

INCH-POUND

MIL-C-24615A(SH)

14 October 1988

SUPERSEDING

MIL-C-24615(SH)

15 December 1982

(See 6.6)

MILITARY SPECIFICATION

CASTINGS, NICKEL-CHROMIUM-MOLYBDENUM-COLUMBIUM ALLOY

This specification is approved for use within 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 nickel-chromium-molybdenum-columbium (Ni-Cr-Mo-Cb) (UNS N06625) alloy castings for corrosion-resistant service.

1.2 Classification. The alloy castings are classified as the following grades (see 6.2.1):

Grade A - Air melt processed.

Grade B - Argon oxygen decarburization process.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

MILITARY

MIL-E-22200 - Electrodes, Welding, Covered; General Specification for.

MIL-E-22200/3 - Electrodes, Welding, Covered: Nickel Base Alloy; and Cobalt Base Alloy.

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.

AMSC N/A

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AREA MECA

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STANDARDS

FEDERAL

FED-STD-151 - Metals; Test Methods.

MILITARY

MIL-STD-163 - Steel Mill Products, Preparation for Shipment and Storage.

MIL-STD-271 - Requirements for Nondestructive Testing Methods.

MIL-STD-278 - Welding and Casting Standard.

MIL-STD-792 - Identification Marking Requirements for Special Purpose Components.

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DoDISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

E 3 - Standard Methods of Preparation of Metallographic Specimens. (DoD adopted)

E 8 - Standard Methods of Tension Testing of Metallic Materials. (DoD adopted)

E 38 - Standard Methods for Chemical Analysis of Nickel-Chromium and Nickel-Chromium-Iron Alloys.

E 883 - Standard Guide for Metallographic Photomicrography.

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

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3, 6.2.1, and 6.3).

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3.1.1 The casting method used for first article sample shall not be changed without specific approval of the Command or agency concerned. Additional first article tests and examinations may be required to verify that any changes will not degrade casting quality.

3.2 Recovered materials. Unless otherwise specified herein, all material in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable 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 is allowed under this specification unless otherwise specifically specified.

3.3 Manufacture. Grade A alloy shall be made by an electric furnace process. Grade B alloy shall be made by a combination of electric furnace and argon-oxygen decarburization (AOD) process. When approved by the Command or agency concerned, other refining processes such as electroslag remelt or vacuum arc remelt may be used. Static or centrifugal castings may be supplied at the option of the contractor unless a specific type is specified (see 6.2.1).

3.4 Internal chills and chaplets. Chills and chaplets shall not be allowed to remain in the casting except by authorization of the Command or agency concerned (see 6.4.2). When either chaplets or internal chills are used, they shall be of the composition specified in 3.5 or of comparable wrought material.

3.5 Chemical composition. The material shall conform to the chemical composition specified in table I.

TABLE I. Chemical composition.

Element	Air melt (percent)	AOD melt (percent)
	Grade A	Grade B
Carbon, maximum	0.06	0.02
Manganese, maximum	1.00	1.00
Silicon, maximum	0.50	0.25
Phosphorus, maximum	0.015	0.015
Sulphur, maximum	0.015	0.010
Chromium	20.0 - 23.0	20.0 - 23.0
Molybdenum	8.0 - 10.0	8.0 - 10.0
Iron, maximum	5.00	5.00
Columbium and tantalum	3.15 - 4.50	3.15 - 4.50
Aluminum, maximum	0.15	0.15
Titanium, maximum	0.10	0.10
Nickel	Balance	Balance

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3.6 Heat treatment. Castings and representative test coupons shall be annealed at 2100-2200 degrees Fahrenheit ($^{\circ}$ F) for 1 hour per inch of thickness (2 hours minimum) at temperature followed by air cooling or water quenching. Test coupons shall be heat treated (see 6.4.1) in the same furnace batch as the castings they represent.

3.7 Mechanical properties. The material shall conform to the mechanical properties of table II.

TABLE II. Mechanical properties.

	Grade A	Grade B
Tensile strength, pounds per square inch (lb/in^2), minimum	70,000	70,000
Yield strength (0.2 percent offset), lb/in^2 , minimum	40,000	40,000
Elongation, percent in 4 times diameter, minimum	20	30
Reduction of area, percent, minimum	20	30

3.8 Metallographic examination. When specified (see 6.2.1), metallographic examination shall be performed on a mechanical property test sample.

3.9 Weldability. When specified (see 6.2.1), a weldability test in accordance with 4.5.4 shall be performed and meet the specified requirements.

3.10 Internal soundness. Unless otherwise specified (see 6.2.1), each production casting shall be radiographed for conformance with MIL-STD-278 or other standard as specified (see 6.2.1).

3.11 Pressure boundary castings. Unless otherwise specified (see 6.2.1), each pressure boundary casting shall be hydrostatically tested in accordance with MIL-STD-278 or other standards as specified (see 6.2.1).

3.12 Surface defects.

3.12.1 Visual defects. Casting surfaces shall be free of shrinkage, cracks, tears, cold shuts, and mold material inclusions which are visible to the unaided eye. Visual surface porosity which exceeds the acceptance criteria specified in 4.5.6.1 shall not be permitted.

3.12.2 Liquid penetrant defects. All casting surfaces shall meet the acceptance criteria specified in MIL-STD-278 or as specified (see 6.2.1).

3.13 Weld repair. Defects in castings shall be removed, or removed and repaired by welding in accordance with MIL-STD-278. Sealing of pressure containing castings by peening, plugging, or impregnation of castings is prohibited. Weld repairs shall be performed after annealing in accordance with 3.6. When

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specified (see 6.2.1), reanneal is required after performing special (major) weld repairs in designated critical areas (see 6.2.1). Weld repairs shall not be performed until the heat has passed the weldability test of 4.5.4.

3.14 Finish and dimensions.

3.14.1 Finish. All surfaces of castings shall be clean and suitable for performance of specified nondestructive examinations. Cleaning may be accomplished by blasting with clean mineral grit or metallic, corrosion-resisting shot, or by grinding and buffing using grinding wheels that have not been used on steels or copper-base alloys.

3.14.2 Dimensions.

3.14.2.1 The foundry shall be responsible for the dimensional accuracy of the castings as related to the drawing when the pattern equipment is produced by the foundry.

3.14.2.2 When the pattern equipment is provided by the contractor, the foundry shall be responsible for the dimensional accuracy of the castings as related to the provided pattern equipment.

3.14.2.3 Where thick and thin sections of the castings join, the manufacturer shall be permitted to add (where not previously provided) fillets of adequate size, subject to approval by the Command or agency.

3.15 Marking. Each casting shall be marked with the following information in a permanent fashion as specified in 3.15.1 and 3.15.2:

- (a) Heat and lot number.
- (b) Pattern or drawing number (static castings only).
- (c) Specification number and material grade (see 1.2).
- (d) Material identity mark (UNS N06625).
- (e) Foundry identification (manufacturer's trademark, and so forth).
- (f) Additional information as specified on the casting drawing.

3.15.1 Location of marking. Marking shall be located in accordance with the casting drawing.

3.15.2 Method of marking. Marking shall be cast in raised letters, or shall be done on an integrally-cast pad, or a combination of the two, or shall be done on a cast, or machined surface when so specified on the casting drawing. Method of marking shall be as follows:

- (a) Cast raised letters. Cast raised letters shall be in accordance with the casting drawing.
- (b) Marking on integrally-cast pad. Marking shall be in accordance with MIL-STD-792 using low stress die stamps, a vibrating marking tool (vibro-tool), electrochemical etching, or laser engraving methods.
- (c) Marking on casting surface. Marking shall be in accordance with MIL-STD-792 using a vibrating marking tool (vibro-tool), electrochemical etching, or laser engraving methods.

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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.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a 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 in 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.

4.1.2 Inspection system. When specified in the contract or order, an inspection system program plan shall be prepared (see 6.2.2).

4.1.3 Certification data/report. When specified in the contract or order, a certification data/report shall be prepared (see 6.2.2).

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. First article inspection shall consist of the examinations and tests as specified in 4.3.1 through 4.3.4.

4.3.1 Sampling for first article inspection. The first casting of a given design submitted for inspection shall be the first article sample.

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 Liquid penetrant inspection. The first article casting shall be liquid penetrant inspected in accordance with MIL-STD-271. Unless otherwise specified (see 6.2.1), the acceptance criteria shall be as specified in MIL-STD-278.

4.3.4 Mechanical property test. Mechanical properties shall be determined on critical areas 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. Test bar mechanical properties shall also be determined.

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4.3.5 First article test report. When specified in the contract or order, a first article test report shall be prepared (see 6.2.2).

4.4 Quality conformance inspection.

4.4.1 Sampling for quality conformance inspection.

4.4.2 Lot definition.

4.4.2.1 Chemical analysis. A lot shall consist of castings made from the same heat (see 6.4.1).

4.4.2.2 Mechanical properties. A lot shall consist of castings from the same heat and the same heat treatment batch.

4.4.2.3 Weldability test. A lot shall consist of castings from the same heat.

4.4.3 Sampling.

4.4.3.1 Chemical analysis. One sample shall be taken from each lot. Material for analysis shall be taken from a test coupon or from a casting in the lot.

4.4.3.2 Mechanical properties. One tensile test specimen shall be taken from each lot.

4.4.3.2.1 Static castings. For static castings, separately cast test blocks of the single keel or double keel type shall be cast with each heat. Use of chills or chill molds is prohibited. The minimum size of the test block shall be proportional to the diameter of the largest sphere that can be inscribed in any section of the casting. The minimum dimensions of the separately cast test block shall be as specified on figure 1. At the discretion of the contractor, an extra casting may be cut up for test specimens in which case the specimens shall be taken from the largest cross section.

4.4.3.2.2 Centrifugal castings. Centrifugal castings shall have extra length provided as necessary for test specimens, or an additional production casting shall be provided to be cut into test specimens for each lot. When this is not feasible, separately cast test material of similar sized cross-section to the production casting but of sufficient thickness to remove test specimens shall be produced by the centrifugal casting process subject to approval of the contracting activity. One tensile test specimen shall be taken for each heat treatment lot of castings from the same heat.

4.4.3.3 Metallographic examination. One metallographic sample shall be taken from the test block specified in 4.4.3.2.

4.4.3.4 Weldability test. One casting from each heat shall be provided with a full thickness integral extension at the location of the thickest section production weld joint as necessary to permit the heat weldability test to be performed. When more than one casting design is produced from a heat, the casting with the thickest section production weld joint shall be weldability

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tested. The location and thickness of the integral extension to be used for weldability testing shall be as specified (see 6.2.1). When separate castings are used for mechanical test specimens, the weldability sample may be cut from it, or a separate production casting may be poured for the weldability test.

4.4.3.5 Nondestructive examination.

4.4.3.5.1 Liquid penetrant. Each casting shall be subjected to liquid penetrant examination.

4.4.3.5.2 Pressure boundary castings. Each pressure boundary casting shall be radiographically inspected and hydrostatically tested.

4.4.3.5.3 Visual and dimensional. Each casting shall be subjected to examination for dimensional and visual requirements.

4.5 Test procedures.

4.5.1 Chemical analysis. Chemical analysis shall be as follows:

- (a) Procedure. Chemical analysis shall be performed by any suitable method; however, in cases of dispute, it shall be performed in accordance with ASTM E 38.
- (b) Performance criteria. When any sample fails to conform to the requirements of table I, the lot represented by that sample shall be rejected.

4.5.2 Mechanical property test. Mechanical property test shall be as follows:

- (a) Procedure. Tension specimens shall be machined to the largest possible standard size described in ASTM E 8. Each specimen shall be tested in accordance with ASTM E 8.
- (b) Yield and tensile strength. The yield strength corresponding to a limiting permanent offset of 0.2 percent of the gauge length of the specimen shall be determined at a crosshead speed not to exceed 1/8 inch per minute and reported as yield strength. After the yield strength has been obtained, the tensile strength shall be determined at a crosshead speed not to exceed 1-1/2 inches per minute.
- (c) Performance criteria. If the tensile properties fail to conform to the requirements of table II, the lot represented by that test specimen shall be rejected.

4.5.3 Metallography test. The metallographic specimen shall be prepared in accordance with ASTM E 3, and photographed at 500X in accordance with ASTM E 883. Examinations at other magnifications as necessary to reveal the constituents and structure of the alloy shall be permitted.

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4.5.4 Weldability test. The weldability test shall be as follows:

(a) Procedure.

- (1) After heat treatment, the selected casting shall have the integral extension prepared for test welding using the joint design detailed on figure 2. The test weld shall be made while the extension is still attached to the casting, and the edge of the test joint shall be located within 1.5 inches of the edge of the production weld joint.
- (2) The test weld shall be at least 4 inches in length where possible or of the longest length possible on the actual casting. It shall be deposited using the shielded metal arc process and 1/8-inch or 5/32-inch diameter electrodes conforming to MIL-1N12 of MIL-E-22200/3 and MIL-E-22200. Alternative processes and electrodes may be used if designated in a welding procedure approved by the Command or agency concerned.
- (3) After completion of the test weld, the entire length of the weld and adjacent base metal of the cast extension within 1/2 inch of the toe of the weld shall be liquid penetrant inspected in accordance with MIL-STD-271.
- (4) A transverse weld macrospecimen including at least 1/2 inch of base metal of the cast extension shall be taken through the longest liquid penetrant indication in the weld fusion zone, or heat-affected zone of the casting and etched for visual examination. The cut for the macrospecimen should be made approximately 1/16 inch beyond the indication and then the specimen polished down to the center of the indication before etching. If no liquid penetrant indications are revealed, the transverse macrospecimen shall be taken within the middle half of the test weld length.

(b) Performance criteria.

- (1) Liquid penetrant inspection. Liquid penetrant indications confined entirely within the weld shall not be evaluated. Liquid penetrant indications in the weld fusion zone or heat-affected zone (within 1/4 inch of the weld fusion line) which are linear and exceed 1/16 inch in length shall be rejected if they are identified as cracks or tears. Liquid penetrant indications which are not identified as cracks or tears shall be examined using the transverse macrospecimen, in which case the performance criteria of 4.5.4(b)(2) shall apply.
- (2) Transverse macrospecimen. Visual cracks or tears greater than 1/16 inch in length in the weld fusion zone or heat-affected zone of the casting (within 1/4 inch of the weld fusion line) shall be cause for rejection. Questionable fissures shall be examined at magnifications of 10X to 30X in order to make an identification. If the questionable indication is determined to be a crack, a

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section taken transverse to the crack shall be examined to determine its cause and reported to the contracting activity for an acceptance or rejection decision. Defects other than cracks or tears, such as lack of fusion, or slag at the weld fusion line, or casting shrinkage in the heat-affected zone, shall not be cause for rejection.

4.5.5 Radiographic inspection. The procedure shall be as specified in MIL-STD-271.

4.5.6 Nondestructive examination.

4.5.6.1 Visual examination. Any casting that fails to meet the requirements of 3.12.1 or the criteria stated below for acceptance of visual surface porosity shall be rejected. The criteria for evaluation and acceptance of visual porosity shall be as follows:

(a) Rounded surface porosity on non-machined surfaces.

- (1) Individual porosities. Surface porosity with 3/32-inch or smaller opening is acceptable provided that the internal surfaces are visible, the depth does not exceed 1/8-inch and the minimum wall thickness (determined from drawing dimensions) is not violated. Surface porosity with greater than 3/32-inch opening, or deeper than 1/8-inch, or having internal surfaces that are not visible, shall be explored by grinding. Removal by grinding is acceptable provided the ground out area is faired in or radiused and does not reduce the wall thickness below the minimum drawing dimension.
- (2) Clusters of porosity. Three or more porosities of 1/32-inch size that are included within a 1/2-inch diameter shall be explored by grinding. Removal by grinding out the included area is acceptable provided the ground out area is faired in or radiused and does not reduce the wall thickness below minimum drawing dimension.

(b) Linear surface porosity on non-machined surfaces. Linear porosity is defined as porosity whose length is equal to or greater than three times its width. Linear surface porosity greater than 1/8-inch long shall be explored by grinding. Removal by grinding is acceptable provided the ground out area is faired in or radiused and does not reduce the wall thickness below the minimum drawing dimension.

(c) Porosity on machined surfaces.

- (1) Critical machined surfaces such as seating areas, sealing surfaces, weld end preparation and adjacent surfaces (within 1/2-inch) shall be free of porosity, nicks and other defects.
- (2) Noncritical machined surfaces shall be subjected to the same visual inspection acceptance criteria as non-machined surfaces.

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4.5.6.2 Liquid penetrant examination. The liquid penetrant examination shall be in accordance with MIL-STD-271.

4.5.6.3 Dimensional examination. Any casting containing one or more dimensional defects shall be rejected.

4.5.7 Hydrostatic test. Each pressure boundary part shall be tested at 1.5 times design pressure. Any weeping leakage or permanent deformation of the part shall be cause for rejection. When specified (see 6.2.1), other pressure shall be used.

4.6 Replacement, retest, rejection and resubmittal.

4.6.1 Replacement of test specimens. A test specimen may be discarded, and a replacement test specimen selected from the same lot of material as provided in the general section of FED-STD-151.

4.6.2 Retest. Retesting shall be permitted for chemical analysis, mechanical properties, and weldability only.

- (a) When one or more specified characteristic fails to conform to specification requirements for the tested characteristic, retest of the nonconforming characteristic may be performed to establish product acceptability. For tensile testing, failure of one property (for example, yield strength, tensile strength, elongation, or reduction of area) shall require the redetermination and reporting of each property.
- (b) Retesting shall be performed on twice the number of representative specimens that were originally nonconforming.
- (c) Unless otherwise approved by the Command or agency, retest specimens shall be taken adjacent to the initial nonconforming test specimen location.

4.6.3 Rejection. When any retest specimen does not conform to specification requirements for the characteristic being tested, the lot represented by that specimen shall be rejected.

4.6.4 Resubmittal of rejected lots. A rejected lot may be resubmitted for acceptance testing only after rework, as necessary, is performed to correct the nonconforming condition without adversely affecting the conforming properties. If the rejected lot is re-heat treated to correct a nonconforming characteristic, all mechanical properties, including those which were initially conforming, shall be redetermined.

4.6.5 Resubmittal of individual piece. At the option and expense of the contractor, when a rejected lot consists of more than one piece, each remaining piece in the lot may be tested for nonconforming characteristics and each piece that conforms to all specification requirements may be offered for acceptance.

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.

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5. PACKAGING

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

5.1 Preservation, packaging, packing and marking. Material shall be preserved, packaged, packed as specified (see 6.2.1), and marked as specified (see 3.15) in accordance with MIL-STD-163.

6. NOTES

6.1 Intended use. Ni-Cr-Mo-Cb (UNS N06625) alloy castings are intended for use where superior resistance to corrosion and erosion by sea water is required.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Whether grade A or B is required (see 1.2).
- (c) If casting requires first article inspection (see 3.1).
- (d) If either static or centrifugal castings are specifically required (see 3.3).
- (e) If metallographic inspection is required (see 3.8).
- (f) If weldability test is required (see 3.9).
- (g) If radiographic inspection is not required and test standard if required is other than MIL-STD-278 (see 3.10).
- (h) If hydrostatic testing of pressure boundary castings is not required (see 3.11 and 4.5.7).
- (i) Liquid penetrant inspection acceptance criteria if other than MIL-STD-278 (see 3.12.2 and 4.3.3).
- (j) When reanneal after weld repair is required (see 3.13).
- (k) Location of critical areas (see 3.13, 4.3.2, and 4.3.4) and test requirements if required, and acceptance criteria if other than MIL-STD-278.
- (l) The location and thickness of the integral extension to be used for weldability testing (see 4.4.3.4).
- (m) Hydrostatic test pressure if other than 1.5 times design pressure (see 4.5.7).
- (n) Preservation, packaging and packing required (see 5.1).

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, 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 Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) 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 are cited in the following paragraphs.

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<u>Paragraph no.</u>	<u>Data requirement title</u>	<u>Applicable DID no.</u>	<u>Option</u>
4.1.2	Inspection system program plan	DI-R-4803	----
4.1.3	Certification data/report	UDI-A-23264	----
4.3.5	First article inspection report	DI-T-4902	----

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5010.12-L., 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. When a first article inspection is required, the item should be a first article sample. The first article should consist of one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection 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.

6.4 Definitions.

6.4.1 Heat. A single charge produced by the melting and refining process ready to pour into castings. Several charges mixed in one ladle prior to pouring any castings is considered one heat.

6.4.2 Command or agency concerned. The Government or prime contractor who has acquisition responsibility acting under contract to the Government.

6.5 Subject term (key word) listing.

Metallographic
Nondestructive
Weldability

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6.6 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.

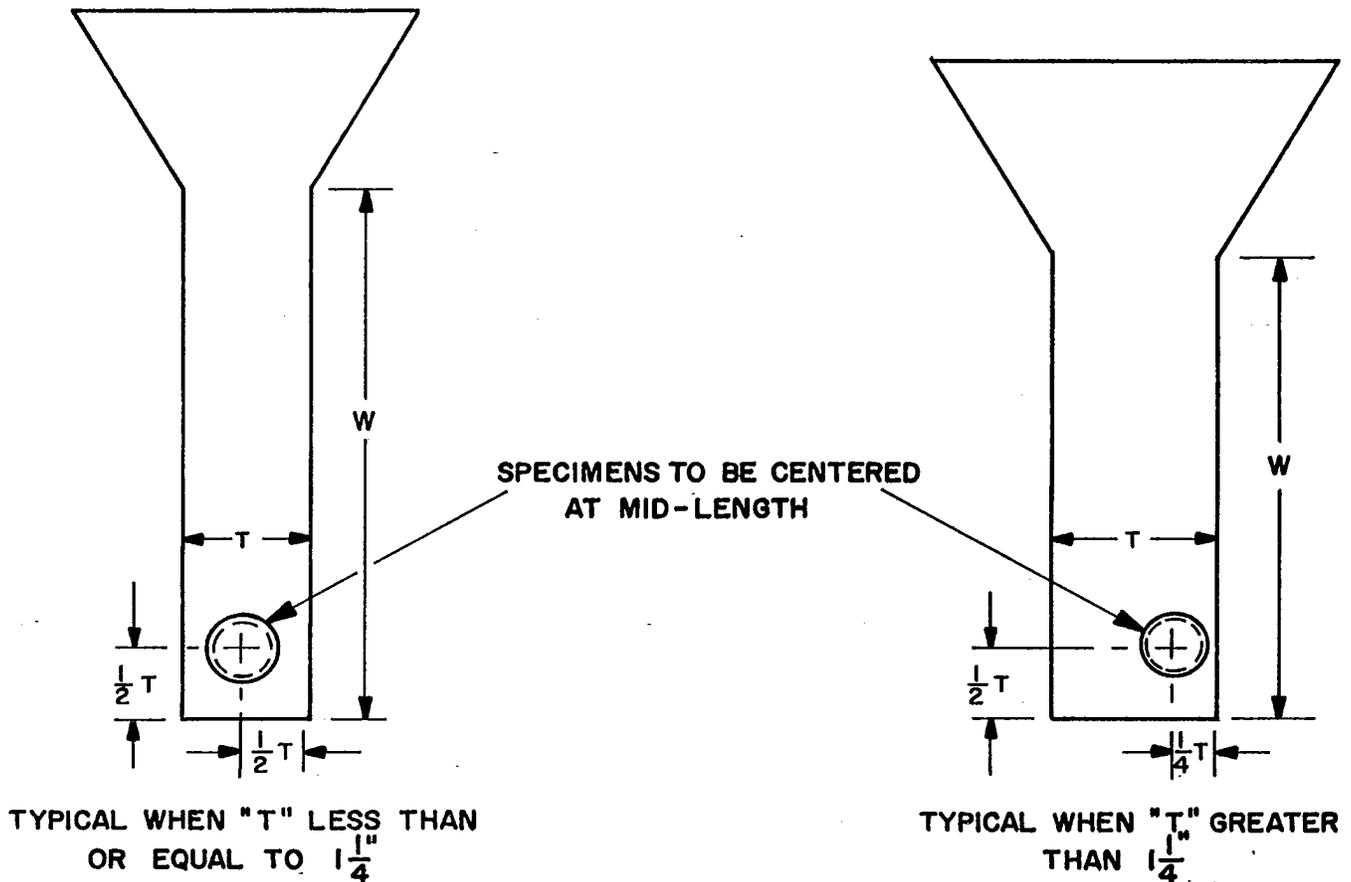
Preparing activity
Navy - SH
(Project MECA-N107)

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Casting size, T <u>1/</u>	Dimensions <u>2/</u>	
	Width	Length
Under 1 inch	7 inches	7 inches
1 to 2 inches, exclusive	4.5T	4.5T
2 to 4 inches exclusive	3T	3T
4 inches and over	T	$6\sqrt{T}$

L = length of mold

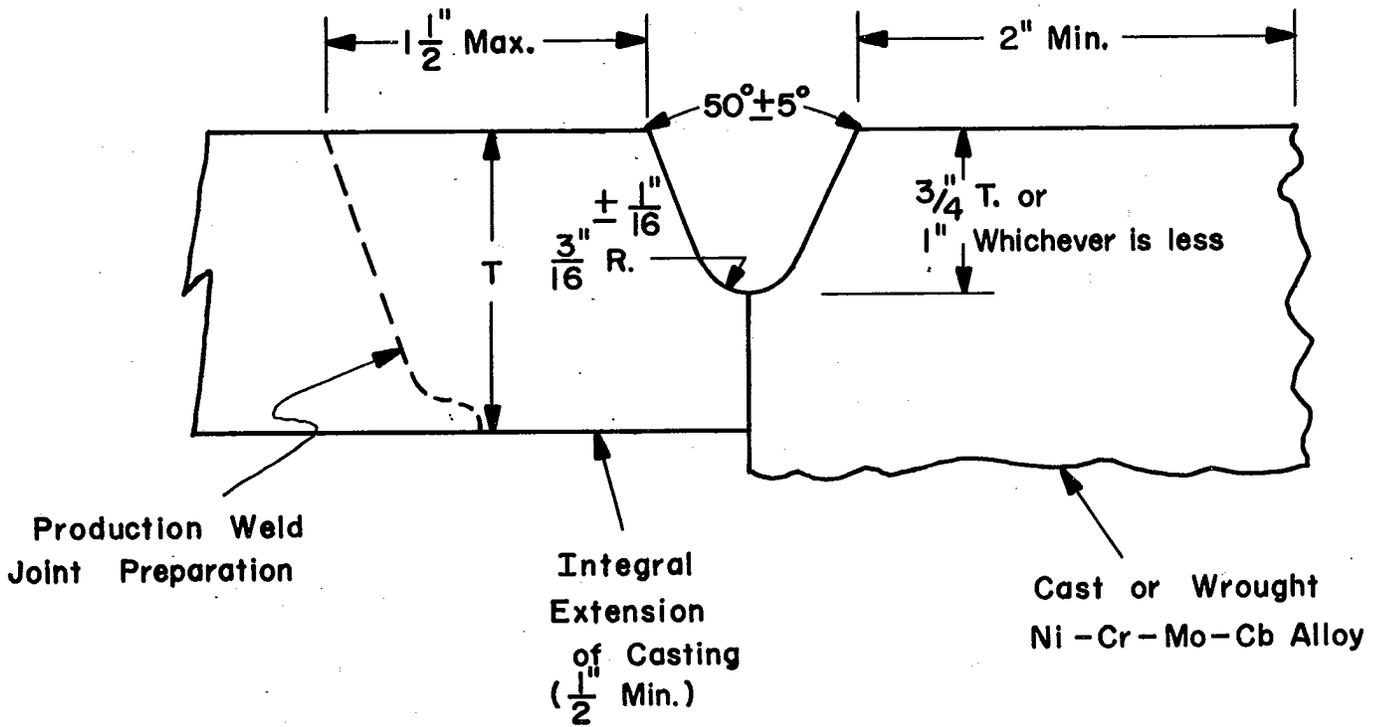
- 1/ "T" is the diameter of the largest sphere that can be inscribed in any cross-section of the as-cast casting.
- 2/ Dimensions are minimum and may be increased if needed.



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FIGURE 1. Location of tensile test specimens in separately cast test blocks.

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Weld Test Length = 4" Min.

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FIGURE 2. Weldability test joint.