

### 3.4 Heat Treatment

Bars and forgings shall be annealed at 1300 to 1450 °F (704 to 788 °C) holding at the selected temperature within  $\pm 25$  °F ( $\pm 14$  °C) for a time commensurate with section thickness and the heating equipment and procedure used, and cooled at a rate equivalent to an air cool. Pyrometry shall be in accordance with AMS2750.

### 3.5 Properties

The product shall conform to the following requirements:

#### 3.5.1 Bars and Forgings

##### 3.5.1.1 Tensile Properties

Shall be as specified in Table 2, determined in accordance with ASTM E8/E8M with the rate of strain maintained set at 0.005 inch/inch/minute (0.005 mm/mm/minute) and maintained within a tolerance of  $\pm 0.002$  inch/inch/minute (0.002 mm/mm/minute) through the 0.2% offset yield strain.

3.5.1.1.1 Tensile property requirements apply in both the longitudinal and transverse directions. Transverse tensile properties of Table 2 apply only to product that a test specimen not less than 2.50 inches (63.5 mm) in length can be obtained.

3.5.1.1.2 Specimens for the longitudinal requirements in Table 2 shall be taken with the axis of the specimen within 15° of parallel to the grain flow.

3.5.1.1.3 Yield strength and reduction of area requirements do not apply to product under 0.125 inch (3.18 mm) in nominal diameter.

3.5.1.1.4 Table 2 properties are limited to product with a maximum cross-sectional area of 79.0 in<sup>2</sup> (506.45 cm<sup>2</sup>).

**Table 2 - Minimum tensile properties (see 8.2)**

Nominal Diameter or Least Distance Between Parallel Sides Inches (mm)	Tensile Strength ksi (MPa)	Yield Strength At 0.2% Offset ksi (MPa)	Elongation in 2 Inches (50.8 mm) or 4D, % (3.5.1.1.5)	Reduction of Area % (3.5.1.1.5)
Up to 4.00 (101.50), incl	130 (896)	120 (827)	10	25
Over 4.00 (101.50) to 6.00 (152.40), incl	130 (896)	120 (827)	10 [8]	20 [15]
Over 6.00 (152.40) to 10.00 (254.00)	130 (896)	119 (820)	10 [8]	20 [15]

3.5.1.1.5 Values in brackets [ ] apply to the short transverse direction for short transverse dimensions of 3.00 inches (76.2 mm) or greater.

3.5.1.1.6 Mechanical property requirements for product outside the size range covered by 1.1 shall be agreed upon between purchaser and producer.

##### 3.5.1.2 Microstructure

Shall be that structure resulting from processing within the alpha-beta phase field. Microstructure shall conform to 3.5.1.2.1 or 3.5.1.2.2 (see 8.3).

3.5.1.2.1 Equiaxed and/or elongated primary alpha in a transformed beta matrix with no continuous network of alpha at prior beta grain boundaries.

3.5.1.2.2 Essentially complete field of equiaxed and/or elongated alpha with or without intergranular beta and with no continuous network of alpha at prior beta grain boundaries.