PROJECT PECULIAR DOCUMENT FOR USCG-HSC-L
PPD-589-001
DETAIL SPECIFICATION FOR BUOY CRANE

PURCHASE SPECIFICATION FOR BUOY CRANE TO BE USED ON C.G. HSC-L VESSEL

1.0 SCOPE

1.1. This document sets forth the requirements for purchase of a buoy crane for an icebreaking CG buoy tender. Requirements include: design selection, performance verification, documentation, manufacture, testing, inspection, preservation, packaging, packing and marking of crane.

2.0 APPLICABLE DOCUMENTS

2.1. DOCUMENT AVAILABILITY - To obtain the referenced documents see section 6.

2.2. GOVERNMENT DOCUMENTS - The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the documents listed here by number and date shall be those in the current Department of Defense Single Stock Point of Specifications and Standards (DoDSSP) and supplements thereto.

2.3. SPECIFICATIONS

None

2.4. STANDARDS

None

2.5. OTHER GOVERNMENT DOCUMENTS - The following documents form a part of this specification to the extent specified herein.

The documents listed shall be by title and effective date, unless otherwise documented.

2.6. DRAWINGS

2.6.1. None

2.7. SPECIFICATIONS

2.7.1. COAST GUARD SPECIFICATION, D-000-0100 Dated 10/91 REV G 02/06, Bar Coding for USCG Procured Material.

2.8. TECHNICAL PUBLICATIONS

2.8.1. None

2.9. COMMERCIAL DOCUMENTS - The following documents form a part of this specification to the extent specified herein. The documents listed here shall be the version listed by number and date from the referenced industry organization. Commercial documents may also be listed in the Department of Defense Index of Specifications and Standards (DODISS).

2.9.1. American Petroleum Institute (API)

a. Specification 2C Offshore Pedestal-mounted Crane, 8th Edition, Dated 2020.

2.9.2. American National Standards Institute (ANSI)/ National Conference of Standards Laboratories (NCSL)

a. ANSI/NCSL Z540-1-1994 DATED 1994, General Requirements for Calibration Laboratories and Measuring and Test Equipment.

2.9.3. American Society for Quality Control (ASQC)

a. ANSI/ASQC Q9003-1994, DATED 1994, Quality Systems Model for Quality Assurance in Final Inspection and Test.

2.10. ORDER OF PRECEDENCE - In the event of a conflict between the text of this specification and the references cited herein, this specification shall take precedence.

3.0 REQUIREMENTS

3.1. GENERAL

3.1.1. The crane shall be a commercially available, knuckle boom design. The proposed model must have a documented service history of at least three years under operational conditions similar to those required by this contract.

3.1.2. The crane shall be designed, constructed, and tested in accordance with the American Petroleum Institute Specification 2C, Offshore Pedestal-mounted Crane.

a. The crane manufacturer shall hold a Monogram License from API.

3.1.3. Crane Functions

a. The crane shall be capable of a 4,500-pound offboard lift at an outreach of sixteen (16) feet and a 3,000-pound lift from a pier at an outreach of twenty-one (21) feet.

b. The lift shall have single part rigging.
The winch shall have a first layer of rope hoist/lower speed of zero to 40 fpm, under full load and operational sea states.

c. The crane shall slew at a variable rate of 0 to 1.0 rpm.

d. The crane shall operate at boom luff elevations of 0 de grees to not more than 79 degrees (above horizontal), under rated load in operational sea states at 1.0 deg/sec.

3.1.4. The vessel-specific method shall be used to calculate the dynamic forces acting on each crane. The following design parameters shall be used, which are a result of operation in Sea State 2 (1.6 ft significant wave height):

a. Crane Boom Tip Vertical Acceleration = 1g +/- 0.35g

b. Crane Boom Tip Horizontal Acceleration = 0.35g

c. Crane Base Horizontal Acceleration = 0.1g

d. Relative Vertical Velocity boom tip vs. Buoy = 5.6 ft/sec

e. Operating Wind Velocity of 20 knots

f. Operational and survival conditions

3.1.5. The vessel static inclinations for each crane shall be:

a. List = 7.5 deg

b. Trim = 0.5 deg

c. Each crane shall be designed to survive seas with a significant wave height of six feet. In the stowed position, equipment shall not be under hydraulic pressure and exposed hydraulic cylinders shall be protected from the weather.

3.1.6. Each crane shall be designed based on an intermediate duty cycle.

3.1.7. Each crane shall be capable of simultaneous operation of any two (2) combined functions (hoisting, luffing, slewing, and extension) at rated load, not less than 1/2 rated speed, and under the specified motion and list conditions without dropping the load or causing uncontrolled rotation of the crane boom.

3.1.8. In addition to the total horizontal design force calculated per API 2C, the cranes shall be designed for an additional 2% of side loading.

3.1.9. Operator's Cab. A cab shall not be provided.

3.1.10. Controls and Alarms

a. Controls shall be a wired portable umbilical chest pack console. Connection points for the chest pack shall be provided on the crane pedestal as well as provisions for one additional remote location. Wireless controls shall not be provided. The console shall contain controls for the functions of the crane, including but not limited to slewing, hoisting, and luffing functions, start/stop control and alarms.

b. Function controls shall be "spring-returned to neutral" type and shall govern movement in both directions.

c. Control Functions

i. Smooth starting and stopping of functions shall be obtained under service conditions of load and speed.

ii. The load, boom, or frames shall stop promptly and shall be held in position when controls are automatically returned to "neutral" positions.

iii. No combination of manipulations of the controls shall permit a freefall of a crane hook or boom.

d. Alarms. Monitoring and alarm systems shall be provided.

i. A warning horn shall be provided. Manual actuation of the horn shall be from the console.

ii. Anti-two-block (A2B) alarm. Crane shall be equipped with an anti-two-block system.

iii. For suspended trigger weight based mechanisms, at least 18 inches of line space shall be provided for the Anti-two-block system to initiate and decelerate the hook with the winch operating at not less than 2/3 rated speed. This dimension shall be included in the rigging design drawing.

iv. For encoder-based systems, an operational tolerance level shall be established and included in the rigging design. Step-by-step instructions for recalibration of the encoder settings shall be

provided in the maintenance manual. A2B and other crane safety systems shall be hard-wired.

e. Springs or micro-switches shall be IP-56 rated at a minimum.

3.1.11. Emergency override procedures. Override and emergency control features shall be provided with covers to prevent inadvertent operation.

3.1.12. Brakes shall be spring-set, hydraulically-released, and shall have a manual release feature. Brake discs shall be CRES or shall be enclosed in steel casing and run in oil.

3.1.13. Grease Lubrication.

a. Grease lubrication fittings shall be installed to provide lubrication for bearings (except for sealed for life type), bushings and other operating mechanisms not lubricated by oil bath.

b. Sliding mechanisms, unless operating in an oil bath, shall be provided with at least two (2) grease fittings 180 degrees apart.

c. Fittings in the weather shall be Monel; fittings internal to the vessel shall be CRES.

3.1.14. Lowering under power shall be positively controlled; freefall lowering shall not be permitted.

a. Hoisting speed under reduced load or light line shall not exceed 200 feet per minute.

b. The crane shall have sufficient length of rope to enable the crane hook to reach 48 ft. below the boom tip with the boom topped out and still have at least five full wraps of rope on the drum.

3.1.15. Synthetic Line. Winch line shall be Cordage Institute Class II high-strength synthetic fiber line, 8-plait or 12-plait construction, suitable for the application as recommended by the cordage manufacturer.

a. Line shall have less than 5% elongation at break after elongation from initial loading.

b. Cordage end terminations shall be greater than 95% efficient as recommended by the cordage manufacturer.

3.1.16. Access

a. Access to interiors of crane pedestals shall be provided for maintenance of hydraulic equipment.

b. The ends of hoses shall be accessible for hose replacement.

c. Maintenance accesses shall be provided for major components.

4.0 DRAWINGS - A design drawing suitable for installation requirements and repairs shall be provided.

5.0 LABOR AND MATERIALS - The contractor shall provide all labor and materials required to manufacture, test, inspect, preserve, package and pack the crane.

6. System Test Requirements
   6.1. Test Plans
      6.1.1. Test Plans shall be submitted prior to First Article Testing and Factory (Production) Testing to verify conformance with requirements and tolerances as specified in the cited drawings, technical publications, and this specification.
      6.1.2. Plans shall include a description and the pass/fail criteria for each test.
   6.2. The Contractor shall utilize a Test Stand for conducti ng First Article and Factory Tests.
      6.2.1. The Test Stand shall provide structural support for the crane in both tilted (10-degree list, 5-degree trim) and horizontal configurations.
   6.3. Test Reports
      6.3.1. The Contractor shall provide a Test Report to the customer for each test event.
      6.3.2. Each test report shall include the final test procedure with, at a minimum:
         6.3.2.1. A description of the test setup and procedures followed.
         6.3.2.2. Logs documenting the start and finish times of the test.
         6.3.2.3. A complete record of all measurements and data collected during the test.
         6.3.2.4. A detailed account of any anomalies, deviations from the test procedure, or failures.
         6.3.2.5. Photographic evidence of the test setup from at least two adjacent sides.
   6.4. No Load Tests
      6.4.1. A visual inspection and No Load Test shall be performed prior to all other operational or weight-based testing events including First Article and Factory testing.
      6.4.2. The test shall consist of operating the crane without a load through its full range of motions. During the test, verify and demonstrate that all of the following are fully functional and operate as intended:
         6.4.2.1. Brake and swing drives in both directions
         6.4.2.2. All controls, safety provisions, limits and interlocks.
         6.4.2.3. Operator interfaces and displays.

All other safety equipment and crane features.

6.5. First Article Testing

6.5.1. The following tests shall be performed on the first shipset of equipment constructed under this contract. All tests shall be conducted with the crane mounted on a test platform that has been tilted to simulate 10 degrees list and 5 degrees trim.

6.5.2. Static Load Test

6.5.2.1. The crane structure shall be static load tes ted to 200% of the Working Load Limit of the crane. (2.0 x 4,500 = 9,000 lbs). The load shall be externally applied to the structur e of the crane, exclusive of the rigging; the load s hall be slowly applied, held for 10 minutes and slowly removed under controlled conditions.

6.5.2.2. The position of the boom tip shall be triangulated with laser beams. Deflection measurements (in each of 3 a xes) based on the coordinate basis of the crane shall be recorded.

6.5.2.3. Upon load release, the crane structure shall return to the original position with no permanent deformities or deflections.

6.5.3. Modified Static / Brake Test

6.5.3.1. The rigging and brake systems shall be static load tested to 150% of the WLL of the crane, (6,750 lbs) by attaching the load and tensioning the rigging, setting the brakes, and limited lifting (grunt) of the test load by luffing.

6.5.3.2. The test load shall be held suspended for 10 minutes, without drifting or creeping. The test load shall be slowly removed by luffing down.

6.5.4. Dynamic Overload Testing

6.5.4.1. The crane shall be dynamically tested to 125 % of the WLL of the rigging system (5,625 lbs), by hoisting, luffing, and slewing the test load over the complete range of motion of the crane, subject to test weight interferences with str ucture.

6.5.4.2. The load shall be moved at slow to medium (not less than one half rated) speed.

6.5.4.3. Lift and lower the test weights repeatedly for at least 10 minutes using the winches. The load shall be stopped and held at several locations. Winch action should be smooth and uniform and not indicate problems.

6.5.4.4. Exercise the boom cylinders and slewing gear by moving the test load over the complete range of motion for at least 10 minutes. Cylinder and slewing actions shall be smooth and uniform and not indicate problems.

6.5.5. Rated Load Testing

6.5.5.1. The crane shall be tested at rated load of the main and auxiliary rigging systems (4,500 lbs) by hoisting, luffing, and slewing the test load over the complete range of motion of the crane subject to test weight interferences with structure.

6.5.5.2. The test weight shall be moved continuously for at least 10 minutes.

6.5.5.3. The following speeds shall be measured and recorded to establish baseline speeds for diagnostic comparison. Speeds do not include acceleration and deceleration at the beginning and end of movement. Speeds shall be recorded at least 6 times each and averaged, in both directions.

6.5.5.3.1. Load lifts and lower speeds (feet per second).

6.5.5.3.2. Boom luff and lower speeds (cylinder feet per second).

6.5.5.3.3. Jib luff and lower speeds (cylinder feet per second).

6.5.5.3.4. Slewing port and starboard (degrees per second).

6.5.6. Lubrication Demonstration

6.5.6.1. The Contractor shall validate the instructions for lubrication of the crane by performing the recommended maintenance, in accordance with the technical publication, for the Quality Assurance Inspector. All points of lubrication on the crane shall be addressed.

6.5.7. Control System Testing

6.5.7.1. The tethered controller shall be the control input for first article testing.

6.5.7.2. The complete control capabilities of the crane system shall be demonstrated from the primary and auxiliary controllers.

6.5.8. Monitoring and Display

6.5.9. The monitoring and display systems shall be completely tested. Extra sensors with separate readouts shall be provided to verify key system readings.

6.6. Factory Testing

6.6.1. Factory tests for additional cranes constructed under this contract shall be performed while mounted on a test platform that has been tilted to simulate 10 degrees list and 5 degrees trim and include:

6.6.1.1. Static Load Test in accordance with section 6.5.2.

6.6.1.2. Modified Static / Brake Test in accordance with section 6.5.3.

6.6.1.3. Dynamic Overload Test in accordance with section 6.5.4

6.6.1.4. Rated Load Test in accordance with section 6.5.5.

7.0 DATA FOR PROVISIONING

7.1. Recommended Spare Parts

7.1.1. On Board Repair Parts (OBRP) - The Contractor shall identify the recommended On-Board Repair Parts list within the Technical Publication. These parts shall be sufficient to perform shipboard maintenance on the equipment for two years.

7.1.2. Depot Level Spare Parts - The Contractor shall identify the recommended Depot Level Spare Parts within the Technical Publication. This list shall include all long lead time items or Coast Guard unique parts, assemblies and subassemblies that the Contractor believes are necessary to support fleet repairs for two years.

7.1.3. Initial Spare Parts - The Contractor shall provide an initial routine or disposable spare parts kit with each shipset of equipment, sufficient to operate the systems for not less than 6 months, assuming no major component

failure. This kit shall include spare fuses, filters, and lamps for each of these parts installed and similar components which may normally fail during the six-month period.

7.1.4. Technical Publications - The Contractor shall provide a new technical publication for the installation, operation and maintenance of the Marine Crane Unit for review and comment by the Government. The technical publication shall include:

a. Step by step instructions with illustrations for the resetting of all encoder variables and reference points.

b. Step by step instructions with illustrations on the calibration of all digital devices.

7.1.5. Software

a. The contractor shall provide a backup version of any software for operation of any/all programmable hardware on crane. The submission shall include a description for all basic elements such as contacts, coils, and registers. During the life of the contract the contractor shall be responsible to provide revised software when any programmable elements of the crane are changed or when any programming of the crane is otherwise changed. The backup version of the software shall be sufficient for the equipment to be rebooted to original configuration at the unit level.

8.0 QUALITY ASSURANCE (Q.A.)

8.1. GENERAL - The Contractor shall provide and maintain an inspection system which shall ensure each item offered to the Government for acceptance conforms to contract requirements. The system shall be documented and meet the requirements of ANSI/ASQC-Q9003-1994.

8.2. RESPONSIBILITY FOR INSPECTION - The Contractor shall be responsible for the performance of all inspection requirements as specified herein. The Contractor may use his own or any other facilities for the performance of the inspections and tests, unless disapproved by the government. The government reserves the right to perform any of the inspections and tests set forth in this specification at any time.

8.3. RESPONSIBILITY FOR COMPLIANCE - All items shall meet the requirements of this specification. The inspections set forth in this specification shall become part of the Contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the Contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling for quality conformance does not authorize submission of known defective material (either indicated or actual) nor does it commit the Government to acceptance of defective material.

8.4. INSPECTIONS/TESTS - The inspections and tests required herein are the minimum necessary and are not intended to replace any controls, examinations or tests normally employed by the Contractor to assure the quality of the product.

8.5. TEST AND INSPECTION REPORTS - One copy of any inspection, test or tolerance check report shall be sent to the Customer.

8.6. A copy of any test, inspection or tolerance check report shall also be turned over to the Coast Guard Quality Assurance Representative upon arrival at the Contractor's plant.

8.7. Any inspection, test or tolerance check report submitted shall have all out of tolerance readings circled.

8.8. CALIBRATION SYSTEM - The Contractor as well as any subcontractors shall be required to maintain a test equipment calibration program in compliance with ANSI/NCSL Z540-1. The program shall be documented and traceable to the National Institute of Standards (NIST).

8.9. The calibration system records shall be maintained for inspection for the duration of any contract referencing this specification.

8.10. PACKING INSPECTION - The Customer shall be notified prior to the preservation, packaging, packing, and marking of the completed units in accordance with section 3.14.

9.0 PRESERVATION, PACKAGING & PACKING, & MARKING

9.1. PRESERVATION & PACKAGING

9.1.1. Eash crane shall be preserved and packaged in accordance with the contractor's standard commercial practices.

10.0 MARKING

10.1. CONTAINER- Each preserved, and packed crane container shall be marked in the upper left-hand side of the two longest sides, (two opposite sides if square) of each box. The marking size shall be 1 inch high, minimum.

10.2. The exterior of each container shall be marked with the STOCK NUMBER, ITEM NAME, MODEL NUMBER, SERIAL NUMBER, CONTRACT NUMBER, SHIPPING WEIGHT (in lbs.), condition code ie. CONDITION A, UNIT OF ISSUE with QUANTITY (1) and the words COAST GUARD MATERIAL.

10.2.1. See below for marking layout.

STOCK NUMBER	TBD
ITEM NAME	Buoy Crane
MODEL NUMBER	TBD
SERIAL NUMBER	TBD
CONTRACT NUMBER	TBD
SHIPPING WEIGHT	As Determined by Contractor
CONDITION CODE	CONDITION A
QUANTITY & UNIT OF ISSUE	1-UNIT
	COAST GUARD MATERIAL
	REUSABLE CONTAINER DO NOT DESTROY

10.2.2. BAR CODING - Bar code labels shall be supplied on all CLIN's except for those that require data submissions only.

a. All bar coded labels shall be in accordance with CG specification D-000-0100 REV G, DATED 02/06.

b. The actual labels shall be Type "V", Grade "A", Style "2", Composition "b" with plastic laminate.

c. Each label shall contain encoded data for the Stock Number.

11.0 NOTES

11.1. GOVERNMENT & COMMERCIAL DOCUMENT SOURCES

11.1.1. GOVERNMENT DOCUMENTS

a. Department of Defense Single Stock Point (DoDSSP) Building 4, Section D

700 Robbins Avenue
Philadelphia PA 19111-5094
215-697-2267/2179
FAX 215-697-1462

b. DOD & Navy Publications & Forms (Other Than DoDSSP)
Naval Publication and Forms Center
5801 Tabor Ave.
Philadelphia PA. 19120
215-697-2000

11.1.2. COMMERCIAL DOCUMENTS

American Petroleum Institute (API)
200 Massachusetts Avenue NW
Suite 1100
Washington, DC 20001-5571
202-682-8000
www.api.org

Society of Automotive Engineers, Inc. (SAE)
400 Commonwealth Drive
Warrendale, PA 15096
412-776-4841
FAX 412-776-5760

American Society for Quality Control (ASQC)
611 East Wisconsin Avenue
Milwaukee, Wisconsin 53202
414-272-8575
FAX 414-272-1734

American National Standards Institute (ANSI)
25 West 42nd Street
(Between 5th and 6th Avenues)4th Floor
New York, NY 10018
212—642-4900
FAX 212-398-0023
www.ansi.org