MATERION

TOUGHMET®

ToughMet® 3 TS120U Rod and TS95 Rod

Materion Brush Performance Alloys' ToughMet 3 TS120U and TS95 Rod are high-strength copper nickel tin alloys designed for use in applications requiring fracture toughness, galling resistance, corrosion resistance, magnetic transparency and good ductility.

CHEMICAL COMPOSITION (weight percent)

Nickel	Tin	Copper
15	8	Balance

PHYSICAL PROPERTIES

Elastic Modulus	Poisson's Ratio	Electrical Conductivity	Coefficient of Thermal Expansion	Density	Magnetic Permeability
21 x 10^6 psi 144 kN/mm^2	0.3	<7% IACS <4 MS/m	8.9 x 10^{-6} in/in/°F 16.1 x 10^{-6} m/m/°C	0.325 lb/in^3 9.00 g/cm^3	<1.001

MINIMUM MECHANICAL PROPERTIES

Alloy	Diameter		0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation (in 4d)	Hardness		CVN Impact Toughness	
	inch	mm	ksi	N/mm^2	ksi	N/mm^2	%	HRC	HBW	ft-lbs	J
ToughMet 3 TS120U	0.75 – <1.6	19 – <41	110	755	120	825	15	24	235	15	20
	1.6 – 3.25	41 – 83								12	16
ToughMet 3 TS95	0.75 – 3.25	19 – 83	95	655	106	730	18	97	222	30	40
										No single value <24 ft-lbs (32 J)	

STANDARD AVAILABILITY

Sizes: 0.75 to 3.25 inch (19-83 mm) diameter

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

Surface: Mill hardened finish

Straightness: <0.5 inch deviation in a 10 ft length (12 mm in a 3048 mm length)

Tolerance: Up to 1.6 inch (<41 mm) diameter +0.02/+0.08 inch (+0.5/+2 mm)
1.6-2.75 inch diameter (41-70 mm) +0.02/+0.10 inch (+0.5/+2.5 mm)
>2.75-3.25 inch diameter (>70-83 mm) +0.02/+0.14 inch (+0.5/+3.7 mm)

SPECIFICATIONS/STANDARDS

UNS C72900, ASTM B 249, NACE MR0175/ISO 15156

RELATED INFORMATION

Additional information on ToughMet 3 TS95 and TS120U rod availability, size capability and pricing can be obtained at **materion.com** or by calling **1-800-375-4205**.

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MATERION CORPORATION
www.materion.com/alloys

ToughMet® just got tougher

New forms of ToughMet engineered for oil and gas

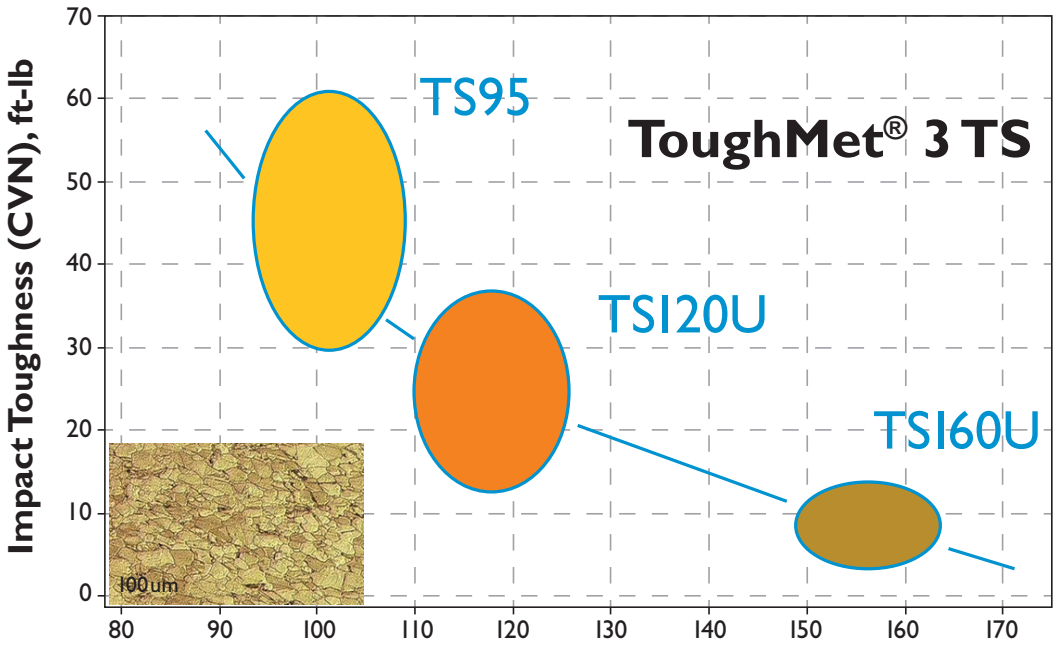
Materion Brush Performance Alloys' has engineered two new forms of ToughMet® 3 specifically for the demanding conditions of oil and gas exploration, drilling, completion and production. ToughMet 3 TS95 and TS120U are wrought, spinodally hardened copper alloys that provide high-impact strength and crack-propagation resistance in rugged service environments.

These new materials will outperform other high-strength alloys, extending the reach and accuracy of oil and gas drilling tools and increasing the reliability of well control, completion and production.

ToughMet 3 TS95 and TS120U materials are copper 15 nickel 8 tin alloys processed to develop desirable combinations of strength, ductility, toughness and corrosion resistance. High notch strength ratios, in excess of 1.4 for stress concentration factors approaching 4, and high fracture toughness, K_{Ic}, from 60 to in excess of 70 ksi√inch, result in materials with outstanding crack-initiation resistance.

The new ToughMet 3 alloys exhibit low general weight loss performance in extreme chloride and high pH drilling fluids, as well as resistance to moderate hydrogen sulfide environments at low pH. Magnetic transparency, elastic compliance and low friction characteristics add to the case for using these high toughness materials in demanding environments.

The ToughMet 3 TS family of alloys was developed utilizing lean sigma principles to targeted design minimum yield strength limits with a CpK of 1, representing 99.73 percent of the produced population.



High Performance for Oil and Gas Applications

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