



**MATERION**



**ETCHMET™**

**ULTRA-HIGH STRENGTH ALLOYS FOR VOICE COIL  
MOTORS AND OPTICAL IMAGE STABILIZATION SYSTEMS**

[www.materion.com/EtchMet](http://www.materion.com/EtchMet)

# Ultra-high strength alloys optimized for long-lasting and faster focusing springs used for voice coil motors and optical image stabilization systems

EtchMet™ alloy is a material that is tailor made for the springs in voice coil motors and optical image stabilization systems common in smart phone cameras. These devices have a relatively large mass (lenses) suspended by extremely small, thin springs. The small size of the springs requires very high strength material to withstand shock loads when the phone is dropped

or deliberately tapped against an NFC reader. Therefore, the springs must be made from a very robust material. Furthermore, the lack of a damping mechanism makes high spring stiffness important to combat vibration and shorten autofocus time. EtchMet alloy provides a number of advantages that make it the ideal material for this application.

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## ETCHMET ALLOY TM10 & TM20 STRIP

### ADVANTAGES

- It has a uniform elastic modulus across all thicknesses/ diameters and from product form to product form. This provides consistently high stiffness for greater damping, allowing faster autofocus and easier spring calculations.
- It has a very high resilience allowing it to withstand impact loads without fracturing or permanently deforming.
- It has high fatigue strength to withstand many drops and actuation cycles.
- It has a uniform, primarily single-phase microstructure, which photochemically machines easily and cleanly for uniform edges free of stress risers.
- It is supplied fully precipitation hardened so no further heat treatment is required.
- It solders and welds readily (above 0.0015" / 0.038mm).
- EtchMet alloy strip is inherently flat with minimal coil set, which helps with alignment during photochemical machining.

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## ETCHMET ALLOY WIRE

### ADVANTAGES

- It has a uniform elastic modulus across all thicknesses/ diameters and from product form to product form. This provides consistent stiffness and damping behavior which makes spring calculations easy.
- It solders and welds readily (above 0.0015" / 0.038mm).
- It has high fatigue strength to withstand many drops and actuation cycles.
- It has a very high resilience allowing it to withstand impact loads without fracturing or permanently deforming.

## Physical Properties\*

	ELASTIC MODULUS	ELECTRICAL CONDUCTIVITY/ RESISTIVITY	DENSITY**	THERMAL EXPANSION COEFFICIENT	THERMAL CONDUCTIVITY (25°C)	RELATIVE MAGNETIC PERMEABILITY
EtchMet™ TM10 Strip	19,000 ksi 131 GPa	17-28% IACS 6.2-10.1 μΩ - cm	0.302 lb/in <sup>3</sup> 8.36 g/cm <sup>3</sup>	9.7×10 <sup>-6</sup> in/in°F 17.5×10 <sup>-6</sup> m/m°C	60 BTU/ft hr°F 105 W/m k	<1.001
EtchMet™ TM20 Strip						
EtchMet™ Wire						

\*Properties specified for the precipitation age hardened (heat treated) condition

\*\*Value listed is the density after heat treatment. The density before heat treatment is 0.300 lbs/in<sup>3</sup> (8.30 g/cm<sup>3</sup>)

## Mechanical and Electrical Properties\*

	TEMPER	HEAT TREATMENT REQUIRED	0.2% OFFSET YIELD STRENGTH**		ULTIMATE TENSILE STRENGTH		ELONGATION***	HARDNESS
			ksi	MPa	ksi	MPa	Percent	DPH
EtchMet™ TM10 Strip	EtchMet TM10	-	160 min.	1103 min	175 min.	1200 min.	3 min.	325 min.
EtchMet™ TM20 Strip	EtchMet TM20	-	195 min.	1344 min.	200 min.	1379 min.	1 min.	375 min.
EtchMet™ Wire****	A	Before Heat Treatment	20-30	130-210	58-85	410-585	30-75	-
	H		130-160	890-1110	140-165	960-1140	1-8	-
	AT	After 1 Hour	145-180	990-1250	160-200	1100-1380	3 min.	-
	HT		180-220	1240-1520	195-230	1340-1590	1 min.	-

\*Properties may vary by diameter.

\*\*These are the target properties for EtchMet TM20.

\*\*\*Elongation numbers valid only for wire greater than 0.004" (0.10 mm) diameter.

\*\*\*\*Wire is typically provided in a cold drawn temper and heat treated after forming. Wire may also be provided pretempered (heat treated).

†Post heat treatment properties are provided for reference only. Thin diameter wire would likely be redrawn by outside vendors, so properties may vary from Materion's certification lab.



## Tolerances

	STRIP THICKNESS (INCHES)		STANDARD THICKNESS TOLERANCE INCHES)	STRIP THICKNESS (MM)		STANDARD THICKNESS TOLERANCE (MM)
	Over	Including	Plus or Minus	Over	Including	Plus or Minus
EtchMet™	-	0.0020	0.00010	-	0.05	0.003
TM10 Strip	0.0020	0.0040	0.00015	0.005	0.10	0.004
EtchMet™	-	0.0020	0.00010	-	0.05	0.003
TM20 Strip	0.0020	0.0040	0.00015	0.05	0.10	0.004

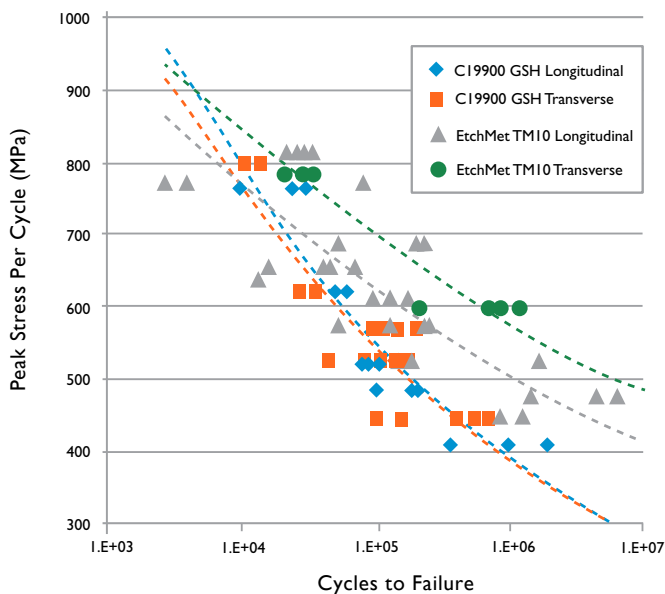
Please specify the exact tolerances that you require when you place your order. Tighter tolerances may be available at additional cost. Please contact your local sales engineer to confirm the requested capability.

	WIRE DIAMETER (INCHES)		STANDARD DIAMETER TOLERANCE INCHES)		WIRE THICKNESS (MM)		STANDARD DIAMETER TOLERANCE (MM)	
	Over	Including	Cold Drawn Tempers	Annealed Temper	Over	Including	Cold Drawn Tempers	Annealed Temper
EtchMet™	0.0300	0.0800	±0.0003	±0.001	0.8	2.0	±0.008	±0.025
Wire	0.0800	0.1250	±0.004	±0.002	2.0	3.2	±0.010	±0.050

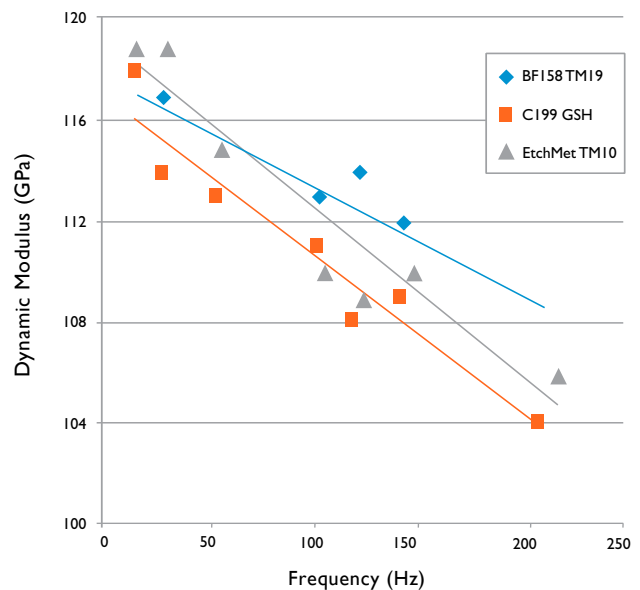
Additional tolerances are per ASTM B 250. Please specify the exact tolerances that you require when you place your order. Tighter tolerances may be available at additional cost. Please contact your local sales engineer to confirm the requested capability.

EtchMet alloy provides higher fatigue strength and longer life than other alloys used in applications. EtchMet alloy provides higher dynamic modulus and longer fatigue life than other alloys used in consumer electronics applications.

ETCHMET FATIGUE PERFORMANCE VS. C1990 CUTI



ALLOY DYNAMIC MODULUS MEASURED BY FREQUENCY DEPENDENCE (0.03MM THICK)



\*Higher Stiffness = Increased damping = Faster Focus

## HEALTH & SAFETY

Handling copper beryllium in solid form poses no special health risk. Like many industrial materials, beryllium-containing materials may pose a health risk if recommended safe handling practices are not followed. Inhalation of airborne beryllium may cause a serious lung disorder in susceptible individuals. The Occupational Safety and Health Administration (OSHA) has set mandatory

limits on occupational respiratory exposures. Read and follow the guidance in the Material Safety Data Sheet (MSDS) before working with this material.

For additional information on safe handling practices or technical data on copper beryllium, contact Materion Brush Performance Alloys, Technical Service Department at 800.375.4205.

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