QQ-B-613D
October 16, 1973
SUPERSEDING
Fed. Spec. QQ-B-613C
February 16, 1967

FEDERAL SPECIFICATION

BRASS, LEADED AND NONLEADED:

FLAT PRODUCTS (PLATE, BAR, SHEET, AND STRIP)

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

1. SCOPE AND CLASSIFICATION

Scope. This specification covers alloys (compositions) of brass flat products with slit, slit and edge-rolled, sheared, sawed, or machined edges, (bar, plate, sheet, and strip) used for fabricated or machined items (see 6.1), but does not include flat products with finished edges (see 6.6).

1.2 Classification.

1.2.1 Alloys (composition), forms, and tempers. Plate, bar, sheet, and strip covered by this specification shall be furnished in the following alloys (composition), forms, and tempers as specified (see 6.2):

Alloys (composition):

Copper alloy numbers
- 230
- 240
- 260
- 268
- 342
- 353

Composition 11

Military Specification:

MIL-C-3993 - Copper and Copper-Base Alloy Mill Products, Packaging of.

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
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:

E 8 - Tension Testing of Metallic Materials.
E 18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials.
E 112 - Estimating the Average Grain Size of Metals.

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

(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 Manufacture. Material covered by this specification shall be manufactured by such hot or cold-working followed by such annealing and straightening as may be required to meet the requirements of this specification.

3.2 Unless material in rolls or on reels or bucks is specified (see 6.2), the material shall be furnished in flat straight lengths.

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

TABLE II. Tensile properties

Copper alloy No.	Temper	Tensile strength, k.s.i.
230	Quarter-hard	44 - 54
	Half-hard	51 - 61
	Hard	63 - 72
240	Quarter-hard	48 - 58
	Half-hard	55 - 65
	Hard	68 - 77
260	Quarter-hard	49 - 59
	Half-hard	57 - 67
	Hard	71 - 81
	Extra-hard	83 - 92
	Spring	91 - 100
	Extra-spring	95 - 104
268	Quarter-hard	49 - 59
	Half-hard	55 - 65
	Hard	68 - 78
	Extra-hard	79 - 89
	Spring	86 - 95
	Extra-spring	90 - 99
342, 353	Quarter-hard	49 - 59
	Half-hard	55 - 65
	Hard	68 - 78
	Extra-hard	79 - 89

3.4.2 Hardness requirements.

3.4.2.1 Copper alloy number 260, annealed temper. Copper alloy number 260 over 0.020 inch in thickness in the annealed temper indicated shall meet the hardness requirements specified in table III.

TABLE III. Hardness requirements for copper alloy number 260

Annealed temper nominal grain size, mm.	Rockwell hardness	
	F Scale	Superficial 30-T
0.120	50 - 62	21 max.
.070	52 - 67	3 - 27
.050	61 - 73	20 - 35
.035	65 - 76	25 - 38
.025	67 - 79	27 - 42
.015	72 - 85	33 - 50

TABLE V. Permissible variations in grain size for annealed brass

Copper alloy No.	Ordered grain size, mm.	Permissible variation in average grain size, mm.	
		Minimum	Maximum
230	0.070	0.050	0.100
	.050	.035	.070
	.035	.025	.050
	.025	.015	.035
	.015	1/	.025
240	0.070	0.050	0.120
	.050	.035	.070
	.035	.025	.050
	.025	.015	.035
	.015	1/	.025
260, 268	0.120	0.070	0.150
	.070	.050	.120
	.050	.035	.070
	.035	.025	.050
	.025	.015	.035
	.015	1/	.025
342, 353	0.070	0.050	0.100
	.050	.035	.070
	.035	.025	.050
	.025	.015	.035

1/ Although no minimum grain size is required, this material must be fully recrystallized.

3.6 Dimensional tolerances. The following references of Fed. Std. No. 146, shall apply:

Dimension	Reference
Thickness	1a(1)
Width	1a(2)
Length	1a(3), 1a(4)
Straightness	1a(5)

TABLE VI. Sampling for chemical analysis

Pounds of material in lot	Number of samples 1/
Up to 2500, incl	1
2501 to 5000, incl.	2
5001 to 7500, incl.	3
7501 to 10,000, incl.	4
10,001 to 70,000, incl.	12/

1/ If the number of original bars, billets, or cakes from which the material is processed is less than the number of samples, not more than one sample need be taken from each piece.

2/ See 4.2b.

4.3.2 For tension test. Unless otherwise specified (see 6.2), two tension test specimens shall be taken from each lot and each shall be selected from a different piece unless the lot consist of one piece in which case one test specimen shall be sufficient. If the lot is 2500 pounds or less, only one tension test specimen is required.

4.3.3 For hardness and grain size. Unless otherwise specified (see 6.2), at least four sample pieces shall be selected from each lot for the tests specified in 4.5.2.3 and 4.5.2.4 unless the lot is represented by less than four pieces. No more than one sample shall be taken from the same piece.

4.3.4 For visual and dimensional examination.

4.3.4.1 Pieces weighing over 150 pounds. Each piece shall be examined.

4.3.4.2 Pieces weighing 150 pounds or less. From each lot of material with pieces weighing 150 pounds or less, a representative sample shall be selected in accordance with MIL-STD-105, inspection level II, with an acceptable quality level (AQL) of 1.5 percent defective. The samples selected for dimensional examination may be the same as those selected for visual examination, but shall be evaluated separately.

4.3.4.3 When strip is furnished in rolls or coils, or on spools, reels, or bucks, the sample for examination shall be taken from within 10 feet of the outer end. If the sample selected is rejected due to handling marks, an additional 20 feet shall be used for re-examination.

4.6.3 Hardness tests. The hardness of specimens selected in accordance with 4.3.3 shall be determined in accordance with ASTM E 18. Readings shall be taken on an outside surface (not cross section).

4.6.4 Grain size requirements. Grain size of samples selected in accordance with 4.3.3 shall be determined in accordance with ASTM E 112.

4.7 Rejection.

4.7.1 Examination defects. Any sample unit having one or more defects shall be rejected. If the number of nonconforming sample units in the sample exceeds the acceptance number specified in 4.3.4.2 for the sample size, the entire lot shall be rejected subject to the provisions of the section on "Acceptance and Rejection" of MIL-STD-105.

4.7.2 Test failures. A lot shall be rejected for failure to meet any of the test requirements when tested in accordance with 4.5, subject to the provisions of the section on "Rejection and Retests" of Fed. Test Method Std. No. 151.

PREPARATION FOR DELIVERY

5.1 Packing (see 6.2).

5.1.1 Levels A and B. The material shall be packed in accordance with MIL-C-3993.

5.1.2 Level C. The products shall be separated by size, alloy, form, and temper and packed in accordance with the manufacturer's standard practice into containers of a type and size commonly used for the purpose, in such a manner as to insure acceptance by carrier for transportation at the lowest rate applicable and to afford maximum protection from normal hazards of transportation.

5.2 Marking (see 6.2 and 6.3).

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

5.2.2 Military agencies. In addition to markings required by the contract or order, shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use.

6.3 The requirements for product identification marking (see 3.10), and for packing and marking for shipment (see 5.1 and 5.2), specified herein apply to direct shipment for Government activities and apply also, where specified, to contracts or orders between the manufacturer and the Government prime contractor.

6.4 Definitions.

6.4.1 Bar. As covered by this specification, a solid rectangular section with two plane parallel surfaces having slit, sheared, sawed or machined edges, up to and including 12 inches in width and over 0.188 inch in thickness.

6.4.2 Plate. A flat rolled product over 3/16 inch (0.188 inch) in thickness and over 12 inches in width.

6.4.3 Sheet. A flat rolled product up to and including 0.188 inch in thickness and over 12 inches in width.

6.4.4 Strip. As covered by this specification, a flat product, other than flat wire, up to and including 0.188 inch in thickness, and generally furnished with slit, sheared, or slit and edge rolled edges in widths up to 20 inches, inclusive.

6.5 General information.

6.5.1 The thickness of plate, sheet, and strip should be stated in decimals of an inch.

6.5.2 Plate, sheet, and strip should be ordered in as narrow widths as can be used.

6.5.3 Where no description of the edge of plate, sheet or strip is specified, the edges furnished will be the finish (slitting, shearing, sawing) most available to the producer.

6.5.4 When material is ordered in the form of plate, sheet, or strip, it should be understood that these terms refer merely to the general form and dimensions of the material, and do not have any technical significance as to the methods of manufacture.

6.5.5 Material in rolls is generally more economical than material of the same cross section in straight or flat lengths.

6.6 Related specifications. Flat products with finished edges (bar, flat wire, and strip) are covered under QQ-B-626. Wire and flat wire are covered by QQ-W-321.

SPECIFICATION ANALYSIS SHEET

Form Approved Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.

SPECIFICATION / QQ-B-613D, Flat Products (Plate, Bar, Sheet, and Strip

ORGANIZATION	CITY AND STATE

CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
		$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A GIVE PARAGRAPH NUMBER AND WORDING.

B RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2 COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4 REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUB	BY *(Printed or typed name and activity)*	DATE

DD FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE