

ToughMet® 3 TS Alloy Rod, Tube & Wire

Materion's ToughMet 3 TS alloy is a cold worked, spinodally hardened alloy designed to provide high strength for the most demanding static structural loads and pressures. It provides high toughness combined with exceptional strength to resist dynamic impact loading. ToughMet 3 TS alloy provides galling resistance, high bearing performance and compatibility with many sour environments or salt water. It is non-magnetic and very easy to machine into complex components.

Chemical Composition (Weight Percent)

Alloy	Nickel	Tin	Copper
C72900	15	8	Balance

Typical Physical Properties

Elastic Modulus	Poisson's Ratio	Electrical Conductivity	Thermal Conductivity	Coefficient of Thermal Expansion (20 – 100 °C)	Density	Magnetic Permeability
21 x 10 ⁶ psi 144 kN/mm ²	0.33	< 7% IACS < 4 MS/m	22 Btu/ft/hr/°F 38 W/m/°C	9.1 x 10 ⁻⁶ in/in/°F 16.4 x 10 ⁻⁶ m/m/°C	0.325 lb./in ³ 9.00 g/cm ³	≤ 1.001

Typical Minimum Mechanical Properties

Temper	Diameter		0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation	Hardness	Average CVN Impact Toughness		
	inch	mm	ksi	N/mm ²	ksi	N/mm ²	%(in 4D)	HRC	ft-lb.	J	
Rod	TS 95	0.75 - 3.25	19 - 82	95	655	106	730	18	93 HRB	30*	40*
		3.26 - 6.00	83 - 152.4	95	655	105	725	18	93 HRB	30*	40*
	TS 120U	0.75 - 1.59	19 - 40.3	110	755	120	825	15	24	15	20
		1.6 - 3.25	40.4 - 82	110	755	120	825	15	24	12	16
	TS 130	3.26 - 6.00	83 - 152.4	110	755	120	825	15	22	11**	14**
		0.75 - 6.00	19 - 152.4	130	895	140	965	10	24		
	TS 160U	0.25	< 6.35	150	1035	160	1100	5	32		
		0.26 - 0.4	6.35 - 10	150	1035	160	1100	7	32		
		0.41 - 0.75	10.1 - 19	150	1035	165	1140	7	36		
		0.76 - 1.6	19.1 - 41	150	1035	165	1140	5	34		
		1.61 - 3.25	41.1 - 82	150	1035	160	1105	3	34		
		3.26 - 6.00	83 - 152.4	148	1020	160	1100	3	32		
Wire	TS 160U	< 0.25	< 6.35	150	1035	160	1105	5	32		
		0.26 - 0.4	6.35 - 10	150	1035	160	1105	7	32		
Tube	TS 105	1.50 - 3.05. (O.D.) < 0.4 wall	38 - 77 (O.D.) < 10 wall	105	725	120	830	15	22		
		1.50-3.05. (O.D.) > 0.4 wall	38- 77 (O.D.) > 10 wall	105	725	120	830	16	22	14***	19***
	TS 150	1.30 - 3.00. (O.D.)	33 - 76. (O.D.)	150	1035	158	1090	5	36		

*No single value less than 24 ft-lb. (32 J).

**No single value less than 10 ft-lb. (13.5 J).

***No single value less than 12 ft-lb. (16 J); (10mm width x 10mm thickness) CVN specimens only.

Standard Tolerances Rod/Wire

Temper	Form	Diameter		Diameter Tolerance		Straightness Tolerance	
		inch	mm	inch	mm	inch	mm
TS 160U	Rod	0.25 - 0.39	6.35 - 9.9	+/-0.002	+/-0.05	< 0.25 inches deviation in 10 ft. length	< 6.35 mm deviation in 3048 length
		0.4 - 0.74	10 - 18.9	+0.005/-0	+0.13/-0		
TS 95, TS 120U, TS 130, TS 160U	Rod	0.75 - 1.6	19 - 40.9	+0.02/+ 0.08	+0.5/+ 2.0	< 0.5 inches deviation in 10 ft. length	< 12 mm deviation in 3048 mm length
		1.61 - 2.75	41 - 70	+0.02/+ 0.10	+0.5/+2.5		
		2.76 - 3.25	70.1 - 82	+0.02/+ 0.145	+0.5/+3.7		
		3.26 - 6.00	83 - 152.4	+0.02/+ 0.187	+0.5/+4.75		
TS 160U	Wire	< 0.4	< 10	+/-0.002	+/-0.05		

Standard Tolerances Tube

Temper	Outside Diameter		Inside Diameter	Diameter Tolerance		Straightness Tolerance	
	inch	mm		inch	mm	inch	mm
TS105	1.50 - 1.99	38 - 50	Wall thickness 10-20% of OD*	+/- 0.010	+/- 0.25	< 0.5 inches deviation in 10 ft length**	< 12 mm deviation in 3048 mm length
	2.00 - 3.050	51 - 76	Wall thickness 10-20% of OD*	+/- 0.012	+/- 0.30		
TS150	1.30 - 1.99	33 - 52	Wall thickness 8-20% of OD*	+/- 0.008	+/- 0.20	< 0.5 inches deviation in 10 ft length**	< 12 mm deviation in
	2.00 - 3.00	53 - 79	Wall thickness 6-10% of OD*	+/- 0.010	+/- 0.25		

*This is only a guideline. Check with mill with actual required dimensions.

**Tighter straightness tolerance may be available.

Standard Availability

Rod: Nominal 6-12 ft (1829-3658 mm) random mill lengths.

Wire: Coil size up to 300 lb. (136 kg).

Surface: Mill hardened finish.

Industry Standards and Specifications

UNS# C72900, AMS 4597 (TS160U rod only)

Disclaimer:

Only the buyer can determine the appropriateness of any processing practice, end-product or application. Materion does not make any warranty regarding its recommendations, the suitability of Materion's product, or its processing suggestions for buyer's end product, application or equipment.

The properties presented on this data sheet are for reference purposes only, intended only to initiate the material selection process. They do not constitute, nor are they intended to constitute, a material specification. Material will be produced to one of the applicable industry standards, if any, listed in the Industry Standards and Specification section.

Actual properties may vary by thickness and/or part number. Please contact your local sales engineer for detailed properties to be used in simulation.

Any properties marked as preliminary are subject to change at any time as the manufacturing process is further refined.