

How to design a photolithography mask in AutoCAD

1. Draw up design in AutoCAD

- a. Start designing, making sure to keep previous iterations and save often. Have one file with all of your CAD ideas and different designs. After you have finished designing you will transfer it into a different file for polishing and prepping for output.
- b. Use all of the AutoCAD commands at your disposal to create your design (line, spline, offset, etc – see autocad command list in protocol folder) except for ELLIPSE (for some reason ellipse just doesn't like to change into polylines and thus not good for pedit).
- c. Keep in mind what height you want the device to be and design accordingly
 - i. Put posts in between areas that might sag due to a greater than 1:10 ratio of height to width or vice versa. Even if it is exactly 1:10 or close to 1:10 ratio putting posts is probably a good idea. For example: if you have 500 um wide channel that is only 25 microns high you probably would want at least one if not two posts.
 - ii. Letters and Numbers for labeling should be easily visible, again remember the 1:10 ratio rule.
- d. Labeling devices and designs is important. For large repetitive designs, use simple symbols, letters or numbers. Remember with the 10x objective on the microscope you have about a 700x700um viewing screen.
- e. Get rid of any overlapping lines use the OVERKILL command. (fuzz distance is how close the lines are before it is considered overlapping)
- f. Once you're done with the design make sure your design is continuous with no breaks or excess lines sticking out anywhere. Make sure your overall design is finished before starting PEDIT otherwise you'll run into trouble when trying to reconfigure some splines and curves
 - i. Use the OSNAP feature to easily connect lines together.
 - ii. The TRIM and EXTEND command will aid you in cutting unnecessary lines.
 - iii. Use FILLET and CHAMFER to connect sharp and curved corners.
 - iv. Use PEDIT to join all of the lines into one continuous segment (see pedit troubleshooting below if you are having any trouble.)
 - v. If you need to redesign something after using PEDIT. Use the EXPLODE command to break it back apart.
- g. Make sure to create different layers and color them differently if you have features within your channels, i.e. posts in channels.
- h. Fill out the supporting document, the mask order form. There should be an example copy in the folder this document is included.
 - i. Specifically note the layers and the type of fill in those layers (i.e. black or clear inside the layer's lines)