

REQUEST FOR PROPOSAL (RFP)

I N D E X OF REQUEST FOR PROPOSAL

Telephone : 03192 -233608

Fax : 03192 -232692

Reply should be addressed to
The Commodore Superintendent

Naval Ship Repair Yard
Post Box No. 705
Haddo Post
Port Blair

NSRY/COM/112 (C) 2 (b)/CID- 986

11 Jun 19

RFP FOR OFFLOADING OF SHORT REFIT WORKS – FUEL BARGE PUSHPA

INVITATION OF BIDS THROUGH E-PROCUREMENT FOR FUEL BARGE PUSHPA

INSTRUCTIONS TO BIDDERS FOR OFFLOADING SHORT REFIT WORKS OF FUEL BARGE PUSHPA

Dear Sir/Madam,

1. Address of Website. Tender document can be downloaded from www.eprocure.gov.in

2. General information about the tender: -

- | | |
|---|---|
| (a) Tender reference No. | NSRY/COM/112(C)2(b)/CID-986 |
| (b) Last date and time for receipt of tenders | 02 Jul 19 at 0900 Hrs. |
| (c) Time and date for opening of tenders | 03 Jul 19 at 0900 Hrs |
| (d) Place of opening of tenders | NSRY Port Blair |
| (e) Address for communication | The Commodore Superintendent (for Senior Manager (PP)), Naval Ship Repair Yard, Post Box No 705, Haddo Post, Port Blair - 744102 |

3. The tender shall be submitted Single Stage Two system i.e. technical & the commercial bid. The following enclosures are forwarded along with the tender enquiry to assist you in preparing your commercial offer:-

- | | |
|--|-------------|
| (a) Particulars of Vessel | - Encl. I |
| (b) Schedule of Requirements (SOR) | - Encl. II |
| (c) Introduction/General Terms | - Encl. III |
| (d) Compliancance Matrix for Technical Aspects | - Encl. IV |
| (e) Quality Inspection Schedule | - Encl. V |
| (f) Standard Conditions of Contract for complete offloading of Short Refit FB PUSHPA | - Encl. VI |

4. Quotation shall remain valid upto **180 days** from the date of opening of Technical Bid. (Note: Bid Validity period may be increased/decreased on a case to case basis with the approval of CFA)

5. **Work Completion Period:** Work completion period for normal refit works FB Pushpa **Would be 90 (Ninety) days** from the effective date of contract. Extension of contracted delivery period will be at the sole discretion of the Buyer, with applicability of LD clause.

Submission/Opening of Tenders

5. Submission of online bids at www.eprocure.gov.in is mandatory. Non adherence to the same will be considered as non acceptance of all the terms and conditions by the firm and the bid is liable to be rejected. In addition to online submission of bids, the bidder should also deposit hard copy of the bids to the unit within the promulgated 'Last date and time for depositing the bids' to facilitate internal processing of the case for sanction. The responsibility to ensure this lies with the Bidder.

6. Submission of online bids at www.eprocure.gov.in is mandatory. Non adherence to the same will be considered as non acceptance of all the terms and conditions by the firm and the bid is liable to be rejected. In addition to online submission of bids, the bidder should also deposit hard copy of the bids to the unit within the promulgated 'Last date and time for depositing the bids' to facilitate internal processing of the case for sanction. The responsibility to ensure this lies with the Bidder.

7. **Last date and time for depositing Bids:** The bids are to be submitted online on www.e-procure.gov.in by **0900 hrs on 02 Jul 19**. Manual bids will not be entertained. The responsibility to ensure this lies with the Bidder.

8. **Manner of Depositing the Bids:** Bids to be submitted online along with EMD and other relevant documents which have been sought. Hard Copy of all documents technical also to be submitted in tender opening box a sealed box.

9. **Time and date for opening of Bids** Online Bids will be opened by a committee at **0900 hrs on 03 Jul 19** (.If due to any exigency, the due date for opening of the Bids is declared closed holiday, the Bids will be opened on the next working day at the same time or on any other day/time, as intimated by the NSRY (PBR)/buyer.)

10. **Location of the Tender Box** Tender Box marked as **"TENDER BOX PSC** "at NSRY Main Gate, kept in front of Chief Security Office Reception.

11. **Place of opening of the Bids:** Online at [eprocure.gov.in/central public procurement portal](http://eprocure.gov.in/central-public-procurement-portal) in NSRY (PBR) Commercial Department Office. The Commercial Offer will be opened by an appointed Committee and the firm if desires, may depute their representative, duly authorized in writing, to be present at the time of opening of the commercial bids. This event will not be postponed due to non-presence of your representative.

12. **Bid System:** **Two-Bid.** In case of the Two-bid system, only the Technical Bid would be opened on the time and date mentioned above. Date of opening of the Commercial Bid will be intimated after acceptance of the Technical Bids. Commercial Bids of only those firms will be opened, whose Technical Bids are found

compliant/suitable after Technical evaluation is done by the Buyer

13. **Forwarding of Bids.** Bids should only be forwarded by Bidders under their original memo / letter pad inter alia furnishing details like **GST** number, Bank address with EFT Account if applicable, etc and complete postal & e-mail address of their office. Failure to do so can lead to rejection of bids. All the individual pages of bid are required to be signed prior to submission of the bids. Original EMD are also required to be submitted in addition to uploading in E portal.

14. **Critical Data Sheet & Manner of depositing the Bids.** Firms fulfilling the conditions and capable to undertake required services may submit bid form with the requisite documents. Failure to do as per instructions given below will render your offer invalid. Detailed instructions as follows:-

(a) **Critical Data Sheet:**

| <u>Ser.</u> | <u>Description</u> | <u>Date</u> | <u>Time</u> |
|--------------------|--|--------------------|--------------------|
| (a) | Tender Publishing Date on CPP Portal | 11 Jun 19 | 1800 Hrs |
| (b) | Bid Document Download from CPP Portal | 11 Jun 19 | 1800 Hrs |
| (c) | Clarification Start Date | 11 Jun 19 | 1800 Hrs |
| (d) | Pre-Bid Meeting Date at Tender Opening Room at , NSRY (PBR) | 18 Jun 19 | 1100 Hrs |
| (e) | Clarification End Date | 18 Jun 19 | 1700Hrs |
| (f) | Bid Submission Start Date on CPP Portal | 18 Jun 19 | 1800 Hrs |
| (g) | Bid Submission End Date on CPP Portal | 02 Jul 19 | 0900 Hrs |
| (h) | Opening of Tender Box for physical verification of documents/ Bid supporting documents | 03 Jul 19 | 0830 Hrs |
| (i) | Online Bids Opening Date on CPP Portal | 03 Jul 19 | 0900 Hrs |

(b) **Submission of Online Bids at www.eprocure.gov.in.** Bids with relevant supporting documents indicated in this RFP are to be uploaded in Central Public Procurement Portal (CPPP) (i.e. www.eprocure.gov.in). Non adherence to the same will be considered as non acceptance of all the terms and conditions by the firm and the bid is liable to be rejected. Details of documents to be uploaded are as follows:-

(i) **Content 1 (Description:- Scanned copy of EMD).** Scanned copy of EMD (wherever applicable) is to be uploaded in **.PDF** format in this cover. In case the firm is exempted from paying EMD, Proof of exemption of EMD is to be uploaded in **.PDF** format in this cover in lieu of EMD.

(ii) **Content 2 (Description:- Scanned copy of GST Certificate)**. Scanned copy of GST Certificate as per **Annexure I** to this RFP/TE in **.PDF** format

(iii) **Content 3 (Description:-Compliance Matrix)**. Duly filled, signed & stamped Compliance Matrix of both Technical Parameters and Commercial aspects at **Annexure II** to RFP/TE be scanned into **.PDF** document and to be uploaded in this cover.

(v) **Content 4 (Description:- Price Bid)**. Bill of Quantity (BOQ) named as 'Price Bid Format' available in **.xls** format be downloaded from **www.eprocure.gov.in** Same is to be duly filled (post enabling of macros), validated by pressing BoQ validation button available in the sheet and post successful validation to be uploaded in **.xls** format only.

15. **Clarification regarding contents of the Tender Enquiry /RFP**: A prospective bidder who requires clarification regarding the contents of the bidding documents shall notify to the NSRY (PBR) in writing about the clarifications sought within the clarification end date as indicated in critical data sheet above.

16. **Modification and Withdrawal of Bids**: A bidder may modify or withdraw his bid after submission provided that the written notice of modification or withdrawal is received by the Buyer prior to deadline prescribed for submission of bids. A withdrawal notice may be sent by fax but it should be followed by assigned confirmation copy to be sent by post and such signed confirmation should reach the purchaser not later than the deadline for submission of bids .No bid shall be modified after the deadline for submission of bids. No bid maybe withdrawn in the interval between the deadline for submission of bids and expiration of the period of bid validity specified. Withdrawal of a bid during this period will result in Bidder's forfeiture of bid security.

17. **Clarification regarding contents of the Bids**: During evaluation and comparison of bids, the Buyer may, at its discretion, ask the bidder for clarification of his bid. The request for clarification will be given in writing and no change in prices or substance of the bid will be sought, offered or permitted. No post-bid clarification on the initiative of the bidder will be entertained

18. **Rejection of Bids**. Canvassing by the Bidder in any form, unsolicited letter and post-tender correction may invoke summary rejection with forfeiture of EMD. **Conditional tenders will be rejected**. Further Bids will also be rejected in the following cases:-

- (a) Bids not conforming to RFP terms and condition and technical specifications.
- (b) Bidders not submitted EMD.
- (c) Part receipt of bids.
- (d) If the rates submitted by a firm are found to be manipulative in nature i.e. rates are not in conformation with the market rates for the corresponding equipment / capacity / service / spare.
- (e) Pool/ Cartel formation (a group of bidders quoting identical / supporting rates against a rate contract tender).

19. **Unwillingness to quote**: Bidders unwilling to quote should ensure that intimation to this effect reaches before the due date and time of opening of the Bid, failing which the defaulting Bidder may be delisted for the given range of items as mentioned in this RFP.

20. **Earnest Money Deposit.** The bidders are to furnish EMD for a sum of **Rs 9,14,500.00 (Nine Lakh Fourteen Thousand Five Hundred Only)**, with a validity of **45 days** beyond the final bid validity period, in the form of an Fixed Deposit Receipt or Banker's Cheque or Bank Guarantee from any of the public sector banks or a private sector bank authorised to conduct government business in favour of **Add. CDA and IFA, Port Blair**. The format in Form DPM-13 may be adopted. Bid Security/ EMD is not required from those firms who are registered with the Central Purchase Organisation (e.g. DGS&D), National Small Industries Corporation (NSIC) or concerned Departments or Ministries of Government of India for the same item/ range of products, goods or services for which tenders have been issued. Copy of exemption certificate is required to be attached along with submission of bids online.

Evaluation Criteria

21. **Loading of Cost for items "Not Quoted"**. The bidder is to quote for all the sections/subsections mentioned in the SOR. Any omissions/deviations to the SOR are to be recorded in the Record of Deviations and submitted along with the 'T' Bid. 'In case a bidder fails to quote for a certain item/ Defect List Serial, their bid will be loaded by the amount quoted by the highest bidder for that particular item/ Defect List serial and this loading will be considered for determining the L1. CUSTOMER reserves the right to determine the qualification of a firm on this account.

23. **Finalising of L1 Firm.** The L1 firm will be decided on sum total of services, repair charges, budgetary cost of spares ,but exclusive of Taxes .

24. **Payment Terms.** The Payment Terms for the Contract Price shall be as follows

| <u>Stage No</u> | <u>Activity Definition</u> | <u>Stage Payment</u> |
|------------------------|---|-----------------------------|
| Stage I | Advance of basic contracted refit cost against bank guarantee / indemnity bond (in case of DPSUs) on placement of order/contract | 10% |
| Stage II | Basic contracted refit cost on docking (excluding taxes and Growth of Work) | 10% |
| Stage III | The basic contracted refit cost on final undocking and completion of all under water works | 20% |
| Stage IV | The basic contracted refit cost on satisfactory completion of Basin Trials and harbour trials of major machinery/ equipment (such as Main Propulsion Plant, Shafting and equipment related to Habitability). | 20% |
| Stage V | The basic contracted refit cost minus cost of all incomplete work on satisfactory completion of post refit Sea trials and departure of the ship from the shipyard. Cost of incomplete work will be withheld till completion of work. | 20% |
| Stage VI | Balance along with cost for Growth of Work | 20% |

| | | |
|--|---|--|
| | and taxes on submission of final bill within sixty (60) days on Satisfactory completion of Refit. Shipyard to provide a bank guarantee equal to 10% of the final cost of refit/repair (indemnity bond in case of DPSUs), which should be valid till the completion of the guarantee/ warranty period. | |
|--|---|--|

Note:- All stage and final bill payments are to be vetted and cleared by COA. Handling charges, if any, are to be restricted to a maximum of 7.5%.

Standard Conditions of Contract (SCOC).

25. Firm shall be required to accept the Standard Conditions of Contract (SCOC). Additionally standard clauses regarding agents/ agency commission, penalty for use of undue influence, access to books of accounts, arbitration and laws would be incorporated in the contract. A Contract will be signed between the Contract Operating Authority (**COA, The Commodore Superintendent Naval Ship Repair Yard, Haddo, Port Blair, (Post Box-705)**) and the shipyard/firm incorporating the SCOC at para 3(b) of this RFP, which will form an integral part of the Contract.

Pre-Bid Conference

26. The SOR (Enclosure II to Enclosure VIII) and SCOC (Enclosure X) should be carefully considered while preparing the bids. All clarifications are to be resolved in the Pre-Bid Conference on at **NSRY(PB) conference hall** prior submission of bids. No revision of Commercial Bid would normally be permitted after opening of the Technical Bid.

Commercial Bid

27. The Commercial bid is to be submitted strictly in accordance with the BoQ format upladed in website.along with this tender enquiry. The Commercial bid once opened, will not be subjected to unilateral revision by the firm, unless the firm is called for price negotiations specifically and asked to justify the rates.

Conditions under which this RFP is issued.

28. This RFP is being issued with no financial commitment and Customer reserves the right to change or vary any part thereof at any stage. The Customer reserves the right to reject any or all of the offers without assigning any reason whatsoever. The Customer also reserves the right to withdraw the RFP should it be so necessary at any stage.

29 **Note:-** (i) Any bid which does not conform to the terms & conditions and technical specifications of the Tender Enquiry will be considered as non-responsive and is liable for rejection.

Thanking you,

(VK Prasad)
Commader
Senior Manager(Commercial)
for Commodore Superintendent

Enclosures: - As above.

(SCOPE OF WORK FOR SHORT REFIT WORKS OF FB PUSHPA)

PARTICULARS OF VESSEL – FB PUSHPA

| | | | |
|-----|-----------------------|---|---------------------------|
| 1. | Name of the vessel | : | FBPUSHPA |
| 2. | Built by | : | M/s MODEST INFRASTRUCTURE |
| 3. | Date of Commissioning | : | JAN 14 |
| 4. | Overall Length | : | 58.15 M |
| 5. | Length BP | : | 54.80 |
| 6. | Breath Molded | : | 11 M |
| 7. | Draft (Design) | : | 2.81 M |
| 8. | Draft (Scant) | : | 3.00 m |
| 9. | Depth | : | 4.20 M |
| 9. | Displacement | : | 733T |
| 10. | Light Displacement | : | NA |
| 11. | Last docking details | : | 03 Mar 16-09 Mar 16 |

SCHEDULE OF REQUIREMENTS (SOR)

(Note: The Schedule of Requirements is a technical document and specific to the Project/ Service and is part of the RFP)

INTRODUCTION

Naval Ship Repair Yard, Port Blair, is the repair agency for IN Ships based at Port Blair. The Hull department of this yard undertakes all Hull related renewal/repairs on IN Ships and Yard crafts. In light of acute shortage of manpower and infrastructure, the repair and renewals onboard Pushpa for the defect projected for the forthcoming Short Refit (SR), are being offloaded. This contract will cover defect rectification of Fuel Barge Pushpa SR works.

All vendors are requested to read the document carefully prior to submission of quotes. Successful bidder is to complete the entire package within 90 days

GENERAL TERMS

Issue of Material

1. The vendor is responsible for carrying all the material that he needs for ship repairs to FDN and to jetty. No conveyance will be provided by Yard. The charges for the same are to be quoted within the cost of services. In case vendor hires any mode of transportation then he has to take proper clearances from the Chief Security Officer of the yard or any other officer nominated for the purpose.
2. All Firms desirous of taking part in the competitive bidding are to send their respective reps to ship to assess the work and work involved and detailed scope thereof prior to submission of quote.
3. The entire quantity indicated in the contract may or may not be consumed. It will depend on the survey carried out by the Yard reps. Firm is to carry out work only on those as indicated by the Yard's designated rep.
4. Delay in completion of work would have cascading affect on the overall refit duration, the vendor is to endeavor to complete all work within the stipulated timeline. To achieve this, the firm at times would require augmentation of manpower and working round the clock.
5. To maintain perfect material usage record / material reconciliation report along with left over materials to be submitted after completion of assignment to Outfitting department.
6. Necessary staging is to be arranged by the contractor including transportation to work area and the cost for the same is to be quoted in the existing package itself.
7. Stiffening is to be provided wherever openings are cut in bulkheads/girder/beams as per quality standards.
8. All works described above are shown to Yard's rep, on a day-to-day basis. All transportation is to be borne by the vendor including boat.

9. Pressure testing of all system is to be done by the contractors: to the satisfaction of Yard reps. Required equipment line pumps with pressure gauges blank flanges etc. are to be arrange by the contractor.
10. Necessary removal of associated fittings such as panels, lagging, additional pipes to facilitate removal of the defective job and refit the same post work will be done by the firm as the work package and scope of work.
11. **Inspection:** Yard reserves the right to inspect the job while in progress during execution of the contract by the representatives of Shipyard/Class/Owners. Contractors shall provide required facilities for such inspection. Testing shall be done in presence of the concerned yard overseeing agency.
12. In case of test failure/remarks of Surveyors/Owners, the same to be rectified and re-offered for Survey without any extra cost.

13. **Safety Aspects**

Safety aspects are covered under the following heads:-

- (a) Safety norms
- (b) Safety of personnel
- (c) Safety of ship

Safety Norms

14. The following safety norms will govern the works NSRY(PBR):-
- (a) The Factories Act (1948)
 - (b) The Environment Protection Act with rules 1986
 - (c) The Hazardous waste management rules – 1989
 - (d) The noise pollution (Regulation & Control) rules – 2002
 - (e) Workmen compensation Act (1923), Rules (1924)
 - (f) The Public Liability Act (1923), Rules (1924)

Safety of Personnel

15. Firm should designate a person who would be responsible for safety Personal protection gear is to be necessarily used by workers employed in wooden works. This include Overalls, Hand gloves, harnesses if working in heights, Safety shoes, Industrial safety helmets for all barring welders when actually employed, Safety goggles labourers when fitting / cutting, and all other safety precautions as required to protect any harm to personnel.

Safety of Ship

16. The Vendor has to ensure the following:-
- (a) The work force is conversant with fire safety & hot work norms of ships.

(b) Safe to weld certificate is to be submitted 24 hrs in advance and duly certified by the ship staff and cleared for hot work, for the specified job, prior to commencing the work. Work should be done in presence of fire sentry.

(c) Necessary protection such as asbestos cloth, FR cloth, floor sheets as required is positioned prior to commencing the hot works.

(d) Before securing from the job location, it has to be ensured that no hot spot is left over and the area is safe, even if unattended.

Area Cleanship Liability

17. Area cleaning involves the following:-

(a) The vendor is liable for the cleanship of the area where he has worked. It means that all the scrap generated by the Firm during the work, including dust and dirt is to be cleaned by the vendor, and moved to the scrap yard.

(b) This cleanship is to be done on a daily basis.

(c) The work area may be ship, FDN, Naval Jetty or any other location inside the Naval Premises.

(d) Firm has to quote for daily cleanship charges accordingly within the cost of services.

18. **Action Plan** The following methodology is to be adopted by the vendor once the work order is placed:-

(a) **Gantt Chart** A Gantt Chart is to be mandatorily prepared by the Vendor within 03 working days of placement of the work order depicting all works to be carried out by the firm in a sequential manner. The chart should be meaningful, easy to read and understandable and all recommendation of the user is submission department to be included in the chart. The firm will not be allowed to commence the work onboard till the time the GANTT chart is supplied to the yard in duplicate. (One copy each to SM (COM) and SM (PR) and no extra time will be given for the delay in non submission of GANTT chart. The 'MS Project' software may be used for the specific repairs reports for rudder, stern, skeg, manufacture/modification of special nature for preparation of the Gantt chart. The Gantt chart is to be mandatorily supplied to the Yard in soft CD and on A2 sheet of paper neatly printed and colour coded in four copies.

(b) **Mobilisation of manpower.** The Vendor has to make his manpower available within three days of placement of the Work Order.

(c) The docking time available for any ship in FDN varies as per the class of the ship. This docking time is shared by the Yard and FDN to carry out the hull survey, renewal, APT, underwater blasting & painting. Therefore, the actual time available for steel renewal is sometimes 50% of the total docking time that has to be gainfully utilized by mobilizing manpower such that, all the dry-dock related

works are completed within that duration including APT. No additional time will be given. The GANTT chart submitted has to be suitably designed.

(d) **Daily Report.** A daily report, including the work allocation for the jobs being undertaken is to be forwarded to the yard on a daily basis and should contain all details like Dart no. Job description, start date of repair, EDC and location (onboard or ashore/shop floor/ contractor's premises etc.) of repair, manpower involved (number of Carpenters, other skilled or unskilled labourers involved). The report is to be countersigned by the Respective refit coordinator and Manager Outfitting thereof.

(e) **Weekly report.** The vendor has to submit a weekly work status report which shall relate to the Gantt chart provided by the Firm at the beginning of the refit/repairs. The report will include the jobs completed in the week, amount of manpower employed, reason for the interruption of the work, number of people working on OT, amount of renewal carried during the working time and the Plan for the next week including Saturday and Sunday. The reports shall cover all the serials being worked on of the contract.

(f) The daily report is to be submitted by 1600 hr every day. In case of holidays it can be submitted by 0900 hr on the following working day. All such reports are to be submitted on A4 or larger sheet of paper duly printed using computer printer. Hand written reports/ dot matrix printouts will not be accepted.

(g) The weekly report is to be submitted by 0900 hr on every Wednesday starting from the first Wednesday, from the date of commencement of the work. In case of holidays it can be submitted by 0900 hr on the following working day. All such reports are to be submitted on A4 or larger sheet of paper duly printed using computer printer. Hand written reports/ dot matrix prints will not be accepted.

19. **SECURITY:** The contractor's personnel shall be subject to security rules and guidelines of the yard and will have to take security clearance from chief security officer of the yard.

20. **SAFETY:** The contractor must observe all safety precautions in connection with the work to be performed by him, his agents or labourers. In the event of any accident happening in our yard resulting in loss of lives or otherwise damaging any part of the property, the contractor shall be required to make good the loss to the NSRY (PBR) and shall be responsible for all consequences that follow from the loss and/ or injuries to the persons involved in such accidents. The standard of safety to be observed in the NSRY (PBR) shall be decided by the Officer-in-Charge Safety, or any officer appointed for the purpose before the commencement of work in the yard. It will be essential for contractor to ascertain the standard precautions which contractor is required to observe in discharging his work as per the standards prevalent in NSRY (PBR). The decision of NSRY (PBR) in matters concerning Safety shall be final and binding on the contractor. The contractor shall be required to provide his workmen with Boiler Suits of any suitable colour other than blue or white, with the Name of the contractor in prominent letters on the boiler suits along with personal protection gears like safety shoes, hand gloves, working helmets etc. workmen of the contractor must

wear throughout their working while in the premises of NSRY (PBR). Contractor's workmen working without safety gears are likely to be disallowed for work.

21. WELDING AND BURNING (HOT WORK) OPERATIONS

Definition: The term "Welding and burning" is to be interpreted to include all welding, oxyacetylene burning, brazing use of blow lamps, liquefied petroleum gas burners and any other operation which involves use or application of a naked flame for heating.

Inspection after welding/burning operations. It is essential that the vicinity of all welding/burning areas be inspected shortly after each operation has been completed and at the end of each day's work to ensure that no smoldering material or areas of excessive heat are present. All adjacent compartments are also to be checked for hot spots by welding sentries before securing. Even when the workers leave for a short recess, the supervisors are to ensure that welding equipments are properly secured, gas cylinder valves are closed and area where welding and cutting has taken place is cooled.

Machineries' and other Spaces. Particular care should be taken when welding or burning operations are taking place in machinery or other spaces due to the possibility of oil being in the bilges. This would necessitate taking additional precautions.

Petrol Storage Tanks and Petrol Tank compartments. The necessary precautions to be observed are laid down in BR 1754, Regulations for the Storage and Handling of Gasoline, Kerosene etc.

22. PAINT SCHEMES

Paint as per the appropriate paint schemes given below. A minimum dry film thickness of 150 microns of the complete paint system is to be maintained on weather work surfaces. For surface preparation of painted surfaces refer instruction in Appendix 'B' and Appendix 'C' to this Navy Order. The interval between applications of each coat of paint scheme is not to be less than 16 hrs and not more than 7 days.

LIST OF PAINT SCHEME AND THEIR APPLICABILITY

| Compartment/ Surface | Paint scheme |
|---|--------------|
| <u>UNDER WATER AREA :-</u> | |
| 1. EPOXY PRIMER TIE COAT (INTERGARD 269) - RED - DFT 50 - PSR (m ² /Lt) 6.58 | |
| 2. ABRASION RESISTANT ALUMINIUM PURE EPOXY (INTERSHIELD 300) - BRONZE - DFT 150 - PSR (m ² /Lt) 2.8 | |
| 3. ABRASION RESISTANT ALUMINIUM PURE EPOXY (INTERSHIELD 300) - ALUMINIUM - DFT 150 - PSR (m ² /Lt) 2.8 | |
| 4. EPOXY TIE COAT (INTERGARD 263) - LIGHT GREY - DFT 125 - PST 3.19 | |
| 5. TBT FREE SELF POLISHING COPOLYMER A/F (INTERSMOOTH 360 SPC) - DARK BROWN - DFT 150 - PSR (m ² /Lt) 1.87 | |
| 6. TBT FREE SELF POLISHING COPOLYMER A/F (INTERSMOOTH 360 SPC) - DARK RED - DFT 150 - PSR (m ² /Lt) 1.87 | |

FORE PEAK TANK + CHAIN LOCKER:-

1. ZINC PHOSPHATE PRIMER (INTER PRIME 538) - RED - DFT 75 - PSR (m2/Lt) 5.32
2. AKLYD FINISH. (INTER LAC 665) - WHITE - DFT 50 - PSR (m2/Lt) 6.72

FUEL OIL TANK / L.OTANK:-

1. EPOXY TANK HOLDING PRIMER (INTERLINE 982). PRIMROSE - DFT 40 - PSR (m2/Lt) 5.25
2. EPOXY TANK COATING (INTERLINE 704) - GREY - .DFT 100 PSR (m2/Lt) 3.71
3. EPOXY TANK COATING (INTERLINE 704) - PINK - .DFT 100 PSR (m2/Lt) 7.42
4. EPOXY TANK COATING (INTERLINE 704) - PINK - .DFT 100 PSR (m2/Lt) 3.71
5. EPOXY TANK COATING (INTERLINE 704) - GREY - .DFT 100 PSR (m2/Lt) 3.71

FODS TANK P/S:-

1. EPOXY TANK HOLDING PRIMER (INTERLINE 982). - PRIMROSE - DFT 40 - PSR (m2/Lt) 5.25
2. EPOXY TANK COATING (INTERLINE 704) - GREY - . DFT 100 PSR (m2/Lt) 3.71
3. EPOXY TANK COATING (INTERLINE 704) - PINK - .DFT 100 PSR (m2/Lt) 7.42
4. EPOXY TANK COATING (INTERLINE 704) - PINK - .DFT 100 PSR (m2/Lt) 3.71
5. EPOXY TANK COATING (INTERLINE 704) - GREY - .DFT 100 PSR (m2/Lt) 3.71

FOAM TANK

1. EPOXY TANK HOLDING PRIMER (INTERLINE 982). PRIMROSE - DFT 40 - PSR (m2/Lt) 5.25
2. EPOXY TANK COATING (INTERLINE 704) - GREY - .DFT 100 PSR (m2/Lt) 3.71
3. EPOXY TANK COATING (INTERLINE 704) - PINK - .DFT 100 PSR (m2/Lt) 7.42
4. EPOXY TANK COATING (INTERLINE 704) - PINK - .DFT 100 PSR (m2/Lt) 3.71
5. **EPOXY TANK COATING (INTERLINE 704) - GREY - DFT 100 PSR (m2/Lt) 3.71**

FRESH WATER TANK:-

1. EPOXY PHENOLIC TANK (INTERLINE 850) - GREY - DFT 150 - PSR (m2/Lt) 3.55
2. EPOXY PHENOLIC TANK COATING (INTERLINE 850) - WHITE - DFT 150 - PSR (m2/Lt) 10.64
3. EPOXY PHENOLIC TANK COATING (INTERLINE 850) - WHITE - DFT 150 - PSR (m2/Lt) 3.5

FUEL OIL TANK P/S:-

1. EPOXY TANK HOLDING PRIMER (INTERLINE 982). PRIMROSE - DFT 40 - PSR (m2/Lt) 5.2
2. EPOXY TANK COATING (INTERLINE 704) - GREY - .DFT 100 PSR (m2/Lt) 3.71
3. EPOXY TANK COATING (INTERLINE 704) - PINK - .DFT 100 PSR (m2/Lt) 7.42
4. EPOXY TANK COATING (INTERLINE 704) - PINK - .DFT 100 PSR (m2/Lt) 3.71
5. EPOXY TANK COATING (INTERLINE 704) - GREY - .DFT 100 PSR (m2/Lt) 3.71

AFT PEAK TANK:-

1. ZINC PHOSPHATE PRIMER (INTER PRIME 538) - RED - DFT 75 - PSR (m2/Lt) 5.32
2. AKLYD FINISH . (INTER LAC 665) - WHITE - DFT 50 - PSR (m2/Lt) 6.72

ENGINE ROOM BILGES WITH FRAMES:-

1. ZINC PHOSPHATE PRIMER (INTERPRIME 538) - RED - DFT 80 - PSR (m2/Lt) 4.99

2. ALKYD FINISH . (INTER LACK 665) - WHITE - DFT 40- PSR (m2/Lt) 8.4
3. ALKYD FINISH . (INTER LACK 665) - WHITE - DFT 40- PSR (m2/Lt) 8.4

SUPER STRUCTURE BULK HEAD AREA:-

1. EPOXY PRIMER / TIE COAT (INTERGARD 269) - RED - DFT 50 - PSR (m2/Lt) 6.58
2. EPOXY ANTICORROSIVE (INTERUF 262) - BLACK - DFT 125 - PSR (m2/Lt) 4.09
3. EPOXY ANTICORROSIVE (INTERUF 262) - GREY - DFT 125 - PSR (m2/Lt) 4.09
4. POLYURETHANE (INTERTHANE 990) - RAL7040 WINDOW GREY - DFT 50 - PSR (m2/Lt) 7.98

ABOVE BOOT WATER LINE AREA + BULWARK AREA: -

1. EPOXY PRIMER / TIE COAT (INTERGARD 269) - RED - DFT 50 - PSR (m2/Lt) 6.58
2. ABRASION RESISTANT ALUMINIUM PURE EPOXY (INTERSHIELD 300) - BRONZE - DFT 150 - PSR (m2/Lt) 2.8
3. ABRASION RESISTANT ALUMINIUM PURE EPOXY (INTERSHIELD 300) - ALUMINIUM - DFT 150 - PSR (m2/Lt) 2.8
4. EPOXY TIE COAT (INTERGARD 263) - LIGHT GREY - DFT 125 - PSR (m2/Lt) 3.19
5. TBT FREE SELF POLISHING COPOLYMER A/P (INTER SMOOTH 360 SPC) - BLACK - DFT 150 - PSR (m2/Lt) 1.87
6. TBT FREE SELF POLISHING COPOLYMER A/P (INTER SMOOTH 360 SPC) - BLACK - DFT 150 - PSR (m2/Lt) 1.87
7. TBT FREE SELF POLISHING COPOLYMER A/P (INTER SMOOTH 360 SPC) - BLACK - DFT 150 - PSR (m2/Lt) 1.87

23. The Tendered should mandatorily have well equipped in any location in India and should have mobilization capacity to set up workshop at Port Blair within two weeks from the date of concluding the contract. The Tendered not meeting the foresaid criteria may enter into a JV/MoU with any establishing local firm in procession of well equipped workshop so as to meet the contractual obligations. The JV/MoU so established should either be registered with Govt. of India or should be verified and certified by a Govt Approved Notary. If the JV/MoU has been established after 31 Mar 10 the two firms shall collectively meet the eligibility criteria with lead partner meeting not less than 50% of the eligibility criteria and the other partner to meet not less than 25% of the eligibility criteria. The firm(s) awarded the contract is expected to employ at least 70% skilled and 90% unskilled manpower from A&N Island.

QC & QA TERMS AND TECHNICAL SPECIFICATIONS

Quality Control Quality Assurance

1. In order to assure the quality of repair/refit and exercise effective control, the work executed by the CONTRACTOR shall be in accordance with Yard inspection schedule as applicable followed by preliminary, stage and final inspection.
2. The CONTRACTOR shall submit a Quality Assurance (QA) Plan as applicable to the scope of work for approval of the CUSTOMER. The approved QA plan will form the basis for inspection and acceptance of work executed by the CONTRACTOR under this contract.
3. Any non-conformity discovered by user Representative, in Refit or material or workmanship shall be corrected by the CONTRACTOR at his cost, to the full satisfaction of Representative in accordance with the relevant drawings and specifications.
4. During the repairs / refit of the Ship, until the delivery thereof, the ship (user) representatives shall be given free and ready access to the **Ship/FDN/Yard Craft /Asset** and to any other place where related work is being performed, or materials are being processed or stored, including the yards, workshops, stores and offices of the CONTRACTOR and premises of contractors who are doing work or storing materials, in connection with the underwater works. Notwithstanding any provision in this Article or any other Article in this Contract, the responsibility for the repairs / refit as per the scope of work of underwater works shall rest with the Contractor.
5. **Overseeing and Inspection** Necessary tests and inspections of the contracted job shall be carried out by NSRY (PB) or any nominated agency. The CONTRACTOR shall give reasonable notice to the above team reasonably in advance of the date and place of such tests / inspections. The user's representative may during the repairs / refits invariably attend such tests and inspections as per the QA Plan/Quality Inspection Schedule.
6. **Yard QA/QC Standards & QIP Procedure** In addition to the guidelines of the welding inspector nominated by the Yard, the Vendor has to comply to the guidelines and directives issued by the QC Team of the Yard from time to time. A reference QIP procedure list is placed as follows which is to be adhered to by the vendor as a standard practice:

(a) The vendor has to get the underwater shell plate renewal QI/QA done as per NES 147, NES 755, NES 155, NES 706, NES 147, ASME Sec V, VIII, IX approved equivalent standards of yard QC is as follows:-

| S NO. | ACTIVITY | QC OBSERVATION | REMARKS |
|------------|--|----------------|---------|
| (A) | PRE-DEFECTATION/DISMANTLING. | | |
| 1. | Receive UW Hull Survey Report (locations marked for plate renewal) from Production Dept. on day to day basis. | | |
| 2. | Cross checking of marked plate for renewal area as required. | | |
| (B) | PREPARATION FOR REPAIR/RENEWAL | | |
| 1. | Check if temporary stiffening is given to prevent distortion prior to cutting (as applicable). | | |
| 2. | Check the quality of the electrode (type, mfg. date, batch no., grade) used for welding (approved electrodes as per NCD specification). | | |
| 3. | Check proper baking time & temp of welding electrodes in shop oven and make sure to maintain the baking temperature in portable oven during welding in Work Site/ Ship as recommended by the manufacturer. | | |
| 4. | Check the qualification of welders. | | |
| (C) | DEFECT RECTIFICATION | | |
| 1. | Check the cut & polished stiffeners and boundaries of renewal area. | | |
| 2. | Check the bent plate and stiffeners in shop floor with templates (where applicable). | | |
| 3. | Check edge preparation of plate and stiffeners prior to erection. | | |
| 4. | Check that the erection of plate and stiffeners are done properly with correct root gap. | | |
| 5. | Check visually for surface defects of weldment of butt & fillet from inner side after chipping & wire brushing. | | |
| 6. | Check root of internal welding by back gouging D.P.Test. | | |
| (D) | FINAL CHECKS | | |
| 1. | Check surface defects of weldment after external full welding by D.P.Test (surface cleaning by chipping & wire brushing to be carried out prior to D.P.Test). | | |
| 2. | Witness checks of weldment by Hose Test (butt joints)/ Air Pressure Test (tank boundaries) as applicable. | | |

- (b) The vendor has to get the underwater shell plate built up and grounded flush QI/QA done as per NES 147, NES 755, NES 155, NES 706, NES 147, ASME Sec V, VIII, IX approved equivalent standards of yard QC is as follows:-

| S.NO | ACTIVITY | QC OBSERVATION | REMARKS |
|------------|--|----------------|---------|
| (A) | PRE-DEFECTATION/DISMANTLING. | | |
| 1. | Receive UW Hull Survey Report (locations marked for BUGF) from Production Dept. on day to day basis. | | |
| 2. | Cross checking of marked plate for BUGF area as required. | | |
| (B) | PREPARATION FOR REPAIR/RENEWAL | | |
| 1. | Removal of paint, rust and other agents from the surface of marked area. | | |
| 2. | Check the quality of the electrode (type, mfg. Date, batch no., grade) used for welding (approved electrodes as per NCD specification). | | |
| 3. | Check proper baking time & temp of welding electrodes in shop oven and make sure to maintain the baking temperature in portable oven during welding in Work Site/ Ship as recommended by the manufacturer. | | |
| 4. | Check the qualification & grade of welders to employ them as per their qualification. | | |
| (C) | DEFECT RECTIFICATION | | |
| 1. | Weld one pass on the boundaries of BUGF location for reference. | | |
| 2. | Start weld pass horizontally from lower level of marked area towards upward direction. | | |
| 3. | When one layer of pass is completed visually check for surface defect. | | |
| 4. | Keep buttering the weld till a little more than the desired thickness is attained (visual inspection of weld to be carried out after each layer of pass is completed). | | |
| 5. | Mechanical grinding to be carried out to flush the excess metal on the builded up surface. | | |
| (D) | FINAL CHECKS | | |
| 1. | Check surface defects of BUGF area by D.P.Test. | | |

| | | | |
|----|--|--|--|
| 2. | Confirm thickness of BUGF surface with USG machine (reading should not be below the original thickness). | | |
| 3. | Check weldment by DPT Hose Test, Air Pressure Test as applicable. | | |

(c) The vendor has to get the underwater sacrificial anodes QI/QA done as per NES 147, NES 755, NES 155, NES 706, NES 147, ASME Sec V, VIII, IX approved equivalent standards of yard QC is as follows:-

| S NO. | ACTIVITY | QC OBSERVATION | REMARKS |
|------------|--|----------------|---------|
| (A) | PRE-DEFECTATION/DISMANTLING. | | |
| 1 | Receive UW Hull Survey Report for sacrificial anode renewal (locations marked) from Production Dept. | | |
| 2 | Cross checking of marked sacrificial anode for renewal as required. | | |
| (B) | PREPARATION FOR REPAIR/RENEWAL | | |
| 1 | Check the quality of the electrode (type, mfg. date, batch no., grade) used for welding (approved electrodes as per NCD specification). | | |
| 2 | Check proper baking time & temp of welding electrodes in shop oven and make sure to maintain the baking temperature in portable oven during welding in Work Site/ Ship as recommended by the manufacturer. | | |
| 3 | Check the status of the new sacrificial anodes for its anodic action, MK no. & weight and signs of discontinuity like cracks etc. | | |
| 4 | Check whether the inner side of anode is painted. | | |
| (C) | DEFECT RECTIFICATION | | |
| 1 | Check the cut & polished plate of anode renewal area. | | |
| (D) | FINAL CHECKS | | |
| 1 | Check visually signs of surface defects of weldment after welding of sacrificial anodes. | | |
| 2 | Check signs of paints or any other agent that covers the sacrificial anode surface. If present, to be removed by buffing. | | |

- (c) The vendor has to get the APT QI/QA done as per NES 147, NES 755, NES 155, NES 706, NES 147, ASME Sec V, VIII, IX approved equivalent standards of yard QC is as follows:-

| S.NO | ACTIVITY | QC OBSERVATION | REMARKS |
|------------|--|----------------|---------|
| (A) | PRE-DEFECTATION/DISMANTLING. | | |
| 1. | The APT of clusters should be undertaken only on completion of following activities; a) Dry survey & rectification of defects. b) NDT & rectification of defects. c) All outside surfaces are approachable & adequate lighting & ventilation provided. d) All manholes not making the cluster have been boxed up with water tight covers. e) All major welding have been completed on the other sides of boundaries. f) All other sides of boundaries are dry and free of dirt & slag. g) Areas of cluster and adjacent structure are adequately protected. | | |
| 2. | Receive the list of openings to be blanked from production dept. | | |
| (B) | PREPARATION FOR REPAIR/RENEWAL | | |
| 1. | Check the Air pressure test adaptor, gauge and other test arrangements. | | |
| 2. | All compartments forming cluster is to be tested from the single water tight door/ hatch/ manhole with an air indicator test plug. | | |
| 3. | Before the test all inter connecting doors/ manholes of cluster should be kept open. | | |
| 4. | Check if all the openings (glands of system pipes, defective rivets/ rivet holes, leakage through W.T.Door/ Hatch, ventilation flap, cable glands, bimetallic joints, supply & exhaust trunking, ventilation valves etc.) as per the list provided are closed/ blanked properly. | | |
| 5. | Compartment should not be subjected to pressure when manned. | | |

| (C) | DEFECT RECTIFICATION | | |
|------------|---|--|--|
| 1. | The pressure testing of cluster of compartment is carried out by admitting LP air from onboard or a shore after removing the indicator test plug and inserting a special adaptor. | | |
| 2 | <p>APT of cluster is done in two phase</p> <p>a) <u>Phase-I</u>: A search pressure of 1370mm of water gauge (0.14 kg/cm²) in excess of atmospheric pressure is to be given to identify all leaks. The suspected air leak on the watertight boundaries are to be identified using soap solution and taken up for repairs.</p> <p>b) <u>Phase-II</u> : Once all the leaks are identified & rectified a pressure of 152mm water gauge is to be given and the air supply is cut-off.</p> | | |
| (D) | FINAL CHECKS | | |
| 1. | If the drop of pressure is not exceeding 13mm in 10 minutes, then the cluster/ compartment is APT proved. | | |
| 2. | Check signs of buckling/ undulations of weak steel structure due to air pressure. | | |
| | | | |

- (e) The vendor has to get the Manhole QI/QA done as per NES147, NES755, NES155, NES706, NES147, ASME Sec V, VIII, IX approved equivalent standards of yard QC is as follows:-

| S NO. | ACTIVITY | QC OBSERVATION | REMARKS |
|------------|--|----------------|---------|
| (A) | PRE-DEFECTATION/DISMANTLING. | | |
| 1. | Receive UW Hull Survey Report (location marked for manhole renewal) from Production Dept. | | |
| 2. | Cross checking of marked manhole for renewal area (as required). | | |
| (B) | PREPARATION FOR REPAIR/RENEWAL | | |
| 1. | Check if temporary stiffening is given to prevent distortion prior to cutting (as applicable). | | |
| 2. | Check the quality of the electrode (type, mfg. date, batch no., grade) used for welding (approved electrodes as per NCD specification). | | |
| 3. | Check proper baking time & temp of welding electrodes in shop oven and make sure to maintain the baking temperature in portable oven during welding in Work Site/ Ship as recommended by the manufacturer. | | |
| 4. | Check the quality of the rubber used (neoprene rubber) for sealing joint packing along with manufacturers test certificate and NABL test certificate. | | |
| 5. | Check quality fasteners (bolt, nut & washer) used for boxing up of manhole along with manufacturers test certificate. | | |
| 6. | Check the qualification of welders. | | |
| (C) | DEFECT RECTIFICATION | | |
| 1. | Check the cut & polished deck of manhole renewal area. | | |
| 2. | Check bend flat bar in oval/ circular shape as per design/existing sample for manufacturing of manhole coaming. | | |
| 3. | Check the opening made on manhole covers for ITP is done by machining/ drilling. | | |
| 4. | Check if collapsible/fixed handles are | | |

| | | | |
|------------|---|--|--|
| | welded properly to the manhole cover. | | |
| 5. | Check if flange plate and cover of manhole is temporarily tack welded for alignment before drilling holes. | | |
| 6. | Check root gap between manhole coaming and drilled flange plate post tack weld. | | |
| 7. | Check root gap between manhole coaming and deck plate post tack weld. | | |
| 8. | Check if the holes are made in the rubber joint using hollow punch of appropriate size. | | |
| 9. | Check the securing of ITP bolt. | | |
| (D) | FINAL CHECKS | | |
| 1. | Check surface defects of weldment after external full welding by D.P.Test (surface cleaning by chipping & wire brushing to be carried out prior to D.P.Test). | | |
| 2. | Witness checks of weldment/ joint packing & ITP area by Air Pressure Test. | | |

7. Warranty & Warranty Bond

Guarantee The CONTRACTOR warrants that the repairs carried out under this Contract conform to specifications vide SOR. The CONTRACTOR shall give **Twelve Months Guarantee** for workmanship and material defects for items repaired/renewed from the contract from the Contract Completion Date. The guarantee clause will also be applicable to the items repaired by the OEMs / Contractor of shipyard. Any defects noticed during this guarantee period due to defective / poor workmanship or sub-standard are to be made good at no extra cost to state.

Quality of Workmanship

8. All the finished welds shall be sound, uniform and substantially free from slag, inclusions, porosity, under-cut and other defects prejudicial to the strength of the structure. Care is to be taken for thorough penetration and fusion.

9. Proper care is to be taken to avoid distortions, sagging, undulations, buckling etc. Temporary supports are to be provided wherever necessary to avoid distortions, without extra cost and to be dressed properly after removal on completion of steel renewal. Quality of the welding at underwater location should conform to classification societies and stand X-Ray, Radiography and other NDT tests as required. Defects if any, shall be rectified free of cost. The costs of unsuccessful tests will be recovered from the contractor.

10. The work shall be carried out as per the best ship repair practice. The total workmanship shall be to the utmost satisfaction of NSRY (PB) & USER. All remarks / recommendations made during inspection / survey by owners, surveyors and statutory authorities are to be carried out free of cost.

11. Deformations if any, resulted in the course of working are to be removed by appropriate methods to the satisfaction of the owners, Class and NSRY (PB) without charging any additional cost. And also rectifications if any as suggested are to be attended without fail to the satisfaction of owners, class and NSRY(PBR) free of cost. Contractor shall follow proper sequence of cutting/ assembly / welding.

12. Welding Procedure will be as per following guidelines:-

| S. No. | Reference no. | Subject |
|--------|----------------|--|
| (a) | WPS | OR on instructions as issued by the weld Inspector of Fabrication dept on job basis. |
| (b) | ANSI/ASC Z49.1 | Safety in Welding and Cutting |
| (c) | AISI 8620 | Carbon and Alloy Steels |
| (d) | AWS B4.0 | Standard Methods for Mechanical Testing of Welds |

13. Firms are to be conversant with following standards also:-

| SI | IS No. | Title | Reaffirmed Date | Amd. |
|-----|--|---|-----------------|-----------|
| (a) | SP 0 : 19 | ISI Handbook of manual metal-arc welding for welders | 1 | SP 0 : 19 |
| (b) | SP 12 : 1975 | ISI Handbook for gas welders | | |
| (c) | IS 816:1969 | Code of practice for use of metal arc welding for general construction in mild steel (first revision) | 09 2003 | 2 |
| (d) | IS 1261:1959 | Code of practice for seam welding in mild steel | 09 2003 | |
| (e) | IS 1323:1982 | Code of practice for oxy-acetylene welding for structural work in mild steels (second revision) | 09 2003 | |
| (f) | IS 4353:1995 | Submerged arc welding of mild steel and low alloy steels - Recommendations (first revision) | 11 2000 | |
| (g) | IS 6409:1971 | Code of practice for oxy-acetylene flame cleaning | 03 2003 | |
| (h) | IS 6916:1973 | Code of practice for fabrication welding of steel castings | 09 2003 | |
| (j) | IS 10234:1982 | Recommendations for general pipeline welding | 09 2003 | |
| (k) | IS 10801:1984 | Recommended procedure for heat treatment of welded fabrications | 09 2003 | |
| (l) | IS 15327:2003 / ISO 14731:1 997 | Welding coordination - Tasks and responsibility | | |

14. Following material as per mentioned technical specification are to be used:-

- | | |
|---------------------------------|------------------------------------|
| (a) Aluminum sheets/plates | -IS 737:1986 Gr 54300 |
| (b) Chequered Plates | -Is 3502 pattern 1A:1994 |
| (c) GI Sheet | -IS 277 (2003) |
| (d) Rubber gasket | -IS 11149 Type II (Class 2A) |
| (e) Epoxy Red Oxide Primer | - IS 14506/NCD 1435 |
| (f) Marine Plywood | -IS 710 |
| (g) Fire Retardant Plywood | -IS 5509 |
| (h) Al Filler Rod | -AWS/SFA 5.10-ER 5356, AWS ER-5183 |
| (j) Grit conforming to G-17-G24 | -Chilled cast iron as per BS 2451 |
| (k) Aluminium pipes | -IS 738 Gr 52000 |
| (l) Steel Fasteners | -IS 1397 Part-1 |
| (m) MS nuts & bolts | -IS 1367 Part-1 |
| (n) SS nuts & bolts | -AISI 304 (Stainless Steel) |
| (o) Wire mesh | -IS 2405 Part-I |

15. Cutting gas shall be either DA & oxygen or Bharat gas & oxygen. Gas cylinders are to be duly refilled from authorized filling agency and certified by the local administration.
16. All work finally should be neatly completed so that surface that is affected due to cutting is grounded to give a smooth finish. MS Pipes and fittings are to be power brushed and applied with one coat of EROP (navy approved brands only) to give total DFT not less than 30 microns. Any extra burrs or deposits pipes are also to be ground flushed. The gaskets are to neatly cut and fitted so that they protrude beyond the flanged portion or give any odd appearance.
17. While carrying fabrication works, the bends on the pipes are to smoothly formed without any surface deformations or rippling. Bends are to be obtained by filling river sand method.
18. All CuNi pipes are to be TIG welded using appropriate filler rods.
19. Post fitment of the work, system trials would be conducted by the Ship's staff. Defects such leaks on the worked portion if any will be made good by the firm without any cost. In case of any fresh work coming out is required to be made good with additional cost at the same rate.
20. Fasteners that will be used shall confirm to the following:-
- (i) UNC Threaded MS bolt, BS 2708 only are to be used for fuel/ oil line.
 - (ii) UNC Threaded GI bolt, BS 1769 only is to be used for Ballast lines.
 - (iii) Zinc plated nuts and bolts of BS 1768 standard are to be used where greater strength is required. The length & diameter of the fasteners used shall suit to the technical and aesthetic aspects.
 - (iv) Firm has to provide certificate from NABL Accredited lab for the above mentioned items.
21. Pressure test of the pipe has to be witnessed by Yard rep. Test pressure will be 1.5 times the working pressure of the pipe, by liquid pressure method.
22. **Mechanical Cleaning** - 'Mechanical Cleaning' means pipes and its system accessories are to be cleaned using wire brush and is to be made free of dirt, dust and rust. It also involves flame burning if required for removal of dirt etc.
23. **Chemical Cleaning** - 'Chemical Cleaning' involves cleaning of pipes by dipping them into 15% HCl solution till the time all hard dust, dirt and rust does not gets removed.
24. **Renewal of Flanges** – Flanges are provided to join two pipes. Flange renewal should include following:-
- (i) Manufacturing of new flanges is to be done by proper gas cutting.

- (ii) The new flange is to have an accurate circular shape.
- (iii) Grinding at the edges is to be carried out to give it a smooth appearance and to remove sharpness.
- (iv) The pitch circles are to be machined properly by drilling only.

25. **Gasket-** 'E' & 'F' type Gaskets are to be used as per flange type. Firm has to provide certificate from NABL Accredited lab for the above mentioned items. Rubber Gasket is to be renewed as follows:-

- (i) **Nitrile** (Buna-N) Trade Names: ChemigumHycar (Zeo (Goodyear) n Chemical) NySyn (Copolymer) Paracril (Uniroyal) Krynac (Polysar) Perbunan (Mobay). For fuel and petro products. Nitrile rubber of **IS 5192** standard is to be used for fuel lines.
- (ii) **Fluorocarbon** (Viton, FKM or Fluorel) Fluorocarbon (FKM) is a high tech. elastomer designed for extreme heat, oil and chemical resistance. Viton resists aliphatic aromatic and halogenated hydrocarbons, concentrated acids, alkalis, animal and vegetable oils.
- (iii) **EPDM** - Ethylene Propylene Diene Monomer: rubber for sea water lines & ballast lines.
- (iv) **Chloroprene** (Neoprene) for fresh water lines.

26. **Primer** – Application of EROP is to be undertaken by the firm post all hot works up to a minimum thickness of 50 microns.

27. Prior to any re-fitment work, clearance has to be taken from the designated rep of fabrication department. Also, necessary clearance is required to be undertaken from ship's staff prior to commencement of hot works.

28. **Working Space** The removed pipes can be worked either contractors works area or taken out to the firm's workshop. For taking out any job gate pass is to be signed by Yard's rep, Manager and ACHSO.

29. The shelf life of all the material supplied by the firm should be a minimum of 12 months from the date of supply. Same is to be mentioned in the quality certificate mentioned provided along with the material.

30 **Material section**

- (i) All consumables such as gas, electrodes, grinding wheel, brushes, tools, adhesives, jigs etc will be is to be quoted within the cost of services.
- (ii) MS plates, MFMB slabs only will be supplied by the Yard.
- (iii) Other material such as pipes if available will be supplied by the Yard. Vendor to quote the pipes cost against the cost of material.

(iv) The shelf life of all the material supplied by the firm should be a minimum of 12 months from the date of supply. Same is to be mentioned in the quality certificate mentioned provided along with the material.

31. **Surface preparation** **ST surface preparation standards (for fabrication works)**. Surface preparation by manual and power tool methods, such as scraping, wire brushing, machine brushing and grinding is designated by the letters 'ST', ST 2 standard are to be achieved by the firm & the surface shall have a faint metallic shine..

32. **SA 2.5** For the surface preparation prior painting the standard of SA 2.5 to be maintained in accordance with Navy Order 20/03.

33. Firm has to apply 01 coat of EROP at all the hot affected areas post repairs for a minimum thickness of 30 microns.

34. **Sacrificial Anodes System** As per the NO 53/16 for survey of hull structure of surface ships, sacrificial anodes are to be examined during all refits and are to be renewed if consumed more than 50%. As specified in the above NCD3906/3907, Anodes of twelve different designs (size/weight) are available for fitment in different areas of ships/structures. The extract of the same is indicated in the table below:-

| Type of Anode | Area / structure where used |
|---------------|--|
| MK-I | Under water hull of ship |
| MK-II | Under water hull of ship |
| MK-III | Bilge compartment, se water inlets, Rudder |
| MK-IV | Cassions for small compartment |
| MK-V | Sea water inlets |
| MK-VI | Sea water inlets, Rudder and stern area |
| MK-VII | Under water hull of ship during fitting out period |
| MK-VIII | Large structure in sea water such as offshore drilling |
| MK-IX | Under water hull on transom (Missile boats) |
| MK-X | Internals of ballast tanks |
| MK-XI | Submarine stern area |
| MK-XII | Inlets of condenser tubes |

35. **Fastener Standards And Specifications** A selection of BS which relate to metric and imperial fasteners is given as follows:-

| <u>Description</u> | <u>Metric</u> | <u>Unified</u> | <u>BA</u> |
|---|---------------|----------------|---------------|
| Precision hexagon bolts, screws and nuts | | BS 3692 | BS 1768 BS 57 |
| Black hexagon bolts, screws and nuts | | BS 4190 | BS 1769 – |
| Machine screws—cheese, pan, countersunk raised countersunk head countersunk, head, and machine screw nuts | | BS 4183 | BS 1981 BS 57 |
| Hexagon socket screws and wrench keys | | BS 4168 | BS 2470 |
| – | | | |
| Self-tapping screws | | BS 4174 | |

| | | | |
|--|-------------|--------------|---------|
| Studs, stud bolts and nuts for flanges and - pressure consuming purposes | BS 4882 | BS 4882 | |
| Prevailing torque type nuts - | BS 4929Pt 1 | BS 4929 Pt 2 | |
| Washers for general purposes | BS 4320 | BS 3410 | BS 3410 |
| Spring washers for general purposes - | BS 4464 | - | |
| Crinkle washers for general purposes - | BS 4463 | - | |
| Tapping of holes to receive wire thread inserts | BS 4377 | BS 3409 | - |
| Screw threads | BS 3643 | BS 1580 | BS 93 |
| Clearance holes for bolts and screws - | BS EN 20273 | | - |

36. **Rudder** The forces on the rudder and stock will be defined from hydrodynamic considerations. The construction of the blade will usually consist of a grillage framework onto which the skin is attached. The framework is to be designed so as to transfer the loads to the stock in the most efficient manner neglecting the strength of the skin, but the spacing of the members in the framework must be such as to allow good access for construction and preservation. Scantlings of the framework and skin are to be in accordance with original form & fit or with existing ships drawings.

37. For any of the critical stress concentration areas are involved Yard's guidance is to be obtained prior to commencing the work. The solution will usually be to rearrange the detail to reduce the stress concentration factor; fitting thicker plating rarely has a significant effect on local stresses and therefore fatigue life. If effective local redesign is not feasible then consideration is to be given to a change in philosophy to a fail-safe arrangement, that is the crack growth rate and direction is to be estimated to establish whether it is likely to hazard the ship before the next opportunity arises to repair it.

38. **QUALITY OF WORK**

(a) Electrodes used shall be as per existing relevant WPS (welding procedure specification) with Navy approved brands. Electrodes will be supplied by the firm.

(b) Necessary care is to be taken by the contractor to provide requisite allowance at welding joints to cater for shrinkages during welding. Any dimensional variation due to weld shrinkage or consequential misalignment shall be the responsibility of the contractors and necessary re-work/repair is to be carried out by the contractor to the acceptable standards without any extra cost.

(c) All the dimensions, welding symbols, types of welds, extent of welds are to be done as per drawings sequence of welding, if any, and also "NOTES" given

on the drawings shall be adhered to, if any such drawing is provided by the Yard.

(d) The entire safety of the workmen and equipment is the responsibility of the contractors. Necessary safety gadgets, viz. helmets, shoes, leather hand gloves, sleeves, aprons, safety belts and equipment, tools etc. are to be supplied to the workmen by the contractor and ensure they should wear the same without fail. The workforce should comply with discipline, other rules & regulations as prevailing in NSRY (PB). If the workers are not wearing the safety gear, they will not be allowed to work. If any accident occurs during the execution of the work, NSRY (PB) is not liable for such incidents and the contractor shall stand responsible for the same.

(e) Clearance certificate is to be obtained from the respective supervising officials of the production Depts., stating that scrap/other waste materials generated by the contractors during the course of work were removed by them immediately on completion of work on daily basis to the satisfaction of NSRY (PB), otherwise payments will not be released, which may please be noted also the cost incurred in removal of scrap will be deducted from the bills.

(f) The Firm is liable to offer all works undertaken by them to the QC Team of the Yard. Delay for the same will be treated as delay in work completion and appropriate LD will be applicable for late completion of work.

(g) The firm has to give undertaking that routine on Main Engine will be carryout by OEM

TERMS AND CONDITION FOR OUTFITTING WORKS

39. The DFT of applied paints should be as per NCD 1491, issue 1 dated May 2011. **The OEM being different for each paint scheme, the contractor should specify the name of the paint scheme in price bid format for respective above mentioned serials.**

40. The firm should be able to undertake **50 units of works per day in any combinations** as mentioned in table 1. The contractor should be able to consider the requirement of manpower and quote accordingly.

| Srl | Activity | | Individual unit value |
|-----|-------------------------------|-----------------------------|-----------------------|
| (a) | Surface preparation | ST 3 Standards | 1 unit = 0.5 sqm |
| | | SA 2.5 standards | 1 unit = 1 sqm |
| (b) | Application of paint one coat | By roller in tank space | 1 unit = 1 sqm |
| | | By spray in tank space | 1 unit = 1.2 sqm |
| (c) | Lagging works | Removal of existing lagging | 1 unit = 2sqm |
| | | Fitment of 1" lagging | 1 unit = 1 sqm |

| | | | |
|--|--|----------------------------|-------------------|
| | | Fitment of 2" lagging | 1 unit = 0.8 sqm |
| | | Fitment of ceramic blanket | 1 unit = 0.25 sqm |
| | | Fitment of GF cloth | 1 unit = 0.5 sqm |

Table 1 : Unit quantities for works

41. The firm should obtain stage wise approval of Outfitting QC team prior commencement of next stage of works. Works undertaken without approval of Outfitting QC team will be considered as incomplete and the same area is to be reworked as per Outfitting QC requirements at no extra costs. The various stages of QC inspection are mentioned at Table 2

42. The firm should anticipate the loss factor associated with the painting works and procure paint accordingly. The loss factor is to be calculated as per NCD 1491, issue 1 dated May 2011 for respective paint scheme.

43. The paint supplied by OEM should have a minimum shelf life of 09 months. The firm should always maintain a reserve stock of materials, amounting to 5 percent of rate contract quantity at all times in Port Blair along corresponding batch certificate. The batch number, date of manufacture and date of expiry should be marked legibly on the paint drums supplied by the OEM. The paint without these markings will not be allowed to be used by QC.

| Srl | Stage of Inspection | Time of Inspection | Inspection procedure |
|-----|---------------------|---|--|
| (a) | Stage 1 | Inspection of surface | Visual survey post cleaning of tanks |
| (b) | Stage 2 | Prior commencement of surface preparation | Grit pattern number and OEM certificate regarding material specification. |
| (c) | Stage 3 | Post surface preparation and prior application of paint | Measurement of surface profile by profilometer. should adhere to SA 2.5/ST3 |
| (d) | Stage 4 | Prior paint application | Checking of batch numbers, manufacture date and expiry date of paints marked on the paint drums. |
| (e) | Stage 5 | During application of paint | Measurement of WFT by WFT gauge. |
| (f) | Stage 6 | Post application of paint | Measurement of DFT by DFT gauge. |
| (g) | Stage 7 | Adhesion test | Measurement of pull off by PAT adhesion tester. |

Table 2 : Stages of Inspection for Quality check approval

44. The equipments for the application of the paints as per NO 53/16 and NCD 1491, issue 1 dated May 2011 is the liability of contractor. The tools/equipments will be maintained and replaced by the firm in case of fail, wear & tear. In addition the contractor should have the following QC items available at all times during the application process:-

- (a) Profilometer.
- (b) PAT adhesion tester.

- (c) Peel off tape.
- (d) Hygrometer
- (e) Dry film thickness gauge for both aluminum and steel substrate
- (f) Wet film thickness gauge
- (g) Trial of the above mentioned items are to be demonstrate^{3d} within one month of conclusion of contract in presence of M(Out) and M(QC).

45. Certified Paint inspector of OEM has to be present throughout the time of paint application. The paint inspector should have NACE/Frosum qualifications. Any other tye of qualification will not be accepted by yard. The paint inspector should also be present during any repairs being undertaken to the paint scheme in the guarantee period. For repair of guarantee works, the firm has to adhere the work speed as per Para 5 and QC as per Para 6 of scope of work.

46. The contractor should be able to work in both FDN-1 and IN jetty as per yard directives. Transportation of material to place of work is liability of contractor. The contractor has to make suitable arrangement for transportation of material to FDN. In case of contractor hiring a boat under own expenditure for transportation of materials, the firm has to obtain clearance from yard security officer or any officer appointed for the purpose 48 hours in advance.

47. **The firm has to give a functional guarantee as per NCD 1491, Issue 1 dated May 2011 for the paint scheme.** In case of failure of the paint scheme within the guarantee period the firm is to repair the same as per satisfaction of the yard. The paint repair has to be undertaken within a time period of 30 days from the day of intimation of the failure to the firm by the yard.

48. The paint certificate by certified paint inspector of OEM is to be submitted to the yard within 07 days of completion of paint application.

49. The firm has to work according to the schedules/planning of the yard.

50. The standards of surface preparation should be as per NO 53/16 and NCD 1491, issue 1 dated May 2011. The grits used should confer to the standards mentioned in the above references.

51. The equipments for the application of the lagging as per NES 703 should be brought by the contractor. The tools will be maintained and replaced by the firm in case of fail, wear & tear.

52. The firm is to undertake the clamping wherever required for fitment of battons. The welding for clamp fitment should be as per yard standards and should be offered to weld QC team prior commencement of further works.

53. It is the responsibility of the contractor to store materials and transport materials to the yard/work place as per the requirements for application procedures.

54. All the material mentioned in RFP as 'Yard Supply' will be provided by the yard. All other material, mentioned or not, required for completing package related works, are to be provisioned by the vendor.

55. All works being undertaken as per this package are of QC Level 1 and 2 (L1& L2). It is liability of the vendor to get his area of responsibility checked by yard QC and obtain 'SATISFACTORY/SAT' remarks. No bill will be cleared without QC clearances.

METHODOLOGY OF AUTOMATED HULL SURVEY

56. Crawler mounted computer based Ultrasonic scanning of hull to assess the material state of the underwater, boot top and above water hull has to be undertaken. The work involves Ultrasonic scanning of outer hull, which includes the underwater & boot top for ships in Normal Refits(NR) and includes the above water hull for ships in MR. The scanning would require to be undertaken in dry dock, post hydro jet cleaning of the hull(to be undertaken by yard). The scanning may have to be undertaken during two phases of docking to complete the work in both versions. The second version would involve only scanning the dock areas covered in the first versions. Internal surface of the structures is likely to be rusted (All scattered locations) with heavy scale deposits and consists of stiffeners in longitudinal and locations) with heavy scale deposits and consists of stiffeners in longitudinal.

57. Initially a coarse scanning is to be carried out with scanning density of one reading per 50mmx 20mm area of shell. Based on results of the coarse scanning denser scanning will be required in selected areas. Visual inspection of weld seams and marking of pits along the weld seams based on manual USG techniques is to be carried out.

58. **Encoding of position Data** The system must be capable of accurately encoding the locations co--- ordinates of the scanner head on the hull at any point in time so that thickness data can be accurately assigned to the correct co-ordinate on the shell expansions drawing. Before commencing survey, the contractor must show that the position accuracy achieved by the system after the scanner has traversed some distance from a given reference point is acceptable (within 05mm)

59. **Time Frame** The entire hull scanning as indicated above to be completed at the minimum rate of 125Sqm/day. The scanning should start not later than two days of the date of clearance for commencement of work by FAB department. From fourth day onwards of commencement of scanning, the firm will mark the problem areas (as per requirements placed at Appendix A') and forward site report on daily basis. There after the firm should carry out denser scanning in

60. The affected areas as per the scanning grid decided jointly by the firm and the representative of fabrication department.

61. **Deliverables** The contractor will supply the following:-

(a) 08 CDs (hull survey reports) containing the entire A scan data of the U/W hull up to boot top region in NR and complete U/W hull in MR.

(b) C-scan containing colour coded plots showing the measured thickness of the shell plating. The colour codes are to distinguish clearly the areas with reduction I thickness as per the following scale

- (i) 0-10%
- (ii) 10-25%
- (iii) Above 25%

(c)

- | | | |
|-----------------|-------------------|------------------------|
| (i) 0-10% | -Light corrosion | -Chipping and painting |
| (ii) 10-25% | -Medium corrosion | -Repair by buildings |
| (iii) Above 25% | -Heavy corrosion | -Repair by renewal |

Note:- Scattered pits(if any) to be marked for buildup irrespective of K factor or reading. Renewals and buildings of deep pits should be listed down in the site report as well as the complete report. It should be possible to change the range of variation of thickness in the colour legend to get colour plots for different ranges of thickness. The site report is to be mandatorily forwarded to the yard on daily basis clearly indicating the defective/suspected locations.

(d) B-scan and through B-scan must be derived from the A-scan data recorded on the hull for any location on the hull

(e) K-factor calculation and display is to be done (as per details in Appendix 'A' of NO 19/06) over grid sizes of 500 mm x 500mm of corroded plating on the hull . Balance 'K' factor calculation should be done stake & frame wise.

(f) Data should be compatible with the post processing software to calculate point by point thickness of the plating cross sectional view of the plate to enable detection of subsurface defects, colour coding, calculation and display of K- factor over selected grid and 3-D representation of the plate (selected area) giving a perspective view of the corrosion

(g) Given the design thickness of the plating on the shell expansion drawings, reeducation in plate thickness at any point must be displayed on taking the cursor/pointer to the required point on the shell expansion.

(h) The soft copy of the hull expansion drawings must be editable by Yard for marking the actions for repair actually undertaken. It should be possible to overlay the drawing showing residual plate thickness on the drawing showing the design plate thickness.

(j) In addition to CDs/soft copies as above 08 in nos hard copies in colour prints of the following must be supplied

(i) Shell expansion drawing with design thickness as scanned/ digitized from Yard's data

(ii) Colour coded plots on the shell expansion drawing showing actual residual thickness on the plating. Colour codes for ranges as mentioned in para6(b) above must be used.

(iii) B-scan (cross sectional views) plots at corroded selected locations.

(iv) Drawing showing "K factors" on the selected grid of 500x500 mm of strake/frame wise on the shell expansion.

(v) Excel spread sheets of A- scan values for the corroded area printed in A-3/A-2 size to be provided.

62. Service to be provided by Yard: Power supply (23v, 50 Hz) will be made available in the Floating Dock (FDN). Fresh water will be provided by the yard during routine supply once in a day. All other requirements are to be met by the Contractor. The security and safety of the equipment used by contractor will be his own liability.

63. **Submission of survey report.** The results are to be forwarded in the form of survey report as per format provided the yard in one/two phases. First phase report to be submitted within one week of scanning of hull in the first version and the second

phase report (if applicable) to be submitted within one week of scanning of hull in the second version.

64. **Association of Yard personnel.** Suitable yard personnel will be associated with the contractor during the survey operations and result analysis. The contractor will provide all information and clarifications to the yard personnel in respect of the work.

65. **Test Check.** Before commencing the survey operations, test scanning of a selected grid on the hull will be undertaken. The results of the scanning will be verified by hand held ultrasonic scanning probes.

66. **Security of Data.** All data provided to the contractor in the course of the work and all results generated are the property of the Indian Navy and the same shall not be communicated to any third party. No copies of the data or results will be made by the contractor for his own relation during execution of or on completion of the contract.

67. Quality inception Specification/Acceptance procedure: Survey team of Fabrication department

68. Speed of the job should be as follows:-

- (a) Minimum of 125 m² area scanning per day
- (b) Report Submission: Within one week of completion of scanning.

69. In addition to the above the firm should fulfill following criteria:-

- (a) **Firm should be registered with any NSRY/ Naval Dockyard/ Coast Guards/ WOTs or PSU shipyards.**
- (b) The firm has to employ only **classification society approved welders** for all works on Primary structure (Primary structure means Shell with stiffening members, all WT decks, tanks tops, WT bulkheads and main machinery foundations).
- (c) Proof of employment of 25 persons as an overall workforce/ team is to be attached with tech bid format. They should be in the payroll of the firm for the last one year prior to opening of technical bids. Necessary documents attested by gazetted officer are to be submitted. Submit copies of payroll (form V) duly attested by a Gazetted Officer.
- (d) All welders coming for work inside should have welding certification valid throughout the tenure of rate contract. Firm to give undertaking that for all the works related to this RC, Classification society certified welders will only be deployed. In addition all Class Certified welders should carry their valid welding certificates while working inside the yard premises under this contract.
- (e) The firm has to furnish an undertaking that on requirement basis they will be able to mobilize at-least thirty in number additional skilled manpower.
- (f) Firm to give undertaking that as per **Para 38(d)**, all their workers engaged in work related to the contract will be wearing protective clothing which will include industrial boots, helmets and overalls.
- (g) Firm is to give an undertaking that they have the capacity to successfully complete one metric ton of underwater steel works per week and will be able to undertake the same under this rate contract.
- (h) The firm has to give undertaking that routines on Main Engine

COMPLIANCE MATRIX FOR TECHNICAL ASPECTS
(SHORT REFIT WORKS OF FB PUSHPA)

| <u>S. No</u> | <u>Description of clause</u> | <u>Understood and accepted/Documents submitted</u> | |
|--------------|---|--|----|
| | | YES | NO |
| 1 | Indicate acceptance of the entire scope of work as per RFP | | |
| 2 | Indicate acceptance of the QAP for the scope of work as per RFP | | |
| 3 | Indicate acceptance that any spare required for completing work package will be provided within the cost of the project. | | |
| 4 | Indicate whether Earnest Money Deposit as per RFP has been attached.(Only NSIC,MSME and DGS&D registered firms are exempted for EMD) | | |
| 5 | Indicate acceptance of Payment terms as per RFP | | |
| 6 | Indicate acceptance of all terms and conditions given in the RFP. | | |
| 7 | Agree to deploy work force round the clock on all days including Sundays and holydays without any break till the completion of the job. | | |
| 8 | Performance guarantee for paint scheme applied as per No 53/2016. | | |
| 9 | Firm should be able to undertake 300 units of work per day. | | |
| 10 | Agree for the following:- (i) Agreement for submission of inspection certificates for all material, from NABL accredited lab as per RFP. (ii) Adherence to work completion dates, Yard timings, safety procedures, general points, QC aspects as per SOW and work orders. | | |
| 11 | Agree to submit proof for having following qualified work force comprising:- 06 Welders(IRS/ABS/CLASS certified 4G experienced , 02 experienced welders with certificate from any classification society/Institute approved by Govt of India or State Govt. 06 Plate Fitters & Cutter, 03 Grinders, | | |

| | | | |
|----|---|--|--|
| | 10 Semi Skilled Workers, 10 Helpers -With certification from any classification society institute approved by Govt of India or State Govt. | | |
| 12 | Agree to submit proof of having successfully completed:- 03 similar works each costing not less than Rs 74 Lakhs Or 02 similar works each costing not less than Rs. 110 Lakhs. Or 01 similar works each costing not less than Rs 148 Lakhs. In IN Ships/Coast Guard ships/Yard crafts/Merchant ships/Offshore platforms | | |
| 13 | Average annual financial turn over during last 03 years ending 31 Mar of the previous financial year should be Rs. 02 Crores or above. Balance sheet duly attested by CA to be submitted. | | |
| 14 | Agree for proper safety measures as per Yard safety rules and Industrial safety norms should be adhered to including fire sentries, protective gear etc. | | |
| 15 | Firm should be registered with any NSRY/ Naval Dockyard/ Coast Guards/ WOTs or PSU shipyards. Valid certificate of registration to be attached. | | |
| 16 | The firm should have experience on undertaking NR/SR of any of the water barge/fuel barge/Yardcrafts/Ships. Copy of work order to be furnished. | | |
| 17 | The firm has to give undertaking that routine on Main Engine and other major machinery will be carryout by OEM | | |
| 18 | Copy of PAN Card to be submitted. | | |
| 19 | Copy of IT returns for last three years. | | |
| 20 | Affidavit duly notarized stating that the firm has not been blacklisted by any State/Central government organization. | | |

Conditional bid will be rejected.

Commercial bid of vendors disqualified in the Technical bid will be with held.

M/s Certifies that the documents enclosed with this format and to the best of my knowledge and belief. Further I am aware that I may be disqualified if the enclosed documents are found incorrect or mala fide at any stage.

Firm Rep Signature

COMPLIANCE MATRIX FOR COMMERCIAL ASPECTS
(TO BE ATTACHED WITH Q-BID)

| S.No | Q Bid Parameter | Complies with RF P (Yes/ No) | If Yes par a ref. in Q bid |
|-------------|--|-------------------------------------|-----------------------------------|
| 1 | Quotation shall remain valid till 06 months from opening of Bids. | | |
| 2 | Unit rates are to be quoted for each of the requirement as per as per SOR | | |
| 3 | Detailed breakdown of cost of material and labor for each serial as per SOR | | |
| 4 | Destination basis by road inclusive of Packing, Forwarding, Freight charges, Transit Insurance and any other charges as applicable. Agree. | | |
| 5 | <u>Taxes&Levies.</u> Break up of all loading amount (taxes & duties) for each serial as per SOR | | |
| 6 | GST Terms & Conditions | | |

On and on the behalf of the President
Signature of Tenderer (s)

QUALITY INSPECTION SCHEDULE

Quality Inspection Schedule/ QAP as applicable will be finalizing during TNC

QUALITY AND INSPECTION

1. **Quality Assurance & Quality Control:** In order to assure the quality of repair/refit and exercise effective control, the work executed by the CONTRACTOR will be in accordance with inspection as applicable followed by preliminary, stage and final inspection. The repair work will be undertaken as per **(specified standards)** and quality norms. Ensuring and maintaining quality will be the responsibility of the Shipyard **(Additional Third Party Inspection or the Services of Professional Certifying Agencies are to be mentioned in Technical bid as applicable in respect of underwater structure and items of special use).**
2. The CONTRACTOR shall submit a Quality Assurance(QA) Plan as applicable to the scope of work for approval of the CUSTOMER. The approved QA plan will form the basis for inspection and acceptance of work executed by the CONTRACTOR under this contract.
3. **Overseeing and Inspection:** Necessary tests and inspections of the contracted job shall be carried out by COA or his nominated agency. The CONTRACTOR shall give reasonable notice to the above team reasonably in advance of the date and place of such tests/ inspections. COA shall also carry out joint receipt inspection of the equipment and material procured by the CONTRACTOR/ supplied by CUSTOMER. The CUSTOMER'S representative shall, during the repairs/ refit invariably attend such tests and inspections as per the QA Plan/ Quality Inspection Schedule.
4. Any non-uniformity discovered by CUSTOMER Representative and intimated in writing co-relating relevant documents where necessary, in Refit or material or workmanship shall be corrected by the CONTRACTOR at his cost, to the full satisfaction of Representative in accordance with the relevant drawings and specifications.
5. During the repairs/ refit of the Ship, until the delivery thereof, the CUSTOMER's representatives shall be given free and ready access to the **Ship/ Submarine/ Asset** and to any other place where related work is being preformed, or materials are being processed or stored, including the yards, workshops, stores and offices of the CONTRACTOR and premises of Sub contractors who are doing work or storing materials, in connection with the repairs/ refit of the **Ship/ Submarine/ Asset**. Notwithstanding any provision in this Article or any other Article in this Contract, the responsibility for the repairs/ refit as per the scope of work.

Extract of Relevant Navy Orders (As applicable)

TRIALS OF EQUIPMENT-AFTER REPAIR- NO(Str)5/95

1. The rotating parts of equipment after overhaul or repairs should whenever possible be tested in slow speed by hand before testing them by power. Any departure from this procedure is likely to cause serious damage to the machinery and should be completely discouraged.
2. Administrative authorities and those responsible for refit are to ensure that the personnel employed on maintenance or repairs are fully conversant with the arrangements for hand operation of equipment and that they invariably adopt this method before applying power for testing purposes.

EMI/EMC SURVEY/TRIALS OF NAVAL PLATFORMS- NO 89/2002 (EE/06/1565)

Introduction

1. The increasing density of Electrical and Electronic Systems onboard Naval ships require that particular attention be paid to Electromagnetic Interference and Electromagnetic Compatibility (EMI/EMC) at the ship building stage, as well as, during the life-cycle of the ship.
2. Disregard of well-established EMI/ EMC engineering practices during ship design/installation of new system onboard can lead to deterioration in the combat capability of a warship. Similar adverse effects can arise from ill-planned changes in cabling/wiring onboard, poor workmanship during refit, natural deterioration of earthing conductors, screens etc, or from inadvertent damage to electronic components.
3. There is therefore, a need to institute a system of EMI/EMC surveys, both at ship construction and at refit stages, to ensure the Electromagnetic Integrity of Indian Naval Warships.

Pre and Post Refit EMI/EMC Survey

4. EMI/EMC problems being reported by ship/submarine during operational and refit cycles are mostly a consequence of inadequate EMI/EMC hygiene resulting from lack of attention on upkeep or arising during installation of new equipment. Some of these factors are given below:-
 - a) Incorrect /poor bonding of equipment doors, inclined ladders collapsible stanchions, lockers, top deck metallic rigging.
 - b) Use of unshielded cables, and indiscriminate bunching of different categories of cables.
 - c) Improper earthing, termination of screens, feeder cables etc.
 - d) Indiscriminate painting of mating surfaces loose nuts and bolts etc.
 - e) Improper choice or use of material leading to Galvanic Corrosion.
 - f) Inadequate use/poor condition of EMC enhancing equipment such as multi couplers, notch filters, suppression filters and blanking units.
 - g) Gradual wear, tear and degradation of components and parts.

5. Pre and post refit survey of every ship scheduled for refit NR and above are to be undertaken to remedy the above listed symptoms. These surveys are to be conducted by NEC and are to be treated as an extension of the mutual Radio Interference Trials stipulated in BR 2533. Specifications NECSPC-2240 and NEC-HDBK-160 (amended from time to time) are to be used as guidelines. Specific trials directive, covering details of the tests and the duration of the survey for each ship and its electronic package, shall be issued by NEC, with the approval of the administrative authority, two weeks prior to the commencement of survey. Electronic equipment trials are to be programmed simultaneously with these EMI/EMC Trials to the extent possible.

6. After completion of pre-refit survey, NEC shall render a report to the administrative authority bringing out specific problem areas and recommended remedial measures, with copies to concerned authorities, including Fleet Headquarters. Naval Dockyard, FMU etc. Dockyard assistance, wherever needed is to be sought by the concerned ship/submarine through supplementary defect list and /or AWRFs for timely resolution.

7. Post-refit EMI/EMC survey shall be planned to be conducted only after satisfactory completion of Harbour Acceptance Trials of all weapon/electronic equipment/systems. These shall be conducted to ensure compliance with earlier recommendations on corrective actions. The trials programme shall be communicated to all concerned by signal by the administrative authority.

Record of Ships EMC Signature.

8. NEC shall maintain a record of EMI/EMC status throughout the life cycle of all ships that have undergone pre-post EMI/EMC survey. Any major deviation in the status due to A's and A's or maintenance policy implementation shall be reported to Naval Headquarters. The Directorate of Electrical Engineering at Naval Headquarters shall be the nodal directorate for all activities concerned with EMI/EMC.

9. In the case of new construction/acquisition ships, EMI/EMC survey/trial reports shall be submitted to all agencies involved in the ship's design, production, maintenance and the Flag Officer Sea Training. In addition, NEC shall render a biannual report to Naval Headquarters in June and December of each year, in respect of ships in commission, summarizing the survey conducted by it.

TIME FRAME/SCHEDULE: CONDUCT OF PART 'A' SURVEY

| | | |
|------------|---|---|
| D-6 months | Finalization of NEC survey Part 'A' and promulgation of the dates | WOT in consultation with Directorates and NEC |
| D-2 month | Finalization of ship specific EMI/EMC survey schedule | NEC/DEE |
| D-1 month | Printing and promulgation of the finalized survey schedule | WOT/SB |
| D | Conduct of Part 'A' survey | NEC/WOT/SB |
| D+1 month | Submission of survey report/ recommendations to all concerned. | NEC/WOT |

TIME FRAME/SCHEDULE: CONDUCT OF PART 'B' SURVEY

| | | |
|------------|---|-------------|
| D | Completion of HATs of all weapon/electronic equipment. | WOT/WATT/SS |
| D+1/2month | promulgation of part 'B' Schedule | NEC/WOT |
| D+1 month | Part 'B' survey | NEC/WOT/SS |
| D+2month | Submission of survey analysis and recommendations | NEC/WOT |

OPERATIONAL AND TRAINING
WELDING AND BURNING (HOT WORK) OPERATIONS-ORGANISATION AND
PRECAUTIONS TO BE TAKEN IN SHIPS AND SUBMARINES
NO 84/2002 (EG/4743/01/NBCD)

1. A large proportion of the total number of out breaks of fire in ships and crafts results from welding and burning operations and reports indicate that most fires are generally due to inadequate precautions. The precautions to be taken during welding and burning operations set out in this order apply to all ships and submarines.
2. The Commanding officers are responsible to ensure that an efficient organization is available on board for dealing with fires, should they occur and for ensuring that the necessary precautions are taken to prevent fire in accordance with regulation 0357 Regulations Navy Part I.
3. Definition: The term "Welding and burning" is to be interpreted to include all welding, oxyacetylene burning, brazing use of blow lamps, liquefied petroleum gas burners and any other operation which involves use or application of a naked flame for heating.
4. The actions required to be taken by various authorities and their responsibilities whenever welding and burning is to be carried out on board ships is as given below:
 - a) *Refitting Authority*
 - i) A notice, in writing, regarding the welding and burning operation planned to be carried out by the dockyard or its contractors on board any ship in commission or under naval administration is to be handed over the ODD of the ship by the supervisor of the concerned dockyard department. In case of ships in refit, where quantum of hot work is large, the requisitions could be handed over to a central place, such as DCHQ/HQL welding control center nominated by the ship.
 - ii) The notice for hot work is to be handed over to the ship at least 24 hours in advance.
 - iii) Assistance as necessary for removal of inflammable material like paneling, lagging etc, and ventilation of closed compartments is to be provided.
 - iv) The "safe to weld" certificate signed by the departmental officer and NBCDO is to be countersigned by the OOD. The format for "Safe to Weld Certificate" is placed at Appendix-A.
 - v) The safety requirements spelt out in the order should be brought to the notice of all welders and burners before being detailed for welding and burning operations.
 - vi) The supervisory staff, welders and burners are to satisfy themselves that the instructions contained in paragraphs 4,5,& 7 of this order have been fully complied with prior to commencing welding/ burners before being detailed for welding and durance accorded by the ship.
 - vii) In the event of hot work being offloaded to trade, it is to be ensured by the repair yard that welders/burners being employed by the contractor are in possession of requisite proficiency certificate. They are also to be briefed on additional precautions to be taken while working on board ships and submarines.
 - b) *Officer of the Day*. The officer of the day would be responsible for the following:

- i) On the receipt of notice as per Para 4(a) (i) above the Officer of the Day is to inform the departmental officer concerned, the NBCD officer, the executive officer and the commanding officer.
 - ii) Distribution of requisitions received to the concerned departments through duty CPO/PO.
 - iii) Ensuring concerned departments provide required hot work sentries.
 - iv) Supervising the briefing of all fire sentries and welders. NBCDI shall conduct the briefing.
 - v) According final clearance on "Safe to Weld" certificate and commencement of welding/burning operations.
 - vi) Ensuring smooth functioning of the organization for hot work.
 - vii) Coordinating rounds of the area of hot work.
 - viii) Obtaining frequent SITREPs on the progress of hot work.
 - ix) Rounds of the area during silent hours.
- c) *Departmental Officer.* The compartment in which welding or burning operation is to take place is required to be declared "Safe to Weld" by the department responsible for the compartment. The concerned departmental officer is to sign the "Safe to Weld" certificate after ensuring the following:
- i) All inflammable materials including insulation stores, packing material, oil in bilges etc, in the vicinity of hot work area are removed.
 - ii) Access covers of any closed compartment, such as tanks, cofferdams, etc, are removed and the compartment is ventilated for at least 24 hours. Tanks and cofferdams are to be certified gas free by NMRL or shipyard safety officers in non-naval shipyards.
 - iii) All precautions to prevent fire are observed and fire-fighting equipment listed out in this order is available prior to commencement of hot work.
 - iv) All compartments, adjacent to area of welding burning operations, are examined thoroughly and all inflammable material removed. This includes the removal of paint or similar coatings, wet or dried from bulkheads on which welding or burning is to take place.
 - v) His department provides requisite sentries for the operation.
- d) *NBCD officer.* The ship's NBCD officer is to:
- i) Ensure all fixed and portable fire-fighting systems on board are operational (fixed systems to the extent possible in case of ships in refit) and ready for use.
 - ii) Sign "Safe and Weld" certificate after inspecting the intended area of hot work presented by the departmental officers after due preparation. He is to ensure that the department concerned has taken all necessary precautions.
 - iii) Forward "Safe and Weld" certificates for final countersignature and clearance of the OOD.
 - iv) Ensure smooth functioning of the organization set up for hot work and for maintenance of FF/DC equipment.

Organization

5. *Fire sentry organization – in – charge.* The duty CPO/PO will carry out duties of the fire sentry organization-in-charge.

His duties are as follows:

- a) Receiving hot work requisitions from repair authorities and distributing it to departments concerned for area clearance.
- b) Coordinating hot work clearance with departmental hot work in-charges.
- c) Mass briefing of hot work sentries before commencement of hot work.
- d) Ensuring NBCDI provides fire-fighting equipment to sentries.
- e) Taking rounds of areas of hot work during and after completion of hot work.
- f) He will be in-charge of welding control centre.

6. *Welding and Burning Sentries*

a) A sailor not below the rank of Petty Officer is to be the hot work in-charge for a particular area. In case of simultaneous hot work in a large number of areas, the executive officer could consider downgrading the in-charge to a leading rate. The duties of the hot work in-charge would be as follows:

- i) Hot work in-charge would be responsible to ensure that his team of sentries for the specific welding location is available and alert.
- ii) He is also to ensure that all sentries of his team have been provided with the requisite fire fighting appliances.
- iii) During breaks in hot work and on completion of work for the day, he is to ensure that power/gas supplies to the equipment switched off from the source.
- iv) He is taken rounds of the compartment for which he is hot work in charge and its adjacent compartments prior to commencement of the hot work to ensure no fire hazard exists and on completion of hot work to ensure no hot spots exist.

b) As far as possible, sentries are to be detailed from the department owning the compartment for better appreciation and understanding. Before being detailed for duty, sentries are to be issued with written instructions, which they are to carry on person to the place of duty. These instructions are to be pasted on plywood boards fitted with lanyards. Ships are to produce the instructions locally in the format shown at Appendix 'B'.

c) All sentries are also to be briefed centrally by the NBCDI as per instructions at Appendix 'C'. These instructions are also to be conveyed in the local language to the dockyard workers and subcontractors.

d) Welding sentries are to wear brassards of stout red canvas, approximately 75mm wide, with the words "WELDING SENTRY" written in plain white letters. Dockyards are to manufacture the brassards for ships in refit or otherwise.

7. *Provision of firefighting equipment.* Each sentry is to be provided with the following equipment.

- a) Two 9ltr AFFF (Aqueous Film Forming Foam) extinguishers.
- b) One Co₂ extinguisher in addition to a) above where electrical risk exists.

- c) At least two fire hoses are to be rigged up from the nearest hydrants to the welding area and kept stand by after proving fireman.
- d) A bucket of water and mug for intermittently cooling off the hot work area.
- e) Adequate quantity of asbestos cloth or fire retardant material for covering cables and fitted equipment.
- f) Sentries are to be issued with extinguishers from locations remote to the area hot work so that maximum availability of extinguishers in the vicinity of welding/burning area.
- g) Portable smoke extraction fans are to be rigged up and run/kept standby to clear smoke generated by welding/burning. In case of excessive build up, the sentry is to stop hot work, run the portable extraction fan and recommence hot work when 'look through' clearance of smoke is achieved.

8. The responsibility for providing fire extinguishers to welding sentries is that of the NBCDO/NBCDI. The dockyard/repair authority is however, responsible for providing shore firemain and shore based firefighting equipment for ships in refit/dry dock. The dockyard is also to ensure that adequate quantity of fire retardant material is provided to prevent spread of sparks and for the protection of the electric cables in the vicinity.

9. Precautions must be taken to ensure that fire extinguishers at the site of welding or burning operations are charged and serviceable. When extinguishers are being issued daily to cover welding and burning operations, testing need only be carried out prior to first issue as laid down. In BR2170 vol. II chapter 41 paragraphs 4175 and 4176 provided that each extinguisher is numbered and the test recorded. An effective organization is to be established for the control and recharging of extinguishers.

10. *Firemain pressure:* Designed firemain pressure is to be maintained when hot work is being carried out on board. The DCPOOW is responsible for monitoring firemain pressure during hot work operations. In ships where, DCHQ is not manned round the clock, the MCR watch keeper shall monitor firemain pressure. All hot work is to be stopped in case of loss of firemain pressure. The following announcements are to be made on the ships main broadcast:

- a) *On loss of firemain pressure,* the welding party in-charge should stop all hot work and the Hot Work in-charge should report to Officer of the day/gangway (insert designated welding control centre).
- b) *On Restoration of Firemain.* "Firemain Pressure Resorted..... Hot work in-charges may commence hot work".

11. *Inspection after welding/burning operations.* It is essential that the vicinity of all welding/burning areas be inspected shortly after each operation has been completed and at the end of each day's work to ensure that no smoldering material or areas of excessive heat are present. All adjacent compartments are also to be checked for hot spots by welding sentries before securing. Even when the workers leave for a short recess, the supervisors are to ensure that welding equipments are properly secured, gas cylinder valves are closed and area where welding and cutting has taken place is cooled.

12. *Form IN 1039.* Welding and Burning Log is to be maintained by all ships. An updated record of areas of hot work is to be maintained at the welding control center and at the gangway Log books can be demanded by the users from the respective Naval Store Depots.

Precautions

13. *Machinery and other Spaces.* Particular care should be taken when welding or burning operations are taking place in machinery or other spaces due to the possibility of oil being in the bilges. This would necessitate taking additional precautions.
14. *Protection of Electric Cables.* All electrical cables in the vicinity of the site for an intended welding operation and liable to damage from flying particles of molten metal are to be covered by asbestos or other protective material. The cables fixed to the far side of the bulk head are to be disconnected from the nearest JB, unclamped and removed from the vicinity of the welding area, where possible, and wrapped in layers of asbestos cloth. In case it is not possible to disconnect the cables, they are to be unclamped, slackened and wrapped in layers of asbestos cloth. If required a baffle plate may be introduced to protect the cables. These precautions are to be carried out before welding commences and the Officer-in-charge of the welding operations is responsible for ensuring that this is done.
15. *Petrol Storage Tanks and Petrol Tank compartments.* The necessary precautions to be observed are laid down in BR 1754, Regulations for the Storage and Handling of Gasoline, Kerosene etc.
16. *Metal Arc/Gas Welding or Burning.* Details of special precautions to be taken during metal arc welding, gas welding or burning are placed at Appendix D to this order.
17. *Welding on Pipe work and Trunkings.*
 - a) Welding and burning operations on pipe-work and trunkings in situ is prohibited under the following circumstances.
 - i) If the pipe normally carries inflammable fluids/POLs.
 - ii) In compartments containing explosives.
 - iii) On pipes and trunking any portion of which passes through compartments containing explosives.
 - iv) On other pipes or trunkings within 6 meters of compartments containing explosives.
 - v) In compartments containing unsealed flammable material e.g. fuel, Lubricating oil, wet paints or easily ignitable solids and where the pipe or trunking passes into an adjacent compartment containing such material, that compartment is to be manned by a sentry equipped with appropriate firefighting equipments.
 - vi) Within 2 meters of the site of operation on pipes containing any trace of fuel, lubricating oil or hydraulic fluid.
 - vii) Within 2 meters of the site of operation on trunking which contains fluff of dust.
 - b) To prevent flammable vapours in pipe systems reaching the vicinity of welding or burning operations, the section of the system concerned is to be isolated by lashing or shutting the valves. Warning notices regarding the state of the system are to be displayed prominently at control positions.
 - c) When the conditions obtaining inside any pipe, including water drains, is suspected, the pipe is to be removed from the associated system before welding or burning operations start.

18. *Welding in Magazine and Adjoining Areas.* No cutting or drilling tool of any description is to be used in compartments containing explosives or on decks or bulkheads bounding compartments containing explosives except by approval of the Commanding Officer. When explosives are retained on board during docking or refit, with dockyard workmen employed on-board for hot work, the following special precautions are to be observed:
 - a) Restrictions on hot work on pipes and trunking as enumerated at para17 above are to be strictly followed.
 - b) Welding, burning, brazing or any work involving the use of naked flame is prohibited within 6 meters of decks or bulkheads bounding magazines or other spaces as defined in articles 0401 (a) to (d) BR862 containing explosives or loaded missiles/torpedo launcher/barrel/container. The distances may be reduced with express permission of the Executive Officer, who is to ensure that his authorized representative is present through-out the operation and is thoroughly conversant with all the safety precautions necessary(Article 0103 (c) of BR 862 refers).
19. *Special Instructions for removal of lagging.* Special instructions for removal of lagging/installation on ships and submarines are as follows:
 - a) *Ships.* A number of incidents of fire have been reported from ships undergoing scheduled refits. The cause in many cases has been lagging or other inflammable material from the vicinity of the place of hot work. The high density equipment fit and space constraints do not always permit adequate removal of lagging. However, as far as possible, the place of hot work is to be stripped of the lagging of any other inflammable material. The extent of stripping may be mutually agreed upon between the ship and the concerned centre agreed upon between the ship and the concerned centre of the dockyard. Asbestos sheets or fire retardant material is to be used for covering machinery/equipment.
20. The importance of speed in reporting a fire cannot be overemphasized especially in ships undergoing refit. Reduction of complement and disruption of communications are liable to cause difficulty in raising an alarm from compartments with difficult accessibility. Instructions to fire sentries should therefore make it clear how and to whom a fire alarm is to be reported. Effective communication is to be maintained between the DCHQ and welding site/adjacent compartment(s) and dock floor for ships in dry dock during hot work.
21. Similar precautions are to be observed in dock, caissons pontoons, etc, where welding or burning operations are carried out.
22. The closest cooperation is to be maintained between the dockyard officer/repair authorities, ship's officers and others responsible in order to ensure that all possible precautions are taken. In private yards, where ships are refitting, the commanding officer of the ships is to draw the attention of the shipyard officials of the necessity for close collaboration with the ship's officers in the matter of fire prevention.

SAFE TO WELD CERTIFICATE

Tele:

date

SAFE FOR HOT WORK CERTIFICATE-SERIAL
NO:

To
The Commanding Officer
FUEL BARGE PUSHPA

Request Certify the following locations safe for hot work on
from to hrs in accordance with NO. /2002.

| Sl | location | welding or cutting | Affected compartments | remarks |
|----|----------|--------------------|-----------------------|---------|
| | | | a. | |
| | | | b. | |
| | | | c. | |
| | | | d. | |

NOTE: 'Safe for Hot work Certificate' be handed over to ships staff/OOD at least 24hrs prior to hot work operations.

Project officer
Refitting ship yard

PAINT SCHEME OF IN STEELSHIPS/CRAFT
NO 20/2003 (NC/1948)

1. This Navy order on painting of IN ships, crafts covers the subject under following heads:
 - a) General instructions – Appendix-A
 - b) Instructions for surface preparation and preservation of structure and hull fittings that have been previously painted – Appendix ‘B’
 - c) Preservation/treatment of steel plates and sections in yard during prefabrication/construction – Appendix ‘C’
 - d) Do’s and Don’ts on surface preparation and painting in Indian Naval Ships– Appendix ‘D’.
 - e) Scheme of painting for specific surfaces as indicated below – Appendix ‘E’
 - i) Paint Scheme ‘A’ (PSA) for weather work surfaces excluding weather deck.
 - ii) Paint Scheme ‘B’ (PSB) for weather decks.
 - iii) Paint Scheme ‘C’ (PSC) for general surfaces in dry compartments.
 - iv) Paint Scheme ‘D’ (PSD) for general surfaces in wet compartments.
 - v) Paint Scheme ‘E’ (PSE) for general surfaces for special compartments.
 - vi) Paint Scheme ‘F’ (PSF) for machinery schemes.
 - vii) Paint Scheme ‘G’ (PSG) for system pipes and pipe lines.
 - viii) Paint Scheme ‘H’ (PSH) for tanks.
 - ix) Paint Scheme ‘J’ (PSJ) for outer bottom under water areas and fittings.
 - f) List of paint schemes and their applicability – Appendix ‘F’
 - g) List of paints and their governing specifications – Appendix ‘G’
 - h) Details of alternate paint schemes in case the changeover to proposed paint schemes are not possible immediately – Appendix ‘H’
 - j) Details of paints under evaluation and likely to be inducted into service on successful completion of trials – Appendix ‘J’
2. The notes given in appendices to this order are for general information and guidance to all concerned with the painting of IN ships and Crafts.

GENERAL INSTRUCTIONS

1. The paint schemes given in this Navy order are mandatory. All paint schemes in the maintenance schedules of ships/crafts are to be prepared/ updated in conformity with this Navy order. In all other cases painting is to be undertaken as per the approved paint schedule of the ship/crafts.
2. When a new paint scheme is introduced, the changeover from the old scheme should be undertaken either on the expiry of the useful life of the old scheme or when Naval Head quarters (DNA) issues specific instructions to this effect.
3. This Navy order is applicable for new construction ships as well. Should any difficulty arise in following the instructions contained in this Navy Order, express approval of Naval Headquarters (DNA) should be obtained for deviations.
4. For specialized activities such as underwater painting battery compartment/battery pit painting and tank painting etc, adequately trained personnel are to be deployed. Specially trained manpower should be employed for spray painting to avoid occurrence of common painting defects.
5. Should there be any deviation between the instructions contained in this Navy order and recommendation of proprietary paint manufacturers, Naval Headquarters (DNA)'s express approval should be obtained for changed requirements. The request for such an amendment should be accompanied with details of paint manufacturer, number of coats applied, DFTs achieved, environment condition such as temperature of substrate, relative humidity, location of compartment, ventilation etc.
6. Particular attention is to be given to the use of the correct cleaning and surface preparation prior to painting. Instructions for pre-treatment of surfaces prior to painting are provided in Appendix 'C' to this Navy order.
7. Painting of operating mechanisms and fittings is to be done by brushing.
8. The surfaces preparation work and painting interiors of fresh water and distilled water tanks is required to be undertaken by healthy men wearing clean outfits. On completion of painting, each tank should be inspected to ensure that the coating /paint film completely covers the surfaces, with particular attention to parts of the structure, which are not readily visible. The tanks should be washed out with fresh water and any sediment or dirt present should be removed and the covers closed before the tanks are brought into use. The water sample from the tank should be sent to NMRL or the Naval Dockyard Laboratories for potability test prior to use of water for drinking purpose.
9. Painting of offices and spaces containing electronic/radio gunnery equipment are generally to be undertaken with brush and spray painting is to be restricted to new construction ships where painting is undertaken prior to the fitment of equipment.
10. In compartments containing electronic or other precision equipment, the equipment is to be shielded and protected adequately during painting.
11. Where examination shows evidence of corrosion, the structure is to be chipped (galvanized steel, aluminum structure must be scraped) to determine extent of corrosion and pitting of the structure. Where paint is cracked, blistered, badly adhering or corrosion is evident the structure is to be prepared to bare surface,

- thoroughly dried and re-preserved in accordance with the appropriate paint scheme.
12. Particular attention should be paid to corrosion in concealed areas by removal of semi-portable fittings with the help of base staff, wherever feasible.
 13. *Storage of paint.* The paints being of low flash point are considered flammable and should therefore be stored in well ventilated rooms fitted with flame proof electrical fittings. The paint drums are to be periodically rolled to prevent settings of pigments. In addition, paint manufacturers recommendations on storage of paint should also be adhered to.
 14. *Compartment containing inflammable and Toxic Material.* All precautions against fire, explosion, and presence of toxic and obnoxious fumes are to be taken in accordance with BR 1754 before work involving chipping or scraping, spraying or using paint materials.
 15. *Ventilation Trunking.*
 - a) The external surfaces of ventilation trunking are to be painted as per the scheme of compartment in which they are to be fitted and are to carry identification marking in accordance with NBCD manual BR 2170.
 - b) The interior surfaces of ventilation trunking, which will generally be of Aluminium or galvanized steel, are to be left unpainted. The interiors of ungalvanized steel trunks are to be coated with following paint scheme.
 - i) Two coats of yellow chromate primer DS Cat No. 8010-000113.
 - ii) Two coats of white fire retardant paint DS Cat No. 8010-000212.
 - c) Internal surface of old galvanized steel trunking where galvanized coating is damaged/corroded should be cleaned and painted as non-galvanised trunking.
 16. *NBCD.* NBCD markings are to be painted in accordance with NBCD manual BR 2170.
 17. *Magazines.* Work involving chipping is to be carried out only when the magazine do not contain inflammable and explosive stores.
 18. *Confined Spaces.* Prior commencing work in confined spaces, suitable ventilation arrangements are to be made to keep environment free from fumes generated during paint application and during drying process. As a guideline all confined spaces including tanks of capacity 20 kilo litres and below should be ventilated at a rate 1 ½ time volume of space per minute. For larger tanks the rate should be equal to the volume of the tanks. A gas free certificate is to be arranged by ship staff before entry of personnel inside confined areas. A flame proof light should be used in confined spaces/tanks while undertaking any surface preparation or painting work.
 19. Cringle bars, rods, hooks and tanks in store rooms are to be painted with synthetic black paint DS Cat No. 8010-000150.
 20. *Iron Ballast.* Where ever permanent iron ballast is fitted the surface of the plating and framing under and in way of ballast are to be vacuum blasted to achieve a surface preparation of Sa 2 ½ and painted as per paint scheme for bilge areas of compartments. The iron ballast is to be cleaned by abrasive blasting to a high standard and coated with the same paint system as that applied to the bilge of the compartment to which it is being fitted.
 21. *Aluminium kit lockers.* Aluminium kit lockers, which have bright Aluminium finish, are not to be painted. Lockers in unfinished conditioned are to be coated

with two coats of yellow zinc chromate primer DS Cat No. 8010-000113, followed by two coats of paint white fire retardant paint DS Cat No. 8010-000212.

22. *Aluminium stanchions.* Aluminium stanchions are to be anodized and are not to be painted. However, where it is not possible to provide anodized stanchions following paint scheme may be applied:

- a) Degrease the surfaces as per detail given in Para 8 of appendix 'B'
- b) Apply one coat of pretreatment primer consisting of base DS Cat No. 8010-000116 and acceleration DS Cat No. 8010-000117.
- c) Apply two coats of paint priming Aluminium (water resistance) DS Cat No. 8010-000114.

23. Stabilizers, sea tubes, shaft brackets, rudders, main inlets and other shipbuilder tubes (paint scheme PSJ 6) are to be abrasive blasted and coated with anticorrosive and antifouling paint as per the paint scheme being followed for the entire underwater hull. The rudders are recommended to be electrically bonded to the hull in accordance with NES 704 part 2.

24. *Painting of underwater areas covered by Dock blocks.*

The ship is to be docked in alternate version of docking during each refit to ensure surface preparation and painting of complete areas covered by dock blocks at least once between two dockings. However, in case the entire paint scheme is being renewed the ship is required to be docked in both the versions of docking during the same refit, to ensure complete renewal of paint scheme of entire U/W hull.

25. Whenever under water paint scheme or boot top full paint renewal is being undertaken surface preparation to Sa2 ½ up to 500mm above original boot top must be undertaken as per Para 1 of appendix 'C' of this Navy order.

26. *General Safety precautions while handling of paints.*

Following general safety precautions should be followed while handling paints and these must also be prominently displayed in paint shops in local languages.

- a) Avoid skin and eye contact by using gloves, goggles, facemasks etc.
- b) If the paint comes in contact with the skin, wash thoroughly with luke warm water and soap or suitable industrial cleaner. If the eyes are contaminated, flush it with fresh water and seek immediate medical assistance.
- c) Provide adequate ventilation.
- d) Paint should be stored away from sparks and open flames. No smoking would be permitted in the vicinity.
- e) Follow all precautionary measure given in manufacturer's manuals.

**INSTRUCTIONS FOR THE SURFACE PREPARATION AND PRESERVATION OF
STRUCTURE AND HULL FITTINGS THAT HAVE BEEN PREVIOUSLY
PAINTED**

(All surfaces other than glass reinforced plastics and wood)

1. *Surface preparation.* The surface preparation is of paramount importance in the performance of a coating. A good paint may show failure when applied on a poorly prepared surface. Experience has shown that nearly 80-90% paint failures can be traced back to insufficient surface preparation. The main objectives of surface preparation are to remove the surface contaminants, which are detrimental to the paint and to create a proper anchor pattern profile that facilitates the adhesion of the coating to the substrate. Mill scale, rust, salts, face contaminants. These are removed by various methods such as abrasive blasting, compressed air/vacuum cleaning, degreasing, manual and power tool cleaning etc.
2. *Effect of surface contaminants on performance of paints.*

| Contaminant | Effect on paint coating | Method of removal |
|-------------|--|---|
| Rust | Weak to support paint coating being porous, tends to attract moisture and salts | Blast cleaning or Mechanical cleaning |
| Oil/ Grease | Interferes, in adhesion between surface and coating | Degreasing |
| Salts | Osmotic blistering, adhesion failure, corrosion. | Fresh water cleaning |
| Dust | Paint adheres well to dust, but results in detachment of dust along with paint from the substrate | Compressed air/vacuum. |
| Old paint | Lack of adhesion/cohesion compatibility, if to be coated with another type, adds to unevenness of the painted surface. | Blast cleaning, Mechanical cleaning, use of paint removers. |

3. Various international standards exist for the surface preparation. Most widely accepted are Swedish Standards (STS) prepared by Swedish Corrosion Institute in cooperation with American Society of Testing Materials and Steel Structure painting Council (SSPC), USA. The norms are published in form of a book by the Swedish Standard Institute. The text describes how work should be carried out with supporting coloured photographs. These can be compared with finished pretreatment as check to see whether or not it is up to standard.
 - a) *Swedish Standard Sa2 ½ or SSPC standards SP 10 very thorough blast cleaning.* When viewed without magnification, the surface shall be free from visible oil, grease, dirt and poorly adhering mill scale, rust and foreign matter shall be removed to the extent that is feasible. Finally the surface is cleaned with a vacuum cleaner. Clean dry compressed air or a clean brush. Any remaining traces of contamination shall show only as slight strains in form of spots or stripes.
 - b) *St-3 Surface preparation.* Very thorough mechanical scrapping and wire brushing/ machine brushing/grinding etc. The treatment shall remove loose mill

scale, rust and foreign matter. Finally the surface is cleaned with a vacuum cleaner, clean dry compressed air or a clean brush. After removal of dust, the surface shall have a pronounced metallic sheen arising from the metal substrate.

c) *St-2 Surface preparation.* Thorough scrapping and wire brushing/machine brushing/grinding etc, the treatment shall remove loose mill scale rust and foreign matter. Finally the surface is cleaned with a vacuum cleaner. Clean and dry using compressed air or a clean brush. The surface shall have a faint metallic shine.

4. Aluminium and stainless steels can also be lightly abrasive blasted. On Aluminium, non metallic abrasives are used to prevent bimetallic corrosion immediately after blasting. A wash primer is usually used for less severe conditions. For heavy duty performance, an epoxy primer is used.
5. *Preparation of underwater surface for painting.* The life of the paint is largely dependent on the surface preparation and painting practice. Any contamination or slight traces of Oil, salt and delay in application of paint over prepared surface may drastically bring down the service life of the paint system. Therefore, prior to commencement of the blasting work or prior to application of anti corrosive paint on top of previously applied primer coat, the entire ship including above water (ship side) portion should be thoroughly washed down with fresh water. This will avoid contamination of hull by traces of salts coming down with any water flowing/trickling down by way of even condensation. The oil sticking to the underwater hull should be removed using detergent. The weld lines need extra care while painting. The weld lines should be sprayed from both the sides. Stripe coating by brushing the weld lines in between spray application will help in ensuring adequate thickness over such vulnerable areas.
6. The following surfaces are to be cleaned with detergent solution prior to application of specified paint schemes.
 - a) All metallic surfaces exposed to oil and dust contamination.
 - b) Surfaces where although paint is adhering well, however has become dirty.
 - c) Painted surfaces requiring another coat of paint.

NOTE: The detergent solution referred, throughout the Navy order is Labolene, which is a liquid detergent and is a proprietary product of M/s Glaxo India Ltd. The solution is to be prepared by mixing 6 ml of the detergent in one litre of fresh water. The solution is applied on the surface with brush or cotton rags or sponge and allowed to react with contamination for 10minutes. Subsequently, this is to be washed down twice with fresh water and surfaces should be dried with clean sponge or cloth.

7. Do not wash dirty paints work with alkali solution as, residual alkali on painted surfaces results in poor inter-coat adhesion when a fresh coat is applied. This leads to flaking of the fresh paint film and promotes discolouring of paint.
8. *Extent of paint failure.* This is indicated by extent of corrosion observed on visual examination of hull after cleaning. It is expressed as a percentage of corroded area to the area under survey. Superficial or surface corrosion etc should be included during this assessment. Extent of corrosion indicates the extent of paint failure. Structure repair/ renewal are not related to this. This grading for extent of paint failure is to be as follows:

| | | |
|-----------|---|-------------|
| Grade 'A' | : | Upto 10% |
| Grade 'B' | : | 10 to 30% |
| Grade 'C' | : | 30% or more |

Area graded 'A' and 'B' should be touched up after surface preparation. Areas graded 'C' to be cleaned to bare metal/blasted and complete paint scheme is to be restored.

9. *Pre treatment when painting on top of intact paint film.* When painting on top of old undamaged paint, which is not contaminated, the surface should firstly be washed with fresh water and made absolutely dry before coating. The max over coat limit is to be restricted as specified. If this over coat limit is exceeded then the paint may become glossy and hard requiring surface abrading for creating desired surface profile to generate bondage between existing and the subsequent coat of paint. The mechanical bonding thus provided will however not be as effective as chemical bond.
10. *Area requiring touch up painting.* Where paint work is generally sound but repainting is necessary due to partial failure of paints.
 - a) Remove loose paint from area which are rusty or the paint work is defective by scraping, wire brushing or by paint remover up to intact paint film primer/bare metal whichever is observed first.
 - b) Wash down thoroughly with detergent solution, rinse with fresh water and dry with a clean sponge or cloth.
 - c) Touch up the bare areas with the appropriate priming scheme and allow drying.
 - d) All defective paint film to be cleaned to the bare metal and boundaries of intact paint to be feathered with sander to provide requisite surface for proper joining of edge of old paint film with new paint films.
 - e) Rub down the whole surface with abrasive paper carefully chamfering down the edges of the patches, which have been touched up.
 - f) Apply under coats and finishing coat as appropriate.
11. *Galvanized Steel, Zinc or Aluminium sprayed steel and Aluminium.* While painting above surfaces following measures must be taken to ensure satisfactory results.
 - a) Apply paint remover, DS Cat No. 8010-000292 by brush over the painted area and allow to remain for 20 minutes.
 - b) Remove the softened paint, using hard wood or plastic scrapers (chipping and wire brushing is prohibited).
 - c) Wash down with detergent solution and rinse with fresh water thoroughly and dry.
 - d) Immediately after drying apply one coat of pretreatment primer made form DS Cat No. 8010-000116 (base) and DS Cat No. 8010-000117(accelerator).
 - e) Within 4 to 24 hrs of application of pretreatment primer the first coat of the appropriate paint scheme should be applied.
12. *Surface preparation for paint application in wood.*
 - a) Remove all loose and deteriorated paint, dirt oil, grease and water by scraping or by use of paint remover.
 - b) Abrade the surface to smooth finish using appropriate abrasive paper.
 - c) Apply two coats of knotting DS Cat No. 8010-000678. Prime all holes and cracks with aluminium paint DS Cat No. 8010-000114 and fill with putty DS Cat No. 8010-000288.

- d) Apply full paint scheme as applicable to the surface to which it is associated or attached.

NOTE: Paint remover should not be used in the vicinity of naked light or radiators owing to inflammability of solvents and formation of toxic decomposition products. Smoking is prohibited in the vicinity during application of paints. All traces of wax left behind after scraping off the paint remover must be removed. For metal surfaces 50/50 mixture of Nephtha and spirit should be used. On wood surfaces use of industrial methylated spirit is preferred for removal of paint. Also provision of adequate ventilation using flame proof fans must be made. The ship's ventilation system is not to be used for the burning off process. The operator must be trained in the use of blower. Deck and deck covering must be protected with asbestos or canvas or any such FR mats or sheets and adequate ventilation provided in the enclosed compartments.

13. *Preparation of outer bottom underwater surface for painting during routine docking.*

- a) The area is to be cleaned by water jetting within 72hrs of docking to remove marine, growth, slime etc. The pressure at water jetting nozzle should not exceed 3000 psi to remove all marine growth slime etc. Any stubborn fouling shall be scraped off before it has time to dry permanently. If water jetting is carried out with salt water, the surfaces shall be thoroughly washed down with fresh water to remove salt and slime etc and allowed to dry. After examination of the outer bottom a light Normal or heavy scraping/abrasive blasting as necessary should be used to remove any loose paint and roughen the surfaces of the residual antifouling paint. Area of breakdown of paint shall be cleaned to bare metal by abrasive blasting and the paint system restored. Minor and scattered areas of paint failure can be cleaned to bare metal by mechanical grinding/wire brushing.
- b) Where the heavy duty under water paint scheme have completed their service life the surface shall be prepared to Sa2 ½ by vacuum blasting using chilled iron grits/shots of Gr 24 or Gr 17 DS Cat No. 8010-000139 or 5350-000140. This procedure shall give a surface contaminants are to be cleaned with a vacuum cleaner or dry compressed air and clean brush. The surface should be coated with first coat of primer as per the applicable paint scheme immediately. Grit particles from the surface should be removed by wire brushing prior undertaking any painting.

NOTE: The relative humidity in the working areas surrounding the area being blasted should not exceed 80%.

14. *Where paint work is Dirty, Adhering well, in good condition and has not outlived its stipulated life.*

- a) Wash down with detergent solution.
- b) Rinse with clean fresh water.
- c) Dry with clean sponge or cloth.

15. *Where old paint work has failed due to blistering cracking and where it is necessary to remove completely and repaint.*

- a) Apply paint remover DS Cat No. 8010-000559 to painted surfaces only taking care to avoid spreading of paint remover to the substrate.
- b) When the paint is soft, usually after about 15 minutes, scrape the surface with wooden or plastic scrapers.
- c) After the paint has been removed the surfaces are to be washed with detergent, rinsed with fresh water and dried with clean sponge or cloth.

d) Re-coat with the appropriate complete paint scheme.

16. *Where paint work is essentially sound but repainting is necessary due to partial failure of paint.*

- a) Remove defective paint from the affected areas. Clean the surface to bare metal by method described in Para 13 to 15 above. Lightly abrade bare area with grade 180 abrasive papers and dust off.
- b) Touch up the bare area with appropriate paint and allow to dry. The first coat is to be applied by brush or spray.
- c) Rub down the whole surface with abrasive paper, carefully smoothing down the edge of the patches, which have been touched up.
- d) Wash with detergent solution (the preparation is as specified in Para 6)
- e) Rinse with fresh water and then dry.
- f) Apply under coat and finishing coat as appropriate

NOTE: a) The paint remover must not be allowed to remain on the surface for more than 15 minutes. After the time has elapsed, wash the surface with clean fresh water to remove the residual paint remover and softened paint, taking care to avoid spreading the mixture on to the substrate.

b) Any spillage of paint remover on poly vinyl chloride (PVC) on GRP surfaces is to be washed away immediately with fresh water.

PRESERVATION/TREATMENT OF STEEL PLATES AND SECTIONS IN YARD AND DURING PRE FABRICATION/CONSTRUCTION

1. *Blast Cleaning of New Steel before use (if not received in Blasted and primed condition).*
 - a) Immediately on receipt in Naval store Depots all steel plates of 5mm and above thickness and sections supplied in as rolled condition are to be cleaned of all dirt, oil, grease and other foreign matter by thoroughly washing and scrubbing with detergent solution, rinsed with clean fresh water dried and then abrasive blasted to Sa 2 ½ Swedish standard of blast cleanliness. These are then to be immediately coated with Epoxy Red Oxide shop primer DS Cat No. 8010-001009 or Zinc rich epoxy primer. The primer should be applied after removing the grit/dust from the surface by wire brushing. These plates should be stored on hard ground, under cover before use. The plates are to be vertically stacked, care is to be taken that the priming coat is not damaged during handling/transit.
 - b) Touch up of the primed plates at regular interval of 2 to 6 moths (depending on the storage place) is to be carried out after cleaning the rusted areas by scraping/wire brushing to bare metal. Primed plates and sections that have started rusting heavily pitted during storage are to be reblasted and primed as mentioned in Para 1 (a) above.
 - c) Steel plates below 5mm thickness are to abrasive blasted to SA 2 ½ with sand/copper slag, cleaned and preserved as per Para 1 (a) above.
 - d) The relative humidity in the working area surrounding the automotive blasting and priming plant is should not exceed 80%.
2. *"Copper sulphate test".* The blast surface are required to be subjected to "Copper sulphate test" for presence of mill scale. The test procedure is as follows:
 - a) The copper sulphate solution is to consist of 4% copper sulphate and 1% sulphuric acid by volume in distilled water.
 - b) The prepared solution is to be applied to the newly blast cleaned steel surface using 25mm square impregnated pad. Bright copper is deposited preferentially on the base steel areas of mill scale and corrosion products will become visible as dark areas.
 - c) If after applying the copper sulphate solution dark areas appear to a greater extent than those specified in BS: 4232 for a first or a 2nd quality blast cleaned surface as appropriate to the standard required, the area is to be reblasted and re-tested until the requirement is met.
 - d) After testing, the copper deposit is to be completely removed from acceptably cleaned plates and sections by grinding or re-blasting the local areas to avoid pitting, which will otherwise occur.
3. *Blast cleaning of steel after fabrication for application of heavy duty paint coating.*
 - a) All welding, burning and heat treatment is to be completed and all sharp edges on structure rounded off during fabrication prior to abrasive blasting as a preparation for the application of Heavy duty paint coatings. The resultant damaged areas are to be abrasive blasted and touched up with primer to preserve these areas until application of specified paint system.

- b) The surfaces where abrasive blasting and application of heavy duty paint scheme is not required then such surfaces should first be thoroughly cleaned of all dirt, oil, grease and other foreign matters by thoroughly washing with detergent solution scrubbing with short bristle brushes followed by rinsing with clean fresh water and then dried.
 - c) For abrasive blasting, the steel surfaces are to be vacuum/abrasive blasted to Sa2 ½ of Swedish standard using chilled iron/steel grits DS Cat No. 5350-000139 or 5350-000140 to produce a blast cleaned surface profile of 50 to 75 microns.
 - d) After the abrasive blasting has been carried out to the required standard, the surfaces are to be thoroughly cleaned of all dust arising and spent abrasive using suitable industrial type vacuum cleaner fitted with brush attachment to ensure that the arising are removed prior application of specified paint system.
 - e) Once cleaned the surfaces are not to be allowed to oxidized or become contaminated in any way prior to the application of the specified paint system.
4. *Blast cleaning of minor structural fitting and attachments.* After manufacture and before fitting in position, all minor attachments and fittings such as pipes, clips, electric cables, carrier plate stools, ventilation trunk stools, brackets and seating for supporting equipment etc are to be cleaned free of all oil, dirt, grease and other foreign matters by washing and scrubbing with a detergent solution thoroughly rinsed with fresh water, dried and then abrasive blast cleaned to Sa 2 ½ of Swedish standard and immediately coated with appropriate primer.

5. *Blast cleaning of structure and fittings for application of sprayed metal coatings.*

Steel structure and fittings specified to be protected with a sprayed metal coating are to be abrasive blast cleaned to Sa 2 ½ of Swedish standard by using chilled iron grits DS Cat No. 535-000139 to IS-4683-1968 to produce a blast cleaned surface profile of 50 to 75 microns.

NOTE: While undertaking surface preparation by vacuum blasting technique following guidelines are recommended:

- a) Use correct air pressure at the nozzle, reduction of pressure will after lead to poor surface profile and greater consumption of blasting agent.
- b) Use correct proportion of grit and air instruction for use of blasting machine/equipment should be studied and followed correctly.
- c) Remove hard dried paint and rust, as far as feasible, prior commencement of blasting, by using compressed air, diesel or hard mechanical scraper. It will help in achieving greater rate of surface preparation.
- d) Store grit in clean and dry area. It is recommended to use only good quality sharp, absolutely dry grits, for good surface preparation.
- e) It is very important to remove dust from blast-cleaned surfaces by using vacuum cleaner or by sweeping before application of first coat of paint.
- f) Undertake blasting of small area at a time. Protect these areas by using primer. Primer dries very quickly after application and blast cleaning can thereafter be continued in the vicinity of newly painted area without blasting agent having any wet paint to stick to.
- g) Use slow, controlled movements by keeping the nozzle very close to the surface being prepared.

6. *Galvanizing.* Whenever specified, galvanizing is to be carried out by hot dip process immediately after abrasive blasting and tested in accordance with BS: 729 parts I.
 - a) *Steel plates (thickness above 5mm).* The weight of zinc deposit is not to be less than 610 g/m² of galvanized surface.
 - b) *Steel sections and fittings.* The weight of zinc deposits is to be carried out by the hand dipping or continuous hot dipped process. The weight of zinc deposit is not to be less than 460 g/m² of galvanized surface each side.
 - c) *Steel sections and fittings.* The weight of zinc deposited is not less than 610 g/m² of galvanized surface.
 - d) *Steel tubes.* Before galvanizing the tubes are to be thoroughly pickled in order to remove scale, tubes on which treads are to be cut, are to be galvanized before the threads are cut. Weight of zinc deposit is not to be less than 460 g/m².
 - e) *Steel wire ropes.* To be in accordance with DG ships 1165/ IS 2581.
7. *Metal spraying.*
 - a) To ensure the fullest possible protection against corrosion, certain selected areas as specified are to be metal sprayed and painted. Steel surfaces required to be Zinc sprayed are to be abrasive blasted cleaned and thereafter zinc sprayed in accordance with IS 5905 of 1970 to get a coating of 150microns.
 - b) The compartments which are required to be zinc sprayed are to be structurally completed with all attachments, seats, bracket, hangers etc secured on the structure both externally and internally prior to commencement of abrasive blasting and metal spraying. On completion of spraying the sprayed metal is to be sealed with a coat of pretreatment primer conforming to DEF STAN 80-15 followed by the first coat of specified paint system.
 - c) All work involving welding or burning on weather decks and interior decks where metal spraying is specified is to be completed prior to commencement of abrasive blasting and metal spraying.
8. *Application and use of prefabrication/Holding primer.*
 - a) To protect the steel from corrosion during storage/fabrication and construction, Epoxy Red Oxide shop primer DS Cat No.8010-0001009 is to be applied after cleaning the steel of all mill scale and corrosion products by means of abrasive blasting to Sa2 ½ Swedish standards. This primer does not interfere with fabrication process such as welding and flame cutting and will provide protection against corrosion for period of two years. When applied in two coats, second coat being applied subsequently at appropriate time but not later than 8 months.
 - b) The primer coating is to be maintained in a sound condition until specified paint system is applied. If rusting occurs on the structure or the coating is damaged as a result of welding/flame cutting or for any other reason, the affected areas are required to be re-prepared to Sa2 ½ Swedish standards and coated with one coat of primer within 02 hrs.
 - c) Safe over coat interval between epoxy red oxide shop primer and first coat of heavy-duty paint scheme as specified in this Navy order is 3 months, extendable to 6 months subject to sound general condition of the primer and satisfactory adhesion test results carried out on adequate representative areas covering entire ship.
 - d) Prior to over coating, primer coat should be thoroughly washed with detergent solution as specified in Para 6 of appendix 'B' of this Navy order, followed by

rinsing with cold fresh water to remove all atmospheric deposits, oil grease and dirt and dried.

- e) Pre fabrication/holding primer is to be completely removed and the substrate re-prepared to Sa2 ½ standard in the following circumstances.
 - i) Where the structure after fabrication is specified to be metal sprayed.
 - ii) In areas where bare steel is specified.
 - iii) Where primer will be incompatible with the subsequent paint system.
 - iv) As and when the maximum safe over coating interval is exceeded.

NOTE: In DIESO, lubricating oil and hydraulic oil tanks, which are generally not painted and applied with heavy filtered mineral oil primer coat is required to be removed as the same may contaminate the fuel.

Dos AND DONTs ON PREPARATION AND PAINTING OF SURFACES OF NAVAL SHIPS

1. The painting of both internal and external of ships is a matter of highest importance for preservation of materials, for their maintenance and from aesthetic considerations. The maintenance of painted surfaces requires care and control. All efforts should, therefore, be directed towards preventive maintenance rather than 'craze' for repairing. Close supervision during painting operation needs no emphasis. Some of the broad essential instructions are given in succeeding paragraphs.
2. *Dirty intact paint film.* If old paint film is intact, washing down with detergent solution and water should suffice. Do not destroy intact paint film as far as possible. The best motto should be "*wash to clean, do not paint to hide*".
3. *Damaged paint film.* Where the paint film is damaged and signs of corrosion are observed, the corrosion products and loose paint film is to be removed using suitable tools. Use of sharp tools should be avoided as they cause crevices and sharp edges that are difficult to be protected. Once the surface is prepared, do not expose the surface to environment for long period. Apply a coat of primer as soon as possible after proper surface preparation.
4. *Surfaces where as major paint failure is observed.* Where the paint film has deteriorated over a large area, it is advisable to restore full paint scheme. It is, however, necessary to prepare the surface suitably of the new painting schemes. It shall be remembered that normal paints on *well prepared surface will last longer than sophisticated heavy duty paint applied on improperly prepared surface*. Further, paint has poor adhesion on wet surface, therefore painting on wet surfaced or surfaces where water splashing is there, will lead to loss of adhesion of paint film and consequently premature failure of the paint scheme.
5. *Precautions during painting.*
 - a) Do not apply next coat till the previous coat has dried completely or the specified intercoat interval has lapsed.
 - b) Avoid application of too many numbers of coats. Use of paint film thickness measuring gauge (elcometers) must be made to check the thickness of cured paint and wet film thickness measuring equipment for measuring wet film thickness while undertaking painting process. Too many coats lead to wastage of material, energy, money and are likely to result in loss of intercoat adhesion in addition to increasing the fire hazard.
 - c) Do not resort to painting in haste. Remember haste is waste.
 - d) Avoid use of soda or soap for degreasing the surface or cleaning the old painted surface before repainting. Residual alkali leads to yellowing of the finalized coat. Use only specified detergent solution as per Para 1 of appendix 'B' of this Navy Order.
 - e) If paint has become too thick, it may diluted by mixing 5% by volume of corresponding thinner.
6. *General guidelines for paint application.*
 - a) For two component products the pot life plays a critical role.

- b) It is important to ensure that two component products are thoroughly mixed, preferably by using a mechanical mixer prior to paint application.
 - c) For small and relatively intricate areas, application by brush is recommended similarly, repair of small areas on touch up coating should be undertaken by brush as it will allow better control. Fast drying coating, however are best applied by brush.
 - d) For obtaining best results of primer coat it is preferred to apply the primer coat by brush to achieve proper wetting of surface. The back and forth motion of brush aids the wetting process. The movement of brush makes the coating flow over the surface, increasing the intimate contact of paint with the surface. Movement also fills pinholes, pits and rough surfaces.
 - e) Stippling and dabbing the coating onto the surface is important while applying paint around bolts, rivets, welds and corners.
 - f) Use of rollers for the application of first coat of paint should always be avoided, as while using the roller there is no slipping or sliding and therefore there is no scrubbing action which may help wet the surface. Use of roller many a times leads to holiday formation.
 - g) While spray painting impact of the spray particle is very important as it can have strong influence on adhesion and other film characteristics. For the painting to be most effective the paint particles should impact the surface at right angle to the surface. More direct the impacts the better wetting of the surfaces. The spray gun, therefore, should always be held at right angle to the surface.
 - h) The spray pattern should always overlap the previous pass by 50% to ensure an even coating impact and thickness over the entire surface.
 - j) The 'Nozzle should always be used of good quality and correct size. Due maintenance and care should also be provided while handling the nozzle metal objects should never be used to open a clogged nozzle. If necessary, always use a wooden chip and nothing harder than that.
 - k) While using two packs epoxies it is good practice to blend the two components and then allow mixed material to stand for approx 10 minutes (this time will vary depending on type of paint and prevailing conditions). This will ensure adequate chemical mixing.
7. *Effective monitoring of warship painting.* Performance of paint depends upon the application of sufficiently thick, well adhering and defect free paint coating. The applied paint coating is invariably associated with some flaws due to various reasons and visual inspection is not sufficient to detect such flaws. Improvement in the work culture, achievement of specified standards and timely corrective action is possible by use of following portable gadgets to monitor the painting work undertaken by the shipyards, ships staff and dockyard during construction, exploitation and refits. Use of these equipments will ensure longer protection to the ships against onset of corrosion.
- a) *Dry film thickness measurements.* This is a nondestructive test, electronic digital gadgets with 0-1250 micron range. These are rugged reliable, and easy to operate and are most suitable for field use. Separate gadgets are required for measurement of thickness on non-ferrous substrates such as Aluminium (working on eddy current principle).
 - b) *Wet film thickness measurements.* Wet film thickness measurement is an effective method of finding the likely achievable dry film thickness of the paint while application of the paint film. The relationship between the wet film thickness

and likely DFT depends on the volume of solvents present in the paint and the conversion factor is specified by respective paint manufacturing.

- c) *Adhesion Testing.* Testing of the coating adherence to the substrate is imperative to ensure an effective long life of the coating. A defined pattern of cross cuts at right angles into the coating material is obtained with the help of a cross hatch cutter (with 1mm blade spacing for coating up to 50 microns and 2 mm blade spacing for coating in excess of 50 microns). The cracking of edges or peeling of segments is evaluated as per ASTM/DIN/ISO/BS standards. The cutter is hand held and most suitable for use. Since the test involves cutting departments of the shipyard and the dockyards with adequate caution on sample areas only. The test area must be repainted to requisite thickness after such test. *These tests should be undertaken only on critical sample areas and not to be undertaken as routine matter.*
- d) *Porosity detection.* Pin holes, air bubbles, voids and thin spots invariably occur in a wide range of coatings and can lead to a premature failure. Detection of flaws makes it possible to take corrective action. A high voltage is applied to a probe that is passed over the painted surface. Flaws are detected by a spark or audiovisual alarm. Instruments with 0-15KV are available. The voltage can be set to the desired value depending upon the paint film thickness. Pinhole detectors are also used for tracing pinholes in the paint film thickness up to 300 microns using wet sponge probe. The flaws are indicated by alarm. This type of instrument is suitable for general surfaces with good ventilation and access to facilitate wiping out the water squeezed out of the wet sponge during measurements. *These tests should be undertaken only on critical sample areas and not to be undertaken as routine matter.*
- e) Climatic condition recording (surface temperature, Relative humidity and Dew point).
 - i) Painting carried out in proper climatic condition ensures proper adhesion, curing and avoids adverse effects of dew on the wet film and paint adhesion on to substrate. If environmental parameters are not as per specified levels then painting should not be undertaken.
 - ii) The surface temperature has to be more than the dew point temperature. Non-adherence of this condition will cause poor adhesion of paint on to the surface which is function of humidity. If the painting is required to be undertaken in localized area then the plated surface temperature in the vicinity could be raised by using heat lamps etc, internally or externally.
 - iii) Dew meters give direct read out of surface temperature, air temperature, relative humidity and the dew point. Alternatively, air temperature and relative humidity can be measured with the help of whirling hygrometer. Dew point temperature can therefore be cancelled from literature/tables. The surface temperature can be found out with the help of digital thermometer with a surface probe.
- f) If paint has become thick then it can be thinned by mixing 5 % by volume of corresponding thinner.
- 8. *Do's and Don'ts for the painters.* The ship staff/yard supervisors should understand these instructions and make the sailors/workers aware of them. If necessary regular classes should be help to educate paint users about do's and don'ts of paint, painting and painting processes.

- a) Stir the contents of the paint drum thoroughly by mechanical stirrers or rolling and inverting the drum to ensure that there is no settlement of pigment improper mixing leads to application of thin coats and other paint defects.
 - b) Close the drum tight to avoid loss of solvents.
 - c) Remove any skin, which might have been formed due to presence of driers in the paint prior to using the paint.
 - d) Use separate brush for different paints. Clean the brush and other tools with proper solvents immediately after painting to avoid rendering the paint brushes unusable due to drying up of paint on them.
 - e) Plan the work properly. Do not waste time after transferring the paint in small containers. The paint once mixed should be used within the stipulated pot life period as specified by the paint manufacturer.
 - f) Always prepare paints in small batches for application.
 - g) Supervisors should ensure well in advance that sufficient quantity of requisite paints is available for the planned job, it is better plan and prepare than to run despair.
 - h) The distance of spray gun should be 30-45 cm from the surface being painted. The spray gun should always be held perpendicular to the surface being painted. Care should be taken to avoid sagging of paint and if at all sagging takes place the defect should be rectified immediately.
 - j) Care should be taken to ensure no over spray of paint. The over spray may result into sagging. This could be achieved by adjusting speed of painting and distance of spray gun from surface being painted.
 - k) Never use a shelf life expired paint.
9. *Dos and Don'ts for use of Vacublasting equipment.*
- a) Chilled iron grit being used should be Gr 24 or Gr 17 of DS Cat No. 5350-000139 and 5350-000140.
 - b) The chilled cast iron grit should not be rusted, wet or contaminated with chloride or dirt at the time of its use for vacuum blasting.
 - c) The maintenance schedule for vacuum blasting machines should be rigidly followed and equipment kept in working order at all the times.
 - d) The hoses being used for the purpose of vacuum blasting should always be in very state and there should not be any cracks or holes in them. The material state of hoses is therefore should be monitored on regular basis. It will ensure that abraded hoses are not put to use as use of such hoses are likely to suck water/dirt/moisture/oil from the dock floor and contaminate the cast iron grit thereby leading to instant corrosion of surface being blasted.
 - e) The machines not in use should be properly covered and kept inside the shop.
 - f) Any defect observed, should be immediately rectified in case of a major defect the next senior officer should be fully apprised of the nature of the defect so that action could be initiated to get the equipment operational at the earliest.
10. *Fault in paint application.* There are a number of common faults experienced in paint application. Some of these faults, together with cause of their occurrence and procedure for correcting them are enumerated below:
- a) Sound paint film fading but adhering.
Cause: Normal wear and exposure.

Procedure: Remove oil and grease, clean surface and remove loose paint.

- b) Flaking and poor adhesion.

Cause: Painted over moist surface or over contaminated surface or too short intervals between coats.

Procedure: Remove oil and grease, marks clean the surface. Remove flaking paint down to sound surface. Remove flaking paint down to sound surface by chipping or wire brushing, dust down.

- c) Painted with limited areas of blistering corrosion.

Cause: Painted over moist surface using equipment containing water. Poor initial surface preparation.

Procedure: Remove oil and grease, clean surface scrape blisters away and remove any corrosion. Wash to remove any fluid from blisters.

- d) Painted surface cracking or crocodiling.

Cause: Too short interval between two coats. Improper curing of undercoat paint unsuited for its use.

Procedure: Remove oil and grease, chip or scrape to remove cracked paint to reveal sound paint or base steel.

- e) Brush mark on the surface.

Cause: using brush strokes, paint too thick when applied.

Procedure: Clean surface as necessary light abrade areas by wire brush or emery block.

- f) Cissing (withdrawal of paint in spot)

Cause: Using strong brush strokes, paint too thick when applied.

Procedure: Thoroughly degrease. Remove cissed paint by power dicing or hard scraping.

- g) Sagging.

Cause: Excessive thick coat applied. Spray gun not used skillfully too much thinner.

Procedure: Remove sagging paint to reveal sound film.

11. Safety and health hazards. During any painting operations there are two safety rules to be born in mind. One concerns health hazard and the other the danger of explosion. It is therefore utmost important to study the safety data sheet for each product before starting the paint application. Generally health hazards can be eliminated through good work conditions. Following are the additional safety and health precautions, which are recommended while handling of paint:

- a) Provide good ventilation inside compartments by use of air fed hose. Vapours from solvents should be removed by mechanical ventilation, which involves placing an outlet at the lowest possible point in tank.
- b) While painting of tanks or confined spaces, extra safety aid in form of a lifeline and intervals in fresh air may be used.
- c) Continued exposure to solvents can cause skin irritation on hands. Skin will become dry and eczema may develop. Washing hands in water first can reduce the risk of irritation. A solvent soaked rag can then be used to wash paint off the

hands whilst they are still wet. The final importance factor is to wash the hands with soap and water and never in the solvent itself.

- d) Some paints may give rise to asthma and irritation of lungs. Therefore it is important to ensure that spray mist is not inhaled.
- e) Smoking should not be allowed and welding equipment should not be used within 15 meters of painting operation.
- f) Use explosion proof can spark proof equipment.
- g) Extension cords and connections must never be allowed inside the tank.
- h) Approved light fittings must be used and cables must never be stretched due to risk of disconnection that could cause spark.
- j) Workers involved for tank coating should wear rubber soled shoes.
- k) Air fed hood should be used while painting in closed area. Paint spray in the face can be avoided by using air fed hood with a window in front. Air pressure inside the hood will blow away paint dust.

12. The following items are not to be painted.

- a) Abrasive tread strips.
- b) Aluminium decks and coming in LOX plants.
- c) Sacrificial and ICCP anodes, anode base plates and reference electrodes.

NOTE: Insert plates used in sacrificial anodes should be blasted and then painted after welding them in place.

- d) Anodized aluminium stanchions.
- e) Blast deflectors.
- f) Canvas sections of ventilation systems containing electrical screens.
- g) Deck coverings.
- h) Flexible connections between ventilation fans and associated trunking.
- j) Electric cables.
- k) Filters in ventilation systems.
- l) Flame proof gauzes.
- m) GW blast deflector's panels.
- n) Lubricator and lubrication paints.
- o) Galley bright metal canopies, lining and exhaust trunking.
- p) Galvanized drip-trays beneath air conditioning coils.
- q) Galvanized gratings at ventilation terminals and scuppers.
- r) Galvanized fittings in refrigerated spaces.
- s) Galvanized ladder in fresh water tanks.
- t) Gaskets to refrigerated space, hatches and doors and escape scuttles.
- u) Hanger fire curtains.
- v) Ladder rungs.
- w) Magazine deck areas specified to remain bare.
- x) Plastic lining and plastic faced partition to shower etc.

- y) Plastic piping (except for identification markings and PVC piping exposed to sunlight).
- z) Plated fittings, pipes etc.
- aa) Preventer chain clips.
- ab) Pre-wetting deck nozzles.
- ac) Refrigerated spaces interior (except as specified).
- ad) Rigid expanded PVC insulation, where fitted behind lining.
- ae) Rubber items and shock mountings.
- af) Slip and bottle screws of wire work.
- ag) Spray system hoses and perforated pipes.
- ah) Talley and indicator plates.
- aj) Tumbler bolts.
- ak) Universal and similar joints in control gearing.
- al) Valve spindles and indicator plates.
- am) Varnished wood work.
- an) Ventilation louvers & diffusers and protective covers to relief valve.
- ao) Ventilation trunks and fan casings: interior of galvanized steel or aluminium (except those exhausting from battery compartments and charging rooms).
- ap) Vinyl bulkhead coverings.
- aq) Wooden battens and dunnage gratings in refrigerated spaces, stores, provision rooms, magazines.
- ar) Zinc protectors fitted on kort nozzles, underwater of ships and submarine.
- as) Propellers.
- at) Eco-sounders, under water telephones and other underwater electronic equipments.

PAINT SCHEMES

PSA: Weather work surfaces excluding weather decks and deck fittings.

These are to be painted as per the appropriate paint schemes given below. A minimum dry film thickness of 150 microns of the complete paint system is to be maintained on weather work surfaces. For surface preparation of painted surfaces refer instruction in Appendix 'B' and Appendix 'C' to this Navy Order. The interval between applications of each coat of paint scheme is not to be less than 16 hrs and not more than 7 days.

PSA1: Ungalvanized steel: Prepare the surfaces as per method prescribed in Appendix 'B' and Appendix 'C' as applicable and to be painted with one of the following paint scheme as appropriate.

a) Light grey.

M/s Akzo Nobel paint scheme.

- i) Two coats of inter prime 198 red/Grey primer to achieve 75 micron DFT.
- ii) Two coat of Intersheen Finish Silicon light grey exterior to RAL 7040 colour specifications to achieve 80 microns thickness.

Or

M/s Sigma Coatings.

- i) Two coats of sigma marine primer ZP or Two coats of Sigma Universal Primer to achieve 80 micron DFT.
- ii) Two coat of Sigma Marine Silk Finish light grey exterior to RAL 7040 colour specifications to achieve 70 microns thickness.

Or.

M/s Jotun Pte Ltd.

- i) Two coats of Cromo primer to achieve 80 micros DFT.
 - ii) Two coats of Correx light grey exterior paint to RAL 7040 colour specifications to achieve 80 microns thickness.
- b) White
- i) Three coats of DS Cat No. 8010-000458 red lead graphite primer.
 - ii) One coat of DS Cat No. 8010-000124 white exterior under coat.
 - iii) One coat of DS Cat No. 8010-000215 white exterior finishing paint.
- c) Black
- i) Three coats of DS Cat No. 8010-000458 red lead graphite primer.
 - ii) Two coats of DS Cat No. 8010-000150 black finishing paint.
- d) Buff.
- i) Three coats of DS Cat No. 8010-000458 red lead graphite primer.
 - ii) Two coats of patt No. 8010-000486 paint synthetic resin, exterior buff (shade no. 358 of IS 5)

PSA-2 Galvanized Steel Aluminium sprayed and aluminium. Prepare the surfaces as per method given in Para 4 and 11 of Appendix 'B' of this Navy order to be painted with the following paint scheme as appropriate.

a) Light Grey.

M/s Akzo Nobel paint scheme.

i) Two coats of Interguard primer to achieve 40 microns DFT.

ii) Two coats of Intersheen Finish Silicon light grey exterior to RAL 7040 colour specifications to achieve 80 microns thickness.

Or

M/S Sigma Coatings-

i) One coat of Sigma Universal Primer followed by one coat of Sigma Marine Primer ZP to achieve 80 microns DFT.

ii) Two coats of Sigma Marine Silk Finish light grey exterior to RAL 7040 colour specifications to achieve 70 microns thickness.

OR

M/S Jotun Pte Ltd.

i) Two coats of Cromo primer to achieve 80 micron DFT.

ii) Two coat of Correx light grey exterior paint to RAL 7040 colour specifications to achieve 80 microns thickness.

b) *White*

i) One coat of pretreatment primer prepared from DS Cat. No 8010-000116(base) and 8010-000117 (accelerator).

ii) Within 4hrs apply three successive coats of DS Cat. No 8010-000113 yellow zinc chromate primers.

iii) One coat of DS Cat. No. 8010-000124 white exterior under coat.

iv) One coat of DS Cat. No. 8010-000125 white exterior finishing paint.

c) *Black*

i) One Coat of pre-treatment primer prepared from DS Cat. No. 8010-000116 (base) and 8010-000117 (accelerator) confirming to DEF STAN - 80-15.

ii) Within 4 hrs apply three successive coats of DS Cat. No. 8010-000113 yellow zinc primer.

iii) Two coats of DS Cat. No. 8010-000150 black finishing paint.

d) *Black (Heat Resistance)*

i) One coat of pre-treatment primer prepared from DS Cat. No. 8010-000116 (base) and 8010-000117 (accelerator).

ii) Within 4hrs apply two successive coats of DS Cat. No. 8010-000443 heat resisting Aluminium paint.

iii) One coat of DS Cat. No. 8010-000150 black finishing paint.

e) *Buff.*

i) One coat of pretreatment primer prepared from DS Cat. No. 8010-000117 (accelerator).

ii) Within 4hrs apply two coats of DS Cat. No. 8010-000113 yellow zinc chromate primer.

iii) Two coats of DS Cat. No. 8010-000486 paint synthetic resign exterior buff (shade no. 358 of IS-5).

PSB - Weather Decks. To be painted with the appropriate paint scheme as given below:

PSB 1: Weather Decks (Un galvanized steel Plating Thickness 5mm and above):

- a) Decks to be abrasive blasted to SA 2 1/2 standard in accordance with Para 1 of appendix C of this Navy order.
- b) Within 4hrs of abrasive blasting apply minimum two coats of Epoxy Aluminium Price DS Cat. No. 8010-000987 confirming to NCD 1467. If this primer is not available then four successive coat of Epoxy Red Oxide 1435 to achieve a minimum total dry film thickness of 120-150 microns may be applied.
- c) Apply minimum two coats of Epoxy Heavy Duty Non skid (Dark Grey) paint DS Cat. No. 8010-002098 confirming to NCD 1437 to achieve a minimum dry film thickness of 500 microns of the complete paint system.
- d) The interval between application of each coat of primer and Epoxy heavy Duty Non Skid paint is not to be less than 16hrs and not to exceed 72hrs.

PSB 2: Weather Decks (Ungalvanized steel Plating Thickness less than 5mm):

- a) To be abrasive blasted to achieve surface preparation of SA 2 1/2 standard. The abrasive blasting may be carried out with sand/copper slag.
- b) Remaining paint scheme will be as per the paint scheme PSA 1.

PSB 3: Weather Decks (Galvanized metal sprayed Steel and Aluminium):

- a) Old paint to be removed by applying paint remover DS Cat. No. 8010-000292 over the painted area by brush. After 20minutes remove the softened paint using hard wood/plastic scraper. Clean the deck using mild liquid soap solution or detergent solution referred to in Para 8 of Appendix 'B' of this Navy order and rinse down with clean fresh water. Wipe the deck with clean sponge or cloth. For new construction ships where old paint scheme does not exist, the surface is to be degreased cleaned with fresh water and dried before painting in accordance with Appendix 'B' of this Navy order.
- b) Within 4hrs of surface preparation apply minimum two successive coats of Aluminium Epoxy Primer DS Cat. No. 8010-000987 to achieve total minimum dry film thickness of 130-150microns.
- c) Thereafter apply minimum two successive coats of Epoxy heavy Duty Non Skid (Dark grey) paint DS Cat. No. 8010-002098 to achieve total minimum dry film thickness of 500 microns of the complete paint system.
- d) The interval between application of each coat of primer and epoxy heavy Duty Non skid paint is not to be less than 16hrs and not exceed 72hrs.
- e) For painting the marking on deck paints may be used as per aviation requirements.

PSB 4: Flight Deck / hello decks (Ungalvanized steel):

- a) Deck to be abrasive blasted to SA 2 ½ standard in accordance with Para 1 of appendix 'C' to this Navy order.
- b) Within 4hrs of abrasive blasting, apply minimum two coats of Epoxy Aluminium primer DS Cat. No. 8010-000987 confirming to NCD 1467. If this primer is not available then apply minimum four successive coats of Epoxy Red Oxide Primer DS Cat. No. 8010-001009 to achieve a total minimum dry film thickness of 120-150 microns.

- c) Thereafter, apply minimum three successive coats of Epoxy Heavy Duty Non skid paint DS Cat. No. 8010-002098 (Dark grey) to achieve a minimum dry film thickness of 750microns of the complete paint system.
- d) The interval between application of each coat of primer and non slip paint is not to be less than 16hrs and should not exceed 72hrs.
- e) For painting the marking on deck paints may be used as per requirements.

PSB 5: *Helo Deck (Aluminium):*

- a) To be prepared as per instruction in PSB-3(i) above.
- b) Within four hours of surface preparation, apply minimum two successive coats of Aluminium Epoxy Primer DS Cat. No. 8010-000987 to achieve a total dry film thickness of minimum 120-150 microns.
- c) Thereafter, apply minimum three successive coats of Epoxy Heavy Duty Non skid (Dark grey) paint DS Cat. No. 8010-002098 to achieve minimum dry film thickness of 750 microns of the complete paint system.
- d) The interval between application of each coat of primer and Epoxy Heavy Duty Non Skid Paint is not to be less than 16hrs and should not exceed 72hrs.

NOTE: *General Guidelines for Maintenance of weather Deck/Helo/Flight Deck paint Scheme.*

- a) Non-Skid property of the heavy-Duty non-skid coatings are characterized by coefficient of friction. The frictional coefficient values of 0.55 under wet conditions and 0.30 under oily conditions (with oil OM 100 spread evenly on areas where measurements are being undertaken) are considered as limiting critical values for safe helo /flight operations on worn out/used flight/helo decks. 'Pendulum Skid Resistance Tester', Developed by Road Research laboratories, London (A British Govt Organization) has been identified as standard equipment for measurement of frictional coefficient values onboard ship decks. One such equipment is held with NMRL, Mumbai Based on the measured values, the condition of antiskid paint can be assessed and repair/renewal undertaken as necessary.
- b) Responsibility for measurement of frictional values is that of respective HITUs.
- c) Measurements of friction coefficient values is recommended to be undertaken prior to refits in the vicinity of landing spots and also at random locations wherever aircrafts/helicopters are likely to be traversed or parked.
- d) *Maintenance.*
 - i) Regular cleaning of nonskid coating using industrial vacuum cleaner or by sweeping is essential during service life for maintaining appearance and prevent build up of ingrained dirt which would, in time, cause unacceptable reduction in the non skid property of the coatings.
 - ii) Normal contamination of coating by oil, grease, dirt and fuel is to be removed by the detergent solution in accordance with para6 of Appendix 'B' rinsed with fresh water and dried with clean sponge or cloth. On no account are surfaces to be left soaked in detergent for longer periods, otherwise softening of the non-slip coating may occur.
 - iii) The cleaning operation may be undertaken using salt water when fresh water is in short supply. In this event it is important that the cleaned

surfaces are finally HP water jet cleaned with fresh water to remove all salt deposits.

- e) *Repair of Coating Break down of Local Area.*
 - i) Local break down areas shall be abrasive blasted and recoated with full paint scheme. Where abrasive blasting is not practicable, the surface to be thoroughly scraped, mechanically prepared and wire brushed and the area to be coated with paint scheme as applicable. Records shall be maintained of areas so treated and it is to be ensured that these areas are abrasive blasted and painted with the appropriate paint scheme at the earliest opportunity.
 - ii) The paint scheme used to repair damaged area must be same as original paint scheme.
- f) *Re-coating of Non skid paint.* Where the coatings are in good condition, but an additional coat of non skid is considered essential to maintain non skid property of the deck, the same may be applied in consultation with NMRL/HITU after thorough cleaning /drying the existing paint scheme.
- g) *Re Coating over All with Non Skid Paint.*
 - i) Re-coating sound coatings overall with non skid paint is only to be undertaken when the non skid properties have been reduced through wear or through frequent to be carried out purely to restore cosmetic appearance.
 - ii) Work of re-coating/repairs should not be undertaken in Wet weather conditions.
- h) In addition all the laid down guidelines as per NCD 1437 should be adhered to.

PSC – General Surfaces in Dry Compartments. To be painted with appropriate paint scheme given below. The total dry film thickness on interior structure should be a minimum of 125 microns except where specified. For surface preparation refer instructions in Appendix 'B' and Appendix 'C' to this Navy Order. The interval between applications of each coat of paint scheme is not to be less than 16hrs and not to exceed 72hrs except where specified.

Bulkhead, Deck Head, Ship side.

PSC 1: Un galvanized Steel (Unlined/Insulated/Un insulated).

- a) Two coats of yellow zinc chromate primer DS Cat No. 8010-000113.
- b) Two coats of white interior fire retardant paint DS Cat No. 8010-000212.

PSC 2: Aluminium (Unlined/Insulated/Un insulated).

- a) One coat of Pretreatment primer prepared from DS Cat No. 8010-000116 (base) 8010-000117 (accelerator) conforming to DEF STAN 80-15.
 - b) Within 4hrs apply one coat of yellow zinc chromate DS Cat No. 8010-000113.
- Two coats of white interior fire retardant paint DS Cat No. 8010-000212.

PSC 3: Galvanised Steel/Zinc Sprayed Steel/Insulated/ (Un insulated).

- a) One coat of Pretreatment primer prepared from DS Cat No. 8010-000116. (base) and DS Cat No. 8010-000117(accelerated).
- b) Within 4hrs apply one coat of chlorinated rubber paint primer patt No. 8010-000460.

- c) One coat of chlorinated rubber paint white patt no. 8010-000431.

PSC 4: Steel and Aluminium Beneath Mineral Fibre Marie Board and Rigid Expanded PVC

- a) One coat of pretreatment Primer to DEF STAN 80-15.
b) Three coats of yellow zinc chromate 8010-000113.
c) Two coats white interior fire retardant paint DS Cat. No. 8010-000212.
d) Face of MFMB or the rigid expanded PVC to be painted with two coats of white interior fire retardant paint Cat. No. 8010-000212.

PSC 6: Structure Beneath Aluminium Alloy or Plywood Lining (Fire and rot proof)

- a) Structure to be painted as per PSC-1, PSC-2 and PSC-3 as applicable.
b) Face of Aluminium lining to be painted as per PSC-3.
c) Face of plywood to be painted with:
i) One coat of Aluminium paint DS Cat. No. 8010-000114.
ii) Two coats of white interior paint DS No. 8010-000212.

PSC-7: Structure Beneath Perforated Lining for Insulation

- a) To be painted as per PSC-1, PSC-2 and PSC-3 as applicable.
b) Lining which are self coloured are not to be painted.

PSC-8: Face Colouring coats (Bulk heads, Ship sides and Front Surfaces of the Lagging and Lining)

Any one of the following interior fire retardant finishing paint may be used.

- a) DS Cat No. 8010-000208 pale cream interior paint to IS-5 colour No. 358.
b) DS Cat No. 8010-000209 eau-de-nil interior paint to IS-5 Colour No. 216.
c) DS Cat No. 8010-000211 signal red champagne interior paint to IS-5 colour No. 386.
DS Cat No. 8010-000634 sky blue interior paint to IS-5 colour No. 101.
d) DS Cat No. 8010-000210 salmon pink interior paint to IS-5 colour No. 443.

PSC: 9: Decks and Dadoes of Dry Compartments (Except as specified in PSC 10 to PSC 13)

- a) Two coats of DS Cat No. 8010-000113 yellow zinc chromate primer.
b) Two coats of any of the following finishing paints:
i) DS Cat No. 8010-000298 middle brown finishing paint to shade No 411 to IS - 5.
ii) DS Cat No. 8010-000299 middle Brunswick green finishing paint to shade No 266 to IS - 5.
iii) DS Cat No. 8010-000461 red finishing paint.
iv) DS Cat No. 8010-000462 fawn finishing paint to shade No 414 to IS- 5.
c) Dadoes in accommodation spaces are not to be more than 300mm high and in other spaces not more than 600mm.

PSC 10: Decks of Low Power Room.

- a) One coat of chlorinated rubber primer paint DS Cat No. 8010-000460.
b) Two coats of chlorinated rubber paint finishing black DS Cat No. 8010-000433.

PSC 11: Decks of Compartments Controlling Water Cooled Electronic Cabinets.

Underneath electronic cabinets containing water-cooled heat exchanger and inaccessible parts of the compartments between the banks of cabinets and shipside or bulk heads. Following paint scheme is to be applied.

- a) Surface to be prepared to Swedish standard SA 21/2 in accordance with appendix 'B' and 'C' of this Navy order.
- b) Within 2hrs apply one coat of Epoxy red oxide primer DS Cat No. 8010-001009.
- c) Apply two coats of Coal tar epoxy paint DS Cat No. 8010-000618.

PSC 12: Decks under False Floors.

Following paints schemes is to be applied:

- a) One coat of pretreatment primer made from DS Cat No. 8010-000116 (base) and DS Cat No. 8010-000117 (accelerator) conforming to DEF STAN 80-15.
- b) Within 4hrs apply one coat of chlorinated rubber paint white patt no. 8010-000431.

PSC 13: Decks in magazine

- a) *Magazine deck conducting.* (Refer BR 2924 chapter 4, article 51 to 54). These are not to be painted.
- b) *Magazine Deck Non- conducting*
 - i) Apply two coats of yellow zinc chromate primer DS Cat No. 8010-000113.
 - ii) One coat of white interior fire retardant paint DS Cat No. 8010-000212

NOTE:

- a) The use of Aluminium pigmented paint in magazine is prohibited.
- b) Aluminium alloy fouls floors.
- c) The tread plates are to be left bare metal.

PSD- General Surfaces in wet compartment (Bakeries, WCs. Bathrooms, decontamination spaces, galleys, preparing room and associated compartments, garbage compartments, laundries & diving store are classified as wet compartments).

Bulk head, Deck head, shipside.

PSD-1: *Steel (Unlined and un insulated) and Beneath Insulation if Insulated.*

- a) Three coats of priming yellow zinc chromate primer DS Cat No. 8010-000113.
- b) One coat white undercoat DS Cat No. 8010-000124.
- c) Two coats of white exterior finishing coat DS Cat No. 8010-000215.

PSD-2: *Steel zinc sprayed/ Aluminium (Unlined/ Un insulated) beneath insulation if insulated.*

- a) One coat of pretreatment primer made from DS Cat No. 8010-000116 (base) and DS Cat No. 8010-000117 (accelerator).
- b) Within 4hrs apply one coat of chlorinated rubber paint primer DS Cat No. 8010-000460.
- c) Two coats of chlorinated rubber paint white DS Cat No. 8010-000431.
- d) **NOTE:**
 - i) In case the above surfaces are only insulated then three coats of white chlorinated rubber paint DS Cat No. 8010-000431 are to be applied on the face of the insulation.

- ii) In case insulation as well as lining or only lining is provided then the surfaces of lining are to be coated with three coats of chlorinated rubber paint white DS Cat No. 8010-000431. In case the linings are self coloured the same need not to be painted.

PSD-3: Steel (unlined, beneath lining/insulation not designated Decontamination areas)

- a) One coat of coal tar epoxy black DS Cat No. 8010-000618.
- b) Followed by one coat of coal tar epoxy brown DS Cat No. 8010-000617.
- c) Followed by one coat of coal tar epoxy black DS Cat No. 8010-000618.
- d) Waterways and dados below the level of lining to be finally coated with one coat of Aluminium bitumen paint patt. No. 8010-000632.

PSD-4: Zinc sprayed steel and aluminium (united and beneath lining/insulation designated decontamination areas).

- a) One coat of pretreatment primer made from DS Cat No. 8010-000116 base and DS Cat No. 8010-000117 (accelerator) conforming to DEF STAN 80-15.
- b) Within 4hrs apply one coat of chlorinated rubber paint primer patt no. 8010-000460.
- c) Three coats of chlorinated rubber paint white DS Cat No. 8010-000431.

Decks and Dados of wet compartments

PSD-5: Decks and Dados in wet compartments.

Steel decks and dados in wet compartments are to be abrasive blasted and protected with the approved epoxy based deck covering.

PSD-5: Decks of oxygen producing and charging rooms and stores

Steel decks and dados in wet compartments are to be abrasive blasted and protected with the approved epoxy based deck covering.

PSE: General surfaces in special compartments (Decks, Dados, bulkhead and deck heads).

PSE-1: Acid store, Battery charging Room

Bulk heads and Deck head.

- a) Two coats of chlorinated rubber paint prior DS Cat No. 8010-000460.
- b) Followed by two coats of chlorinated rubber paint finishing white DS Cat No. 8010-000431.

Decks and Dados.

- a) To be abrasive blasted to SA 2 ½ standard.
- b) Within 2hrs apply one coat of solvent free epoxy paint EP-1 to achieve a dry film thickness of 250 microns.
- c) Apply two successive coats of solvent free epoxy paint EP-2 to achieve a total dry film thickness 750 microns of complete paint system.
- d) The interval between applications of each coat of paint is not to be less than 24 hrs.

PSE-2: Aircraft lift well.

Bulk head are to be painted with.

- a) Three coats of yellow zinc chromate DS Cat No. 8010-000113.
- b) Two coats of DS Cat No. 8010-000150 black finishing paint.

PSE-3: Hangar Decks.

Area beyond 5mtr periphery from edge of lift opening is to be left unpainted. The 5mtr perimeter area is to be painted as follows.

- a) To be abrasive blasted Sa 2 ½ standard.
- b) Three coats of epoxy red oxide primer DS Cat No. 8010-001009.
- c) Two coats of epoxy heavy duty, non skid, and dark grey paint DS Cat No. 8010-002098.

PSE-4: Gas Turbine intake and Uptakes.

a) Intakes: External surfaces of casing

- i) Three coats of yellow zinc chromate DS Cat No. 8010-000113.
- ii) Two coats of DS Cat No. 8010-000122 dark Grey or White DS Cat No. 8010-000124 white exterior under coat is applicable.
- iii) Two coats of DS Cat No. 8010-000213 dark Grey or DS Cat No. 8010-000215 white exterior finishing paint as applicable.

b) Uptakes (Casing surfaces behind insulation)

- i) Two coats of yellow zinc chromate DS Cat No. 8010-000113.
- ii) Two coats of DS Cat No. 8010-000212 fire retardant white paint.

c) Uptakes surfaces beneath insulation

- i) One coat of heat resisting paint DS Cat No. 8010-000443.
- ii) Lagging covered with stainless steel plate surfaces is to be left unpainted.

PSE-5: Medical compartments:

a) *Deck heads.* To be painted in accordance with PSC 1, PSC 2, PSC 3 as applicable.

b) *Bulkheads and ship side.* (Not insulated or beneath insulation if insulated)

- i) Two coat of primer yellow zinc chromate DS Cat No. 8010-000113.
- ii) One coat of white exterior under coat DS Cat No. 8010-000124.
- iii) Two coats of white exterior finishing paint DS Cat No. 8010-000215 (painted as per PSE-5(e).

iv) Face of insulation to be painted with two coats of white exterior paint DS Cat No. 8010-000215.

c) *Wooden door:*

- i) One coat of Aluminium paint DS Cat No. 8010-000114.
- ii) One coat of white exterior under coat DS Cat No. 8010-000124.
- iii) Two coats of DS Cat No. 8010-000215 white exterior finishing paint [painted as appropriate as for PSE 5(e)]

d) *Overhead fitting such as ventilation trunks (galvanized steel and Aluminium alloy)*

- i) One coat of pretreatment primer made from DS Cat No. 8010-000116 (base) and DS Cat No. 8010-000117 (accelerator) (confirming to DEF STAN 80-15).
- ii) Within 4hrs apply one coat of DS Cat No. 8010-000113 yellow zinc chromate primers.
- iii) Two coats of white interior fire retardant paint DS Cat No. 8010-000212.
- e) *Colour scheme for general surfaces, sickbay annexes and Dental clinics.*
 - i) Ward rooms are to be painted with salmon pink, pale cream or sky blue as required.
 - ii) Dark room to be painted with DS Cat No. 8010-000234 jet black, where compartments are used solely as a dark room.
 - ii) Doors frames, ceiling, architraves and scuttle flaring to be painted white.
 - iii) Other spaces to be painted champagne.
 - iv) Pantries and dispensaries to be painted champagne.
- vi) Colours to be obtained by tinting white exterior paint DS Cat No. 8010-000215 with suitable pigments to obtain the colour coats as listed in PSC-8 (i) to (v).

PSE-6: Photographic spaces.

- a) One coat of chlorinated rubber paint primer DS Cat No. 8010-000443
- b) Two coats of Chlorinated rubber paint white DS Cat No. 8010-000431.

PSE-7: Refrigerated spaces.

- a) Steel structures behind aluminium allow lining and faying surfaces of the lining to be painted with three coats of yellow zinc chromate primer DS Cat No. 8010-000113.
- b) Surfaces of wood in refrigerated spaces are not to be painted.

PSE-8: Cable locker, sewage tank, Soil boxes in WC

- a) Surfaces to be abrasive blasted to Sa2 ½
- b) Multiple coats of coal tar epoxy paint DS Cat No. 8010-000618 to achieve a minimum dry film thickness of 225 microns.

PSF: Machinery Spaces.

PSF-1: Deck Head, Bulk head and Shipside.

To be painted in accordance with PSC-1, PSC-2, and PSC-3 as applicable.

PSF-2: Steel Biles (Not metal sprayed):

- a. Steel surfaces to be abrasive blasted or thoroughly cleaned to bare metal by chipping, scrapping, wire brushing and power abrasive discing followed by degreasing as per Para 8 of Appendix 'B' to this Navy order.
- b. After surface preparation to Sa2 ½ one coat of NMRL developed solvent free epoxy paint EPI to be applied to achieve dry film thickness of 250 microns.
- b) Apply two or more successive coats of solvent free epoxy paint EP2 paint achieve DFT of 750 microns of complete paint system.
- c) Inter-coat interval between each coat should not be less than 24hrs.

PSF-3: Bilges Metal Sprayed

- a) To be abrasive blasted to Sa 2 ½
- b) To be zinc sprayed in accordance with IS 5905-1970 to get minimum coating of 150 microns thickness.

- c) One coat of DS Cat No. 80101-000460 chlorinated rubber primer.
- d) Two coats of DS Cat No. 80101-000431 chlorinated rubber paint white finishing.

PSG: System pipe and pipeline.

PSG-1: Copper alloy and other non-ferrous pipes in machinery spaces, bilges and wet compartments.

- a) Unlogged pipes to be thoroughly degreased with naphtha, roughened with, emery paper, again degreased and thereafter coated with three coats of white chlorinated rubber based paint DS Cat No. 80101-000431.
- b) Lagged pipes to be treated with three coats of DS Cat No. 80101-000431 white chlorinated rubber based paint.
- c) Copper allows pipes passing behind lining paneling are to be roughened, degreased and coated with.
 - i) One coat of DS Cat No. 80101-000460 chlorinated rubber primer paint.
 - ii) Two coats of DS Cat No. 80101-000431 chlorinated rubber paint white finishing.

NOTE: The surfaces of Aluminised lagging are not to be painted and dry surfaces of paint to be cleaned off.

PSG-2: Copper, copper alloy and other non ferrous pipes outside machinery spaces, bilges and wet compartments.

- a) Unlogged pipes to be thoroughly degreased with naphtha, roughened with emery papers, again degreased and coated with.
 - i) One coat of DS Cat No. 80101-000431 white chlorinated rubber based paint.
 - ii) Finishing coat as on adjacent areas.
- b) Lagged pipes to be covered with white PVC adhesive tape and do not require painting for vapour sealing. The cold water, salt water, chilled water and pre wetting system pipes suctions from tanks and drains from ATUs are to be treated as above.
- c) The lagging of hot water pipes is to be painted with two coats of DS Cat No. 80101-000212 white interior paint tinted as necessary.

PSG-3: Galvanized steel pipes and fittings.

Galvanized steel pipes and fittings are to be thoroughly cleaner and degreased as per Para 8 of Appendix 'B' of the Navy Order and pretreated with one coat of pretreatment primer conforming to DEF STAN 80-15 before over coating with approved paint scheme.

PSG-4: Lagging on Auxiliary Steam pipes:

To be treated with two coats of DS Cat No. 80101-000435 pink distemper Emulsion paint.

PSG-5: Lagging on feed water pipes:

To be treated with two coats of DS Cat No. 80101-000438 pale green distemper Emulsion paint.

PSG-6: Lagging on mainstream pipes in compartments other than accommodation spaces.

To be treated with two coats of DS Cat No. 80101-000439 white distemper Emulsion paint.

PSG-7: Lagging of main stream pipes of sprayed limper asbestos:

In general compartments and accommodation spaces are to be treated with two coats of any of the following distemper emulsion paint:

- a) DS Cat No. 80101-000435 pink.
- b) DS Cat No. 80101-000436 pale blue.
- c) DS Cat No. 80101-000437 light buff.
- d) DS Cat No. 80101-000438 pale green.
- e) DS Cat No. 80101-000439 white.

PSG-8: Canvas covering of insulation on salt water and chilled water piping system (in dry compartment).

To be treated with three coats of DS Cat No. 80101-000212 white finishing paint (except where specified). It could thereafter be over coated with any shade of fire retardant paint.

PSG-9: Canvas covering of insulation on salt water, cold fresh water and chilled water piping system (in wet compartments).

To be treated with coats of DS Cat No. 80101-000431 white chlorinated rubber paint finishing.

PSH- Tanks

PSH-1: Fresh water tanks

- a) *Steel Galvanized.* Tanks and ladders of galvanized steel are not to be painted.
- b) *Steel not galvanized:*
 - i) The surface to be prepared to bare metal by mechanical chipping/abrasive blasting to achieve Sa 2 ½ standards.
 - ii) Application of two coats of SFAC, EP-1 paint to active total DFT of 350-400 microns.

PSH-2: Heeling, trimming, Ballast and drains tanks, air spaces and cofferdams. (Steel ungalvanized) to be painted with one of the following schemes:

- a) *M/s Sigma paint scheme:*
 - i) To be vacuum blasted to Sa 2 ½ standard.

- ii) Apply one coat to achieve 75 microns F/C sigma EP Universal Primer.
- iii) Thereafter apply multiple coats of F/C sigma guard BT (7451) paint to achieve 300 microns thickness.

Or

b) M/s Jotun paint

- i) To be vacuum blasted to Sa 2 ½ standard.
- ii) Apply one coat of microns to obtain 30microns F/C Epoxy holding primer.
- iii) Thereafter apply two coats of F/C BalloxyHB light paints to obtain 200 microns on each coat.

Or

c) M/s Akzo Nobel

- i) To be vacuum blasted to Sa 2 ½ standard.
- ii) Apply one coat of intergard 269 primer to achieve 40 microns.
- iii) Apply two coats of intergard 403 to obtain 250 microns thickness.

NOTE: The paint scheme PSH-2 is also applicable to sumps, (excluding sumps in photographic room, machinery spaces and bathroom). The paint scheme must be used if the compartment has boundaries common with a tank containing fuel or lubricant.

PSH-3: *FFO and Diesel Oil tanks, Lubricating Oil, Oil Drains and Oil sullage tanks-Steel surfaces.*

- a) To be thoroughly cleaned & dried.
 - b) Apply one coat of Heavy Filtered mineral oil DS Cat No. 9150-000058.
- Or
- c) Apply two coats of solvent free epoxy composition EP-1 to achieve a minimum dry film thickness of 500 microns. Inter-coat interval should be 24hrs.

PSH-4: *Water compensated Diesel Oil tanks (Steel surfaces)*

Thoroughly clean to bare metal by abrasive blasting as per instruction in Para 3 of Appendix 'C'. Then apply two coats of solvent free epoxy composition EP-1 to achieve a dry film thickness of 500microns.

PSH-5: *Avgas and avcat storage tanks.*

- a) Prepare the surface by abrasive blasting as per instruction in Para-3 of Appendix 'C'.
- b) Apply two coats of solvent free epoxy composition EP-1 to achieve minimum a dry film thickness of 500 microns. Intercoat internal should be for a minimum of 24 hrs.

PSH-6: *Sonar hull outfit trunks.* Abrasive blast if possible to achieve surface preparation of Swedish standard Sa2 ½ otherwise the surfaces are to be mechanically cleaned to bare metal by chipping, descaled for application of heavy duty paint system. Apply paint scheme as applicable to ships under water hull.

PSH-7: Feed water tanks. Surfaces to be abrasive blasted and Aluminium sprayed to BS-2569 Part I to a minimum thickness of 200 microns. If abrasive blasting is not possible, then the surfaces to be wire brushed, degreased and painted with three coats of Aluminium paint DS Cat no. 8010-000114.

PSH-8: Hydraulic oil tanks. Hydraulic oil system tanks will normally be constructed of stainless steel. However, if they are not made of stainless steel and are integral with the ship structure then they are to be abrasive blasted and coated with two coats of solvent free epoxy composition EP stainless steel tanks are to be left unpainted.

PSJ: Outer bottom under water areas and fittings.

PSJ-1: CTE+SPC Scheme. For steel hulls steel ships provided with cathodic protection except SNM class ships.

- a) *Surface preparation.* Entire underwater hull to be abrasive blasted to Sa 2 ½ standard in accordance with Appendix 'B' of this Navy order.
- b) *Primer.* Within two hours of surface preparation apply one coat of Epoxy Red oxide primer DS Cat no. 8010-00109 to achieve a dry film thickness of 30 to 35 microns.
- c) *Anti corrosive paint.* Apply three successive coats of coal Tar epoxy Anti corrosive paint DS Cat no. 8010-000618 black and DS cat no.8010-000617 brown confirming to NCD 1416-92 (First coat black, 2nd brown and 3rd black) to achieve a dry film thickness of 225 microns minimum.
- d) *Tie coat and anti fouling paints.* The tie coat will depend on type or anti fouling paint schemes being used.

The various antifouling paint schemes along with their respective tie coats should be one of the following.

a) M/s Akzo Nobel:

- i) Tie coat-intertuf modified epoxy JXA 674/675 one coat to achieve 125 microns.
- ii) A/F paint inter smooth HisolBFA 900 series. Each coat will provide DFT of 75 microns and 125 microns of A/F will give one year of service life.

Or

b) M/s sigma paint:

- i) Tie coat-Sigma TC N 300-one coat of 125 microns.
- ii) A/F paint- sigma plane HA 3025 (Red) each coat will provide DFT of 75microns and 125 microns of A/F will give one year of service life.

Or

d) M/s jotun paint:

- i) Tie coat-safe guard dark brown-one coat of 125 microns.
- ii) A/F paint-SeamateHB 99 three successive coats of 125 microns each.

NOTE:

- a) The SPC paints of all the three firms are compatible with each other.
- b) The intercoat interval between each coat of anti corrosive paints, between anti corrosive paint and tie coat and between tie coat and anti fouling paints mentioned above should not be less than 18 hrs and should not exceed 72 to 96 hrs depending on the environmental conditions.
- c) The intercoat interval between each coat of SPC A/F paint should not be less than 6hrs. There is no maximum over coat time limit on top of sound SPC A/F paint, when over coated with SPC anti fouling. However, time limit (min/max) will be dependent on atmospheric temperature, humidity and other environmental parameters.
- d) Alternate coat of A/C and A/F to be of different colours, Black A/F paint is to be applied on boot topping areas.
- e) Should there be any deviation in above specified intercoat interval and product data sheet of proprietary paints then action as specified in Para 5 of Appendix 'A' of this Navy order may be resorted to.

PSJ-2: HBCR anticorrosive and CR antifouling. For outer bottom of SNM class ships.

- a) The underwater hull to be cleaned by scrapping, hard wire brushing or by using pneumatic tools.
- b) Apply first coat of HBCRALuminium A/c paint DS Cat No. 8010-000988 to achieve a dry film thickness of 100microns.
- c) Apply 2nd coat of HBCR Red oxide A/c paint DS cat no. 8010-000989 to achieve a dry film thickness of 100 microns.
- d) Apply 3rd coat of HBCRALuminium A/C paint DS Cat No.8010-000988 to a dry film thickness of 100 microns.
- e) Apply three coats CR antifouling red DS Cat No. 8010-000990 to achieve to dry film thickness of 150 microns. CR black paint DS Cat No. 8010-000991 to be applied on boot topping area.
- f) The interval between application of each coat of anticorrosive and antifouling is not to be less than 24 hours.

PSJ-3: Preservation of Underwater Hulls of New Construction of ships During Fitting out and Prior to CST.

- a) If launce to commissioning period is less than 3 years the damaged/affected areas of the paint on the underwater hull are to be abrasive blasted to bare metal and touch up of anti corrosive paint is to be carried out as per the approved scheme on the affected areas and apply tie coat as well as antifouling paint as per approved scheme.
- b) If the period between launching and commissioning exceed 3 years, then the whole underwater hull is to abrasive blasted prior to commissioning and complete scheme is to be restored.
- c) The ships are to be docked as and when considered necessary during fitting out of examination of underwater hull and restoration of paint scheme.

- d) Hanging sacrificial anodes shall be provided for protection of underwater hull during fitting our period in consultation with NMRL (Provided ICCP is not working).

PSJ-4: Routine Dockings.

- a) At each docking the underwater hull is to be inspected after cleaning in accordance with Para 5(a) of Appendix 'B' to this Navy Order. Areas of breakdown of anticorrosive paint to be cleaned to bare metal and paint scheme restored.
- b) Ships copy of last docking reports form IN 379 should be consulted for the paint scheme applicable. The existing paint scheme is not to be changed without prior approval of Naval Headquarters (DNA).
- c) Anodes and reference electrodes are to be suitably covered with the outer bottom painting is in progress.
- d) Anodes shields as specified in ships or class specification to be restored. Anodes of ICCP system require heavy duty coating in their vicinity to be over coated with appropriate paint scheme applicable to ship. For procedure/preparation of epoxy coating refer to chapter 3. Para 3.5 of INBR 372.

PSJ-5: Boot topping Areas.

Ships copy of docking form IN 379 to be consulted before pointing during routine docking.

- a) Clean entire areas to white metal finish by abrasive blasting.
- b) To be coated as per paint scheme PSJ-1 to PSJ-2 as applicable except that antifouling block is to be used on boot topping areas.

PSJ-6: Stabilizer fin, shaft brackets, rudder, main inlets and other ship builder tubes

- a) All main inlets, rudders, shaft brackets and other ship builder tubes of all IN ships should be grit blasted to achieve surface preparation up to Sa 2 ½ standards and coated with three successive coats of coal Tar Epoxy Anticorrosive paint DS Cat No. 8010-000618 black and DS Cat No. 8010-000617 brown conforming to NCD 1416-92(first coat black, 2nd brown and 3rd black) to achieve a dry film thickness of 225 microns minimum. The inter coat interval between each coat should not be less than 18 hrs and should not exceed 723 to 96 hrs depending on the environmental conditions.
- b) Subsequently the tie-coat and the antifouling painting should be in accordance with the paint scheme applicable for the remaining underwater portion of hull.
- c) Other sea inlets and discharges too small to be abrasive blasted are to be of galvanized steel and should be cleaned by scrapping and wire brushing and coated as follows:
- i) One coat of tie-coat specified for the outer hull.
 - ii) Three coats of antifouling paint as used for the outer bottom.

LIST OF PAINT SCHEME AND THEIR APPLICABILITY

| Compartment/ Surface | Paint scheme |
|--|--|
| Acid Store | PSE-1 |
| Air Craft lift | PSE-2 |
| Air space | PSH-2 |
| Avcat Tanks | PSH-5 |
| Battery Charging Room | PSE-1 |
| Biles in machinery spaces | PSF-1& PSF-2 |
| Cable locker | PSE-8 |
| Cofferdam | PSH-2 |
| Medical Compartment | PSE-5 |
| Photographic space | PSE-6 |
| Refrigerated spaces | PSE-7 |
| <i>Decks</i> | |
| Weather | PSB-1, PSB-2 & PSB-3 |
| Flight | PSB-4 & PSB-5 |
| Hanger | PSE-3 |
| In dry compartment | PSC-9 |
| In wet compartments | PSD-5 |
| Of low power Room | PSC-10 |
| In water of water cooled electronic cabinets | PSC-11 |
| Under False floor | PSC-12 |
| Oxygen producing charging of store room | PSD-6 |
| Of magazine | PSC-13 |
| <i>Dry compartments</i> | |
| General surface, Bulkheads, Deck heads, shipside's | PSC-1 to PSC-8 as applicable |
| Outer bottom under water hull & fittings | PSJ-1 to PSJ-5 |
| Piping | PSG-1 to PSG-9 as applicable |
| <i>Tanks</i> | |
| Avcat | PSH-5 |
| Ballast | PSH-2 |
| Diesel oil | PSH-3 |
| Feed water | PSH-7 |
| FFO | PSH-3 |
| Fresh water | PSH-1 |
| Hydraulic oil | PSH-8 |
| Oil sullage | PSH-3 |
| Sewage | PSE-8 |
| <i>Wet compartment</i> | |
| General surface, Bulkheads, Deckheads, shipside's | PSD-, PSD-2, PSD-3 & PSD-4 as applicable. |

LIST OF PAINTS AND GOVERNING SPECIFICATION

| | | | |
|----|----------------------------------|---|---------------------|
| 01 | 8010-000113 | Paint RFU priming yellow zinc chromate | IS-1874 |
| 02 | 8010-000114 | Paint RFU priming aluminium water resisting brushing | IS-3585 |
| 03 | a) 8010-000116 b) 8010-000117 | Pre-treatment primer (base) (accelerator) | DEF STAN 80-15 |
| 04 | 8010-000122 | Paint RFU under coat dark admiralty Grey | IS-6948 |
| 05 | 8010-000124 | Paint RFU under coat white | IS-6948 |
| 06 | 8010-000144 | Paint RFU interior synthetic light | CQAE(M) SS/60(b) |
| 07 | 8010-000150 | Paint RFU finishing exterior synthetic | SS/98 |
| 08 | 8010-000208 | Paint RFU finishing fire pale cream | JSS-3-47-05 |
| 09 | 8010-000209 | Paint RFU finishing fire retardant Eaud-Nil | |
| 10 | 8010-000210 | Paint RFU finishing fire retardant selmon pink | |
| 11 | 8010-000211 | Paint RFU finishing fire retardant signal red | |
| 12 | 8010-000212 | Paint RFU finishing fire retardant signal | IS-6951 |
| 13 | 8010-000213 | Paint RFU finishing fire retardant admiralty Grey | |
| 14 | 8010-000215 | Paint RFU finishing exterior synthetic white | |
| 15 | 800-000255 | Bituminous solution heavy duty acid resisting | IS-158 |
| 16 | 8010-000271 | Varnish marine synthetic resin | IS-524 |
| 17 | 8010-000276 | White hard spirit varnish | IS-436 |
| 18 | 8010-000288 | Putty hard spirit varnish | IS-419 |
| 19 | 8010-000292 | Paint remover | IS-430 |
| 20 | 8010-000298 | Paint RFU finishing interior deck and dadoses middle brown | JSS-8010-6 |
| 21 | 8010-000299 | Paint RFU finishing interior deck and dadoses middle Brunswick Green | |
| 22 | 8010-000431 | Paint RFU finishing acid & alkali resistance chlorinated rubber white | DEF-STAN-80/72 |
| 23 | 8010-000433 | Chlorinated rubber paint finishing black | IS-428 |
| 24 | 8010-000435 | Pink distemper oil emulsion | |
| 25 | 8010-000436 | Pale blue distemper oil emulsion | |
| 26 | 8010-000437 | Light buff distemper oil emulsion | |
| 27 | 8010-000438 | Pale green distemper oil emulsion | |
| 28 | 8010-000439 | white distemper oil emulsion | INSCH P-15 |
| 29 | 8010-000443 | Paint finishing heat resisting Aluminium | |
| 30 | 8010-000458 | Paint priming red lead graphite | DEF-1444 |
| 31 | 8010-000459 | Paint quick drying white for GRP surfaces | DEF-1443 |
| 32 | 8010-000460 | Chlorinated rubber paint primer | DEF STAN 80-72 |
| 33 | 8010-000461 | Paint RFU interior red finishing paint | DNC/M70 |
| 34 | 8010-000462 | Paint RFU interior deck and dadoses fawn | |
| 35 | 8010-000486 | Paint RFU finishing exterior synthetic resin | IS-2932 |
| 36 | 8010-000559 | Paint remover | |

| | | | |
|----|-------------------|--|---------------------------------------|
| 37 | 8010-000617 | Coal tar epoxy brown | NCD-1416 |
| 38 | 8010-000618 | Coal tar epoxy black | |
| 39 | 8010-000632 | Paint Aluminium Bituminous | DGS-1024 |
| 40 | 8010-000634 | Sky blue interior paint | CQAE(M)/Ss/60(B) |
| 41 | 8010-000678 | Knotting | BS-1336 |
| 42 | 8010-000987 | Paint aluminium epoxy primer | NCD-1467 |
| 43 | 8010-002098 | Paint epoxy heavy duty non skid deck dark admiralty grey | NCD-1437 |
| 44 | 8010-000988 | HBCR tar Aluminium paint | NCD-1417 |
| 45 | 8010-000989 | HBCR red oxide paint | NCD-1417 |
| 46 | 8010-000990 | CR anti fouling paint red | |
| 47 | 8010-000991 | CR anti fouling black | |
| 48 | 8010-000992 | Cold bituminous composition | IN/OPC/55 |
| 49 | 8010-0001009 | Epoxy red oxide shop primer | NCD-1435 |
| 50 | 8040-000187 | GY 250 Epoxy resin | Proprietary |
| 51 | 8040-000188 | HY 830 Hardener | Proprietary-848 |
| 52 | 9150-000058 | Heavy filtered mineral oil | |
| 53 | 8010-NIL | Solvent free epoxy paint EP-1 | NCD-1457 |
| 54 | 8010-NIL | Solvent free epoxy paint EP-2 | NCD-1457 |
| 55 | - | Labolen liquid detergent | Proprietary-M/s Glaxo India Ltd |
| 56 | - | F/C sigma E.P universal primer | Proprietary-M/s Glaxo India Ltd |
| 57 | - | F/C sigma guard BT 7451 paint | |
| 58 | - | F/C epoxy holding primer | Proprietary-M/s Jotun |
| 59 | - | F/C balloxyHB light | |
| 60 | N0442-R00-4091 | Intertuf modified epoxy JXA 674 & 675 | Proprietary-M/s Akzo Nobel |
| 61 | N0442-R00-4092 | Intersmooth HisolBFA 900 plum Pink Black | Proprietary-M/s Akzo Nobel |
| | 4093 | | |
| | 4093 | | |
| 62 | - | Sigma TCN 300 | M/s Sigma |
| 63 | N0442-R00-4092 | Seamate HA 3025 Pink black | |
| | 4093 | | |
| | 4093 | | |
| 64 | - | Safe guard Dark Brown Tie coat | M/s Jotun |
| 65 | N0442-R00-4092 | Seamate HB-99-A/F paint Plum Pink black | |
| | 4093 | | |
| | 4093 | | |
| 66 | N8010-P00954 6 | Inter prime 198 Red/Grey | M/s Akzo Nobel |
| 67 | N8010- | Interguard 269 Red | |

| | | | |
|----|-----------------------|--------------------------|-------------------------------------|
| | P00954 5 | | |
| 68 | N8010- P00954 4 | Intersheen Finish | M/s Akzo Nobel to RAL 7040 |
| 69 | N8010- P00954 6 | Sigma Marine primer | M/s sigma coating |
| 70 | N8010- P00954 5 | Sigma universal primer | M/s sigma coating |
| 71 | N8010- P00954 4 | Sigma marine silk finish | M/s sigma coating to RAL 7040 |
| 72 | - | Sigma guard BT | M/s sigma coating |
| 73 | - | Epoxy holding primer | M/s Jotun |
| 74 | - | Baloxyl HB light | M/s Jotun |
| 75 | N8010- P00954 6 | Cromo primer | M/s Jotun |
| 76 | N8010- P00954 4 | Corrox paint | M/s Jotun to RAL 7040 |

DETAILS OF ALTERNATE PAINT SCHEMES

1. Large number of new paint schemes has been introduced through this Navy order. The paint schemes have been designed/ selected considering their long service, life and applicability on new construction ships. For ships in service, the changeover to paint schemes in accordance with this Navy Order is recommended to be undertaken at the earliest opportunity. However, cases where the change over may not be feasible immediately due to surface preparation requirements it is recommended that existing schemes may be continued till such time the changeover can be implemented.
2. Some of the likely areas where the difficulties in change over may be experienced along with their proposed alternate paint schemes are enumerated in succeeding paragraphs. However, all efforts should be made to change to the new schemes at the earliest possible opportunity. Any case of non conformity is required to be brought to the notice of Naval Head quarters.
3. *Para (a) for PSA-1- shipside, superstructure (Un galvanized steel).*
Prepare the surface as per method prescribed in Appendix 'B' and appendix 'C' as applicable and to be painted with following paint scheme:
Dark Grey:
 - a) Three coats of DS Cat No. 8010-000458 red lead graphite primer.
 - b) One coat of DS Cat No. 8010-000122 dark grey exterior under coat paint.
 - c) One coat of DS Cat No.8010-000213 dark Grey exterior fire retardant finishing paint.
4. *PSD-5: Decks and Dadoes in Wet compartments:* Steel Decks and dadoes in wet compartments are to be abrasive blasted and painted with the following paint schemes:
 - a) One coat of pretreatment primer made from DS Cat No. 8010-000116 (base) and DS Cat No. 8010-117 (accelerator) conforming to DEF STAN 80-15.
 - b) Within 4hrs apply one coat of Chlorinated rubber paint white primer DS Cat No. 8010-000460.
 - c) Two coats of chlorinated rubber paint white DS Cat No. 8010.000431.
5. *PSD-6: Decks of Oxygen producing and charging rooms and stores.*

The decks and lower parts of bulkheads to a height of 600mm are to be given two coats of cement wash. The cement wash is to be prepared by making 1 part Portland cement to 3 parts of fresh water by volume.
6. *PSF-2: Steel bilges (Not Metal Sprayed)*
 - a) Steel surfaces to be abrasive blasted or thoroughly cleaned to bare metal by chipping, scraping, wire brushing and power abrasive discing followed by degreasing as per Para 8 of appendix 'B' to this Navy Order.
 - b) Three coats of coal tar epoxy paint DS Cat No. 8010-000618 to give a total dry film thickness of minimum 225 microns.

- c) One coat of Aluminium bitumen paint DS Cat No. 8010-000632.
 - d) The interval between applications of each coat of paint is not to be less than 24 hrs.
7. *PSH-1: Fresh water tanks:* After surface preparation as Para (i) above apply three coats of cold bituminous composition DS Cat No. 8010-000992.
8. *PSH-2: Heeling, Trimming, Ballast and Drains Tanks Air spaces and Cofferdams* (Steel ungalvanized) to be painted with following scheme.
- a) To be vacuum blasted to Sa 2 ½ standard.
 - b) Apply one coat of Pretreatment primer to DEF STAN 80-15.
 - c) Thereafter apply minimum three successive coats of coal tar epoxy anti corrosive paint alternate coats of DS Cat No. 8010-000618 black and DS Cat No. 8010-000617 brown to achieve a minimum dry film thickness of 225 microns.

ADVANCED PAINT SCHEMES UNDER EVALUATION AT NHQ

1. Rapid advancements in the field of paint technology have been made and many state of the art paints have been introduced in the commercial market. In addition, to meet specific paint requirements for Indian Navy, development of new paints is also being undertaken through defence laboratories.
2. To keep abreast with the latest development in the field of painting, DNA has validated new state of the art paint schemes by applying them on ships on trial basis and monitoring their performance over a prolonged period. On successful completion of trials, the schemes will be progressively introduced in to Navy through policy letters. Some of such paints under advanced stages of extended trials are enumerated in succeeding paragraphs.
3. *Tin Free SPC A/F paints*
 - a) M/s Jotun paint applied on T-58 in May 2000. Evaluated in Dec 2001- Reports satisfactory.
 - b) M/s Kansai paints on TRVA-72 in May 01.
 - c) M/s Sigma paint on Vibhuti in Jun02.
 - d) M/s Akzi Nobel – Meen in Mar 02.
 - e) M/s Hempel-Negotiations are on for trial on NC-NC basis.
4. *Bio-Cide free A/F paints.*
 - a) Offered by M/s Akzo Nobel on NC-NC basis.
 - b) NSTL understanding effectiveness of paint in reduction of drag.
 - c) XFAC will be nominated for trials as paint is considered suitable only for very fast moving high activity vessels.
5. *Glass Flakes paints*
 - a) *Corrocoat (kirloskar):* Applied on one rubber of INS Tarasa.
 - b) *Corrocoat (Kirloskar):*
 - i) Brahmaputra- Dec 99- under helo traversing rails.
 - ii) Kuthar – Dec 99-Cable lockers, grid well, spurn water.
6. *Polyurethane paints for weather works.*
 - a) Sigma coatings
 - b) Hempel.
 - c) Akzo Nobel
 - d) Jotun
7. *Surface Tolerant paint:* Trial application of surface tolerant paints offered by following firms have been undertaken in machinery and boiler room bilges.
 - a) M/s Jotun
 - b) M/s Sigma
 - c) M/s Hempel
 - e) M/s Akzo Nobel.

8. NMRL developed surface tolerant paint is being improved in its formulation and soon trials will be ordered.
9. *In tumescent paint (NMRL developed)*: The paint has been subjected to field trials and the paint performance is reported to be satisfactory. Studies are being done to evaluate feasibility of usage of this paint of onboard applications.
10. Glass Flake paint of sigma applied on FDN- I U/W hull. The paint is guaranteed for service life of 10 to 12 years.
11. NMRL developed modified silicon alkyd based paint to RAL 7040 for application on above water shipside and super structure.

**HIGH PERFORMANCE ADVANCED NON – SKID
COATNG SYSTEM FOR WEATHER DECKS**

Colour schemes: D.A Grey
Performance guarantee: 07 Years

| SI | Firm | Primer coat | No of coats DFT (um) | Anti corrosive intermediate coat | No of coats DF T (um) | Non-skid top coat | No of coats DFT (um) | Total |
|-----|-------|-----------------|-----------------------|----------------------------------|------------------------|--------------------------------|------------------------|-------|
| (a) | Akzo | Intergard 269 | 1X50 | Inter shield 300 | 1X200 | Intershield 85 2 | 1X800 | 1050 |
| (b) | Jotun | Penguard Primer | 1X50 | Jotamastic 87 Aluminum | 1x200 | Jota Am our | 1X800 | 1050 |
| (c) | Sigma | Sigma cover 280 | 1X50 | Sigmarite Flight Deck Primer | 1X200 | Sigmarite Flight Deck Co ating | 1X800 | 1050 |

**HIGH PERFORMANCE ADVANCED HYBRID
COATNG SYSTEM FOR ABOVE WATER SHIPSIDE & SUPERSTRUCTURE**

Colour scheme: Light grey (RAL 7040)
Performance guarantee: 06 years for anticorrosive system, 03 years for polyurethane

| Sl | Firm | Primer coat | No of coats DFT (um) | Anti corrosive | No of coats DFT (um) | Non – skid top coat | No of coats DFT (um) | Total |
|-----|-------|------------------------|----------------------|-------------------------|----------------------|-----------------------|----------------------|-------|
| (a) | Akzo | Intergard 269 | 1X50 | Intertuf 262 | 2X125 | Interthane 990 | 1X60 | 360 |
| (b) | Jotun | Penguard Primer* | 1X50 | Primastic ** (red/grey) | 2X125 | Hardtop AS | 1X60 | 360 |
| (c) | Sigma | Sigma cover 280 (7417) | 1X50 | Sigma cover 630 (7430) | 2X125 | Sigmadur Gloss (7528) | 1X60 | 360 |

* PenguardHB 1 X100 Micrones for aluminum substrates

** PenguardHB 1 X100 Micrones intermediate coat for aluminum substrates

EXTERNAL UNDER WATER AREA

LONG LIFE PAINT SCHEME FOR IN SHIPS

| <u>COAT</u> | <u>SIGMA</u> | <u>AKZO NOBEL</u> | <u>JOTUN</u> | <u>DFT# (Microns)</u> | <u>PATTERN NUMBER</u> |
|--|--|-----------------------------|---|----------------------------------|----------------------------------|
| Primer | Universal Primer | Intergard 269 | Epoxy Holding Primer | 50** | N8010-P009678 |
| Anti Corrosive | Sigma Multimastic (Aluminium) | Intershield 300 (Aluminium) | Jotacote Universal (Aluminium) | 150 | N8010-P061977 |
| Anti Corrosive | Sigma Multimastic (Grey) | Intershield 300 (Bronze) | Jotacote Universal (Grey) | 150 | N8010-P061944 |
| Tie coat | Sigma Hullrite | Intergard 263 | Safe Guard ES | 125 | N8010-P009601 |
| Anti fouling | Sigma Alphagen 50 (Brown/Light Red) | Intersmooth 360 (Brown) | Seaquantum Ultra (Brown / Light Red) | 150 | N8010-P009602 |
| Anti fouling | Sigma Alphagen 50 (Red Brown / Dark Red) | Intersmooth 360 (Dark Red) | Seaquantum Ultra (Red Brown / Dark Red) | 150 | N8010-P009603 |
| Anti fouling | Sigma Alphagen 50 (Brown/Light Red) | Intersmooth 360 (Brown) | Seaquantum Ultra (Brown / Light Red) | 150 | N8010-P009602 |
| Anti fouling black (bottom) | Sigma Alphagen 50 | Intersmooth 360 | Seaforce 90 | 150 | N8010-P009604 |
| 1) Recommended thinners for above coatings may be sourced from OEMs # DFT - Dry Film Thickness in microns. **DFT for M/s Jotun Epoxy holding primer-- 30 microns | | | | | |

INTERNAL AREAS (M/C COMPTS/ BILGES)

LONG LIFE PAINT SCHEME FOR IN SHIPS

| <u>COAT</u> | <u>SIGMA</u> | <u>AKZO NOBEL</u> | <u>JOTUN</u> | <u>DFT#</u> (Mi cr on s) | <u>PATTERN NUMBER</u> |
|-------------------------------|-------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|---------------------------|
| Primer | Universal Primer | Intergard 269 | Epoxy Holding Primer | 50** | N8010- P009678 |
| Anti Co rro siv e | Sigma Multimastic (Aluminium) | Intershield 300 (Alumini um) | Jotacote Universal (Aluminium) | 1X150 | N8010- P061977 |
| Anti Co rro siv e | Sigma Multimastic (Grey) | Intershield 300 (Bronze) | Jotacote Universal (Grey) | 1X150 | N8010- P061944 |
| Top coat | | | Penguard Topcoat | 50 | N8010- TB00417 |

INTERNAL AREAS (BALLAST TANKS)

| <u>COAT</u> | <u>SIGMA</u> | <u>AKZO NOBEL</u> | <u>JOTUN</u> | <u>DFT#</u> (Mi cr on s) | <u>PATTERN NUMB ER</u> |
|--|---------------------|----------------------|-------------------------|--------------------------------------|--------------------------------|
| Primer | Universal Primer | Intergard 269 | Epoxy Holding Primer | 50** | N8010- P00967 8 |
| Anti Co rro siv e | Sigmaguard BT | Intershield 300## | BalloxyHB Light | 2x150 | N8010- P00967 9 |
| 1) Recommended thinners for above coatings may be sourced from OEMs # DFT - Dry Film Thickness in microns. ** DFT for M/s Jotun Epoxy holding primer-- 30 microns ## Refer Appendix 'D' for Pattern numbers | | | | | |

(a) Fresh water tanks.

- (i) Mechanical chipping /Abrasive blasting to achieve SA 2.5
- (ii) Application of 02 coats of SFAC EP1 paint to achieve DFT of (350 – 400)#

EQUIPMENT, STORE AND SERVICING SURVEY OF ANCHORS AND CHAIN CABLE
NO 12/01 (NC/1901)

Scope

1. This Navy Order lays down, for the guidance of Ships, Dockyards and Administrative Authorities, instructions regarding general maintenance, survey and test of anchors, chain cables and associated accessories and equipment fitted on board 'IN ships.

Anchors

2. The survey procedures for anchors are as follows:-
 - a) The arms of all anchors are to be moved and lubricated at least once a month.
 - b) All anchors, which have not been tested at the time of issue or which have undergone extensive repairs, are to be tested in accordance with the load test requirement as per NES 174.
 - c) Anchors should be examined for survey as follows:-
 - i) Clean off all paint and rust using mechanical chipping, and wire brush tools.
 - ii) Dismantle all parts of the anchor.
Suitably suspend all cast steel components and thoroughly hammer test to detect any flaws and / or cracks.
 - iii) Inspect arms and shanks for cracks, excessive wear and damage, paying particular attention to possible enlargement of the stock hole.
 - iv) Survey the anchor ring in accordance with Para 5 and wear limits as per Para 3(e) below.
 - v) Check for free movement of anchor ring within the stock hole.
Grease/lubricate stock hole and anchor ring.
 - vi) Clean and grease all moving parts of the anchor before reassembly.

Chain Cables

3. Survey procedure for chain cables are as follows:-
 - a) All chain cables are to be surveyed during all scheduled refits.
 - b) For survey of chain cable the cable locker must first be cleared and the cable ranged on the dockside or jetty, clear of the crane tracks. Laying of anchor and ranging of chain cable on the dock floor, is not recommended for reasons of poor environment during cleaning of the cable and obstruction for Dockyard work. This opportunity should be availed by the ships staff to clean and paint the cable locker compartment.
 - c) The senior officer ordering the survey is to arrange for an experienced blacksmith from the Naval Dockyard to assist the surveying officer.
 - d) The chain cable and the associated gear are to be examined by ship's officer. Before re-testing all repairs, other than stud-tightening, are carried out by the refitting authority.
 - e) The chain cable should be examined for survey as follows:-
 - (i) Clean of all paint and rust using mechanical chipping, scrapping and wire brush tools.
 - (ii) Hammer test every link and stud to detect possible flaws or loose studs.
 - (iii) Caulk or renew loose stud. If it is extremely loose the stud. Can be welded to the link using 5mm tack weld on each face and at each end, a proof test

is not required following this repair. A maximum of 7 weld repaired links on half cable and 15 weld repaired links on full cables are permitted.

- (iv) Examine each link for distortion.
 - (v) Examine each link for cracks, bent links and signs of wear, particularly at bearing surfaces.
 - (vi) If the limits of wear exceeds above the following limits, the chain cables are deemed unsuitable for service (these wear limits are applicable to all fittings) :-
 - (aa) 70 mm dia cable & above: loss in dia in any link is above 12.5% of its original dia.
 - (ab) Below 70 mm dia cable: loss in dia in any link is above 10% of its original dia.
 - (ac) However where the defective link are at the ends, the same may be removed by cutting. Where chain cable length is reduced below half shackle, the chain cable is to be condemned.
 - (vii) Prior to restoring, the entire chain cable should be recoated with bituminous paint.
- f) Chain cable or fitting are to be subjected to load test only when any serious damage is observed or major repairs are undertaken on them. On such occasions, forged chain cables and accessories are to be tested to three quarters of appropriate proof load, and chain cables and accessories of Aluminium Bronze are to be tested to full proof load. However, load test values for cast steel chain cables of Russian origin are different and are placed at Appendix to this Navy Order. Where certain links are removed from ends due to were beyond specified limits, no requirement to load test the remaining serviceable chain 'cable exists.
- g) The chain cable and the associated gear are to be carefully examined after testing, if undertaken and all necessary stud tightening is to be carried out.

NOTE: Forged steel chain cable is not to be heat treated.

CHAIN CABLE ACCESSORIES

4. Lugless Joint Shackle

- (a) Dismantling use a top swage of correct size to part Lugless- Joint Shackle from a chain. The swage directs the blow to the correct part of the shackle and avoids damaging the machined surface.
- (b) Survey is to be undertaking as follows:-
 - (i) Clean the dovetail chamber of each shackle.
 - (ii) Hammer test all three components part of shackle to detect possible Flaw and defect.
 - (iii) Examination each part of the shackle for crack distortion, poor fit and wear that could lead to failure. Particular attention must be made to bearing surfaces, as it is where the most wear will occur.
 - (iv) Examine pin and renew if bent, broken, badly corroded or end of paint project through shackle body when assembled.
 - (v) Clean and grease machined surface before assembly.
 - (vi) Fit new pins to joining shackle if old pin is broken.
 - (vii) Ensure that end of pin does not project through shackle after reassembling.

- (viii) After reassembling the joining shackle in a chain, hammer a lead pellet into the dovetail chamber broad end first.
5. Anchor Shackle and Lugged joining shackles, Securing to Buoy Shackles.
- (a) Dismantling .Dismantle the shackle by removing lead pellet and tapered pin.
- (b) Survey is to be undertaken as follows:
- (i) Hammer test the shackle and shackle bolt.
 - (ii) Visually examine shackle and bolt for cracks, distortion and defects.
 - (iii) Examination the shackle bolt paying particular attention to middle of bolt. Renew bolt o\if it if bent, badly corroded or wear is excessive
 - (iv) Examine the tapered pin and renew if bend, broken badly corroded or projects beyond the shackle body.
 - (v) Grease shackle bolt before assembling.
 - (vi) A new lead pellet must be hammered; broad end first, after assembling and tapered pin is inserted.
 - (vii) In the case of securing to buoy shackle additionally in examine the bolt keep chain for security to the shackle body and bolt head. If any link is broken, elongated or badly corroded, chain must be repaired and replaced. The length of the chain should be such that it prevents total withdrawal of shackle pin.
6. Joggle shackles
- (a) Dismantling. Remove shackle by turning bolt so that protruding feather are in line feather way in the shackle body.
- (b) Survey id to be undertaken as follows:-
- (i) Hammer test shackle body and bolt.
 - (ii) Visually examine bolt for distortion, cracks corrosion straightness and wear.
 - (iii) Examine bolt feathers for burrs.
 - (iv) Examine shackle body for wear.
- (v) Examine shackle feather ways for burrs and obstruction that could restrict shackle
- Bolt insertion/withdrawal*
- (vi) Grease shackle bolt and shackle body feather ways before assembling bolt to shackle.
7. Stopper Assembles (Blake and Screw Stopper)
- (a) Dismantling. Remove the joining shackle and open up the pelican hook.
- (b) Survey is to be undertaken as follows:-
- (i) Hammer test all parts of the stopper assembly, including each chain cable link and the pelican hook.
 - (ii) Visually examine all part of the stopper assembly for cracks and distortion.
 - (iii) Check the chain links for wear.
 - (iv) Check the joint shackle as per Para 5 above.
 - (v) Check pelican hook for ease of operation and examine for corrosion, particularly in stress areas. If hook is difficult to open and close, it must be made workable by cleaning, greasing and freeing the link.
 - (vi) Examine buckle link for operation, ease of movement and ability to secure the pelican hook if the buckles link is difficult to operate, it must be made workable by cleaning and greasing the pin.

- (vii) Examine keep chain for corrosion and security to retaining pin and buckles link. If any keep chain link are badly corroded, broken or the chain missing it must be repaired/renewed.
 - (viii) Unscrew bottle screw to its fullest extent and thoroughly clean and grease threads before assembly.
- (c) Visually examine each link for cracks or wear.
 - (d) Check conditions of grease nipples on swivels; missing or broken nipple must be replaced.
 - (e) Fill cups of swivels with grease and check for ease of operation.
9. Adapter Piece. The survey procedure for adapter piece is as follows:-
- (a) Hammer test all the links.
 - (b) Visually examine the links for cracks or wear.
 - (c) If wear is above the specified limits, the adapter piece is to be declared unserviceable.
10. Eye Plates. Eye plates associated with anchoring arrangement are to be surveyed as follows:-
- (a) Examine for general wear and deterioration.
 - (b) Check for ovality of the hole which must not be more than 10%.
11. Towing Hawser, Steel wire ropes and associated equipment:
- (a) All towing hawsers, steel ropes and sling used for towing operation, are also to be visually examined and surveyed + along with survey of chain cables.
 - (b) Associated slip, stoppers and shackles are to be surveyed as per procedure Specified in the preceding paragraphs
12. Survey/Test Report
- (a) A report of the survey /test is to be rendered in quadruplicate on form IN 305/NSO 269 (b) and distributed as under:-
 - (i) Original: NauSenaMukhyalaya (DNA)
 - (ii) Second copy administrative Authority
 - (iii) Third Copy: Refitting authority
 - (iv) Fourth Copy: Ship Book
 - (b) Ship is to forward a copy of the last survey report to the respective dockyard along with the details of the defects observed during the periodic inspection/routine maintenance.
 - (c) As indication and procurement of new cables normally taken considerable period of time. When chain cable or fittings are worn beyond 85% of the permissible wear, Ship Staff is required to intimate Administrative authority and material organisation to enable commence action on replenishment of stores .Refitting Authority is to endorse suitable remarks on IN 305.

Acceptance Criteria

13. Material organization are to supply anchor, chain cable and accessories to ship along with the certificates of Load test carried out at the time of initial acceptance after manufacture. A copy of the certificate is to be retained by the storehouse for future reference. where the load test certificates are not available, Ship Staff is required to get the chain cable and fitting load tested through refitting Authority

prior to usage onboard. This Certificate must be presented to the refitting Authority at every survey.

Storage at Storehouses

14. Chain cable and accessories are required to be as far as possible in covered shed. Quarterly inspection to check the efficacy of anti- corrosive coating and early observance of onset of corrosion are to be carried out. Necessary action if required, for preservation is to be taken ,first in first out (FIFO) policy of issue of the stores are to be done to prevent undue long storage period. Where the chain cable or accessories are issued later than three years after procurement, a survey is mandatory prior onboard use.

(NO 57/84 is cancelled)

APPENDIX 'A'

[Refers to Para 3(f) of NO 12/2001]

TESTING OF ANCHOR CABLES OF CAST STEEL

| Chain Diameter (MM) | Test Load for Steel (Tone) |
|----------------------------|-----------------------------------|
| 34 | 45.8 |
| 37 | 54.2 |
| 40 | 63.4 |
| 43 | 73.4 |
| 46 | 84.0 |
| 49 | 95.2 |
| 53 | 111.1 |
| 57 | 129.1 |
| 62 | 152.6 |
| 67 | 173.6 |

STANDARD CONDITIONS OF CONTRACT FOR FUEL BARGE PUSHPA

TABLE OF CONTENTS

| ARTICLE NO. | DESCRIPTION |
|--------------------|--|
| ARTICLE 1 | DEFINITION AND ABBREVIATION |
| ARTICLE 2 | EFFECTIVE DATE AND OPERATION OF CONTRACT |
| ARTICLE 3 | SCOPE OF CONTRACT |
| ARTICLE 4 | CONTRACT PRICE AND TERMS OF PAYMENT |
| ARTICLE 5 | TAXES AND DUTIES |
| ARTICLE 6 | ADVANCE BANK GUARANTEE |
| ARTICLE 7 | PERFORMANCE BOND/ INDEMNITY BOND |
| ARTICLE 8 | DURATION AND DELIVERY |
| ARTICLE 9 | LIQUIDATED DAMAGES |
| ARTICLE 10 | RISK AND EXPENSE CLAUSE |
| ARTICLE 11 | QUALITY AND INSPECTION |
| ARTICLE 12 | WARRANTY & WARRANTY BOND |
| ARTICLE 13 | GENERAL TERMS AND CONDITIONS |
| ARTICLE 14 | INDEMNITY & INSURANCE |
| ARTICLE 15 | SECURITY |
| ARTICLE 16 | FORCE MAJEURE |
| ARTICLE 17 | TERMINATION OF CONTRACT |
| ARTICLE 18 | LAW |
| ARTICLE 19 | ARBITRATION |
| ARTICLE 20 | PENALTY FOR USE OF UNDUE INFLUENCE |
| ARTICLE 21 | AGENTS/AGENCY COMMISSION |
| ARTICLE 22 | NON DISCLOSURE OF CONTRACT DOCUMENTS |
| ARTICLE 23 | NOTICES |
| ARTICLE 24 | AMENDMENTS |
| ARTICLE 25 | NOTICES & COMMUNICATIONS |
| ARTICLE 26 | INTERPRETATION |
| ARTICLE 27 | SIGNATURE AND WITNESSING BY PARTIES |

ANNEXURES

| ANNEX No. | DESCRIPTION |
|-----------|---|
| 1 | FORMAT OF CERTIFICATE OF ACCEPTANCE |
| 2 | SCOPE OF WORK (DEFECT LIST WITH ITEMISED COST) |
| 3 | FORMAT OF PROMULGATING CHANGE IN SCOPE OF WORK |
| 4 | FORMAT OF WORK COMPLETION CERTIFICATE (to be filled up whenever bills are raised in accordance with terms of payment) |

Contract No. **NSRY(PBR)/COM/112(C)2(b)/SR/CID-986 /19-20**

Date: 2019

PREAMBLE

This Contract is made and entered into at Port Blair, on this ____ day of the month _____ in the year Two Thousand _____.

BETWEEN

The President of India represented by the Commodore Superintendent of NSRY (PBR) [Contract Operating Authority (COA)] (hereinafter referred to as the **CUSTOMER**), which terms, unless excluded by the context, shall be deemed to include his successor or successors and permitted assignees, **ON THE FIRST PART**

AND

M/s....., A & N Islands – 744102. Hereinafter referred to as the **CONTRACTOR**, which expression shall include their Administrator, Executors, Successors and Assignees, **ON THE SECOND PART**

And whereas the CUSTOMER agrees to deliver /permit NT UDUPI to the CONTRACTOR for undertaking SR and to take delivery of NT UDUPI from the CONTRACTOR after successful completion of SR.

The **CUSTOMER** and the **CONTRACTOR** being hereinafter referred to as **“Party”** or **“Parties”**.

It is now agreed by and between both the parties hereto as follows:

ARTICLE 1: DEFINITIONS AND ABBREVIATIONS

1.1 DEFINITIONS

The following words and expressions in this Contract including its Annexes shall have the meanings as hereinafter defined unless the context requires otherwise:-

Actuals: The term Actuals, related to payment, shall mean all expenses, inclusive of those incurred towards associated cost elements such as all taxes, duties & levies, freight, insurance and clearance charges incurred by the CONTRACTOR and computed at the prevailing exchange rate wherever applicable, at the time of release of payments by the CONTRACTOR to the OEMs. Additionally handling and / or service charges and remuneration payable to the CONTRACTOR (not exceeding 7.5% of the basic cost exclusive of taxes, duties, and freight, Insurance and clearance charges) shall be applicable on such Actual expenses as per the terms of this Contract.

Article: Any Article of this Contract or partial Article with separate marginal number as referred to anywhere in the wording of this Contract and / or its Annexes.

Certificate of Acceptance: The Certificate to be signed jointly by the representatives of the CONTRACTOR and the CUSTOMER on the Date of Delivery of Acceptance the Ship as set out in Article 8.1.1 and Annex 1 of this Contract.

Contract: Shall mean this Contract including its Preamble, Articles 1 to 27 and Annexes 1 to 5 herein, and all amendments, changes, alterations and modifications made to this Contract.

Material: The term Material shall mean all equipment, fittings, finished /semi finished products, spares, consumables, Yard material, items, sub-assemblies/assemblies, documentation etc. required for the removal, repair & refurbishment, refit/installation and testing of any part of the work being undertaken by the CONTRACTOR (and/or by his Subcontractors on his behalf) as per scope of his work defined in this Contract, up to completion of the guarantee period and liquidation of his outstanding liabilities.

COA: Agency assigned by the Competent Financial Authority on behalf of the President of India to conclude the contract and operate in accordance with Article 2.1

Month: Any calendar month, as defined in the Gregorian Calendar, or any period of 30 consecutive Days.

Year: Year starting from the 1st January and ending on 31st December or any period of 12 consecutive Months, as the case Jun be.

'Overhaul': As contained in the DL serials, the term 'overhaul' would deem to include removal, dismantling, renewal/repairs, fitment, trials and commissioning. The "Overhaul" indicates comprehensive repairs of all defects existing in the system including replacement of components, fitting back the equipment and proving of system thereafter. The definition of overhaul of a motor includes the following:-

- (a) Dismantle the motor.
- (b) Undertake trueness checks of rotor on the lathe. Repair observed defects.
- (c) Check for ovality in bearing housing. Repair observed defects.
- (d) Clean the rotor and stator thoroughly with alcohol, air, varnish and bake. There should be not dust particles or other foreign particles observed after cleaning.
- (e) Measure the insulation of windings of rotor and stator. In case insulation is below one mega ohm rewind the rotor / stator.
- (f) Assemble the motor with new bearings.
- (g) In case of repairs to shaft trueness or renewal of winding.
- (h) Undertake dynamic balancing of the rotor.
- (j) Check and rectify phase imbalance in insulation of windings.
- (k) Undertake test bed trials and confirm no load starting and running currents, speed, SPM readings apart from other standard checks **1.2**

ABBREVIATIONS: The following words and abbreviations in this Contract including its Annexes shall have the meanings as hereinafter defined unless the context requires otherwise:-

| | | |
|--------------|---|---------------------------------------|
| B & D Spares | : | Base & Depot Spares. |
| DCD | : | Dockyard Completion Date |
| FAT | : | Factory Acceptance Trials |
| HAT | : | Harbour Acceptance Trials |
| SAT | : | Sea Acceptance Trials |
| MoD | : | Ministry of Defence |
| OBS | : | On Board Spares |
| PAC | : | Proprietary Article Certificate |
| OEM | : | Original Equipment Manufacturer/ Firm |
| accorded | : | PAC |
| TEC | : | Technical Evaluation Committee |
| CNC | : | Contract Negotiation Committee |
| R & R | : | Remove and Refit |

| | | |
|-----------|---|---------------------------------------|
| STW | : | Setting To Work |
| COA | : | Contract Operating Authority |
| ABER | : | Anticipated Beyond Economical Repairs |
| A's & A's | : | Additions and Alterations |
| QAP | : | Quality Assurance Plan |

77

ARTICLE 2 - EFFECTIVE DATE AND OPERATION OF CONTRACT

2.1 It is hereby agreed and declared that the powers and functions of the CUSTOMER under this Contract shall be exercised by The Commodore Superintendent, Naval Ship Repair Yard, Port Blair-744102.

2.2 The Effective Date of Contract is _____ (The date of signing of Contract or the date of handing over the vessel/asset or as the case Jun be). The Contract commences from the Effective Date of Contract.

ARTICLE 3 -SCOPE OF CONTRACT

3.1 Work & Services Contracts.

3.1.1 It is expressly understood and agreed between the CUSTOMER and the CONTRACTOR that this is a repair, refit and services Contract.

3.2 Scope of Work.

3.2.1 The FUEL BARGE PUSHPAis to be completed in accordance with the terms, conditions and provisions of this Contract, as detailed in the following Articles.

3.2.2 The Scope of Work with itemised cost is placed **Enclosure 1 in Excel Sheet of this Contract.**

3.3 Removal and Refitting of Items

3.3.1 In the event of the requirement to remove the existing machinery equipments, switch-boards / control panels, electronic & communication equipments, light fittings, piping, trunking, valves, electrical cables, junction boxes, lagging, panelling, obstructions, protrusions, foundations, etc. falling in the way of repairs, **temporarily to facilitate completion of Scope of Work**, the CONTRACTOR shall reinstall the same as per drawings, amendments thereto and to the satisfaction of the CUSTOMER. All work associated with this Article forms an integral part of Scope of Work specified in Article 3.2.

3.3.2 Electrical cables in way of repairs, if required, are to be covered adequately for protection against accidental mechanical / fire damage, by the CONTRACTOR. Damages caused during the execution of the work by the CONTRACTOR or his Sub Contractors are to be made good by the CONTRACTOR at his cost.

3.3.3 All pipe lines, machinery, equipment and fittings which are not required to be taken out of the Ship are to be properly covered / secured to ensure they are not damaged during the course of the refit. Damages caused during the execution of the work by the CONTRACTOR or his Sub Contractors are to be made good by the CONTRACTOR at his cost.

3.4 Changes in Scope of Work

3.4.1 Notwithstanding the scope of work specified in Article 3.2 and 3.3.1, the CUSTOMER shall have the right to modify the Scope of Work during the execution of the Contract. The necessity for repairs/ renewals/replacements other than those presently included in the Scope of Work Jun arise during the inspection/survey/repair. **All such work as also consequential work (rework) required to be done by the CONTRACTOR along with work arising out of items/drawings supplied by the CUSTOMER shall be treated as Scope of Work.**

3.4.2 Such changes in the scope of work and the cost and time implications thereof shall be mutually agreed upon on priority, in writing, before undertaking such changes in the scope of work. The resultant increase in cost as well as any extension in project duration will be intimated by the CONTRACTOR and shall be agreed and accepted by the CUSTOMER through mutual negotiations prior to undertaking such changes in Scope of Work. Format for promulgating of Change in Scope of Work is placed at **ANNEX –3** of this Contract.

3.4.3 In case promulgation of such change in Scope of Work affects the Initial Scope of Work as per Article 3.2 and 3.3 and/or additional Scope of Work as per article 3.4.1, the cost and time implications due to such changes, shall also be taken in to consideration by both the Parties, while promulgating the change in Scope of work in accordance with Article 3.3.

3.5 Procurement of Material by the CONTRACTOR

3.5.1 A list of items procured, indicating landed cost which includes cost of materials, freight, insurance, packing/forwarding taxes, duties, clearing charges etc. together with handling charge not exceeding 7.5% (Seven point Five percent) will be furnished along with the bill raised by the CONTRACTOR on the basis of Third Party Invoice.

3.5.2 All material and items procured by the CONTRACTOR for Scope of Work, except where specifically indicated that such items are CUSTOMER supplied, are to conform to the relevant approved and applicable specification (in accordance with Article 10).

3.6 Return of Unused Materiel. All Ferrous scrap arising out of repairs shall be the property of CONTRACTOR. However, non-ferrous scraps/equipments shall be the property of the CUSTOMER.

3.7 Sub-Contracting.

3.7.1 The CONTRACTOR Jun subcontract any part of Scope of Work on mutual agreement with the CUSTOMER. The CONTRACTOR can under no circumstance sub-contract the complete Scope of Work to a Third Party.

3.7.2 The CONTRACTOR would be entirely responsible for quality / standard and timely execution of the sub-contracted work. The CONTRACTOR is to draw up a suitable Quality Assurance (QA) Plan with the Sub- Contractor and a copy of the same along with Record of Inspection in accordance with such QA Plan shall be submitted to the CUSTOMER.

3.7.3 The supervision of work for the sub-contracted jobs is to be done by the CONTRACTOR. The CONTRACTOR is not permitted to seek any extension of Completion Date citing delay on the part of Sub- Contractors or re-work arising out of Sub-Contracted work.

3.8 Employment of Service Personnel.

The CONTRACTOR shall not employ any service personnel of the NSRY (Pbr) (Repair Agency/Service) or on his own take any assistance either directly or indirectly from any of the workshops / facilities of the NSRY (Pbr) (Repair Agency/Service) in the form of men or material for Scope of Work.

ARTICLE 4 - CONTRACT PRICE AND TERMS OF PAYMENT

4.1 CONTRACT PRICE

4.1.1 This is a Fixed Price**GST** shall be paid at actuals on submission of proof of payment. A detailed breakdown of the Contract price, **including applicable taxes and duties** (calculated as per the existing rate) is placed at **ANNEX – 4** of this Contract.

4.1.2 Notwithstanding the provisions contained in Article 4.1.1, the price is subject to revision upon mutual agreement, as and when scope of work is changed as per Article 3.4, ERV, Changes in Tax Rate, etc.

4.2 CHANGE IN CONTRACT PRICE DUE TO PROCUREMENT OF ADDITIONAL/NA SPARES.

Notwithstanding the Contract Price specified in Article 4.1 and as amended vide Article 4.2, the CUSTOMER shall pay for any additional/NA Spares procured by the CONTRACTOR for Scope of Work based on mutual agreement. Payment shall be made under this Article on the bill raised by the CONTRACTOR on the basis of Third Party Invoice accompanied by list of items procured, indicating landed cost which includes cost of materials, freight, insurance, together with handling charge of not exceeding 7.5% (Seven point Five percent)]. The Contract Price specified in Article 4.1 and as amended vide Article 4.2, shall further stand amended to include payment towards such additional/NA Spares.

4.3 **PAYMENT TERMS.** The Payment Terms for the Contract Price specified in Article 4.1 shall be as follows: -

(a) Refit cost

| Stage No | Activity Definition | Stage Payment |
|------------------|--|----------------------|
| Stage I | Advance of basic contracted refit cost against bank guarantee / indemnity bond (in case of DPSUs) on placement of order/contract | 10% |
| Stage II | Basic contracted refit cost on docking (excluding taxes and Growth of Work) | 10% |
| Stage III | The basic contracted refit cost on final undocking and completion of all under water works | 20% |
| Stage IV | The basic contracted refit cost on satisfactory completion of Basin Trials and harbour trials of major machinery/ equipment (such as Main Propulsion Plant, Shafting and equipment related to Habitability). | 20% |
| Stage V | The basic contracted refit cost minus cost of all incomplete work on satisfactory completion of post refit Sea trials and departure of the ship from the shipyard. Cost of incomplete work will be withheld till completion of work. | 20% |
| Stage VI | Balance along with cost for Growth of Work and taxes on submission of final bill within sixty (60) days on Satisfactory completion of Refit. Shipyard to provide a bank guarantee equal to 10% of the final cost of refit/repair (indemnity bond in case of DPSUs), which should be valid till the completion of the guarantee/ warranty period. | 20% |

78

ARTICLE 5 - TAXES AND DUTIES

5.1.1 The Contract price indicated in Article 4.1 of this Contract is inclusive of all taxes, duties, levies of Central / State authorities, as applicable at prevailing rates under the extant Government policy for all Materials and services procured by the CONTRACTOR for the Scope of Work. Any increase on rates during the period of contract shall be paid extra at the time of invoicing. The same shall be

reimbursed by the CUSTOMER to the CONTRACTOR at actuals on submission of documentary proof of payment. The CUSTOMER reserves the right to deny any increase in taxes, duties, levies, etc. if the delivery period is extended beyond the period specified in Article 8.1.1.

5.1.2 Contract Operating Authority or his nominated representative shall issue appropriate tax exemption/concession certificate(s) on behalf of the CUSTOMER, to avail tax exemption/ concession, where applicable, as per existing Government policy, rules and regulations in force.

5.2 **“END USER” CERTIFICATE**. Contract Operating Authority or his nominated representative shall issue the appropriate “End User Certificate” on behalf of the CUSTOMER, for import of material and services, wherever required by the concerned manufacturer /supplier of equipment material and services / governmental agency.

79

ARTICLE 6 - ADVANCE BANK GUARANTEE

The Bidder will be required to furnish an Advance Bank Guarantee (Indemnity Bond in the case of DPSU) by way of Bank Guarantee through a public sector bank or a private sector bank authorized to conduct government business (ICICI Bank Ltd., Axis Bank Ltd or HDFC Bank Ltd.) for a sum equal to 100% of the advance payment within 30 days of receipt of the confirmed order. Advance Bank Guarantee should be valid up to 60 days beyond the date of work completion. The specimen of advance bank guarantee is enclosed as form DPM-16.

ARTICLE 7 - PERFORMANCE BOND

The Bidder will be required to furnish a Performance Guarantee by way of Bank Guarantee through a public sector bank or a private sector bank authorized to conduct government business (ICICI Bank Ltd., Axis Bank Ltd or HDFC Bank Ltd.) for a sum equal to 10% of the contract value within 30 days of receipt of the confirmed order. Performance Bank Guarantee should be valid up to 60 days beyond the date of warranty. The specimen of PBG is enclosed as form DPM-15

80

ARTICLE 8 - DURATION OF THE DELIVERY

8.1 Duration of Work

8.1.1 The CONTRACTOR shall complete his scope of work specified in Article 3.1 and 3.2 in 90 days (Including Dry Dock Period) (duration in months/days/date for completion of Scope of Work) from the Effective date specified in Article 2.2. Delivery by the CONTRACTOR shall be treated as complete on satisfactory HATs/SATs and upon signing of Delivery Acceptance Certificate (applicable in the case of complete Refit/Repairs of Ships/ Submarines only) OR Completion of Scope of Work and Trails (applicable in case of Refit/Repairs of Yard/Service Assets and partial Refits of Ships / Submarines).

8.1.2 The said duration of Refit specified in Article 8.1.1 Jun be extended on mutual agreement only, with the CUSTOMER shall accept the vessel/asset without imposition of any sort of Penalty / Reduction in Contract Price.

8.2 Incomplete Work

8.2.1 The CONTRACTOR and the CUSTOMER shall mutually agree on the quantum of incomplete and unsatisfactory work. Cost of such incomplete work shall be withheld, except where such incomplete work is not attributable to the CONTRACTOR. Payment thus withheld will be made on completion of such incomplete work, which should in any case be completed within 60 days. If such work is incomplete beyond the specified date, the same shall be deleted from Scope of Work specified in Article 3.2 with corresponding amendment to Contract Price specified in Article 4.1. The CUSTOMER reserves the right to levy LD as per Article 9 on such incomplete work.

8.2.2 The CONTRACTOR shall be paid for completion of work specified in Article 3.2.2 only on satisfactory completion and trials.

81

ARTICLE 9 - LIQUIDATED DAMAGES

9.1 The CONTRACTOR shall be liable to pay to the CUSTOMER Liquidated Damages (LD), and not by way of Penalty, a sum equivalent to 0.5% (zero point five percent) of the unfinished/undelivered/unfulfilled part of Contract for each week of delay beyond duration of Work specified in Article 8.1, subject to a maximum of 10% (Ten percent) of the Contract Price.

ARTICLE 10 -RISK AND EXPENSE

10.1 Risk & Expense clause –

10.1.1 Should the stores or any instalment thereof not be delivered within the time or times specified in the contract documents, or if defective delivery is made in respect of the stores or any instalment thereof, the Buyer shall after granting the Seller 45 days to cure the breach, be at liberty, without prejudice to the right to recover liquidated damages as a remedy for breach of contract, to declare the contract as cancelled either wholly or to the extent of such default.

10.1.2 Should the stores or any instalment thereof not perform in accordance with the specifications / parameters provided by the SELLER during the check proof tests to be done in the BUYER's country, the BUYER shall be at liberty, without prejudice to any other remedies for breach of contract, to cancel the contract wholly or to the extent of such default.

10.1.3 In case of a material breach that was not remedied within 45 days, the BUYER shall, having given the right of first refusal to the SELLER be at liberty to purchase, manufacture, or procure from any other source as he thinks fit, other stores of the same or similar description to make good:-

(a). Such default.

(b) In the event of the contract being wholly determined the balance of the stores remaining to be delivered there under.

10.1.4. Any excess of the purchase price, cost of manufacturer, or value of any stores procured from any other supplier as the case Jun be, over the contract price appropriate to such default or balance shall be recoverable from the SELLER. Such recoveries shall not exceed the value of the contract.”

82

ARTICLE 11 - QUALITY AND INSPECTION

11.1 Quality Assurance & Quality Control

11.1.1 In order to assure the quality of repair/refit and exercise effective control, the work executed by the CONTRACTOR will be in accordance with CUSTOMERS inspection schedule as applicable followed by preliminary, stage and final inspection. The repair work will be undertaken as per specified Standards and quality norms. Ensuring and maintaining quality will be the responsibility of the Shipyard. The repair work will be undertaken as per Navy's specifications/ standards and quality norms under the quality inspection/ control of a registered third party inspecting authority such as ABS, IRS, LRS etc. as per their approved rules for Naval vessel. The CUSTOMER'S nominated agency will have the right to inspect the work being undertaken at any stage to ensure compliance with specifications/standards and stop the work in case it is not found to meet requisite standard/quality. CONTRACTOR is to clearly indicate in house quality control facilities, stages of inspection and proposed quality assurance/ control plans while submitting technical bid.

11.1.2 The CONTRACTOR shall submit a Quality Assurance (QA) Plan as applicable to the scope of work for approval of the CUSTOMER. The approved QA plan will form the basis for inspection and acceptance of work executed by the CONTRACTOR under this contract.

11.2 Overseeing and Inspection

- 11.2.1 Necessary tests and inspections of the contracted job shall be carried out by COA/ or his nominated agency. The CONTRACTOR shall give reasonable notice to the above team reasonably in advance of the date and place of such tests / inspections. COA shall also carry out joint receipt inspection of the equipment and material procured by the CONTRACTOR / supplied by CUSTOMER. The CUSTOMER's representative shall, during the repairs / refits invariably attend such tests and inspections as per the QA Plan/Quality Inspection Schedule.
- 11.2.2 Any non-conformity discovered by CUSTOMER Representative and intimated in writing co-relating relevant documents where necessary, in Refit or material or workmanship shall be corrected by the CONTRACTOR at his cost, to the full satisfaction of Representative in accordance with the relevant drawings and specifications.
- 11.2.3 During the repairs / refit of the Ship, until the delivery thereof, the CUSTOMER's representatives shall be given free and ready access to the Ship/Submarine/Asset and to any other place where related work is being performed, or materials are being processed or stored, including the yards, workshops, stores and offices of the CONTRACTOR and premises of Subcontractors who are doing work or storing materials, in connection with the repairs / refit of the Ship/Submarine/Asset. Notwithstanding any provision in this Article or any other Article in this Contract, the responsibility for the repairs / refit as per the scope of work vide Article 3.2, 3.3 and 3.4 shall rest with the CONTRACTOR.

83

ARTICLE 12 - WARRANTY & WARRANTY BOND

12.1 Guarantee

- 12.1.1 The CONTRACTOR warrants that the repairs carried out under this Contract conform to specifications vide SOR.
- 12.1.2 The CONTRACTOR shall give Six months guarantee for workmanship and material defects for items repaired and 12 months guarantee for new installations under the contract from the Contract Completion Date. The guarantee clause will also be applicable to the items repaired by the OEMs / sub contractor of shipyard. Any defects noticed during this guarantee period due to defective / poor workmanship or sub-standard material shall be rectified free of cost.
- 12.1.3 If within the period of warranty, the repairs reported by the CUSTOMER to have failed to perform as per the specifications, the CONTRACTOR shall either replace or rectify the same free of charge, within reasonable time of notification of such defect received by the CONTRACTOR provided that the equipment are used and maintained by the CUSTOMER as per instructions contained in the Operating Manual. Record of the downtime would be maintained by user in logbook. Spares required for warranty repairs shall be provided free of cost by CONTRACTOR.
- 12.1.4 CONTRACTOR hereby warrants that necessary service and repair backup, during the warranty period of the repair, shall be provided by the CONTRACTOR at the CUSTOMER's premises.
- 12.2 Notice for Remedy / Rectification of Defects during Warranty Period shall be in writing and transmitted to each other by the fastest possible means.

84

ARTICLE 13 - GENERAL TERMS AND CONDITIONS

- 13.1 Safety of Men: The CONTRACTOR is to ensure adequate safeguards for personnel when employed on work where human risk of health/injury is involved. All personnel including supervisors employed for the work on the premises of the Yard will wear uniforms with Employee's name prominently printed on the front

and back side. All employees should be provided with personal protective clothing such a shoes, gloves, cap, and Junon etc.

13.2 First Aid: The CONTRACTOR is liable to provide immediate first aid/hospitalisation in case of accident/sudden illness to personnel.

13.3 Gas Free & Man Entry Certificates, Fire Sentries, Administrative Support to OEMs, Pumping-out Facilities & Removal of Debris/Waste Material shall be as per **SOR/Terms and Conditions of RFP.**

85

ARTICLE 14 - INDEMNITY & INSURANCE

14.1 **Indemnity.** The CONTRACTOR shall indemnify the CUSTOMER against all claims for death or injury caused to any person, whether workman or not, while engaged in any process connected with the CONTRACTOR's work or for dues of any kind whatsoever, and the CUSTOMER shall not be bound to defend any claim brought under the Workmen's Compensation Act, 1923 or Payment of Wages Act 1936, or any other statutory Act or Law in force from time to time and applicable to the said work unless the CONTRACTOR first deposit with the CUSTOMER a sum sufficient to cover any liability which CUSTOMER Jun have to incur in relation to such proceedings.

14.2 **Insurance.** The vessel shall not be insured during the repairs period as it is the property of Government of India and no Insurance Policy is taken for Warship/Government vessel. The items/work shall not be insured during the repair/refit period as it is the property of the Customer and no insurance policy is taken. The Contractor is liable to pay for any damage that Jun be caused to the state property on account of negligence by his staff.

86

ARTICLE 15 -SECURITY

15.1 The CONTRACTOR is bound by the Official Secrets Act 1923 and, in its connection any other statutory Act / Law / Amendment in force and the information given is to be treated as strictly confidential and is not to be disclosed to any person or persons not concerned therein. The CONTRACTOR shall be responsible to ensure that all persons employed by him in the execution of any work in connection with this Contract are fully aware of the provisions of the Official Secrets Act 1923 / Law / Amendment in force and have undertaken to comply with the same.

15.2 The CONTRACTOR shall also ensure secrecy of design, construction, equipment and documentation and shall carry out all or any instructions given by the CUSTOMER in this respect. Should the CUSTOMER desire to check up the security measures which have been provided, or will be adopted to achieve security, the CONTRACTOR shall produce necessary evidence to establish the same.

15.3 In giving any information to the Sub-Contractors, the CONTRACTOR shall furnish to the Sub-Contractors only such information as Jun be necessary for carrying out the respective work entrusted to them.

15.4 The security of the Ship, men and material in the CONTRACTOR's premises is the CONTRACTOR'S responsibility.

87

ARTICLE 16 - FORCE MAJEURE

16.1 The Force Majeure Clause will constitute the following:

- a. Neither party shall bear responsibility for the complete or partial nonperformance of any of its obligations (except for failure to pay any sum which has become due on account of receipt of goods under the provisions of the present contract), if the non-performance results from such Force Majeure circumstances as Flood, Fire, Earth Quake and other acts of God as well as War, Military operation, blockade, Acts or Actions of State Authorities or any other circumstances beyond the parties control that have arisen after the conclusion of the present contract.

- b. In such circumstances the time stipulated for the performance of an obligation under the present contract is extended correspondingly for the period of time of action of these circumstances and their consequences.
- c. The party for which it becomes impossible to meet obligations under this contract due to Force Majeure conditions, is to notify in written form the other party of the beginning and cessation of the above circumstances immediately, but in any case not later than 10 (Ten) days from the moment of their beginning.
- d. Certificate of a Chamber of Commerce (Commerce and Industry) or other competent authority or organization of the respective country shall be a sufficient proof of commencement and cessation of the above circumstances.
- e. If the impossibility of complete or partial performance of an obligation lasts for more than 6 (six) months, either party hereto reserves the right to terminate the contract totally or partially upon giving prior written notice of 30 (thirty) days to the other party of the intention to terminate without any liability other than reimbursement on the terms provided in the agreement for the goods received.

88

ARTICLE 17 - TERMINATION OF CONTRACT

Termination of the contract: The Buyer shall have the right to terminate this Contract in part or in full in any of the following cases:-

- (a) The delivery of the material is delayed for causes not attributable to Force Majeure for more than (05 months) after the scheduled date of delivery.
- (b) The Seller is declared bankrupt or becomes insolvent.
- (c) The delivery of material is delayed due to causes of Force Majeure by more than (06 months).
- (d) The Buyer has noticed that the Seller has utilised the services of any Indian/Foreign agent in getting this contract and paid any commission to such individual/company etc as per decision of the Arbitration Tribunal.

89

ARTICLE 18 – LAW

Law: The Supply Order shall be considered and made in accordance with the laws of the Republic of India. The Contract and Work Order shall be governed by and interpreted in accordance with the laws of the Republic of India.

90

ARTICLE 19 - ARBITRATION

All disputes or differences arising out of or in connection with the Contract shall be settled by bilateral discussions. Any dispute, disagreement or question arising out of or relating to the Contract or relating to construction or performance, which cannot be settled amicably, can be resolved through arbitration. The Arbitration is as per Form DPM-7 / DPM-9 enclosed with this RFP/ contract (Also available on MoD website).

ARTICLE 20 - PENALTY FOR USE OF UNDUE INFLUENCE:

Penalty for use of Undue influence: The Seller undertakes that he has not given, offered or promised to give, directly or indirectly, any gift, consideration, reward, commission, fees, brokerage or inducement to any person in service of the Buyer or otherwise in procuring the Supply Orders or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of the present Supply Order or any other Supply Order with the Government of India for showing or forbearing to show favour or disfavour to any person in relation to the present Supply Order or any other Supply Order with the Government of India. Any breach of the aforesaid undertaking by the Seller or any one employed by him or acting on his behalf (whether with or without the knowledge of the Seller) or the commission of any offence by the Seller or anyone employed by him or acting on his behalf, as defined in Chapter IX of the Indian Penal Code, 1860 or the Prevention of Corruption Act, 1986 or any other Act enacted for the prevention of corruption shall entitle the Buyer to cancel the Supply Order and all or any other Supply Orders with the Seller and recover from

the Seller the amount of any loss arising from such cancellation. A decision of the Buyer or his nominee to the effect that a breach of the undertaking had been committed shall be final and binding on the Seller. Giving or offering of any gift, bribe or inducement or any attempt at any such act on behalf of the Seller towards any officer/employee of the Buyer or to any other person in a position to influence any officer/employee of the Buyer for showing any favour in relation to this or any other Supply Order, shall render the Seller to such liability/ penalty as the Buyer Jun deem proper, including but not limited to termination of the Supply Order, imposition of penal damages, forfeiture of the Bank Guarantee and refund of the amounts paid by the Buyer.

ARTICLE 21 - AGENTS/ AGENCY COMMISSION

The Seller confirms and declares to the Buyer that the Seller is the original manufacturer of the stores/provider of the services referred to in this Contract and has not engaged any individual or firm, whether Indian or foreign whatsoever, to intercede, facilitate or in any way to recommend to the Government of India or any of its functionaries, whether officially or unofficially, to the award of the contract to the Seller; nor has any amount been paid, promised or intended to be paid to any such individual or firm in respect of any such intercession, facilitation or recommendation. The Seller agrees that if it is established at any time to the satisfaction of the Buyer that the present declaration is in any way incorrect or if at a later stage it is discovered by the Buyer that the Seller has engaged any such individual/firm, and paid or intended to pay any amount, gift, reward, fees, commission or consideration to such person, party, firm or institution, whether before or after the signing of this contract, the Seller will be liable to refund that amount to the Buyer. The Seller will also be debarred from entering into any supply Contract with the Government of India for a minimum period of five years. The Buyer will also have a right to consider cancellation of the Contract either wholly or in part, without any entitlement or compensation to the Seller who shall in such an event be liable to refund all payments made by the Buyer in terms of the Contract along with interest at the rate of 2% per annum above LIBOR rate. The Buyer will also have the right to recover any such amount from any contracts concluded earlier with the Government of India.

ARTICLE 22 - NON-DISCLOSURE OF CONTRACT DOCUMENTS

Except with the written consent of the Buyer/Seller, other party shall not disclose the contract or any provision specification, plan, design, pattern, sample or information thereof to any third party.

ARTICLE 23 - NOTICES

Any notice required or permitted by the contract shall be written in the English language and Jun be delivered personally or Jun be sent by FAX or registered pre-paid mail/airmail, addressed to the last known address of the party to whom it is sent.

ARTICLE 24 - AMENDMENTS

No provision of present Contract shall be changed or modified in any way (including this provision) either in whole or in part except by an instrument in writing made after the date of this Contract and signed on behalf of both the parties and which expressly states to amend the present Contract.

ARTICLE 25 - NOTICES & COMMUNICATIONS

25.1 **Address for notice /communication:** The legal addresses of the Parties for the purpose of Notice/Communication are as follows:-

(Legal Address of Customer)
The Commodore Superintendent
Naval Ship Repair Yard
Port Blair – 744102
Andaman & Nicobar Islands
Fax No : 03192-232692
Telephone : 03192-233608

(Legal Address of Contractor)
The Partner
M/s Campbell Engineering
Port Blair-744102
Andaman & Nicobar Islands

25.2 **Language.** Any and all notices and communication in connection with this Contract shall be in English language.

91

ARTICLE 26 - INTERPRETATION

26.1 This Contract shall be governed by the laws of Republic of India.

26.2 In the event of any conflict or discrepancy between the provisions of any Article to this Contract and any Annex thereof, the Article of this Contract shall prevail.

26.3 This Contract constitutes the entire agreement between the CUSTOMER and the CONTRACTOR

26.4 Any amendment to this Contract and its Annexes shall be in writing and signed by both Parties.

26.5 In the event of any conflict with respect to specification/drawing/existing practices, the order of precedence for acceptance would be as follows:-

- (a) THE CUSTOMER APPROVED DRAWING
- (b) SPECIFICATION VIDE SCHEDULE OF REQUIREMENTS
- (c) THE CUSTOMER’S DECISION

26.6 The failure of either Party to enforce any provision of this Contract shall not be considered as a waiver of such provision or the right of such Party hereafter to enforce the same.

ARTICLE 27 - SIGNATURE AND WITNESSING BY PARTIES

This Contract is signed on _____ day of the month of _____ in the Year_____, in Two (2) originals of the same wording, One (1) for the CUSTOMER and one (1) for the CONTRACTOR. The Annexes listed in Table of annexures and forming an integral part of this Contract are signed under same circumstances.

This has concurrence of IFA vide U O No._____ dated _____.

| | |
|--|---|
| FOR AND ON BEHALF OF | FOR AND ON BEHALF OF |
| M/s _____ THE CONTRACTOR | PRESIDENT OF INDIA THE CUSTOMER |
|)) PRESENTATIVE OF CONTRACTOR) ted _____ 20... |)) PRESENTATIVE OF CUSTOMER) ted _____ 20.... |
| the presence of | the presence of |

| | |
|-----------------------------|-----------------------------|
| me _____ signation | me _____ signation |
| me _____ signation _____ | me _____ signation _____ |

ANNEX 1

CERTIFICATE OF ACCEPTANCE

1. CERTIFIED THAT THE M/s _____, HAVE COMPLETED THE FUEL BARGE PUSHPA AS PER THE SCOPE OF WORK ASSIGNED TO THEM AND HANDED OVER THE SAME TO COMMODORE SUPERINTENDENT, NAVAL SHIP REPAIR YARD, PORT BLAIR AT _____ HOURS, ON THIS _____ DAY OF THE MONTH _____ IN THE YEAR TWO THOUSAND AND _____.

2. THE LIST OF LIABILITIES AS ON DATE IS PLACED AT ANNEXURE TO THIS CERTIFICATE.

COA/REP

FOR AND ON BEHALF OF
THE PRESIDENT OF INDIA

REP OF

M/s _____

ANNEX 2

SCOPE OF WORK

(Text of SOR finalized and accepted is as per BOQ attached to the RFP)

ANNEX 3

FORMAT OF PROMULGATING CHANGE IN SCOPE OF WORK

1. NAME OF WORK: _____ 2. D.L. NO: _____
3. Proposed by: _____ 4. Reference: _____
Drg. _____
Document _____
5. Details of additional work (if required use overleaf of the form / attach Annexure)

NAME

DESIGNATION SIGNATURE OF THE
PROPOSER

6. (a) Proposal No. _____ REP OF FIRM/PROJECT
(b) Effect on overall Schedule MANAGER OF
SHIPYARD (c) Approved Cost
7. Approved / Not approved COA/HEAD OF PROJECT
(Reasons if any) MONITORING TE

ANNEX 4

FORMAT OF WORK COMPLETION CERTIFICATE

PART – I
WORK COMPLETION CERTIFICATE

1. Name of Ship/Establishment :
2. Work Order No. / Date :

3. Description of work :

A. Following Work has been undertaken : Job Commencement on _____
Job Completed on _____

| S No. | Description of work | Work Carried Out |
|-------|---------------------|------------------|
| 1 | | Yes or No |
| 2 | | Yes or No |
| 3 | | Yes or No |

B. The consumed spares list is placed at enclosure.

Firm

RC

QC

Ship Rep

Manager

Sr Manager

Form DPM-7

Format of Arbitration Clause – Indigenous Private bidders

- (i) All disputes or differences arising out of or in connection with the present contract including the one connected with the validity of the present contract or any part thereof should be settled by bilateral discussions.
- (ii) Any dispute, disagreement of question arising out of or relating to this contract or relating to construction or performance (except as to any matter the decision or determination whereof is provided for by these conditions), which cannot be settled amicably, shall within sixty (60) days or such longer period as Jun be mutually agreed upon, from the date on which either party informs the other in writing by a notice that such dispute, disagreement or question exists, will be referred to a sole Arbitrator.
- (iii) Within sixty (60) days of the receipt of the said notice, an arbitrator shall be nominated in writing by the authority agreed upon by the parties.
- (iv) The sole Arbitrator shall have its seat in New Delhi or such other place in India as Jun be mutually agreed to between the parties.
- (v) The arbitration proceedings shall be conducted under the Indian Arbitration and Conciliation Act, 1996 and the award of such Arbitration Tribunal shall be enforceable in Indian Courts only.

(vi) Each party shall bear its own cost of preparing and presenting its case. The cost of arbitration including the fees and expenses shall be shared equally by the parties, unless otherwise awarded by the sole arbitrator.

(vii) The parties shall continue to perform their respective obligations under this contract during the pendency of the arbitration proceedings except in so far as such obligations are the subject matter of the said arbitration proceedings.

(Note) - In the event of the parties deciding to refer the dispute/s for adjudication to an Arbitral Tribunal then one arbitrator each will be appointed by each party and the case will be referred to the Indian Council of Arbitration (ICADR) for nomination of the third arbitrator. The fees of the arbitrator appointed by the parties shall be borne by each party and the fees of the third arbitrator, if appointed, shall be equally shared by the (buyer and seller).

Form DPM-9

Format of Arbitration Clause – CPSUs/DPSUs

In the event of any dispute or difference relating to the interpretation and application of the provisions of the contract, such dispute or difference shall be referred by either party to the Permanent Arbitration Machinery set up in the Department of Public Enterprises and that if the Department of Public Enterprises fails to settle the dispute, the same will be referred to the Committee constituted by the Cabinet Secretariat.

FORM DPM-15

PERFORMANCE BANK GUARANTEE FORMAT

From:

Bank _____

To,

The President of India
Ministry of Defence,
Government of India
New Delhi

Dear Sir,

1. Whereas you have entered into a contract No. _____ dated _____ (hereinafter referred to as the said Contract) with M/s _____, hereinafter referred to as the "CONTRACTOR" for supply of goods as per Part-II of the said contract to the said CONTRACTOR and whereas the CONTRACTOR has undertaken to produce a bank guarantee for (%) of total Contract value amounting to _____ to secure its obligations to the President of India. We the _____ bank hereby expressly, irrevocably and unreservedly undertake and guarantee as principal obligors on behalf of the CONTRACTOR that, in the event that the President of India declares to us that the goods have not been supplied according to the Contractual obligations under the aforementioned contract, we will pay you, on demand and without demur, all and any sum up to a maximum of _____ Rupees _____ only. Your written demand shall be conclusive evidence to us that such repayment is

due under the terms of the said contract. We undertake to effect payment upon receipt of such written demand.

2. We shall not be discharged or released from this undertaking and guarantee by any arrangements, variations made between you and the CONTRACTOR, indulgence to the CONTRACTOR by you, or by any alterations in the obligations of the CONTRACTOR or by any forbearance whether as to payment, time performance or otherwise.

3. In no case shall the amount of this guarantee be increased.

4. This guarantee shall remain valid for months from the date of JRI acceptance of test consignment in India or until all the store, spares and documentation have been supplied according to the contractual obligations under the said contract.

5. Unless a demand or claim under this guarantee is made on us in writing or on before the aforesaid expiry date as provided in the above referred contract or unless this guarantee is extended by us, all your rights under this guarantee shall be forfeited and we shall be discharged from the liabilities hereunder.

6. This guarantee shall be a continuing guarantee and shall not be discharged by and change in the constitution of the Bank or in the constitution of M/s_____.

FORM DPM-16

FORMAT FOR BANK GUARANTEE FOR ADVANCE PAYMENT

From :

Bank _____

To

The President of India
Ministry of Defence,
Government of India
New Delhi

Sir,

With reference to Contract No. _____ dated _____ concluded between the President of India, hereinafter referred to as „the Purchaser. and M/s _____ hereinafter referred to as the “the Contractor” for the MR/ NR/ SR of _____ as detailed in the above contract which contract is hereinafter referred to as “the Said Contract” and in consideration of the Purchaser having agreed to make an advance payment in accordance with the terms of the Said Contract to the said contractor, we the _____ bank, hereinafter call „the Bank hereby irrevocably undertake and guarantee to you that if the Said Contractor would fail to develop and supply the stores in accordance with the terms of the Said Contract for any reason whatsoever or fail to perform the Said Contract in any respect or should whole or part of the said on account payments at any time become repayable to you for any reason whatsoever, we shall, on demand and without demur pay to you all and any sum upto a maximum of Rs. _____ (Rupees _____ only) paid as advance to the Said Contractor in accordance with the provisions contained in Clause _____ of the Said Contract.

2. We further agree that the Purchaser shall be the sole judge as to whether the contractor has failed to develop and deliver the stores in accordance with the terms of the Said Contract or has failed to perform the said contract in any respect or the whole or part of the advance payment made to Contractor has become repayable to the Purchaser and to the extent and monetary consequences thereof by the Purchaser.

3. We further hereby undertake to pay the amount due and payable under this Guarantee without any demur merely on a demand from the Purchaser stating the amount claimed. Any such demand made on the Bank shall be conclusive and binding upon us as regards the amounts due and payable by us under this Guarantee and without demur. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. _____ (Rupees _____ only).

4. We further agree that the Guarantee herein contained shall remain in full force and effect for a period of 12 months from the date the last advance payment was made or for a period of 90 days from the date on which final delivery of the stores after development was made and accepted by the Purchaser whichever falls later unless the Purchaser in his sole discretion discharges the Guarantee earlier.

5. We further agree that any change in the constitution of the Bank or the constitution of the contractor shall not discharge our liability hereunder.

6. We further agree that the Purchaser shall have the fullest liberty without affecting in any way our obligations hereunder with or without our consent or knowledge to vary any of the terms and conditions of the Said Contract or to extend the time of development/delivery from time to time or to postpone for any time or from time to time any of the powers exercisable by the Purchaser against the contractor and either to forbear or enforce any of the terms and conditions relating to the Said Contract and we shall not be relieved from our liability by reason of any such variation or any indulgence or forbearance shown or any act or omission on the part of the Purchaser or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so relieving us.

7. We lastly undertake not to revoke the Guarantee during the currency of the above said contract except with the prior consent of the Purchaser in writing.

Bank

Place : _____

Date : _____ Seal of the Bank

Yours faithfully,

for _____

(Authorised Attorney)