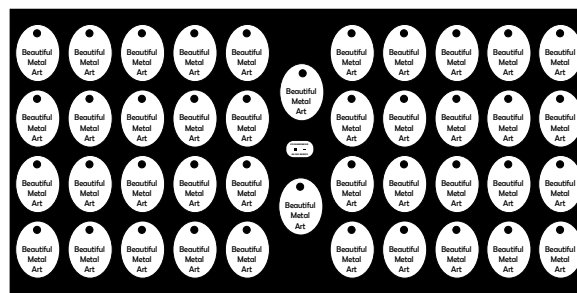


Metal Parts Design Guidelines

To better understand how to layout your artwork, please read the next section illustrating how our process works. This is a quick overview of our etching process.

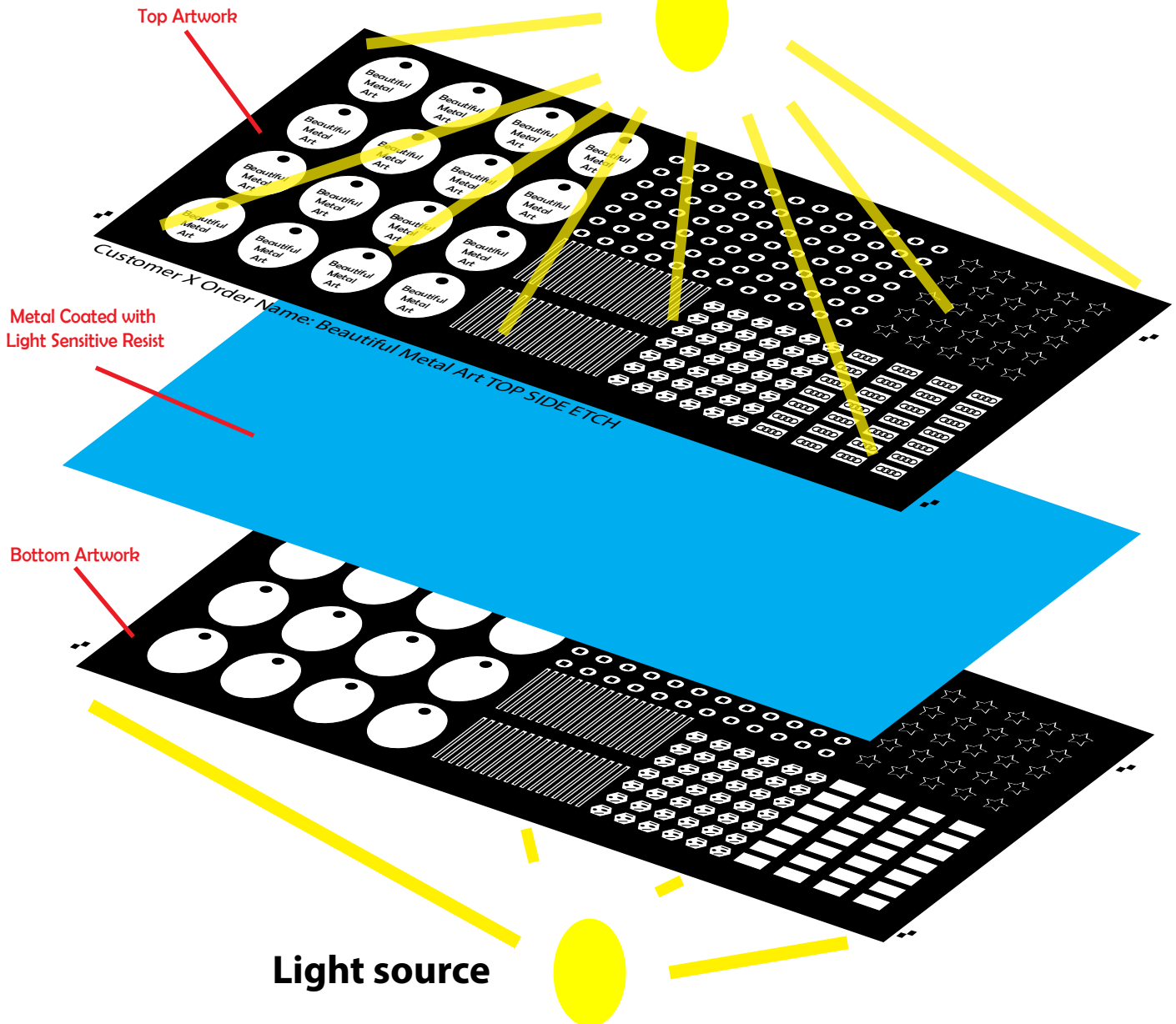
Then, using our design templates and easy to follow step by step instructions you can create your very own metal art!



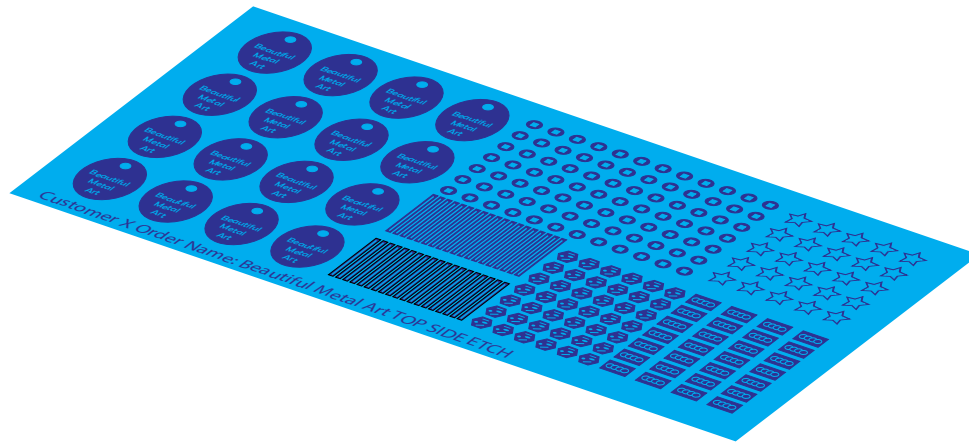
How our process works

- We etch from both sides of the metal, therefore we need two artworks: top and bottom
- Your artworks are printed onto a mylar film. Black areas will be etched, clear areas will not.
- Metal coated with light sensitive “resist” is sandwiched between top and bottom artwork.
- The film emulsion makes intimate contact with the resist surface.
- Light shines down on the metal through the artwork

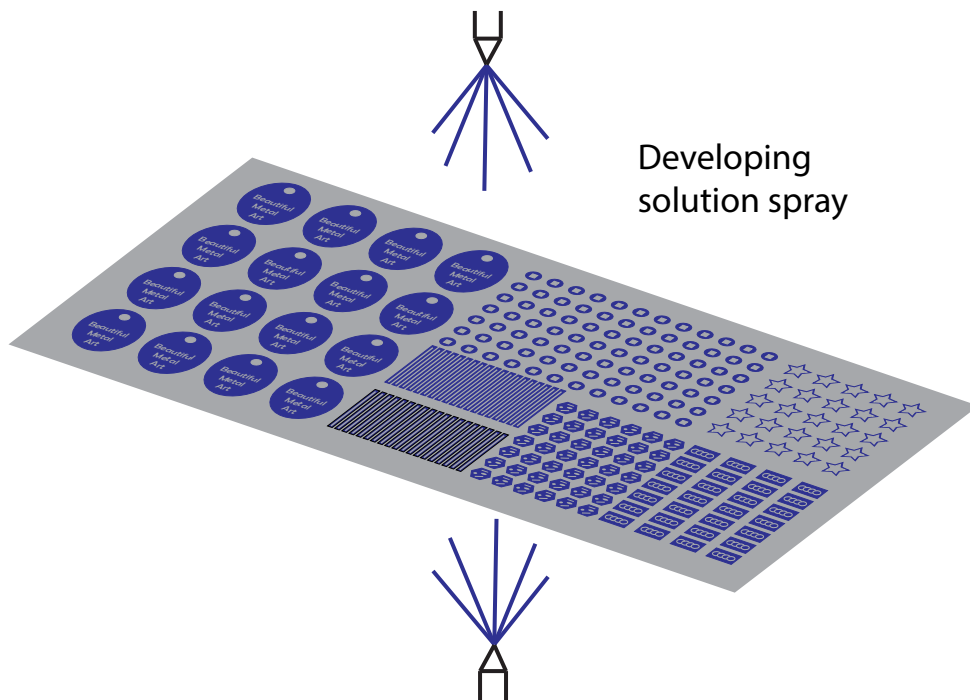
Light source



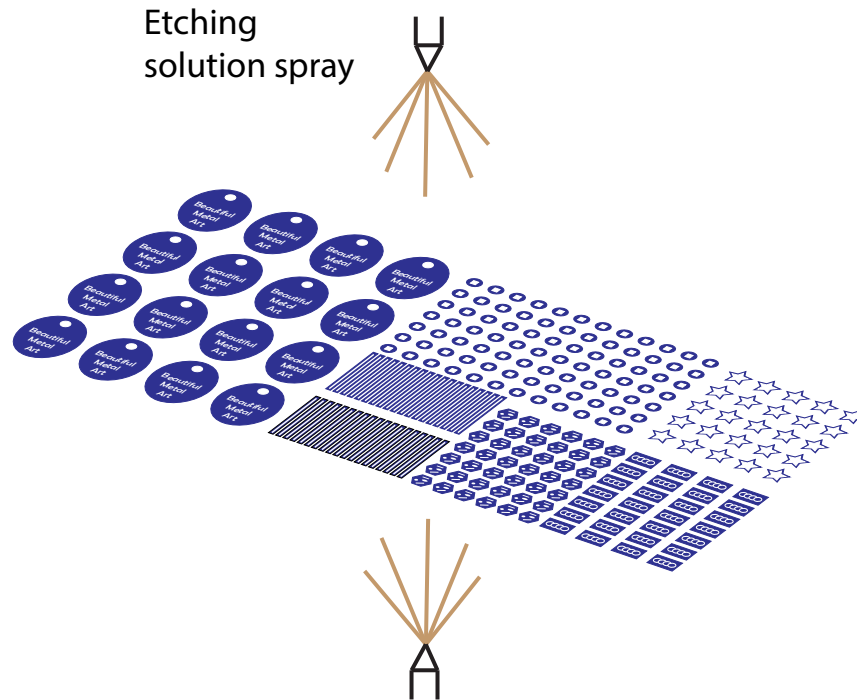
Resist coated metal has been imaged,
and is ready for developing



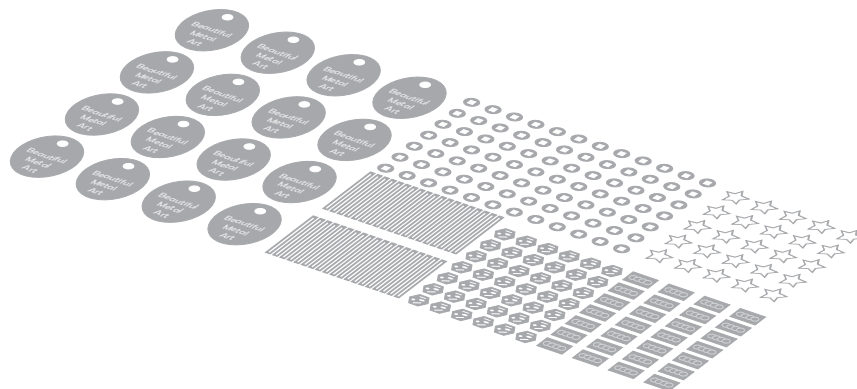
Resist exposed to light will stick to the metal. Anything not
exposed will wash away in the developing solution. This exposes
the bare metal underneath.



Acid is sprayed onto sheet from both sides. It eats the exposed metal. The resist covered metal is protected.



The resist is chemically stripped off. The pieces are then cleaned, sorted, inspected and packaged.



Metal Parts Design Guidelines

Some details to remember:

- We require vector designs, and accept PDF files (from Adobe Illustrator, Corel Draw, and similar)
- Black areas will be etched away. White (clear) areas will be metal.
- Create all etched features in grayscale 100% black, RGB mode (Adobe Illustrator)
- Minimum feature size should be no smaller than the thickness of metal. For example, 0.020" thick piece, smallest feature size is 0.020".
- Add etch compensation to your designs. See the guidelines below.
- Leave about .10" between your parts. This will minimize damage in the etching process.
- Arrange similar parts near each other on the sheet. Examples on the following pages.
- ‘Outline’ all text- (break it down to shapes, not fonts)
- Choose between 6x6, 12x12, and 12x24 sheet size (see Sheet Layout page for more information)

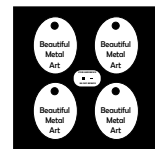
**For best results, use our
design guide templates.**

6x6

12x12

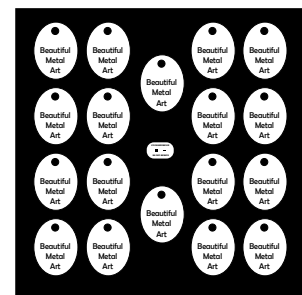
12x24

6x6



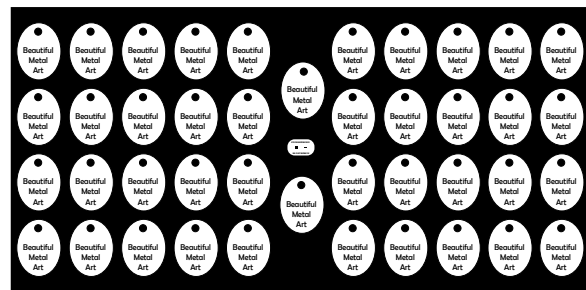
12x12

(11.5 x 11.5 usable area)



24x12

(23.5 x 11.5 usable area)

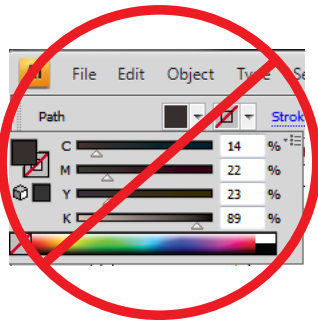


Design process example

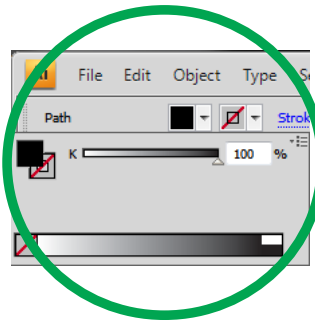
Step 1: Create Design

Document must be in black and white.
Etched features must be 100% black:

NO!



If using Adobe Illustrator, set document mode to RGB and create all etched features in grayscale, 100% black

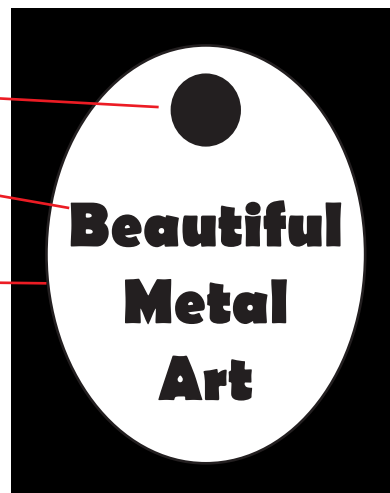


Black areas will etch away...
Clear (white) areas will be metal.

Hole etched through

Text etched on top surface only

Body of piece



Step 2: Add etch Compensation

As the acid eats down into the metal, it eats to the sides as well. (Figure 1)

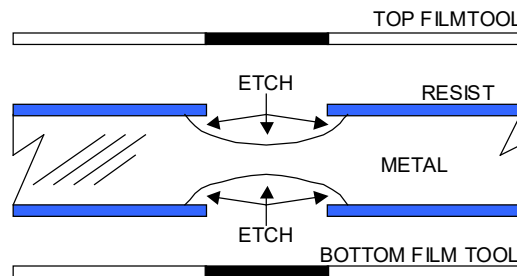
The finished piece will have "undercut" when compared to the artwork (Figure 2)

Therefore you should compensate all features and text accordingly so the finished features do not blur together, and are sized correctly. A good rule of thumb is reduce/enlarge features by 1/2 the metal thickness, but no more than 0.007"

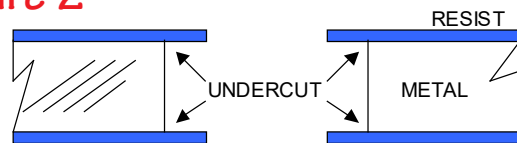
For example, this cross section shows the artwork, photo-resist, and metal.

Piece is 0.010" thick, and therefore the etch compensation will be 0.005" (0.0025" per side)

Cross-section Figure 1



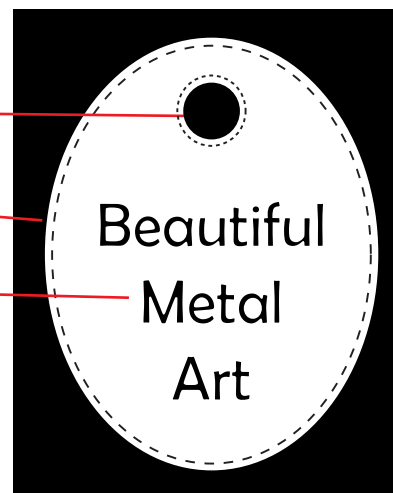
Cross-section Figure 2



Reduce inner feature size

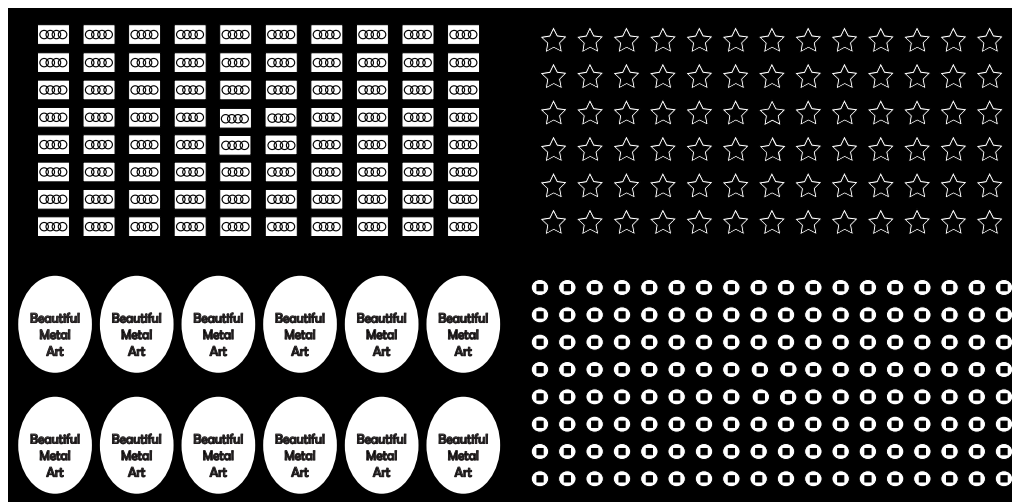
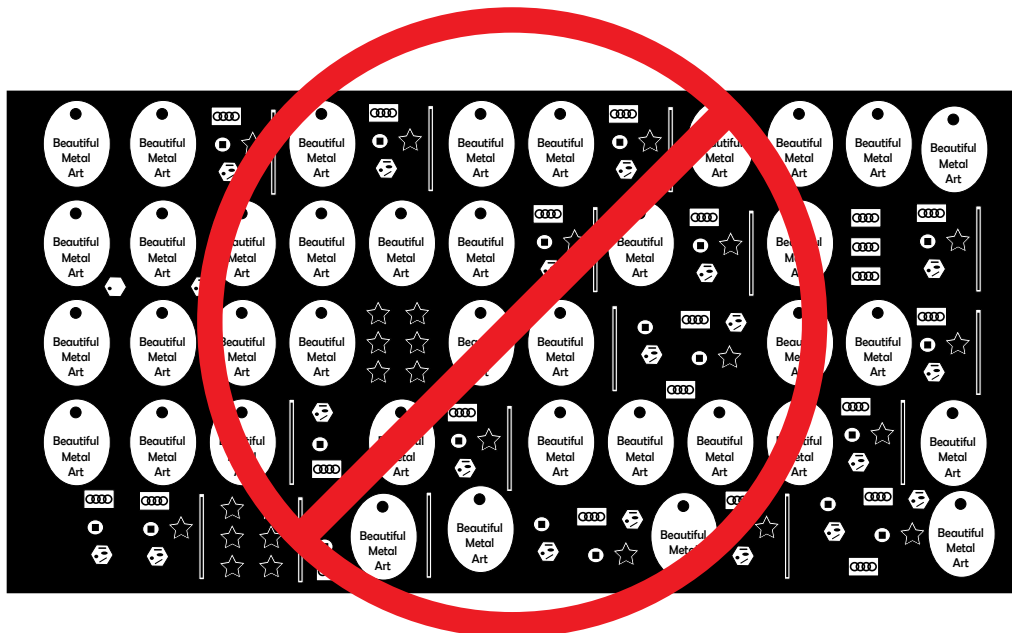
Outer features enlarged

*Text and half-etched features
slightly thinner*



Step 3: Create sheet layout

- Use our design templates to create sheet layout
- Arrange each like design into it's own section.
- Keep .10" between parts, and note keep out areas

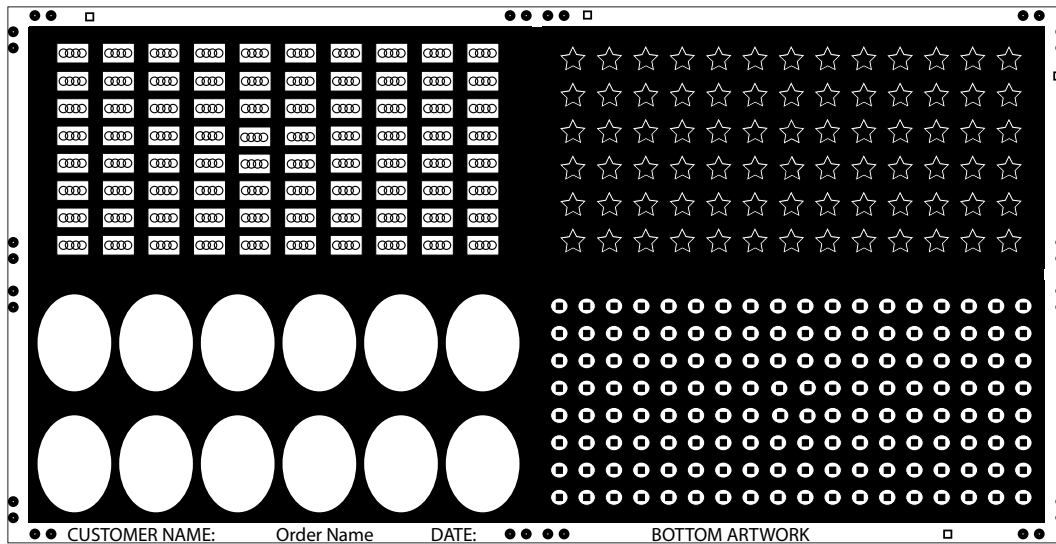


Miss-matched pieces will cause inconsistent etching and poor quality.

Step 3½: Label your sheet

24 X 12 Layout example

With a properly labeled sheet and designs,
you can re-order your pieces with ease
and you will not need to resubmit new artwork.



Label the sheet as follows

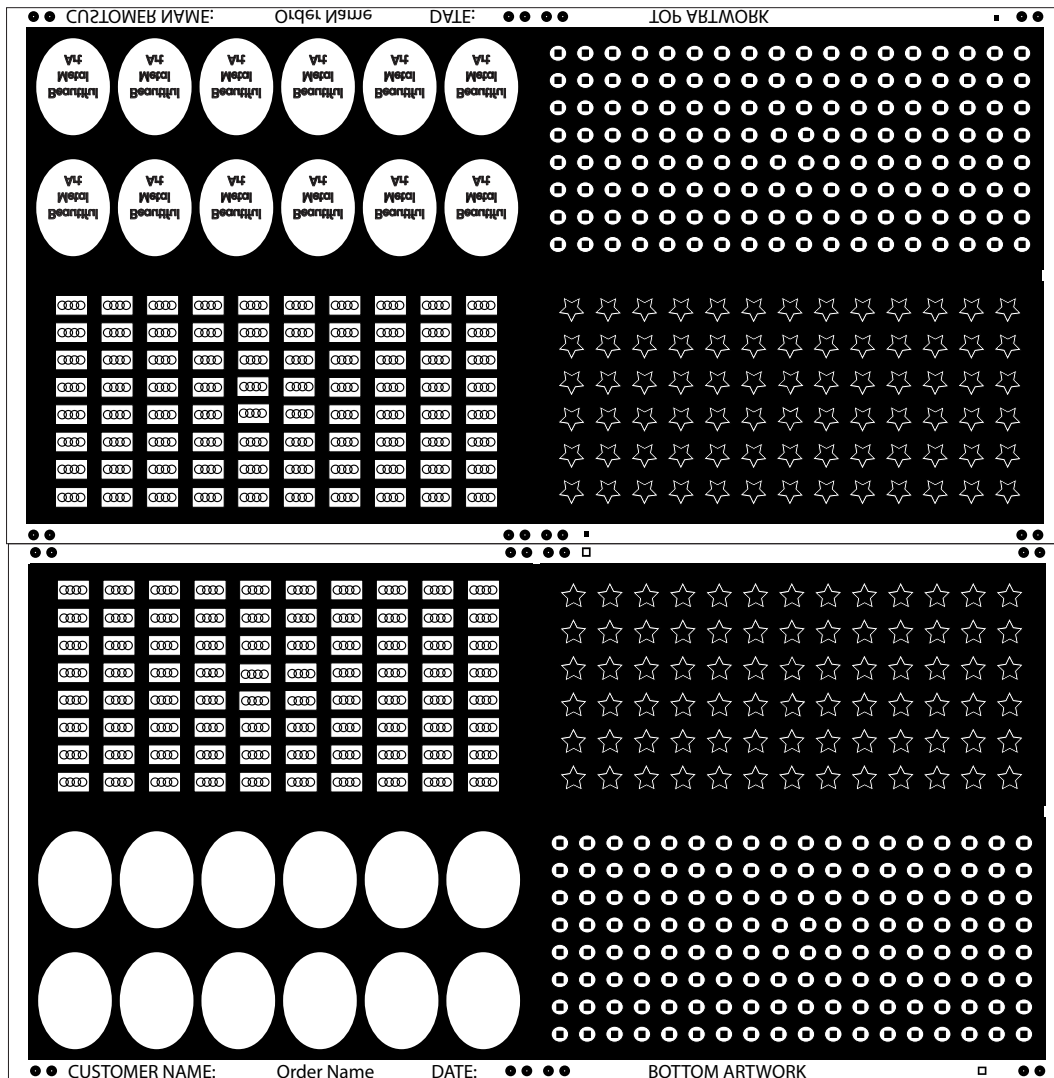
-Label the sheet with your company name, Order Number, Date and “Top Film” or “Bottom Film”

Include reference marks

-All circular and square alignment marks around perimeter

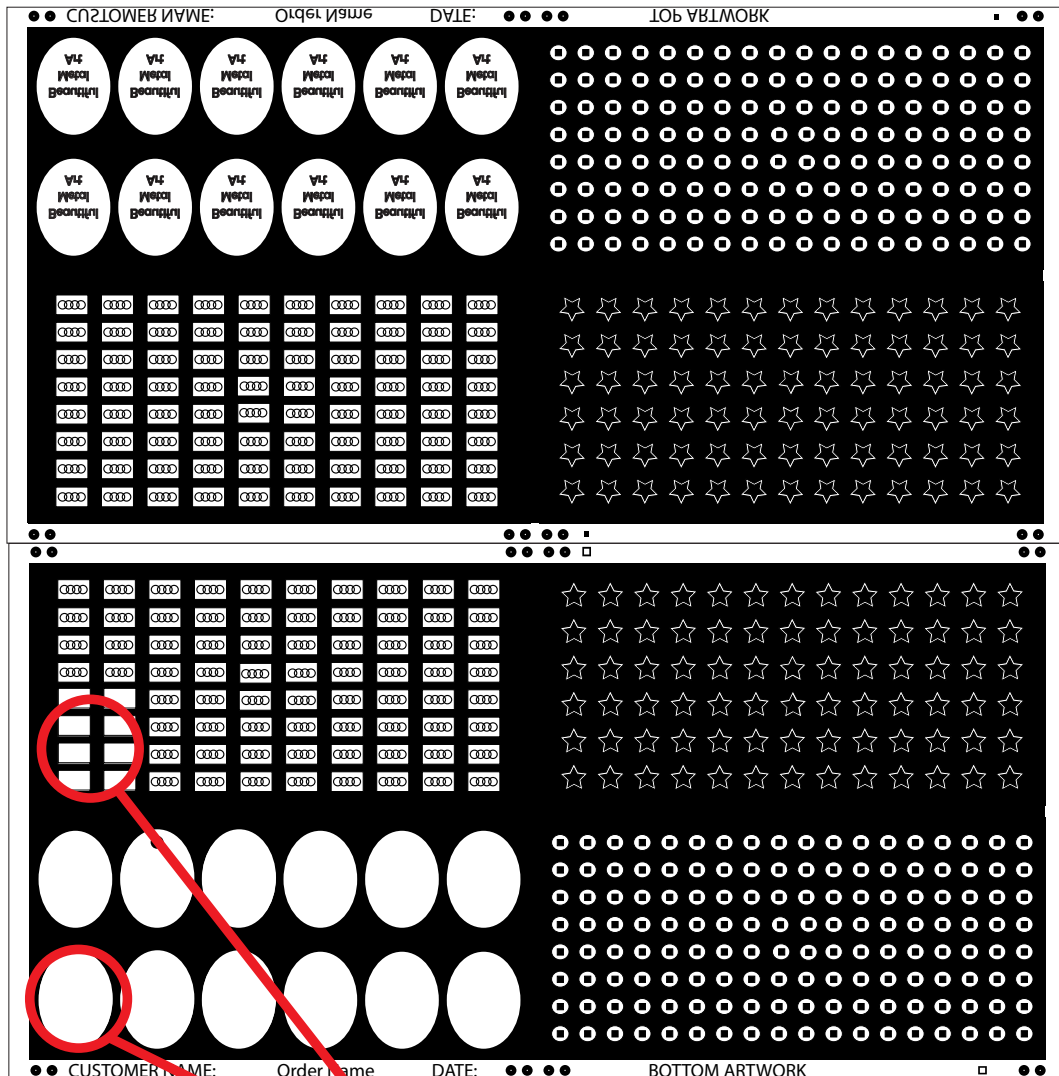
Step 4: Create Top and Bottom artwork

Mirror a Copy of artwork,
Creating 2 artworks total:
one for Top and one for Bottom



Step 5: Half Etched Features

If some features are only half-etched, then those features should only appear on one artwork



Remove half-etch features
from the non-etched side
(Etched only on top surface in this example)

Step 7: Prepare file and submit

Top and bottom artwork to be in one PDF file as shown in our design templates.

Submit your file and order information to: order@greatlakeseng.com

Include the following information:

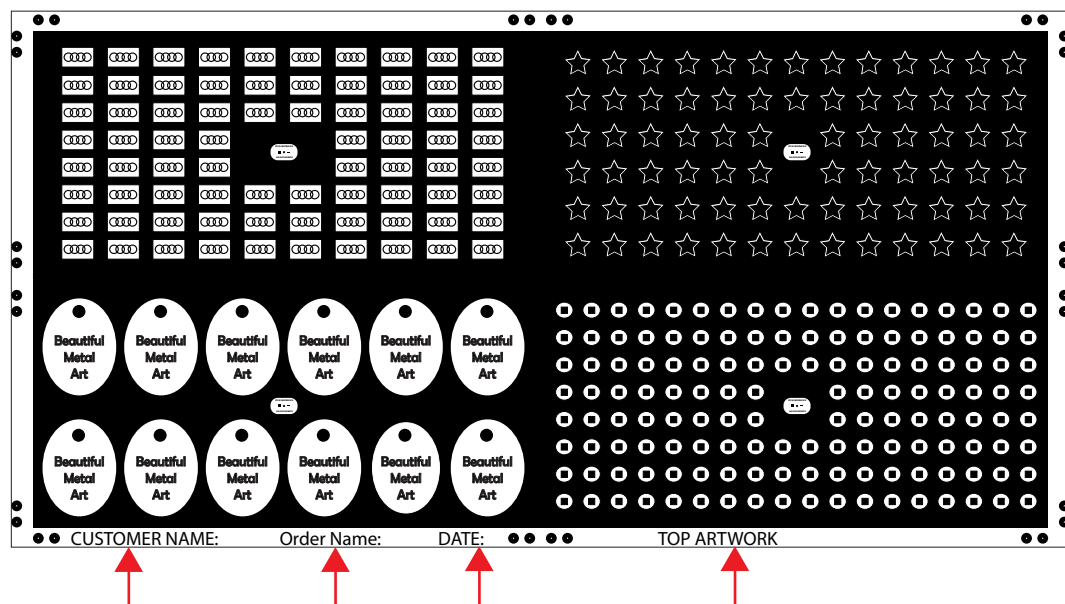
- Your Company Name
- Your Name
- Bill to and Ship to addresses
- Desired shipping method (ground, overnight, etc)
- Type of metal desired
- Thickness of metal desired
- Quantity (in sheets or pieces)

CUSTOMER NAME: Order Name DATE: TOP ARTWORK

CUSTOMER NAME: Order Name DATE: BOTTOM ARTWORK

Ordering and Reordering parts

Be sure to have a labeling/numbering scheme for your orders, and label the artworks. Then if you need to reorder the same designs, we can easily reference the artwork we have on file, and you will not need to resubmit another artwork.



Note artwork labels

Order Check list

- ___ Use our design templates: 6x6, 12x12, or 12x24 with Etch reference and alignment marks.
- ___ Vector drawings in PDF format (from Adobe Illustrator, Corel Draw, and similar)
- ___ Black areas will be etched away. White (clear) areas will be metal.
- ___ All etched features in grayscale 100% black. RGB mode (Adobe Illustrator)
- ___ Minimum feature size should be no smaller than the thickness of metal.
- ___ Add etch compensation
- ___ .10" between your parts
- ___ Each design in its own section on sheet (designs not mixed together)
- ___ 'Outline' all text- (break it down to shapes, not fonts)
- ___ Label the sheet with part names, order numbers, etc.
- ___ Create Top and Bottom artwork together in one file as shown
- ___ Remove half-etch features from opposing artwork
- ___ Mirror the top artwork (for example, text should appear wrong reading on top artwork.
- ___ Submit order to order@greatlakeseng.com with the following:
 - ___ Your Company Name
 - ___ Your Name
 - ___ Bill to and ship to addresses
 - ___ Desired shipping method (ground, overnight, etc)
 - ___ Thickness of metal desired
 - ___ Type of metal desired
 - ___ Quantity (in sheets or pieces)