

	Marine Loading Arms		IP 3-11-2	
			Page 1 of 8	
	(This practice is appropriate for attachment to Inquiry or Purchase Document)		Rev. 0	March 1998

SCOPE

- I 1.1 This practice covers all-metal, counterweighted, self-supported marine loading arms used at fixed marine berths (docks). It does not cover support structures, neither piers nor structural fabricated platforms.
- I 1.2 **An asterisk (*)** indicates that a decision by the Purchaser is required or that additional information will be furnished by the Purchaser.

SUMMARY OF ADDITIONAL REQUIREMENTS

- I 2.1 **Table 1** lists the practices, codes, specifications and standards which shall be used with this practice.

TABLE 1

PRACTICES			
IP 3-9-1	Winterizing and Protection against Ambient Temperatures	IP 18-7-1	Welding Procedures
IP 3-11-1	Marine Cargo Transfer Hose	IP 19-1-1	Paint and Protective Coatings
IP 3-16-1	Flanges, Gaskets, Bolting and Fittings	IP 20-1-1	Inspection of Equipment and Materials
IP 3-18-1	Piping Fabrication	IP 20-1-2	Administrative Procedures for Obtaining Inspection
IP 4-1-3	Design Loads for Structures	IP 20-1-3	Quality Programs
CODES, SPECIFICATIONS AND STANDARDS			
ASME Codes Section V Nondestructive Examinations Section VIII Pressure Vessels, Division 1 ASME Standards B16.5 Pipe Flanges and Flanged Fittings B31.3 Process Piping ANSI Standards A12.1 Safety Requirements for Floor and Wall Openings, Railings, and Toeboards A14.3 Safety Requirements for Fixed Ladders		ANSI / AWS Code D1.1 Structural Welding ANSI / NFPA Standard 70 National Electric Code AISC Manual of Steel Construction (ASD) - Specification for Structural Steel for Buildings OCIMF Design and Construction Specification for Marine Loading Arms (Parts I, II, III) - Revised Edition 1987	

- I * 2.2 The vendor shall comply with any **local rules or regulations** specified by the Purchaser.

DOCUMENTATION

PROPOSAL INFORMATION

- I 3.1 **The bidder's proposal** shall include the following information:
 - a. Total equipment list (within vendor's scope of supply), with description of each item.
 - b. Materials of construction including specifications and grades.
 - c. Data required per OCIMF Specification Part II Section 5.1. Where applicable, data required for Subpar. a through g, and k of this OCIMF Specification, shall be submitted as dimensioned drawings.
 - d. Swivel joint data indicating:
 - 1. Separate costs for testing each swivel having a different size, design, or materials of construction, in accordance with **Pars. 6.1 and 6.2**.
 - 2. Results of laboratory tests, if available, on swivels of the size, design and materials to be used in the arm(s).
 - e. Quick connect/disconnect coupler data indicating:
 - 1. Separate costs for testing each coupler having a different size, design or materials of construction, in accordance with **Pars. 7.1 and 7.2**.
 - 2. Results of laboratory tests, if available, on coupler(s) of the size to be used on the arm(s)

IP 3-11-2		Marine Loading Arms	
Page 2 of 8			
Rev. 0	March 1998		

(This practice is appropriate for attachment to Inquiry or Purchase Document)

DOCUMENTATION (Cont)

- f. Emergency release system data indicating:
 1. Separate costs for testing each system having a different size, design or materials of construction, in accordance with **Pars. 9.1 and 9.2.**
 2. Results of laboratory tests, if available, on ERS(s) of the size to be used on the arm(s).
- g. A description of the support device or alternative proposals to reduce manifold stresses, when required, showing the means of adjustment and the range of minimum/maximum deck to manifold centerlines that can be accommodated.
- h. Hydraulic control system data indicating:
 1. Representative hydraulic/electric logic diagram and equipment list.
 2. Description of system function during arm maneuvering, freewheel, over-ride and storage attitudes.
- i. The design and location of the electrical insulating flanges and fittings, and flexible hose showing cross-section, materials, and dimensions.
- j. Composite operating envelope for each arm including the spherical area for counterweight range.
- k. Separate cost for yard erection of each arm type.
- l. Separate cost for onsite assistance during assembly, erection, testing and commissioning of arms.
- m. Price list for spare parts, and list of recommended spares and special maintenance tools for first two years of service.
- n. A schedule of documentation submission for approval by the Owner's Engineer prior to contract award.
- o. **A list of exceptions to this practice; or if there are no exceptions, a statement to this effect.**

DRAWINGS AND DATA

- I 3.2 Unless otherwise specified or approved, **within 60 days from placing the order**, the vendor shall submit the information required by **OCIMF Specification Part III Section 5.0**, modified per the following, to the Purchaser for approval by the Owner's Engineer:
 - a. Complete calculations of:
 1. Stresses in critical components of the loading arms and tanker manifolds as required by **Par. 5.1 through 5.3.**
 2. Maximum lateral deflection of the arm in the connected, stored and maneuvering attitudes.
 3. Maximum equivalent axial loads (P_{CA}) on all swivels.
 4. Thermal stresses with cross sectional temperature profiles shown at various components.
 - b. In addition to the complete calculations per **Subpar. a. above**, summary tables shall be submitted giving:
 1. Location and magnitude of counterweights.
 2. Maximum stresses by member, including the member number keyed to a schematic drawing; also, the governing attitude and load combination.
 3. Swivel PCA loads, Coupler MCA loads, and ERS MCA loads.
 4. Maximum foundation loads of the completed arm assembly.
 - c. Welding and weld repair procedures for all welds and overlays.
 - d. Manual covering all details of required shop tests, including procedures, dimensioned equipment drawings and table of load levels to be tested.
 - e. Component drawings.

	Marine Loading Arms (This practice is appropriate for attachment to Inquiry or Purchase Document)	IP 3-11-2	
		Page 3 of 8	
		Rev. 0	March 1998

- I 3.3 Within 6 months of award but no later than one month before arm shipment, the vendor shall submit the following information to the Purchaser:
- a. A minimum of three sets of installation, operating, maintenance and testing manuals, in English, including the information required by **OCIMF Specification Part II Sections 5.3 and 5.4**, and the following, as applicable:
 - 1. Final layout and as-built drawings, with dimensional tolerances.
 - 2. Installation, commissioning, operation, maintenance, field testing and shutdown instructions, including assembly/erection drawings.
 - 3. Vessel and environmental operating and design limits.
 - 4. Settings, operating ranges and adjustment procedures for all instruments and controls.
 - 5. Manifold connection criteria.
 - 6. Simultaneous loading arm connection criteria.
 - 7. Loading arm reference envelopes.
 - b. Field interconnection wiring diagrams and wire/conduit installation drawings.

MATERIALS

- R 4.1 Unless otherwise specified, all materials will be in accordance with the requirements of the **OCIMF Specification**.
- R 4.2 Weld overlay materials and joint designs shall be selected to minimize metallurgical notches. **Prior to weld overlaying**, a minimum **preheat** of 250°F (122°C) shall be employed for all alloy steel base metals and for all carbon steel base metals whose carbon content exceeds 0.28%.
- R 4.3 **Butt, attachment, and overlay welds** shall be **postweld heat treated** as required by and in accordance with **ASME Code Section VIII-1, Par. UCS-56**. For all other materials requiring postweld heat treatment, vendor shall submit procedures for approval by Owner's Engineer.
- I * 4.4 Painting shall be in accordance with **IP 19-1.1 Service Category II (Marine Atmosphere)**. Top coat and color to be specified by the Owner. The vendor shall repair all damaged coating after installation but prior to final commissioning tests.

DESIGN

LOADING ARM AND TANKER MANIFOLD STRESS ANALYSIS

- R * 5.1 **The vendor shall analyze stresses in the loading arm and tanker manifolds** for the specified counterweight method in all appropriate arm attitudes; and, for operation of the arm both singly and in combination with other arms, as specified. **The load combinations and allowable stresses** are indicated in **Part I Tables 6.1 and 6.2** of the **OCIMF Specification**. The reduction of all other allowable stress values (other than allowable tensile stresses) shall be in the ratio of tensile design stresses required by this practice and the **OCIMF Specification** to the tensile design stress (Ft) permitted by **AISC Specification**. The exceptions to this requirement are:
- a. For the piping members where the allowable shear stress shall be **half the practice allowable tensile stress, and**
 - b. Where the effects of Thermal Loads (TL) can cause buckling, compression stresses **shall not** exceed allowable stresses of **AISC Specification**.
- The Owner reserves the right to conduct an independent stress analysis prior to final approval of vendor's design. Where differences exist between analyses, the higher calculated stress values shall govern the arm design.
- R 5.2 **Actual stresses in structural members** shall be combined in accordance with **AISC Specification**.
- R 5.3 **Allowable tensile stress for flange bolts** shall be per **ASME B31.3**.