AEROSPACE
MATERIAL SPECIFICATIONS
SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York, N.Y. 10017

AMS 2355

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Revised

TENSILE TESTING OF WROUGHT ALUMINUM AND MAGNESIUM PRODUCTS
Except Forgings

1. PURPOSE: To establish proper size and location of tensile test specimens, and proper testing methods for tensile testing of wrought aluminum and magnesium products. The procedures specified herein shall be used in determining tensile properties of sheet, plate, wire, bar, rod, tubing, and shapes to the requirements of Aerospace Material Specifications (AMS), Aerospace Material Documents (AMD), and other specifications in which this specification is referenced. Where ASTM E8 is referenced, the applicable issue shall be that listed in the latest issue of AMS 2350.

2. TENSILE TEST SPECIMEN TYPES: Tensile test specimens may be substantially the full cross section of the material being tested or they may be machined.

2.1 Full-Section Specimens: Tensile test specimens of substantially the full cross-section of the material may be used for wire, rod, bar, tubing, and shapes. The section may be reduced slightly throughout the test section to insure fracture within the gage marks. The gage length shall be 4 times the diameter for solid round specimens and 2 in. for all other specimens.

2.2 Machined Specimens: Standard machined specimens for tensile testing are of two types: round and rectangular, with a gage length of 2 in. and a width or diameter of 1/2 inch. These standard specimens are shown in ASTM E8, Figs. 7, 8, and 13.

2.2.1 Sub-Size Specimens: Smaller round specimens proportional to the standard 1/2 in. diameter round specimen shall be used when a standard specimen cannot be prepared. These smaller round specimens are also shown in ASTM E8, Fig. 8. Other sizes of small round specimens may be used if the gage length for measurement of elongation is 4 times the diameter of the reduced section of the specimen and provided that in no case shall the dimensions of the smallest specimen be less than the following:

Diameter of reduced section, in.	1/4
Length of reduced section, in.	1-1/4
Radius of fillet, in.	3/16
Diameter of end section, in.	3/8
Overall length, in.:	
With shouldered ends	2-3/8
With threaded ends	3
With plain cylindrical ends	4

3. TENSILE TEST SPECIMEN ORIENTATION, LOCATION, AND SIZE: Tensile test specimens shall be cut from the material in the direction shown below unless otherwise specified, and shall be cut from the locations and to the sizes specified.

3.1 Sheet and Plate:

3.1.1 Aluminum: For non-heat-treatable aluminum alloys, tensile test specimens shall be taken paralled to the direction of rolling. For heat-treatable aluminum alloys, tensile test specimens shall be taken perpendicular to the direction of rolling for widths of 9 in. and greater, and parallel to the direction of rolling for widths less than 9 in., except as noted in 3.1.1.1.

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3.1.1.1 When short transverse tensile properties are specified in the applicable material specification and are to be determined, short transverse tensile test specimens shall be taken with axis of specimen parallel to the thickness direction of the product.

3.1.2 Magnesium: Tensile test specimens for magnesium alloys shall be taken parallel to the direction of rolling, except as noted in 3.1.2.1.

3.1.2.1 When long transverse tensile properties are specified in the applicable material specification and are to be determined, tensile test specimens shall be taken perpendicular to the direction of rolling for widths of 9 in. and greater.

3.1.3 Location and Size of Tensile Test Specimens:

3.1.3.1 Longitudinal and Long Transverse Specimens: Standard rectangular tensile test specimens shown in Fig. 7 of ASTM E8 shall be used for sheet and plate less than 0.500 in. in thickness. For plate 0.500 in. and greater in thickness, the standard 1/2 in. round tensile test specimen shown in Fig. 8 of ASTM E8 or a smaller round specimen proportional to it shall be used. The tensile test specimen shall be taken midway between the two surfaces of plate 0.500 in. through 1.500 in. in thickness and midway between the center and surface of plate over 1.500 in. in thickness. Material less than 3/4 in. in width shall be tested in full-section when the standard 1/2 in. round tensile test specimen or a smaller round specimen proportional to it cannot be used; elongation requirements of material specifications apply to such sizes only when round specimens are used.

3.1.3.2 Short Transverse Specimens: For plate 2-3/8 in. and greater in thickness, sub-size specimens as specified in 2.2.1 shall be used. The tensile test specimens shall be taken as specified in 3.1.1.1.

3.2 Wire, Bar, and Rod:

3.2.1 Aluminum and Magnesium: Tensile test specimens shall be taken in the longitudinal direction, except as noted in 3.2.1.1.

3.2.1.1 When long transverse tensile properties are specified in the applicable material specification and are to be determined, tensile test specimens shall be taken perpendicular to the rolling or extruding direction.

3.2.2 Location and Size of Tensile Test Specimens:

3.2.2.1 Longitudinal Specimens: If the size or shape makes it impractical to use full-section tensile test specimens, the standard 1/2 in. round specimen shown in Fig. 8 of ASTM E8 or a smaller round specimen proportional to it shall be used, except that for rectangular bar less than 0.500 in. in thickness the standard rectangular tensile test specimen shown in Fig. 7 of ASTM E8 may be used. For material 1.500 in. and less in diameter or thickness not tested in full-section, the tensile test specimen shall be taken from the center of the section. For material greater than 1.500 in. in diameter or thickness, the specimen shall be taken midway between the center and surface; for rectangular bar, the specimen shall also be located midway between the center and edge. Elongation requirements of material specifications do not apply to wire less than 0.125 in. in diameter or thickness.

3.2.2.2 Long Transverse Specimens: Standard rectangular tensile test specimens shown in Fig. 7 of ASTM E8 shall be used for bar less than 0.500 in. in thickness and 8.00 in. and over in width. For bar 0.500 in. and greater in thickness, the standard 1/2 in. round tensile test specimen shown in Fig. 8 of ASTM E8 or a smaller round specimen proportional to it shall be used. The tensile test specimen shall be taken midway between the two surfaces of bar 0.500 in. through 1.500 in. in thickness and midway between the center and surface of bar over 1.500 in. in thickness. For rod over 3 in. in diameter, the location and size of the tensile test specimen shall be as agreed upon by purchaser and vendor.