NEVER CUT THESE MATERIALS

Because *many* plastics are dangerous to cut, it is important to know what kind you are planning to use.

Material	DANGER!	Cause/Consequence
PVC (Poly Vinyl Chloride)/vinyl/pleather/artificial leather	Emits chlorine gas when cut!	Don't ever cut PVC, the chlorine release will ruin the optics and corrode the machine itself.
(>1mm) Lexan or Polycarbonate	Cuts very poorly, discolors, catches fire	Polycarbonate absorbs infrared radiation which is the frequency of light the laser uses to cut/engrave. It's a poor choice for laser cutting and creates clouds of soot that can ruin the optics.
ABS	Melts / Cyanide	ABS does not cut or engrave well as it melts rather than vaporizes. This gives it a higher risk of fire and dripping on the workspace. It also releases hydrogen cyanide, which is unsafe at any concentration.
HDPE/milk bottle plastic	Catches fire and melts	It melts. It gets gooey. It catches fire. Don't use it.
PolyStyrene Foam	Catches fire	It catches fire quickly, burns rapidly, melts, and only thin pieces can be cut. It is the #1 material that causes laser fires!
PolyPropylene Foam	Catches fire	Like PolyStyrene, it melts, catches fire, and the melted drops continue to burn and turn into rock-hard drips and pebbles.
Epoxy	burn / smoke	Epoxy is an aliphatic resin with strongly cross-linked carbon chains that a CO2 laser can't cut. The resulting burned mess creates toxic fumes. This includes items coated in Epoxy or cast Epoxy resins.
Fiberglass	Emits fumes	It's a mix of two materials that can't be cut. Glass (etch, no cut) and epoxy resin (fumes)
Coated Carbon Fiber	Emits noxious fumes	A mix of two materials. Thin carbon fiber mat can be cut, with some fraying - but not when coated.
Any foodstuff (meat, seaweed sheets, dough, bread)	Food safety, taste	The laser is not designed to cut food and is often used cut things that can create poisonous debris. If you want to cut foodstuffs, consider sponsoring a food-only laser cutter for the space that is kept as clean as a commercial kitchen would require.
Material with Sticky Glue Backing	Coats lens, cracks lens	There are many items that are usually laserable but become unusable when the manufacturer adds a layer of peel-off glue. Items such as cork tiles, laminate, acrylic tiles, or paper stickers can cause issues. The glue vaporizes and forms a coating on the optics that can crack, damage, or cloud it. The residue is worse than resin and you will likely have to replace the lens.

SAFE MATERIALS

The laser can cut or etch. The materials that the laser can cut materials like wood, paper, cork, and some kinds of plastics. Etching can be done on almost anything, wood, cardboard, aluminum, stainless steel, plastic, marble, stone, tile, and glass.

Material	Max Thickness	Notes	**WARNINGS!**
Many woods	1/4"	Avoid oily/resinous woods	Can catch fire
Plywood/Composite woods	1/4"	These contain glue, and may not be laser cut as well as solid wood.	
MDF/Engineered woods	1/4"	These are okay to use but may experience a higher amount of charring when cut.	
Paper, card stock	thin	Cuts well on the laser cutter, and also very quickly.	
Cardboard, carton	thicker	Cuts well but may catch fire.	Watch for fire.
Cork	1/8"	Thin cork can be cut, but the quality of the cut depends on the thickness and quality of the cork. Engineered cork has a lot of glue in it and may not cut as well.	Avoid cutting thicker cork (5mm). Engraves well, cuts poorly.
Acrylic/Lucite/Plexiglas/ PMMA	1/2"	Cuts extremely well leaving a beautifully polished edge.	
Thin Polycarbonate Sheeting (<1mm)	<1mm	Very thin polycarbonate can be cut, but tends to discolor badly. Extremely thin sheets (0.5mm and less) may cut with yellowed/discolored edges. Polycarbonate absorbs IR strongly, and is a poor material to use in the laser cutter.	Watch for smoking/burning
Delrin (POM)	thin	Delrin comes in a number of shore strengths (hardness) and the harder Delrin tends to work better. Great for gears!	

Kapton tape (Polyimide)	1/16"	Works well, in thin sheets and strips like tape.	
Mylar	1/16"	Works well if it's thin. Thick mylar has a tendency to warp, bubble, and curl	Gold coated mylar will not work.
Solid Styrene	1/16"	Smokes a lot when cut, but can be cut.	Keep it thin.
Depron foam	1/4"	Used a lot for hobby, RC aircraft, architectural models, and toys. 1/4" cuts nicely, with a smooth edge.	Must be constantly monitored.
Gator foam		Foam core gets burned and eaten away compared to the top and bottom hard paper shell.	Not a fantastic thing to cut, but it can be cut if watched.
Cloth/felt/hemp/cotton		They all cut well. Our lasers can be used in lace-making.	Not plastic coated or impregnated cloth!
Leather/Suede	1/8"	Leather is very hard to cut, but can be if it's thinner than a belt (call it 1/8").	Real leather only! Not 'pleather' or other imitations that are made of PVC.
Magnetic Sheet		Cuts beautifully	
NON-CHLORINE-containing rubber		Fine for cutting.	
Teflon (PTFE)	thin	Cuts OK in thin sheets. See ulsinc.com/materials/teflon ; the issues listed in en.wikipedia.org/wiki/Polymer_fume_fever should not matter because our lasers are fully vented and exhausted.	
Carbon fiber mats/weave		Can be cut, very slowly.	Do not cut carbon fiber that has been coated!!
Coroplast ('corrugated plastic')	1/4"	Difficult because of the vertical strips. Three passes at 80% power, 7% speed, and it will be slightly connected still at the bottom from the vertical strips.	

Etching

All the above "cuttable" materials can be etched, in some cases very deeply. In addition, you can etch:

Material	Notes	WARNINGS!
Glass	Green seems to work best...looks sandblasted.	Flat glass should be engraved in our cutter as we have no rotary device. Round or cylindrical objects like bottles or glasses will have distortion.
Ceramic tile		
Anodized aluminum	Vaporizes the anodization away.	
Painted/coated metals	Vaporizes the paint away.	
Stone, Marble, Granite, Soapstone, Onyx.	Gets a white "textured" look when etched.	100% power, 50% speed or less works well for etching.

Marking

Cermark is the brand name of a marking compound containing molybdenum which can be sprayed onto stainless steel, brass, aluminum, copper, nickel, glass or light-colored stone/tile before being etched to leave behind a permanent dark black mark. Some people have had some luck using dry moly lube spray to the same effect. It is thought that the molybdenum sulfate in the dry lube breaks down to molybdenum which either oxidizes or reacts with the underlying surface to create the mark.