CNC laser cutter

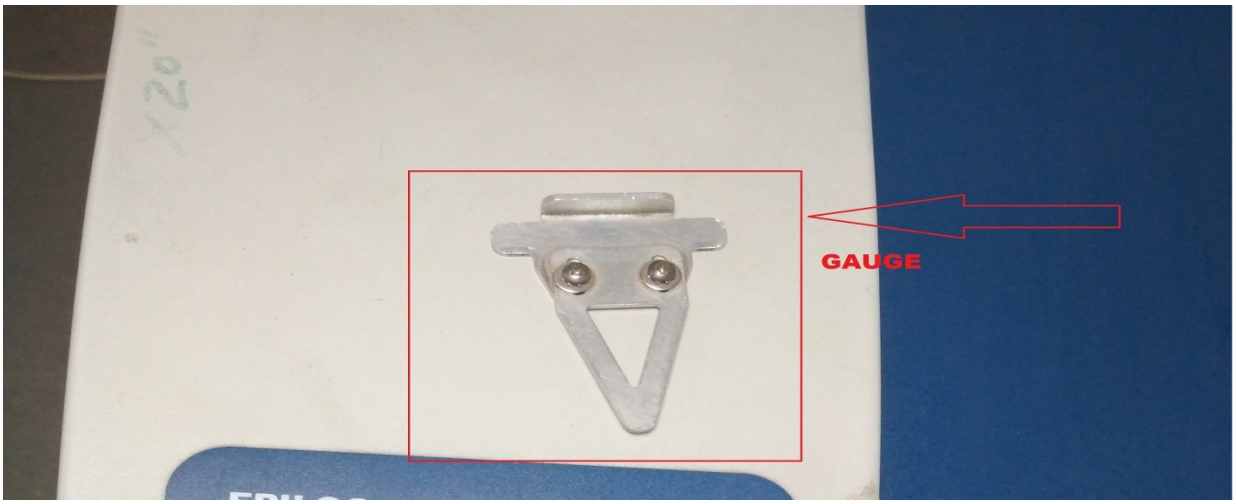
LASER CUTTER AND CREATE PRESS-FIT COMB

Laser cutting is a technology that uses a laser to cut materials, and is typically used for industrial manufacturing applications. Laser cutting works by directing the output of a high-power laser most commonly through optics. Laser optics and CNC (computer numerical control) are used to direct the material or the laser beam generated. A commercial laser for cutting materials involved a motion control system to follow a CNC or G-code of the pattern to be cut onto the material. The focused laser beam is directed at the material, which then either melts, burns, vaporizes away, or is blown away by a jet of gas, leaving an edge with a high-quality surface finish. Industrial laser cutters are used to cut flat-sheet material as well as structural and piping materials.

ABOUT CNC LASER CUTTER:

Here is the Computer Numerical Control laser cutter.

This machine uses CO2 gas for production of laser (CO2 laser is 10.6 micrometer in wavelength) and uses maximum 60 watt power. And with the help of gauge we fix the distance between the material and nozzle. The gauge height is 2".



Having display, which shows job number and time required to complete the job. And also there

are 6 functional key and a joy key.

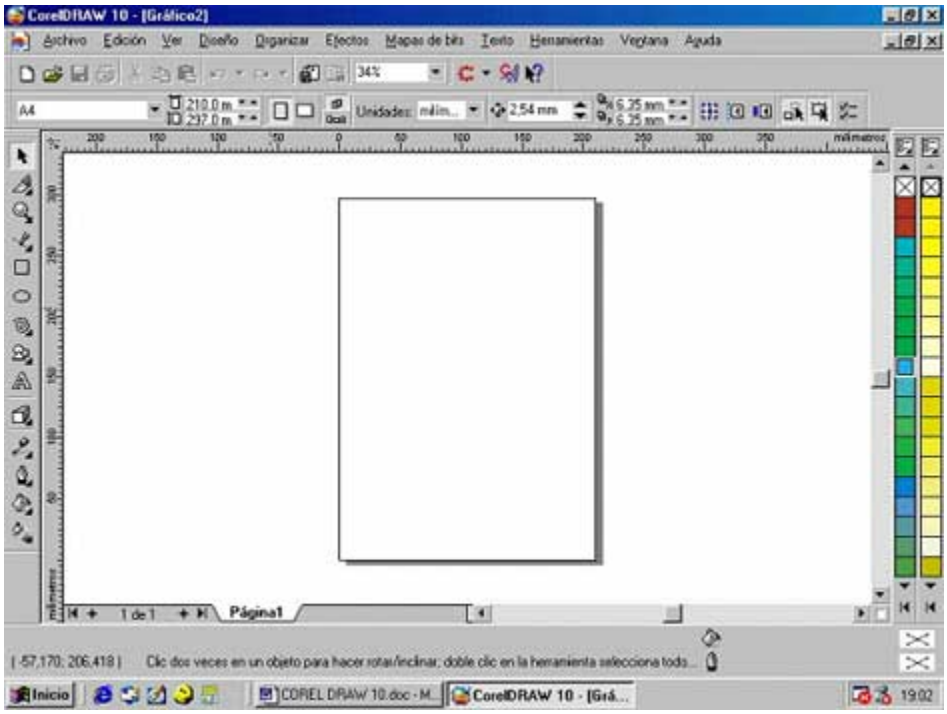
Emergency exit and main power switch is on the down side of front view.

This is the bed (movable) of laser machine ,having horizontal dimension 812cm and vertical dimension 508cm.

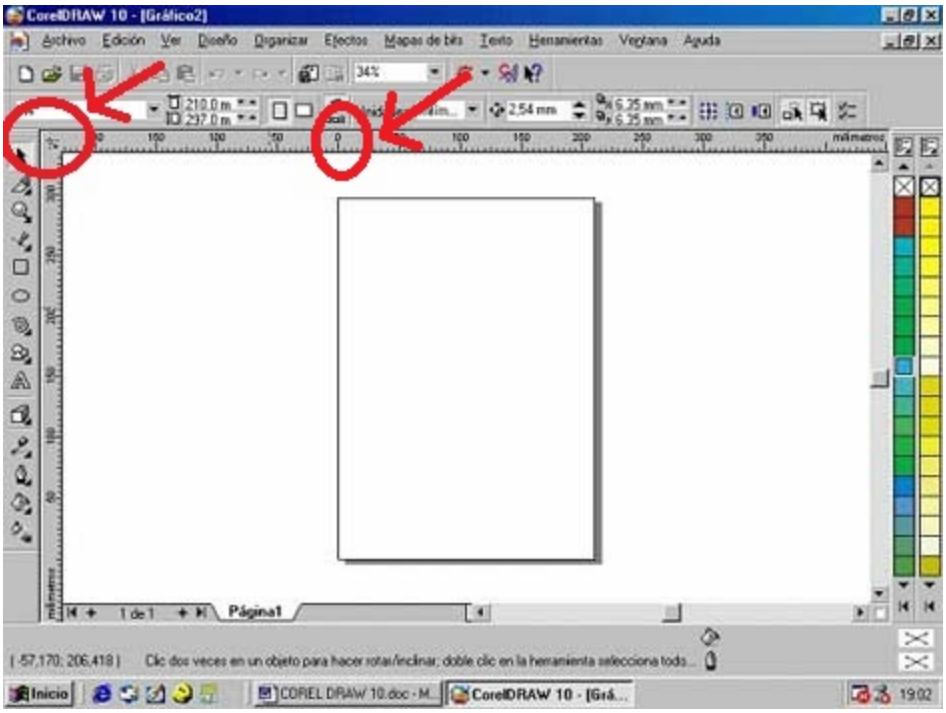
Working on this machine first we need to draw a design from suitable CAD software and then open in CorelDraw or we can draw in CorelDraw also .This is the software which have to download to run the laser cutter .CorelDraw support the design file in dxf and pdf format.

STEPS FOR USING CORELDRAW:

1. Open the design in CorelDraw



2. Drag the symbol inside the frame 0 in x axis and 0 in y axis to set in the 4rth quadrant.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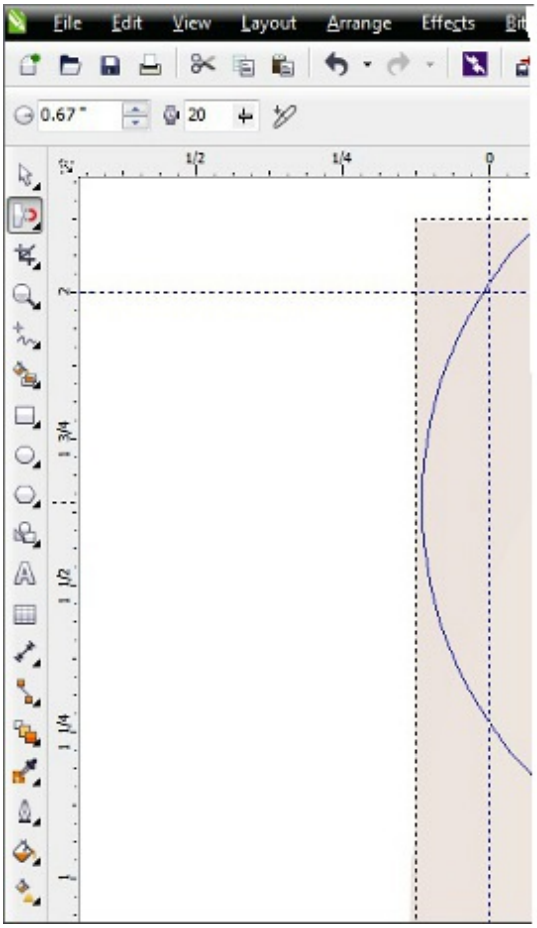
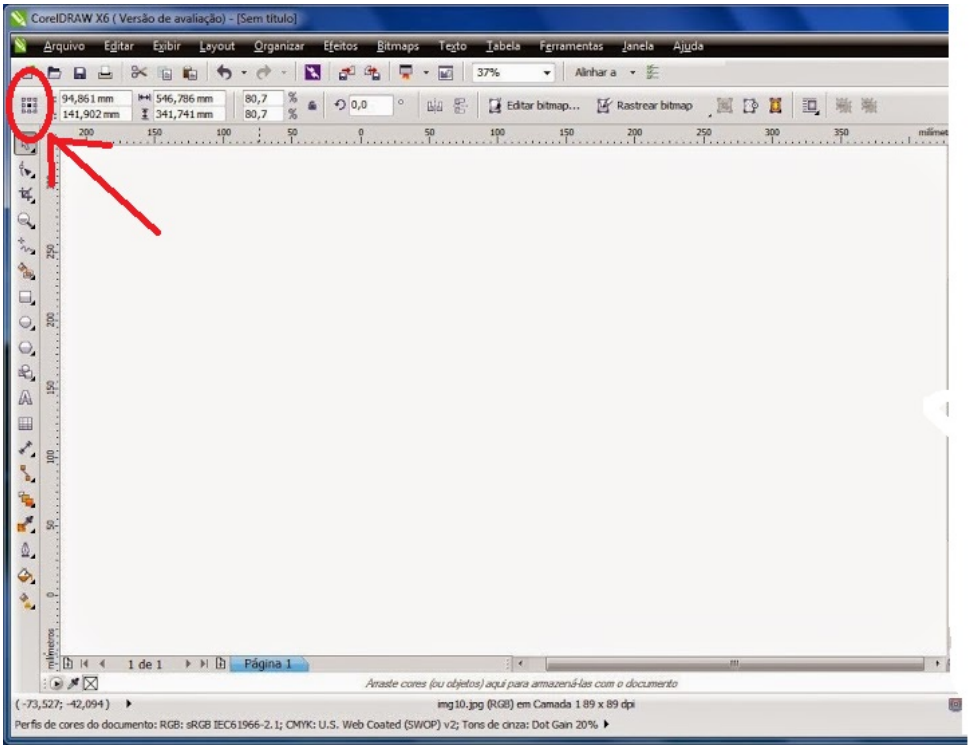
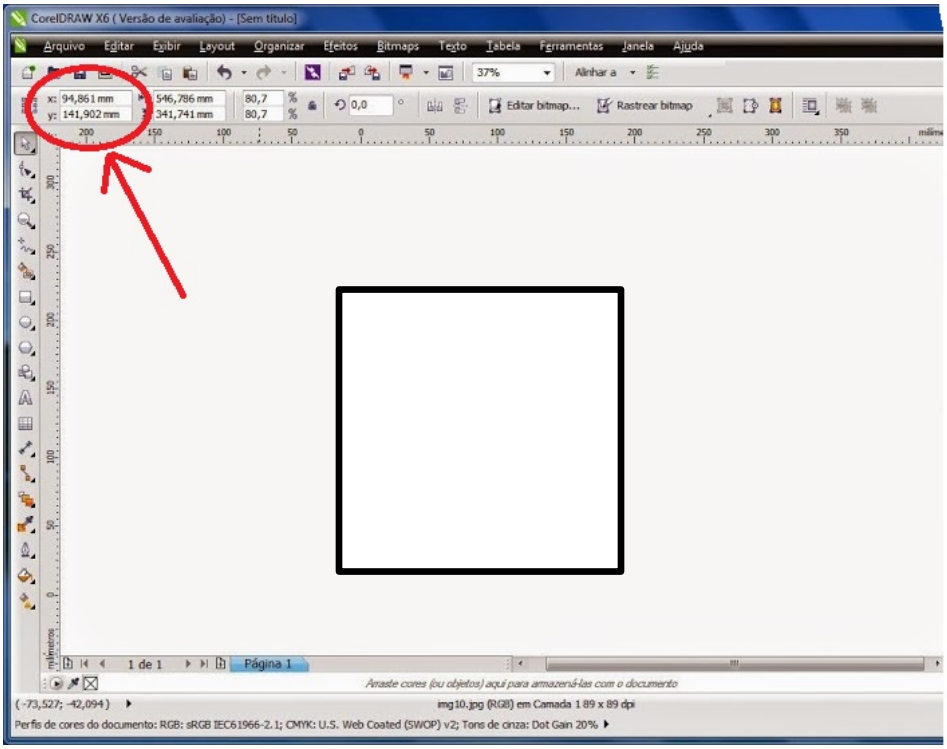

File Edit View Layout Arrange Effects
0.67 "
20

3. Now select one point .This shows the position of drawing.

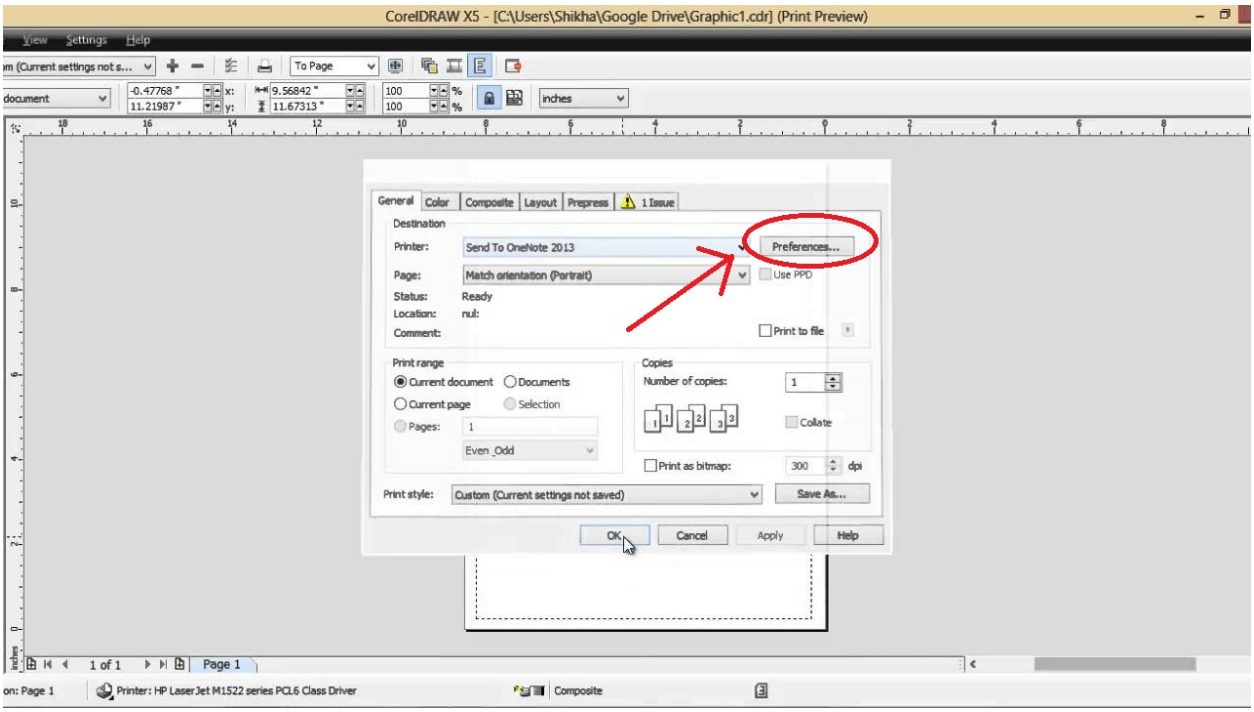


4. Give x distance in positive and y distance in negative according to the length and width of sheet on which the design is going to cut.



5. Now select the whole design and press ctrl+p or print.

6. Go to preferences.



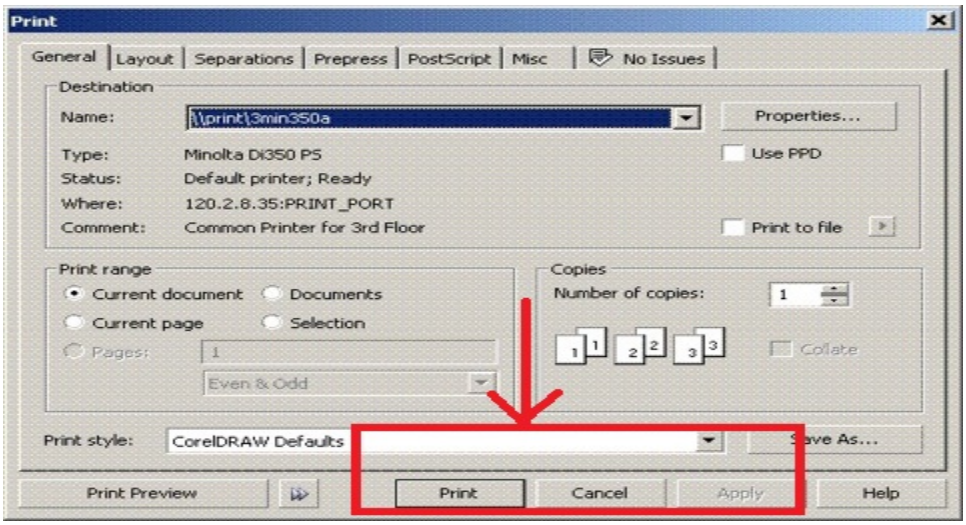
7. We have to select job type

- **Raster**-engraving
- **Vector**-cutting
- **Combine**-engraving + cutting

Settings for power, frequency:
Initially speed is given 5% and power is given 50%.

If we select vector for job type then power, frequency, speed is given to the cutter.
Frequency is given by dots/inches and speed varies according to the thickness.
After job type and power speeds setting go to OK.

8. Click apply and print. And then press ‘GO’ on the machine for cutting.



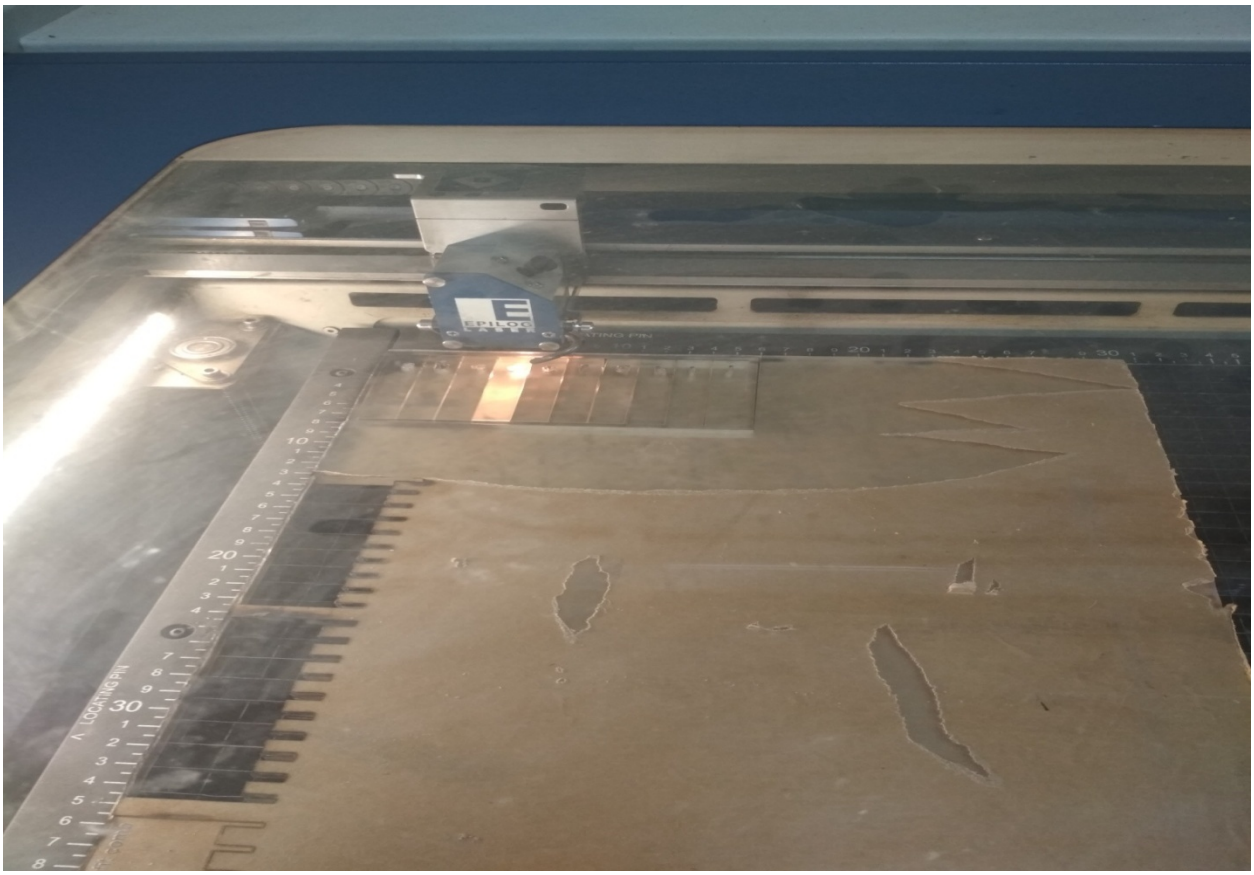
IMPORTANT NOTE:

- Before actual working, first turn on the ventilator and compressor to prevent the machine from burning.
- Always care about the fire as I have given 100%power and 3%speed flames were generating around the nozzle.
- If fire occurs, immediately open the bed cover glass. The power of laser cut off by opening glass cover and cutting stops but movement of nozzle keep going on.
- Inform to lab incharge regarding fire.

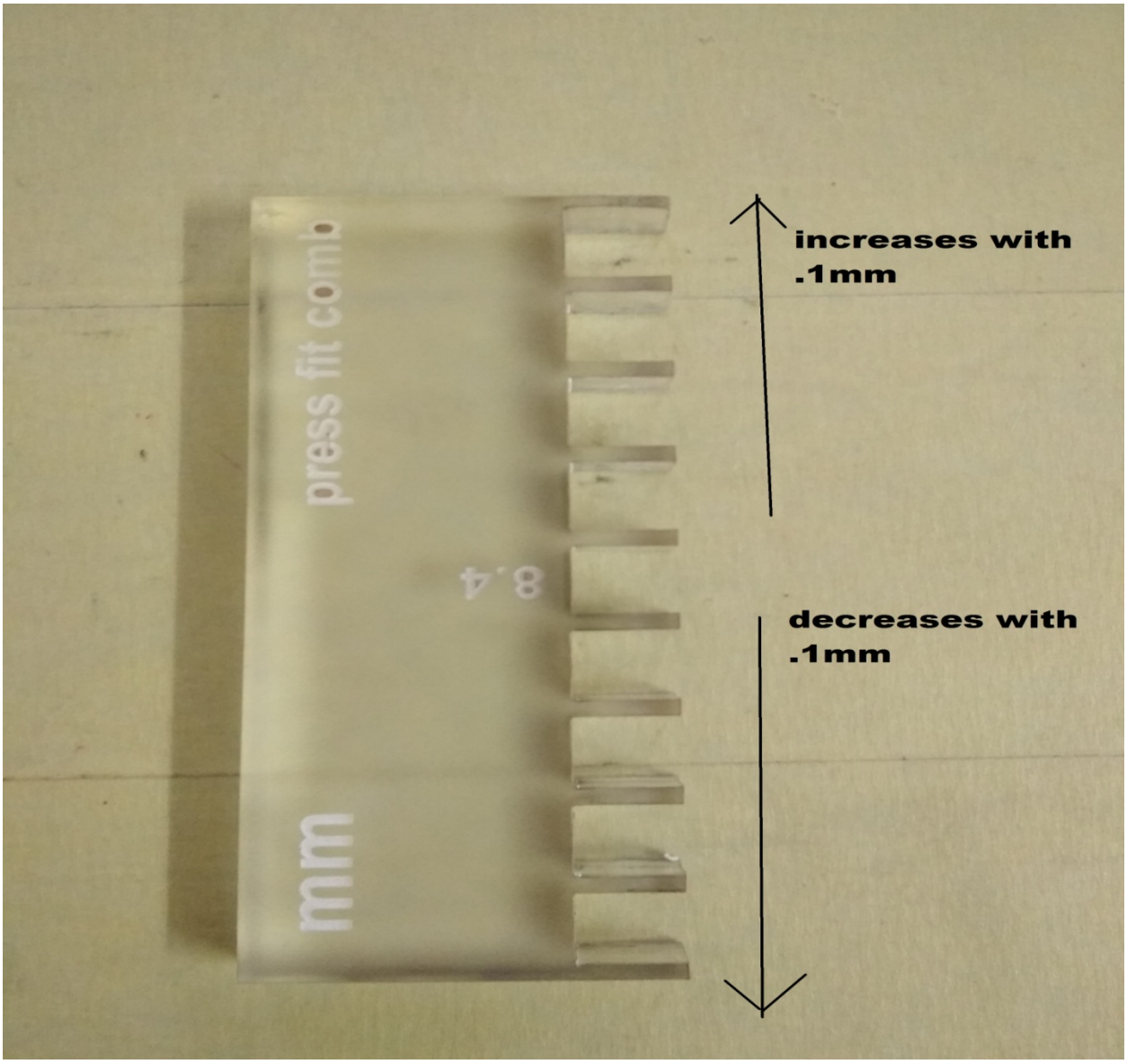
Press-fit comb

I downloaded dxf file of comb

STEPS FOR CUTTING IN LASER CUTTER WITH CORELDRAW:
1. Turn on the power supply
2. Turn on the AC.
3. Turn on the main power switch of machine.
4. Switch on compressor and ventilator
5.Wait for 2-3 minutes until the display of machine shows ‘JOB’
5. Select focus key on machine and put the gauge vertical on the slot given above the laser nozzle.
6. With the help of jog key the bed move upward till it touch the gauge.
7. Open the downloaded file in CorelDraw.
8. Drag the origin→select point→give distance→select sketch→print→job type→speed/power setting→ok→apply/print→ GO….(as discussed in steps for using CorelDraw)

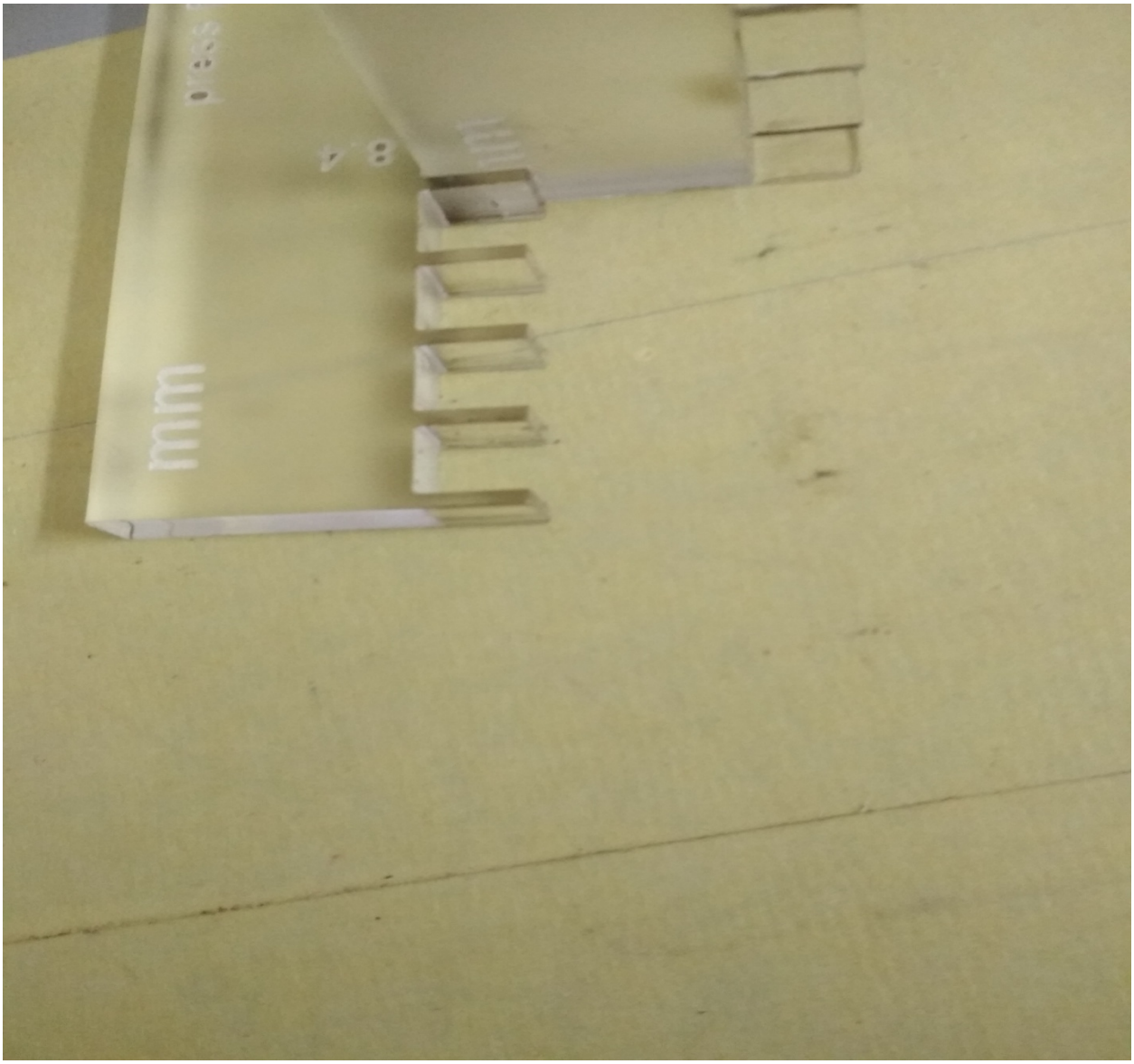


For this speed 5%,power 100%,frequency 100%.Didn’t cut in single pass so again pressed ‘GO’ to cut.



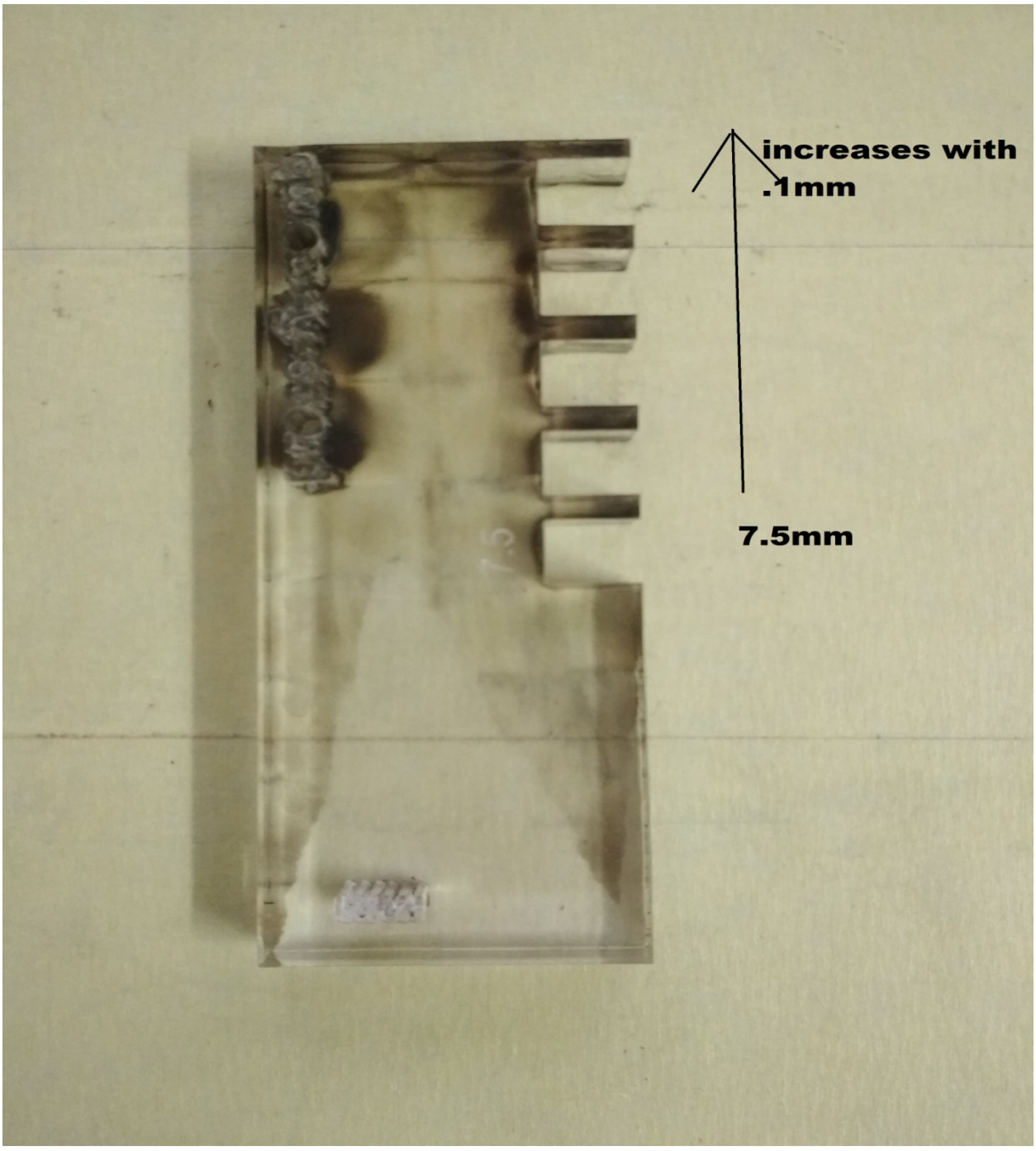
Changed the speed to 3%.This time sheet cut in single pass.

8.4 mm was given for vertical cut .This dimension is same as the thickness of sheet. But the thickness of sheet didn't fit tightly in the 8.4 vertical cut section.

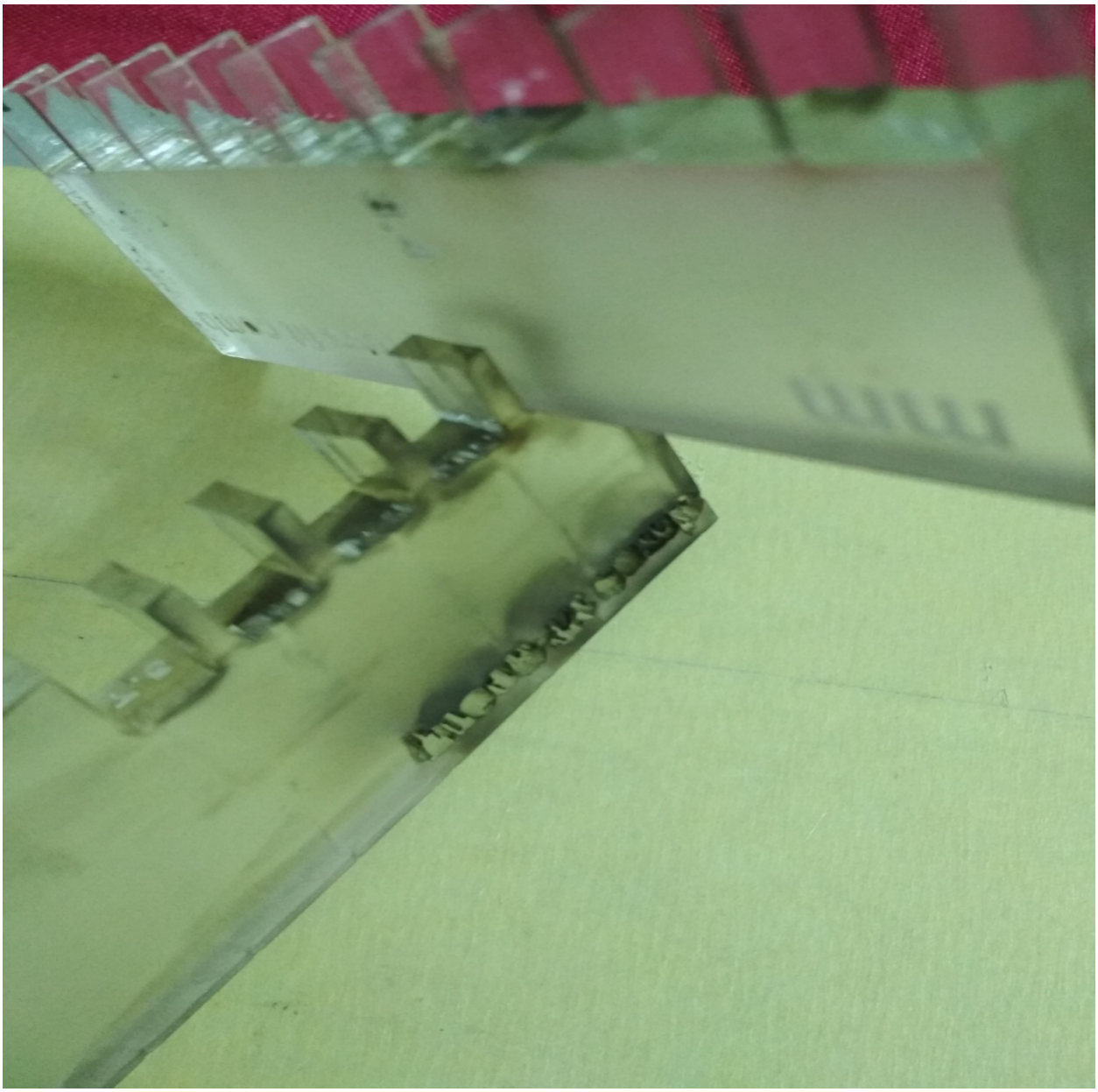


Now measure the 8.4 mm cut by digital caliper. It showed the cut 8.58mm

It means that the laser cut more than the given value. For press fit I tested with another comb having dimension 7.9 to 7.5



Insert the sheet thickness in all the cut to check press fit. Sheet was fitted tightly in 7.9 vertical.



Measured the 7.9 cut, it was showing 8.35 in digital caliper. The difference between the cut sheet and original dimension was .45mm or approx .5mm.This is known as kerf. Each side the kerf was .25mm.

IMPORTANT NOTE:
1. Kerf should be kept in mind while designing.
2. Position of design should be proper in sheet so that maximum use of sheet can be done.
3. Always care for fire.