Shape Memory Nitinol Alloys*

**PHYSICAL PROPERTIES**

- **Melting Point:**
  - SM495: 1310°C
  - SM500: 1310°C
- **Density:**
  - SM495: 6.5 g/cm³
  - SM500: 6.5 g/cm³
- **Electrical Resistivity:**
  - SM495: 76 µohm-cm
  - SM500: 76 µohm-cm
- **Modulus of Elasticity:**
  - SM495: 28 – 41 GPa
  - SM500: 28 – 41 GPa
- **Coefficient of Thermal Expansion:**
  - SM495: $6.6 \times 10^{-6} / ^\circ C$
  - SM500: $6.6 \times 10^{-6} / ^\circ C$

**MECHANICAL PROPERTIES**

- **Ultimate Tensile Strength:**
  - SM495: ≥ 1070 MPa
  - SM500: ≥ 1070 MPa
- **Total Elongation:**
  - SM495: ≥ 10%
  - SM500: ≥ 10%

**SHAPE MEMORY PROPERTIES**

- **Loading Plateau Stress @ 3%**
  - SM495: ≥ 100 MPa
  - SM500: ≥ 100 MPa
- **Shape Memory Strain**
  - SM495: ≤ 8.0%
  - SM500: ≤ 8.0%

**TRANSFORMATION TEMPERATURE**

- **Ingot Austenite Finish ($A_f$):**
  - SM495: 75 to 110°C
  - SM500: 45°C to 80°C
- **Finished Product $A_f$:**
  - SM495: 50 to 80°C
  - SM500: 30°C to 50°C

**COMPOSITION** (Meets ASTM F2063 requirements)

- **Nickel (nominal):**
  - SM495: 54.5 wt.%
  - SM500: 55.0 wt.%
- **Titanium:**
  - SM495: Balance
  - SM500: Balance
- **Oxygen:**
  - SM495: ≤ 0.05 wt.%
  - SM500: ≤ 0.05 wt.%
- **Carbon:**
  - SM495: ≤ 0.02 wt.%
  - SM500: ≤ 0.02 wt.%
- **Inclusion Area Fraction:**
  - SM495: ≤ 2.8%
  - SM500: ≤ 2.8%

**APPLICATIONS**

- SM495 is our standard shape memory wire that is malleable at room temperature and returns to shape in boiling water or autoclave. Typical applications for the material are actuators and surgical tools.
- SM500 exhibits shape memory such that it is malleable at room temperature and returns to shape just above body temperature. Typical applications for SM500 are for dental products such as archwires and springs.

*These values should only be used as guidelines for developing material specifications. Properties of Nitinol Alloys are strongly dependent on processing history and ambient temperature. The mechanical and shape memory properties shown here are typical for standard shape memory Nitinol at room temperature tested in uniaxial tension. Bending properties differ, and depend on specific geometries and applications. Modulus is dependent on temperature and strain. Certain shapes or product configurations may require custom specifications. Materials are also available in the cold-worked or annealed conditions.*

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