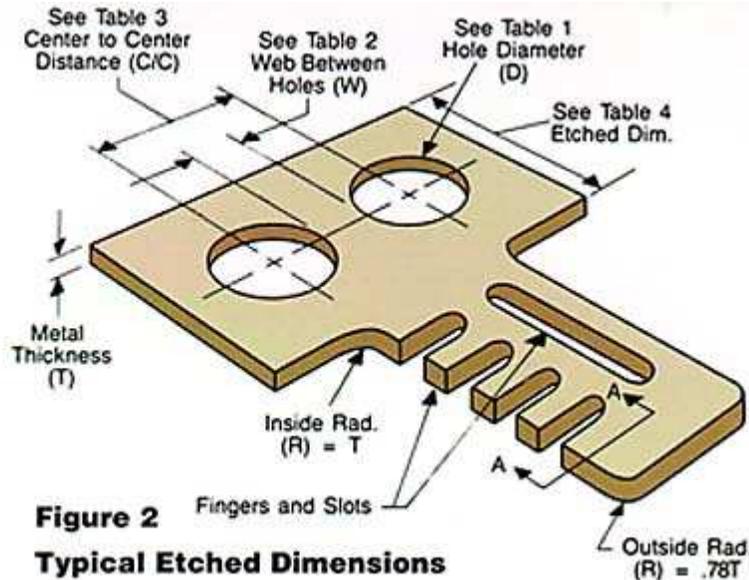
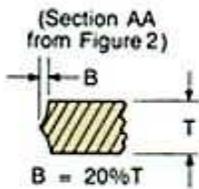


# Flat Parts Photo Etching Design Guide

All dimensions, tolerances and configurations are functions of the thickness of the material being photo etched and should be considered during the design process. The following guide gives practical limitations for slots, spaces, holes and construction dimensions with relation to metal thickness for photo chemical milling. (See Figures 1 and 2 for a pictorial representation of the features referenced.)

In many cases it may be possible to exceed these photo etching limitations, but with a reduction in yield percentage. Consult the factory for design assistance when these situations occur.

**Figure 1**  
**Typical Etched Edge**



**Figure 2**  
**Typical Etched Dimensions**

## DIMENSIONS

### HOLES / SLOTS

Generally, the diameter of a hole or the width of a slot cannot be less than the metal thickness. This relationship varies as the metal thickness changes. A more exact relationship is illustrated in Table 1.

Table 1. HOLES OR SLOTS	
Metal Thickness (T)	Diameter or Width
.001"-.005"	At Least Metal Thickness, Min. .003"
.005" or Over	Min. of 1.1 Times Metal Thickness

### INSIDE CORNER RADIUS

The smallest inside corner radius is directly proportional to the metal thickness. Consult the factory if a smaller or sharp radius is required.

## OUTSIDE CORNER RADIUS

The outside corner radius will be at least .75 of the material thickness.

## FINGERS / WEBS

Generally, the width of a finger or web cannot be less than the metal thickness. This relationship varies as the metal thickness changes. A more exact relationship is illustrated in Table 2.

Table 2. WEB OR FINGER	
Thickness (T)	Spaces Between Holes (W)
Less than .005"	At Least Metal Thickness, Min. .003"
Over .005"	Min. of 1.25 Times Metal Thickness

## TOLERANCES

### CENTER TO CENTER

Generally, the tolerances are a result of the stability of the photo tooling material. Table 3 illustrates the practical tolerances attainable from industry standard Mylar tooling. Consult the factory for information on alternate tooling materials.

Table 3. CENTER TO CENTER TOLERANCES	
C/C Dimensions (inches)	Tolerance Attainable
1.0" or Less	±.0005"
1.0" - 3.0"	±.0010"
3.0" - 6.0"	±.0020"
6.0" - 10.0"	±.0030"

### PHOTO ETCHED DIMENSIONS

Generally, a tolerance of ± 15% of the material thickness is practical. A more exact relationship is illustrated in Table 4.

Table 4. ETCHED DIMENSION TOLERANCES						
Thickness (T) (inches)						
.001"	.002"	.005"	.010"	.015"	.020"	.040"
Empirical	±.0010"	±.0010"	±.0015"	±.0020"	±.0030"	±.0050"