



***LASER
ENGRAVING
&
CUTTING
GUIDE***



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1. Steps for Ordering Laser-Cut Parts

Once you have a design for a custom part, getting it laser cut is relatively simple. Upon receiving your design, we typically ship within five business days, and we can ship as quickly as the same day depending on product availability. Here are the steps involved in making a custom part:

1. You prepare the vector drawing files of your custom part. (See [Section 5](#) for information on preparing your files.)
2. You send us your designs sales@creativetrophies.ca.
3. We email you a quote within 1-2 business days (faster for expedited parts).
4. You confirm a PDF proof and order the parts.
5. After we receive payment, we cut the parts and send them to you!

2. Pricing for Laser Cutting

The cost of a laser-cut part is determined by how long the parts take to cut on the machine, the amount of labor involved (unloading and verifying parts), and the amount of risk involved in cutting a part (multiple medium-sized pieces are less risky to cut than a single large piece that takes hours to cut).

Here are some factors that affect the price of laser-cut parts:

- **Laser cutting cost:** The laser cutting charge is based on the time it takes to cut the parts, which depends on the material type and thickness. For example, cutting 1/8" acrylic starts at \$0.10 per inch. There is a \$25 minimum charge per job. We do lower charges for simple parts or for large quantities.
- **Laser engraving cost:** Raster engraving and vector engraving start at \$0.66 per square inch. Raster engraving larger areas cost less. Long, continuous vector engraving lines cost roughly \$0.08 per inch. We do provide discounts off of these rates on a case-by-case basis.
- **Material costs:** We stock various plastics, acrylics and woods which we sell by the square inch. You may also send us your own material or have a supplier ship it to us directly.
- **Minimum order:** There is a \$25 minimum order per material type (the minimum includes charges for labor and materials). We do lower this minimum if your design is simple or if your quantities are large.
- **Shipping:** We can add shipping costs to your invoice or charge to your courier account.
- **Optional charges:**
 - **Expediting services:** Rushing an order costs 20% – 50% more (on top of the standard-turn price) per expedited day, depending on what your standard turn time is. The standard turn time for most parts is 3-5 business days.
 - **File creation:** \$60 per hour with a \$25 minimum

- **Handling fee:** Large or delicate parts that require custom packaging will incur a handling charge.
- **Exceptions:** We do make exceptions to our minimums and pricing depending on the parts. If your parts are particularly simple to handle and cut, we will provide more competitive pricing. On the other hand, we are less likely to discount our rates if your parts are more difficult or risky to cut, such as:
 - Single large or complex parts that take a long time to cut
 - Parts that involve a lot of careful or tedious handling (such as very small parts or fragile parts), which are more time consuming to verify and unload from our machines.
 - Parts that have many small, sharp, acute angles and small details.
 - Parts that have many disjointed cuts (such as an array of small holes), which take longer to cut since the laser cutting head has to stop and move from cut to cut more often than when it cuts along a continuous path.

Expediting costs for laser cutting

The standard turn time for most parts is 3-5 business days, assuming you do not need many hundreds or thousands of parts. If you need the parts more quickly, we generally charge 20% – 50% more per expedited day depending on the standard turn time (the percentage is such that the minimum turnaround will cost double the standard turn price). Here are examples for cutting a minimum order of parts with a standard 3-day turn and standard 5-day turn:

Sample prices for expedited service on a 3-day standard-turn order:

Turn time	Price
3 business days	\$25 base price for standard turnaround time
2 bus. days	\$33.25, added 33% (\$8.25) to base price
1 bus. days	\$41.50, added 66%
Same-day service	\$50, added 100% (double the price of standard turnaround)

Sample prices for expedited service on a 5-day standard-turn order:

Turn time	Price
5 business days	\$25 base price for standard turnaround time
4 bus. days	\$30, added 20% (\$5) to base price
3 bus. days	\$35, added 40%
2 bus. days	\$40, added 60%
1 bus. day	\$45, added 80%
Same-day service	\$50, added 100% (double the price of standard turnaround)

To place an expedited order, email your order with laser file attachments and mark 'High Importance', indicating that you would like your order to be expedited. After receiving your quote, you will be given a list of expedited options for the order.

File creation costs for laser cutting

If you are not able to provide a vector-format file of your parts for laser cutting (CDR, AI, DXF, DWG, SVG, or PDF vector file), we might be able to draw your part on the computer for you for \$60 per hour with a \$25 minimum.

To request a quote that includes file creation, please submit a standard file type in the quote request form that communicates exactly the part you need. The file can be any file type that we can read, such as a text file with a written description, a scan of a hand sketch (JPG, GIF, BMP, PDF), a mock-up in Word, Paint, or Excel, etc. For more information, please see [Section 5](#).

CREATIVES

3. Materials for Laser Cutting

We can laser cut plastics, woods, rubbers, foams, leathers, cards, papers and much more, as long as they do not contain chlorine. Depending on the material, there is usually no limit to the thinnest sheet we can cut, and the thickest sheet we can cut is typically 1/2" (12 mm). We stock various plastics, acrylics, woods and leathers, and you are welcome to drop off material or have suppliers ship us material directly.

3.a. Materials we can laser cut

We can cut the following materials. If you do not see your material listed, we would be happy to try cutting it as long as it does not contain chlorine.

- Plastics:
 - [ABS](#) (acrylonitrile butadiene styrene)
 - [Acrylic](#) (also known as Plexiglas, Lucite, PMMA)
 - [Delrin](#) (POM, acetal)
 - High density polyethylene (HDPE) – melts badly
 - Mylar (polyester)
 - Nylon – melts badly
 - [PETG](#) (polyethylene terephthalate glycol)
 - Polyethylene (PE) – melts badly
 - Polypropylene (PP) – melts somewhat
 - Styrene
 - Two-tone acrylic – top color different than core material, usually for custom instrumentation panels, signs, badges and plaques. See [Colour Chip Chart](#)
- Foam:
 - Depron foam – often used for RC planes.
 - EPM
 - Gator foam – foam core gets burned and eaten away compared to the top and bottom hard shell.
- Other:
 - Cloths (leather, suede, felt, hemp, cotton)
 - Magnetic sheets

- Papers
- Rubbers (only if they do not contain chlorine) – like used for rubber ink stamps.
- Teflon (PTFE, Polytetrafluoroethylene).
- Woods (MDF, balsa, birch, poplar, red oak, cherry, holly, etc.),

3.b. Materials we cannot laser cut

We do not or cannot cut the following materials:

- Metals – We cannot cut through any metals. We do stock an acrylic-based, dual-tone plastic with a faux-metal finish on one side – see [Colour Chip Chart](#). If you need metal parts, you might consider a water jet cutting service.
- Polycarbonate (PC, Lexan) – we stopped cutting Lexan due to the fumes.
- Any material containing chlorine
- PVC (Cintra) – contains chlorine
- Vinyl – contains chlorine
- Glass – we can engrave glass, but we cannot cut it.
- Fiberglass
- Printed circuit board (FR4 and other material types)
- Carbon fiber
- High-density polyethylene (HDPE) thicker than 1/16" – We are unable to cut HDPE thicker than 1/16", and HDPE of any thickness melts badly when laser cut.

3.c. Some of the various acrylics we stock

- **Two-tone acrylic/abs stocked:** We also stock many two-tone acrylics (in 1/64", 1/32", 1/16" and 1/8" thicknesses).
- **Mirrored acrylic** in silver, red, yellow, green, purple, blue, teal, bronze, pink, and gold, all available in 1/8".
- **Marble acrylic** in Blue, green and red, in 1/8"
- **Edge glow acrylic** in cyro red/orange, cyro blue and cyro green, in 1/8"
- **Clear cast/extruded acrylic** in various thicknesses. Cast acrylic engraves a beautiful white, either on the front or reversed on the back. (Same effect on glass and crystal) Please note: extruded acrylic engraves clear.

3.d. General information about some plastics

We mainly laser cut the following plastics, for which we have provided some additional information:

Acrylic (Plexiglas)

Acrylic, also known as PMMA, is a type of plastic with a variety of brand name manufacturers, including Plexiglas, Lucite, Acrylite, and Optix. We stock different brands depending on what our suppliers carry. We can cut up to 1/2" acrylic. The thicknesses in inches of acrylic is nominal; the actual thicknesses are in millimeters and vary by + or – 10% within the same sheet.

Acrylic is the cheapest plastic to laser cut. It is attractive (it has a glossy surface), comes in a variety of thicknesses and colors, and the edges of laser-cut acrylic have a “laser-polished” look. Acrylic is somewhat brittle (you have to be careful not to crack if you want to drill holes after laser cutting; it is better to have us laser-cut all screw holes and mounting holes). Acrylic parts will crack or chip (especially at sharp corners) if you drop them on a hard surface. Acrylic usually comes with a paper masking on both sides.

Acrylic is manufactured in two main ways: via casting or extrusion. Extruded acrylic has a lower melting point than cast acrylic, so extruded acrylic tends to have a shinier, polished finish when cut. We mainly stock extruded acrylic for this reason. However, we do stock some cast acrylic since cast acrylic is better for engraving (the engraved portions of cast acrylic become a milky-white, sand-blasted version of the original color).

Acrylic comes in a variety of thicknesses. It is available in transparent, translucent, and opaque colors, including neons, fluorescents, and mirrored colors. If we do not stock the thickness or color you need, we can special-order it for you from our suppliers, or you may have it shipped to us.

Two-tone acrylic (with a thin, top layer that is a different color than the core material) is available for parts that require high-contrast engraving such as instrumentation panels, signs, and plaques – see [Colour Chip Chart](#).

Acrylic is transparent to infrared light (IR), so it is not appropriate for IR-sensing applications. You can glue acrylic together using special acrylic glues such as Weld-On. Please contact your local hardware store and ask for glues used for acrylic or Plexiglas.

Our customers have made the following types of parts with acrylic:

- robot parts and chassis
- computer case parts
- computer fan grills
- custom jewelry and charms
- custom stencils
- luthier templates and tools
- instrument inlays
- instrument-making tools

- enclosures for electronics
- custom ornaments
- trophies
- custom awards
- custom gifts
- custom trinkets
- custom model railroad parts
- other scale model parts
- custom art pieces
- custom sign lettering and logos

ABS (acrylonitrile butadiene styrene)

ABS comes in black or white, with one side smooth, and the other side textured. The texture is called a “hair cell texture” and is similar to the texture on the sides of older refrigerators. We have cut up to 1/4" ABS. We can probably cut thicker ABS, but we have not tried. The thickness in inches of ABS is nominal; the actual thicknesses are in millimeters and vary by + or – 10% within the same sheet.

ABS does not come masked. If you would like us to mask it during cutting, please request this in the special instructions section of our quote request form. ABS is opaque to infrared light (IR), so it can be used for IR-sensing applications.

ABS is easy to machine and is not brittle (it will bend quite a bit before it cracks). ABS parts will not crack or break easily, even if you drop them. Legos, many computer peripherals, and graphing calculator cases are made from ABS. ABS is less rigid than acrylic, and is somewhat soft. You can glue ABS parts together using sticky, black, ABS glue available at hardware stores. With ABS, you can design parts that snap together by making tabs with small “hooks” or “feet” that fit into slots that are slightly smaller than the feet (so they stay hooked in to the slots).

Laser-cut ABS parts tend to smell, so you might have to air them out for a few days and wipe dust and residue from the edges. Do not attempt to clean ABS parts in your dishwasher (the parts become discolored).

Other customers have made laser-cut encoders, sturdy robot chassis, instrumentation panels, gears, and sprockets using ABS.

PETG (polyethylene terephthalate glycol)

PETG usually comes with a thin, plastic, film masking on both sides. It is not brittle (it will bend quite a bit before it cracks), and PETG parts will not crack or break easily, even if you drop them. PETG is less rigid than acrylic, and is somewhat soft.

Laser-cut PETG parts tend to smell, so you might have to air them out for a few days and wipe off any dust and residue with warm water.

Other customers have laser cut PETG to make very thin grids/nets for scientific experiments and guards for pinball machines to protect the pinball parts from the impact of the pinballs.

How to supply your own material for laser cutting

If you plan to supply your own material, please mention this in the special instructions section in our quote request form, and also specify the sheet size of the material you plan to supply. Material sheets must be no larger than 24" x 18". Please send the material to our address as shown on our contact page.

If you are sending the material yourself, please include a note that has your full name, day-time phone number, quote number, and email address that you check regularly. The material must be very flat (not bowed, warped, or rolled; otherwise the laser cannot focus properly).

If a material supplier is shipping to us directly, please be sure they include your full name and quote number in the attention line in the address. If possible, the shipping receipt, label, invoice, or packing list should also include your day-time phone number. Please instruct the supplier to select the flattest material and ship it flat, not rolled, folded, or bent.

It is always good to supply extra material just in case something goes wrong with the cutting, and for testing and calibration purposes, especially if you are sending material we have not cut before. If you would like us to ship excess material back to you, please let us know.

4. Capabilities and Limitations of Custom Laser Cutting

With our custom laser cutting service, you can create custom, two-dimensional plastic parts suitable for a variety of projects. We can laser cut almost anything you can draw, including sharp angles, smooth curves, small screw holes, and complex lace designs, and we can also laser engrave text, logos, and photos on to your parts.

We can...

- Cut up to 1/4" acrylic or wood comfortably, and up to 1/2" acrylic or wood under special circumstances.
- Cut very thin materials including 0.003" mylar sheets
- Cut, raster and vector engrave parts up to 24" x 18" economically and larger parts if required.
- Cut holes as small as the laser beam widths, around 0.01"
- Use a variety of file types including CDR, AI, PDF, DXF, DWG, and SVG.
- Draw parts for you based on a sketch
- Cut just one part or thousands of parts, and anything in between (we do provide price breaks)

Materials

We do many laser cut custom plastic, wood, rubber, and foam parts. We stock many colour variations of plastics, see our [Color Chip Chart](#). You may also drop off your own material. Please see our [Materials for Laser Cutting section](#) for a complete list of materials we can cut.

We cannot cut metals, glass, polycarbonate (Lexan), carbon fiber, or any material containing chlorine, including PVC and vinyl. Please see [materials we cannot laser cut](#) for a comprehensive list. If you need a metallic look, we do stock two-tone acrylic-based sheets with a thin, faux-metal top layer. See our [Colour Chip Chart](#)

Two-dimensional parts

We can only laser cut two-dimensional parts, but you can create three-dimensional designs from flat pieces with tabs and slots and some glue, brackets, and screws.

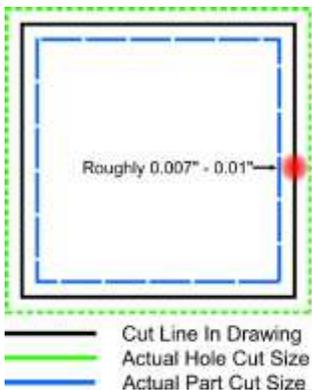
You might try Weld-On acrylic adhesives for gluing acrylic/Plexiglas parts. Hardware stores usually carry thick, black glue for gluing ABS parts. You must take care when drilling holes in acrylic, which is brittle and tends to crack (it is better to have us laser-cut small screw holes). ABS, PETG, styrene, and wood are easier to machine by hand.

Laser engraving

We can do two types of laser engraving (also called laser etching): vector engraving and raster engraving. Engraving depths can range from barely scratching the surface to almost going through the material; we cannot control the depths very precisely, but we will try our best to achieve what you need. In general, laser engraving is suitable for marking material (not for making deep grooves for mechanical purposes).

- Vector engraving is for etching lines that are the width of the laser beam (around 0.01"); it is just like laser cutting, but the laser does not cut all the way through the material. Vector engraving is limited to line art.
- Raster engraving is slower and more costly than vector engraving, and is used for engraving bitmaps (JPG or GIF files of logos, photos, etc.), text, and filled-in areas of your vector drawing file. Raster engraving is more flexible; you can engrave thin lines as well as recessed areas. The laser blasts away material one pixel at a time, similar to the printing process used by inkjet printers. We usually raster engrave at 600 dpi, but we can use other resolutions at 200 dpi, 400 dpi and 1200 dpi settings.

Issues to consider



The kerf of our laser beams varies from roughly 0.007" to 0.01" which causes hole and part sizes to vary.

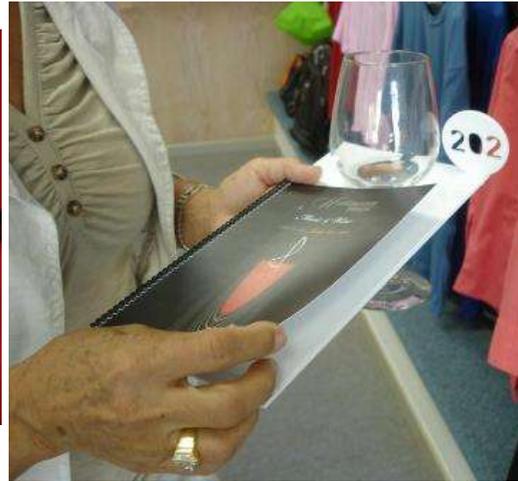
- The laser cuts at a slight taper (1-2 degrees) since the laser beam is shaped like a cone (it gets focused from a larger spot to a small point). The tapering causes one side of a laser-cut part (the side facing up during laser cutting) to be slightly smaller than the other side. The taper is almost unnoticeable in 1/8" material; the thicker the material, the more noticeable the taper. When using laser-cut parts such as wheels or gears, you might need to position the parts in an alternating pattern so that the tapers "cancel out".
- The kerf (the thickness of the laser beam) is about 0.010". [Please see our file preparation instructions to learn how to adjust for the kerf.](#)
- Small circles (usually for screw holes) will not be perfectly circular, but very close. Also, the holes will be conical due to the slight taper of the laser cut as described above. If you need the holes to be more circular and cylindrical, we suggest that you have us laser-cut small starter holes, which you clean up with a drill.

- Plastic thickness can vary by + or – 10%, so you cannot count on the thickness to be exact when designing your parts. If you are designing interlocking parts with slots and tabs and you are trying to create a tight fit, keep in mind that you can only control the dimension being cut by the machine (not the material thickness). You will have to decide whether to design the part so that the dimensions you control are slightly too big or too small (so that to achieve a tight fit, you might have to either sand some parts, or use glue or add some shims).
- The edges of some materials including wood, paper, felt, and cloth, will get charred from the laser. The degree of charring depends on the material. The back side might show more charring or some scorching (the laser bounces off of the metal grill on which the material sits and hits the back of the material, leaving scorch marks). You can mask the material to decrease the charring and scorching on the material surface, but the edges will still have a small amount of charring. Most plastics that we cut, including acrylic, PETG, and ABS, do not char.
- Sharp, thin pieces, especially those that taper to a needle-sharp point, might warp from the laser's heat, or crack when taken out of the scrap. This is true especially if the width of a piece is the same or less than the material thickness.
- If you have parts that taper to a thin, sharp point, note that once the two converging lines are closer than 0.01" apart, the laser beam (which is roughly 0.01" in diameter) will eat away any material left between the two lines. The material at the end of the tip will become paper-thin and brittle and will probably break off in an unpredictable spot. We would suggest that you round off any acute, sharp corners where the two converging lines are no less than 0.018" apart.
- The material sits on a metal grid during cutting. When the laser cuts through the material, it hits the metal grill and bounces back and hits the bottom of the material, causing a small dent or mark. The backs of the parts will usually have small dents along the cut edges of the part wherever the laser, metal grid, and material meet.
- Many plastics including acrylic come with a protective masking on both sides. Other plastics, such as ABS and styrene, do not have any protective masking. The masking helps to decrease denting on the back side described above, and protects the material surface from any flames or residues that are created during cutting. If you would like us to mask your material, please request this in the special instructions section of our quote request form.

[To order custom laser cut parts, see information in Section 5 about file setup.](#)

5. Instructions for Laser Cutting File Setup

Wine glass holder for booklet, with auction number disc.



Accepted file types for laser cutting

We use CorelDRAW X5 to draw and laser-cut parts. We can also use files from a variety of other programs as long as you can export or save as one of the vector-format file types below.

File types if your parts or layouts are less than 18" x 24" or, and are 1/4" or thinner

- CDR (CorelDRAW) version X5 or earlier
- AI (Adobe Illustrator) version CS or earlier
- DXF compatible with AutoCAD version 2004 or earlier
- DWG (we work with DWG files compatible with AutoCAD version 2004 or earlier, but we can convert newer versions to an older version for you if necessary)
- EPS
- PDF
- SVG
- The file can contain any type of curve or line

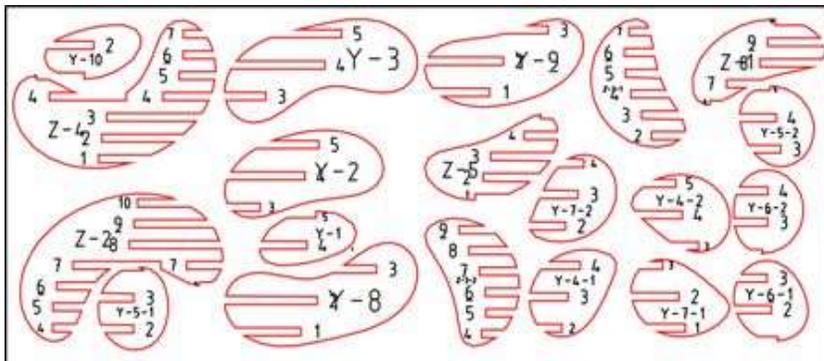
Other file types

We might be able to use other vector drawing file formats not listed above; you are welcomed to send a different file type via the quote request form (if we cannot open it, we will let you know). If in doubt, please send a PDF or EPS file compatible with CorelDRAW X5 (most programs let you "Save as" or "Export" to this file type and have a "Set up" or "Advanced" option

to set the PDF version compatibility). If you need us to create a file for you, please see the topic below about [setting up a sketch or mock-up](#).

Laser cutting file set up instructions

If you would like to create a laser cutting file for your parts using a program such as CorelDraw, Adobe Illustrator, Turbo CAD, AutoCAD, or Open Office Draw, please set up your files as follows:



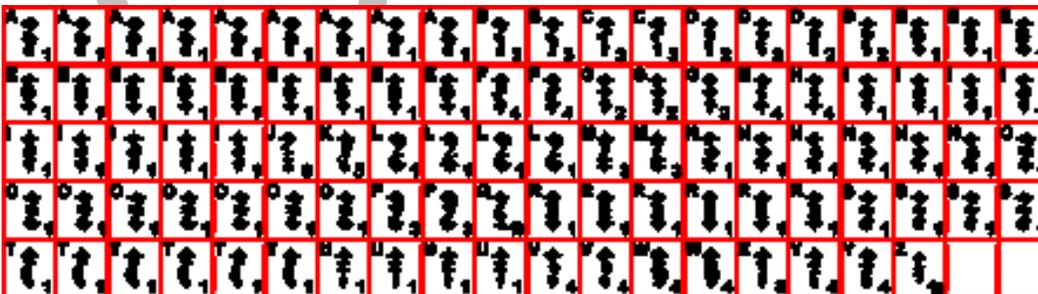
3D Doughnut puzzle

- **Cut lines** – Draw thin, red lines where you want the laser to cut; the laser will cut down the center of your lines. In CorelDRAW, the lines should be “Hairlines”. In TurboCAD, the line thickness should be 0. In other programs, be sure the cut lines are 0.003 inches wide or less.
- **Size reference** – Include and label a one-inch square size reference in your file and if possible add a few dimensions to specific widths.
- **Standard layout areas** are listed below. The parts shown below were laid out in a 11.75" x 23.75" area. Be sure to leave at least 0.05" between adjacent parts in your layout (for materials thicker than 1/4", adjacent parts should be no closer together than the material thickness). If you need a different layout area, we can use any sheet size up to 18" x 24" (Ideal 12"x24") that can be cut from a 48" x 96" sheet, in which case the layout must have at least a 1/4" border all the way around.
- **Laying out your own parts** – If you would like to lay out your own parts, please include the layout in a different area in your file (away from the single copies of each unique piece) and label it as your layout. (If you have many small, unique pieces in your layout, you do not have to separately include a single copy of each part and state how many of each you need; the layout by itself will suffice.)
- **Send only one file for each material** – The file should include one copy of each unique part with indications of how many of each you need, and the material from which they should be cut. This information can either be text in the file, or explained in the special instructions section of the quote request form. Please make sure to leave enough space around every part so that we can easily select them by dragging a rectangle around them.
- **Multiple files** – If you must send more than one file for a single design, you may submit them together. Please clearly explain what you would like us to do with each file in the special instructions section of the quote request form.

- Choose a unique name for your file – something like “john-douhnut-2.cdr” is much better than “laser-cut-part.cdr”.
- Line sharing – When setting up a layout that includes line sharing (two parts right next to each other so that they share a single cut line), please be sure to delete any redundant copies of lines. If you have lines stacked on top of each other, though you might not be able to see them in your file, the laser cutter will see the paths and end up cutting twice along the same line, degrading the final part (and possibly causing melting or warping).
- Saving cut outs – If you need the cut outs that fall out from your main parts, please specify this in your file or in the special instructions field in the quote request form.
- Sharp corners – If you have any sharp corners, you might consider rounding them (called “adding a radius” to a corner, or “adding a fillet”) so your parts will be less likely to crack around the corners. We can certainly cut your parts with sharp corners if you prefer.
- Adjust for kerf – You may want to adjust for the kerf (the thickness of the laser beam), which is about 0.01". (The laser centers itself on the lines you draw and takes off about 0.005" of material from either side of the lines.) For example, if you would like the hole in your part to have a diameter of roughly 1.0", you should draw a hole with a diameter of 0.99". If you would like a circular part with a diameter of about 3.0", draw a circle with a 3.01" diameter. (These numbers are approximate and can vary depending on the material and its thickness.) In CAD programs, this can be achieved using an offset of 0.005".
- Small details should be no smaller than material thickness. For example, if you are cutting a spider web pattern from 1.5 mm acrylic, the thin pieces of plastic that make up the web must be no thinner than 1.5 mm wide in your drawings. Note that the laser beam thickness will cause the final piece to have webs that are slightly less than 1.5 mm wide. We can attempt to cut thinner pieces than this general rule of thumb allows, but the part will likely warp and be very fragile.
- Text should be converted from a font to line art (often called “breaking apart text to lines or polylines” in CAD, or “converting text to curves” in other drawing programs). Otherwise, if we do not have the font you are using, our programs will substitute your font with a different one.

Laser engraving file set up instructions

We can do two types of laser engraving (also called laser etching): vector engraving and raster engraving. Please note the following when setting up your files for engraving:



- Vector engraved lines should be indicated with different RGB colors (each color indicating a different engraving depth) as shown in this file of Vulcan Scrabble tile set with vector cuts shown in red and the engraving in black. Please group all items of the same color and indicate the approximate engraving depths that you would like for each color. We can also vector engrave parts up to 18" x 24".
- Raster-engraved areas in your file should not have an outline around it (otherwise the laser may cut along that outline – convert all raster lines to curves). The depth of the engraving is specified by the gray-scale color of the pixel (black gets engraved the deepest, gray is engraved to medium depth, and white is left un-engraved). Please specify the depth of the black (deepest) portions of your image and color everything else with the appropriate grays (50% black will get engraved about half as deep as the black portion). We can raster-engrave parts that are up to 18" x 24".
- Engraving depths – We can vary the laser speed and power to change the raster engraving and vector engraving depths. If you just want your engraving to be clearly visible, we recommend that you allow us to select the appropriate engraving depth (usually very shallow, just scratching the surface of the plastic enough to leave an attractive, clearly visible engraving). If you must have particular depths, please let us know the rough depth you would like (for example, "vector engrave blue lines to be about 1/32" deep, green lines just enough to be clearly visible, and raster engrave black areas to be about 1/64" deep). We will try our best to achieve the depths you specify by playing with the laser speed and power, but note we cannot guarantee any particular accuracy with engraving depths. Raster and vector engraving are best for making cosmetic markings and are not suitable for making mechanical grooves and features with precise depths.
- Front or back engraving – We can engrave clear and transparent plastic from the front or back of the material. When engraving from the back, we will be sure to set up your file correctly (mirror image) so that any text and all images look correct when viewed from the front. Mirrored acrylic is typically engraved from the back (the matte gray side) so that when you look at the piece from the front, mirrored side, you can see the engraved areas that have been etched away in the mirror substrate.
- Text for engraving should be converted from a font to line art (often called "breaking apart text to lines or polylines" in CAD, or "converting text to curves" in other drawing programs). Be sure to fill the line-art text black and remove any thin, black outlines that would otherwise get cut.
- Protective masking – We typically remove the paper masking on acrylic when engraving (to avoid goo-ing up the engraving with the glues in the masking, and to make peeling the masking easier for you), and we re-mask the material during cutting (to protect the plastic from residues that are created during cutting). You might consider requesting that we engrave with the masking left on if you plan to paint the engraved areas a different color (so that the masking will serve as a mask during painting). If you need a high-contrast engraving, you might consider using two-tone acrylic (top thin layer is a different color than the core).
- Files with cutting, raster engraving, and vector engraving – We can laser cut, vector engrave, and raster engrave a part all as a single job. All images, lines, text, etc. to be raster engraved or vector engraved should be a part of the same file as the cutting file (see the above section about laser cutting file set up for details). You do not need to split the cutting and engraving among different files.

Programs for drawing laser-cut parts

We mainly use CorelDraw X5 to draw and cut parts. We can also open files from a variety of other programs (please see our accepted file types above). If you need a program to draw your parts in vector-format, here are a few free trials or completely free programs to try:

- Open Office Draw: This free vector-graphics drawing software is part of a free office suite, OpenOffice.org. You will have to download the entire suite of programs to use Open Office Draw. We can use PDF files saved in this program to cut parts less than 18" x 24" and no thicker than 1/4".
- Inkscape: This free vector-graphics drawing software is available at <http://inkscape.org/>. Please be sure to include a 1" square size reference in your SVG file generated from Inkscape, as sometimes there are scaling issues when opening SVG files in the software we use.
 - CorelDRAW trial version: You can download a free trial of this vector-graphics drawing software (with capabilities similar to Adobe Illustrator) at www.corel.com. Please save your file as version X5 or earlier before submitting them for a quote so that we can open it. We can use CDR files from this program to cut parts less than 18" x 24" and no thicker than 1/4".
- TurboCAD professional trial version: You can download a free trial of this CAD software at www.turbocad.com. Please save your file as a DXF. You can access this option in TurboCAD in the "Save As" window under a "Setup" button or tab. Please see accepted file types above to learn about certain restrictions on the file for larger parts.

Setting up a sketch or mock-up (if we are drawing your parts for you)



To laser cut parts, we will need one of the accepted file types listed above. If you would like us to draw your parts on the computer for you, you will need to prepare a mock-up file of your parts or a file with a written description communicating the parts you need. The file can be any file type that we can read, such as a text file with a written description, a scan of a hand sketch (JPG, GIF, BMP, PDF), a mock-up in Word, Paint, or Excel, etc.

To request a quote that includes file creation, please submit your file in the quote request form and mention that you need us to draw your parts in the special instructions field. File creation costs are listed at our laser cutting pricing page.

Please follow these guidelines when preparing your mock-up file:

- Written descriptions should include all sizes of parts, quantities required, and material types and colors for each part. For example:

Quantity	Material	Description
2	1/8" alder wood	Circle diameter 3"
8	1/16" black plastic	5" x 5" square with four 1/8"-diamter mounting holes in the corners (center of mounting holes should be 1/2" away from the corners of the square)
10	1/8" white acrylic	Circle diameter 10" with 1/4" center hole, will supply the acrylic in 12" x 12" sheets, will ship a few extra sheets just in case, material will be coming from J

- If you are drawing a sketch by hand, please scan your drawing and send the resulting JPG, GIF, BMP, or PDF file. Kinko's, Office Max, Office Depot, or any copy shop should be able to make a scan for you.
- Mock-ups and scans should include all relevant dimensions (be sure to indicate the units of measure you are using). Please try as much as possible to make your drawings close to scale.
- When showing the location of a hole, please specify the distances from the hole center to the nearby edges of the part.
- Include the quantity required for each part.
- Include the material type, thickness, color, and supplier for each part. You can see the materials we stock at our materials page. If you will be supplying the material, please specify the sheet size you will be sending.
- If you need to send more than one file, please zip the files.

To order custom laser cut parts, proceed to the [quote request form](#).

6. Examples of Custom Laser-Cut Parts

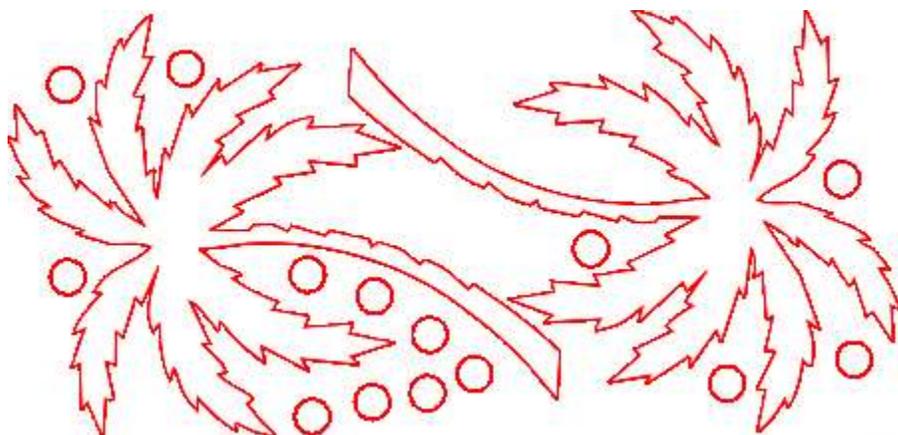
We can cut almost any two-dimensional part that you can draw. We have made many types of custom laser-cut parts, including:

custom jewelry and charms	custom sign lettering and logos
custom robot parts	custom ornaments
custom stencils	custom trophies
encoder wheels	custom awards
custom computer case parts	custom gifts
custom computer fan grills	custom trinkets
custom instrumentation panels	custom gaskets
luthier templates and tools	custom art pieces
instrument inlays	custom radio control airplane parts from balsa wood
instrument-making tools	custom model railroad parts
custom enclosures	other scale model parts

Browse the following sections to see some examples of laser cutting projects.

6.a. Laser Cutting Example: Palm Trees

The drawings for the two palm trees and dots are shown below, followed by a cost breakdown.

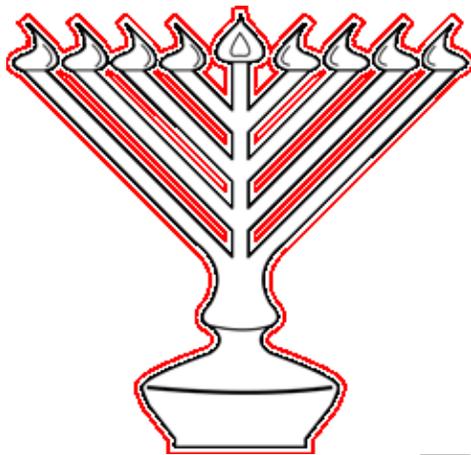


These custom laser-cut palm trees and dots were cut from 0.25" blue acrylic and inlaid into a white acrylic custom planter base that was back lit so the palm trees and dots light up. The cutting work used the same file for the planter base and allowed for the kerf (width of the laser beam cut)

Pricing

ONE set of 0.25" blue acrylic parts for the minimum order: | \$25.00

6.b. Laser Engraving & Cutting Example: Minora Ornament created from a picture



Our custom laser-cutting service is not just for robot enthusiasts; it can be for anybody with a creative project requiring custom parts! This custom ornament was laser engraved and cut from 0.125" silver mirrored acrylic and was designed to be used as gifts for attending dignitaries celebrating the first annual lighting of a large metal minora in a city park. The customer provided us a photograph of a similar style, which we referenced to draw this design on the computer to create a file suitable for laser engraving and cutting, then we mounted them onto clear acrylic bases and then onto red marble trophy bases . The decoration was cut from 0.125" silver and gold mirrored acrylic, and is 6.5" wide and 6.25" high. Once we have laser cutting file, we can easily re-use the same file to cut a smaller or larger version of the part — we could cut the same design to be as high as 12".

Pricing

- One-time laser cutting file creation fee (since customer could only provide a picture):	\$25.00
- ONE of this custom minora ornament (excluding bases) minimum charge:	\$25.00
- TWO of this ornament (excluding bases):	\$39.95
- FIVE of this ornament (excluding bases):	\$88.35

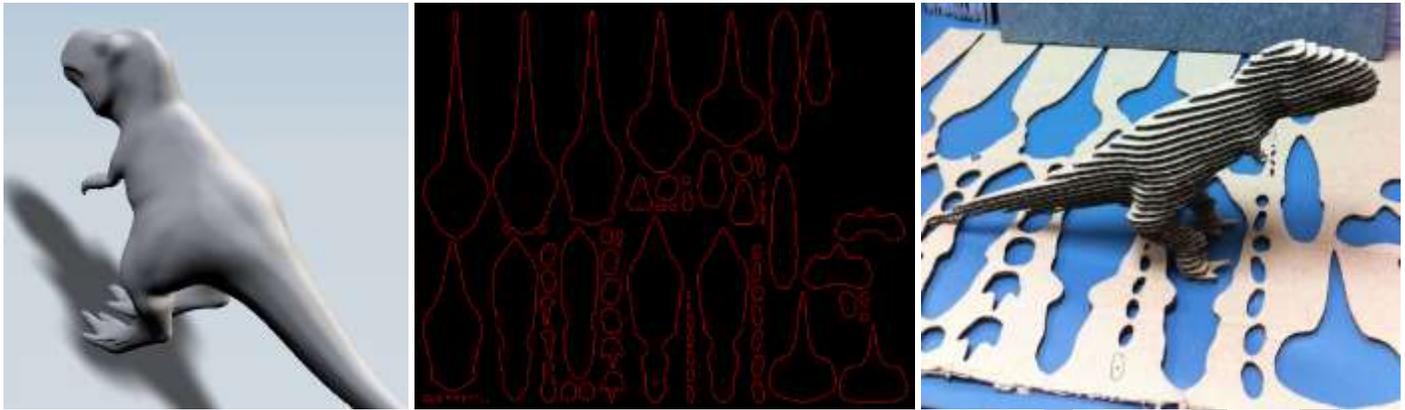
6.c. Laser Cutting Example: ZAP sticker in 0.004" red/white plastic.

This custom low profile plastic sticker was originally supplied as just a sketch. We scanned it into our drawing program and converted it to a vector file, then sized it 6" x 8" and cut ten out of 602-206T red/white thin core (0.004" with adhesive). See our [Colour Chip Chart](#) for other colours and thicknesses.

Pricing

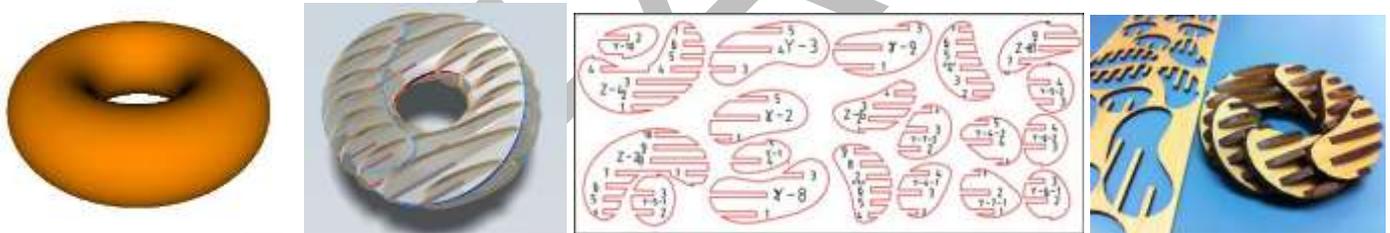
One-time laser cutting file creation fee:	\$25.00
Cutting cost - minimum charge:	\$25.00
ONE custom sticker, inc. material:	\$50.00
TWO custom stickers, inc. material:	\$56.46
TEN custom stickers, inc. material:	\$166.57

6.d. Laser Cutting Example: 3D modeling – dinosaur & doughnut



This project shows how we convert 3D images (*.stl or *.obj files) into custom slices to create a 3D model. The 3D model is imported into a special graphics program that can create a file to cut the parts to create stacked slices (dinosaur - above), interlocked slices (doughnut - below) or radial slices (like the doughnut, but radiating from the centre).

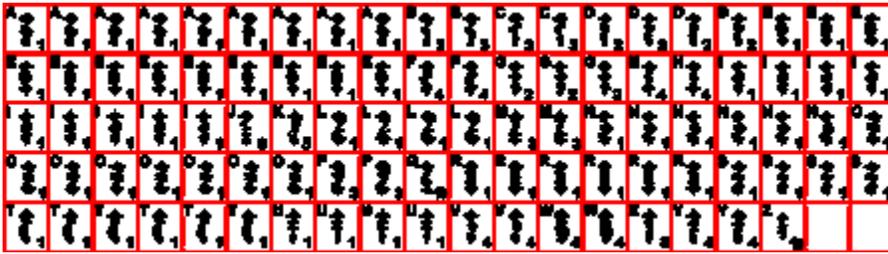
The dinosaur model was produced using cardboard (16" x 13") and is 10" x 3.5", the doughnut was made out of 0.125" alder wood (4" x 18") and 4" x 1.5". We vector marked the cardboard to aid assembly, but opted not to mark the alder, but instead printed out a copy of the cut file to identify the parts.



Pricing guide

One-time laser cutting file creation fee for each:	\$25
Cutting cost (dinosaur or doughnut) - minimum charge:	\$25
TWO doughnuts inc. alder wood & file creation	\$66.52

6.e. Laser Cutting Example: Custom Startrek Vulcan Scrabble Tiles



100 scrabble tiles engraved with standard alphanumeric and Vulcan alphabet characters.

We also designed and produce Startrek Klingon tiles and American sign language tiles – available in store or on eBay for auction at \$29.95 or buy now at \$34.98.

Example cost to produce a set of alder wood scrabble tiles:

(You give us the idea and we work with you to design your project from start to finish)

One-time research, design & create laser cutting file fee:	\$195.00
ONE set of these custom scrabble tiles:	\$33.45
2-4 sets – 28.50ea, 5-9 sets – 26.95ea and 10+ sets – 25.50ea.	

7. Contact us:

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