

all this...



from...



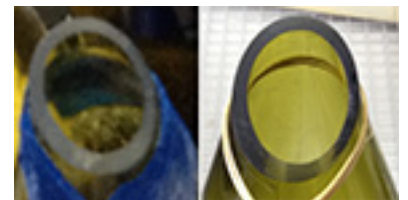
Upcycling Bottles into Glassware

Many liquor bottles have unique shapes and textures; there are wine bottles with an interesting dimple or bulge in the bottom (called the 'punt'); there are lots of bottles with interesting labels and branding art; and there are a wide range of bottle colors to be found. This guide will show you how you can turn just about any glass bottle - wine, beer, soda, liquor - into a drinking glass, vase, planter, or some other piece of unique and useful glassware!

It's important to understand there is no uniformity in the glass used to make bottles so turning them into glassware is a bit of a trial-and-error process. Generally you will find wine, liquor, and some soda bottles are thicker walled thus making them less likely to break or crack during fabrication. Beer and soda bottles tend to be much thinner making them more susceptible to cracking and breakage; not a deterrent to using them, just plan accordingly.

There is a learning curve to the process so before you start on the really cool bottles, practice on a few not so special ones to get these basic steps down and a feel for working with a particular type of bottle:

1. **Cutting** the bottle using either the DB-100™ Diamond Band Saw or SwapTop™ Diamond Trim Saw. The band saw gives the most flexibility allowing you to work with larger bottles, cut different bottle shapes (round, square, multi-sided, etc.), cut bottles with textures, and make angled cuts. The trim saw is an option for cutting through smaller round, shaped, and textured bottles.
2. **Finishing** the cut edge to create a rim and get it ready for polishing using the SwapTop Flat Lap with a series of different grit diamond laps. You can also opt to use a SwapTop grinder (or other glass grinder) with a SuperFine™ grit bit to round over the inner cut edge.
3. **Polishing** the edge to make it 'drinking-glass' safe using the SwapTop Flat Lap with a polishing pad and diamond paste and / or cerium oxide.



START

END

SAFETY

- ALWAYS wear safety goggles or glasses!!
- Follow all safety, set-up, and use guidelines detailed in the user's guides for machines and tools used.
- Work on a water tolerant surface at a comfortable working height.

BOTTLE PREPARATION

Rinse the bottle and remove any dirt or grime from the outside. Working on a dirty bottle can make it difficult to see what you are doing and can compromise the polishing process.

If the bottle has artwork that you want to preserve you will need to protect it first. Bottles with painted, fired on, or self adhesive plastic labels can be protected by covering the area with painters tape or similar type tape that won't pull off the design but is water resistant. Paper labels won't stand up to this wet process and if you want to be able to wash your final project the label needs to be waterproofed in some manner. Here are a few options:

- Paint over the label with several coats of Mod Podge®.
- Use a weatherproof label spray pray like Krylon® Preserve It.
- Paint over it with a few layers of a clear lacquer, acrylic, varathane or polyurethane spray or liquid.
- Rub a white candle or wax over the label.
- Cover the label with rubber cement.



STEP 1: CUTTING

You can use either the DB-100 Band Saw with a diamond blade or the SwapTop Diamond Trim Saw set up with a diamond blade. The choice depends on the bottle shape, diameter, where you want to make the cut, and whether you want the cut straight across or at an angle.

Using the DB-100 Band Saw with a DiamondCut™ Blade

The DB-100 will handle just about any bottle and cut you want: straight, angled, square and odd shaped bottles, cuts high on the neck, textured bottles, and larger diameter bottles.

1. Mark the bottle where you want to make the cut using a water resistant marker, paint pen, line of tape or even a rubber band. You want a cutting guide that won't easily wash away.
2. Decide which way you need to hold the bottle so it will clear the saw throat as you cut.
3. Adjust the height of the drip guide so that it clears the maximum height of the bottle.
4. Make sure the coolant reservoir is filled with water. You can add a capful of DiamondCoolant™ (Inland no. 50011) if desired. Adjust the coolant flow rate so you have a steady drip rate, about 1 drop of coolant every 3-4 seconds. Increase the drip rate if a dry powder forms on the bottle while sawing.
5. Turn on the saw and set the speed about 3/4 of full. A faster speed does not mean faster cutting, you want sawing action while being able to maintain control.
6. Slowly feed the bottle straight into the blade and keep it straight as you saw along your cut line. It's important not to twist or deflect the blade as you are cutting, especially as you go through open center. Let the blade do the work! As you reach the end of the cut, apply little if any pressure to avoid chipping as the blade exits the bottle. Take your time; the more even the cut the easier it is to take through the polishing steps!
7. Rinse and dry the bottle to remove any grit or cutting residue before moving on to the next step, finishing.

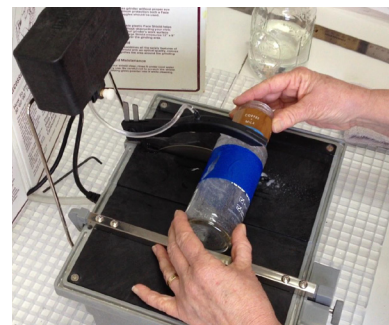


Using the SwapTop Diamond Trim Saw

The SwapTop Trim Saw with DiamondTuff™ blade and WaterDrip™ Reservoir will cut through round bottles whose diameter fits under the blade guard at its highest position by spinning them on the blade. It will also cut straight through bottles not taller than the blade height.

Spin cutting a round bottle

1. Mark where you want the cut to be on your bottle using a water resistant marker, paint pen, line of tape, or even a rubber band. You want a cutting guide that won't easily wash away. An alternative is to use the SwapTop Rip Fence (Inland no. 69801661) as a cutting guide.
2. Adjust the saw blade guard height to accommodate the bottle diameter while still allowing water to drip down onto the bottle and blade as you cut.
3. Make sure the coolant reservoir is filled with water; you can add a capful of DiamondCoolant™ (Inland no. 50011) if desired. Adjust the drip rate to a drop of coolant every 2-3 seconds, increasing the flow rate if a dry powder forms on the bottle while sawing.
4. Turn on the saw and set the speed from 3/4 to full. You want the blade to saw while being able to maintain control of the cut.
5. Slowly push the bottle forward, straight into the blade along your cut line (or by keeping it against the rip fence) allowing the blade to do the work. Continue until you have cut through the lower part of the bottle. Stop pushing forward.
6. Now slowly begin turning the bottle in place toward you, continuing the cut you started. Allow the blade to do the work and make sure you don't twist or deflect the bottle on the blade. Keep rotating the bottle around until the beginning of the cut comes back into view. As you come to the finish, apply little if any pressure to avoid chipping as the blade finishes the cut and you end up with your two pieces.
7. Rinse and dry the bottle to remove any grit or cutting residue before moving on to the next step, finishing.



Straight through cutting

1. Mark where you want the cut to be on your bottle using a water resistant marker, paint pen, line of tape, or even a rubber band. You want a cutting guide that won't easily wash away. An alternative is to use the SwapTop Rip Fence (Inland no. 69801661) as a cutting guide.
2. Make sure the coolant reservoir is filled with water; you can add a capful of DiamondCoolant™ (Inland no. 50011) if desired. Adjust the blade guard height and set the drip rate to a drop of coolant every 2-3 seconds, increasing the flow rate if a dry powder forms on the bottle while sawing.
3. Slowly push the bottle forward straight into the blade along your cut line (or by keeping it against the rip fence), allowing the blade to do the work. Make sure you don't twist or deflect the bottle on the blade as it cuts. Keep feeding the bottle forward until you have completely cut it in two.
4. An alternative is to use the SwapTop Protractor Guide (Inland no. 69801662) to help steady and feed the bottle into the blade.
5. Rinse and dry the bottle to remove any grit or cutting residue before moving on to the next step, finishing.



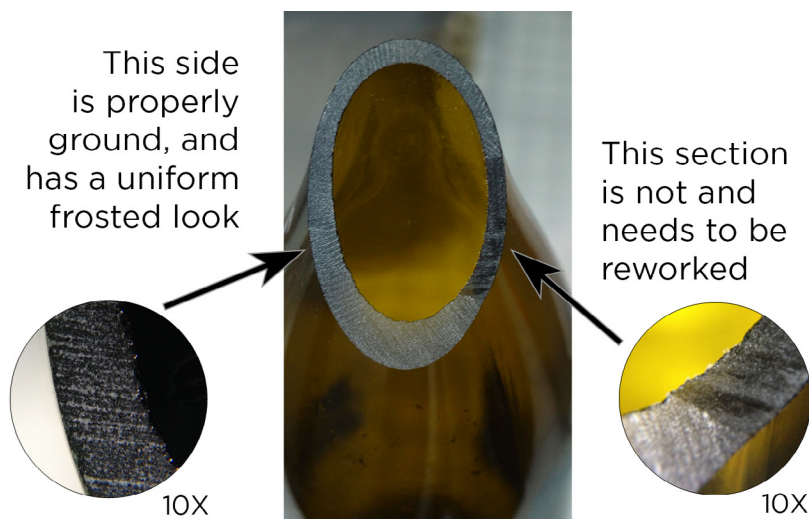
STEP 2: FINISHING

This step starts refining and shaping the cut edge, smoothing it, making it safe to touch, and adding rims if desired. You will use the SwapTop set up as a flat lap and a series of different grit laps. You can use either 6" or 8" diameter laps (depending on your machine) but 8" laps will give you more real estate and make working with larger diameter and odd shaped bottles easier. To add an inner rim you'll use the SwapTop set up as a grinder / shaper (or another model Inland glass grinder) with an UltraFine Grit grinding head.

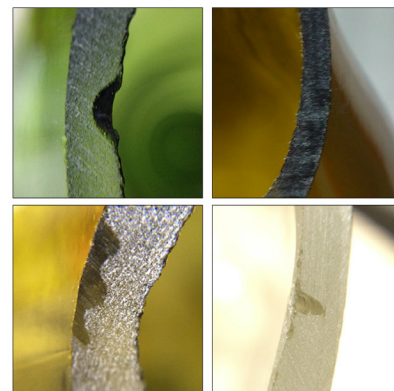
INITIAL SHAPING & SMOOTHING

Install a 325 grit lap on to your flat lap machine following the instructions in the user guide.

1. Make sure the coolant reservoir is filled with water; you can add a capful of DiamondCoolant™ (Inland no. 50011) if desired. Adjust the drip rate to a 1-2 drops every second or two, increasing the flow rate if a dry powder forms on the lap or bottle while working it.
2. Turn on the machine and turn the speed up to about 3/4 of full to start. You can increase or decrease the speed as needed to balance grinding speed while maintaining control of the piece.
3. Bring the cut side straight down onto the lap then start moving the piece back and forth across the lap surface while rotating it in circles. Let the lap do the work; pushing into the lap will not make it grind faster or better, rather the opposite will occur.
4. If your cut wasn't quite level, use this lap to fix that by grinding down the higher parts until you have a level edge. Continually check your progress - it's easy to over-grind!
5. Work the edge until the surface takes on a uniform frosted appearance. Check by rinsing the edge and holding it up to the light; it should look like it has been evenly sandblasted. If any portion looks pitted, chipped or you see clear divots, go back to the lap and grind a bit more then rinse and re-check. Repeat until the entire edge has a uniform frosted look.



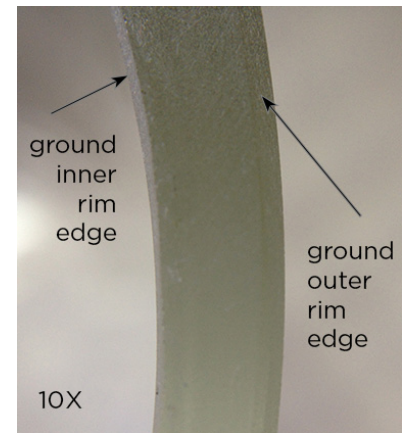
avoid leaving areas like these, as they will not be removed in the next steps . . .



Take your time on this step! Getting that uniform surface now is critical to having a nice finished edge in the end. Any deep lines, scratches, scales or pits that appear at this point will not be removed in further steps or polished out in the end and to remove them you will need to come back to this step. When you are done with the 325 grit lap it's time to decide whether or not to shape a rim.

SHAPING RIMS

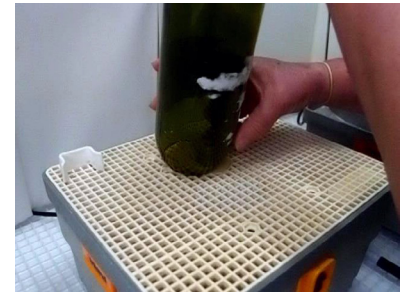
The rim on commercial glassware is part of the production process that involves temperatures between 1100-1300°F and then cooling them in a controlled manner, called annealing. Firepolishing is a technique where the item is put in a kiln and the temperature raised just to the point where a smooth, polished edge forms then the piece is annealed. A similar result is achieved using a 600 grit UltraFine bit and a 600 grit flat lap to round over the edges. Rounding the edges first helps reduce and correct any chipping that can happen if you finish the cut edge first and then round the edges. You can opt to skip rounding off one or both of the edges, going directly to **FINAL SMOOTHING and PREPOLISH** but we think knocking off the edges, even just a tiny bit, makes for a smoother, safer, and better looking end product.



SHAPING THE INNER RIM EDGE

This step uses the SwapTop set up as a grinder with a 600 grit UltraFine bit, but you can use any model glass grinder. Choose either a 3/4" or 1" (depending on your grinder model) but a 3/4" bit is better suited for smaller diameter openings and getting into the inside curves of square bottles.

1. Set up the SwapTop as a grinder / shaper. Install the 600 grit UltraFine diamond head so that at least 3/4 of the diamond is above the work surface. If the bit is set too low, it reduces the angle you can grind and increases the likelihood of catching on the brass top or grinding up too high.
2. Remove the splash guard behind the bit and make sure that sponge is in position. Turn your SwapTop motor up to full speed and check to make sure the sponge is feeding coolant from the reservoir up to the bit surface.
3. It is helpful to use a piece of tape or make a tic mark on the bottle as a visual start / stop marker. Hold the bottle upside down, opening centered over the bit and bring it down over the bit and onto the grid surface - the bit is in the center of the opening but you are not grinding anything at this point!
4. Now tilt the bottle toward you at about a 20°-30° angle from vertical. Holding this position, bring the bottle into the bit to begin grinding. Spin the bottle around the bit as you continue to hold the angle until you have ground around the entire inner edge (this is why having a marked start/stop point is helpful).
5. Don't force the bottle into the bit! This is a very fine grit and removes glass slowly but smoothly which is what you want. Generally two or three passes around the bottle is sufficient to knock back the inner edge. Depending on the thickness of the glass you may want to take it back more or less.



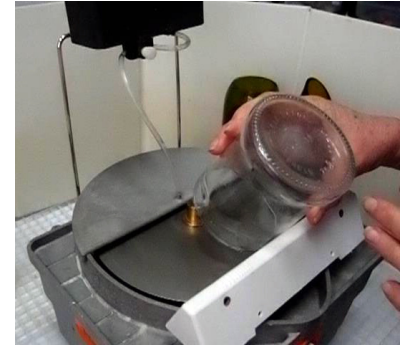
It will take some practice to get a feel for the angle, how best to hold the bottle (depends on size and shape), how fast to spin the bottle, and how many passes to make.

SHAPING THE OUTER RIM EDGE

This step uses the SwapTop flat lap set up with a 600 grit lap and a 22.5°/60° Angle Bar. Make sure you have thoroughly rinsed and cleaned the work surface, arbor, and master lap of any residue from the 325 grit lap; you don't want to contaminate the 600 grit lap with 325 grit residue. The 600 grit lap is used to round over the outer edge and smooth out the surfaces left by the 325 grit lap, making it ready for polishing.

1. Make sure the coolant reservoir is filled with water; you can add a capful of DiamondCoolant™ (Inland no. 50011) if desired. Adjust the drip rate to a 1-2 drops every second or two, increasing the flow rate if a dry powder forms on the lap or bottle while working it.

2. It's helpful to use a piece of tape or make a tic mark on the side of the bottle as a start / stop marker. Turn on the machine and turn the speed up to about 3/4 of full to start. You can increase or decrease the speed as needed to balance grinding speed while maintaining control of the piece.
3. To help steady the bottle and control the angle we used the 22.5° side of the 22.5°/60° Angle Bar. Set the bar into the work surface holes with the 22.5° side facing toward the arbor.
4. Start by resting the bottle against the bar and then slowly slide it straight down (avoid tilting it to right or left) into the lap then start spinning the bottle as you hold it against the angle bar. Continue turning the bottle until you have ground the entire outer edge (this is why having a marked start/stop point is helpful).
5. Don't force the bottle into the lap! This is a very fine grit and removes glass slowly but smoothly which is what you want. Generally two or three passes around the bottle is sufficient to knock back the outer edge; remember the longer you grind the more of the edge you remove. Depending on the thickness of the glass you may want to take it back more or less.
6. You can freehand this step, holding the bottle at a 20°-30° angle to the lap surface as you spin it instead of using the angle bar but we believe you will get a more even and uniform edge using the angle bar.



When done continue on to **FINAL SMOOTHING AND PREPOLISHING** below.

FINAL SMOOTHING and PREPOLISH

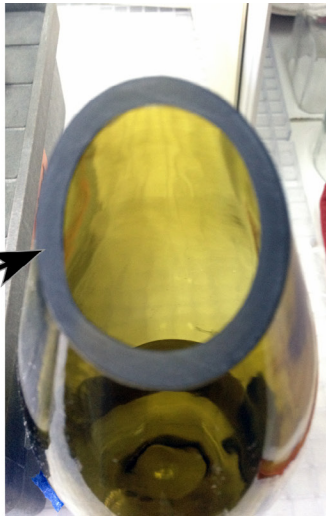
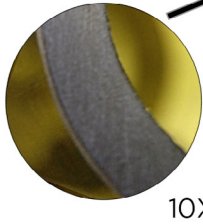
This is done on the SwapTop flat lap, set up with a 600 grit lap. If you added an outer rim you are ready to go, just remove the Angle Bar. If you opted for just an inner rim or no rims, thoroughly rinse and clean the work surface, arbor, and master lap of any residue from the 325 grit lap first before installing the 600 grit lap.

1. Make sure the coolant reservoir is filled with water; you can add a capful of DiamondCoolant™ (Inland no. 50011) if desired. Adjust the drip rate to a 1-2 drops every second or two, increasing the flow rate if a dry powder forms on the lap or bottle while working it.
2. Turn on the machine and turn the speed up to about 3/4 of full to start. You can increase or decrease the speed as needed to balance grinding speed while maintaining control of the piece.
3. Bring the piece straight down onto the lap and begin grinding moving it back and forth and turning it in circles. If you added rims, you're now working just the remaining flat, top surface.
4. Periodically rinse the piece and check your progress by holding it up to a bright light. Look for scratches or deeper lines that remain from the 325 grit lap - these need to be removed before moving on to polishing. Continue grinding and checking until you have a smooth, satiny looking surface; like it has been etched.

You can now move on to polishing or you can stop here depending on the piece's use and the desired appearance. At this stage if you like the look, the cut edge should be smooth, safe to touch and suitable for pieces being used as vases, plant rooters, candle holders, and so forth. Move on to polishing if the final use is as a drinking glass or you want the edge to have a higher, glassy-shine finish.



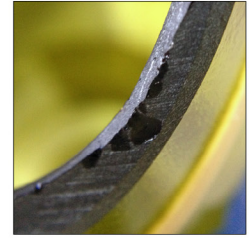
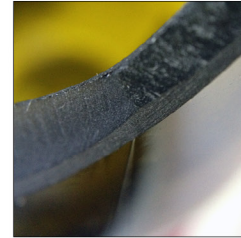
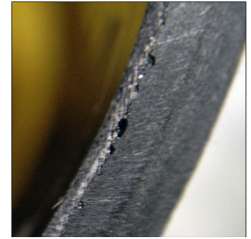
after the 600 grit lap, you should have a smooth and evenly etched appearance



this edge is ready for final polishing

you can also choose to leave it at this point as finished

areas like these need additional grinding before going to the final polish step, they can't and won't be polished out



STEP 3: POLISHING

This is the step that makes the edge very smooth and gives it that transparent, shiny finish. Polishing is simply the process of making the scratches in the material more and more fine until they are so fine you don't see them as scratches but as a uniform, smooth surface. The key to a good polish is making sure all the scratches from the previous step are removed before going onto the next - i. e. all the scratches from the 325 grit lap must be removed by the 600 grit lap before moving on to the 14000 grit diamond paste. Any 325 grit scratches remaining when you move from the 600 grit lap to the 14000 grit diamond paste will remain and no matter how much you try, the 14000 grit won't take them out.

The type of glass and just how shiny you want the edge to be dictates whether polishing is a single or multiple step process. Try the single step polish first. If the result is not what you want, then go to one of the multiple step process.

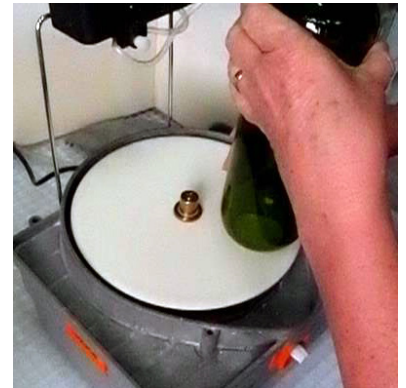
Single Step Polishing with 14000 Grit Diamond Paste

Remove the 600 grit lap and VERY thoroughly rinse and clean the reservoir, arbor, and master lap. It is VERY important that you don't contaminate the polishing lap with any grit from previous steps. You also need a container of clean water to dip and rinse the glass in as you work.

1. Apply the felt pad to the master and install on your machine. We highly recommend having a dedicated master lap for each polishing grit you may use. It's much easier to keep a dedicated polishing lap free from contamination and have errant grit ruin all the work you have done to this point.
2. A new pad will need to be charged before use. Wet the pad by brushing the surface with clean water using a clean sponge brush then briefly turn the machine on and off to spin off excess water. Then squeeze the syringe plunger of the 14000 grit diamond paste to apply a series of small dots around the pad surface; about a dozen on a 6" pad, and 16 or so on an 8" pad to start. Once the pad is charged you only apply additional diamond compound occasionally, when you notice that the pad is no longer polishing.
3. You do not use the water drip during polishing as it would quickly rinse away the diamond paste from the pad. Remove the Drip Guide / Cover to give you more working space.



4. Turn on the machine and turn the speed up to full. Polishing is done at higher speeds. If you find it difficult to hold or control the piece, turn the speed down just to the point you have control. You need to create enough friction and heat so the polishing agent, here the 14000 grit diamond paste, brings up a shiny, smooth surface. At the same time you don't want to get it hot to the point the glass fractures. Polishing is all about developing a feel for this balance.
5. Bring the piece down evenly onto the polishing pad and apply pressure to the point you feel resistance and / or hear a pitch change in the motor. DON'T press so hard that you bog the motor or stall the lap. Move the piece back and forth across the pad surface, rotating it as you go. Polish the out rim edge by tilting the piece at an angle to the polishing pad.
6. Periodically rinse and dry the edge to check your progress. If it doesn't seem like the edge is getting any smoother or shinier, try applying more pressure and / or keeping it in contact with the pad longer; the edge should feel very warm to hot. Note that the closer you are to the outer edge of the polishing pad, the faster it is spinning, creating more 'polishing action'.
7. If the diameter or shape of the piece is wider than your polishing pad you will need to work in sections and make sure to keep rotating the piece so all edges come in contact with the polishing pad.



The type of glass will effect just how clear and shiny the finished edge can get. The edge may be very smooth but still look a bit hazy. If the 14000 grit diamond paste does not produce the finish you want, then you might try this two step process:

Two Step Polishing with 3000 and 14000 Grit Diamond Pastes

1. Remove any laps or polishing pads and thoroughly rinse and clean the work surface, arbor, and master lap. It is VERY important that you don't contaminate polishing laps with any grit from previous steps. You will need an additional polishing pad for the 3000 grit diamond paste (you would already have a pad charged with 14000 grit diamond paste) and a container of clean water to dip and rinse the piece with.
2. Install the new polishing pad on the master lap. Follow the same process outline above in the 'SINGLE STEP POLISHING' to charge the pad and work the piece to a nearly clear finished edge.
3. Remove the 3,000 grit polishing pad, clean and rinse the work surface, arbor, and master lap (if you aren't using a dedicated grit and polishing pad set-up). Install the polishing pad with the 14000 grit diamond paste. Continue working the piece, polishing until you have a clear, transparent edge.

If the this two step process doesn't produce the look you want, try one of these other grinding and polishing combinations:



Other Polishing Combinations

These are just a few of the possible combinations you can try:

- After the 600 grit lap, try refining the edge using a 1200 grit lap and then go on to polish with the 14000 grit diamond paste as outlined in 'SINGLE STEP POLISHING' above.
- After the 600 grit lap, try refining the edge using a 3000 grit lap and then go on to polish with the 14000 grit diamond paste as outlined in 'SINGLE STEP POLISHING' above.

- After the 600 grit lap, try refining the edge using a 1200 grit lap and then go on to using the 3000 and 14000 grit diamond pastes as outlined in ‘TWO STEP POLISHING’ above.
- Try using cerium oxide (Inland Polishing Compound, no. 50037) as the polishing agent instead of 14000 grit diamond paste. The process is the same as outlined in ‘SINGLE STEP POLISHING’ above other than you charge the new pad with cerium oxide:

Mix the Polishing Compound according to its directions. Use the sponge brush to paint radial lines onto the wetted felt polishing pad, dividing it into thirds or quarters, like a small pizza. A new felt pad may need additional applications until it becomes “charged”. Once charged you only need to apply addition Polishing Compound when you notice that the pad is no longer polishing. **NOTE:** Using excess cerium oxide can form balls under the surface being polished and make scratches.

TIPS

- Practice on unimportant pieces first!
- Take your time on each grit step to make sure your edge is uniform before moving on. Rushing a step will only mean having to go back and do the work all over again.
- Set up a production process, working multiple pieces through each step rather than taking one piece through the entire process each time. It’s much easier to get a feel for that particular step, you’ll work faster, and your results will be more consistent.
- When polishing bottles cut on an angle, hold the bottle so the lap spins across the cut, low side to high, pointed side. Holding with the pointed upper edge into the pad can cause that edge to catch and rip apart your polishing pad.
- You may it helpful to wear latex or rubber gloves to help better hold the glass while working.
- Grit contamination is your enemy! Thoroughly rinse and clean the work surface, arbor, and master lap of any residues between steps. Rinse and store your fine grit laps individually to avoid grit carryover.
- Use dedicated master laps with pads for each polishing agent. Store individually to avoid contamination.
- Work under good light and keep a container of clean water handy for rinsing and checking your progress.



SUMMARY

Now that you have the process, with a bit of practice you’ll soon be turning out all kinds of fun, interesting, and useful glassware and look at every empty bottle with new possibilities!





building what we'd like to own.

Upcycling Bottles into Glassware - Product List

The machines and supplies you need to turn bottles into glassware using this guide are listed below in a couple of different configurations. What you need to purchase will depend partly on what option you want to use to cut your bottles (diamond band saw or diamond trim saw) and what machines you already own.

If you do not own any Inland machines

Inland 8" All-In-Wonder™ Complete Lapidary Workshop - Inland no. 10890: Although created for lapidary work it has nearly everything you need. It is based on the SwapTop™ system and has all the parts to set up the 6 1/2" SwapTop Diamond Trim Saw to saw most round bottles; the Grinder / Shaper for creating rims, and the 8" Flat Lap with the diamond laps for shaping and finishing (325, 600 plus a 170 and 1200) plus felt pad, master lap, and 14,000 grit diamond compound for polishing. You will need to purchase a 1" (25mm) 600Grit diamond bit, Inland no. 40690, as the 100Grit bit included with the All-In-Wonder is too coarse.

If you own a SwapTop

If you already own a SwapTop then you will just need the conversion kits you are missing as you already own the base and motor unit. For example if you already have the SwapTop Flat Lap then you would buy the conversion kits to make the diamond trim saw and the grinder / shaper. The conversion kits include:

- **SwapTop 8" Flat Lap Conversion Kit - Inland 10885:** Includes the flat lap reservoir with disc cover, brass arbor, splashguard, 8" diamond laps(1 each of 275, 325, 600, 1200 grit), polishing pad, master laps, WaterDrip™ System, Allen wrenches, 14,000 Grit Diamond Compound, instruction guide.
- **SwapTop Diamond Trim Saw Conversion Kit - Inland no. 10675:** Includes the trim saw work surface with molded nylon insert, blade arbor, blade guard, 6 1/2" diamond coated blade, wrench, protractor guide, drain hose, WaterDrip AddOn™ kit, instruction guide.
- **SwapTop Grinder / Shaper Conversion Kit - Inland no. 10655:** Includes reservoir top, reversible grid surface, 1" (25mm) 100Grit^{††} diamond bit, BitSert™ with splash guard, instruction guide. ^{††} You would need to purchase a 1" (25mm) 600Grit diamond bit as the 100Grit bit included is too coarse.

Options and alternatives

These items are shown in the guide and videos and offered as options that will enhance the process and end product or mentioned as alternative methods to try:

- **DB-100™ Diamond Band Saw - Inland no. 91010 or 91030:** Will handle just about any bottle and cut you want including: straight, angled, square and odd shaped bottles, cuts high on the neck, textured bottles, and larger diameter bottles.
- **8" Master Lap - Inland no. 438001:** Having a dedicated master for every polishing pad greatly reduces the possibility of contamination.
- **8" Felt Pads - Inland 438005:** If you are going to use other grits or types of polishing compound then you will need a felt pad dedicated just to that grit or polishing medium.
- **3,000 Grit Diamond Compound - Inland no. 450612:** Alternative polishing process.
- **Inland Polishing Powder w/ Brush - Inland no. 50037:** Alternative polishing process.
- **8" 3000 Grit Diamond Flat Lap - Inland no. 438300:** Alternative polishing process.
- **SwapTop™ Saw Rip Fence - Inland no. 69801661:** Aid for bottle cutting on SwapTop saw.
- **22.5/60° Angle Bar for Flat Lap - Inland no. 73801277:** Aid for grinding rims on the flat lap.