

Etching brass plates

by [gotang](#) on May 24, 2008

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intro: Etching brass plates

This is how I etched a brass plate to use as a decorative plate for my laptop lid. I've also used these stuck onto the front of notebooks and sketchbooks as presents for friends. My method draws heavily from this [instructable](#) and this [website](#), so I thank the respective authors for their sterling work. There are many, many different ways of doing this, but when I was researching it, there weren't very many thorough tutorials, so I think this may still be useful for some people. But if you're interested, do scour the internet and you'll find a wealth of information about toner transfer and etching - some good, some bad, some just plain puzzling.

The artwork I used is a piece called [Tribal Eagle](#) by *xx-trighappy-xx and is used with permission.



step 1: What you need (and where you can get it in the UK)

You will need:

- Brass plate (I got mine from eBay)
- Iron
- Computer to prepare artwork
- Laser printer and laser OHP acetate (Or do what I did and get a print shop to photocopy it onto acetate for you)
- Permanent OHP marker (useful for touching up the mask before etching)
- Insulating (PVC) tape (Woolworths/Robert Dyas or hardware stores)
- Masking tape (ditto)
- Scissors
- Non-metal kitchen scourer pad
- Kitchen towel
- Acetone (optional - but useful. Nail polish remover is mostly acetone and will do nicely)
- (Hydrated) ferric chloride crystals (Maplin)
- Fine Wet & Dry paper (Wilkinson or hardware stores)
- Some form of sanding block (I just used a scrap bit of wood I had lying around)
- Cheap tupperware (You're not going to be able to reuse this for food!)
- Rubber gloves (absolutely essential)
- Goggles (essential if you're not stupid - don't risk your eyesight doing something like this!)
- Dust mask (optional if you're careful and do the painting outdoors - there's not much painting involved)
- Spray paint (I used black enamel satin-finish stuff from Wilkinson)
- Superglue



Image Notes

<http://www.instructables.com/id/Etching-brass-plates/>

1. Image photocopied onto OHP acetate.
2. Image printed four times to allow me some leeway for screwing up!
3. This is actually a jar full of acetone, not instant coffee!
4. Brass plate for etching.

step 2: Preparing the artwork

The first thing is to get your (black and white) artwork prepared and printed to the right size onto OHP acetate. This can be done directly by a laser printer, or indirectly by printing onto normal paper and then photocopying onto acetate. The process of toner transfer does effectively reflect the image though, so if you have text, make sure you mirror the image before printing. A word to the wise though: This has to be done with either a laser printer or a photocopier and **not** an inkjet! Only toner will mask off the areas of the brass that we don't want to mask - ink won't work.

Remember, any areas that are black will be masked off, not etched and will end up brass-coloured, whereas any areas that are white will be etched and end up black on the finished plate.

step 3: Prepare the plate

Cut the plate down to the correct size and shape and finish off the edges - it's easier to do this now than after etching. Most importantly though, clean the plate! Use the kitchen scourer to scrub the front of the plate until it's shiny (but it doesn't have to be polished) and free of any tarnish or dirt. Then, use the kitchen towel dipped in acetone to thoroughly clean the surface to remove any oil or grease. Try not to touch the face of the plate now - the cleaner the plate is, the better the toner will transfer later.

Mind out here - acetone is extremely flammable. If you get any on your hands, it'll dry out your skin, so use some moisturiser on it afterwards.

step 4: Line up the mask

Align the plate with the artwork on the OHP film and use the masking tape to stick it down carefully. Make sure the tape is only on one side of the brass plate, as this will make removing the film later much easier. Also make sure the tape is taut, as otherwise the artwork will move and you'll transfer the toner in the wrong place.

Image Notes

1. Note that the masking tape only goes over one edge of the plate - this allows the acetate to be pulled away from the plate easily.

step 5: Toner transfer

Place the brass/acetate sandwich on a heatproof surface (I used some scrap cardboard) and heat up the iron. You want the iron as hot as it will go and no steam! Start with the brass-side up and press down on the back of the metal with the hot iron. This will preheat the brass and help the toner melt. After 20 seconds or so, flip the brass/acetate over **without touching the brass**, which will by now be extremely hot. Place a piece of scrap paper over the acetate and once again, press down on the brass (this time through the paper and acetate) with the iron, keeping the iron moving. Be careful not to melt the acetate. The actual toner transfer happens very quickly, and I found it needed very little heating with this method - in the order of 5-10 seconds. Take the iron away and immediately peel the acetate back carefully - this must be done while the brass and toner is still hot (which is different to if you're using paper to transfer it). If you let the toner cool first, it will come away with the acetate rather than remaining on the brass.

You'll also find that the adhesive on the masking tape will melt with the heat, so it's easier to peel this off while the brass is hot. Don't burn yourself though!



Image Notes

1. Image is mirrored by the toner transfer.

step 6: Check and finish the mask

This is the time to check that you're happy with the toner transfer. If you've messed up and need to start over, the acetone will dissolve the toner from the plate easily and you can try again (with a fresh sheet of OHP acetate though). If the toner layer is a bit thin, you can carefully align another printed sheet of acetate with your already partially-coated brass and try the toner transfer step again. This is one of the major benefits of using OHP film rather than the other options which people have said work (e.g. magazine paper, inkjet glossy paper, press 'n' peel toner transfer paper etc.). Make sure that the brass plate is free from bits of melted acetate, which can happen if you heat the acetate too much.

If you're happy with it, use the insulating tape to cover the back, sides, borders (if you want them) and any other large areas that you don't want to etch. Touch up any bits of the mask that look slightly thin on toner with the permanent OHP marker.



Image Notes

1. Note the border is created with tape and the sides of the plate are masked off as well as the back.

Image Notes

1. If you look closely in this region, compared with the previous photo, you can see that I've touched up this area of black with the permanent marker.

step 7: Etch!

Time to etch! Put on your rubber gloves and goggles now! Make up the ferric chloride solution according to the back of the packet in your tupperware and immerse your plate in the solution. The etch will work much faster if it is warmed - I think the packet recommends 40-50 degrees C. I placed the tupperware containing the etch solution in a larger basing half-filled with hot water to achieve this. It will work at room temperature, but it'll take longer.

What I found much more important though, was to agitate the solution while etching. This ensures a fresh supply of etchant to the plate and will speed up the etch tremendously. I just donned my gloves and picked up the plate every 10-15 minutes and used that to swirl the solution around before putting the plate back down and leaving it again. Time-consuming, but it works well and has the benefit of simplicity.

My etch took about 3 hours until I decided it was done. You can monitor the progress of the etch by gently feeling the surface of the etch with your (gloved) fingers. You probably won't see any depth to the etch until it's nearly done. However, keep an eye on the mask, as eventually it will start to flake off - when this happens, you definitely need to remove the plate, as you'll start to etch in places you don't want to etch.

Ferric chloride is not terribly nice stuff, so do this outdoors and don't get it on your skin. Don't breathe the fumes and beware - it stains anything and everything indelibly.



Image Notes

1. This is the hot-water bath to warm up the etchant solution. It's brown because the ferric chloride solution gets everywhere!

step 8: The etched plate!

No, we're not quite done yet. But here's a picture of the plate fresh out of the etchant bath. When you're happy with your plate, remove it from the etchant and rinse it thoroughly with water.

You'll see that my plate is covered with verdigris - this didn't happen on the first two plates I did, but it did on this one. I'm not entirely sure why...

Image Notes

1. The plate fresh from the etchant bath after rinsing with water.

step 9: Disposing of the etchant solution

First thing - don't bother! You can keep the etchant for the next plate you do (it will gradually take longer to etch the plate as the solution becomes weaker though).

Second thing - when you do need to dispose of the etchant, do so responsibly. Don't just put it down the drain! The ferric chloride is corrosive to lots of metals, but more importantly, it now contains dissolved copper which is rather harmful to wildlife. What you need to do is neutralise the solution with an alkali (something like washing soda) which will precipitate out the copper as a solid. Then, you can dilute the liquid with lots of water and put that down the drain, as long as you filter/decant off the solid copper and dispose of that safely - your council will advise you how best to do this.

step 10: Painting the plate

Time to finish it off! Once again, clean and dry is the name of the game here. Get hold of your spray paint and shake it to mix it. Do some test spraying onto old newspaper until you're happy with your technique - remember, light, even passes larger than the object being sprayed, and thin coats. Once you're happy, stick the plate down and paint it! I sprayed mine with three light coats of the paint, letting it dry between each coat. Remember to spray from different angles to ensure that you catch all edges of the etched plate. Ensure the paint is thoroughly dry before continuing - if you're impatient like me, use a hairdryer!

Remove all the tape from the edges and back, and you'll probably find that it's left all sorts of gunk. I'd clean this off carefully at this point by scrubbing gently. Rinse the plate and dry with some kitchen towel.





Image Notes

1. Cheap enamel spray paint!

step 11: Finishing off the plate

Nearly there now. Grab your Wet & Dry paper and wrap it around your sanding block (the block is just there to keep the paper flat) and sand down the surface of the plate. This will expose the brass on any areas that were not etched. Don't worry about the way it scratches the paint surface - it gives it a nice pseudo-aged look. Once you've cleaned down to the brass all over the unetched areas, add a bit of water to the plate (this makes the Wet & Dry effectively a finer abrasive) and scrub with small circular motions all over the plate to ensure a nice finish. If the paint has been scratched unevenly, then carefully use the paper without the sanding block on the unscratched areas and even it out. When you're happy with the finish, rinse the plate and dry.

Don't forget, if you completely screw up this stage, all is not lost - just clean the plate, respray and try again!



Image Notes

1. The finished plate!

step 12: Attach to the object of your choice

Final step - glue it on! I used superglue, as it's quite good at sticking mixed materials (in this case, metal to plastic) and can be removed with the appropriate solvent. I'd recommend using the masking tape as before to allow you to align the plate first, flip it up so that you can spread the superglue and then flip it back to stick it correctly in position - superglue dries really quickly!



Related Instructables



Comments

34 comments [Add Comment](#)



vengeance89 says:

Mar 21, 2009. 8:39 AM [REPLY](#)

nice instructable..but in the toner transfer process it would be safe to use a photo paper than to use acetate..its because it won't melt and won't ruin your design and it can also transfer the image almost perfectly. and i also found a nice etching solution from one of the instructables here..its a combination of hydrogen peroxide(H₂O₂) and hydrochloric acid(HCl)..the ratio is 2:1, 2 parts of H₂O₂ and 1 part of HCl,but 2:1 ratio is more effective for me..and the best thing is it is less harmful to the environment and its very quick too..



vengeance89 says:

Mar 21, 2009. 9:01 AM [REPLY](#)

i mean 2:2 ratio.sorry for the typing error.



Monk says:

Feb 3, 2009. 4:14 PM [REPLY](#)

Yay finally an instructable with some UK stores to buy stuff! excellent instructable too.



pollo del mar says:

Jun 5, 2008. 2:20 PM [REPLY](#)

I recently used a very similar technique to this to etch a number of brass medallions. However, I wanted to point out that there is a nice complementary Instructable entitled "Stop Using Ferric Chloride" here:

<http://www.instructables.com/id/Stop-using-Ferric-Chloride-etchant!--A-better-etc/>

I used the solution detailed in that article to etch over 100 brass medallions. I was able to etch between 10-15 1.25" brass circles with a batch that was 4 cups hydrogen peroxide and 2 cups muriatic acid before I had to mix a new batch. The etching took about 45 minutes to etch to a depth of about 1/32" and was relatively non toxic.

I used a small (5 gallon) plastic fish tank with a light-weight fish tank air pump to do the etching in and keep the solution agitated.



gotang says:

Jun 6, 2008. 4:28 PM [REPLY](#)

This has been covered previously in another comment. While the mixture is relatively non-toxic (though ferric chloride is actually also pretty non-toxic - it is used in water treatment), it is very corrosive. I personally feel more comfortable handling FeCl₃ than an HCl/H₂O₂ mixture. Personal preference really.



T2Pogi says:

Jun 6, 2008. 5:32 PM [REPLY](#)

I read in an article that Adding baking soda to the ferric chloride solution will break it down into water, iron, etc. you can pick up or strain the solids out and dispose of the water.



gotang says:

Jun 11, 2008. 9:51 PM [REPLY](#)

Yes, that is correct. Baking soda will do the exact same thing that the washing soda that I suggested will. All you are really doing is neutralising the solution and precipitating out the copper. Be aware though that the solid produced, therefore, contains the copper and so you should dispose of it properly and not just put it into the bin!



Pkranger88 says:

May 27, 2008. 10:33 AM [REPLY](#)

Very nice.



Phoghat says:

I just used some dry transfer letters from staples on some .44 mag shell key chains for my friends so they would have the "bullet with their name on it"

Jun 5, 2008. 6:05 PM [REPLY](#)



agdollison says:

i do agree

May 27, 2008. 10:47 AM [REPLY](#)



gotang says:

Thanks!

May 28, 2008. 5:17 AM [REPLY](#)



stonehenge360 says:

couldn't I do this using electrolysis? that seems a lot easier and safer...

Jun 1, 2008. 6:34 PM [REPLY](#)



gotang says:

Yup, you most certainly can do it by electrolytic etching. However, I'd disagree that it would be safer - the risks associated are just as great, but they are different (chiefly the risk of fire). Neither method is particularly dangerous if you're sensible.

Jun 5, 2008. 9:57 AM [REPLY](#)

I chose against an electrical method because it would have taken me much more effort to cobble together as I don't have the required bits. But if you've got a couple of car batteries or a suitable regulated DC supply, then it might be better for you. Check out the link to the website I gave in the first step if you want to look into electrolytic etching - it's very good and has lots of info.



awkrin says:

wouldn't it look better without the little board? I mean only the eagle on the laptop: sorry I'm not good at gimp

May 29, 2008. 3:06 AM [REPLY](#)



gotang says:

Personal preference I guess. I wanted a border around it, so I masked off a border. The thing is, in reality, the plate stands proud of the surface by about a millimetre, so even if you have the black running right to the edges, it won't look that clean.

May 29, 2008. 3:41 AM [REPLY](#)



awkrin says:

lol I thought about something like a milling machine to cut it, but you're probably doing this because u don't have a 3d printer sorry..

Jun 1, 2008. 3:08 PM [REPLY](#)



obamafan says:

That looks AWESOME! Cool job!

May 29, 2008. 2:35 PM [REPLY](#)



jomaro says:

Thats a very good job there.
I have been etching (PCBs) myself with ferric chloride solution.
However I am getting concerned if this is the best choice for chemicals.
Maybe we should take a look the alternatives we have around.
Take a look at this <http://www.instructables.com/id/Stop-using-Ferric-Chloride-etchant!--A-better-etc/>
Another solution would be this one
I am not sure what to choose.
Does anyone around have more information about this?
Tks

May 29, 2008. 2:52 AM [REPLY](#)




gotang says:


Well, I opted for ferric chloride because it's easy to get hold of and well documented. I don't know much about alternative etchants, but I personally am more comfortable handling FeCl3 than an HCl/H2O2 mixture!


May 29, 2008. 3:43 AM [REPLY](#)


 **darkmuskrat** says: May 28, 2008. 10:03 AM [REPLY](#)
Sweet, a must do for laptops/desktops alike.


 **blam72** says: May 27, 2008. 4:58 PM [REPLY](#)
Well done, I might have to try this sometime.


 **gotang** says: May 28, 2008. 5:17 AM [REPLY](#)
Thanks. Do try it - it's not that difficult and the photo doesn't really do it justice. It's well worth a go!

 **ac1D** says: May 27, 2008. 9:19 PM [REPLY](#)
AWESOME!
I have a question, would you be up to sell me one? I would like that have one glued on my EEE ==)

 **gotang** says: May 28, 2008. 5:16 AM [REPLY](#)
Thanks for the kind words. I would consider making a one-off for you, but to be honest, I probably wouldn't be willing to do it for a sensible price - it takes me quite a long time and the raw materials aren't **that** cheap. Equally though, if you're really keen, get in touch and we can discuss what you'd want and other terms.

 **Mr. Rig It** says: May 27, 2008. 2:41 PM [REPLY](#)
Very cool, well written. That is something you could sell in the instructables marketplace. Good job!


 **gotang** says: May 28, 2008. 5:14 AM [REPLY](#)
Thanks for the suggestion. I think it takes me more time than I really have to spare, so I don't think I'll try selling them regularly. Equally though, I'd consider doing one-offs occasionally on request...


 **bxxridley** says: May 27, 2008. 9:28 PM [REPLY](#)
Honour to the Builder!

This is a clear, precise, and interesting Instructable.


Thank you for the attention to detail re: where you got supplies, etc. I am in the US, but from your instructions I can replicate this for my own projects, which is the objective of Instructables anyway. Well done.

-Bastion


 **gotang** says: May 28, 2008. 5:13 AM [REPLY](#)
Excellent - thanks for the support. Best of luck with your own attempts; it's really not that difficult. I'm glad to be of help!

 **TheWomanMonster** says: May 27, 2008. 9:51 PM [REPLY](#)
Fantastic work, and thanks for linking to your references and inspiration, it's so nice to see!

 **gotang** says: May 28, 2008. 5:12 AM [REPLY](#)
Thanks for the kind comments - it's really appreciated!

 **Jr Hacking kid** says: May 27, 2008. 11:08 PM [REPLY](#)
did you join eeeuser.com its a site detecated to the asus eee pc c u at the forums

also i got 4 of them

 **gotang** says: May 28, 2008. 5:12 AM [REPLY](#)
Yup, I've been a member for a while - though I'm not terribly active on the forums anymore. Just added a photo of it to the "Hacks & Mods" forum though...

 **csharpdeveloper** says: May 28, 2008. 4:51 AM [REPLY](#)
Nice eee. I second joining eeeuser, its an excellent community.



GorillazMiko says:

Ah, very cool. I want to try the Instructables Robot.

+4.5/5 stars. (Accident. Sorry.)

May 27, 2008. 8:20 PM [REPLY](#)