

PRODUCTS, USES & DESCRIPTIONS

	PRODUCT	FORM	AVIONICS	OPTICAL & SATELLITE STRUCTURES	NUCLEAR	DESCRIPTION
Beryllium	S-200-F	Vacuum Hot Pressed (VHP) Material Rod, Bar, Block	Inertial Guidance Systems RLG Guidance 10 Piga Trident	Nickel-Plated Optical substrates NPOESS/CRIS Structures, gimbals, mechanisms Spacecraft structures, small rocket nozzles	Reflector and moderator of neutrons in nuclear environments Materials test reactors like the Advanced Test Reactor (ATR) & Japan Materials Test Reactor (JMTR)	A versatile material selected when weight & inertia factors exceed those of lower cost aluminum. With its low mass, it can be driven through the scanning cycle much faster, with lower power requirements. Also certifies to AMS7906.
	S-200-F H	Hot Istostatic Pressed Material Near Net Shapes (NNS) Rod, Bar, Block		High First Mode Frequencies, 3X over Al, Doubles operating speed of bar code readers, laser printers, & other scanners Optical Sensors: NPOESS/CRIS, APL-5, Mass Mounted Sites, Sniper, LANTIRN Mechanisms, Gimbals, Yokes	Reflector and moderator of neutrons in nuclear environments Materials test reactors	A lightweight, high stiffness material, while maintaining typical metal properties. Selected when weight & inertia factors exceed those of lower cost aluminum. Also certifies to AMS7908.
	S-200-F C	Cold Isostatic Pressed (CIP) Material NNS		Optical Substrate for Fire control systems in tanks and aircraft Mirrors	JET RF Antenna and Belt Limiter Tiles	Useful for NNS apps requiring lesser properties than obtained by HIP or VHP material. Tooling is reusable, good for parts required in the hundreds. Also certifies to AMS7910.
	S-65	VHP Material Rod, Bar, Block			Nuclear Reflectors Fusion energy applications: First wall in ITER and breeder pebbles	Where high purity is a consideration, or a high neutron flux is desired, beryllium is very useful as both a moderator and reflector of neutrons.
	S-65-H	HIP Material NNS Rod, Bar, Block			Nuclear Reflectors Tiles for JET ITER-like wall project	Where high purity is a consideration, or a high neutron flux is desired, beryllium is very useful as both a moderator and reflector of neutrons.
	I-70-H	HIP Material NNS Rod, Bar, Block		Low Scatter Optics Cryogenic Optical Substrates High Thermal Isotropy Optical Benches, Metering Rods		
	I-220-H	HIP Material NNS Rod, Bar, Block		Used as optical substrate for high dimensional stability; Telescope support for exploring deep space; VLT Optics, LIDARS		Has the highest tensile and microyield strength of beryllium for low creep.
	O-30-H	HIP Material Near Net Shapes Rod, Bar, Block		Low Scatter Optics Cryogenic Optical Substrates High Thermal Isotropy		O-30H is lowest oxide grade of Be at 0.5% max. Highest isotropy of thermal & mech properties of any grade of Be & is ideally suited for cryogenic apps.
E-MATERIALS	E20 E60	Bar, Shapes, Plates	Have demonstrated their value in airborne and space-based electronic substrate applications SEM-E Modules, 6UV Modules. Heat Sinks/Chill Plates AEGIS, F22, F16, F18, JSF	Lens Housing Material to match CTE of lens materials Iridium, Gal Star		Offers improved electronic component life due to lower displacement, improved solder joint life. High Stiffness, Low CTE, High Therm. Cond.

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	PRODUCT	FORM	AVIONICS	OPTICAL & SATELLITE STRUCTURES	NUCLEAR	DESCRIPTION
AIBeMet®	AMI62-H	Hot Istopatic Pressed Material Near Net Shapes Rod, Bar, Block	Minimizes stress from vibration on leads, solder joints & substrates, increases fatigue life of electronic packages, reduced section thickness, adjusts for platform req. Faster designs versus composites	Higher first mode frequencies, improved Line-of-Sight (LOS), more room inside housing. Lighter, stiffer, thermally-stable vs. Al, Flying on 150 satellites, Not susceptible to Sulfide Stress Cracking. IFTS, APACHE, SPIRITT, JSF, F18/22, FLIR, ATP, Damocles, Tammac, AEHF, KAP	Potential use as holder for reflector material in test reactors Beam pipe material in high energy particle physics applications	Contains 62 wt.% commercially pure beryllium and 38 wt.% commercially pure aluminum Electron-Beam (EB) weldable, Dip and Vacuum brazing . Machines like aluminum can be coated like aluminum. Also certifies to AMS 7911, 7912, 7913.
		Rolled Sheet, Extruded Bar, Rod				
SupremEX®	S225xe	HIP Block, Forged or Extruded		Structures, gimbals, mechanisms Mirrors		
	S640xa	HIP Block, Forged or Extruded				

MATERIAL PROPERTY COMPARISON

Property	Beryllium S200F	Beryllium S200FH	AIBeMet AMI62H	E-Material (E60)	SupremEX AMC22	SupremEX AMC640xa	Magnesium AZ80A T6	Aluminum 6061 T6	Stainless Steel 304	Titanium 4
Density, lbs/in3 (g/ml)	0.067 (1.85)	0.067 (1.85)	0.076 (2.10)	0.091 (2.51)	0.104 (2.88)	0.104 (2.90)	0.065 (1.80)	0.098 (2.70)	0.29 (8.0)	0.163 (4.5)
Modulus, MSI (GPa)	44 (303)	44 (303)	28 (193)	48 (331)	16.7 (115)	20 (140)	6.5 (45)	10 (69)	30 (205)	15.2 (105)
Ultimate Tensile Strength, KSI (MPa)	47 (324)	60 (414)	38 (262)	39.3 (273)	88 (610)	83 (570)	49 (340)	45 (310)	75 (515)	95.7 (660)
Yield Strength, KSI (MPa)	35 (241)	43 (296)	28 (193)	N/A	64 (440)	70 (480)	36 (250)	40 (275)	30 (205)	85.6 (590)
Elongation %	2	3	2	<0.05			5	12	40	20
Fatigue Strength, KSI (MPa)	39 (261)	39 (261)	14 (97)	N/A	45 (310)	39 (271)	14.5 (100)	14 (95)	N/A	N/A
Thermal Conduct Btu/hr/ft²°F (W/m.K)	125 (216)	125 (216)	121 (210)	138 (230)	150	130	44 (76)	104 (180)	9.4 (16)	9.75 (16.9)
Heat Capacity, Btu/lb.°F (J/g.K)	0.46 (1.95)	0.46 (1.95)	0.373 (1.56)	0.310 (1.26)			0.251 (1.05)	0.214 (0.896)	0.12 (0.5)	0.129 (0.54)
CTE, ppm/°F (ppm/K)	6.3 (11.3)	6.3 (11.3)	7.7 (13.9)	3.4 (6.1)	8.9 (16.1)	7.4 (13.4)	14.4 (26)	13 (24)	9.6 (17.3)	4.8 (8.6)
Electrical Resistivity, ohm-cm (x 106)	4.2	4.2	3.5	N/A			14.5	4	72	60

*Specification Minimum (Other Properties Given are Typical)

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