


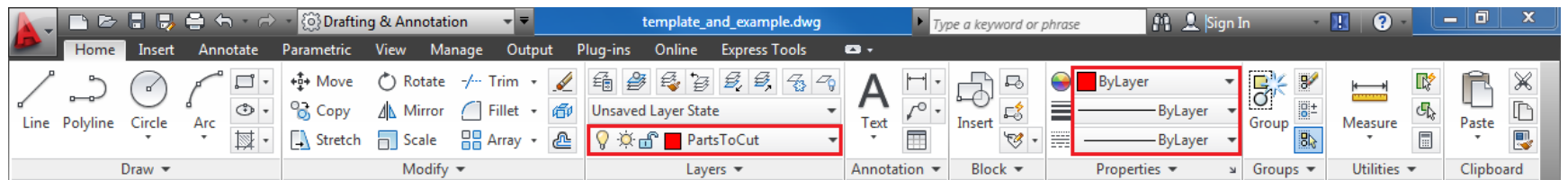











Laser Cutter File Preparation Instructions

1. If your part files are in SolidWorks, open them and convert them to AutoCAD DWG files.
 - 1) In a part file, select the face you want to cut and select **Normal To** ( or **CTRL+F8**).
 - 2) Go to **File, Save As**, and change file type to **.DWG**.
 - 3) Click the green check  at the left of the screen.
 - 4) Click **Save** in the cleanup window that pops up.
 - 5) Repeat this procedure for all your parts.
2. Open all of your AutoCAD part files and copy the parts into a copy of the Laser Cutter Template. The Laser Cutter Template may be found on the “Material Science Lab” moodle page (yes, Material, not Materials). Please download this file and save your parts in it.
 - 1) In the AutoCAD file of a part, delete any unwanted marks such as centerlines.
 - 2) Select the part (**CTRL+A** or **click, hold, and drag from right to left**).
 - 3) Copy your selection (**CTRL+C** or **right click and Copy**).
 - 4) Open the Laser Cutter Template and paste (**CTRL+V** or **right click and Paste**).
 - 5) Repeat this procedure for all your parts.
 - 6) Sometimes, parts converted from SolidWorks to AutoCAD will be extremely large when copied into the Laser Cutter Template because your file was in metric units. To convert to inches, select the part, type **Scale**, hit **Enter**, type **0.03937** and hit **Enter**. Use **Measure**  to check that your part has been scaled down correctly.
3. Select all your parts and put them in the “Parts to Cut” layer.



- 1) Select the parts (**click, hold, and drag from right to left**).
- 2) At the top of the screen, select **Parts to Cut**  for the Layer, **By Layer**  for the Line Color, **By Layer**  for the Line Weight and **By Layer**  for the Line Type.
- 3) Hit **Esc** to unselect your parts.
- 4) If you have any features to raster, select the features to be rastered and select **Parts to Raster** for the Layer, **By Layer** for the Line Color, **By Layer** for the Line Weight, and **By Layer** for the Line Type. Note that text on files imported from SolidWorks will raster very poorly; use AutoCAD’s **Text**  command to create the text you want to raster.
4. Convert each individual part to a Block, which allows your parts to be copied and moved easily.
 - 1) Select an individual part.
 - 2) Type **Block** and hit **Enter**.
 - 3) You will be prompted to give the Block a name. Appropriately name it and click **OK**.
5. Make copies of any parts you need multiples of.
 - 1) Click on a part and use **CTRL+C** to copy and **CTRL+V** to paste parts that you only need a few copies of and/or are irregularly shaped.
 - 2) Use the **Array**  command for small, regularly shaped parts that you need many copies of such as spacers.

6. Arrange your parts as compactly as possible in the Laser Cutter Template, using commands such as **Move**  Move , **Rotate**  Rotate , and **Mirror**  Mirror to make your parts fit as closely together as possible.

- 1) If you are using laboratory acrylic, you are **required** to do this step if you want your parts cut.
- 2) If you are using laboratory acrylic, please find the smallest sized piece of scrap you can reasonably fit your parts on. If you are cutting many small parts, a laser cutter operator may choose to cut separate parts in separate passes on different scraps for efficient material use.
- 3) If you are using your own materials, you are welcome to arrange your parts as efficiently or inefficiently as you please.

Please also note:

- When drawing anything in SolidWorks, make sure you are using the correct unit system (**Tools, Options, Document Properties, Units**) for the part you are designing.
- If you have parts that can share a common edge while being cut (such as rectangular beams), move them such that they share this common edge before making them into a Block. Also before making a Block, select these parts and use the **Overkill** command to delete and combine overlapping lines. This step prevents the laser from passing over the same spot multiple times when cutting.
- If you request an operator to cut a large rectangular slab from laboratory acrylic, you will likely be denied, since such parts often do not serve a critical function and/or need not be made from acrylic. You may be asked to cut the part from a cheaper, more readily available material.
- Please make sure that all of your parts are correctly dimensioned and will fit together when assembled. If you have even the slightest doubt, and you are using laboratory acrylic, have your parts cut from cardboard and construct a mock-up before using our materials. Use AutoCAD tools such as **Measure** to check dimensions.
- If you have any questions about laser cutting, AutoCAD, or SolidWorks, feel free to contact an operator. Contact information is posted in the lab. We're here to help!