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AEROSPACE MATERIAL SPECIFICATION

SAE AMS-QQ-A-250/15

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Submitted for recognition as an American National Standard

ALUMINUM ALLOY ALCLAD 7178, PLATE AND SHEET

UNS A87178

NOTICE

This document has been taken directly from Federal Specification QQ-A-250/15E and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards.

The original Federal Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, (b) the use of the existing government specification or standard format, and (c) the exclusion of any qualified product list (QPL) sections.

The complete requirements for procuring 7178 aluminum alloy alclad plate and sheet described herein shall consist of this document and the latest issue of AMS-QQ-A-250.

1. SCOPE AND CLASSIFICATION:

1.1 Scope:

This specification covers the specific requirements for 7178 aluminum alloy alclad plate and sheet; the general requirements are covered in AMS-QQ-A-250. The plate and sheet covered by this specification shall be an integral composite product consisting of a heat-treatable aluminum alloy (7178) core with thin layers of an aluminum alloy (7072) anodic to the core and of approximately equal thickness bonded to both surfaces.

1.2 Classification:

1.2.1 Tempers: The plate and sheet are classified in one of the following tempers as specified (See 6.2): O, T6, T62, T651, or F temper. Definitions of these tempers are specified in AMS-QQ-A-250.

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2. APPLICABLE DOCUMENTS:

See AMS-QQ-A-250.

3. REQUIREMENTS:

3.1 Chemical Composition:

3.1.1 The chemical composition of the core ingots or slabs and of the cladding plates used for the manufacture of the alclad plates and sheets shall conform to the requirements shown in Table I for core and cladding, respectively.

TABLE I. Chemical Composition 1/

Element	Analysis			
	Core (7178)		Cladding (7072)	
	Minimum	Maximum	Minimum	Maximum
	Percent	Percent	Percent	Percent
Zinc	6.3	7.3	0.8	1.3
Magnesium	2.4	3.1	-	0.10
Copper	1.6	2.4	-	0.10
Chromium	0.18	0.35	-	-
Manganese	-	0.30	-	0.10
Iron	-	0.50	-	2/
Silicon	-	0.40	-	2/
Titanium	-	0.20	-	-
Other Elements, each	-	0.05	-	0.05
Other Elements, total	-	0.15	-	0.15
Aluminum	Remainder		Remainder	

1/ Analysis shall routinely be made only for the elements specifically mentioned in Table I. If, however, the presence of other elements is indicated or suspected in amounts greater than the specified limits, further analysis shall be made to determine that these elements are not in excess of specified limits.

2/ Iron plus silicon 0.7 percent maximum.

3.2 Mechanical Properties:

3.2.1 Mechanical Properties of Material as Supplied: The mechanical properties perpendicular to the direction of final rolling, except for material under 9 inches in width, shall conform to the requirements of Table II for the temper specified. For material under 9 inches in width, the mechanical properties parallel to the direction of final rolling shall conform to the requirements of Table II for the temper specified.

TABLE II. Mechanical Properties (See 6.5)

Temper	Thickness Inches	Tensile Strength minimum ksi	Yield Strength at 0.2 percent Offset, minimum ksi	Elongation in 2 in. or 4 times D 1/, 2/ minimum Percent
O	0.015 thru 0.062	3/ 36.0	3/ 20.0	10
	0.063 thru 0.187	3/ 38.0	3/ 20.0	10
	0.188 thru 0.499	3/ 40.0	3/ 21.0	10
T6 and T62 5/	0.015 thru 0.044	76.0	66.0	7
	0.045 thru 0.062	78.0	68.0	8
	0.063 thru 0.187	80.0	70.0	8
	0.188 thru 0.249	82.0	71.0	8
-T651 and T62 5/	0.250 thru 0.499	82.0	73.0	8
	4/ 0.500 thru 1.000	84.0	73.0	6
	4/ 1.001 thru 1.500	84.0	73.0	4
	4/ 1.501 thru 2.000	80.0	70.0	3
F	All	6/	6/	6/

1/ Not required for material 1/2 inch or less in width.
2/ D represents specimen diameter.
3/ Maximum.
4/ These properties are those of the core material inasmuch as the tests are made on a round specimen machined from the plate. The minimum tensile and yield strength across the whole section of the plate shall be about 2.5 percent lower than these values.
5/ Material in the T62 temper is not available from material producers.
6/ No requirements.

3.2.2 Mechanical Properties After Heat Treatment: In addition to conforming to the requirements of 3.2.1, material in the annealed (O) and the as-fabricated (F) tempers shall, after proper solution heat treatment and aging, also conform to the requirements of Table II for the T6 and T62 tempers. Material as received in the T6 and T651 tempers shall, after proper re-solution heat-treatment and aging, be capable of conforming to the requirements specified in Table II for the T6 and T62 tempers.

3.3 Cladding Thickness:

3.3.1 Thickness of Cladding Plates: The aluminum alloy (7072) plates that are bonded to the two sides of the aluminum alloy (7178) ingot or slab to form a composite that is to be rolled to the finished thickness shall each have a thickness as specified in Table III.

TABLE III. Cladding Thickness

Thickness of Finished Plate or Sheet Inches	Nominal Cladding Thickness per Side; Percent of Composite Thickness	Average Thickness per Side of Cladding on Finished Plate or Sheet; minimum Percent of Plate or Sheet Thickness
Under 0.063	4	3.2
0.063 thru 0.187	2.5	2
0.188 and over	1.5	1.2 1/

1/ For plate 0.500 and over, the average cladding thickness per side shall have a maximum value of 3 percent of the plate thickness.

3.3.2 Thickness of Cladding: If question arises concerning the thickness of cladding of the finished sheet or plate, samples examined in accordance with AMS-QQ-A-250 shall show an average of cladding on each side, not less than that specified in Table III.

3.4 Internal Defects:

When specified (See 6.2), plate shall be ultrasonically inspected (See AMS-QQ-A-250). Acceptance limits shall be as specified in Table IV.