MATERION

High strength alloys for exploration, drilling, completion and production

ToughMet™ | Alloy 25

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UNIQUE PROPERTY COMBINATIONS MAKE TOUGHMET® 3 ALLOY AND ALLOY 25 the materials of choice in the oil and gas industry.

Ideal for instrument housings, bearings, couplings and actuator stems, these alloys extend the reach and accuracy of drilling tools and increase the reliability of well control, completion and production.

TOUGHMET ALLOYS

ToughMet copper-nickel-tin alloys are engineered to provide attributes beyond those typically found in high-strength copper alloys, especially in the high temperature, high pressure regime.

ToughMet materials retain their strength at elevated temperatures and resist most sour environments. Some ToughMet alloy tempers combine high levels of fracture toughness with strength.

In addition to rod, bar, sheet and plate, ToughMet alloys are also offered in large diameter bar form, which offers very consistent properties throughout cross sections of the material in diameters more than double regular ToughMet alloy size ranges.

Advantages:

- High fatigue strength
- Lower friction
- Non-magnetic
- Anti-galling
- Corrosion, erosion and wear resistance
- Resiliency
- Excellent machinability

ALLOY 25

Alloy 25 is a high-strength copper beryllium alloy that can be age hardened to property combinations tailored for individual application requirements.

Alloy 25 offers high material strength even in large cross sections and the best thermal and electrical conductivity capability available in a high-strength material.

Advantages:

- High fatigue strength
- High strength
- Anti-galling
- Non-magnetic
- Corrosion resistance
- High hardness
- Resiliency
- Thermal and electrical conductivity
- Excellent machinability

PHYSICAL PROPERTIES

	Density lbs/in³	Elastic Modulus 10^6 psi	Relative Magnetic Permeability	Thermal Conductivity (Room Temp.) BTU/ft hr °F	Poisson's Ratio	Nominal Composition
ToughMet 3	0.325	21	<1.001	22	0.32	Cu – 15 Ni – 8 Sn
Alloy 25	0.302	19	<1.001	60	0.3	Cu – 1.9 Be – 0.2 Co

Properties are specified for the fully heat treated condition

MINIMUM MECHANICAL PROPERTIES*

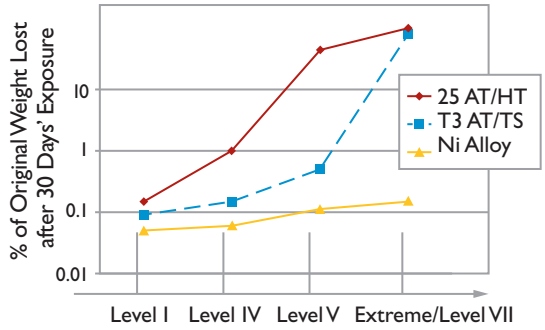
	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation in 2" (%)	Hardness
ToughMet 3 CX105	99	94.5	4	HRC 27
ToughMet 3 AT110	125	110	6	HRC 30
ToughMet 3 TS130	140	130	10	HRC 24
ToughMet 3 TS150	158	150	5	HRC 36
ToughMet 3 TS160U	160	150	3	HRC 34
Alloy 25 AT	165	130	3	HRC 36
Alloy 25 HT	165	130	2	HRC 36
Alloy 25 AT/HT Oilfield	155	140	6	HRC 36

IMPROVED TOUGHNESS TEMPERS*

	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation in 2" (%)	Hardness	CVN ft-lbs
Alloy 25 DSTO-1	140	110	10	HRC 26	11 avg**
Alloy 25 DSTO-2	135	100	12	HRC 26	11 avg**
ToughMet 3 TS 95	106	95	18	HRB 97	30 avg (24 min)
ToughMet 3 TS 105	120	105	15	HRC 22	
ToughMet 3 TS 120U	120	110	15	HRC 24	10 min*

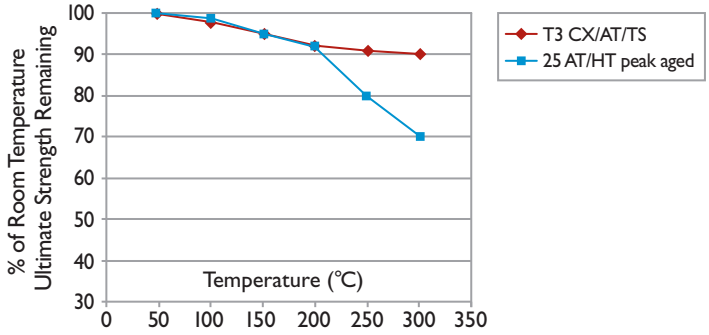
*Properties combinations cited are minimums. Contact Materion for corresponding dimensional capability.
**Reported but not considered a requirement for material acceptance.

CORROSION RESISTANCE



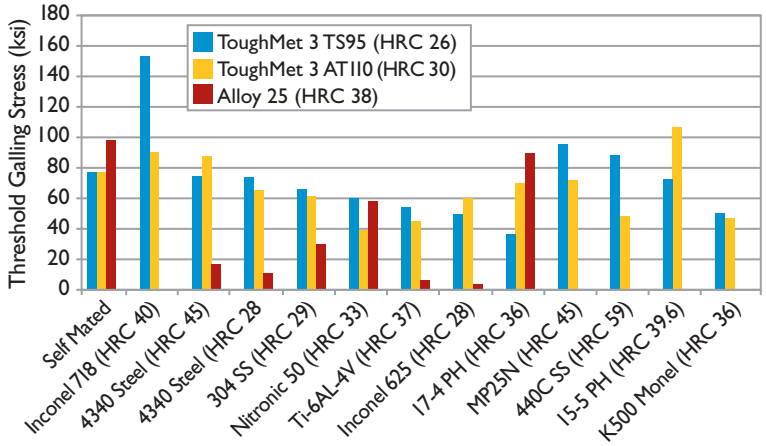
General corrosion rates in NACE standard environments

TEMPERATURE RESISTANCE



Strength at temperature after 30-minute exposure

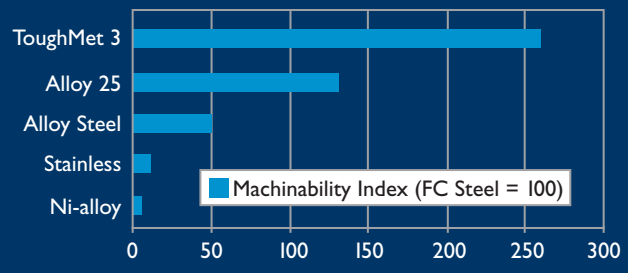
GALLING RESISTANCE (ASTM G98)



ToughMet™ | Alloy 25

ToughMet and Alloy 25 materials are available in a wide range of sizes and shapes. Design flexibility and excellent machinability deliver the best total cost solution for high-performance oil and gas components.

MACHINABILITY (ASTM E618)



Recommended machining practices may be found on our website.

AVAILABLE FORMS

	Availability (Rod, Tube, Plate, Shape)
ToughMet 3 CX105	R, T, P, S
ToughMet 3 AT110	R, T, P
ToughMet 3 TS130	R
ToughMet 3 TS150	R, T
ToughMet 3 TS160U	R, T
Alloy 25 AT	R, T, P
Alloy 25 HT	R, T, P
Alloy 25 AT/HT Oilfield	R, T, P

IMPROVED TOUGHNESS TEMPERS

	Availability (Rod, Tube, Plate, Shape)
Alloy 25 DSTO-1	R, T
Alloy 25 DSTO-2	R, T
ToughMet 3 TS95	R, T
ToughMet 3 TS105	T
ToughMet 3 TS120U	R, T

For more information, please call 1-216-383-6800 or visit **materion.com/oilandgas**.

MATERION

MATERION CORPORATION

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