

LaserCAM

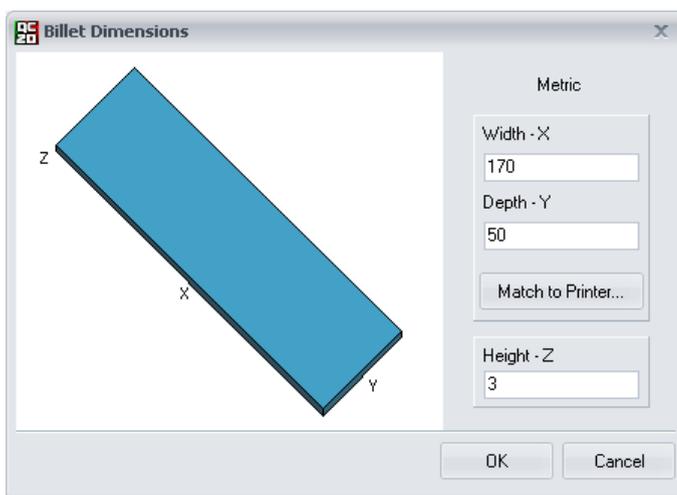
6" Ruler Tutorial

Covers:

- Billet definition
- Grid and Step (cursor nudge) setup
- Rectangles and round rectangles
- Entering precise coordinates
- Rectangular arrays
- Text creation
- Editing properties
- Copy and Paste shapes
- Exploding shapes
- Hatching
- Rotating shapes

This tutorial shows how LaserCAM 2D Design can be used to create a 6 inch ruler. The design could then be manufactured either by a laser cutting machine, or a CNC router.

Define working area (billet)



Define the size of the billet needed to create the component (X 170mm by Y50). This can be done as the software starts, or by clicking the resize material icon:



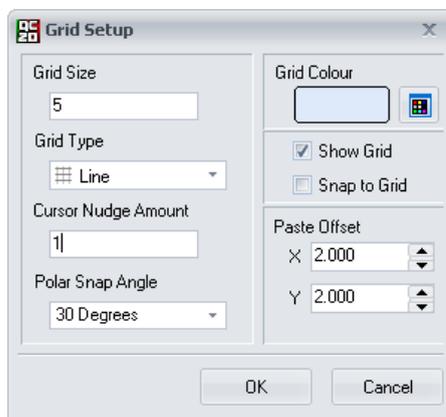
Set Grid Size to 5mm:



Select grid options from the Options button on the Snap menu, or by right mouse clicking the Snap menu

Now enter the **grid size** as 5

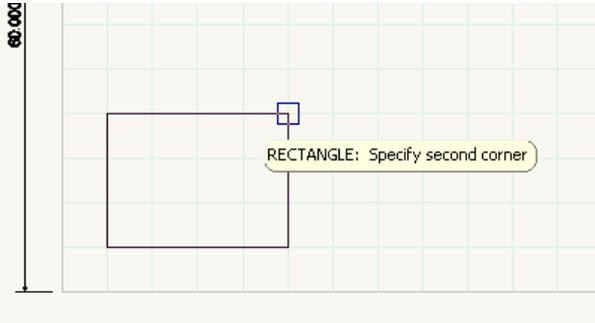
Set the step size (**cursor nudge**) value to 1 at the same time



Create ruler outline:



Select rectangle tool from the toolbar, or press **R** on the keyboard



Left mouse click on the first bottom left grid point.
 This has defined the start point for the ruler's outline.
 Note that the start point should have snapped to the nearest grid point (X5 Y5) as shown above.



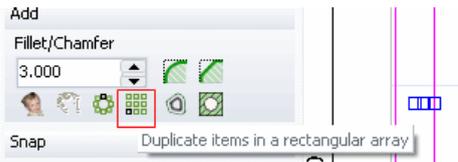
Relative coordinate

To define the opposite corner of the rectangle, we can enter the required size by inputting relative coordinates into the boxes located in the toolbar at the top of the screen. Relative co-ordinates are relative to the last entered point (in our case this would be X5 Y5). Clicking the button (highlighted above) toggles between absolute and relative position input.

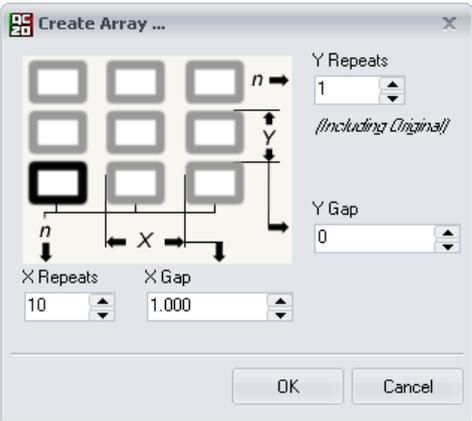
We now have a 160mm by 40mm rectangle which is to be the outline of the ruler.



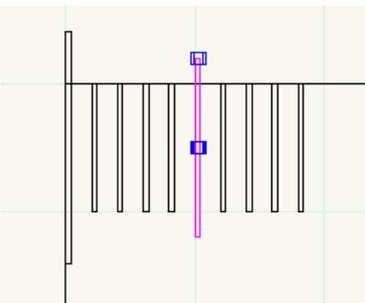
Create divisions by drawing another rectangle from the top left corner of the ruler which is 0.2 wide and -5 deep



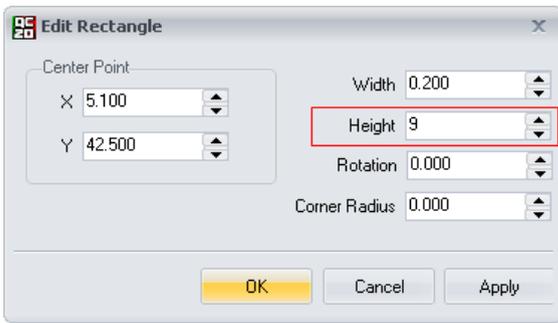
Highlight this new rectangle and select the Rectangular repeat tool from the toolbar.



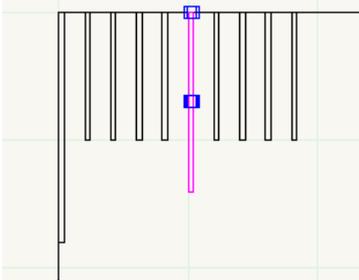
Enter 10 repeats along the X axis with a gap of 1mm between each.
 Y repeats is set to 1 as we only want one row, press OK



We now have 10 divisions for the metric side of our ruler.



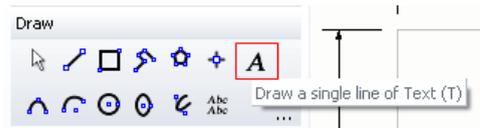
Select the first division and edit its height from 5mm to 9mm by double clicking on the rectangle and putting 9 into the height edit box
Select the 6th one and alter its height from 5mm to 7mm.



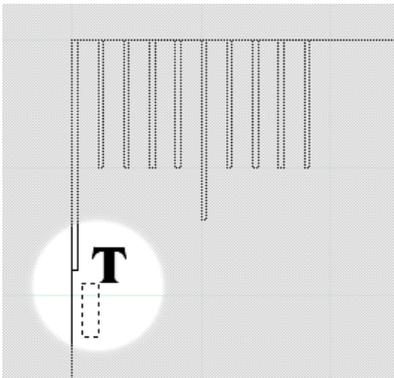
Using the step nudge feature by selecting the modified divisions and pressing cursor down  arrow to move the divisions back in line with the others - each press of the cursor will move the selected shape exactly by the step amount in grid setup (1mm in our case).



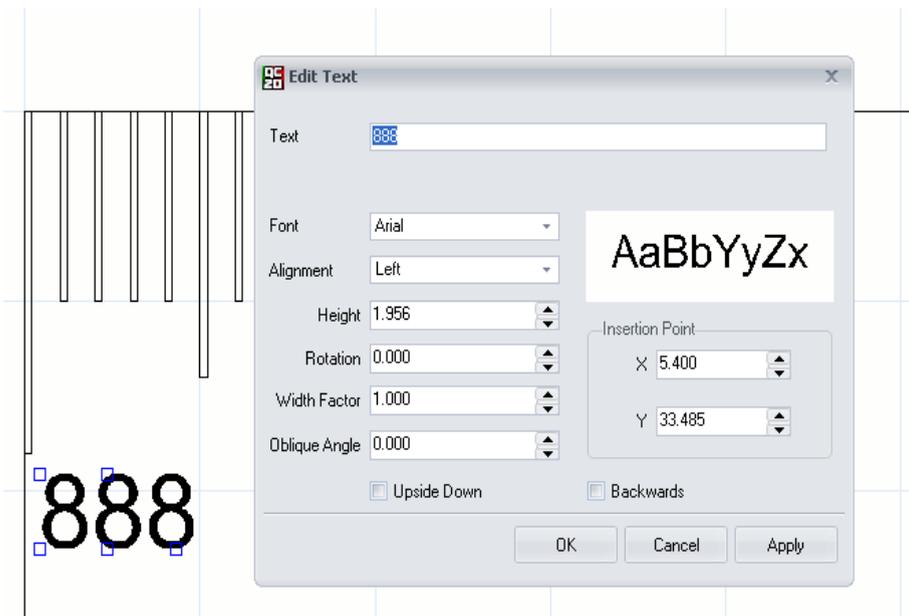
For the next part we will need to turn the grid snap mode off. Use the toolbar button or change grid snap mode from the grid setup menu.



Select the text tool.

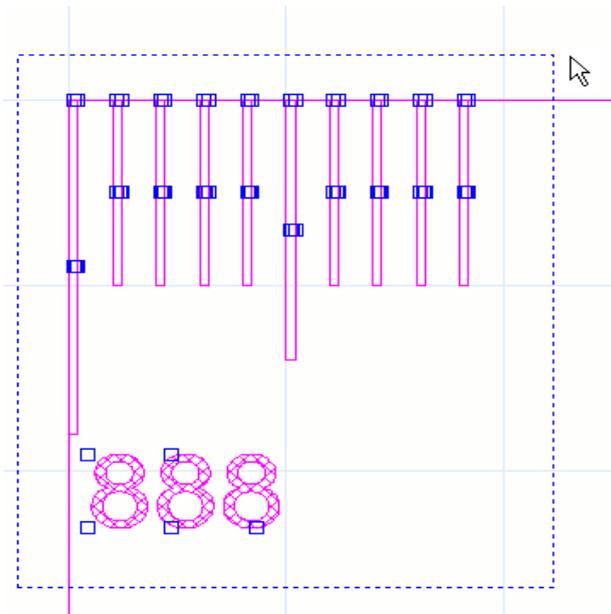


To add text you must define the text start point and height by drawing a text box (note that the width of box does not constrain the text at all)



Choose a suitable font and enter 888. Press Apply to see how the text will look in the drawing. If the text looks too big then edit the height within the text edit window.

We can now repeat the divisions and text 16 times to fill this side of our ruler



Move the mouse pointer to the left, bottom corner of the items we wish to duplicate.

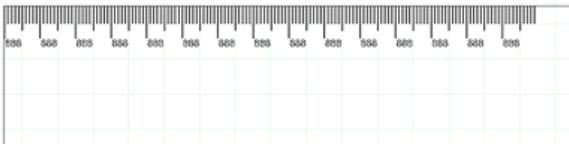
Press and hold the left mouse button.

Now drag, whilst holding left mouse button down, the mouse to the top right corner of the design (as shown above) and let go of the mouse button.

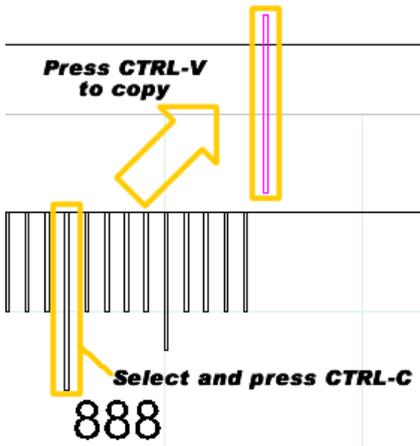
All items including the ruler outline have been selected.

De-select the ruler outline by holding down SHIFT and clicking on the ruler outline rectangle.

Now select the rectangular repeat tool and repeat these items 15 times in the X axis at a spacing of 10. Make sure Y repeat is only set to 1.

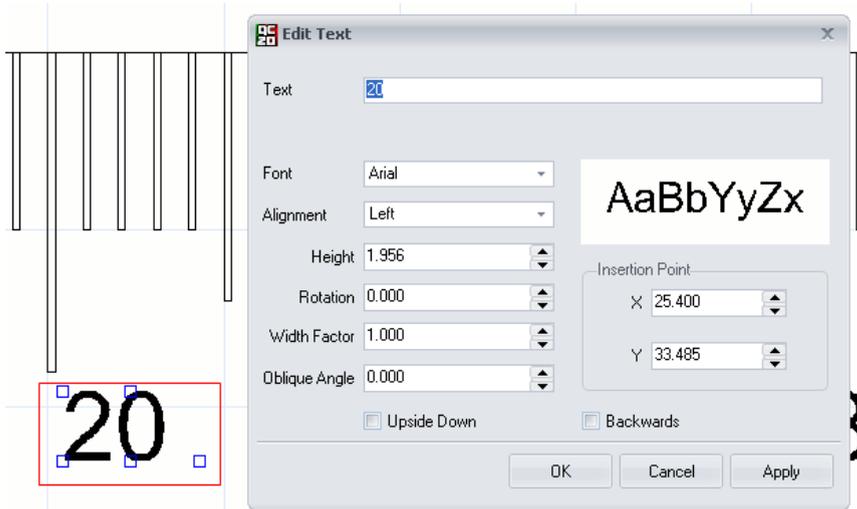


The ruler is now taking shape.



Finish the divisions off by selecting the last major one on the right hand side.
 Hold down CTRL and press C (for copy selection)
 Hold down CTRL and press V (for paste selection)
 Any items currently selected will now be copied into the drawing, and shifted in X and Y by the grid pitch amount.
 Now select the copied division and press the cursor down arrow  10 times to 'nudge' the division into place.

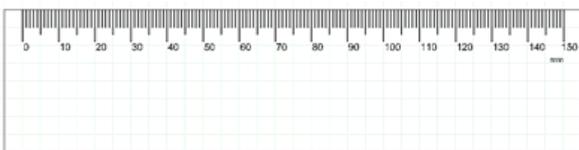
Now the division text needs changing to show the mm value



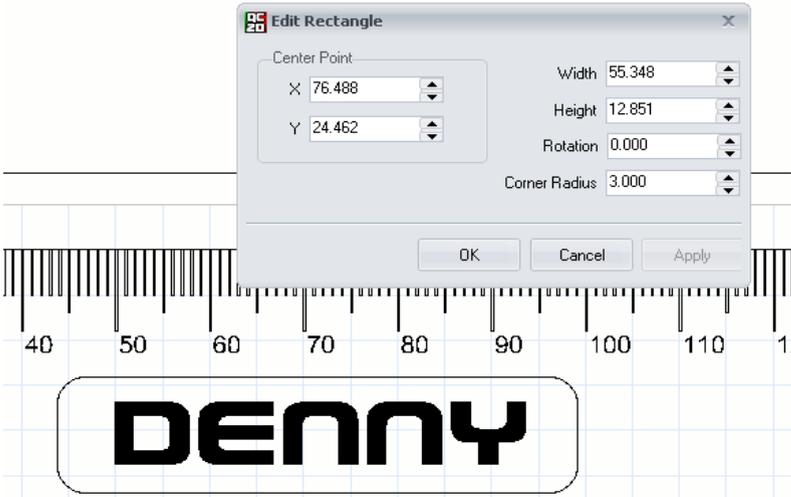
Double mouse click to edit
 or
 Select shape, click right mouse
 and choose Properties from
 the popup menu

Edit each text item by double clicking, or selecting the properties for each item in turn.

Now select and move the divisions to appear in the centre of the ruler, add more text for the 150 division, and add 'mm' to the right hand end:



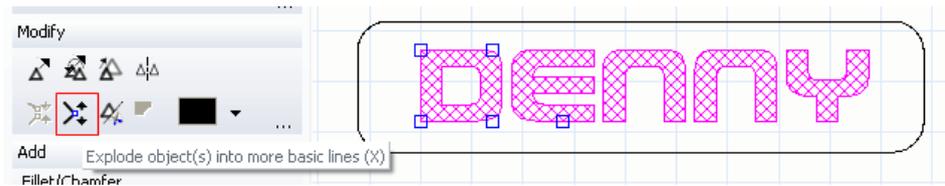
Add your name to the center of the ruler and create a rectangle around it.



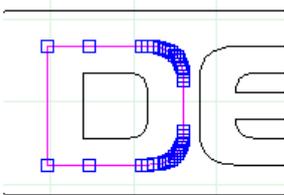
Edit the rectangle (double click or properties) and enter 3 into the Corner Radius value. Click the APPLY button to preview what the rectangle will now look like.

Next we will create a hatch pattern around the text but within the rounded rectangle.

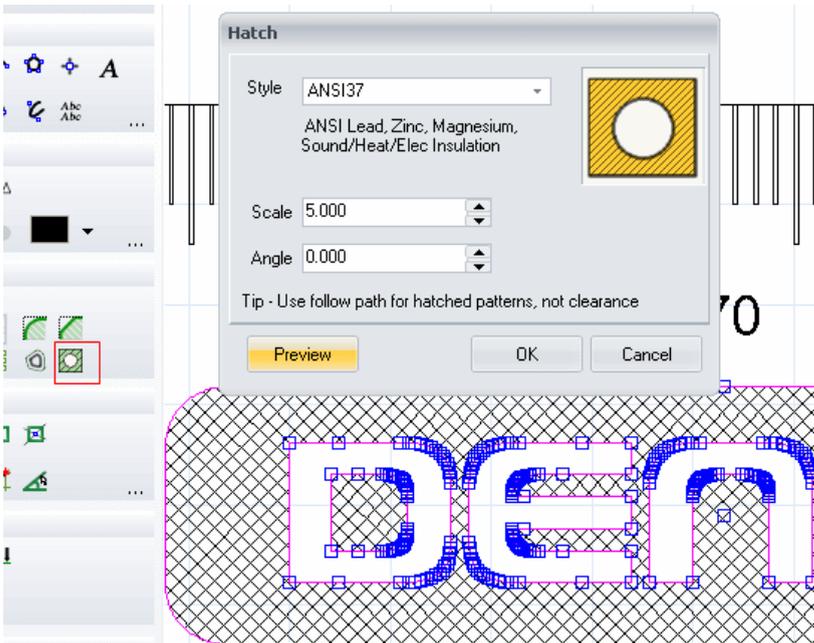
Before text can be hatched, it must be exploded into polyline shapes first - doing this will then not allow you to change the wording - make sure it is correct now !



Select the text. Then choose the Explode command from the toolbar, or press X on the keyboard.



You will now see that the text has been 'exploded' into polyline shapes.



To create the hatch pattern simply select all the text polylines and the outer rectangle, then click the hatch tool.

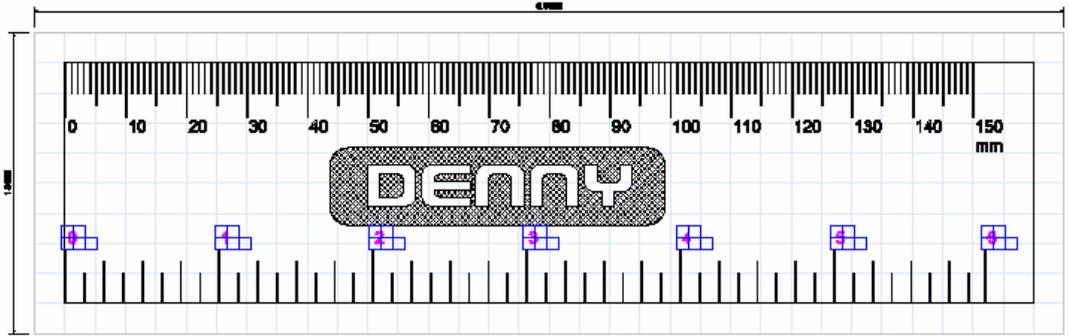
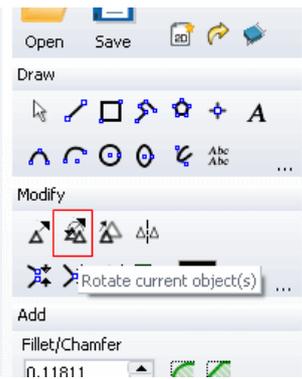
Choose a suitable hatch pattern and scale, then click Preview button to see how the hatch will look.

We have chosen ANSI37 here to create a nice diamond pattern when engraved (by laser or CNC).

Now, in a similar way, create the imperial side of the ruler.



Note that the text on the imperial side is the wrong way round (or it will be when you turn the ruler around).
It needs rotating - you could do this by editing the properties of each text shape, and changing the angle to 180, or use the rotate tool:



Select the 7 items of text by holding down SHIFT and left mouse clicking on each shape in turn.

Select the rotate tool

The software now needs to know the centre of rotation or base point.

Click the mouse pointer roughly in the centre of the ruler - next to the text for 3 Inch.

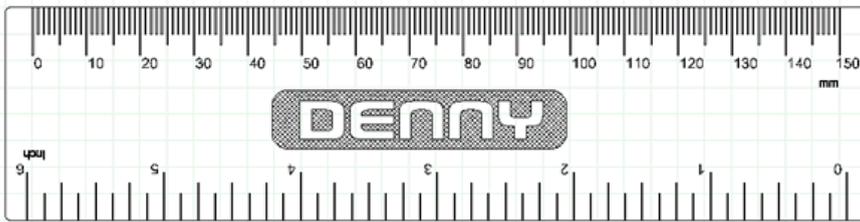
Now specify the angle of rotation by moving the mouse pointer around the screen.

Left click a point directly to the left of the 3.

Tip - have grid snap on to allow precise rotations to be executed

Hold down SHIFT on the keyboard when applying rotation to leave the original, and create a rotated copy

Tidy up the design, and you're finished !



Here is the finished product:

