



1AS.013

Aluminum Nitride

Applications

- Electronic components, particularly where electrical insulation and thermal dissipation are required.
- Components in which a low dielectric constant and a low dissipation factor are required.
- Fixing parts, in which a low coefficient of thermal expansion is required.

Physical variables included in this documentation are provided by way of indication only and do not, under any circumstances, constitute a contractual undertaking. Please contact our technical service if you require any additional information.

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Overview

Aluminum nitride (AlN) is a nitride of aluminium and a wide band gap (6.2 eV) semiconductor material. It is an electrical insulating refractory material having very high thermal conductivity (higher than that of copper at 200 °C) and showing high resistance to oxidation and abrasion. It has potential applications for substrate and in power electronics for the manufacture of microwave power transistors.

Aluminium nitride is synthesized by the carbothermal reduction of aluminium oxide or by direct nitridation of aluminium. It is transparent in the visible wavelengths and in the infrared (0.5 to 3 µm) and can be used as a window for infrareds and radars.

Final Advanced Materials machines high-precision ceramic components from blanks obtained by moulding or extrusion. These shaped parts are obtained by a diamond machining process which is specially designed for dense ceramics.

We only work with ceramics of high purity, which are calibrated and certified. Finished parts reproduce the unimpaired physical characteristics of machine-ready blanks, with no impairment or mechanical deterioration.

Intrinsic properties of ceramics, including hardness, abrasion resistance, compression resistance, high-temperature resistance, resistance to thermal impacts and high dielectric strength are maintained and reproduced in finished components.

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Benefits

- Excellent machinability: it can be machined in complex shapes with conventional tools
- Excellent sealing ability to vacuum
- High thermal conductivity: 10 times as much thermal conductivity as that of alumina
- High mechanical and bending strength of 30 kg/mm², comparable to that of alumina
- Transparency: it allows visible infra-red light to pass through easily
- Low dielectric loss
- High corrosion resistance
- Ultra high purity

Technical Data

Property	Unit	Aluminium Nitrid
Item N°		055-0031
Density	g/cm ³	2.9
Porosity	%	< 0.1
Compressive Strength at 20 °C	MPa	1,170
Flexural Strength at 20 °C	MPa	300
Max. Operating Temperature	°C	1,020 (1,900 under vacuum)
Heat Shock Resistance	°C	400
Thermal Conductivity at 20 °C	W.m ⁻¹ .K ⁻¹	92.6
Electrical Resistivity at 20 °C	Ω.cm	10 ¹²
Dielectric Constant at 20 °C for 1 MHz		7.1
Dielectric Strength at 20 °C	kV/mm	40

Impurities			
Ca	450 ppm	Fe	< 50 ppm
Cr	60 ppm	Si	< 15 ppm
Mg	< 20 ppm	O	0.8 %
Ni	< 10 ppm		

Dimensions

Type	Dimension
Plate	up to 300x300x40 mm
Rod	up to ø40x300 mm

We also machine your parts according to your drawings.