MIL-B-16115F (YD)
21 August 1978
SUPERSEDING
MIL-B-16115E
6 April 1976

MILITARY SPECIFICATION

BUOYS, MOORING, AND MARKER

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers riser chain, telephone, and cylindrical mooring buoys; a peg top buoy having a cylindrical upper portion and a frustrum shaped lower portion; and tension bars for riser chain and peg top buoys.

* 1.2 Classification. Buoys shall be of the following types and sizes as specified (see 6.2):

Type I - Riser chain mooring buoy.

Size 6-1/2 - 6-1/2 feet diameter, 4 feet deep.
Size 7 - 7 feet diameter, 5 feet deep.
Size 9-1/2 - 9-1/2 feet diameter, 5 feet deep.
Size 10-1/2A - 10-1/2 feet diameter, 6-1/2 feet deep.
Size 10-1/2B - 10-1/2 feet diameter, 7-1/2 feet deep.
Size 12 - 12 feet diameter, 6 feet deep.

Type II - Telephone mooring buoy.

Size 14 - 14 feet diameter, 7 feet deep.
Size 15 - 15 feet diameter, 7-1/2 feet deep.
Size 16 - 16 feet diameter, 8-1/2 feet deep.
Size 17 - 17 feet diameter, 10-1/2 feet deep.

Type III - Marker buoy.

Size 3-1/2 - 3-1/2 feet diameter, spherical shape.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer (156), Naval Construction Battalion Center, Port Hueneme, CA 93043, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 2050

Type IV - Peg top mooring buoy.

Size 12 - 12 feet diameter, 9-1/2 feet deep.

Type V - Cylindrical mooring buoy.

Size 5 - 5 feet 6 inches diameter, 9 feet 6 inches long, MK V.
Size 6 - 5 feet 9 inches diameter, 12 feet long, MK 2, MOD 1.
Size 8 - 8 feet diameter, 14 feet 8 inches long, MK IV.

2. APPLICABLE DOCUMENTS

* 2.1 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

TT-E-522 - Enamel, Phenolic, Outside

MILITARY

MIL-T-704 - Treatment and Painting of Materiel.
MIL-C-18295 - Chain and Fittings for Fleet Moorings.
MIL-P-24441 - Paint, Epoxy-Polymide, General Specification for.

STANDARDS

FEDERAL

FED STD No. 595 - Colors.

MILITARY

MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-130 - Identification Marking of US Military Property.
MIL-STD-271 - Nondestructive Testing Requirements for Metals.

DRAWINGS

NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

620605 - Standard Fleet Moorings Hawse Pipe Riser Chain Type Buoy Details.
620657 - Standard Fleet Moorings Telephone Type Buoy Details Capacity 390,000 Lbs.
620659 - Standard Fleet Moorings Bar Riser Chain Type Buoy Details Capacity 166,000 Lbs.
620660 - Standard Fleet Moorings Telephone Type Buoy Details Capacity 170,000 Lbs.
620662 - Standard Marker or Mooring Buoy 3' -6" Diameter Capacity 12,000 Lbs.
620663 - Standard Fleet Moorings Chain and Fitting Details.
749872 - Standard Fleet Moorings Tension Bars for Hawse Pipe Buoys.
749873 - Standard Fleet Moorings Bar Riser Chain Type Buoy Details Capacity 42,000 Lbs.
1195707 - Standard Peg Top Buoy, General Arrangement and Details.
1195708 - Standard Peg Top Buoy, Details.

NAVAL SEA SYSTEM COMMAND

275040 - Mooring Buoy MK IV (Cylindrical 8'0" x 14'8") General Arrangement and Details.
275043 - Mooring Buoy Mark V (Cylindrical, 5'6" x 9'6") General Arrangement and Details.
275083 - Mooring Buoy MK 2 MOD 1 General Arrangement.

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

* 2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

B18.2.1 - Square and Hex Bolts and Screws, Including Askew Head Bolts, Hex Cap Screws, and Lag Screws.
B18.2.2 - Square and Hex Nuts.
B18.6.1 - Slotted and Recessed Head Wood Screws.

B18.6.2 - Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Cap Screws.
B.18.22.1 - Plain Washers.

(Applications for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A27 - Mild-to Medium-strength Carbon-Steel Castings for General Applications.
A36 - Structural Steel.
A570 - Hot-Rolled Carbon Steel Sheets and Strip, Grade D, of Structural Quality.
D2000 - Classification System for Elastomeric Materials for Automotive Applications.

(Applications for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

AMERICAN WELDING SOCIETY (AWS)

D1.1 - Structural Welding Code.
B3.0 - Standard Qualification Procedure.

(Application for copies should be addressed to the American Welding Society, 2501 N.W. 7th St., Miami, FL 33125.)

AMERICAN WOOD-PRESERVERS' ASSOCIATION STANDARD (AWPA)

C2 - Lumber, Timbers, Bridge Ties and Mine Ties-Preservative Treatment by Pressure Processes.
M4 - Standard for the Care of Pressure-Treated Wood Products.

(Application for copies should be addressed to the American Wood-Preservers' Association, 1625 Eye St., N.W., Washington, DC 20006.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

SOUTHERN PINE INSPECTION BUREAU (SPIB)

Standard Grading Rules for Southern Pine Lumber.

(Application for copies should be addressed to the Southern Pine Inspection Bureau, P.O. Box 846, Pensacola, FL 32502.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Tariff Publishing Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

Grading Rules For Western Lumber, 3rd Edition.

(Application for copies should be addressed to the Western Wood Products Association, Yeon Bldg., Portland, OR 97204.)

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies.

3. REQUIREMENTS

3.1 Materials. Material shall be as specified herein and as shown on the applicable drawings. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification unless otherwise specifically specified.

3.1.1 Structural steel. Steel plates, shapes, and bars shall conform to ASTM A36. Steel sheet shall conform to ASTM A570, condition and finish as appropriate. Wherever drawings call for obsolete ASTM

designations A7 or A245, the ASTM designation A36 and A570, respectively, shall be used. Laminated steel plate used at eyes of tension bars shall be free from defects affecting strength, when examined in accordance with 4.6.3. Basic oxygen- or electric-process steel may be used in lieu of the open hearth process steel specified in Drawings 275040 and 275043.

3.1.2 Cast steel. Steel castings for telephone buoy swivel ring and post shall conform to MIL-C-18295 and the applicable drawings. Other castings shown on drawings shall conform to ASTM A27, of the class shown on the applicable drawings.

* 3.1.3 Wood. Lumber for rubbing and bearing strips shall be yellow pine dense structural 86 or long leaf structural 86, conforming to the SPIB Standard Grading Rules for Southern Pine Lumber or construction grade Douglas Fir, conforming to the WWPA Standard Grading Rules for Western lumber. All lumber shall be creosoted as specified in 3.7.3.

* 3.1.4 Rubber. Rubber for fenders shall conform to classification 3 BA 725 A14 B13 as specified in ASTM D2000. Short lengths shall not be used.

* 3.2 First article. Unless otherwise specified (see 6.2), the contractor shall furnish a complete buoy for first article inspection and approval (see 4.3 and 6.4).

3.3 Construction.

3.3.1 Buoys. Buoys shall be constructed as specified herein and on the applicable drawings listed in Table I. The contractor shall furnish the type II buoys complete with swivel posts and swivel ring castings. Plastic rope and floats for type III buoy shall be as shown on Drawing 620662. Manholes for type I, II, and III buoys may be cut, where required, provided they are closed by a watertight full penetration weld around the closing plate after all interior work has been completed and inspected.

TABLE I. Applicable drawings for buoys.

Type	Size	Drawing No.
I	6-1/2 and 7	749873
I	9-1/2, 10-1/2A, and 10-1/2B	620659
I	12	620605
II	14, 15, and 16	620660, 620663
II	17	620657, 620663
III	3-1/2	620662
IV	12	1195707, 1195708
V	5	275043
V	6	275083
V	8	275040

3.3.2 Tension bars. When specified (see 6.2), tension bars constructed as specified herein and on Drawing 749872 shall be furnished with or for type I, size 12, and type IV buoys when converting from riser chain hawse pipe to the tension bar arrangement.

3.3.3 Hard facing. Unless otherwise specified (see 6.2), the surfaces of eyes in tension bars and swivel ring castings, as shown on the applicable drawings, shall be hard faced by the metal spray process. All surfaces to be faced shall be thoroughly prepared by removal of all foreign material and corrosion products and then roughened by grit blasting using an abrasive of angular steel or nonmetallic grit of a range of 25 to 40 mesh. A coating of self-fluxing metal powder composed of chromium, boron, nickel, and silicon shall be sprayed onto the prepared surfaces so as to produce a finished coating, after fusing, of not less than 20 mils thickness. The sprayed coating shall be fused to the base metal by uniformly heating with oxygen-acetylene torches, or in a controlled atmosphere oven, to the proper fusing temperature (approximately 1,900° Fahrenheit). Extreme care shall be exercised to prevent overheating during the fusing process in order to prevent running or sagging of the coating. The sprayed part shall be cooled slowly in accordance with recommendations of the metal spray manufacturer. The finished coating shall be of fine texture, uniform thickness, free of unatomized or unfused particles of metal, and shall have a hardness of 56 to 61 on the Rockwell C scale or 79 to 81.5 on the Rockwell A scale.

3.3.4 Swivel posts and swivel rings. The swivel posts and swivel rings shall be fabricated as shown on Drawings 620657, 620660, and 620663, and shall conform to MIL-C-18295, group 3, except that the class of casting shall be as shown on the drawings.

3.4 Steel pipe and fittings. Pipe shall be regular commercial seamless or welded steel pipe except where wrought iron pipe is shown on the drawings. Pipe shall be of the size, schedule, and wall thickness shown. Pipe fittings shall be standard steel and cast iron as shown.

3.5 Fasteners. Studs, nuts, bolts, wood screws, and capscrews shall be of the characteristics, dimensions, and quantities as shown on the drawings. Steel fasteners , other than stainless steel, shall have commercial grade zinc coating.

* 3.5.1 Bolts and nuts. Bolts and nuts shall conform to the requirements for regular hexagon, bolts and nuts of ANSI B18.2.1 and B18.2.2. Material shall be type 316 stainless steel.

* 3.5.2 Cap screws. Cap Screws shall conform to the requirements for hexagon head cap screws of ANSI B18.6.2. Material shall be type 316 stainless steel.

* 3.5.3 Wood screws. Wood Screws shall conform to the requirements for slotted and recessed wood screws of ANSI B18.6.1. Material shall be brass.

3.5.4 Washers. Circular washers shall be flat and smooth and shall conform to the requirements for type A washers as specified in ANSI B18.22.1. Material shall be type 316 stainless steel.

* 3.6 Tightness. Type I, II, and III buoys shall not leak when tested by air or hydrostatic pressure in accordance with 4.6.1 or 4.6.2, the method of testing to be determined by the manufacturer. When tested hydrostatically, the buoys, and individual compartments of buoys, shall withstand an internal hydrostatic pressure of 5 pounds per square inch (lb/in^2), maintained for a period of not less than 15 minutes, without leakage, joint failure, or abnormal bulging of plates. Type IV and V buoys shall be tested as specified on the drawings.

3.7 Treatment and painting.

* 3.7.1 Metal surfaces. After each buoy has passed all tests as specified, and before installation of fenders, rubbing and bearing strips, the exterior metal surfaces of all buoys, tension bars, and swivel posts, except threaded surfaces, shall be cleaned, treated, and painted in accordance with MIL-T-704, type B, except that, finish paint shall conform to MIL-P-24441. Unless otherwise specified (see 6.2), the finish color shall be lusterless black No. 37038 of FED STD No. 595. In addition, the interior surfaces of type IV and V buoys shall be cleaned, treated, and painted in accordance with MIL-T-704, type C, except that the finish coat of type IV shall be in accordance with TT-E-522, type I.

3.7.2 Threaded surfaces. The threaded surfaces of all fasteners in tapped holes, and all pipe plugs installed prior to and after testing, shall be coated with a thick mixture of red and white lead in linseed oil.

* 3.7.3 Wood treatment. All wood shall be pressure treated with creosote to a net retention of 20 pounds (lb) in accordance with AWPA C2. All treated lumber, cut or bored after treatment, shall have the cut surfaces coated with creosote in accordance with AWPA M4.

3.8 Identification marking. The equipment shall be marked for identification in accordance with MIL-STD-130. Unless otherwise specified on the drawings, marking shall be 1/8-inch raised letters 1-inch high located on the buoys under railing for type I and II buoys or as shown on the applicable drawing. The legend shall include size of buoy, weight in lb, and year of manufacture. Tension bars furnished separately shall have stenciled markings.

3.9 Workmanship.

* 3.9.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

* 3.9.2 Bolted connections. All bolt holes shall be accurately punched or drilled and shall have the burrs removed. Washers and lockwashers shall be provided. All nuts, bolts, and screws shall be tight.

* 3.9.3 Welding. Surfaces to be welded shall be free from foreign matter which would be injurious to the weld. Welding shall conform to AWS D1.1. Spot, tack, or intermittent welds for strength will not be permitted. All welding shall be performed by welders qualified as specified herein. Qualification of welders and duration of qualification period shall be in accordance with the requirements of AWS B3.0.

* 3.9.4 Wood fabrication. Wood bearing and rubbing strips shall be neatly and accurately cut, contoured, finished, and drilled as shown, and shall fit snugly to the buoy without forcing.

* 3.10 Servicing and restoration. Each unit tested shall be serviced and restored to a service condition equal to the original condition of the unit, neglecting nominal wear incurred during the tests. The restoration shall include paint touchup or repainting, as required for delivery.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

(a) First article inspection (see 4.3).
(b) Quality conformance inspection (see 4.4).

* 4.3 First article inspection. When specified (see 6.2), first article inspection shall be performed on one buoy. This inspection shall include the examination of 4.4 and the tests of 4.5. The first article shall be the first buoy produced prior to initiation of the production items.

* 4.4 Examination. Each buoy shall be examined in accordance with Table II for compliance with the requirements specified in Section 3 of this specification. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

TABLE II. Table of defects.

Categories	Defects
Major	
101	Material not as specified.
102	Construction not as specified. Dimensions not as shown on referenced drawings.
103	Steel pipe and fittings not as specified.
107	Hard facing not as specified. Facing cracked, chipped, or rough.
108	Workmanship is inferior and not as specified. Extrusions not free from burrs and sharp edges, bolt holes not accurately drilled to coincide with bolts or other fittings; welds are sparse or incomplete.

4.5 Welding inspection. Visual inspection will be made while the operators are making the welds, and again after the work is completed for penetration of the weld metal, fusion, and general ability of the operator. The inspector will pay particular attention to surface cracking, surface porosity, surface slag inclusions, undercut, overlap, and size of welds.

* 4.6 Test. Tests for type IV and V buoys shall be as shown on the drawings. For type I, II, and III buoys, the first article before painting, shall be subject to the test of either 4.6.1 or 4.6.2 and the test of 4.6.3.

4.6.1 Pneumatic test. Each buoy having one or more compartments, shall be tested for tightness of joints by the application of air pressure of not less than 5 lb/in^2 for a minimum period of 30 minutes. While the buoy is under pressure, a soapsuds solution shall be applied externally to reveal any leaks or as an option, the pressurized buoy shall be given full immersion to detect any leaks.

4.6.2 Hydrostatic test. After completion of all welding, the buoy shall be subjected to a hydrostatic test of not less than the specified pressure (see 3.6) maintained for a period of 15 minutes. Any joint failure or leaks shall be cause for rejection. The water used for hydrostatic testing shall be made rust inhibiting by the addition of sodium dichromate at a concentration of 1/2 percent by weight. After completion of the test, each buoy shall be thoroughly drained to remove all liquids.

4.6.3 Radiographic test. Radiographic tests of parts, where shown on the drawings and required herein, shall be in accordance with MIL-STD-271; evidence of defects which would affect the strength of these parts shall be cause for rejection.

* 4.7 Packaging inspection. The preservation-packaging, packing, and marking of the buoys and tension bars shall be inspected to verify conformance to the requirements in Section 5.

5. PACKAGING

5.1 Preservation-packaging and packing. The following constitutes the total requirements for any level (A, B, or C) of packaging. The buoys and tension bars shall be prepared for shipment in a manner which will insure arrival at destination in satisfactory condition and which will be acceptable to the carrier at lowest rates. Packing shall comply with Uniform Freight Classification rules or National Motor Freight Classification rules.

5.2 Marking. The buoys and tension bars shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. Type I and II buoys are used in standard fleet mooring assemblies. Type III buoys are used for marking the ends of submerged fuel transfer lines, marking centerline of tanker berth, and for small craft moorings, as appropriate for the size. Type IV and V buoys are used for mooring and flotation.

* 6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type and size of buoy required (see 1.2).
(c) When first article is required for inspection and approval (see 3.2, 4.3, and 6.4).
(d) When tension bars shall be furnished for type I, size 12 buoy and type IV buoy (see 3.3.2).

(e) When hard surfacing shall be applied by methods other than metal spraying (see 3.3.3 and 6.5).
(f) When finish paint shall be other than as specified in 3.7.1).
(g) When color of finish paint shall be other than as specified (see 3.7.1).

* 6.3 Contract data requirements. When this specification is used in a procurement which incorporates a DD Form 1423 and invokes the provisions of paragraph 7-104.9(n) of the Armed Services Procurement Regulations (ASPR), the data requirements will be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the Contract Data Requirements List (DD Form 1423) incorporated into the contract. When the provisions of ASPR 7-104.9(n) are not invoked, the data shall be delivered in accordance with the contract requirements.

* 6.4 First article. When a first article is required, it shall be tested and approved under the appropriate provisions of paragraph 7-104.55 of the ASPR. The first article should be a preproduction sample. The first article should consist of one unit. The contracting officer should include specific instructions in all procurement instruments, regarding arrangements for examination, test, and approval of the first article.

* 6.5 Hard facing alternates. Hard facings normally are applied by the gas welding, metal arc welding, atomic-hydrogen arc welding, or spray welding process. The advantages of spray welding are mainly economic. First, it saves alloy by achieving a more closely controlled deposit, and second, the cost of finishing the more uniform deposit is less.

* 6.6 Changes from previous issue. The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodian:

Navy - YD

Review activity:

Navy - OS

User activity:

Army - ME

Preparing activity:

Navy - YD

Project No. 2050-0023

☆ U.S. GOVERNMENT PRINTING OFFICE: 1978—703-122/4215

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS: This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.

NOTE: This form shall not be used to submit requests for waivers, deviations or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. 2050-0023

DOCUMENT IDENTIFIER *(Number)* AND TITLE

MIL-B-16115F - BUOYS, MOORING, AND MARKER

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

☐ VENDOR ☐ USER ☐ MANUFACTURER

1. ☐ HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? ☐ IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

A. GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDED WORDING CHANGE

C. REASON FOR RECOMMENDED CHANGE(S)

2. REMARKS

SUBMITTED BY *(Printed or typed name and address — Optional)*

TELEPHONE NO.

DATE

DD FORM 1426 1 OCT 76

EDITION OF 1 JAN 72 WILL BE USED UNTIL EXHAUSTED.

FOLD

Commander
Naval Facilities Engineering Command
200 Stovall Street
Alexandria, VA 22332

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

POSTAGE AND FEES PAID
DoD-316

U.S. MAIL

Commanding Officer (156)
Naval Construction Battalion Center
Port Hueneme, CA 93043

FOLD