99-353 SolidWorks and Laser Cutting

Working With Acrylic

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Acrylic Comes in Many Colors
What Is Acrylic?

- Polymer of acrylic acid: poly (methyl methacrylate)

- Also known as Plexiglass, Lucite, Perspex...

- Can be either *cast* or *extruded*. Cast is better for laser cutting; extruded is easier to thermoform.
Thickness Variance

- We order 1/8 inch cast acrylic sheets.
- What we get:
  - Sometimes 0.125 inch sheets.
  - Sometimes 0.118 inch (3 mm) sheets.
- Thickness tolerance +0.015 to -0.025 inches.
- Thickness can vary:
  - From one batch to another
  - From one edge of a sheet to the other edge!
- Thickness matters for press fit.
Cutting Acrylic

• For 1/8 inch acrylic use:
  - Speed 16 mm/sec
  - Power level 80%

• For 1/4 inch acrylic use:
  - Speed 12 mm/sec
  - Power level 80%

• If the laser is having problems and not cutting all the way through the sheet (could be a dirty lens or focusing problem), reduce the speed slightly.
Acrylic vs. Other Plastics

• Acrylic is:
  – Colorful
  – Inexpensive
  – Fragile

• Delrin is:
  – Black or tan only
  – More expensive
  – Stronger

• ABS plastic:
  – Black/white/tan sheets only
  – Much stronger
  – Catches fire in the laser cutter!
Laser Beam Width

- The beam cuts by burning and melting.
- The width of the beam is non-negligible.
- Parts will be slightly undersized, holes slightly oversized.
Cut Residue

- Sometimes parts are discolored due to:
  - Smoke/ash plume from the melting plastic.
  - Residue from the honeycomb bed re-melting and contaminating the part.

- Wiping with isopropanol (rubbing alcohol) can clean up the part.

- Acetone (nail polish remover) sometimes works better.