





No.	Description	Requirement	To be declared / confirmed by manufacturer
4	Rudder stock liners	Material: Stainless steel Strength (As per class requirement and Indian Navy standard) Required in way of main bearing and stuffing box Qty.: 2 Nos. / Rudder stock	..... Yield strength ..... Kg/mm <sup>2</sup> ..... ..... Qty.: .. Nos./Rudder stock
5	Lifting eye bolt	A lifting eye bolt of suitable capacity to be provided on the top of the each rudder stock for lifting of Rudder stock and Assembly. Qty.: 1 No. / Rudder stock	..... ..... ..... Qty.: .... No./Rudder stock
6	Hydraulic nut	Keyed or Keyless hydraulic connection of rudder stock with blade by means of hydraulic nut. Material and strength of hydraulic nut as per class requirement. Qty.: 1 no. / stock	..... ..... ..... Material ..... Yield strength ..... Kg/mm <sup>2</sup> Qty.: ..... no. / stock
7	Rudder trunk	Seamless Steel tube (Strength and material specification as per class requirement). To be welded with bearing housing. Qty.: 2 nos./ship Length Weight	Yield strength ..... Kg/mm <sup>2</sup>  Qty.: ..... nos./ship ..... mm .....Tonne
8	Bearing housing	Cast / forged steel (Strength and material specification as per class requirement) Weight Qty.: 1 No. / rudder trunk	..... Yield strength .... Kg/mm <sup>2</sup> .....Kg. Qty.: ..... No. / rudder trunk
9	Rudder Bearing	Finally machined and pressed/freeze fitted into bearing housing and of Approved metal or synthetic material. Type of material and strength as per class requirement. Qty.: 1 No. / rudder arrangement	..... Material ..... Yield strength ..... Kg/mm <sup>2</sup> ..... ..... Qty.: ..... No. / rudder arrangement
10	Filling/Drain plug for rudder blade	A Stainless Steel filling plug at the top and a stainless steel drain plug at the bottom to be provided. Qty.: 1 No. each / rudder	..... ..... ..... Qty.: ..... No. each / rudder
11	Hydraulic tiller nut	Material specification and strength as per class requirement and as per requirement of steering gear manufacturer Qty.: 1 No. / rudder stock	Material ..... Yield strength ..... Kg/mm <sup>2</sup>  Qty.: .... No. / rudder stock
12	Jumping stoppers	Material specification and strength as per class requirement. Qty.: 1 No. (In two halves) / rudder	Material..... Yield strength ..... Kg/mm <sup>2</sup> Qty.: .... No. (In two halves) / rudder
13	Lip type seal	Lip type sealing arrangement to be provided in the bottom end of the bearing housing to prevent intrusion of sea water into trunk tube / steering compartment. Arrangement and location of rudder trunk seals to be provided such a way that the replacement of rudder seals should be feasible under the floating condition of the vessel. Qty.: 1 No. / trunk tube	..... ..... ..... ..... ..... ..... Qty.: ..... No. / trunk tube



No.	Description	Requirement	To be declared / confirmed by manufacturer
14	Stuffing Box	Material specification as per class requirement / manufacturer's Standard Qty.: 1 No. / trunk tube	Qty.: ..... No. / trunk tube
15	Tiller stock matching and fitment	Pre machined classification society approved tillers for attachment to rudder shaft shall be directly supplied by steering gear manufacturer. Final machining, matching and fitment of tiller hub cone to rudder stock including blue print / bedding test and class approval of tiller stock connection to be carried out / obtained by rudder arrangement manufacturer	..... ..... ..... ..... ..... .....
16	Painting	Internal Surface of rudder blade to be filled with Bituminous paint and drained. All other parts of the Rudder stock and Assembly to be painted with marine paint as per standard ship building practice. Other machined areas to be suitably protected against corrosion.	..... ..... ..... .....
17	Drawings & Manuals	<ul style="list-style-type: none"> <li>• Installation, operation and maintenance manual: 6 sets/vessel</li> <li>• Spare part catalogue: 6 sets/vessel</li> <li>• Dimensional drawings for all the components and accessories: 6 sets/vessel</li> <li>• GA &amp; detailed dimensional drawing for installation: 6 sets/vessel</li> </ul> <p><b>Note:</b> Technical documents as listed above are to be provided inline with D-787 of Indian Navy</p>	<ul style="list-style-type: none"> <li>• ..... sets/vessel</li> <li>• ..... sets/vessel</li> <li>• ..... sets/vessel</li> <li>• ..... sets/vessel</li> </ul> <p>..... .....</p>
18	Any component/ arrangement not specified here above however found necessary as per Indian Navy and classification / statutory requirement and required for efficient working of the system needs to be included in standard scope of supply.	To be confirmed by the manufacturer and details of the same to be submitted along with the technical offer.	..... ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....
19	Site condition	Rudder arrangement to perform satisfactorily under following site condition <u>Ambient air temp.:</u> (-) 10° C to (+) 40° C <u>Sea water temp.:</u> 1° C to 35° C <u>Relative humidity/salinity:</u> Up to 90% @35° C Salinity of water up to 35 PPM	..... ..... ..... .....



No.	Description	Requirement	To be declared / confirmed by manufacturer																
20	Operating criteria and other requirements	<p>(A) Rudder arrangement should be capable of efficient operation under the following conditions of vessel during operation;</p> <p>a) Heel: 20<sup>0</sup> continuous either side            b) Roll: 20<sup>0</sup>            c) Trim: 5<sup>0</sup> continuous            d) Pitch: 6<sup>0</sup></p> <p>(B) System should have reliability and maintainability for a minimum mission period of four weeks.</p> <p>(C) The rudder arrangement offered should confirm and comply to the Indian Navy RFP requirements as applicable</p> <p>(D) <u>Sea Worthiness</u>: The vessel together with its machinery and equipments/system to be capable to transit on all the headings up to sea state 4 and capable of conducting hydrographic survey operation up to sea state 3. The vessel and its machinery and equipments also to be survivable at best heading up to sea state 5.</p>	<p>(A) .....</p> <p>.....</p> <p>.....</p> <p>a) .....</p> <p>b) .....</p> <p>c) .....</p> <p>d) .....</p> <p>(B) .....</p> <p>.....</p> <p>.....</p> <p>(C) .....</p> <p>.....</p> <p>.....</p> <p>(D) .....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>																
21	Operating mode and speed of the vessel	<p>Vessel's propulsion and manouvering machinery exploitation will be assumed as to ensure vessel operation of 4500 hours per year. Speed, range, endurance and mission duration is clearly specified as follows;</p> <table border="1" data-bbox="568 1171 1093 1641"> <thead> <tr> <th>Speed range [knots] and operating mode</th> <th>Installed engine power required [kw] [MCR]</th> <th>% of annual hours [% of 4500 hours]</th> <th>No. of propulsion drive in operation</th> </tr> </thead> <tbody> <tr> <td>0 to 6 knots, hydrographic survey operation</td> <td>[1x895]</td> <td>10% [450 hours]</td> <td>One</td> </tr> <tr> <td>12 knots, cruising / economical speed operation</td> <td>[2x895]</td> <td>80% [3600 hours]</td> <td>Two</td> </tr> <tr> <td>18 knots, sprint/full speed operation</td> <td>[4x895] *</td> <td>10% [450 hours]</td> <td>Four</td> </tr> </tbody> </table> <p><b>Note:</b> Maximum speed [18 knots] shall be achieved at 85% MCR of the engines at maximum displacement of the vessel.</p>	Speed range [knots] and operating mode	Installed engine power required [kw] [MCR]	% of annual hours [% of 4500 hours]	No. of propulsion drive in operation	0 to 6 knots, hydrographic survey operation	[1x895]	10% [450 hours]	One	12 knots, cruising / economical speed operation	[2x895]	80% [3600 hours]	Two	18 knots, sprint/full speed operation	[4x895] *	10% [450 hours]	Four	<p>.....</p> <p>.....</p> <p>.....</p>
Speed range [knots] and operating mode	Installed engine power required [kw] [MCR]	% of annual hours [% of 4500 hours]	No. of propulsion drive in operation																
0 to 6 knots, hydrographic survey operation	[1x895]	10% [450 hours]	One																
12 knots, cruising / economical speed operation	[2x895]	80% [3600 hours]	Two																
18 knots, sprint/full speed operation	[4x895] *	10% [450 hours]	Four																





No.	Description	Requirement	To be declared / confirmed by manufacturer
25	Commissioning	Installation and commissioning assistance by competent service engineer as per yard schedule at vendor's cost	..... ..... .....
26	Warranty	12 months from the date of delivery of the respective vessel to Indian Navy	..... .....
27	<p><b><u>Approval of drawings and specifications</u></b></p> <p>Within two weeks of placement of order the manufacturer is to forward to the yard, a drawing and technical information / calculation schedule indicating list of documents / drawings and proposed dates by which these will be submitted to the yard, class, statutory authority and IHQ-MOD(N) respectively for their approval. This list should contain the drawings / documents / information / calculations etc. required as per all above agencies / authorities. All the drawings and technical information are to be submitted by the manufacturer on magnetic media with required number of hard copies for onward submission to IHQ-MOD[N] for their approval and record. All the drawing / technical information that requires yard / class / statutory authority approval are to be first submitted by the manufacturer to all above for their approval and after obtaining their approvals same shall be submitted to IHQ-MOD(N) for their final scrutiny, comments and approval.</p>		
28	<p><b><u>Equipment drawings</u></b></p> <p>Before manufacturing/supplying any equipment, fitting or material, the manufacturer is to forward final detailed drawing / specification for the prior approval of all concern. Approval of the yard, class and statutory authority as applicable shall be obtained by the manufacturer prior to submission to IHQ-MOD[N]. The approval of any proposal, specification, drawing will not exonerate the manufacturer from their responsibility in connection with the correct supply and functioning of the systems and complete installation</p>		



No.	Description	Requirement	To be declared / confirmed by manufacturer
29	<p><b>As made drawings and distribution of documents</b></p> <p>The manufacturer to furnish a list of “As made” drawings of various equipment proposed to be supplied. Same shall be subject to approval of the yard and IHQ-MOD(N). All drawings and documents are required to be supplied on magnetic media also in addition to the hard copies. The electronic documents to be in compliance with IETM/CALS format. The documents such as Ship Fit Definition [SFD], D-787, list of B&amp;D and onboard spares, OEM / Manufacturer / Vendor details etc. to be provided in Integrated Logistic Management System [ILMS] format. The manufacturer is to ensure that the tracings and prints are of the best quality and to the satisfaction of the yard and Naval Overseer. The requirements of sets of “As made” drawings, velographs, manuals and other documents are to be supplied by the contractor / vendor for distribution to various Naval authorities as per following list for “Distribution of Documents”.</p>		

### DISTRIBUTION OF DOCUMENTS

SL. NO	DESCRIPTION OF DOCUMENTS	SOURCE	TYPE OF DOCUMENT	IHQ-MOD(N)				ADMIN AUTH *						REPAIR AUTH *					MS *				WPSWOT	SHIP	SMA	MTU/ETMU/WAT	DQA(WP)/DQA(N)	SHIVAJI/VALSUR	TOTAL	
				PROD. DTE.	PROF. DTE.	DFM	DLS	HQ WNC	HQ ENC	HQ SNC	HQ ANC	ASD (M)	ASD (V)	NSRY(C)	NSRY(PB)	FMU(B)	BMU(V)	MS(B)	MS(V)	NSD(PB)	NSD(C)									
1	SCHEMATIC SYS. DRGS	S/B	VELO		1							1																		2
			PRINT	1	1	1				1				2		1	1	1					1	1	1	1	1	1	1	15
2	AS MADE EQPT DRGS	S/B	VELO		1							1																		2
			PRINT	1	1	1				1				2		1	1	1						1	1			1	1	13
3	CPL/PIL	S/B	PRINT	1	1		1					1		1	1	1						1								9
4	EQPT HAND BOOK	S/B	PRINT	1	1	1					1			1	1	1						1	1	1	1	1	1	1		14
5	INSTALLATION SPECS	S/B	PRINT	1	1	1					1											1	1							7
6	EQPT CODE	S/B	PRINT	1	1	1	1				1											1	1				1			9
7	MACHINERY INFO BOOK	S/B	PRINT	1	1						1			1	1							1	1	1				1		10
8	TEST CERTIFICATES LLYODS / IRS ETC	S/B	PRINT	1	1									1								1	1				1			6
9	EQPT ORDER COPY	S/B	PRINT	1	1																	1					1			4





## 1.2 TECHNICAL AND OTHER INFORMATION

Following drawing / data / information to be submitted along with your technical offer

No.	Requirement / Description	To be declared / confirmed / submitted by Manufacturer / Supplier
1	Rudder calculations [including rudder torque]	
2	Rudder arrangement and details drawing.	
3	Rudder Installation drawings	
4	DME 452 is to be the guiding document for preparation and distribution of all technical / information	
5	Introduction of organization including details of turnover, sales figures and reference list	
6	Construction / performance details of equipment / machinery offered	
7	Product support strategy including minimum stock level, lead time for supply, rupee payment facility for imported items if any	
8	Details of service network	
9	Details of import content as applicable and indigenisation plans for the same	
10	Life cycle costing taking in to consideration, operating, watch keeping, maintenance, spares and other associated costs	
11	General content of standard documentation being provided [details of operation manual, technical manual, PIL, watch keeping, calendar based routines, stock calculations etc.]	
12	Letter of undertaking contractual commitment to provide product support for a minimum period of 15 years after delivery of the last vessel to Indian Navy or 20 years after delivery of the vessel whichever is later. In case the equipment / machinery is likely to become obsolete, the vendor should confirm to give a clear three years notice to the Indian Navy to assess the requirement of "life time buy" of the spares. The vendor should also confirm and ensure supply of these items prior to discontinuation of the production facilities	



1.3 **ONBOARD SPARES AS A STANDARD SCOPE OF SUPPLY FOR HIGH LIFT TYPE RUDDER ARRANGEMENT FOR 2 YEARS (OPERATION CYCLE: 4500 HOURS / ANNUM) OPERATION OF THE SHIP AS PER CLASS REQUIREMENT AND MAKER'S STANDARD (LIST OF ABOVE SPARES TO BE SUBMITTED WITH QTY. SPECIFIED)**

No.	Description	Quantity / Ship	Remark
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			



1.4 **TOOLS, SPECIAL TOOLS, JIGS AND FIXTURES REQUIRED FOR THE INSTALLATION / OPENING AND GUARANTEED OPERATION CYCLE OF TWO YEARS AS A STANDARD SCOPE FOR HIGH LIFT TYPE RUDDER ARRANGEMENT AS PER CLASS REQUIREMENT AND MAKER'S STANDARD (LIST OF ABOVE TOOLS TO BE SUBMITTED WITH QTY. SPECIFIED)**

No.	Description	Quantity / Ship	Remark
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			



1.5 **BASE AND DEPOT SPARES FOR HIGH LIFT TYPE RUDDER ARRANGEMENT FOR 5 YEARS OPERATION OF THE SHIP AS PER MAKER'S STANDARD (LIST OF ABOVE SPARES TO BE SUBMITTED WITH QTY. AND ITEM RATE / PRICE SPECIFIED)**

No.	Description	Quantity / Ship	Rate	Remark
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				