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20 June 1985  
SUPERSEDING  
MIL-B-24480(SHIPS)  
30 January 1973  
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29 July 1960  
(See 6.4 and 6.5)

## MILITARY SPECIFICATION

### BRONZE, NICKEL-ALUMINUM (UNS No. C95800) CASTINGS FOR SEAWATER SERVICE

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification covers static and centrifugal castings of nickel-aluminum bronze (UNS No. C95800) having good corrosion resistance for general seawater applications.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Standards. Unless otherwise specified, the following standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

#### STANDARDS

##### MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-248 - Welding and Brazing Procedure and Performance Qualification.
- MIL-STD-271 - Nondestructive Testing Requirements for Metals.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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MILITARY (Continued)

MIL-STD-278 - Fabrication Welding and Inspection; and Casting Inspection and Repair for Machinery, Piping and Pressure Vessels in Ships of the United States Navy.

(Copies of standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.1.2 Government publication. The following Government publication forms a part of this specification to the extent specified herein.

PUBLICATION

NAVAL SEA SYSTEMS COMMAND (NAVSEA)  
0991-LP-023-3000 - Propeller Ship Bronze Straightening and Weld Of.

(Copies of standards and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting 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. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)  
B 148-82 - Standard Specification for Aluminum-Bronze Sand Castings.  
B 271-81 - Standard Specification for Copper-Base Alloy Centrifugal Castings.

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

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2.1), a sample shall be subjected to first article inspection (see 4.3 and 6.3).

3.2 General. Requirements for UNS No. C95800 static and centrifugal castings shall be in accordance with ASTM B 148, and as specified herein.

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3.3 Heat treatment. Castings shall be given a temper anneal heat treatment at  $1250 \pm 50$  degrees Fahrenheit ( $^{\circ}$ F) for 6 hours, minimum. Cooling shall be by the fastest means possible that will not cause excess distortion or cracking. Propeller castings shall be exempt from this requirement.

3.4 Casting repair. Weld repair of castings shall be performed in accordance with MIL-STD-278. Welding procedure qualification, prior to production welding, shall be in accordance with MIL-STD-248. Repair of propeller castings shall be in accordance with NAVSEA 0991-LP-023-3000.

3.4.1 Post-weld heat treatment. When weld repairs are made to the side of the casting coming into contact with seawater in service or the heat affected zone extends to within 1/4 inch of the seawater side castings shall be post-weld heat treated by the same procedure used to comply with 3.3. Redetermination of mechanical properties is not required after post-weld heat treatment. Surfaces in contact with seawater shall be specified (see 6.2.1).

3.5 Identification marking. Identification marking shall be in accordance with ASTM B 148, including supplemental requirement S4, except that this specification number shall be used.

3.6 Chemical and mechanical property requirements. The chemical and mechanical property requirements shall be as specified in ASTM B 148.

3.7 Nondestructive requirements. The nondestructive requirements shall be as specified by MIL-STD-278, or the contract or order (see 6.2.1).

3.8 Form and dimensions. The form and dimensions of the castings shall meet the pattern or drawing specified (see 6.2.1).

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, 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 inspection. 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. First article inspection shall consist of the examinations and tests as specified in 4.3.1 through 4.3.3.

4.3.1 Sampling for first article inspection. The first casting submitted for inspection shall be considered the first article sample.

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4.3.2 Radiographic inspection. The first article casting shall be radiographically inspected in accordance with MIL-STD-271 to the acceptance criteria specified in MIL-STD-278 of the criticality level specified (see 6.2.1).

4.3.3 Mechanical property test. Mechanical properties shall be determined on highly stressed regions of the casting as specified (see 6.2.1) and shall meet requirements as agreed upon between the Command or agency concerned and the contractor.

4.3.4 Basic foundry practices. The contractor shall maintain a record of the basic foundry practices (type of melting or refining unit, molding process, basic rigging design, location of risers and chills, and so forth) used in the first article casting and shall make no change thereto without the specific approval of the Command or agency concerned. The contractor may be required to perform specific first article tests and examinations to verify that the change will not degrade casting quality.

4.3.5 First article test report. The contractor shall prepare a first article test report in accordance with the data ordering document included in the contract or order (see 6.2.2).

4.4 Quality conformance inspection. Castings shall be examined and tested in accordance with 4.6.1 through 4.6.3.1 herein. If any specimen fails to conform to the requirements of this specification, the entire lot shall be rejected, except as specified in 4.6.1.

4.4.1 Certification of quality compliance. A certificate of quality compliance shall be prepared for each lot of material offered for acceptance (see 6.2.2). The certificate shall include actual data of specified chemical and mechanical tests. Qualitative results of nondestructive tests and other inspections or tests shall be recorded on the certificate. The certificate shall also state that each lot has been sampled, tested, and inspected in accordance with this specification and meets all specification requirements. The certificate shall be signed by a responsible representative of the contractor.

4.5 Sampling for quality conformance.

4.5.1 Lot. A lot shall consist of all castings produced from one furnace or crucible melt. When two or more furnace melts or crucible melts, or both, are used to charge a ladle for pouring, the casting produced therefrom shall constitute a lot.

4.5.2 Chemical analysis sample. A chemical analysis sample shall be obtained in accordance with ASTM B 148.

4.5.3 Mechanical test sample. A mechanical test sample for static castings shall be obtained in accordance with ASTM B 148. The sample for centrifugal castings shall be obtained in accordance with ASTM B 271. Mechanical test samples shall accompany the castings through the heat treatment specified in 3.3.

4.5.4 Nondestructive test sample. Each piece shall be tested as specified in 4.6.3.

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4.5.5 Identification of test coupons. All test bars shall be identified with the proper heat or lot number.

4.5.6 Sampling for visual and dimensional examination. From each lot, samples shall be selected for visual and dimensional examination in accordance with MIL-STD-105 at inspection level I. The Acceptable Quality Level (AQL) shall be 4.0 percent defective.

4.6 Examinations and tests.

4.6.1 Visual and dimensional examination. Each of the castings selected in 4.5.6 shall be visually and dimensionally examined for conformance with the requirements of ASTM B 148 and the casting drawing. Any casting in the lot containing one or more visual or dimensional defects shall be considered a defective item and rejected. If the number of defective items found in the lot equals or exceeds the rejection number specified in MIL-STD-105, the lot shall be rejected subject to the resubmittal provisions of MIL-STD-105.

4.6.2 Chemical and mechanical property tests. Chemical and mechanical property tests shall be performed in accordance with ASTM B 148.

4.6.3 Nondestructive tests. The applicable nondestructive tests as specified by MIL-STD-278, or the contract (see 6.2.1), shall be performed in accordance with MIL-STD-271.

4.6.3.1 Acceptance criteria. The nondestructive test results shall conform to the requirements of MIL-STD-278, or as specified (see 6.2.1). The system or category of the casting shall be as specified (see 6.2.1).

4.7 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisition.)

5.1 Packaging. Packaging shall be in accordance with the levels specified (see 6.2.1), as annotated under the supplementary requirements section of ASTM B 148.

6. NOTES

6.1 Intended use. Bronze, nickel-aluminum castings are intended for seawater applications.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

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- (a) Title, number, and date of this specification.
- (b) First article, if required (see 3.1).
- (c) What surfaces are in contact with seawater (see 3.4.1).
- (d) Nondestructive test requirements, if other than MIL-STD-278 (see 3.7 and 4.6.3).
- (e) Pattern or drawing number and condition, whether as cast or machined in accordance with ASTM B 148 (see 3.8).
- (f) Criticality level of MIL-STD-278 for nondestructive inspection requirements (see 4.3.2).
- (g) First article mechanical property test locations (see 4.3.3).
- (h) Acceptance criteria for nondestructive tests other than to MIL-STD-278 and systems or category of casting (see 4.6.3.1).
- (i) Level of packaging (see 5.1).

6.2.2 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of FAR 52.227-7031 are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

<u>Paragraph no.</u>	<u>Data requirement title</u>	<u>Applicable DID no.</u>	<u>Option</u>
4.3.5	First article inspection report	DI-T-4902	---
4.4.1	Certification data/report	UDI-A-23264	---

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L., Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in sections 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 First article inspection. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection as to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

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6.4 Propeller alloys. Propeller castings previously acquired to MIL-B-21230, alloy 1, are now acquired to this specification. Alloy 2 is no longer being used as propeller material.

6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Preparing activity:  
Navy - SH  
(Project MECA-N110)

