A Bottle Polishing Primer

By Joe Brisson

Preface

In recent years, the practice of bottle polishing has come under a great deal of scrutiny from both within and without the hobby. Recently, an important glass museum suggested that cleaning a bottle back to its original state makes it a candidate for the recycle bin. While I'm not interested in debating this idea here, I think it's only fair to acknowledge that everyone is not onboard with bottle polishing although some of us have witnessed results that could lend credibility to their statement. The purpose of this article is to disseminate information towards more consistent results from those polishing bottles and to educate collectors about what we are doing. As titled, this is a primer for all interested parties however many additional techniques beyond the scope of this article are known to professional polishers.

For the sake of clarity, I use the term "polishing" in this article to describes the *outcome* rather than the more commonly used term, "tumbling", which describes the *process*. Rock polishers would agree with me on this.

About Etched Glass

Let's start by considering what is happening to the glass that causes it to need polishing. Certainly, most everyone is familiar with dug bottles etched by minerals from the ground. Similarly, leaving a liquid, even water, in a bottle or jar for an extended period also causes etching. I use the term "etching" to more accurately describe the process of glass damaged by exposure to moisture and the minerals it contains. The bottle or jar is not stained, but the glass has deteriorated. For those of you clinging to home remedies for cleaning bottles, I offer that it would take approximately a week of non-stop shaking of a bottle filled with Gramma's secret recipe and rice to even begin to remove this etching!

Needed Equipment

To restore the intrinsic visual appeal of a bottle or jar, items are polished through a tumbling process like rock polishing. This process requires a tumbling machine that can roll one or more canisters twenty-four hours a day for up to a week over a set of rollers. Tumblers are motor driven (1/3 HP) and the entire unit is either purchased or hand assembled. The only commercial venture I know selling tumbling machines is The Jar Doctor (jardoctor.com). For those of you thinking about making your own, check out our Facebook group, Antique Bottle Cleaning, for ideas on building machines. A small, commercially built system can be purchased for $350 to $550. I personally compare building a tumbler to building a bike. I could build my own bike, but I'm sure I wouldn't want to ride it very far!

As previously mentioned, you will need canisters to hold your bottles on the tumbler. Here again, you can purchase them or construct your own (see the previously mentioned sources for more information). Canisters are constructed or bought in a variety of sizes from as small as a three-inch diameter to seven inches or larger. Ideally, you will use small canisters for small bottles and larger canisters for larger bottles. I use four-inch canisters to cut and polish most hutches and pint beers. Five-inch or larger canisters are preferred for quart-sized items and six-inch for most half-gallons. It is vital to the process that the copper must have room to move around the bottle or it may bind and scratch the glass.

Canister Diameter	Bottle Diameter (at the widest point)	Typical Bottles
3-inch	½ to 2 inches	Small medicines and druggists, round vials, others
4-inch	1 ½ to 3 inches	Medium sized medicines, inks, beers, sodas, others
5-inch	2 ½ to 4 inches	Larger medicines, flasks, quart sodas and beers, others
6-inch	3 ½ to 5 inches	Quart and half-gallon fruit jars, other larger bottles

You may purchase canisters in either clear or opaque PVC pipe. I prefer the clear as it allows me to observe the bottle or jar during placement to make sure it's seated correctly in the stopples.

Another key requirement for your equipment list is bottle stopples. The stopples serve to hold the bottle or jar in place during the tumbling process. Stopples should tightly fit the diameter of the canister you are using. A four-inch stopple matches a four-inch canister. They can be purchased or constructed yourself. The bottom stopple has three or four fingers that hold the bottle in a stationary position. Three finger stopples work well for round bottles while four finger stopples cradle round or square bottles. The top stopple is cone shaped and fits into the neck of the bottle or jar. Fruit jars require a wide top stopple so the jar mouth is resting on the rubber cone and not the base of the top stopple. Great care should be taken to ensure that both the bottom and top stopples fit securely or bottles can move during tumbling causing damage or breakage.

The final piece of equipment needed to complete the tumbling process is copper. Copper serves to push the various cutting and polishing oxides against the glass. You can think of this process like sanding a piece of wood by hand: the copper acts as your hand with the oxide working like the sandpaper. Copper is the most expensive part of your tumbling equipment with prices running up to $8.50 a pound. To make copper wire for tumbling, cut twelve or fourteen-gauge wire into small pieces from 1/16 to 5/32 of an inch. A half-gallon fruit jar requires up to 35 pounds of copper in a six-inch canister. Consider that it takes $300 worth of copper to polish a large jar or bottle although your investment will last for many years. Smaller cut copper, such as 14 gauge at 1/16 inch, is more effective for getting into tight spaces like inside edges and for around embossing. The smaller copper is gaining popularity with polishing professionals even though it's harder to rinse and more likely to fall through your sieve.

Cutting and Polishing Oxides

Now that you have all the basic equipment you'll need, it's time to consider oxides. Cutting oxides, as the name implies, serve to remove the etching and light scratches from the glass. The cutting oxides appropriate for glass range from 600 to 1500 grit. The lower the grit, the more aggressive the cutting. Oxides with grit numbers lower than 1200 can remove too much glass and must be used conservatively as they can remove embossing and other features such as vent marks and seams.

The most popular polishing oxides are 4 to 6-micron aluminum and half-micron aluminum. These oxides will only remove things that are adhered to the glass such as actual dirt deposits, stain, rust, etc. They will not act as cutting agent to remove etching.

The amount of oxide, cutting or polishing, used by professionals varies somewhat, although much of it may be going down the drain. To cut or polish a soda or pint beer in a four-inch canister, I use about a 1/2 teaspoon on the inside the bottle and 3/4 to a full teaspoon on the outside. I know many other polishers that use two or three times these amounts. I find using more oxide doesn't improve the results

and only makes for a messier clean-up. Larger amount of oxide is not better as the oxide tends to absorb water. When too much water is absorbed, you create a "dry batch" that heats up during tumbling, causing the oxide to adhere to the bottle. To remove this oxide residue, another light cutting run may be necessary.

No one oxide is perfect for all bottles, especially considering that the hardness of the glass varies greatly. For this reason, I usually start with 1200 as a safe cutting oxide to serve as a barometer of how hard the glass may be without putting the embossing or other features at risk. Cobalt glass, for example, tends to be very hard and is often slow to respond to cutting with 1200. Since this isn't universally true, I like to err on the conservative side by starting with 1200 for five days and then moving to 1000 if I'm not satisfied with the results. Similarly, most glass polishes nicely with the 4 to 6-micron aluminum, yet other bottles may require the half-micron polish to achieve a good finish.

You can purchase both polishing and cutting oxides from the Jar Doctor, your local rock store or online at lapidary supply stores.

The Polishing Process

Polishing is a multi-step process, first involving the use of a glass cutting agent that removes the micro-thin surface layer of glass that is damaged. In the second step, the glass must be polish to restore its original luster using a polish oxide. For the novice, you should know before you start that this is a very messy process!

Here is a step-by-step guide agreed upon by several experienced, professional polishers. Through your own experienced, you will adjust this process based on the condition of bottle or jar you are polishing.

1. Wash and Inspect the Item	• Is there any damage to consider? Cracked items can be polished, but only with great care and the cracks can easily grow or cause the item to break. Also, open or partially open bubbles will fill with oxide, you may want to cover or seal them (see below). • Does the item have both interior and exterior etching? Many items, especially attic bottles and fruit jars contain only content etching so you will only need to polish the inside. • Does the bottle have a pontil or light embossing that requires extra care? If so, there are special stopples that protect the pontil. I use the stopple and add duct tape over the pontil and light embossing. The tape may come off during tumbling, but it stays on long enough to afford the embossing protection. Others use materials to 'paint' the embossing before tumbling. Such as: o Nail Polish o Marine Varnish o Exterior Varnish. Use at least two coats and allow 24 hours between coats to dry completely. Lacquer thinner works to remove this after tumbling. • What shape is the bottle? Round bottles are polished optimally at 65 to 85 rpms. Square or rectangular bottles require a slower tumbling speed of around 20 to 35 rpms.

2. Load the Item for Cutting	a. Using a funnel, fill the bottle or jar so the copper will contact all inside surfaces when it is laying on its side (as it would in the canister). On the inside, make sure copper goes all the way up the neck or you'll miss stain in the neck. The big key is having enough copper to slide inside the neck or it won't clean the neck. b. Add a cutting oxide such as 1200 grit for a badly etched bottle or 1500 grit for a light etched item. a. Bottles 2 to 8 ounces - ¼ to ½ teaspoon oxide b. Bottles 8 to 20 ounces - ½ to ¾ teaspoon oxide c. Bottles over 20 ounces – 1 teaspoon or more oxide c. Add enough water to the bottle or jar so that the copper is submerged by at least an inch or more. Do not fill the bottle or jar more than ¾ full. d. Choose the correct canister and stopples for your bottle or jar. a. There must be enough room in the canister between the bottle and the inside canister wall to allow the copper to easily circulate. b. Three finger stopples are for round jars, four finger stopples are for square or rectangular bottles. c. The top stopple must fit secure in the opening on your bottle or jar. For jars, make sure the neck opening is contacting the cone on the top stopple and not the base of the stopple. e. Place the finger stopple in one end of the canister and tighten until secure. Also, make sure the finger stopple is evenly seated in the canister and not tipped to one side. f. Place the bottle or jar (filled with water, copper and oxide mixture) firmly into the finger stopple. Again, make sure the bottle is evenly seated in the stopple and resting against the fingers, not the canister. g. Add copper to the canister so the copper will contact all exterior surfaces when it is laying on its side (as it would in the canister). You want to make sure you have enough copper to spill completely over the neck and top. h. You MUST maintain at least 1/2" between the bottle and the inside of the canister or the copper may start jamming up between the glass and the inside of the canister. Once it starts getting jamming up, it may become so tightly wedged that you must break the bottle to get it out. i. Add a cutting oxide to the canister. a. 3-inch canister - ¼ to ½ teaspoon oxide b. 4-inch canister - ½ to ¾ teaspoon oxide c. 5-inch canister - 1 to 1 ½ teaspoons oxide d. 6-inch canister – 1 1/2 to 2 teaspoons oxide j. Add enough water to the canister so that the copper is submerged by at least an inch or more. The combination of water, copper and oxide should be ½ to ¾ of the way up the bottle or jar when standing upright. k. Place the top stopple in the canister and seat the cone squarely on the bottle or jar in the neck opening. Push down on the stopple while tightening to hold the bottle firmly in the fingers. l. Turn the canister on its side and hold up to a light source. Inspect that everything looks secure (this is why you purchase clear canisters). I often shake the canister to make sure nothing moves or clunks! Visually inspect that all the stopple fingers contact the bottle surface.

3. Load the Canister and run.	• Most bottles or jars require a minimum of 5 days of continuous tumbling. Occasionally, for a very lightly etched item, I shorten this to 3 or 4 days. Professional polishers speculate that oxides begin to breakdown beyond 5 days of tumbling so running items longer is only wasting electricity. • Every 24 hours, reverse the canister (turn end-to-end) so the embossing wears evenly. In the circumstance of moderate to heavily etched items, cutting may reduce the definition of embossing. For bottles or jars requiring two cutting cycles, I cover all embossing for one of these cycles.
4. Unload the Canister	a. Remove the top stopple and rinse off any copper and excess oxide over a sieve. Do not allow any copper to wash down the drain! b. Carefully remove the bottle or jar and empty the copper from interior into a sieve. Set the bottle aside for now. c. Rinse the copper in the sieve with water and return the copper to its storage bottle (I use plastic orange juice bottles). d. In small batches, pour the remaining copper from the canister into the sieve and rinse with water. Once rinsed, return it to the storage bottle. e. Remove the finger stopple and rinse. f. Wash the canister to remove oxide residue. I prefer to use Lemon Scented Soft Scrub without bleach and a Scotch Brite pad to keep my clear canisters clear. Avoid anything with bleach as it stains everything and may interact with other cleaners. g. Wash the bottle to remove the oxide residue. Again, I use Soft Scrub to remove the oxide from the glass along with a bottle brush, pad or toothbrush. A dental water pic also works to clean remaining compound from cracks, open air bubbles, and pits. h. Allow the bottle to dry and inspect for any remaining etching before polishing. Badly etched bottles may require a second cutting run. Sometimes bottles may be cloudy from the cutting run. This is not etching but simply dull glass that needs to be polished, do not cut further!
5. Polishing	• The polishing process is the same as the cutting process above except that you only need to polish items for 2 to 3 days. Polishing longer than 3 days can cause items to become ‘shiny’ creating the common complaint that something was ‘over polished’. Similarly, under polishing leaves the glass dull looking. • Use polish oxides in the same amounts as the cutting oxides. Aluminum and half-micron aluminum polishes are efficient and cost-effective.
6. Alternate Method	• Another approach is to use 1200 cutter compound for seven days straight. After five days, the cutter breaks down and acts like a polish. Most bottle come out looking perfect and need nothing more but a few additional measures to remove the stopple marks, and spots of heavy etching.

Other Important Things to Know

Motors

For individuals looking to build their own tumbling unit, the motor is a critical consideration. For a variety of technical reasons beyond the scope of this article, motors used for tumbling must have either automatic or manual (red button) thermal protection. Additionally, motors should be continuous duty and NOT error over. Motors not so equipped are subject to burning out and possibly causing a fire.

Acids

In the early days of bottle collecting, acids, such as hydrofluoric and others were often use to remove etching. Hydrofluoric acid dissolves glass and while this is effective for removing etching, it ruins far more bottles than it helps. Additionally, Hydrogen fluoride gas is an acute poison that may immediately and permanently damage lungs and the corneas of the eyes. I strongly urge collectors to steer clear of its use.

Repairs

Bottles or jars previously repaired using today's resins are not candidates for polishing. The cutting process dulls or even separates the epoxy from the glass. Additionally, bottles previously treated with acids can often be restored or at least improved through polishing.

Let it Be

Items that are heavily etched or even corroded are not good candidates for restoration. I've seen badly damaged bottles buffed using a heavy wire brush and, while the result is a shiny bottle, the embossing, seams, vent marks and other important characteristics of the bottle are lost. Bottles cleaned in this manner no longer retain their value as a collectable.

Another group of bottles and jars to 'let be' are those with beautiful etching and rainbow colors brought on by a 100 plus years of burial in acidic soils. This condition is nearly impossible to replicate and these items often command a premium price.

About Cactus Joe Brisson

Cactus Joe is an old-time bottle collector having joined the North Star Historical Bottle Club in Minnesota in 1973. He is currently a member of the FOHBC and other bottle clubs. Joe is the proprietor of the SW Bottle and Jar Spa (swbottleandjarspa.com) and last year alone polished over 500 bottles and jars.

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