

AEROSPACE MATERIAL SPECIFICATION

SAE AMS-QQ-A-200/14

REV. A

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Superseding AMS-QQ-A-200/14

Aluminum Alloy, Bar, Rod, Shapes,
and Wire, Extruded, 7178-T76
Improved Exfoliation Resistance
(Composition similar to UNS A97178)

RATIONALE

AMS-QQ-A-200/14A has been reaffirmed to comply with the SAE five-year review policy.

NONCURRENT NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of April, 2007. It is recommended, therefore, that this specification not be specified for new designs.

"NONCURRENT" refers to those specifications which have previously been widely used and which may be required for production or processing of existing designs in the future. The Aerospace Materials Division, however, does not recommend these specifications for future use in new designs.

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NOTICE

This document has been taken directly from Federal Specification QQ-A-200/14B 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 aluminum alloy 7178-T76 bar, rod, shapes, and wire extruded described herein shall consist of this document and the latest issue of AMS-QQ-A-200.

1. SCOPE AND CLASSIFICATION:

1.1 Scope:

This specification covers the specific requirements for aluminum alloy 7178-T76 bar, rod, shapes, and wire produced by extrusion.

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1.2 Classification:

- 1.2.1 Tempers: Bar, rod, shapes, and wire are classified in the following tempers as specified (See 6.2): T76, T76510, and T76511. Definitions of tempers are specified in AMS-QQ-A-200.

2. APPLICABLE DOCUMENTS:

See AMS-QQ-A-200.

3. REQUIREMENTS:

3.1 Chemical Composition:

The chemical composition shall conform to the requirements specified in Table I.

TABLE I. Chemical Composition ^{1/}

Element	Percent	
	Minimum	Maximum
Zinc	6.3	7.3
Magnesium	2.4	3.1
Copper	1.6	2.4
Chromium	0.18	0.28
Manganese	--	0.30
Iron	--	0.50
Silicon	--	0.40
Titanium	--	0.20
Other Elements, each	--	0.05
Other Elements, total ^{2/}	--	0.15
Aluminum	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 present in excess of specified limits.

^{2/} The sum of "Other" metallic elements, 0.010 percent or more each, expressed to the second decimal place before determining the sum.

3.2 Mechanical Properties:

- 3.2.1 Mechanical Properties of Material As-Supplied: Mechanical properties of as-supplied material shall, in the longitudinal (extrusion) direction, conform to property requirements specified in Table II, except as exempted from elongation requirements by AMS-QQ-A-200.

TABLE II. Mechanical Properties

Temper	Thickness (bar and shapes); diameter (rod and wire) Inches	Area Square Inches	Tensile Strength minimum ksi	Yield Strength at 0.2 percent Offset, minimum ksi	Elongation in 2 inches or 4 times D <u>1</u> / minimum percent
T76,	Up thru 0.249	Up thru 20	76.0	66.0	7
T76510,	0.250 to 0.499	Up thru 20	77.0	67.0	7
and T76511	0.500 to 1.000	Up thru 20	77.0	67.0	7

1/ D represents specimen diameter.

3.3 Internal Defects:

When specified (See 6.2), rod, bar, and shapes shall be ultrasonically inspected (See AMS-QQ-A-200). Acceptance limits shall be as specified in Table III. All extrusions in the inspection lot shall be inspected.

TABLE III. Ultrasonic Discontinuity Acceptance Limits 1/, 2/

Thickness (bar and shapes), inches <u>3/</u>	Maximum Weight of Piece, pounds	Maximum Width to Thickness Ratio	Discontinuity Class <u>4/</u>
0.500 - 1.000	600	10 to 1	B

1/ Discontinuities in excess of those listed in Table III may be allowed subject to approval of the procuring activity, if it is established that they will be removed by machining or that they are in noncritical areas.

2/ Requirements for ultrasonic inspection for sizes, maximum weights, and discontinuity classes differing from those shown in Table III and for rod shall be specified in the contract provided the techniques and standards are agreed to by the procuring activity and the contractor (See 6.2).

3/ For thickness of a shape, see definition for shape in AMS-QQ-A-200.

4/ Discontinuity class limits are defined in MIL-STD-2154.

3.4 Resistance to Exfoliation Corrosion and Stress-Corrosion Cracking:

- 3.4.1 Exfoliation Corrosion: Material, tested in accordance with 4.2.3, shall not show exfoliation corrosion equivalent to or in excess of that depicted in Figure 2 of ASTM G 34-72 for category B. The frequency of tests shall be in accordance with AMS-QQ-A-200.
- 3.4.2 Stress-Corrosion Cracking: Extrusions, 0.750-inch and over in thickness, shall exhibit no susceptibility to stress-corrosion cracking under the conditions of the test specified in 4.2.5. The frequency of tests shall be in accordance with AMS-QQ-A-200.
- 3.4.3 Lot Acceptance Control Criteria: Resistance to exfoliation corrosion and stress-corrosion cracking for each inspection lot of material shall be determined by the following control criteria (See 4.1.2 and 4.2.6).

Determine electrical conductivity and mechanical properties.

If the conductivity is 38.0 percent International Annealed Copper Standards (IACS) or higher, and the tensile properties meet the minimum limits specified herein, the material is acceptable.

If the conductivity is at least 35.0 percent IACS but less than 38.0 percent IACS, and the tensile properties meet the minimum limits specified herein, the material shall either be tested as specified in 4.2.3 or be reprocessed.

If the conductivity is below 35.0 percent IACS, the material is not acceptable and must be reprocessed.