

# Engraving

## Ceramic Scribing

The technique of scribing engineering ceramics such as silicon nitride or alumina involves a groove being cut into the material, the width of which can be controlled. The material can then be broken along this groove. This leaves a high quality edge finish with minimal micro-fracturing. Furthermore, as there is only a small amount of material being ablated, processing times can be minimised. Alumina is the most common engineering ceramic that requires this application. An example of its use is in singulated LED circuits.

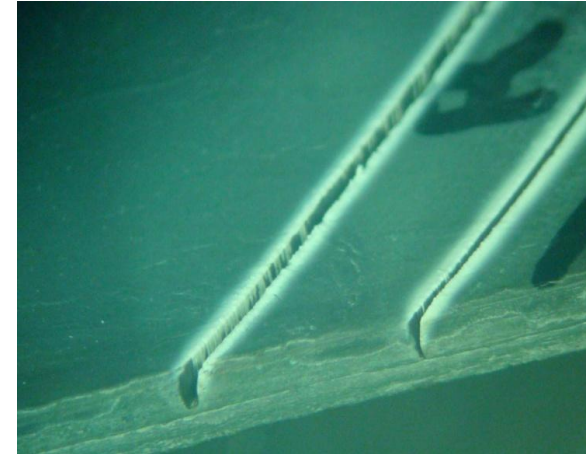
SPI's G4 70W EP-Z laser was able to scribe lines in silicon nitride with a width of at least 30µm and a depth of >80µm at 200mm/s with just one single pass. Longer pulse duration (WF 36 /520ns) provides deeper scribes at a constant scan speed compared to shorter pulse durations. However, using multiple passes with long and short pulse durations, scribe depth can be increased and the scribe profile can be improved. With the G4 laser, rapid changing of pulse parameters can be done on the fly.

Longer pulse durations were shown to provide deeper scribes at a constant scan speed when compared to shorter pulse durations. Furthermore, a wobble can be applied to achieve a high quality scribe with a width greater than 30µm and a depth of >80µm. Similar scribing results can be achieved on a range of other engineering ceramics.

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## Application Parameters

Type	G4 70W EP-Z
Power	70W
M <sup>2</sup>	<1.6
Beam Ø	8mm
Scanner/Lens	15mm/100mm FL
Energy	WF 36 70kHz @ 200mm/s

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