



# Standard Specification Guide

Laser Processing of Ceramics,  
Plastics, Metals and other Technical Materials.

## General Specifications

### Quality System

- The Quality System at Hybrid Laser Tech is accredited to ISO9001:2015
- Internal inspection of both the product and process is carried out at all stages of manufacture.
- All laser processing work shall take place on the front side and all drawings shall be interpreted as being front view, unless otherwise clearly stated.
- Ceramic is purchased as per Company Procurement Specification .
- Hybrid Laser Tech does not warrant total cleanliness of supplied product. Hybrid Laser Tech recommends the clean firing of laser processed substrates by the customer upon receipt.

### Special Requirements

For any requirements not covered in this document please contact Hybrid Laser Tech for further assistance.

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# Mechanical tolerances

## Scribing

- As fired ceramic thickness range +/-10%
- Scribe depth 0.08mm to 0.75mm +/-0.05mm
- Nominal scribe depth 33% to 50% of substrate thickness
- Nominal non-accumulative pulse spacing 0.16mm +/-0.025mm
- Surface slag height less than 0.025mm – (avg across length of scribed edge)
- Diapad service to reduce slag height and surface spatter (available on request)



### Scribe line to:

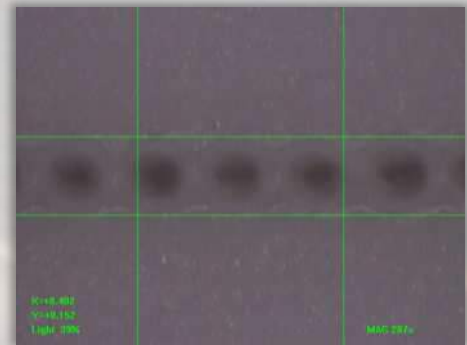
### Distance apart:

### Tolerance:

Scribe line	Up to 100mm	±0.05mm
Fired edge	Up to 100mm	±0.05mm
Centre of hole	Up to 100mm	±0.05mm
Profile cut edge	Up to 100mm	±0.05mm

## Drilling

- Smallest drilled hole size = 0.1mm
- Hole size – 0.25mm – 1mm thick = nominal +/-0.05mm
- Hole size – 1.25mm – 2mm thick = nominal +/-0.076mm
- Hole taper typically = 5% of substrate thickness



### Hole centre to:

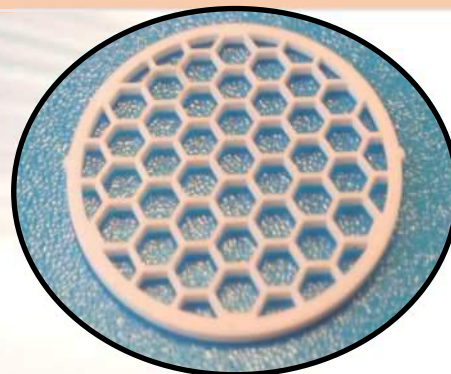
### Distance apart:

### Tolerance:

Hole centre	Up to 100mm	±0.05mm
Fired edge	Up to 100mm	±0.10mm
Profiled edge	Up to 100mm	±0.05mm
Scribed Edger	Up to 100mm	±0.05mm

## Laser Profiling

- Perpendicularity of laser profiled edges +/-0.05mm
- Minimum profile slot cut width = 0.1mm
- Minimum radius 0.05mm +0.05/-0.00mm



### Profiled edge to:

### Distance apart:

### Tolerance:

Profiled Edge	Up to 100mm	±0.05mm
Fired edge	Up to 100mm	±0.10mm
Scribed Edger	Up to 100mm	±0.05mm

# Inspection Methods

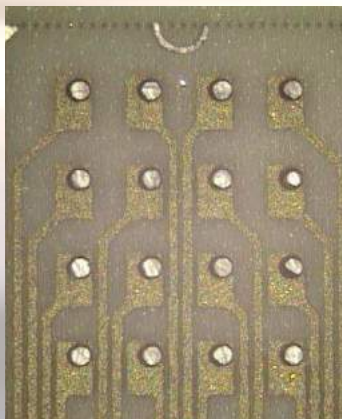
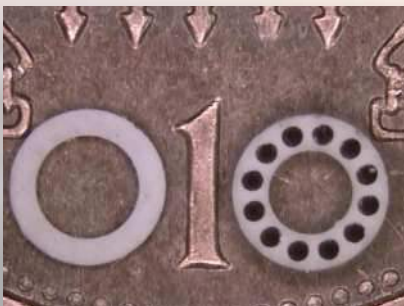
## Attribute/Test Procedure

## Tolerance

<p><b>Scribe Pulses</b></p> <p>Viewed under maximum magnification (170x) with rear projection illumination. Plugged pulse marks appear black or dark.</p>	<ul style="list-style-type: none"> <li>• 90% clean</li> <li>• 1 in 10 plugged</li> </ul>
<p><b>Scribe Depth</b></p> <p>Snap Substrate and measure from the entrance side with non</p>	<ul style="list-style-type: none"> <li>• +/-0.05mm standard</li> </ul>
<p><b>Holes</b></p> <p>Using Non contact optical system, minimum of 15 data points taken for each hole using rear projection illumination.</p>	<ul style="list-style-type: none"> <li>• Free of debris</li> <li>• Nominal hole diameter taken at laser exit side</li> <li>• (See Mechanical Tolerances Drilling section)</li> </ul>
<p><b>Profile slots/edges</b></p> <p>Using non contact optical system, taken at exit dimensions unless otherwise stated.</p>	<ul style="list-style-type: none"> <li>• Free of debris</li> <li>• (See Mechanical Tolerances Laser Profiling section)</li> </ul>
<p><b>Part Detail</b></p> <p>Using non contact optical system.</p>	<ul style="list-style-type: none"> <li>• Within overall specifications limits</li> </ul>
<p><b>Cracks</b></p> <p>High intensity, low angled light using the unaided eye. Dye testing service available on request.</p>	<ul style="list-style-type: none"> <li>• None allowed</li> </ul>
<p><b>Chips</b></p> <p>High intensity, low angled light using the unaided eye. Verification of chip size achieved using no contact optical system.</p>	<ul style="list-style-type: none"> <li>• Depth 0.75mm</li> <li>• Height 50% thickness</li> <li>• Length length of tile</li> </ul>

## Packaging

- All products are wrapped in clear polythene after final inspection. Packets are individually sealed in bubble wrap before being double packed to ensure safe delivery to the customer.
- Packaging other than standard should be noted on the purchase order. Other special services are available upon request, e.g.



## Customer Supplied Material

- With a process yield greater than 90%, Hybrid Laser Tech warrants that substrates manufactured from Customer Supplied Material will be free of defects in workmanship. Hybrid Laser Tech can accept no liability for Customer Supplied Material.
- Please contact the quality department for further advice.