



COOL TOOLS

## Tumbler Barrel Contamination & Tumbler Tarnish

Have you opened your rotary tumbler barrel expecting sparkling, shiny jewelry and instead found your silver covered in either a black sludge, a yellowish, bronzy or black film? For those of you with a magnetic tumbler, has it ever served you up dark grey water and dull, greyish silver? It can be quite a shock and very puzzling when it happens, but there is a logical explanation, cure and treatment for this tumbler affliction.

### Rubber Barrel Breakdown: What Causes It

If your pieces come out of the tumbler covered or splotched in a sticky yellow, bronze, or black sludge your tumbler barrel is breaking down. The type of rubber used to manufacture the barrels is called SBR (Styrene Butadiene). SBR is a man-made rubber. The same type that automobile tires are made from. In order for a rubber to be called SBR it must contain certain components. The raw materials for making the SBR compound come from several sources around the world and are not always the same quality. SBR rubbers can be the same compound technically from batch to batch, but because the raw materials vary somewhat, the finished product may have more or less resistance to chemicals.

All SBR rubbers are susceptible to attack and breakdown in the presence of certain harsh chemicals and can even be attacked by a mild soap and water if the quality of the rubber is poor. While the US tumbler manufacturers purchase quality raw materials, the inexpensive tumblers from China (mainly marketed for rock tumbling) use sub-standard SBR that has a higher oil content and more carbon black filler than most. The extra carbon black makes them more prone to breakdown than the US brands.

### Chemicals known to attack SBR rubber that should not be used in a rubber barrel:

- Ammonia
- High alkaline solutions (such as borax)
- Solvent based solutions (such as acetone, citrus cleaner)
- Bleach
- Mild chemicals in high concentration (such as soaps)

People have reported yellow, bronze or black contamination while running distilled water and various soaps, tap water and various soaps, and burnishing compound with either tap or distilled water. While the breakdown is most common when a tumbler is new, there have been many reports of the contamination after many uses. If you experience the barrel breakdown after many uses, something has changed in what you are doing. Even mild soaps used in high concentration can kick off a tumbler meltdown where there has never been one before. When the tumbler barrel first starts to break down, the pieces will come out covered in a yellow film. As it breaks down further, the film will become bronze and continue darkening until it becomes a black sludge. What you are seeing is how much carbon black and oil is being leached from the rubber. You may not notice the stages of the breakdown since it can happen within a few hours. Some people leave their work running overnight and open the container to find the dreaded black contamination. If you touch the inside of the tumbler barrel that has begun to break down, it will feel anything from tacky to downright sticky.





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### How to Clean a Contaminated Barrel

Most people have had luck running flat Coca Cola in their tumbler as a cleaner. The active ingredient in Coke is phosphoric acid which is a corrosive chemical used as a rust remover on steel and iron and is also an ingredient in pH Down (which many people use as a pickle). The pH of Coke is extremely acidic, ranging from 2.8 for Classic Coke to 4.5 for other Coke versions. It seems to strip the goo from the barrel. Vinegar and lemon juice have a similar pH, so these would probably work as well. LimeAway and CLR have a pH of 1-1.5 and have been reported to work. Run your tumbler in 20 minute cycles with your cleaner and your shot, rinsing well between each cycle until your shot is shiny and clean. Once your tumbler and shot is clean, run only very mild soap and water in the tumbler to avoid having this problem again. A pH neutral or slightly alkaline soap would be best, such as castile or ivory soap. Be sure to clean your items well before tumbling so you do not introduce foreign substances into the barrel that might induce the contamination.

To clean the sludge from silver, you can use a toothbrush and any of the low pH substances assuming you do not have chemically sensitive stones embedded. You could also run the dirty pieces in one or more of the cleaning cycles for a hands-off approach.

This low pH cleaning method does not always work because some rubber barrels were made with unstable rubber or have been so damaged that they are beyond repair. (According to the rubber manufacturers I spoke with, there is no way to repair SBR after it has begun to deteriorate). What has not worked as a barrel cleaner for most people is anything that is highly alkaline (pH over 8.5) because alkaline substances cause the breakdown of the rubber. High alkaline substances are ammonia, orange cleaners, simple green, and 20 Mule Team Borax to name a few.

### Avoiding Barrel Breakdown in New Tumblers

If you have just purchased a new tumbler with a rubber barrel and new shot, you need to run the shot in vinegar and water (50/50) for at least three 20 minute cycles, and then a 20 minute rinse cycle with water and about 2T baking soda. If you have one of the Chinese tumblers, you are probably safest running just plain water with 1 drop of castile, pH neutral or ivory soap. Burnishing compound may be too caustic, so should be diluted to 50% of recommended strength for good measure. If you have a Lortone or Thumblers model tumblers, they are much more stable, but be careful not to make your burnishing compounds too concentrated or cut back to 50% strength to be on the safe side.

Run short cycles and check the water frequently. If you find a batch that is beginning to yellow, this is the first sign of breakdown. Run a cleaning cycle and stop using whatever burnishing compound you were using or dilute it 50% of the strength you were using. If it continues to happen, then the barrel is not going to give you good service and it should be replaced.

### Tarnishing in the Tumbler: What Causes It

If your pieces come out of the tumbler covered in a gray film and the burnishing solution is also gray, your pieces are tarnishing (oxidizing) during tumbling. This is caused by a highly alkaline solution. The pH in the water can be raised by too much soap, too strong a burnishing solution, shot that is already dirty, new shot that has not been cleaned, or the water itself may be already elevated in pH due to local conditions.

If you experience oxidized silver after tumbling and you are using only a drop of soap or burnishing solution diluted according to directions, rinse the shot and tumbler barrel well. Run water only and 2T baking soda in the tumbler for 20 minutes. Then run only plain water for 1 hour with a piece of silver. If the water looks gray and/or the silver looks tarnished, you should switch to distilled water.

Pieces that have been tumble tarnished are very difficult to clean. The longer the pieces tumble in an alkaline environment where oxides have formed, the harder it will be to remove them. A quick dip in silver dip solution or an extended pickle bath should dissolve the oxides.



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### Manufacturers Recommendations

It is recommended to run cycles of no more than ½ hour before changing your burnishing compound and not to re-use it. If your pieces are taking overnight to tumble, then your shot to barrel size ratio and/or water to shot ratio is off and you should adjust the mix to achieve faster/better results. Always clean your pieces before introducing them into the tumbler

#### Note

A good cleaner/degreaser solution is 1 cup warm water with about 1/2 tsp dish soap and about 1 tsp ammonia. Use a toothbrush to clean the piece and then rinse in clear water. A dip in a solution of water and baking soda can be used to guarantee neutralization of the ammonia.

Shot should be cleaned before using for the first time to remove oils and manufacturing residues from it. Tumble your shot with 50/50 vinegar and water for 3 cycles of 20 minutes each, rinsing well between each cycle. Then run a final rinse cycle of 20 minutes with 2T baking soda and rinse well. Then you can make your burnishing solution and tumble as usual.

Maintain separate barrels for different metals or media to avoid contamination. If you want to make beach glass, then you should use a different barrel for this process since you will be using sand as the media which will contaminate the barrel.

Do not leave burnishing compounds sitting in the tumbler when not in use.

The correct ratio of water/shot and work in a 3lb tumbler is 1lb shot just barely covered with water, 1 drop of a neutral pH soap and about 1 cup of work maximum. A 3lb tumbler is designed to hold NO MORE than 3 pounds of total weight, which means the total weight of the barrel with the shot and the water and the workpieces placed on a scale can not exceed 3lbs.

### Shopping for a Tumbler?

If you are just now shopping for a rotary tumbler with a rubber barrel, think "buy American". The tumblers made in the USA are quality machines. The US brands are more expensive, but they are better made, more resistant to breakdown and help to keep our economy healthy. If you are able to check out a tumbler in person you can get a good idea of how stable the rubber is to begin with. Take a piece of white paper and wipe it across the inside of the barrel. If it shows a black residue, don't buy it. It's already in a state of breakdown.

Consider purchasing a tumbler with a polyethylene barrel. These types do not break down because they are made of a different material that is much more resistant to chemicals. These types can still produce oxidized silver if the pH is too high. Most professional grade tumblers have a polyethylene barrel. All of the vibratory tumblers that I'm aware of have this type of barrel. Magnetic tumblers look like blenders and have a clear polycarbonate "barrel" that cannot break down.

#### Brands that have a polyethylene barrel:

Raytech  
Micro-Sonic  
Mini-Sonic