



कोचिन पत्तन प्राधिकरण  
Cochin Port Authority  
समुद्री विभाग /Marine Department



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NO.MD/DM/MLA-Q4/2024

Dated:14-06-2024.

### **NOTICE INVITING BUDGETARY OFFERS**

Cochin Port Authority (CoPA) is contemplating to install two nos. new Marine Unloading Arms at its Oil Berth Q-4 as per the Scope of Work and Technical Specification attached as per Annexure –II.

Port is in the process of preparing the detailed estimate for the above work. It is proposed to invite open tenders for the work shortly.

The bidders are requested to submit the Budgetary rates as per Annexure-I attached and may be sent by email (e-mail: [dc@cochinport.gov.in](mailto:dc@cochinport.gov.in), [dm@cochinport.gov.in](mailto:dm@cochinport.gov.in), [sajeev.va@cochinport.gov.in](mailto:sajeev.va@cochinport.gov.in)) so as to reach us on or before 18-06-2024 at 17:00 hrs.

The bidders may note that the rates are invited only for **budgetary** purpose. Cochin Port is not bound to award the work to any bidders based on the **budgetary** rates submitted. Cochin Port Authority will not be liable for any financial obligation to the bidders in connection with the preparation of their budgetary rates.

Yours faithfully,

Encl: ANNEXURE - I & II

Sd/-  
SUPERINTENDING ENGINEER(M)  
TANKER TERMINALS

**BUDGETARY OFFER**

**SUPPLY OF 2 NOS. NEW UNLOADING ARMS WITH CONNECTED ACCESSORIES**

Name and address of the bidder:

Sl. No.	Description	Qty.	Unit	Rate /unit (indicate currency)excluding Customs Duty/GST	Total Amount	% of Customs Duty/GST applicable
1	Basic cost of design , manufacture and supply of new unloading arms and accessories (CIF Value) at Cochin Sea Port.	2	Nos.			
2	Cost of Spares (CIF Value) at Cochin Sea Port  2.1 One set of Control Valve Assembly. 2.2 One set of Seal for all the hydraulic cylinders. 2.3 One set of seal for each type of swivel joints. 2.4 One set of Solenoid valves for the control system. 2.5 One full set of relays, fuses, gaskets etc. 2.6 One number Megger for flange insulation testing.	Lumpsum	1 unit			
3	Cost of erection, testing and commissioning of two Nos. Marine Unloading Arms at Cochin Port Site (all inclusive but excluding GST)	2	Nos.			

Signature of the representative.

**SCOPE OF WORK & TECHNICAL SPECIFICATION**

Scope of work envisaged in this contract includes the following:

1. Design, Manufacture and supply of 2 Nos. new 12” dia Unloading arms fitted with hydraulic QCDC and Double Ball Valve- Emergency Release Coupling (DBV-ERC) and connected accessories such as Hydraulic system, electrical system, safety system, as per the given specification.
2. Erection and testing of one arm at the firm’s premises for pre-shipment inspection by the third party inspection agency.
3. The cabling from the power house to the Arms shall be the responsibility of the contractor. (Power House is located about 100 m away from the arm location)
4. Foundation: Contractor is required to construct suitable foundations for the 2 Nos. Marine Unloading Arms.
5. The Marine Unloading Arms shall be unloaded at the work site provided near Q-4 berth for assembling and inspections. After completing the pre-installation checks the arms shall be shifted to the installation site at Q-4 and erect on the foundations , testing and commissioning.
6. Shifting the arms to the installation point shall be the responsibility of the contractor. The crane(s) /lifting equipments and man-power shall be provided by the Contractor at his cost and risk.
7. Providing necessary accessories and carry out the required civil, electrical, mechanical and hydraulic works for the efficient and effective functioning of the Marine Unloading Arms shall be the scope of work of the contractor.
8. Providing necessary connections from the tail end of the Unloading Arms to the existing pipe lines of all the Tank Farm operators shall be under the scope of the Contractor.
9. Providing man power, all types of construction equipments, tools and tackles, man power fully equipped with all the required support facilities including mobilization and demobilization of the same to/from the work sites as may be required for successful completion of the work shall be under the scope of the Contractor.
10. Appraisal and taking cognizance of the site conditions, Indian Govt. /State Govt./Dock Safety Rules and Regulations, bye-laws, applicable codes and standards, permission from authorities having jurisdiction over the work site including conditions/stipulations laid down by the concerned authorities etc. shall be under the scope of the Contractor.
11. Obtaining Port and other statutory clearances from concerned Government Authorities for bringing all the materials, equipments, consumables etc. required for permanent incorporation in works to the work site and disposal of debris generated during the execution of works shall be removed from the work site shall be under the scope of the contractor.
12. Imparting operational & maintenance training to Engineers and Staff of COPA.

## Technical Specification of Marine Unloading Arms – Total 2 Nos.

Arm shall be suitable to operate as per the berth data and vessel profile furnished below:-

### A. Q4 Berth and Ship Data:-

Sl. No.	Parameter	Value	Remarks
1	Height of the Berth above Chart Datum	(+)2.9 m Chart Datum	Chart Datum is 0.582 m below MSL
2	Permissible Draft of vessel	9.14 m	
	Capacity of vessels to be handled	Upto 50,000 DWT	
3	Thickness of the Berth (RCC)	500 mm	
4	Highest High Water Level	(+) 1.20 m	
5	Mean High Water Spring (MHWS)	(+) 0.92 m	
6	Mean Low Water Spring (MLWS)	(+) 0.80 m	
7	Mean Sea Level (MSL)	(+) 0.582 m	
8	Mean High Water Neap(MHWN)	(+) 0.60 m	
9	Mean Low Water Neap (MLWN)	(+) 0.30 m	
10	Lowest Low Water Level	(+)0.20 m	
11	Fender width	1.1 m compressed, 2.1 m relaxed.	
12	Longitudinal Drift (Fore & Aft)	6.0 m both ways	
13	Outward Drift	6.0 m	
14	Arm centerline to Jetty edge	3.50 m	
15	Unit spacing (Centre line)	3.50 m	
16	Tanker Flange Spacing (centre line)	Not less than 2.50m	
17	Tanker side to Tanker Manifold Face	4.50 m $\pm$ 0.5 m	

### B. Operating Parameters:

Sl. No.	Parameter	Requirement	Remarks
1	Nominal dia of the Loading Arm Pipe	300 mm (12")	
2	Mode of operation	Eelectro-hydraulic	
3	Electrical supply on which the equipment operates	415 v, AC 3 phase, 50 cycles.	
	<b>Operating envelope for the arms:</b>		
1	Vertical Reach	(+) 3.5 Mtrs CD to (+)	

		21.0 Mtrs.CD	
2	Horizontal reach	17.5 Mtrs.	
3	Distance of Jetty face to centre line of riser	3.5 Mtrs.	
4	Distance of jetty face to arms in housed position	Not less than 1.5 Mtrs. Min.	
5	Rotation of the arms	Left 45° to right 45°	
	<b>Other Parameters</b>		
1	Number of arms that will be connected for simultaneous operations	2 Nos.	
2	Capacity of vessels to be served by the Marine Loading Arms	up to 50000 DWT	
3	Wind Velocity for which equipment have to withstand	In locked position - 120 kms/ hr  In operating position- 75 Kms/ hr	
4	Design Pressure of Marine Loading/Unloading Arms	≥18 Kg/ Cm <sup>2</sup>	
5	Operating Pressure of Arms	≥12 Kg/ Cm <sup>2</sup>	
6	Hyd. Test Pressure	1.5 times the operating Pressure	
7	Flow rate (Max.)	1500 M <sup>3</sup> /hr.	
8	QC DC Flange Size and Rating	Flange Size-12 inch, Rating – 150	
9	Tailpipe end Flange Size and Rating	Flange Size -12 inch, Rating -300 RF	
10	Drain line- Size 2” – Rating 150	To be provided on Tail end pipe and triple swivel assembly with isolating valve.	

C. Products to be handled: Class A, B and C products are proposed to be handled.

Sl. No.	Marine Unloading Arm 1 (White Oils)	Marine Unloading Arm 2 (Black Oil)
1	Motor Spirit	Fuel Oil
2	High Speed Diesel	Furnace Oil
3	Benzene	
4	Ethylene Dichloride	
5	Methanol	

### 1. General Specifications:

- 1.1.Design of the arms: Each of the Marine Unloading Arm shall consists of inboard arm assembly, out board arm assembly, double pipe riser assembly, swivel joint, counter weight system assembly, Hydraulic QCDC assembly and ERC assembly.
- 1.2.The swivel joints shall be designed such as to allow free movement of the arms in all positions for easy movement of the loading arms for the entire operating envelope specified. The swivel joints shall also have sealing arrangement which shall be completely leak proof.
- 1.3.Appropriate facilities shall be incorporated in the arms itself so as to carry out the maintenance/ replacement of seals of swivel joints without the use of any crane or external lifting arrangement.
- 1.4.The design shall permit easy inspection, maintenance/ replacement of vital units like swivel joints, without having to dismantle major sections of the arms.
- 1.5.The arms (including auxiliaries) shall be designed and manufactured for a minimum life period of 25 years. The manufacturer shall provide product support during the life time of 25 years.
- 1.6.The Unloading Arms shall be perfectly balanced in all positions of its movement by means of suitable counter weight system. The triple swivel assembly shall be balanced so that the connecting flange face remains vertical for all positions of slew angle for easy and safe connection to the ship's flange.
- 1.7.The design of the arms shall also be such as to automatically compensate for thermal expansion due to any temperature change within the range of ambient temperature i.e from 16° C to 43° C.
- 1.8. The arms shall be designed to absorb a surge pressure of 55 to 60 Kg/Cm<sup>2</sup> .

### 2. Standards & Codes

The latest edition of the following code, specification and regulations shall be used for the detailed design and specification of Marine Unloading Arm.

2.1.The Arm shall be designed and manufactured as per OCIMF Standard.

2.2.The design and manufacture of the Arms shall conform to the following international standards:

ANSI B 13.3 - Petroleum refinery piping

ANSI B 16.5 -Steel Pipe Flanges and Flanged Fittings

ASME B31.3 -Process Piping Code

ASME - Section VIII – Pressure vessels Division 1

ASME-Section IX- Welding and Brazing Qualification

ASME-Section V – Non-Destructive examination

BS 5500 -Unfired Fusion Welded Pressure Vessels

IEC 60079 Electrical Apparatus for Explosive Gas Atmosphere Part 14

Electrical Installations in Hazardous Areas (other than mines)

IEC 600529 Degrees of Protection Provided by Enclosures (IP Code)

API 6D Specification for Pipeline Valves

ISO 10497 Testing of Valves. Fire Type Testing Requirements

IS 1893 Criteria for Earthquake Resistant Design of Structures.

2.3.The materials used for the Arm shall conform to the following:

Pipes: ASTMA 106 Gr-B

Elbow: ASTMA 234 Gr. WPB

Flanges: ASTMA 105

3. Control/ Power system: The arms shall be provided with control systems for operating each arm independently. Simultaneous movement of arms shall be impossible during maneuvering/ flange connecting up operations. The Arms shall be provided with one set of fixed control system and another set of portable wireless control unit so that the arms can be operated either using the fixed unit or by the portable unit. The Arms shall not be operable from the Local control unit and the remote control unit at the same time. It shall be possible to operate Emergency stop from both the control units.

4. Electro Hydraulic System:

4.1. The hydraulic system shall comprise a self-contained, weather proof, explosion proof cabinet containing electro-hydraulic arm control equipment. The system operating the Arms shall consist of two sets of Hydraulic pump and flame proof motor. Out of the two hydraulic pumps one shall be kept as stand by. The system shall also be provided with emergency hand pump, hydraulic oil tank of suitable capacity with relief valves, pressure regulating valves, intake/ exhaust filters, gauges etc. required for smooth operation of the hydraulic system. The hydraulic system shall have provision for manual operation in the event of power failure.

4.2. Hydraulic Equipments for the operation of the various assemblies of the Arms such as double acting cylinders, hydraulic pipes and hoses shall be provided. Independent flushing of each of the hydraulic circuit shall be possible. All the hydraulic motion cylinders mounted on the Arms shall be nickel and chromium plated for corrosion protection and also shall be protected by bellows. Hydraulic pipes, reservoir etc. shall be weather and corrosion resistance type SS 316 L. All piping shall be securely supported and pipe runs shall be positioned to avoid mechanical damage.

5. Electrical System:

5.1. Port will provide 415 V, AC 3 phase, 50 cycles for the arms at the existing power house at the Fire Pump House of Q-4 Berth. The cabling from the power house to the Arms shall be the responsibility of the contractor.

5.2. The electrical equipment and armoured cables used for operation such as motor, the control unit etc. shall be intrinsically safe and weather proof/ flame proof as per Hazardous area classification. The cabling from the power house to the arms shall be done through FRLS cable trays/Conduits properly clamped. The required auxiliary and control supply shall be derived by means of a transformer and distribution to individual load shall be done by the contractor. The complete design, supply and installation of the electrical system will be within the scope of the contractor. The supply and installation of cables, wiring materials, cable trays, clamps, conduits, earthing & lightning protection connections etc. as required for commissioning are also within the scope of this contract.

6. Hydraulically operated QCDC couplers:

Each arm shall be provided with fully adaptable hydraulically operated QCDC coupler of an approved design in order to engage/ disengage the tankers manifold quickly. The size of the couplers shall conform to the nominal dia. of the Arms and should be capable of being adapted to sizes larger or smaller than the coupler nominal bore. The coupler shall be of light weight and should be capable of being operated rapidly giving an efficient leak proof joint when locked.



The coupler shall incorporate a dummy flange to prevent drainage when the arm is disconnected. Dummy Flange shall remain attached to the arm by a stainless steel chain.

The Couplers shall also be provided with the manual override for disconnecting the couplers in case of emergency without use of the hydraulic system.

The QC/DC shall have a mechanical locking device to prevent accidental release under pressure. The clamps of the QCDC shall act simultaneously with equal forces. The design of the coupler shall be such that lubrication of the parts is possible without dismantling.

7. Emergency Release System (ERS):

The Arms shall also be provided with an Emergency Release System which consisting of a Double Ball Valve Emergency Release Coupling to automatically disconnect the arm in case of emergency. The system shall be designed in such a way as to minimize the liquid trapped between the valves when closed, so that the spillage will be minimized during emergency disconnection. The ERS shall be hydraulically tested to 1.5 times the design pressure. Suitable means shall be provided so that the ERS can be tested without releasing the ERC. In the event of loss of hydraulic or electrical power, and after the power is reinstated, the ERS should remain “as is” and completely closed.

8. A mechanical- hydraulic interlocking system to prevent the emergency disconnection with the valves in open condition and to ensure re-opening of the valves only after the collar has been correctly engaged shall be provided. It shall be possible to operate the valves independently from the ERC collar, so that valves can be operated without activating the emergency procedure. The ERC shall guarantee the smooth & safe movement of the collar from the ERC flange in case of disconnection. The reassembly of the ERC after an emergency separation/ test shall be easy. The procedure and tools for the same shall be provided by the contractor. The portion of the out board arm and triple swivel assembly attached to the tanker after emergency release shall be easily recoverable.

9. Locking of the arms: Each of the Marine Loading Arms shall be provided with suitable locking device to lock the arms in parking position. The locking system shall be such as to restrain the movement of the Arms for the wind speeds specified.

10. Alarm System: Each arm shall be fitted with slew and luffing indicators so that the position of the arm within the safe operating envelope may be checked. Each arm shall be provided with Audio and Visual alarm system in order to warn the operating personnel when the arms are approaching the limits of safe operations.

11. Access Ladders: Each Arm shall be provided with access platform ladders for use of maintenance personnel to reach the top of the Arms and all fasteners shall be in stainless steel material suitable to be used in the saline atmosphere prevalent at the site to withstand corrosion.

12. The arms shall be fitted with lifting equipment to avoid need for crane for servicing.

13. Lubricating System: All the swivel joints and other parts which are subject to wear and tear shall be provided with Centralized lubricating system. The lubricating lines shall be of corrosion resistant stainless steel material suitable to be used in the saline atmosphere prevalent at the site. Elbows, pulleys and other moving parts shall be fitted with grease nipples and shall be capable of being lubricated without dismantling. Lubricating points shall be readily accessible in both housed and maintenance positions.

14. Painting: All the surfaces of the Marine Loading Arms shall be thoroughly shot/ sand blasted and painted as per the painting scheme detailed below. Paints used shall be Akzo Nobel/ Zigma/ Jotun. The primer as well as the other materials shall be of same brand and shall be got approval by the Engineer-in-charge/ authorized representative at site before application.

Painting Specification:

Surface Preparation:

Blast cleaned surface with SA 2 ½ specification.

Coating System:

Zinc ethyl silicate Primer	- 1 coat	60-70 µm
Epoxy MIO under coat	- 1 coat	100-110 µm
Poly siloxane finish coat	- 1 coat	100-125 µm

Coating Specification:

**a.Zinc ethyl silicate Primer:**

Color	- Grey
Finish	-Mat finish
Type	- Two pack
Application	- By spray (air/ airless)
Re-coatability	- 24 hours.

**b.Epoxy –MIO High Build**

Color	- Dark Brown
Finish	- Mat

Type	- Two Pack
Application	- Brush/ spray
Re-coatability	- 24 Hours

c. **Poly Siloxane finish Coat**

Color	- White
Finish	- Glossy
Type	- Two pack
Application	- By brush or airless spray

15. Earthing lug: Each arm shall be provided with an earthing lug at the riser base.
16. Drain Connection: Drain connection shall be provided at the lowest practical point on the riser and on the end of the arm.
17. Insulating Flange: An insulating Flange capable of providing a resistance of 200000 ohms shall be provided near the triple swivel assembly in order to electrically isolate the ship from the arm.
18. Vacuum Breaker: A Vacuum Breaker shall be located at the apex of the Arm and shall be fitted with non-return valve. The valve shall function properly in all orientations of the Arm.
19. Triple support Jack: Triple support jack shall be provided permanently attached to the ship's end of each unit to relieve the vessel manifold of some of the imposed loads. The assembly shall be adjustable to cover the range of manifold heights generally associated with the vessel sizes.
20. Control Unit: The control unit for the arms shall be placed at a suitable location so as to ensure free and unhindered view for the operator in all positions of the Arms within the operating envelope.
21. Requirement of additional arm: The power pack, the control unit, electrical and oleo dynamic equipment shall be designed in such a way that it is possible to install another two arms in future, if required.
22. Spares to be supplied along with the Arms:
  1. One set of Control Valve Assembly.
  2. One set of Seal for all the hydraulic cylinders.
  3. One set of seal for each type of swivel joints.
  4. One set of Solenoid valves for the control system.
  5. One full set of relays, fuses, gaskets etc.
  6. One number Megger for flange insulation testing.