99-353 SolidWorks and Laser Cutting

Working With Acrylic

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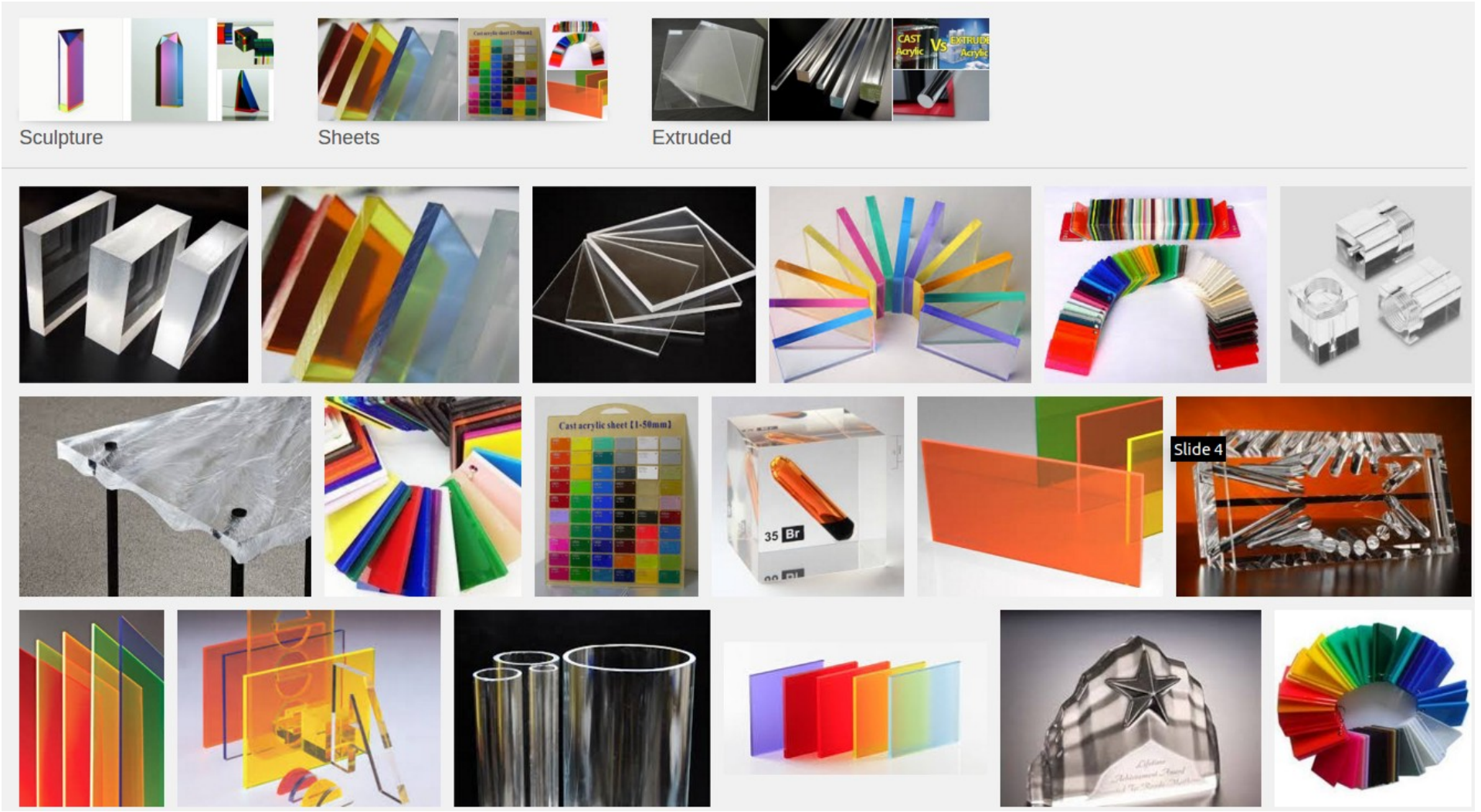
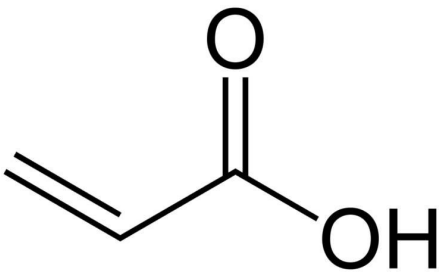
Acrylic Comes in Many Colors

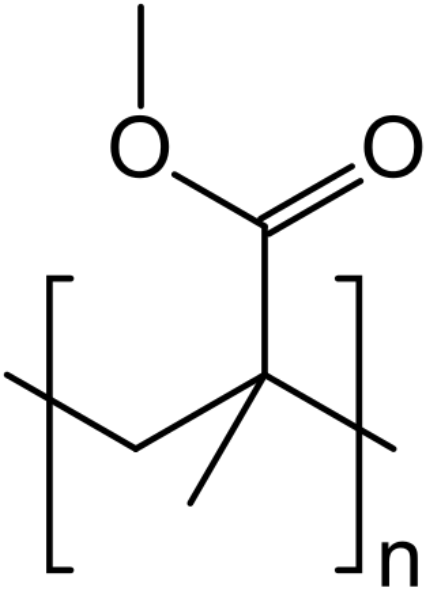


What Is Acrylic?

- Polymer of acrylic acid:
  poly (methyl methacrylate)



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.

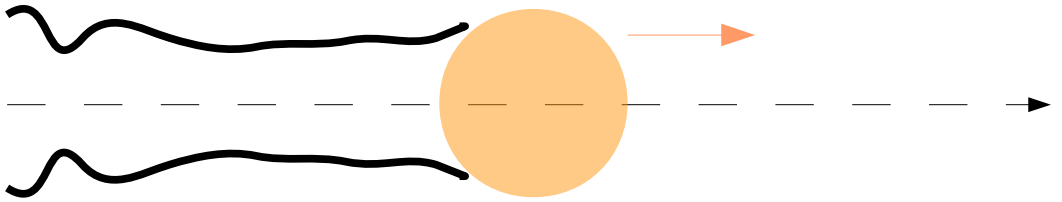
Acrylic vs. Other Plastics

- 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.