

## Laser Drilling and Machining

### Special Processing Removes Slag

If desired, Accumet can provide customers with close tolerance laser drilled or laser machined thick film, thin film, or as-fired substrates. This eliminates the need to purchase substrates from one source, and to have them laser processed by another.

Substrates can be laser drilled, scribed, or cut to customer specifications. Typical of the attainable laser machining tolerances- hole diameters as small as 0.005" can be drilled with diametric tolerances as close as +/- 0.001".

Of significances, Accumet laps/polishes substrates again after laser machining to eliminate all surface slag and laser hole entrance/exit slag. Loose slag on the interior hole is also reduced during the lapping/polishing operations. The extra manufacturing steps taken by Accumet ensure you, the user, better adhesion and higher circuit yields.

### Guidelines for Lasered Substrates

#### Standard Scribe Parameters

(Can be altered for specific requirements)

Thickness	Scribe Depth	Spacing
.010"	.004 - .005"	.003-.005"
.015"	.005 - .007"	.004-.006"
.020"	.007 - .010"	.004-.006"
.025"	.008 - .012"	.005-.007"
.030"	.011 - .015"	.005-.007"
.035"	.014-.018"	.005-.007"
.040"	.016 - .020"	.005-.008"
.050"	.021-.025"	.006-.008"
.060"	.025-.029"	.006-.008"

#### Length and width tolerances for scribed and snapped edges

Thickness	Tolerance
.016" or less	+0.003/-0.002"
.017 - .030"	+0.004/-0.003"
.031 - .040"	+0.005/-0.003"
.041 - .060"	+0.006/-0.004"

#### Tolerances from laser scribed edge to other lasered geometries

Thickness	Tolerance
.030" or less	+0.003/-0.002"
.031" or greater	+0.004/-0.002"

To enhance printing or deposition accuracy and repeatability, a tolerance of +/-0.001" can be achieved by using laser machined bank points.

Tolerance from one lasered internal detail to another is +/-0.001". Scribe line to scribe line, Scribe line to hole, hole to hole, etc. tolerances, are non-cumulative.

Hole diameter tolerance is +0.001" measured at the exit. Entrance diameters will vary from +0.002/.001" at thicknesses of .30" or less to +0.004/-0.001" at thicknesses of .060" or greater.

Thickness tolerance (standard) is +/- 10% NLT 0.0015"

#### Notes

Tighter tolerances on all above specifications are available on request.  
Water soluble protective coating available.