



**MATERION**



**High strength alloys** for exploration, drilling, completion and production

**TOUGHMET®**

**BRUSH  
ALLOY 25**

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

Ideal for instrument housings, bearings, couplings and actuator stems, ToughMet 3 and Brush Alloy 25 extend the reach and accuracy of drilling tools and increase the reliability of well control, completion and production.



### TOUGHMET 3

ToughMet 3 copper nickel tin alloy is engineered to provide attributes beyond those typically found in high-strength copper alloys, especially in the high temperature, high pressure regime.

ToughMet 3 material retains its strength at elevated temperatures and resists most sour environments. Some tempers of ToughMet 3 combine high levels of fracture toughness with strength.

#### Advantages:

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

### BRUSH ALLOY 25

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

Brush 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/in <sup>3</sup>	Elastic Modulus 10 <sup>6</sup> 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
Brush 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 TSI150	158	150	5	HRC 36
ToughMet 3 TSI160U	160	150	3	HRC 34
Brush Alloy 25 AT	165	130	3	HRC 36
Brush Alloy 25 HT	165	130	2	HRC 36
Brush Alloy 25 AT/HT Oilfield	155	140	6	HRC 36

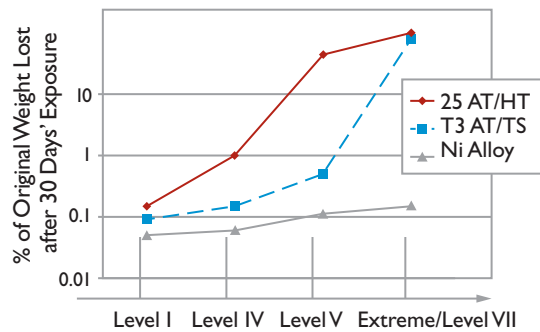
## IMPROVED TOUGHNESS TEMPER\*

	Tensile Strength (ksi)	Yield Strength (ksi)	Elongation in 2" (%)	Hardness	CVN ft-lbs
Brush Alloy 25 DSTO-1	140	110	10	HRC 26	11 avg**
Brush Alloy 25 DSTO-2	135	100	12	HRC 26	11 avg**
ToughMet 3 TSI20U	120	110	15	HRC 24	12 min
ToughMet 3 TS95	106	95	18	HRB 97	30 avg (24 min)

\*Properties combinations cited are minimums. Contact Materion for corresponding dimensional capability.

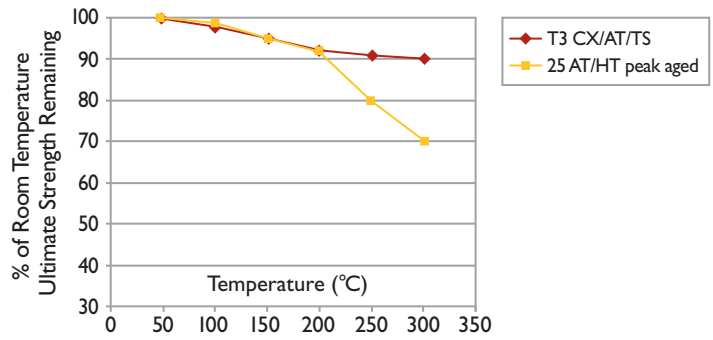
\*\*Reported but not considered a requirement for material acceptance.

## CORROSION RESISTANCE



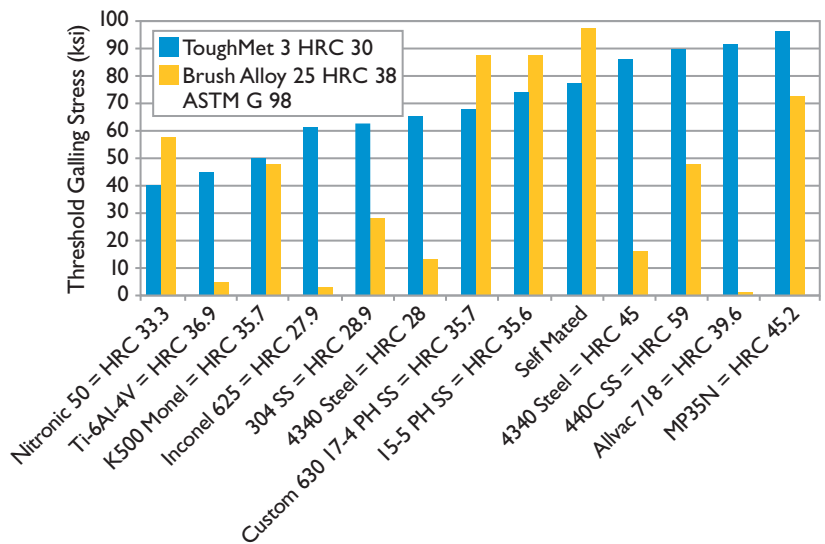
General corrosion rates in NACE standard environments

## TEMPERATURE RESISTANCE



Strength at temperature after 30-minute exposure

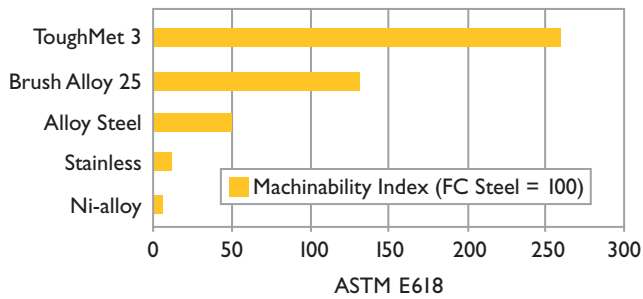
## GALLING RESISTANCE





ToughMet 3 and Brush 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**



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 TS150	T
ToughMet 3 TS160U	R
Brush Alloy 25 AT	R, T, P
Brush Alloy 25 HT	R, T, P
Brush Alloy 25 AT/HT Oilfield	R, T, P

**IMPROVED TOUGHNESS TEMPERS**

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



For more information, please call 1-800-375-4205  
or visit [materion.com/oilandgas](http://materion.com/oilandgas).

