



## Product Information

## Mechanical Properties of Tantalum and Alloys



Typical Room Temperature Mechanical Properties of Tantalum and Its Alloys

|  | Tantalum | Ta2.5W   | Ta10W    | Ta40Nb   |
|--|----------|----------|----------|----------|
| Ultimate Tensile Strength, MPa (KSI)                               | 276 (40) | 379 (55) | 620 (90) | 310 (45) |
| Yield Strength, MPa (KSI)  | 172 (25) | 241 (35) | 482 (70) | 207 (30) |
| % Elongation   | 50       | 30       | 30       | 40       |
| Modulus of elasticity 10 <sup>6</sup> MPa (psi x 10 <sup>6</sup> ) |          |          |          |          |
| ... at room temp   | 179 (26) | 179 (26) | 207 (30) | 152 (22) |
| ... at 750°C   | —        | —        | 152 (22) | —        |
| Rockwell B hardness  | 35       | 55       | 90       | 35       |

Mechanical Properties for Plate, Sheet and Strip, Annealed Condition

(90% minimum recrystallized)

| Grade and Form                                | Ultimate Tensile Strength<br>min. psi (MPa) | Yield Strength<br>min. psi (MPa)<br>(2% Offset) | Elongation<br>min. %<br>(1 in. gauge length) |
|---|---|---|--|
| <b>Unalloyed Tantalum (R05200, R05400)</b>    |   |   |  |
| Plate, sheet and strip                        |   |   |  |
| <0.060 in. thick                              | 30,000 (207)                                | 20,000 (138)                                    | 20   |
| >0.060 in. thick                              | 25,000 (172)                                | 15,000 (103)                                    | 30   |
| <b>90% Tantalum, 10% Tungsten (R05255)</b>    |   |   |  |
| Sheet and Strip                               | 70,000 (482)                                | 60,000 (414)                                    | 15   |
| Plate   | 70,000 (482)                                | 55,000 (379)                                    | 20   |
| <b>97.5% Tantalum, 2.5% Tungsten (R05252)</b> |   |   |  |
| Sheet and Strip                               | 40,000 (276)                                | 30,000 (207)                                    | 20   |
| Plate > 0.187 in. (4.7 mm)                    | 40,000 (276)                                | 22,000 (152)                                    | 20   |
| <b>60% Tantalum, 40% Niobium (R05240)</b>     |   |   |  |
| Plate, Sheet and Strip                        |   |   |  |
| <0.060 in. thick                              | 40,000 (276)                                | 20,000 (138)                                    | 20   |
| >0.060 in. thick                              | 35,000 (241)                                | 15,000 (103)                                    | 20   |

## Mechanical Properties of Tantalum and Alloys

| Mechanical Properties for Rod and Wire, Annealed Condition             |   |   |                                |
|--|---|---|--------------------------------|
| <b>ROD</b><br>0.125 in. (3.18 mm) to 2.5 in. (63.5mm)<br>Diameter      | <b>Ultimate<br/>Tensile Strength<br/>min. psi (MPa)</b> | <b>Yield Strength<br/>min. psi (MPa)</b>                | <b>Elongation<br/>min., %*</b> |
| Unalloyed Tantalum (R05200 and R05400)                                 | 25,000 (172)  | 15,000 (103)  | 25                             |
| 97.5% Tantalum 2.5% Tungsten (R05252)                                  | 40,000 (276)  | 20,000 (138)  | 20                             |
| 90% Tantalum 10% Tungsten (R05255)                                     | 70,000 (482)  | 55,000 (379)  | 20                             |
| 60% Tantalum 40% Niobium (R05240)                                      | 35,000 (241)  | 15,000 (103)  | 25                             |
| <b>WIRE</b><br>0.010 in. (0.254 mm) to 0.124 in. (3.14 mm)<br>Diameter | <b>Diameter<br/>inches (mm)</b>                         | <b>Ultimate<br/>Tensile Strength<br/>min. psi (MPa)</b> | <b>Elongation<br/>min. %*</b>  |
| Unalloyed Tantalum (R05200 and R05400)                                 | 0.010 (0.254) to 0.0149 (0.379)                         | 35,000 (241)  | 10                             |
|  | 0.015 (0.381) to 0.0249 (0.633)                         | 35,000 (241)  | 15                             |
|  | 0.025 (0.635) to 0.1240 (3.140)                         | 30,000 (207)  | 20                             |
| 97.5% Tantalum 2.5% Tungsten (R05252)                                  | 0.010 (0.254) to 0.0149 (0.379)                         | 40,000 (276)  | 5                              |
|  | 0.015 (0.381) to 0.0249 (0.633)                         | 40,000 (276)  | 10                             |
|  | 0.025 (0.635) to 0.1240 (3.140)                         | 40,000 (276)  | 15                             |
| 90% Tantalum 10% Tungsten (R05255)                                     | 0.030 (0.762) to 0.1240 (3.140)                         | 70,000 (482)  | 15                             |
| 60% Tantalum 40% Niobium (R05240)                                      | 0.010 (0.254) to 0.0149 (0.379)                         | 40,000 (276)  | 10                             |
|  | 0.015 (0.381) to 0.0249 (0.633)                         | 40,000 (276)  | 15                             |
|  | 0.025 (0.635) to 0.1240 (3.140)                         | 40,000 (276)  | 20                             |

\*10 in. (254 mm) gauge length to 0.050 in. (1.27 mm) diameter and 1 in. (25.4 mm) or 2 in. (50.8 mm) gauge length over 0.050 in. (1.27 mm) diameter

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