

CAD considerations when engraving with AvCAM 11.235, 18.50, 19.0 and later.

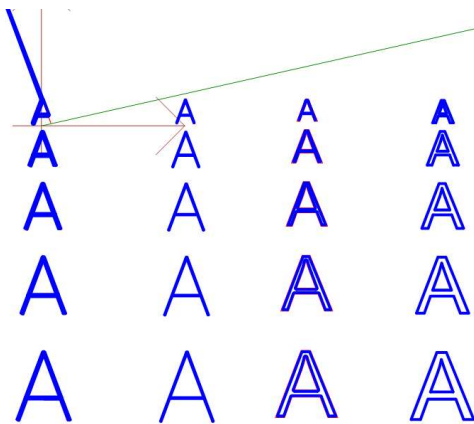
Background:

Prior to AvCAM versions listed above, all engraving was accomplished by tracking down the outline of text and other entities such as lines, arcs, polylines etc.

AvCAM recognizes the true type fonts that are commonly used with Windows programs. When Windows renders a font, it draws the font outline, and fills the interior with pixels. This is a process called rasterization. When using a rotating engraver, we can only cut the outline of the font. In order to accommodate that, we have developed a font called Legend. The lines are so close together that the effect is a single line.

When larger fonts are used, a larger cutter tip width can be used to make larger stroke widths.

When cutting on the outline of a text, there is a possibility of the letters running into the next letter, particularly using a font other than Legend. AvCAM now attempts to offset the letters to the inside by 1/2 of the cutter tip width set in AvCAM settings unless the font is on the layer named online.



The picture shows the left 5 rows of text. The top row is .1" high, the bottom row is .3" each row is .050 higher than the last.

Col 1. legend font, engrave layer .010 cutter
Col 2. Legend font, online layer, .010 cutter

The first A with a line going wacko is a result of trying to offset a very thin section with a too small font or a too big cutter tip. This can be remedied by putting this text on the online layer or cutting with a smaller tip width. Adjusting the cutter width in settings and simulating again will show when it is right.

Col 3. Arial font, engrave layer, .010 cutter
Col 4. Arial font, online layer, .010 cutter

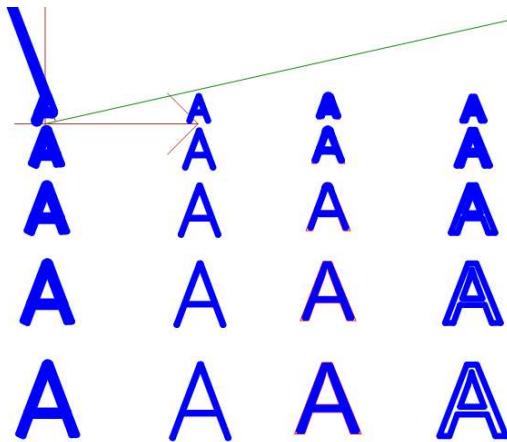
Note that the 2nd col using legend, online increases the letter size but the stroke width remains the same. Looking at the 3rd col, arial, inside, the letters look good at .1 and .15, but .2 starts showing some of the inside not completely cut out with the .010 tip width and .25 and .3 are definitely not cutting the interior. The fix for the larger sizes is simply to use a larger tip width.

The 4th column is online and selecting a cutter size that will fill the inside may actually widen the outside to the point that it interferes with the letter next to it.

So now lets change the tip size to .020 and repeat using the same file.
This is done with the same file as before.
Row 1 = .1 row 5 = .3”.

Col 1 Legend font, engrave layer, .020 cutter
Col 2 Legend font, online layer, .020 cutter
Col 3 Arial font, engrave layer, .020 cutter
Col 4 Arial font, online layer, .020 cutter

Legend inside at .1 high is still a problem,
.15 completely fills in the center of the A. .2,.25, and .3 are usable. Bear in mind that other letters may not work as well.



Legend online looks pretty good except at .1” letter height.

Arial inside, is unusable, at .1” high, .15 is overcut a little at the top, the rest look pretty good. Arial online basically doesn’t work.

So, what to use. As you can see, Legend online works in many situations, but the user still needs to select the correct cutter size.
Using a font such as arial on a layer that is not

named inside and the proper cutter tip size results in well filled and properly spaced letters.

Note that decorative fonts frequently have very thin sections that will result in errors such as the upper left A above. In these cases move it to the online layer and or use a smaller cutter tip width.

Laser:

The spot size of the LZ1 laser is fixed at about .008” The same considerations for engraving with the EG2 rotary engraver hold true for the laser except that you cannot change the cutter size for the laser. For some of the larger sizes, consider using a narrow font like Yu Gothic Light or some other light font so that the inside is cut out. Simply simulate in AvCAM to see how it will cut. If it does not cut out, select a narrower font or a shorter font size.

For large text such as an N Number, consider using a decorative font such as Times New Roman and cut it online.

For both laser and engrave, entities other than text continue to cut on the center of the line that forms that entity. The rule of thumb for engraving cutter tip width is still 10% of letter height whether online or inside.

Justification:

The Autodesk dxf specification lists 4 vertical justifications

Baseline, bottom, middle and top

The problem arises when CAD manufacturers mix them up.

EASY CAD

TOP CENTER
MID CENTER
BOTTOM CENTER
BELOW CENTER

QCAD

TOP CENTER
MID CENTER
BASE CENTER
BOTTOM CENTER



These three screen shots depict EasyCAD, QCAD and Draftsight terminology for the different alignments. I drew 4 lines and selected the alignments and snapped the text on the center of those lines. You can see that EasyCAD, QCAD, and Draftsight each call the alignment that snaps to the bottom of the text. AvCAM will only observe the EasyCAD version of Bottom center. The result is if you use DraftSight or QCAD bottom center alignment, when rendered in AvCAM, the text will shift down because AvCAM only recognizes top, mid and baseline vertical justification.

The vertical placement and height is very accurate, however some cads render the text width differently. For instance place a couple word sentence in EasyCAD, draw a vertical line on each end of the sentence. Zoom in and out. You will notice that at some zoom levels the width of the sentence is quite different. There is no way to detect this in AvCAM, If there is a critical width text, be sure to check it in AvCAM and adjust in EasyCAD as required. QCAD and DraftSight are quite accurate in text width.