

January 26, 1976

SUPERSEDING

Fed. Spec. QQ-S-626B

February 17, 1970

FEDERAL SPECIFICATION

STEEL PLATE, ALLOY (STRUCTURAL QUALITY)

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 one quality of structural alloy steel plate (see 6.1).

1.2 Classification.

1.2.1 Condition, form, edge and finish. Steel plate furnished under this specification shall be of the following conditions, forms, edges and finishes, as specified (see 6.2).

Condition I - As rolled ✓
Condition II - Annealed ✓
Condition III - Normalized ✓

Form A - Rectangular ✓
Form B - Circular and semi-circular ✓
Form C - Sketch, including rings ✓

Edge 1 - Mill ✓
Edge 2 - Universal mill ✓
Edge 3 - Sheared ✓
Edge 4 - Gas cut and special cut ✓

Finish a - As-rolled ✓
Finish b - Pickled ✓
Finish c - Pickled and oiled ✓
Finish d - Blast cleaned ✓
Finish e - Blast cleaned and oiled ✓
Finish f - Painted, prime coat ✓
Finish g - Painted, prime coat and one finish coat ✓

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issues in effect on the 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. 48 - Tolerances for Steel and Iron Wrought Products
Fed. Std. No. 66 - Steel: Chemical Composition and Hardenability
Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies)
Fed. Test Method Std. No. 151 - Metals; Test Methods

(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 product 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, D.C., Atlanta, Chicago, Kansas City, Mo., Ft. Worth, Denver, San Francisco, Los Angeles, and Seattle, Wash.

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

(Copies of Military Specifications and Standards 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 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:

- E 8 - Tension Testing of Metallic Materials.
- E 112 - Estimating Average Grain Size of Metals.

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

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.)

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 Chemical composition. Chemical composition is specified either to ranges and limits, or to steel grade designations (see 6.3 for commonly used steels). In both cases, the specified composition shall satisfy the requirements of "Ranges and Limits for Alloy Steel Plate" specified in Fed. Std. No. 66.

3.1.1 Heat analysis. The supplier shall furnish a heat analysis of each heat of steel.

3.1.2 Product analysis. When specified by the purchaser (see 6.2), the steel shall be subject to product analysis. The chemical composition determined shall be within the ranges specified by the procuring agency. Individual determinations may vary from the specified ranges to the extent specified in Fed. Std. No. 66, but the several determinations of any element in a heat may not vary both above and below the range.

3.2 Tensile properties. When tensile properties requirements are specified in the contract or order (see 6.2), the test specimens representing the steel plate shall meet the requirements of table I for the applicable tensile strength specified (see 6.4).

Table I. Tensile requirements

Specified tensile strength, ksi	Tensile strength range, ksi	Example	
		Specified tensile strength, ksi	Tensile strength range, ksi
Up to 67	12	66	60-72
67 to 80	15	75.5	68-83
80 to 110	20	95	85-105
110 to 140	25	125.5	113-138
140 and over	Consult producer	-	-

3.3 Austenite grain size. Steel plate may be specified to coarse or fine austenite grain size. When specified in the invitation for bids, contract or order, the steel plate shall meet the requirements for austenite grain size specified by the procuring agency (see 6.2).

3.4 Size and dimensional tolerances. Steel plate shall be furnished to the sizes specified (see 6.2 and 6.5) and shall, unless otherwise specified (see 6.2), meet the applicable tolerance requirements of Fed. Std. No. 48.

3.5 Edge. Unless otherwise specified (see 1.2.1, 6.2 and 6.5), steel plate shall be furnished with sheared edges.

3.6 Finish. Unless otherwise specified (see 1.2.1 and 6.2), steel plate shall be furnished with an as-rolled finish.

3.7 Identification marking. Each plate shall be stamped or stencilled in one location with the producer's name or trademark, the heat number, size, and thickness, except in the case of lifts of plates $3/8$ inch and under in thickness in all sizes and of plates $3/6$ inches and under in width in all thicknesses, in which case such marking shall be stamped or stencilled on the top piece of each lift or shown on a tag attached to each lift.

3.8 Workmanship. Plate shall be clean and free from injurious defects such as pipe and laminations. Surface defects and segregation shall be consistent with commercial practice for this quality of plate.

3.8.1 Surface conditioning. Plate may be conditioned, where necessary, by the producer for the removal of surface imperfections on either surface or both surfaces, by grinding, provided the ground area is well flared and does not reduce the thickness of the plate more than 0.010 inch below the ordered thickness.

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 in the contract or order, the supplier 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 Lot. Unless otherwise specified (see 6.2), a lot shall consist of all plate of the same heat, the same condition and finish, the same thickness, and when heat treated, subjected to the same heat treatment procedure. For product analysis, a lot shall be defined as one heat.

4.3 Sampling.

4.3.1 For chemical composition. When specified (see 6.2), at least one sample shall be taken from each lot for product analysis in accordance with method 111 or 112 of Fed. Test Method Std. No. 151.

4.3.2 For tensile properties. When tensile properties are specified (see 6.2), two random samples shall be taken from each heat of steel.

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4.3.3 For austenite grain size. When austenite grain size is specified (see 6.2), one sample shall be taken from each heat.

4.4 Examination.

4.4.1 Visual. Unless otherwise specified in the contract or order (see 6.2), all alloy steel plate in each lot shall be examined for conformance with the requirements for edge (see 3.5), finish (see 3.6), identification marking (see 3.7), and workmanship (see 3.8).

4.4.2 Dimensions and tolerances. A representative number of measurements or weights shall be taken on each lot to determine compliance with the size, weight, and dimensional tolerances.

4.4.3 Preparation for delivery. Prior to shipment, examination shall be made to determine compliance with the requirements of section 5.

4.5 Tests.

4.5.1 Chemical analysis. Specimens for chemical check analysis shall be prepared and tested in accordance with method 111 or 112 of Fed. Test Method Std. No. 151. In case of dispute, analysis by method 111 shall be the basis for acceptance or rejection.

4.5.2 Tension test. Specimens for tensile testing shall be prepared and tested in accordance with ASTM E 8.

4.5.3 Austenite grain size. Grain size specimens shall be prepared and tested in accordance with ASTM E 112.

4.6 Rejection and retest. Unless otherwise specified in the contract or order (see 6.2), rejection and retest shall be conducted in accordance with the general section of Fed. Test Method Std. No. 151.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A. Preservation for shipment shall be in accordance with MIL-STD-163.

5.1.2 Level C. Cleaning, drying, preservation, and packaging shall be in accordance with the manufacturer's commercial practice.

5.2 Packing. Plate shall be packed for shipment in accordance with level A or C as specified (see 6.2).

5.2.1 Level A. Packing for shipment shall be in accordance with MIL-STD-163.

5.2.2 Level C. Packing shall be in accordance with commercial practice adequate to ensure acceptance and delivery by the carrier for the mode of transportation employed. Containers shall comply with the requirements of the Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable to the mode of transportation.

5.3 Marking.

5.3.1 Civil agencies. In addition to any special marking specified in the contract or order (see 6.2), marking for shipment shall be in accordance with Fed. Std. No. 123.

5.3.2 Military activities. In addition to any special marking specified in the contract or order (see 6.2), marking for shipment shall be in accordance with MIL-STD-163.

6. NOTES

6.1 Intended use. Structural quality plates are intended for general structural applications and miscellaneous end uses. Plates of this quality may be furnished to meet chemical composition limits and mechanical property requirements.

6.2 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) Condition, form, edge, and finish (see 1.2.1, 3.5, and 3.6).
- (c) Chemical composition (see 3.1 and 6.3).
- (d) When product analysis is required (see 3.1.2).
- (e) Tensile properties, if required and specified (see 3.2, 4.3.2, and 6.4).
- (f) Austenite grain size, if required and specified (see 3.3 and 4.3.3).
- (g) Dimensions of plate and tolerances if different than applicable tolerance of Fed. Std. No. 48.
- (h) When a lot size other than as specified herein is required (see 4.2).
- (i) When sampling for chemical analysis is required (see 4.3.2).
- (j) When visual examination other than as specified herein is required (see 4.4.1).
- (k) When rejection and retest other than as specified herein is required (see 4.6).
- (l) Level of preservation and packing (see 5.2). When level A preservation and packing is specified, information should be included as to whether protective covering and secured lifts are required.
- (m) Special marking, when required (see 5.3.1 and 5.3.2).

6.3 Selection of chemical composition.

6.3.1 Minimum and maximum limits and ranges. Chemical composition ranges or limits are customarily based on heat analysis unless otherwise specified using the limits and ranges for heat analysis in table I. The elements comprising the desired chemical composition can be specified in one of three ways:

- (a) By a maximum limit.
- (b) By a minimum limit.
- (c) By minimum and maximum limits termed the range. By common usage, the range is the arithmetical difference between the two limits (e.g., 0.15 to 0.22 is a 0.07 range).

6.3.2 Steel grade designations. The following grades are most commonly used for alloy steel plates (see latest AISI Steel Products Manual or latest SAE Handbook Supplement for Alloy Steel Plate Compositions):

1330
1345
4130
4140
4340
4620
6150
8620

6.4 Selection of tensile properties. Tension test ranges for alloy steel plate are commonly specified as shown in table I.

6.5 Edges. The following is a definition of edges (see 1.2.1).

(a) Mill edge is the normal edge produced by rolling between horizontal finishing rolls, and it does not conform to any definite contour. Mill edge plates have two mill edges and two trimmed edges.

(b) Universal mill is the normal edge produced by hot rolling between horizontal and vertical finishing rolls. Universal plates or universal mill plates have two universal mill edges and two trimmed edges. The plates are sometimes designated as U. M. plates.

(c) Sheared edge is the normal edge produced by shearing. Sheared plates or sheared mill plates are trimmed on all edges.

(d) Gas cut and special cut edge is the edge produced by gas cutting or special cutting practice when the shearing limitations are exceeded. When gas cutting or special cutting is specified or required on plates of certain combinations of thickness and chemical composition, a special practice may be necessary to minimize stresses and avoid thermal cracking. Such special practice is commonly negotiated between the consumer and producer.

MILITARY CUSTODIANS:

Army - MR
Navy - OS

Review activities:

Army - WC, EA, PA, WV, MR, MI
DSA - IS

User activities:

Army - AT

Preparing activity:

Army - MR

Civil Agency Coordinating Activities:

COM - NBS
GSA - FSS
JUS - FPI
AGR - ARS