



# Materion Electrofusion Beryllium Comparison With Other Metals

## Beryllium's Main Advantages

- Low Specific Gravity
- Low Electrical Resistivity
- Low Neutron Capture Cross-section
- Highest Stiffness to Weight Ratio of Any Metal
- Transparent to X-Ray Radiation
- High Melting Point
- High Velocity of Sound
- High Thermal Conductivity
- High Modulus of Elasticity
- High Specific Heat at Normal and Elevated Temperatures

## Beryllium's Properties Compared with other Metals

Material	° T	Beryllium	Magnesium	Aluminum	Titanium	Steel
Properties / Units			Alloys	Alloys	Alloys	
Density lb/in <sup>3</sup>	–	0.067	0.064	0.101	0.164	0.286
Melting Point °F	–	2,350	1,100 – 1,200	900 – 1,200	2,700 – 3,000	2500 – 2,800
Specific Heat Btu/lb °F	RT	0.42	0.25	0.22	0.13	0.14
	500 °F	0.56	0.26	0.25	0.14	0.15
	1,000 °F	0.65	0.26	0.30	0.17	0.15
Thermal Conductivity Btu ft/ft <sup>2</sup> hr-°F	RT	105	80	100	4.5	9
	500 °F	80	–	–	5.5	11
	1,000 °F	56	40	50	7.5	13
Linear Coefficient of Thermal Expansion in/in/°F x10 <sup>6</sup>	RT	6.5	15	12.5	5	6
	500 °F	7.5	16	14	5.5	~
	1,000 °F	8.5	17	–	5.75	9.5
Electrical Resistivity microhm/cm	–	4.1	10	5.7	150	70
Speed of Sound <sup>6</sup> ft/sec	RT	41,000	19,000	20,800	19,700	16,700
Modulus of Elasticity PSI x10 <sup>6</sup>	RT	44	6	10.3	16	30
	500 °F	39	5	7	14	26
	1,000 °F	26	–	–	9	23
Ultimate Tensile Strength Wrought Forms PSI x10 <sup>3</sup>	RT	80 <sup>1</sup>	34 <sup>2</sup>	76 <sup>3</sup>	170 <sup>4</sup>	200 <sup>5</sup>
	500 °F	62	15	24	125	175
	1,000 °F	34	–	–	40	135

1 SR-200 cross-rolled sheet    2 HM21A-T8    3 7075-T6 sheet    4 Ti-6Al-4V, Solution treated; aged at 1000°F for 4-Hours    5 PH 17-4-H-900    6 Air = 344 m/sec

### Health & Safety Note:

Handling solid beryllium material poses no significant health risks. However, as with many other industrial materials—materials containing beryllium may pose a health risk, if and when recommended safe handling practices are not followed and adhered to. Inhalation of airborne beryllium may cause a serious lung disorder in susceptible individuals. The Occupational Safety and Health Administration (OSHA) have set mandatory limits on occupational respiratory exposures. Read and follow the guidance set forth in the Material Safety Data Sheet (MSDS) before working with beryllium. For additional information on safe handling practices or technical data on beryllium, contact Materion Electrofusion.