

# AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

## Aluminum Alloy, Structural Shapes, Extruded, 6061

UNS A96061

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The complete requirements for procuring aluminum alloy 6061 structural shapes, 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 6061 structural shapes produced by extrusion.

##### 1.2 Classification:

Structural shapes shall be furnished in the -T6 temper (solution heat-treated and artificially aged) only (See 6.2 and 6.3). Definitions of tempers are specified in AMS-QQ-A-200.

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## 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 <sup>1/</sup>

Element	Percent	
	Minimum	Maximum
Magnesium	0.8	1.2
Silicon	0.40	0.8
Copper	0.15	0.40
Iron	-	0.7
Chromium	0.04	0.35
Zinc	-	0.25
Titanium	-	0.15
Manganese	-	0.15
Other Elements, each	-	0.05
Other Elements, total	-	0.15
Aluminum	Remainder	

<sup>1/</sup> Analysis shall routinely be made only for the elements specifically mentioned in Table 1. If, however, the presence of other elements is indicated in the course of routine analysis, further analysis shall be made to determine conformance to the limits specified for other elements.

### 3.2 Mechanical Properties of Material as Supplied:

The mechanical properties in the direction of extrusion shall conform to requirements specified in Table II. The elongation requirements shall not be applicable to the following:

- (a) Material of such dimensions that a standard test specimen cannot be taken in accordance with AMS-QQ-A-200, and of such shape that it cannot be satisfactorily tested in full section.
- (b) Material thinner than 0.062 inch (nominal).

TABLE II. Mechanical Properties

Temper	Thickness Inches	Tensile Strength ksi minimum	Yield Strength at 0.2 percent Offset or at extension indicated		Elongation in 2 in. or 4 times D $\frac{1}{2}$ , percent minimum
			ksi minimum	Extension under load Inch per inch	
T6	Up thru 0.249	38.0	35.0	0.0055	8
	0.250 and over	38.0	35.0	0.0055	10

$\frac{1}{2}$  "D" represents specimen diameter.

### 3.3 Heat Treatment:

Material shall be either furnace heat-treated in accordance with MIL-H-6088 or shall comply with the requirements of 3.3.1 (See AMS-QQ-A-200).

- 3.3.1 Alternate Heat Treatment: The producer may use an alternate heat treating procedure in lieu of furnace heat treatment in accordance with MIL-H-6088 provided the material conforms to all other requirements of this specification when sampled and tested in accordance with 4.1.1. The alternate heat treatment (press quenching) shall be performed on the whole of a piece, never on a part only, and shall be performed in a manner that will produce the utmost uniformity.

### 3.4 Marking:

When specified (See 6.2), and in addition to the marking required in FED-STD-184, material shall be identified by an inspection lot number marked in at least one location on each piece.

## 4. QUALITY ASSURANCE PROVISIONS:

See AMS-QQ-A-200 and the following:

## 4.1 Inspection Lot:

An inspection lot shall consist of an identifiable quantity of structural shapes of the same type, section thickness, and size subjected to inspection at one time.

## 4.2 Heat Treatment:

- 4.2.1 Additional Sampling and Testing When Material Has Not Been Heat-Treated in Accordance With MIL-H-6088: When material has not been heat-treated in accordance with MIL-H-6088, in addition to the requirements of 3.2, hardness tests shall be performed either on each extruded charge in the inspection lot or on samples selected in accordance with MIL-STD-105, Level II, Acceptable Quality Level (AQL) 1.5 percent defective or MIL-STD-414, Level IV, Acceptable Quality Level (AQL) 1.5 percent defective. The minimum hardness control value shall be in accordance with Table III for the type of hardness tester used. The specific type of hardness tester used shall be left to the discretion of the producer. The hardness shall be checked at the portion of the piece which is determined to have received the least drastic quench. Lots rejected by the statistical sampling plan may be retested by hardness testing each extruded charge and all charges or finished lengths meeting the applicable requirements of Table III are acceptable. Individual extrusion charges which fail to conform to the requirements of Table III may be accepted provided the two pieces in the lot having the two lowest hardness readings are tensile tested and found to conform to the requirements of Table II.

TABLE III. Hardness Values

Thickness Inch	Hardness Number minimum	Hardness Number minimum	Hardness Number minimum
	Webster	Barcol	Rockwell E
0.050 to 0.075	15	76	89
0.076 to 0.499	15	76	90
0.500 and over	-	76	-

## 5. PREPARATION FOR DELIVERY:

See AMS-QQ-A-200.