MATERION

Data Sheet

PF-60 High-Purity Beryllium Foil

Materion PF-60® high-purity beryllium foil is used for analytical and medical X-ray applications where greater image clarity is desired and/or where lower energy X-rays are used. PF-60 foil is provided with a surface that is uniform in quality and condition on a piece-by-piece basis for pieces cut to size. It is clean, sound and free from visible foreign materials or imperfections that are detrimental to fabrication or performance. Slight variations in coloration within individual pieces may be present.

Chemical Composition (Weight Percent)

PF-60 foil contains a minimum beryllium content of 99.0% and conforms to the following maximum chemical limits:

Compound	Maximum %	Compound	Maximum %
Beryllium Oxide	0.80	Lead	0.002
Aluminum	0.05	Lithium	0.0003
Boron	0.0003	Magnesium	0.049
Cadmium	0.0002	Manganese	0.01
Calcium	0.01	Molybdenum	0.002
Carbon	0.06	Nickel	0.02
Chromium	0.01	Nitrogen	0.03
Cobalt	0.001	Silicon	0.04
Copper	0.01	Silver	0.001
Iron	0.08		

*Rev C specification. Other metallic impurities (0.04% maximum each) as determined by normal spectrographic techniques. Beryllium may be determined by difference (i.e., 100% minus other elements). Please note that various test methodologies are used by our laboratory to determine trace element concentrations. Copies of the laboratory's NADCAP and A2LA certifications are available at www.materion.com.

Forms Available

Foil and sheet manufactured to PF-60 specification is available as flat stock in specific gauges as noted below. PF-60 foil is supplied in sheets or cut to shapes such as rectangles, discs and other configurations. The material is available in three integrity grades: vacuum-tight, optically-dense and filter-grade.

Vacuum-tight foil is available at gauges 0.005" (0.13 mm) and thicker and will have no detectable leakage through the foil when tested with a helium mass spectrometer leak detector calibrated to a sensitivity of $1x10^{-9}$ atm-cc/sec. Leak integrity up to $1x10^{-10}$ atm-cc/sec is available as an option for foil at 0.008" (0.2 mm) or 0.010" (0.25 mm) gauge.

Optically-dense foil will have no detectable light penetration when illuminated with a high-intensity light source applied to a restricted area on one side, while viewed from the opposite side in a darkened room environment. The available thickness of optically-dense foil is 0.001" to 0.003" (0.025 to 0.075 mm).

Filter-grade foil is supplied in an as-produced condition and is neither inspected nor guaranteed to be vacuum-tight nor optically dense. The available thickness of filter-grade foil is 0.001" to 0.002" (0.025 to 0.050 mm).

PF-60 foil is available in sheets 0.008" (0.2 mm) thick and 4 sq. in. (25.8 sq. cm) or larger. Such sheets come in an as-is condition which may have cosmetic imperfections and significant variation of color within each sheet. The formation of oxides is a naturally occurring process when beryllium is exposed to atmosphere.

Pieces of foil will be cut from sheets (or entire sheets will be supplied) which have been determined to meet the specified thickness based on the sheet mean thickness measurement plus two standard deviations.

Surface roughness is not specified. Surface roughness of 64 micro-inches Ra (1.6 µm Ra) is available as an option for foil that is 0.008" (0.2 mm) thick or thicker. Surface roughness of 32 micro-inches Ra (0.8 µm Ra) is available as an option for foil that is 0.008" to 0.012" (0.2 to 0.3 mm) thick.

Parts shall be visibly flat to the unaided eye.

We may be able to accommodate requests if specific cosmetic requirements or other characteristics are required. For additional technical information and details on foil sizes, tolerances, finishes and other specifications, contact us at +1.800.375.4205 (+1.216.383.6800). Any custom material requirements must be agreed upon by both parties before being produced.

Available Gauges and Dimensional Tolerance

Feature	Dimension (inches)	Tolerance (inches)	Dimension (mm)	Tolerance (mm)	Vacuum Integrity (Leak Tightness)
Thickness	0.001	±0.0002	0.025	±0.005	Typical: 85%
	0.002	±0.0002	0.05	+0.006 / -0.004	Typical: 90%
	0.003	±0.0003	0.075	+0.009 / -0.006	Typical: 99%
	0.008	±0.0008	0.2	+0.024 / -0.017	
	0.010	±0.002	0.25	±0.05	
	0.012	±0.002	0.3	+0.06 / -0.05	
	0.020	±0.002	0.5	+0.06 / -0.04	Guaranteed vacuum-tight to 1×10^{-9} atm-cc/sec
	0.032	±0.002	0.8	+0.06 / -0.04	
	0.039	±0.004	1	+0.09 / -0.11	
	0.060	±0.004	1.52	+0.11 / -0.10	
	0.079	±0.006	2	+0.16 / -0.15	
	0.090	±0.006	2.3	+0.14 / -0.17	
	0.125	±0.006	3.18	+0.15 / -0.16	
Diameter*	≤ 6	±0.003	≤ 152	±0.08	
	> 6	±0.005	> 152	±0.13	
Length/Width*	< 18	±0.01 Large-area sheets will be ±0.04	< 457	±0.25 Large-area sheets will be ±1	
	≥ 18	Contact us	≥ 457	Contact us	

*Tighter tolerances may be available upon request.

Related Information

All material is appropriately identified, packaged and labeled to comply with applicable government regulations and Materion standard procedures.

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.

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