MATERION

DATA SHEET

Extruded Ceramics

As Fired Dimensional Tolerances

Dimensional Tolerances	Class 1	Class 2	Class 3
Inside & Outside Diameters, Width or Thickness	±1% but NLT 0.002" (0.0508 mm)	±1.5% but NLT 0.003" (0.0762 mm	±2.5% but NLT 0.005" (0.127 mm)
Length	±2% but NLT 0.125" (3.175 mm)	±3% but NLT 0.500" (12.7 mm)	±4% but NLT 0.750" (19.05 mm)
Hole location* and Concentricity	±0.5% but NLT 0.0015" (0.0381 mm)	±1% but NLT 0.005" (0.127 mm)	±1.5% but NLT 0.010" (0.254 mm)
Camber, in/in max.	0.002"	0.004"	0.006"

*Exception may be required for multi-hole or larger tubing.

Machined Dimensional Tolerances

Dimensional Tolerances	Class 1	Class 2	Class 3	Class 4
Length (outside)	±0.0005" (0.0127 mm)	±0.001" (0.0254 mm)	±0.005" (0.127 mm)	±0.010" (0.254 mm)
Diameter	±0.0005" (0.0127 mm)	±0.001" (0.0254 mm)	±0.005" (0.127 mm)	±0.010" (0.254 mm)
I.D.	±0.0005" (0.0127 mm)	±0.001" (0.0254 mm)	±0.005" (0.127 mm)	±0.010" (0.254 mm)
Hole Diameter	±0.0005" (0.0127 mm)	±0.001" (0.0254 mm)	±0.005" (0.1274 mm)	±0.010" (0.254 mm)
Hole Location	±0.001" (0.0254 mm)	±0.001" (0.0254 mm)	±0.010" (0.254 mm)	±0.010" (0.254 mm)
Concentricity, TIR	0.001" (0.0254 mm)	0.005" (0.127 mm)	0.010" (0.254 mm)	±0.010" (0.254 mm)
Roundness	Within dimensional tolerance			
Radius	±0.001" (0.0254 mm)	±0.005" (0.127 mm)	±0.010" (0.254 mm)	±0.010" (0.254 mm)
Angle, Degree	±1/2 degree	±1 degree	±2 degree	±5 degree
Flatness (plates)	±0.0005" (0.0127 mm)	±0.001" (0.0254 mm)	±0.002" (0.0508 mm)	±0.005" (0.127 mm)
Camber in/in max	±0.0005" (0.0127 mm)	±0.001" (0.0254 mm)	±0.015" (0.0381 mm)	±0.002" (0.0508 mm)
Parallelism, TIR	±0.0005" (0.0127 mm)	±0.001" (0.0254 mm)	±0.002" (0.0508 mm)	±0.005" (0.127 mm)
Surface Finish Ra Max	32	64	64	64

Tighter tolerances may be held for additional costs.

Where tolerances are not specified, standard tolerances will be used as follows:

Three decimal places	±0.005" (0.127 mm)
Two decimal places	±0.010" (0.254 mm)
Fractions	±1/64" (0.3962 mm)
Angles	± 1 degree

CC-010

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Visual Defect Criteria

Visual Defects ASTM F-109	Level 1 Max	Level 2 Max	Level 3 Max	Level 4 Max
Blemish	0.030" (0.762 mm)	0.050" (1.27 mm)	0.100" (2.54 mm)	0.100" (2.54 mm)
Blister	None	0.015" (0.381 mm)	0.030" (0.762 mm)	0.050" (1.27 mm)
Chip (Open or closed) length unlimited)	0.020" W x 0.020" D (0.508 mm W x 0.508 mm D)	0.030" W x 0.030" D (0.762 mm W x 0.762 mm D)	0.060" W x 0.060" D (1.524 mm W x 1.524 mm D)	0.080" W x 0.080" D (2.032 mm W x 2.032 mm D)
Cracks	None	0.010" (0.254 mm)	0.010" (0.254 mm)	0.020" (0.508 mm)
Inclusion	None	0.010" (0.254 mm)	0.010" (0.254 mm)	0.020" (0.508 mm)
Pit, Rock, Hole (Surface dimension)	0.010" (0.254 mm)	0.010" (0.254 mm)	0.025" (0.635 mm)	0.030" (0.762 mm)
Porous Area	0.050" (0.762 mm)	0.30" (0.762 mm)	0.050" (1.27 mm)	0.100" (2.54 mm)

Note 2. For small diameter rods or thin wall tube, the width and depth of chips are not to excel 15% of the minimum dimension.

Health and Safety

Handling beryllium oxide ceramics 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 beryllium oxide ceramics, contact Materion Ceramics at 520-746-0251.

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