formlabs

FORM X

Alumina 4N Resin

Technical Ceramic with Extreme Performance

A 99.99% purity technical ceramic with exceptional performance in extreme environments: thermally resistant, hard, abrasion resistant, mechanically strong, and chemically inert.

High voltage components

Mixing blades and pipes

Insulating housings or tubes

Foundry tools for metal casting

V1 **FLAL4N01**

Prepared 31/09/2023

Rev. 01 31/09/2023

Resin Properties	METRIC	IMPERIAL	METHOD
Purity (%)	99.99%		-
Particle Size	d90 < 1 micron		-
Green State Properties			
Flexural Strength [3]	3.6 MPa	520 psi	ASTM D790
Flexural Modulus [3]	24.5 MPa	3.5 ksi	ASTM D790
Shore D Hardness [3]	70D		ASTM D2240
Color	Off-White		
Sintered State Properties	METRIC	IMPERIAL	METHOD
Physical and Mechanical Properties			
4 Point Flex Strength (XY) [3, 5]	400 MPa	58 ksi	ASTM C1259
4 Point Flex Strength (Z) [3, 5]	320 MPa	46 ksi	ASTM C1259
Weibull Modulus (XY) [3, 5]	9	-	ASTM C1259
Theoretical Density [4, 5]	3.987 g/cm^3	0.144 lbs/in3	-
Relative Density [3, 5]	98.60%	-	ASTM C373
Compressive Strength [4, 5]	2200 MPa	330 ksi	ASTM C773
Color	White		-
Vickers Hardness [4, 5]	1500	-	-
Young's Modulus [4, 5]	390 GPa	58,000 ksi	ASTM C1259
Fracture Toughness [4, 5]	3-5 MPa √m	-	ASTM C1421
Surface Roughness (R_a) [3, 5]	0.5-3 μm	20-120 microinches Ra	
Electrical Properties	METRIC	IMPERIAL	METHOD
Electrical Resistivity [4, 5]	> 1x1014 Ω· m)	-	ASTM D257
Dielectric Loss tan delta (tan δ), 1 MHz [4, 5]	9x10^{-5}	-	-
Permittivity [4, 5]	9.8	-	-
Thermal properties	METRIC	IMPERIAL	METHOD
Coefficient of Thermal Expansion [4, 5]	5 ppm/K	2.78 ppm / °F	ASTM E228
Maximum Working Temperature [3, 5]	1500 °C	2750 °F	-
Thermal Conductivity [4, 5]	32 W/m· K	-	-

To learn more about how to use Alumina 4N Resin, visit our support site.

[1] Material properties may vary based on part geometry, print orientation, print settings, and firing schedule used.

[2] All sintered parts were fired using a 2 oven conservative firing schedule (schedule #1)

[3] Internally measured data

4 Literature value

[5] Currently testing at an independent testing lab