

MAZAGON DOCK SHIPBUILDERS LIMITED

माझगांव डॉक शिपबिल्डर्स लिमिटेड

"EXPRESSION OF INTEREST" (EOI) ref no. EY/CD/SP/MRLC-2/ Hiring of services for piping and engineering work for Project-MRLC 2



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MAZAGON DOCK SHIPBUILDERS LIMITED

Mumbai-10

रुचि की अभिव्यक्ति (ईओआई) का आमंत्रण

Corrigendum:1

Corrigendum-1 is with revised SOW

NOTICE INVITING EXPRESSION OF INTEREST (EOI)

FROM REPUTED VENDORS FOR

HIRING OF SERVICES FOR PIPING AND ENGINEERING WORK FOR PROJECT-MRLC 2

1. EOI Ref. No. : EY/CD/SP/MRLC-2/2022
2. Description : Hiring of services for Piping and Engineering work for
Project-MRLC 2
3. Date of Issue of EOI : 30.03.2022
4. Last date for Submission of EOI : 29.04.2022



CERTIFIED

ISO 9001: 2008

for Submarine Division

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MAZAGON DOCK SHIPBUILDERS LIMITED

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रुचि की अभिव्यक्ति (ईओआई) का आमंत्रण

"EXPRESSION OF INTEREST" (EOI)

EOI No: - EY/CD/SP/MRLC-2/2022 for Hiring of services for piping and engineering work for Project-MRLC

EOI date: 30.03.2022

CLOSING DATE : 29.04.2022, 12:00 Hrs

OPENING DATE : 29.04.2022, 15:00 Hrs

SUB: INVITATION OF "EXPRESSION OF INTEREST" (EOI) from Reputed Vendors with expertise in the field of Hiring of services for Piping and Engineering work for Project-MRLC

Mazagon Dock Shipbuilders Limited is the India's premier shipyard under the Ministry of Defence Production constructing warships, Submarines. The company invites Expression of Interest from reputed ISO certified indigenous firm's engaged in shipbuilding activities/ marine structures for long term participation in its production programme for piping and engineering work for Project-MRLC 2.

SUB: Hiring of services for piping and engineering work for Project-MRLC

MAZAGON DOCK SHIPBUILDERS LIMITED INVITES expression of interest (EOI) IN TRIPLICATE from reputed ISO certified indigenous contractors/ship builders with expertise in the field of ship building/marine structures for the following Work.

1. Brief Scope of work:

MDL intends to outsource Refit work of SSK Class Submarine work of Naval Submarine (INS Shankush MRLC 2) for Engineering and Piping works on turnkey basis to be carried out inside MDL premises. MDL is floating EOI to explore suitable competent vendors to undertake the above job meeting the required quality and timelines

a) The broad scope of work for the EOI is as follows:

- i. Degutting
- ii. Storage with proper record keeping
- iii. Overhauling
- iv. Arrangement of Spares
- v. Installation
- vi. Pressure testing & Flushing of Piping systems
- vii. Setting to Work (STW)

b) Indicative work content is given in the following annexures

- i. Piping works - Annexure – 1

- ii. Engineering works - Annexure – 2

2. Qualification Criteria:

Bidders should have experience of PIPING AND ENGINEERING WORK on Submarines in the past 12 years (Documentary evidence like order copies & work completion certificates to be furnished) in following areas:

- a) Piping including pipe fabrication
- b) Hydraulic & Non Hydraulic valves
- c) Engineering, Hydraulic valves / Equipments
- d) Shafting and steering gear system.

Note: Bidders need to have Technical experience in at least 2 specific areas mentioned at Srl 2.

However for balance 2 areas, the bidder need to have MOU with the experienced firms with documentary evidence.

3. Financial Qualification Criteria:

Bidders must submit the following documents along with their offer:

- i) Details of company Profile and valid Shop & Establishment registration certificate.
- ii) Audited / Certified Balance sheet, Profit / Loss account for past 3 years and valid solvency certificate / Banker's opinion issued by Nationalized / Reputed international / scheduled bank.
- iii) Bidder's average Audited Annual financial turnover certificate.
- iv) Valid ISO certificate.
- v) The bidders experience and past performance on similar services (Ship building & Marine Structures/piping) in the last 12 years (Order copies & work completion certificates to be appended).
- vi) List of employees on their pay roll & their work experience/qualification related to SOW.

4. Terms & Conditions Of EOI: Participating firms shall indicate acceptance of terms & conditions of EOI as given below:

4.1 Confidentiality: All the information provided to the vendors shall be treated as confidential and should not be disclosed in any manner to any unauthorized person under any circumstances.

4.2 Statutory Requirement, Official Secret Act, Safety and Security Rules

In the event of placement of Order, contractor shall also abide to all statutory requirements, Official Secrets Act 1923, Security and Safety Rules. The documents are available on MDL website. ~~Bidders are required to submit a non-disclosure agreement on Rs.500 stamp paper in the format as per Enclosure I~~

4.3 Submission of EOI:

EOI complete in all respect with all supporting documents in a Envelope securely closed (Sealed) super scribed with EOI No, due date, Time and firm's name addressed to:-

HOD,
Commercial Department–East Yard,
Mazagon Dock Shipbuilder Limited
Mumbai-10

EOI should be deposited on or before the EOI closing date and time.

**TENDER BOX for East yard, Commercial, situated at MDL Reception Centre
MAZAGON DOCK SHIPBUILDERS LIMITED, Dockyard Road, Mumbai-10**

Also MDL reserves right to demand/ask for soft copy through non Rewritable CD.

4.5 Bid rejection Criteria

- i. Bids received after due date.
- ii. Bidder's failure to furnish sufficient or complete details for evaluation of the bids within the given period.
- iii. Incomplete / misleading / false / ambiguous in the proof of eligibility requirements.
- iv. Failed to produce timely clarifications related thereto, when sought.
- v. Bids not meeting qualification criteria
- vi. Submitted more than one proposal for single specialization area.
- vii. Declared ineligible by the Government of India / State govt. / Public sector undertaking.
- viii. Information relating to the evaluation, clarification and recommendation for pre-qualification shall not be disclosed to bidders or any other persons not officially concerned with such process until the pre-qualification process is completed. Any effort by the bidder to influence MDL prequalification process may result in rejection of his EOI.
- ix. Bidders who are debarred under PPP MII order 2017, GeM, CPPP including Tender holiday issued by MDL
- x. Non-submission of Compliance Certificate w.r.t Land Border Clause as per the enclosed format. (Restrictions under Rule 144 (xi) of the General Financial

4.6 Opening Of EOI:

The EOI received will be opened on the due date at the declared time or next working day if closing date happens to be holiday declared by MDL. Participated firms, who wish to remain present during the EOI opening, should nominate on their company's letterhead the name and designation of one person authorized to remain present at the time of opening the EOI and send this letter so as to reach the undersigned at least one working day prior to closing date of the tender.

7. Purpose:

For identifying the firms who are interested to execute the work as per the standards and process as desirable for the scope of work.

All the EOI received by MDL, on or before the due date & time would be scrutinized w.r.t the scope of work. Upon completion of meetings and scrutiny, MDL will finalize tender. The firms may please note that mere meeting of the requirement mentioned in the EOI does not entitle any firm the right for awarding the tender or contract.

8. Expression of Interest & Selection of Bidders:

Technical offers submitted against expression of interest shall be evaluated by MDL user in line with present requirements as stated in the technical documents/EOI. MDL team may further visit to bidder's premises to ascertain the capability and capacity required to undertake the task. MDL team thereafter shall shortlist the suitable bidders based on the technical offers and visit report of MDL team to progress further. Decision of MDL team/User with regards to short listing of bidders shall be final. MDL has right to accept and reject expression of interest at any stage of the process.

9. Contact Person:

- (i) For any further technical details/queries, firms may contact Mr D C Sonawane CM(PLG-EY), Tel no. 022-2376-3599 & mail- dcsonawane@mazdock.com
- (ii) For any commercial details/queries, firm may contact Shikha Pardhi, DM (C-EY), Tel No. +91 22 23782615 or Mr. Pravin Nikhare, CM(C-EY), Tel No. +91 22 23762614, Fax no. +91 22 23741386, pknikhare@mazdock.com

10. Public Grievance Cell:

A Public Grievance Cell headed by Shri. R R Kumar, General Manager has been set up in the Company. Members of public having complaints or grievances are advised to contact him on

MAZAGON DOCK SHIPBUILDERS LIMITED

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Wednesday between 10.00 hours and 12.30 hours in his office on Third Floor, D-1 Building, East Yard , or send their complaints / grievances to him in writing for redressal. Contact Telephone No is 23782338. Interested firms are requested to submit their Expression of Interest (EOI) on or before the due date & time.

Thanking you,
For MAZAGON DOCK SHIPBUILDERSLIMITED,

Enclosure:-

a) Official Secrets Act 1923 (Available on MDL Website)

Note: The documents mentioned under reference and formats shall be downloaded from MDL's Website: www.mazdock.com > Tender/EOI

Revised SOW

The technical Scope of work for EOI Piping & Engineering Refit Work :

1. MDL intends to outsource Refit work of SSK Class Submarine work of Naval Submarine (INS Shankush) MRLC-2 for Engineering and Piping works on turnkey basis to be carried out inside MDL premises. The complete submarine job will be offloaded to three firms to work parallelly with approximate work ratio of 40:30:30 to work in respective zones on the submarine. However there will be only ONE contractor each for Hydraulic and Non-Hydraulic pipes for Pressure Testing and Flushing of the entire system on-board submarine.
2. MDL is floating EOI to explore suitable competent vendors to undertake the above job on turnkey basis meeting the required quality and timelines (about 30 months)
3. The broad scope of work for the EOI is as follows:
 1. Degutting
 2. Storage with proper record keeping
 3. Overhauling & Pressure test
 4. Arrangement of Spares for Overhauling
 5. Installation onboard
 6. Pressure testing & Flushing of Piping systems
 7. Setting to Work (STW)

Above refit work in following listed jobs of INS Shankush:

- a) Piping including pipe fabrication
 - b) Hydraulic & Non Hydraulic valves
 - c) Engineering, Hydraulic valves / Equipments
 - d) Shafting and steering gear system.
4. Indicative work content is given in the following annexures

Piping works - Annexure – 1

Engineering works - Annexure – 2
 5. **Pre-qualification Criteria** : Bidders should have experience of **PIPING AND ENGINEERING WORK** on Submarines in the past 12 years (Documentary evidence like order copies & work completion certificates to be furnished) in following areas:
 - e) Piping including pipe fabrication
 - f) Hydraulic & Non Hydraulic valves
 - g) Engineering, Hydraulic valves / Equipments
 - h) Shafting and steering gear system.

Note:

1. Bidders need to have Technical experience in at least 2 specific areas mentioned at Srl 4.

However for balance 2 areas the bidder need to have MOU with the experienced firms with documentary evidence.

2. Right to accept or reject any or all Applications:

a) Notwithstanding anything contained in this Eoi, MDL reserves the right to accept or reject any application and to annul the Eoi process and reject all applications, at this Eoi any time without any liability or any obligation for such acceptance, rejection or annulment and without assigning any reasons, thereof. In the event that MDL rejects or annuls all the applications, it may at its discretion, invite all eligible participating firms to submit fresh applications.

b) MDL reserves the right to disqualify any applicant during or after completion of Eoi process, if it is found there was a material misrepresentation by any such applicant or the applicant fails to provide within the specified time, supplemental information sought by MDL.

c) MDL reserves the right to verify all statements, information and documents submitted by the applicant in response to the Eoi. Any such verification or lack of such verification by MDL shall not relieve the applicant of his obligations or liabilities hereunder nor will it affect any rights of MDL.

Annexure -1**Scope of work for Expression of Interest from Indigenous Bidders**

A) The EOI is invited for Piping and Engineering work for MRLC 2 Submarine Project (INS Shankush) at MDL for a period of 3 years tentatively from July 2022. The work required to be undertaken by the Subcontractor is briefly defined below:

I) Piping work:

- a) Removal of Pipes
- b) Cleaning of Pipes
- c) Bending of Pipes
- d) Fabrication of Pipes
- e) Galvanization of Pipes
- f) Installation of Pipes
- g) Pressure Testing of Pipes
- h) Pressure Testing of System
- i) Flushing of systems
- j) Removal of Valves
- k) Installation of Valves
- l) Overhaul of Valves
- m) Arrangement of spares required for overhauling of valves
- n) Removal of Misc. items
- o) Installation of Misc. items
- p) Overhaul of Misc. items
- q) Fabrication of 4 nos. Exhaust gas line inside pressure hull

1. MDL's Scope**1.1 Documents**

Following documents will be provided:

- 1.1.1** Pipe sketches and schematic drawings.
- 1.1.2** Sample copy of QA Plan (As per MDL quality requirement).
- 1.1.3** Instruction given to contractor will be recorded in the Instruction Register. The contractor is required to report hindrances in production for recording in the Hindrance register countersigned by SM.

1.2 Material

- 1.2.1** Pipe Material will be provided progressively based on requirement. The pipes are made of different materials viz. SS, CS, and Copper Alloy.
- 1.2.2** Material required for welder's qualification.
- 1.2.3** Welding/ brazing consumables including gases (Argon and filler wire /electrodes) required for welding/ brazing of pipe clamps/ studs/ supports.
- 1.2.4** All related piping devices like valves, cocks, filters, strainers, clamps, supports, adaptors, unions and fittings, gauges, Cathelco units, gaskets, O-rings, gland - packing, fasteners,

grease, ruch unions, straube coupling, pipe flanges, rubber sheets for pipe joints, adhesives etc. required for fabrication and installation of pipes.

- 1.2.5** All test media (air 6 bar, oil, water, fresh water, nitrogen, etc.) for pressure-testing of pipes.
1.2.6 Special tools and equipment supplied by the system/ equipment manufacturer along with the system/ equipment for special purposes.

1.3 Services

- 1.3.1** Suitable space/work site within MDL, if available, for the subcontractor's office and space for keeping lockable storage, cabinets for instruments and storing material. Contractor has to bring their own porta cabin. Electrical connections will be provided by MDL.
- 1.3.2** Crane facilities for lifting heavy Pipes/ pipe devices (>50 kg) will be provided by MDL, as per requirement, taking safety and weight factors into consideration. However, forklifts, hand trolley for material handling are to be arranged by the contractor.
- 1.3.3** Water and one source for compressed air (service air) supply of 4 -7 bars pressure at each location of work for blowing and cleaning of pipes, devices & accessories, gouging and running small equipments like grinding machine etc.
- 1.3.4** Power supply - 440 Volts, 220 Volts & 110 Volts for tools and equipment/ instruments, 110 Volts for electrical grinding/ drilling machines/ lighting arrangement and 24 Volts for temporary hand-held lighting arrangement. (Subcontractor has to take connection from the power supply points shown by MDL. However, lead wires and bulbs to be arranged by the contractor. Additional Lighting arrangement at the site (apart from general lighting at W/s) is to be provided by the subcontractor as per requirement).
- 1.3.5** Preparation of MR and authorizing Subcontractor for drawing material from EY Stores. All materials will be issued to subcontractor from locations in MDL yard at Mazagon (EY Stores/ Alcock Yard/ South Yard/North Yard etc.). (Contractor may be required to depute their personnel at Anik yard, Sewri Yard or other storage locations for easy identification while mustering the material for issue to facilitate easy take over)
- 1.3.6** Modification on seatings by hot-work and associated painting jobs on modified seatings which are integral part of hull.
- 1.3.7** Covered area for Cleaning of pipes.
- 1.3.8** A Non-destructive testing's, dark room and pit room facility.

2. Subcontractor's Scope:

There will parallel contracts (Max. 03 Nos.) in the Approx. ratio 40:30:30.

3 separate vendors to work in zone wise as detailed below:

Zone 1: Upto soundproof bulkhead

Zone 2: From Soundproof bulkhead to PT Bulkhead

Zone 3: PT Bulkhead to Torpedo tubes including outside pressure hull

2.1 Mobilization

2.1.1 Contractor shall complete mobilization of his workforce, tools and equipment within four weeks from date of award of order or intimation by site manager. In mobilization period contractor should arrange entry passes for his employees & no excuse for delay in commencing work on this account will be entertained.

2.1.2 The subcontractor has to clearly indicate how the firm is going to meet each of the technical requirements mentioned in the following headings.

2.2 Removal of pipes and valves: Firm to remove pipes and valves from submarine. Before removing the valves, proper tallies to be put up on pipes and valves. After removal, pipes and valves to be stored properly and record to be maintained.

2.3 Cleaning of pipes: Vendor to clean the pipes. Vendor to offer the pipes to QA/RMT for thickness gauging of pipes. Pipes found OK in thickness gauging to be used for further process.

2.4 Bending & Fabrication of Pipes

2.4.1 Bending of Pipes

2.4.2 Subcontractor shall execute bending of the pipe on the basis of the technical data of the pipe, written in inspection sheet, Drawing and according to the suitable processes as per document provided by the MDL. Also pipes which are TO-PLACE in nature, to be bent according to On-Board requirement.

2.4.3 The bending of pipes can be done on CNC and NC machine.

2.5 Degreasing, Cleaning & Pickling of pipes

The cleaning /degreasing/ pickling of pipes by alkaline solution & to be dried prior to welding.

2.6 Pre-mounting work

Fitment of end fittings / pipe joints on tack to be as per drawing. Also pipes which are TO-PLACE in nature, to be fabricated according to On-Board requirement.

2.7 Welding/brazing

2.7.1 The subcontractor's welder will execute the welding according to the welding procedure indicated in document supplied by MDL.

2.7.2 The subcontractor shall offer welding work of each pipe to MDL-EY-QA for inspection & clearance to further pipe fabrication process.

2.8 NDT

Non destructive testing's such as visual, DP, Radiography as per QAP.

2.9 Galvanizing of Pipes

Galvanizing of CS pipes where ever applicable.

Note: Galvanizing & Cleaning/ pickling is under contractor's scope.

2.10 Storage of pipes

The firm is required to do the storage of pipes / material in an efficient manner and do the retrieval for installation in space provided by MDL. Pipes to be stored in the racks and shop floor adapted and equipped with rubber protection to avoid marking or deterioration of manufactured pipes and tubes. Management, Storage & delivery of welding filling material as per standard procedure.

2.11 Installation of pipes.

- a. Installation of temporary identification tallies.
- b. Tack-welding/ welding of clamps, supports etc. and NDT as per requirement.
- c. Installation of Finished, Semi-Finished and Template pipes, valves, cocks, filters, strainers, reservoirs, clamps, supports, adaptors, unions and fittings, gauges, Cathelco units etc.
- d. Installation of pipes in sequence as per drawings or site conditions. Pipes located below deck/equipment shall be given priority during installation and the same are to be pressure tested before installation of the deck equipment.
- e. Flange joints are to be bolted using required rubber/ other material gaskets etc., as per the drawings and material supplied.
- f. Threaded pipe joints are to be tightened with the sealant, wherever mentioned.
- g. Cutting of joints from rubber sheets/Gaskets, joining of 'O' rings etc.
- h. Material required for manufacturing templates, shims, chock pieces etc.

2.12 Pressure Testing & Flushing of system: This work involves System wise flushing and pressure testing of hydraulic and non-hydraulic pipe on-board submarine MRLC-2.

NOTE: There will be only ONE contractor each for Pressure Testing and Flushing of the entire Piping on-board for Hydraulic and Non-Hydraulic systems.

2.13 Overhauling of valves: Valves will be issued to vendors for overhauling. Firm to carry out opening of the valves inside MDL. QA/RMT will do the opening inspection of valves after offer by vendor. Final list to be prepared for spares required for overhauling and same to be arranged by the vendor. Overhauling of valves to be done inside MDL. For special machining, parts may be taken outside. Opening inspection of valves to be completed by the vendor within 4 months after issuing valves. Spares to be arranged within 4 months after opening inspection.

2.14 Arrangement of spares for overhauling of valves:

List of spares as per TM will be included for tendering, however requirement of spares will be finalised post opening inspection.

- a) Indigenous – Arrange spares as per sample/ drawing with necessary certificates (Material TC & COC from NABL)
- b) Imported – Arrange spares/ fittings from OEM(Germany) as per requirement on case to case basis.

2.15 Fabrication of 4 Nos. Exhaust Gas Line Inside Pressure Hull (Port and Starboard)

QUANTUM OF WORK PIPE REMOVAL, BENDING, FABRICATION, GALVANIZATION & INSTALLATION

Sr. No.	Material	Group	Total Pipes	Activities	
				Total nos. bends for Pipe Bending	No. of total Joints for Pipe Fabrication
1	CARBON STEEL	SIZE 20-30	20	75	100
2	CARBON STEEL	SIZE 38-60	32	100	150
3	CARBON STEEL	Size 80-100	22	75	100
4	CARBON STEEL	SIZE 150	2	25	25
5	STAINLESS STEEL	SIZE 3 - 10	1000	3000	4000
6	STAINLESS STEEL	SIZE 10 - 20	750	3000	3225
7	STAINLESS STEEL	SIZE 20 - 45	200	3000	3000
8	STAINLESS STEEL	SIZE 40 - 60	50	300	400
9	STAINLESS STEEL	SIZE ABOVE 50	15	50	50
10	CUNI	SIZE 6 - 12	600	2250	2300
11	CUNI	SIZE 14 - 20	300	1200	1200
12	CUNI	SIZE 25- 40	200	1500	1750
13	CUNI	SIZE 40 - 60	100	1100	750
14	CUNI	SIZE 65 - 90	50	600	700
15	CUNI	Size 100 - 125	25	300	300
16	CUNI	SIZE 150 - 175	25	150	200
17	CUNI	SIZE 200 - 275	2	10	100
18	COPPER	SIZE 6 - 10	41	200	200
19	COPPER	SIZE 12 - 25	17	50	20
20	COPPER	SIZE 25 - 42	40	150	200
Total			3491	17135	18770

Item Category	Description of activity	Qty	UoM
10	Galvanization of Pipes(KG)	1,000	Kg
20	Pressure Testing of systems	26	NOS

Item Category	Service Code	Description of activity	Qty	UoM		
		Removal , Overhaul and Installation Valves				

10	200147 7	Valves 250 NB	3	NOS		
20	200147 8	Valves 200 NB	1	NOS		
30	200147 9	Valves 150 NB	14	NOS		
40	200148 0	Valves 100 NB	58	NOS		
50	200149 1	Valves 80 NB	47	NOS		
60	200149 2	Valves 70 NB	15	NOS		
70	200149 3	Valves 50 NB	81	NOS		
80	200149 4	Valves 40 NB	28	NOS		
90	200149 5	Valves 32 NB	96	NOS		
100	200149 6	Valves 25 NB	163	NOS		
110	200149 7	Valves 20 NB	83	NOS		
120	200149 8	Valves 16 NB	140	NOS		
130	200149 9	Valves 10 NB	85	NOS		
140	200150 0	Valves 12 NB	34	NOS		
150	200151 1	Valves 8 NB	80	NOS		
160	200151 2	Valves 6 NB	220	NOS		
170	200151 3	Valves 3 NB	63	NOS		

Annexure 2**II) SCOPE OF WORK FOR ENGINEERING WORK****GENERAL TERMS AND CONDITIONS.**

1.	Best shipbuilding practices in general and Naval Standards in particular must be practiced in all installations and other work on board.
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2.	The subcontractor should execute the work in accordance with Ship Building Methods Manuals of MDL, and as per requirement of ISO 9001.
3.	The installation and other works should conform to the best engineering practice and should maintain high standard of workmanship as applicable to submarine building requirements.
4.	I.T.I. trained operatives shall be deployed for all the jobs involved. The qualifications need to be authenticated by MDL Officer. Adequate supervisory staff should be deployed on board and be responsible to MDL/SOT officers.
5.	Engineers/ Supervising staff with technical background should be deployed and will be entirely responsible for execution of the tasks to the satisfaction of MDL Berth Officer/ Naval Overseers/other Naval trials teams, as and when applicable.
6.	The scope of work consists of removal, re-installation of various equipments on board and overhauling of equipment, wherever required as well as flushing, pressure testing, test/trials on test bed and onboard.
7.	The Contractor may visit the Yard/ Submarine to assess the quantum of work
8.	The job executed shall be strictly in accordance with the Instructions / Drawings / Specifications/ Scope of work and Standard applicable. Necessary Drawings, Part List & TMs shall be provided by MDL, for reference. The Contractor should ensure that the right type of hardware indicated in the Drawings, Part List & TM are used during installation.
9.	To blank all the hull openings of engineering fittings with suitable metal blank along with the gasket, after getting it cleaned & painted by Hull Dept.- EY is the Contractor's responsibility. N.B.: - Material & machining assistance for preparing the blanks will be provided by MDL.
10.	The Contractor should prepare a list of missing, broken items etc. in co-ordination with Berth Officer prior to commencement of work.
11.	New Shims/ chalk pieces, fit bolts required while assembly/ installation is to be prepared by the firm as per site conditions. Materials & machining assistance will be provided by MDL.
12.	If re-testing is required for any associated system, during pressure testing of a particular system due to the leakage observed in pipe joints, equipment, fittings etc. shall be Contractor's liability.
13.	All the tallies along with supports / securing plates / clamps of equipment, valves, fittings etc. removed by the Contractor should be cleaned & preserved and re-installed during refit of items.
14.	Grinding & drilling of newly manufactured clamps & foundations to suit at sight, will be Contractor's responsibility.
15.	Crane facilities, special tools for removal & installation of equipment, compressed air etc. shall be supplied by MDL. Further, any material required for shrunk fitted items e.g. dry ice shall also be supplied by MDL.

16.	<p>The Contractor should arrange test pumps with accessories for hydro testing.</p> <p>The Contractor should use calibrated pressure gauges, which will be used for pressure testing of equipments & systems.</p>
17.	<p>The Contractor should arrange all tools & special lifting arrangement for working onboard in critical places. However, any special jigs available with Engg. - EY will be provided as and when required.</p>
18.	<p>There would be stage inspection by QA-EY and SOT during execution of work and any shortfalls noticed during these inspections shall be attended to expeditiously. Any rework, which is not attributable to the Contractor, shall be charged extra.</p>
19.	<p>The contractor is to comply strictly as per working schedule forwarded to him by the respective OIC. Detailed work schedule should be prepared by the Contractor and submitted to the OIC for approval.</p>
20.	<p>The Contractor's responsibility will be limited to functioning of the items on board and rectify any failure of the entire system/ fittings/ equipments and setting to work in conjunction with Ship Staff.</p>
21.	<p>During functional trials, any fittings/ equipments found defective and which the subcontractor has serviced, is required to arrange removal, rectification and reinstallation at his own cost. Contractor is responsible for making good all the disturbed joints in way of rectification.</p>
22.	<p>The Firm has to stand Guarantee for 12 Months from the date of separation of Submarine from the pontoon. Any failures observed while Setting to Work or HATs, will be rectified to the satisfaction of MDL/ Naval Agency.</p>
23.	<p>The Contractor shall be required to work in all shifts, including Saturdays, Sundays and Holidays, as and when the necessity arises.</p>
24.	<p>The Contractor shall take utmost care in handling all equipments and other items while removal/ reinstallation of the same. Cost of any damages to items shall be recovered from the Contractor's Bill.</p>
25.	<p>Overhauling period is maximum of up to four months from the start date of de-gutting i.e. Start date of contract.</p>
26.	<p>Consumables like grease, cloth, etc. during overhauling of items are to be arranged by the contractor.</p>
27.	<p>Items/ equipments documented for overhaul in DL/SOW will also include removal, installation, test and trials of items.</p>
28.	<p>Items/ equipments documented for removal and installation in DL/SOW will also include overhaul except for renewal of items.</p>
29.	<p>Spares required for overhauling of equipments to be arranged by the vendor. After opening inspection of Equipments, list of spares required is to be prepared and arranged.</p>

30.	Pumps/equipments to be removed along with motor and will be subsequently separated by contractor in MDL. Motors to be handed over to MDL.
31.	Prime mover for test bed trials will be given to the contractor before commencement of test bed trials. The same to be collected from MDL by contractor.
32.	Contractor must have experience of engineering work onboard submarines.
33.	Contractor should have the facilities for FAT (Factory Acceptance Trials) of items after completion of overhaul. i.e. Test Bed for Pump trials, Pneumatic/electrical actuators test facilities, etc.
34.	If firm does not own facility for few critical work such as shaft & propeller repair, then firm must have MOU/tie up with eligible firms who can execute such jobs. Eligibility of such firms will scrutinized by MDL during TNC.
35	Inspection protocols after overhaul of items and for test bed trials will be provided by MDL.

(i) SCOPE OF ENGINEERING WORK.

Sub-contractor is required to remove, overhaul (where indicated) and re-install the items. Scope includes inspections, testing at all stages including trials.

Contractor's sequence of work will be: -

1	One set of schematic drawing, installation drawing, part lists of engineering systems will be provided by MDL. The same is to be preserved by the Contractor for reference & is to be returned after the completion of the Project.
2	The Contractor is to study the schematic drawings, identify the equipments. Make proper tallies and put them equipments before removal. Tallies should be of metallic & tied with SS wire. Materials for tally & SS wire are to be arranged by the Contractor.
3	Prepare a list of items, in triplicate prior to removal from the Submarine and handover to Engg. Dept. for cross checking the identification of the items. After obtaining the clearance, the items have to be removed from onboard Submarine. Obtain signature from the Ship Staff on the list of items before shipping out of the Submarine and hand over a copy of the list to the OIC-Engg. for record.
4	An inventory is to be prepared by the Contractor about missing and damaged items on each

	equipment before removing from submarine. This is to be done in consultation with MDL and Ship's Staff.
5	Contractor is responsible for dismantling any other fittings, pipes, etc. coming on the way of removing the main equipment. A proper marking is to be done to prevent orientation problem while re-installing the same.
6	The Contractor should record the clearance between the chalk pieces & the compression of shock mounts before the removal of any major equipment.
7	Contractor is responsible for removing and replacing all shock mounts. The foundation & rod gearing and other parts associated with equipments, to be reconditioned & painted (Painting assistance will be provided by MDL). All the foundations of the equipment are to be marked with detail Drawing No., punched on the metallic tag tied with SS wire. Materials for tag & SS wire are to be arranged by the Contractor.
8	Removed fasteners and any other smaller items should be kept under the custody of Contractor in cloth bag, equipment wise. Loss of any item will be the responsibility of Contractor and he has to compensate the same.
9	All equipments removed from submarine should be dispatched to Ready Use Store, after making proper dispatch note.
10	All fasteners/ spares required for overhauling/ re-installation of machinery/ equipments/ Hydraulic systems is to be arranged by vendor. List of fasteners, spare parts/ fittings required for re-installation is to be prepared by the Contractor after opening inspection. The Contractor is to draw the materials as per Drawing & Part List related to Defect List (DL) from the Stores-EY by preparing the Material Requisition Note, in consultation with Engg-EY.
11	The Contractor should collect New/refurbished equipments/ items from the EY-Store or EY-Engg. Department. Preparation of area for installation of equipments is the responsibility of the Contractor.
12	Carry out pressure testing of all Hull/ Doubler valves of various systems at the pressure & media specified in the Protocol after installation of the same. Carry out pressure testing of all engineering systems at the pressure & media specified in the Protocol.
13	While removing the pump assembly, motor is to be separated and dispatched. Monoblock pumps will be intact. Main Engine should be de-coupled from Getelfo coupling while dispatching. Assembling and coupling of the above items is the responsibility of Contractor prior to installation. Hydraulic mechanisms should be dismantled for operating flaps/ cocks.
14	The Contractor is to get re-installed equipments cleared by Q.A.- EY and S.O.T. The Contractor, to the entire satisfaction of Q.A.-EY/ S.O.T. or Ship Staff should rectify the

	defects while taking trials on Contractor's fitted items.
15	The Contractor is to ensure not to damage any fitting/pipe during removing reinstallation and pressure testing. In the event of damage to any fittings/pipes, the cost of the same will be recoverable from the Contractor.
16	Measuring instruments used by the Contractor should have proper Calibration Certificate.
17	All open-ended fittings/ equipments should always be kept plugged or capped to prevent dirt entering the fittings/ equipments.
18	Removal and reinstallation of Fitting/machinery identification tallies along with the system is contractor's responsibility.
19	The Firm has to stand Guarantee of their job for 12 Months from the date of separation of Submarine from the pontoon. Any other failures of the engineering system observed, during Setting to work/HATs, also to be rectified by the firm up to the satisfaction of MDL/ Naval Agency.
20	Opening of all equipments to be done inside MDL. Overhauling of equipments to be done inside MDL. For special machining, parts may be taken outside.
21	Responsibility of Engineering Hull valves/ Engineering Penetrations will be with vendor working in particular zone. Any penetration to be machined; contractor is responsible for the same. MDL will give technical specification.

NOTE: -

1. Installation & Pressure testing to be carried out as per the Protocols and the same to be offered to Q.A (EY) and SOT for their acceptance.
2. While Pressure testing, all the valves/ fittings/ filters/ hydraulic blocks/ hoses are also to be tested along with the pipes. Any leaks observed are to be rectified by the Contractor.

List of Engineering Items for refit:

Sr.No.	Name of the Equipment
1	Anchor Assembly Capstan And Deck Equipment
2	Door And Hatches And Escape Trunk
3	Assembly Hatch
4	Sanitary System And Gas Ejector
5	Life Rafts
6	Damage Control Gear / Life Saving Equipment
7	Hydrazine Emergency Blow System
8	Rescue Sphere And Its Callotte
9	6000 Hourly Routines On Four Main Engines. (W-6 Routine)
10	Engine Governors (4 In Nos)
11	Exhaust Gas System
12	Fuel System
13	Lub Oil System
14	Diesel Fresh Water Cooling System
15	Induction System (Surface & Snorkel) Snorkel Mast
16	Air Coupling And Air Line (Snorkel Mast)
17	Locking Mechanism (Snorkel Mast)
18	Snorkel Valves
19	Test (Snorkel Mast)
20	Charging Generators
21	Main Battery And Battery Rooms
22	Battery Cooling System
23	Propulsion Motor
24	Shaft Turning Device
25	Stern Tube
26	Stern Gland
27	Thrust Bearing
28	Central Lubrication Plants
29	Hollow Spring Coupling
30	Main Sea Water Cooling System
31	Main Sea Water Cooling Pump
32	Shafting Propeller
33	Propeller Shaft
34	Miscellaneous And Shaft Tunnel
35	Reserve Buoyancy Meter

36	Dc Motors And Converters
37	Pt Bhd. And Pt Bhd. Door (Engineering Work)
38	Buoyancy And Stability Indicating Devices
39	Vertical Rudder
40	Hydroplane Aft & Forward
41	Hydraulic Drives Of Rudder And Planes .
42	Hydraulic Cylinders Of Aft & Rudder Planes
43	Lantern And Hydraulic Cylinder Seals
44	Bilge Pump
45	Freeing And Compensating System
46	Mbt Vents
47	Halon Fire Warning And Extinguishing Systems
48	Fresh Water Distilling Unit
49	Drink, Wash Water And Sea Water Wash Systems
50	Garbage Ejector
51	Ventilation And Air-Conditioning System
52	Hydraulics
53	Compressed Air System
54	Emergency Breathing (Bibs) And Oxygen Systems
55	Signal Ejector
56	Transport Equipment (Tubes 1 & 2)
57	Torpedo Handling And Embarkation System
58	Mine Laying Equipment
59	Shock Mounts
60	Impeller Balancing, Assembly And Installation Of Atu Fans, Boat And Battery Fans
61	Repair/ Machining Of Rudder Upper & Lower Shafts
62	Repair, Machining & Threading Of Fwd Hydroplane Shaft And Manufacture Of Nut
63	Spares For Signal Ejector For Overhauling Of Equipments
64	Spares For Garbage Ejector For Overhauling Of Equipments
65	Laser Scanning & Measurements Of Submarine Forward Escape Hatch
66	Sea Water Pumps For Ac Repair:
67	White Mettalling /Babbiting And Machining Of Thrust Block Components
68	Preparation, Installation And Pressure Testing Of Hull & Doubler Valves Onboard
69	Refrigeration And Airconditioning System
70	Refilling Of Halon Bottles
71	Hydraulic Valve Refurbishment
72	Repair & Manufacturing Of Piston Head, End Cap Flange, Suitable Seals, Hydraulic Cylinders & Piston Rods At Firm'S Premises.
73	Services For Shutter Space Fitting & Installation Of Retractable Bollards
74	Spares for Stuffing Box
75	Spares for Muzzle Flap Spares
76	Installation Of Furniture And Small Items
77	Calibration And Pressure Testing Of Tanks
78	Tanks Leak Test