MATERION

Data Sheet

SR-200 Structural-Grade Beryllium

Materion's high-purity beryllium metals provide exceptional stiffness-to-weight and strength-to-weight ratios. SR-200 beryllium is a low-density material that allows for weight and volume reductions without a loss in durability. It features high heat resistance and thermal stability at cryogenic temperatures. SR-200 is often selected by designers seeking high-performance heat sinks and structural supports in military electronic and avionics systems and is well-suited for satellite structures as a hot-formed material. Applications include satellites, telescopes, reconnaissance systems, semiconductor equipment, aerospace instrumentation panels, fire control, forward-looking infrared (FLIR) systems and optical targeting systems.

Chemical Composition

Compounds	Composition (wt%)
Beryllium (Be) Assay - minimum	98.0
Beryllium Oxide (BeO) - maximum	2.0
Aluminum (Al) - maximum	0.16
Carbon (C) - maximum	0.15
Iron (Fe) - maximum	0.18
Magnesium (Mg) - maximum	0.08
Silicon (Si) - maximum	0.08
Other Metallic Impurities - maximum	0.04

Typical Physical Properties

Density*	Elastic Modulus	Solidus	Specific Heat Capacity	Thermal Conductivity @ 25˚C	Thermal Expansion @ 25-100˚C
1.85 g/cm^3 0.067 lb./in^3	290 GPa 42 msi	1287°C 2349°F	1.95 J/g/°C 0.46 BTU/lb./°F	216 W/m·K 125 BTU/hr·ft·°F	11.3 ppm/°C 6.3 ppm/°F

*The minimum bulk density is 99.0% of theoretical density for S-200-F and S-200-FC and 99.7% for S-200-FH, which is determined using the water displacement method.

Mechanical Properties

This table shows the minimum tensile properties for the indicated material at room temperature, as determined per ASTM E8:

	SR-200
Ultimate Tensile Strength, MPa (ksi), min	483 (70)
Yield Strength (0.2% offset), MPa (ksi), min	345 (50)
Elongation (% in 4 diameters), min	10.0 (% in 1")

Tolerances

For SR-200, thickness measurements on sheets one inch or more in width will not be conducted closer than 0.375" (9.52 mm) to any edge. There will be no restriction of thickness measurement location for sheet under one inch wide. The width of the material will not vary more than plus 0.125" (3.18 mm), minus 0 inches/mm. The length of the material will not vary more than plus 0.250" (6.35 mm), minus 0 inches/mm. Maximum edgewise curvature (depth of arc) will not exceed 1/16" (1.59 mm) in any foot (305 mm) length, when measured in the plane of the sheet.

Thickness tolerances are as follows:

Nominal Thickness, Inclusive	Tolerance Plus/Minus
Including 0.020" to 0.025" (0.51 to 0.63 mm)	0.003"/0.003" (0.076/0.076 mm)
Over 0.025" to 0.034" (0.63 to 0.86 mm)	0.004"/0.004" (0.102/0.102 mm)
Over 0.034" to 0.056" (0.86 to 1.42 mm)	0.005"/0.005" (0.127/0.127 mm)
Over 0.056" to 0.070" (1.42 to 1.78 mm)	0.006"/0.006" (0.152/0.152 mm)
Over 0.070" to 0.078" (1.78 to 1.98 mm)	0.007"/0.007" (0.178/0.178 mm)
Over 0.078" to 0.093" (1.98 to 2.36 mm)	0.008"/0.008" (0.203/0.230 mm)
Over 0.093" to 0.109" (2.36 to 2.77 mm)	0.009"/0.009" (0.229/0.229 mm)
Over 0.109" to 0.125" (2.77 to 3.17 mm)	0.010"/0.010" (0.254/0.254 mm)
Over 0.125" to 0.140" (3.17 to 3.56 mm)	0.012"/0.010" (0.304/0.254 mm)
Over 0.140" to 0.171" (3.56 to 4.34 mm)	0.014"/0.010" (0.356/0.254 mm)
Over 0.171" to 0.249" (4.34 to 6.32 mm)	0.015"/0.010" (0.381/0.254 mm)

Flatness tolerances indicate the maximum deviation between the surface of the sheet and a straight edge which is in contact with the surface of the sheet and laid in any direction. This deviation is expressed as either a percent of the distance spanned by the contact points or measured deviation per 12" (304 mm) span. Flatness measurements may be made with the sheet restrained. Alternate measuring methods are subject to prior agreements between buyer and seller. Flatness will not vary more than:

Thickness	Flatness Type 1	Flatness Type 2	Flatness Type 3	Flatness Type 4
0.040 and under	2%	1%	0.030"/ft. (0.762/304 mm)	N/A
Over 0.040	1%	½%	0.030"/ft (0.762/304 mm)	0.10"/ft. (2.54/304 mm)

Non-Destructive Testing

Penetrant inspection can be performed when requested on the purchase order. Penetrant inspection shall be performed per ASTM E1417 using penetrants and a dry developer conforming to MIL-I-25135, Type 1, Level 2, Method B, Form A. Personnel performing this inspection shall be certified in accordance with NAS-410.

Radiographic inspection is for fully machined parts only when specified on the purchase order. Radiographic inspection to a penetrameter sensitivity of 2% shall be performed in accordance with ASTM E1742. A 10" (254 mm) maximum thickness of beryllium can be inspected with radiography.

Exceptions are taken to the penetrameter contrast requirements and applicable area of penetrameter density ranges of +30% or -15% from the density at penetrameter location(s). Unless otherwise specified, accept/reject decisions shall include areas directly beneath the penetrameter(s).

Forms Available

SR-200 is a sheet beryllium metal manufactured by hot rolling billets of vacuum hot-pressed block. The standard condition of sheet is hot rolled, ground, stress relieved and etched. Rework of local areas can be performed within the established tolerances. It can be certified to SAE-AMS7902 and is made to order in thicknesses from 0.059" to 0.250" (0.5 to 6.25 mm) with maximum dimensions of 24" x 72" (61 x 183 cm). Sheets 0.020" to 0.058" thick are available at narrower widths and shorter lengths.

Related Information

Certification of compliance with this specification will be furnished upon request. When requested, actual test results will be certified. Testing in accordance with the individual customer's instructions will be performed if mutually acceptable, and actual test results will be certified.

The method of packaging, labeling and shipping will be in accordance with applicable government regulations. Special packaging will be provided when mutually acceptable and in accordance with government regulations. Each container of SR-200 will be marked with company name, sales order number, purchase order number, specification identification, sheet number, lot number, size and beryllium warning information.

Health and Safety

Processing beryllium-containing alloys poses a health risk if safe practices are not followed. Inhalation of airborne beryllium can cause serious lung diseases in some individuals. Occupational safety and health regulatory agencies worldwide have set mandatory limits on occupational respiratory exposures. Read and follow the guidance in the Safety Data Sheet (SDS) before working with this material. The SDS and additional important beryllium health and safety information and guidance can be found at berylliumsafety.com, berylliumsafety.eu and Materion.com. For questions on safe practices for beryllium-containing alloys, contact the Materion Product Stewardship Group at +1.800.862.4118 or contact us by email at Materion-PS@Materion.com.

MATERION Global Headquarters
6070 Parkland Boulevard
Mayfield Heights, OH 44124 USA

Contact Us:
materion.com/ContactPAC
+1.800.375.4205 (+1.216.383.6800)

