

QQ-S-681F

August 29, 1974

~~SUPERSEDING~~

Fed. Spec. QQ-S-681E

October 4, 1968

## FEDERAL SPECIFICATION

## STEEL CASTINGS

This specification was approved by the Commissioner,  
Federal Supply Service, General Services Administration,  
for the use of all Federal agencies.

## 1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers mild-to-medium-strength carbon steel castings for general application as described in ASTM A 27 and high-strength steel castings for structural purposes as described in ASTM A 148.

1.2 Classification.

1.2.1 Grades. Steel castings are furnished in one of the following grades, as specified (see 6.1).

A 27

N-1  
N-2  
U-60-30  
60-30  
65-35  
70-36  
70-40

A 148

80-40  
80-50  
90-60  
105-85  
120-95  
150-125  
175-145

## 2. APPLICABLE DOCUMENTS

2.1 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:

Federal Standards:

Fed. Std. No. 123 - Marking for Domestic Shipment (Civil Agencies)  
Fed. Test Method Std. No. 151 - Metals; Test Methods

Area MECA

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(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

#### Military Standard:

MIL-STD-129 - Marking for Shipment and Storage

(Copies of Military Specifications and Standards required by suppliers 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 a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

#### American Society for Testing and Materials (ASTM) Standards:

- A 27 - Mild-to-Medium-Strength Carbon - Steel Castings for General Application
- A 148 - High Strength Steel Castings for Structural Purposes
- E 71 - Reference Radiographs for Steel Castings up to 2 Inches (51mm) in Thickness
- E 109 - Dry Powder Magnetic Particle Inspection
- E 125 - Reference Photographs for Magnetic Particle Indications on Ferrous Castings
- E 138 - Wet Magnetic Particle Inspection
- E 142 - Controlling Quality of Radiographic Testing
- E 165 - Liquid Penetrant Inspection
- E 186 - Reference Radiographs for Heavy-Walled (2 to 4-1/2 in.) Steel Castings
- E 280 - Reference Radiographs for Heavy-Walled (4-1/2 to 12 in.) Steel Castings
- E 446 - Reference Radiographs for Steel Castings up to 2 Inches in Thickness

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

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National Motor Freight Traffic Association, Incorporated, Agent:National Motor Freight Classification

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

Uniform Classification Committee, Agent:Uniform Freight Classification

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

## 3. REQUIREMENTS

3.1 Preproduction requirements. When specified in the contract or order (see 6.2), the supplier shall submit preproduction samples which represent the steel castings to be supplied in production. These samples shall meet the requirements for acceptance covered by this specification when tested in accordance with section 4. Upon approval of the preproduction samples, no major changes in foundry practice shall be made in the production of castings without approval by the procuring activity.

3.2 Manufacturing process and heat treatment. Castings shall be produced and heat treated in accordance with ASTM A 27 and A 148 as applicable.

3.3 Acceptance requirements. The high-strength carbon and alloy steel castings shall meet all the requirements of ASTM A 148; the mild-to-medium-strength carbon steel castings shall meet all the requirements of ASTM A 27.

3.4 Straightening. Castings may be straightened, if necessary, to permit layout and machining to finished dimensions within the given tolerances. The responsibility for furnishing heat-treated castings that can be machined to the finished dimensions within the given tolerances, without further straightening shall rest with the producer.

3.5 Soundness. When specified in the contract or order, the castings shall be examined for soundness using radiographic, magnetic particle, or penetrant methods (see 4.4). Standards shall be as specified by the procuring activity in accordance with ASTM Standards E 71, E 186, E 280, or E 446 for radiographic inspection, E 125 for dry magnetic particle inspection, and as agreed upon between the producer and procuring activity for penetrant inspection and for wet magnetic particle inspection.

## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 that supplies and services conform to prescribed requirements.

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4.2 Sampling, inspection, and test procedures shall be in accordance with ASTM A 27 or A 148 for the applicable grade.

4.3 Chemical analysis. Samples for chemical analysis shall be prepared and tested in accordance with method 111 or 112 of Fed. Test Method Std. No. 151. In case of dispute method 111 shall be used for referee analysis.

4.4 Nondestructive inspection for soundness. Nondestructive inspection shall be carried out to determine the compliance with the requirements for soundness (see 3.5). ASTM E 142 shall be used for radiographic inspection; E 109 shall be used for dry magnetic particle inspection; E 138 shall be used for wet magnetic particle inspection; and E 165 shall be used for liquid penetrant inspection.

## 5. PREPARATION FOR DELIVERY

### 5.1 Packing.

5.1.1 Level C. Steel castings shall be shipped in a manner which will assure arrival at destination in satisfactory condition at lowest rates. Shipments shall comply with Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

5.2 Marking for shipment. Marking shall be in accordance with 5.2.1 or 5.2.2, as specified (see 6.1).

5.2.1 Civil agencies. In addition to any special markings required by the contract or order, all shipments shall be marked in accordance with Fed. Std. No. 123.

5.2.2 Military activities. In addition to any special markings required by the contract or order, all shipments shall be marked in accordance with MIL-STD-129.

## 6. NOTES

6.1 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Grade of casting required (see 1.2.1).
- (c) When preproduction samples are required (see 3.1).
- (d) When nondestructive testing is required (see 3.5).

MILITARY INTERESTS:

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) Custodians:

Army - MR  
Navy - SH

Review activities:

Army - AT, ME  
Navy - YD

User activities:

Army - MI, TS

Preparing activity:

Army - MR

Civil Agency Coordinating Activities:

Commerce - NBS

DOJ - FPI

GSA - FSS

PS - POS

USDA - ARS

VA - DMS

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Orders for this publication are to be placed with the General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 25 cents each.