



## 10.0 - CALIBRATION LASER SETTINGS FOR MATERIALS

**Material Required:** Stickalase 1" x 4 ¾ "

**Difficulty Level:** Easy

When we want to engrave a material with which we're not familiar, we have to determine the proper power setting for optimum results. As a tool for this, we'll design and run a simple job that lets us make this determination in an organized way.

Our job will consist of 8 small circles arranged in horizontal row. When we perform our engraving, we'll laser each of the circles at a different power setting. We can then visually inspect the engraved piece, select the one that we prefer and use its power setting for future jobs that use the same material. Our finished job is shown in Figure 10-1.

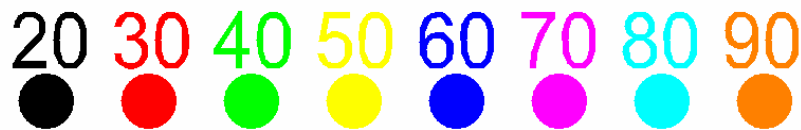


Figure 10-1 Final Job

### 10.1 Designing the Job

- We'll begin by defining our material size as 4 inches wide by 1 inch high with a zero margin.
- Next, go into Select mode change to View by Wire color. Open the "Geometrical Shapes" fly-out tool pallet and select the "Circle" tool. We'll click on the left side of the material, begin dragging our circle, and press the **F2** key. We'll specify a radius of **.125** inches in the F2 dialog window (Figure 10-2) and click "OK".
- We'll keep the completed circle selected and open the "Duplication Tools" fly-out window, where we'll select the "Linear Duplication" tool. We'll specify 8 columns and 1 row in the dialog window that



opens and click **“OK**. Click anywhere on the design area of the screen and drag to the right (Figure 10-3). Release the mouse

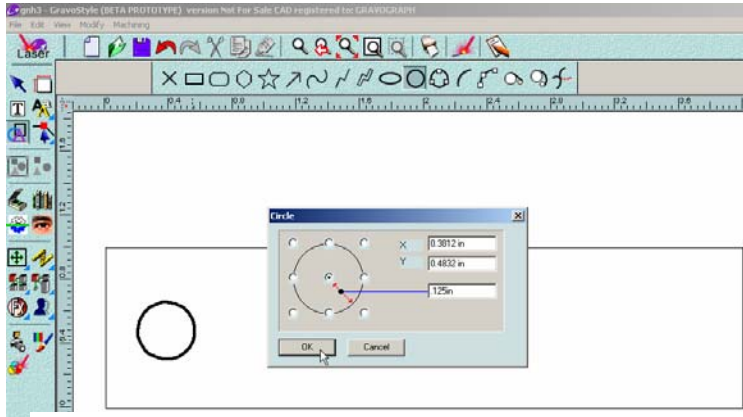


Figure 10-2 Defining the Circle Size



Figure 10-3 Duplicating the Circle

### POWER TIP

*When we open a fly-out tool pallet, we can position it anywhere within the design area of the screen. In this state, it's called a "Floating Tool Bar". It may, however, sometimes still be in the way of seeing parts of our design.*

*We can elect to drag it off the design screen altogether, where it'll change to a single column or row and dock to either the top, bottom or left side of the screen. Figure 10-2 shows the "Geometrical Shapes" floating tool bar docked under the top tool bar.*

*To close a tool bar that has been docked, we either click again on the fly-out icon or convert it back to its floating state & press the 'x' close icon in the upper right corner of the toolbar.*

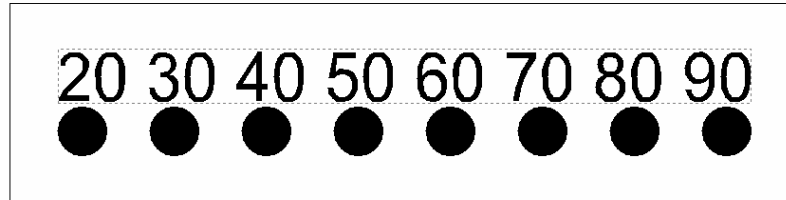
*To undock, just select the docked tool bar's border and drag it back into the design area or double-click the edge.*

button when we see the spacing that we want for the circles.

- Now open the "Text Tools" tool pallet and select the "Text into Rectangle" tool. Drag a text box the width of, and above, the eight circles that we've just created. Make sure that the text box is just a little higher than the diameter of one of the circles.
- Select an Arial font and specify it to be **.25** inches high and use left justification. Type in the sequence of numbers "20 30 40 50 60 70 80 90".
- Get into Select mode. Select the numbers and all of the eight circles, open the "Alignment Tools" tool pallet and click on "Vertical

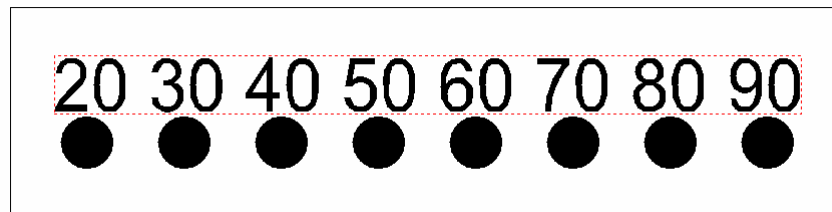


Center” and “Horizontal Center”. The circles and the numbers will then be centered on the material (Figure 10.4).



**Figure 10-4 Circles and Numbers Centered on the Material**

- Notice that in Figure 10-4, the line of numbers is just a little less wide than the line of circles. Let’s widen the line of numbers, by eye, proportionally, until each number is centered over its respective circle. Press **F4** to turn on Preview mode. Grab a corner selection handle around the numbers and dragging until the line of numbers looks to be the same width as the line of circles. When we’re finished, release the mouse and the job will look like Figure 10-5.



**Figure 10-5 Line of Numbers Enlarged**

- Next, we’d like to select, as a group, each circle in turn with the number above it. We would normally do this by dragging the mouse cursor around the two items, but when we try it we find that the numbers cannot be individually selected.

Why? The reason is that any typed text (or numbers or punctuation marks) is not really a true graphic; that is, a collection of lines and curves. If it were, then text couldn’t be edited or spell checked, just



as a circle that we draw couldn't be changed to, say, the letter "G". Text and graphics are different.

Our solution is to change the number line into pure graphic curves and lines. To do this, first select the line of numbers and then open the "Text Tools" fly-out tool pallet. Then click on the "Convert to Curves" tool (Figure 10-6) and the conversion takes place.

Before the text was converted, a dashed line appeared around it when it was selected.

After the conversion, the usual graphic boundary handles mark the selection boundary and we find that we can now make our group selection of one circle and the corresponding number above it.

- Now open the "Laser Colors" window. We'll select each individual circle and the number above and sequentially change their colors in the order in which they are shown in the "Laser Colors" dialog window (Figure 10-7). (We'll keep first circle and its calibration number black.) We'll also set each color for raster fill engraving.

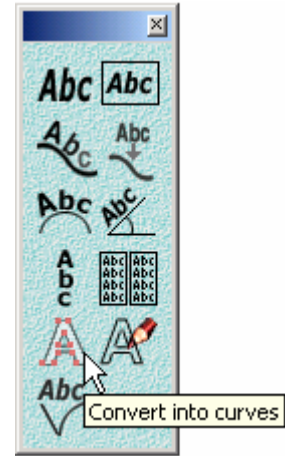


Figure 10-6 Convert to curves

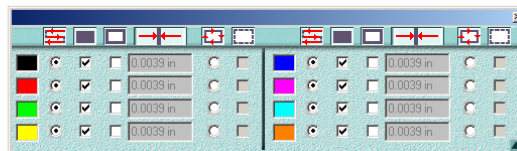
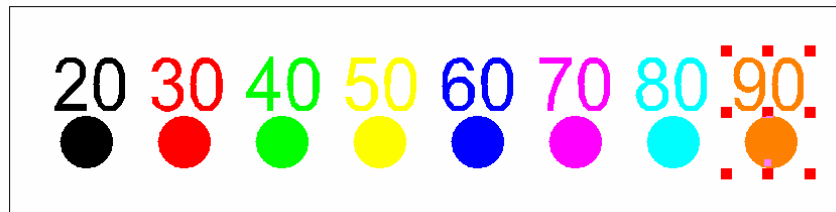



Figure 10-7 Setting Laser Colors to the Test Pattern



## 10.2 Engraving Settings

When we've finished changing all of the colors, close the "Laser Colors" window and open the laser driver dialog window by clicking on the

"Lasering" button  on the top tool bar. Make sure that each color is set to the power level that is the same as the calibration number above each circle in our test pattern job. We'll set each color to engrave at a speed setting of 100 and we'll set resolution to 500 dots per inch (Figure 10-8).

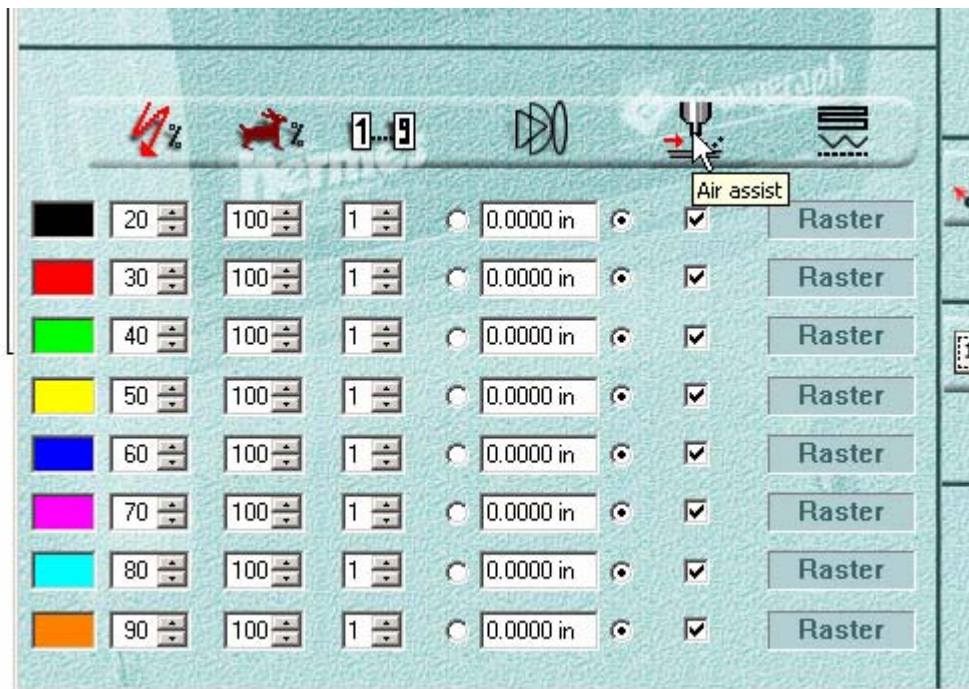


Figure 10-8 Engraving Powers Set for Each Color

Then click on "Run" to send the job to the table. Click "Cancel" after it's finished transmitting and save this useful job for future calibrations.

## 10.3 Engraving the Calibration Pattern

When we engrave this job we'll be able to judge by inspection which power setting works best for the material.



***Caution! Exercise close supervision at the laser machine table when engraving this calibration pattern. This is a calibration of an unknown match of materials to power settings and we may find that some of the settings at the high end of the power range may be too much for some samples. Be prepared to shut the engraving down immediately if it's obvious that we're close to exceeding a prudent power level for our test piece!***

#### **10.4 Other Ways to Use The Calibration Pattern**

- In this job we ran our calibration at a speed setting of 100 for all of the colors. We could run at slower speeds if we have reason to do so, or at other resolutions. For example, we may want to run slower for lower wattage laser engravers.
- We don't have to use the full range of power settings for calibration of a material. If we know in advance that the higher laser power settings would be too much, we could use a narrower range of settings. Just select the objects to be engraved.
- We can also use this test pattern job to calibrate materials for the best settings for vector engraving, including cutouts. For this type of calibration we would change the

##### **POWER TIP**

***After engraving the test pattern on Stickalase, we observe that the engraving is too weak at a power setting of 30, is a little too strong at 40 and is much too strong at 50. This indicates that the power setting requirement is too critical.***

***We engraved the test pattern at 500 dots per inch. If we repeat the job, but at 300 dpi instead, we find that we achieve a wider range of acceptable power settings. This is because the lower resolution setting reduces the dot-to-dot overlap as the laser beam fires on the material and thus lowers the effective laser energy that is applied.***



mode of laser engraving to vector in the “Laser Colors” dialog window.

### **10.5 What We’ve Learned**

By engraving this job, we’ve learned:

- The difference between typed text and “normal” graphics.
- How to convert text to curves.
- How to draw circles.
- The difference between a floating tool bar and a docked tool bar and how to manage them.
- How to determine the proper power settings to use for an unknown material.