided by the contractor to his employees.
- 5.20. The contractor shall employ qualified competent personnel at workmen level / supervisory cadre for carrying out the subject work.
- 5.21. Before commencement of the actual work, the contractor is required to submit a detailed action plan, based on the availability of drawings / material for the approval of authorized officer and when once the same is approved, the contractor shall adhere to the above schedule strictly.
- 5.22. The cable ways shall be assembled initially (as per respective drawings) from the cable tray material supplied by Electrical Department and shall be

erected at site as explained at Para 3.2.

- 5.23.** The Contractor shall arrange to fabricate / modify the Cable Ways to size, if any required, with the HSL supplied material.
- 5.24.** If any modification is essential, even after completion of the job, the same is carried out by the Contractor without claiming extra cost.
- 5.25.** The Contractor shall execute the works with extra stiffening/ doubler, wherever required, as advised by authorized Officer (although the same are not shown in HSL drawings) to meet the standards book / Surveyors recommendation, etc.
- 5.26.** While doing the Hot Works, the Contractor should take all necessary precautions to avoid fire accidents.
- 5.27.** Contractor must work in close coordination with other HSL Departments / other sub-contractors.
- 5.28.** After completion of welding of cable ways etc. and after acceptance of the same by the authorized Officer, one coat of primer paint touch up shall be applied at the burnt ends (due to welding/cutting) and followed by one finishing paint coat. The necessary paints would be supplied by HSL.
- 5.29.** The Contractor shall carry out all the works as indicated in the drawings given at annexure-"A" and should be as per Shipbuilding practices acceptable to HSL / Owner / Surveyors. Wiring / connection diagrams received along with the equipment shall be made available and the contractor shall carry out the connections accordingly.
- 5.30.** All the works approved in the above inspection shall be recorded and got certified by the Authorised officers, and the same shall be enclosed to the respective bills of the contractor, failing which the bills cannot be considered for payment.
- 5.31.** The contractor should leave sufficient space on the main channel/sub-channel for laying the LIGHTING/other cables in consultation with the Department.
- 5.32.** While commissioning/testing/presenting for survey of the equipment / machinery in the ship, the necessary technical manpower shall be provided by the contractor.
- 5.33.** The contractor shall arrange a qualified person as a site incharge who shall be available all time on board, coordinate with other departments, able to solve the problems at site, to prepare an action plan on daily basis and meet the schedule targets.
- 5.34.** The contractor shall arrange minimum man power for attending maintenance works as and when required, till the vessel leaves HSL.
- 5.35.** The contractor shall arrange necessary man power for switching on the shore supply and lighting supply required to facilitate the working for other departments like plumbing J&C, Painting etc...., (though specific electrical works are not being carried out on that particular day) on any given time as advised by the department, including on Sundays / Holidays and beyond working hours.

- 5.36.** The contractor shall arrange minimum man power for switching on shore supply regularly by 7AM and switch off after the assigned jobs are completed on that particular day.
- 5.37.** The contractor shall arrange to draw the galley/laundry equipment from the stores, fabricate the necessary seats on board, install them on position and arrange the necessary wiring for the purpose of commissioning of the same to present the survey to class / owners.
- 5.38.** The contractor shall arrange for necessary laying, clamping and connecting up of cables of all systems as per the drawings enclosed in the annexure. In this connection, it is to inform that though some drawings were not shown in the annexure supplied along with the specification, necessary cables are to be laid and connected to fulfill the requirement of completing the project as a whole. However if any new systems has to be connected, the rate for the same will be paid extra.
- 5.39.** The power cables, the control cables and the signal cables like audio, visual, signals of alarm monitoring systems, main engine monitoring system cables are to be laid and clamped in different layers separately in order to avoid interference.

- 6.** The contractor shall engage competent working personnel with necessary tools during the time of the sea-trials of the ship. They should be able to present all the relevant surveys to OWNERS /MMD/other classification Societies and also should rectify any defects on the spot that may occur during sea-trials.

7. DELIVERY

The work is to be commenced immediately as per schedule. The progress of work is to be in line with other departments without any co-ordination problems and without any hindrance to other department works. The electrical installation work shall be completed in time as per production schedules.

8. 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 the guarantee period, shall be rectified as soon as practicable by the contractor at his own cost or the same shall be done by Shipyard at contractor's cost.

Encl: Annexure A & B

MANAGER

(ELECTRICAL DESIGNS)