

# Cutting

## Ceramic Cutting

Aluminium Nitride (AlN) has been developed into a commercially viable product with many useful mechanical properties. These properties include one of the highest thermal conductivities of any engineering ceramic and a thermal expansion coefficient almost half that of alumina. AlN ceramic is used widely in the electronics industry because of its thermal conductivity and ability to be used as an electrical insulator, meaning the material is often used as a heat sink.

Aluminium nitride is hard and brittle, which makes it difficult to process with conventional machining methods. SPI's G4 50W EP-Z laser shows that it is possible to achieve high quality edges with the use of long pulse durations and low scanning speeds. The challenge with this application is that the material cannot absorb high amounts of energy without melting or vaporising due to its heat conducting properties.

Higher power lasers can be used to reduce process time without compromising edge quality, due to the materials high thermal conductivity. Using a fibre laser also allows AlN ceramic to be cut in its green state before the material is fired.

The process produces a very high quality cut and although not essential, post processing is recommended to enhance the quality yet further. Drilling and engraving of Ceramic is also possible with equally high quality and effective processing.

### Application Parameters

Type	G4 50W EP-Z
Power	50W
M <sup>2</sup>	<1.6
Beam Ø	8mm
Scanner/Lens	>8mm/163mm F-Theta
Energy	WF0 50kHz @ 400mm/s

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