

HINDUSTAN SHIPYARD LTD.: VISAKHAPATNAM – 530005

PRQ No:PRQE/000623/11-12

TECHNICAL SPECIFICATION & SCOPE OF SUPPLY OF CO2 FIXED FIRE EXTINGUISHING SYSTEM FOR ENGINE ROOM OF 50TON BOLLARD PULL TUG FOR THE INDIAN NAVY; VESSEL NO – 11162-64

GENERAL PART

SL NO	DESCRIPTION OF SPECIFICATION OF CO2 FIXED FIRE EXTINGUISHING SYSTEM	VENDORS REPLY COMPLIED / NOT COMPLIED
1.0	GENERAL CONDITIONS:	
1.1	Quantities mentioned below are for one ship. Whereas the material is required for THREE Ships. Quotations are invited in triplicate in English language for the supply of equipment. Scope of supply is described as per Annexure –I and Annexure –II.	
1.2	CLASS RULES: The Equipment shall conform to the following rules and regulations; a) Indian merchant Shipping Rules for Fire fighting appliances (Mercantile Marine Dept. (MMD) Rules), Govt. of India b) SOLAS & FSS Code with latest amendments.	
1.3	The vessel is being built under classification of Indian Register of Shipping (IRS), Class notation is; a) + SUL *TUG* +IY, AGNI 1. The vessel class notation as Fire fighting vessel (FFV) should meet AGNI-1 requirements. b) Indian Register of Shipping-All the equipment and connected parts shall be manufactured in accordance to the above classification societies Rule requirements and are to be inspected and tested in the presence of the IRS surveyors and necessary inspection certificates are to be furnished in THREE original and Six Photo copies. c) For the equipment supplied by foreign makers, their Govt. Maritime certification is required in addition to IRS certification. d) In case of vendors from abroad, if the IRS Classification society is not available in that country/region, the Class Inspection shall be arranged by LRS/ABS/DNV Etc.on behalf of IRS. Vendor shall obtain a letter in this regard from IRS.	
1.4	The vendor shall prepare the required drawings and furnish the same in 8 sets to HSL for obtaining approval of HSL & IHQ MOD (N) within 2 weeks after receipt of order. Final arrangement will be provided as per IHQ MOD (N) approval.	
1.5	After obtaining approval of HSL & IHQ MOD (N), the Vendor shall submit and obtain approval of all the detailed drawings and arrangement plans from IRS.	
1.6	Instruction /Operating manuals, display charts, works/class test	

	certificates are to be furnished in 6 sets per vessel after placement of order.	
1.7	<u>Documents to be furnished by vendors along with offer:</u>	
1.7.1	General arrangement and layout plan indicating the proposed lead of pipes, and disposition of terminal points in triplicate.	
1.7.2	Full technical literature and operating instructions with pamphlets pertaining to the alarms & other components.	
1.7.3	Detailed list of the items to be supplied for the complete operation of the Co2 fire extinguishing systems as detailed under clause 'scope of Supply' including high pressure piping, pipe fittings(unions ,tees), Co2 release piping etc. upto Master valves. All materials shall be furnished with Classification Test Certificates / type approval certificates. All valves, NRV'S, spring loaded safety valves, time delay units must be made of Steel /Bronze/Nodular cast iron of class approved quality. All Co2 pipes are to be seamless galvanized and approved by IRS. High pressure pipes/manifolds are to be tested to 190 Kg/sqcm. IRS certificates shall be furnished. Following information to be furnished ; a) Sizes of piping & Quantity offered; b) Piping jointing high pressure pipes, flanges ,bolts & nuts; c) Pipe jointing low pressure pipes, flanges ,bolts & nuts; d) Blank flanges/fitting to pressure test/blow the system with fresh air , low pressure pipes in place of Nozzle blanking. e) Various sizes of bends,tees,unions. f) Deck fittings for various sizes of pipes. g) Valves h) Alarms/sirems/hooters with flashing beacons i) Other fittings j) Pressure gauges(0 to 250 Bar),clamps, bolts & nuts k) Co2 release precision/pilot pipes/tubes with fittings. l) Metal/wood racks & storage box.	
1.8	<u>Documents to be prepared and furnished by vendors after placement of order:</u>	
1.8.1	P & I Schematic drawing of the Co2 fixed fire extinguishing system indicating all the components including Mechanical & electrical items.	
1.8.2	General arrangement and layout plan showing the lead of pipes, location of distribution nozzles, pipe drains, bulkhead and deck fittings etc. for 'Total flooding' of Engine room'.	
1.8.3	Arrangement of Co2 cylinders, manifolds, pilot valves, control valve operation arrangement, cylinder-weighing device etc. in the Co2 Room.	
1.8.4	Co2 cylinder, weight and Co2 filling certificates.	
1.8.6	Any other plans/information as may be considered necessary.	
1.8.7	Detailed list of the items to be supplied for the complete operation of the Co2 fire extinguishing systems as detailed under clause 'scope of Supply' including high pressure piping, pipe fittings, Co2 release	

	<p>pipings upto Master valves. All materials shall be furnished with Classification Test Certificates / type approval certificates.</p> <p>All valves, NRV'S spring loaded safety valves must be made of Steel /Bronze/Nodular cast iron of class approved quality. All Co2 pipes are to be seamless galvanized and approved by IRS. High pressure pipes are to be tested to 190 Kg/sqcm. IRS certificates shall be furnished.</p>	
1.9	<p>Guarantee: Suppliers shall guarantee all materials, supplied by them against faulty design and defective workmanship and materials and undertake repairs or replacements of all parts found defective within a period of twelve months from date of delivery of the vessel to her owners or thirty months from the date of dispatch of the last consignment.</p>	
1.10	<p>Electrical part of supply shall conform to electrical specification – Annexure- II.</p>	
1.11	<p>SPARES :</p>	
1.11.1	<p>Class and manufacturer recommended Spares (Optional cost to be indicated)</p>	
1.11.2	<p>Onboard Spares: (Optional cost to be indicated)</p> <p>List of Manufacturer Recommended Spares with pattern/part number with individual cost shall be indicated in the offer for two years operation of each vessel. The spares consumed within the guarantee period to rectify / liquidated known defects shall be replaced free of cost.</p>	
1.11.3	<p>Base and Depot Spares : (Optional cost to be indicated)</p> <p>The tenderer shall arrange for quotation from Original equipment suppliers in ILMS format as recommended by them for Base and Depot spares for five years exploitation The quotation shall be for unit price of each item offered. Copy of parts Identification List shall be enclosed to the technical offer. The validity of the offer be for 18 months. The cost of B&D spares will not be considered while evaluating offer.</p>	
1.12	<p>Class and manufacturer recommended tools</p>	
1.13	<p>Product Support: Supplier should confirm that they will provide product support for a minimum period of 20 Years from the date of delivery of the vessel for complete Machinery and Electrical equipment being supplied by them.</p>	
1.14	<p>Systems and features not included in the specification, which vendors deem necessary for satisfactory operation of the supplied system shall be supplied free of cost if observed during installation & commissioning.</p>	
1.15	<p>The vendor shall clearly indicate their reference list and the field records showing well proven performance of their equipment</p>	
1.16	<p>FINAL SELECTION OF THE EQUIPMENT :</p>	
1.16.1	<p>Shall be under the discretion of ship owners based on the TNC (Technical Negotiation Committee) held between representatives of Owners, HSL and OEM.</p>	

1.16.2	Weight is one of the most important criteria for selection of the equipment therefore, maximum weight of the equipment viz. Co2 Cylinder assembly + Manifold +Pilot cabinets+Alarms+ accessories /Tools should be within 1500 Kgs.	
1.17	Training for personnel	
1.17.1	OEM factory training: shall be arranged at manufacturer premises on the Maintenance and operation of the equipment (Mechanical, Electrical & Electronic). OEM shall provide an outline of the training program with the offer. Expenditure on traveling, boarding, lodging and transportation of personnel will be borne by Owners / HSL. [Optional cost for technical crew training per person per day at OEM Factory shall be indicated in the offer].	
1.17.2	Onboard Training of Crew and Maintenance Personnel: The training of crew and shore maintenance personnel (total 10 persons per tug) at the time of commissioning of the equipment by OEM representatives shall be arranged. Vendor shall provide an outline of their training program and recommended duration with the offer. [Optional cost for the onsite crew training at HSL shall be indicated in the offer].	
1.18	Environmental conditions : All equipment provided on the craft should be of marinised version and should be capable of continuously performing the specified duty under the following ambient conditions: <ul style="list-style-type: none"> a) Air temperature - upto 45⁰C b) Maximum machinery space temperature - upto 55⁰C c) Sea water temperature - upto 35⁰C d) Relative humidity - 100% at 35⁰C 	

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HINDUSTAN SHIPYARD LTD.: VISAKHAPATNAM – 530005**TECHNICAL SPECIFICATION & SCOPE OF SUPPLY OF CO2 FIXED FIRE EXTINGUISHING SYSTEM FOR ENGINE ROOM OF 50TON BOLLARD PULL TUG FOR THE INDIAN NAVY; VESSEL NO – 11162-64****MACHINERY PART**

2	<u>Details of Scope of supply -</u>	VENDORS REPLY COMPLIED / NOT COMPLIED
2.1	<p>The Engine room shall be protected with Co2 Fixed fire Extinguishing system. The gross requirement of Co2 gas may be calculated basing on the following data;</p> <p>a) Vol. of Engine Room including MCR (with out casing) : 603 M³ b) Vol. of MCR : 24M³ c) Vol. of Engine room casing/Funnels : 25 M³ d) Capacity of Air bottles ; i) 2 no.s of 1000 Litres Air Bottles @ 30 BAR</p> <p>Note:</p> <p>1: Please note that there are two funnels for Engine room; each funnel vol. is 12.5 M³. CO2 gas calculations shall be incorporated in the drawing. The Co2 gas as required shall be discharged into the protected spaces through classification approved galvanized steel pipes. Co2 gas piping shall be Such that gas should be evenly distributed. Provision shall be made for draining the pipelines. Nozzles are to be such that dust shall not get into the pipe.</p>	
2.2	<u>Engine Room: Fire extinguishing:</u>	
2.2.1	<p>a) The engine room shall be protected against fire by Co2 total flooding system separately. The Co2 Cylinders and manifolds shall be located in a Co2 room on the main deck and shall be pressure operated type. Co2 total flood release boxes for the engine room shall be arranged at outside Engine room and in Co2 room.</p> <p>b) Two separate control boxes (Dual shot)/Pilot cabinets shall be provided for releasing carbon dioxide into a protected space. Each control box shall have two pilot cylinders and to ensure it activates the alarm. One control shall be used to discharge the gas from its storage containers. A second control shall be used for opening the main valve of the piping, which conveys the gas into the protected space.</p> <p>c) The two controls shall be located inside a release box with clear</p>	

	<p>identification, a key box shall be provided in a break glass type enclosure compulsorily located adjacent to the release box.</p> <p>d) Two pilot cylinders are to be provided at each operating position. The required amount of CO₂ shall be released by operating quick opening valve located in the releasing box, for the pilot cylinders. It must be also possible to operate the system manually in Co₂ room. The gas shall be released into Engine room within two minutes through properly graded piping and appropriately distributed multi-jet nozzles both below and above floor plates. Calculation for discharge of Co₂ to these rooms within two minutes individually to be furnished.</p>	
2.2.2	<p>The Co₂ gas shall be supplied in 67 liters capacity Co₂ cylinders with Syphonic tube of copper/stainless steel and valves and approved type of safety disc with a bursting pressure of 0.9 times of the test pressure of cylinder. Each cylinder to be charged with 45 kgs. Of Co₂ suitably manifold together and located in Co₂ room shown in the enclosed general arrangement plans. All Co₂ cylinders shall be manufactured under the Survey of the classification societies and test certificates for all the Cylinders are to be furnished in one original and eight Photostat copies LRS/IRS for Co₂ filling certificate also to be supplied in one original and eight copies. All Co₂ cylinders shall be hard stamped on the shoulder Giving details such as manufacturers monogram, empty weight tare Weight gross weight etc. as per specification ISO 3500. The cylinders are to be as per Bs 5045-1. The cylinder valves shall be of quick release or preferable diaphragm approved by class. Number of Co₂ cylinders required to be sufficient as required for the largest machinery space as per rules .Clamping Arrangements of Co₂ cylinders are to be included. The clamps steel straps are to be of rubberized type or clamps with wooden rack.</p>	
2.2.3	<p>Pressure gauges 0-250 bar as per MMD rules are to be provided in CO₂ manifolds in Co₂ room and on fire station to indicate pressure.</p>	
2.2.4	<p>A distant reading thermometer to be provided out side Co₂ room to indicate the Co₂ room temperature.</p>	
2.2.5	<p>Co₂ cylinder weight and Co₂ filling certificates.</p>	
2.3	<p><u>Alarm devices and safety devices:</u></p>	
2.3.1	<p>For the details of electronically operated alarm devices, refer Annexure-II-Electrical specification.</p>	
2.3.2	<p>The spaces protected against fire extinguishing shall have electrically operated alarms which shall be operated, before the Co₂ is being</p>	

	released to protected spaces to warn the working personnel there on.	
2.3.3	On opening of the door of the control box for engine room located in co2 room and alleyway the following shall operate: a) All the electronically operated alarm devices situated in Engine room as detailed in Annexure-II. b) All engine room ventilation fans, draft fan, main engine auxiliary blower, oil pump units shall shut down automatically. c) Limit switches (door switches) shall be fitted to the door of the control box.	
2.3.4	Co2 operated alarms are also to be provided for engine room.	
2.3.5	In order to indicate accidental operation of the master valves, installed in the Co2 cylinder room a valve switch shall be fitted to each valve and wired to the alarm devices as per class rules.	
2.3.6	A pressure switch shall be installed on the manifold which shall actuate alarm devices in the wheelhouse and engine room when there is pressure build up due to leakage of any cylinder.	
2.3.7	A safety valve shall be mounted on the Co2 main manifold.	
2.3.8	If any other electrical alarm devices are required additionally as per Classification / MMD rules, the same are to be included in the scope of supply.	
2.3.9	A Co2 cylinder weighing device shall be installed in the Co2 room for weighing of co2 cylinders.	
2.3.10	Blank flange connections shall be provided on each Co2 discharge Line for testing with compressed air.	
2.3.11	In co2 room, a wooden box shall be provided to store all cylinder caps.	
2.3.12	Classification recommended spares are to be listed out separately and included in the scope of supply.	
2.3.13	Maker's standard spares for two years maintenance of the complete plant is to be listed separately and included in the quotation.	
2.3.14	The approximate weight of the Co2 system including gas shall be within 1000 Kgs.	
NOTE	The Following Drawings are enclosed herewith, 1) General arggt. Drawing. No: 20001 B	

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ANNEXURE-II
HINDUSTAN SHIPYARD LIMITED, VISAKHAPATNAM-530005

ELECTRICAL PART OF TECHNICAL SPECIFICATION FOR CO2 FIXED
FIRE EXTINGUISHING PLANTS FOR MACHINERY SPACES
FOR VC-11162-64.

SL NO	DESCRIPTION OF SPECIFICATION OF CO2 FIXED FIRE EXTINGUISHING SYSTEM	VENDORS REPLY COMPLIED / NOT COMPLIED												
1.0	GENERAL:													
1.1	All the electrical equipments/units shall be of marine design and shall be in compliance with the requirements specified in paras 1.2 and 1.3 of General part of the technical specification.													
1.2	All the electrical equipments/ alarm devices shall be supplied with Test/Inspection certificates of Indian Register of shipping and Mercantile Marine Department													
1.3	All the DC alarms shall be of low power consumption design and shall operate satisfactorily even on 20% reduction in the rated voltage. The coil shall be insulated and impregnated to withstand the conditions of heat, oil and moisture prevailing in the marine environment.													
2	TECHNICAL SPECIFICATION:													
2.1	All the electric alarm devices, horns, rotating lamps, buzzers, pressure switches and micro- switches (door switches) shall operate on 24 V DC power supply system.													
2.2	The following alarms shall be supplied for CO2 Release system. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th style="text-align: center;">Sl No.</th> <th style="text-align: center;">Description of Item</th> <th style="text-align: center;">Location</th> <th style="text-align: center;">Quantity</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2.2.1</td> <td>24 V DC weather proof, electric horn with Red rotating lamp suitable for Engine room installation..</td> <td style="text-align: center;">Engine Room</td> <td style="text-align: center;">2 Nos.</td> </tr> <tr> <td style="text-align: center;">2.2.2</td> <td>24 V DC Buzzer with Red lamp</td> <td style="text-align: center;">Wheel House & Engine Control room</td> <td style="text-align: center;">2 Nos.</td> </tr> </tbody> </table>	Sl No.	Description of Item	Location	Quantity	2.2.1	24 V DC weather proof, electric horn with Red rotating lamp suitable for Engine room installation..	Engine Room	2 Nos.	2.2.2	24 V DC Buzzer with Red lamp	Wheel House & Engine Control room	2 Nos.	
Sl No.	Description of Item	Location	Quantity											
2.2.1	24 V DC weather proof, electric horn with Red rotating lamp suitable for Engine room installation..	Engine Room	2 Nos.											
2.2.2	24 V DC Buzzer with Red lamp	Wheel House & Engine Control room	2 Nos.											

2.3	The following alarms shall be supplied for CO2 Pressure leakage system.			
	SI No.	Description of Item	Location	Quantity
	2.3.1	24 V DC weather proof, electric horn with Red rotating lamp suitable for Engine room installation..	Engine Room	2 Nos.
	2.3.2	24 V DC Buzzer with Red Lamp	Wheel House	2 Nos.
2.4	2 Nos. each micro switches (door switches) having 1 No. + 1 Nc. contact arrangement shall be provided on the following items.			
2.4.1	Master Valve/Selector valves			
2.4.2	All release lockers			
2.5	<u>SPARES :</u>			
	The Electrical spares shall be provided as per clause no.1.11 of General part.			
3	<u>DRAWINGS AND LITERATURE :</u>			
3.1	Within Two(2) weeks after receipt of detailed literature of the audio alarms and the electrical schematic layout showing the door switches, electric horns, buzzers etc. shall be supplied in duplicate.			
3.2	Electrical drawings indicating schematic layout and connection diagrams shall e supplied in transparencies after obtaining approvals from Classification Society			

Manager (EDO)