

BATT™ Cast Alloy Laps - User's Instructions

Information from Gearloose

The laps are hard enough to ring like a bell when struck, unlike pure tin or tin/lead...but they WILL bend if force is used to pry them off a spindle, or if they are dropped or stepped on, etc. (One person rolled over one in his chair. Things happen.).

Their unique grain structure is grown from the melt. Dropping them onto a hard surface can damage the grain structure of the metal so that if the "bump" is dressed or machined to a true surface, the damaged area may show different wear properties. So handle them with as much care as your other laps.

The laps are cast and machined as simple disks. This way, they can be turned over for a second grit size, or can be resurfaced many times. Some faceters prefer using one side for diamond and the other for oxide polishes.

Choice of Polishes:

The new BATT™ alloy has been tested with many aluminium oxide and cerium oxide suspensions. Originally developed for diamond, the BATT has been proven superior for use by "Oxide Fans". A light touch and low concentration is recommended, because many of these polishes, and the aluminas in particular, can be fast and aggressive and can quickly overheat the stone if allowed to run dry.

Charge the lap before cutting a first stone with diamond. If you are patient, you can skip the charging step, by simply applying diamond compound frequently. As the diamond continues to sink into the lap, less and less will be used.

THE PRESENCE OF METAL DEPOSITED ON THE FACET SURFACE ALWAYS MEANS THERE IS NOT ENOUGH DIAMOND PRESENT!

The diamond does the cutting or polishing, NOT the lap itself.

Load the lap well with diamond compound, or, preferably, diamond powder and a little oil to make a stiff paste. Polish a scrap piece of quartz, topaz, sapphire, etc, sweeping the lap to insure uniform spreading and abrasive loading. After a minute or two you will see the finish begin to improve as diamond is taken into the softer domains of the alloy. Metal being smeared on the stone, (or on any facet during cutting) is an indication that the lap is "seeing" the stone..Apply more polish (diamond, Cerium oxide, whatever you are using.).

You can see an illustrated example, including a VIDEO at <http://www.battlap.com/charging.html>

GENERAL TIPS FOR USE WITH BATT™ LAPS:

1. If using diamond compounds, charge before using for quickest benefits.
2. **SWEEP THE LAP.** When polishing a facet, move the stone from the inside of the lap to the outside. It is a good habit to develop for the following reasons: First, it spreads wear uniformly so the lap will break in and burnish well. Since the laps are made on a lathe, when new they have microscopic annular grooves, like a phonograph record. If the lap is swept, these grooves will not create an impression on the facet. Sweeping any metal lap allows it to break in better and last much longer.

3. USE LITTLE OR NO WATER. BATT™ laps are designed for their low frictional value. Only a thin film of "dew" is needed for adequate cooling and swarf removal. Too much water wastes polish and wears the lap faster.

In recent years, users have found that BATT™ laps can be used for cutting!

When charged with 220 or 325 grits, much water needs to be used to remove the swarf quickly generated...It comes off looking like milk. One user called the Coarse charged BATT™ a "Stump grinder".

(The BATT™ was originally designed to be a polishing lap, and polishing is the process that used to give users the worst headaches, so these instructions are focussed on polishing.)

There has been an increasing trend in recent years not to use water on BATT™ laps at all. Users report the use of WD40™ prevents lap fouling by quartzes and allows much faster polishing.

The best tip for fast and superior polishing is, after the lap has been broken in on a few stones, to wipe the lap almost dry, removing swarf, "Black Stuff", and excess compound. Try for a "Monolayer" or remaining compound. Four sweeps with 50K after a 3K prepolish usually produces a finely polished facet on most 1-2 carat stones.

4. Developed for HIGH SPEEDS! Users report that speeds of 800-1,000 RPM on 8" BATT™ laps produce excellent finishes without overheating. The User's transition from tin or tin/lead laps to BATT™ is fairly easy. If you have never used a metal lap, experiment!

Transfer of metal to the stone:

Usually when any new lap transfers a metal film to a stone being polished, it means there is not yet sufficient polish into the surface. It took me a while to figure this out, and the first stone I did was an emerald. The flaws in the emerald were PACKED with metal! However, by the third stone or so, it never did it again.

Another thing is that these do not use as much water coolant...Do not flood the polish off. It is the polish which does the work, not the metal. It sounds simple, but it is not that obvious. Do NOT use vinegar. There is no need for it, and it will shorten the charge life. The metallurgy and surface characteristics have been optimized for oil or water, not acids. The oxides which normally form in use are hydrophilic already. If you continually etch them away with acids, the lap may not break in as well.

Troubleshooting:

Scratches: Like most metal laps, BATT™ is softer than gemstones, and by itself, cannot scratch. However, it will "do its job" and hold abrasive particles.

The following is drawn from case histories that have been solved by working with BATT owners:

CONTAMINATION:

Case 1: A worn 1200 grit plated prepolish lap was throwing out diamond particles, contaminating the machine, the faceting head, and the dops. These particles were taken up by the polishing lap, and produced fine "Cat Hair" scratches in the finished facet.

Case 2: Cooling water in the drip tank was taken from a tap during a drought. The well pump was pumping SAND.

Case 3: A person was cutting green Cubic Zirconia. Some synthetic materials are not well strain relieved. Tiny chips and flakes were coming off the CZ, and embedding in the lap.

OVERCHARGING:

A particular type of "Horsetail" or "Comet-like" scratch will form if the lap is overloaded with diamond. Under shear and pressure at the lap-stone interface, agglomerated lumps of polish break up under the facet.

CURE:

Use an artgum or similar rubber eraser on the dry rotating lap. (Not the common red type, which contains mineral abrasives!)

Like graphite, diamond has a great affinity for rubber. The excess diamond will be plucked from the lap and will leave with the "eraser crumbs".

SUBSURFACE DAMAGE:

If you use a #170 grit to shape or preform the stone you will have to remove a MILLIMETER of material to get below the scratches, scores, and strains!!! The stone will look fine, all the way through prepolish, but when you begin to polish, you will see a particular type of scratch that is a line with an occasional "starburst" or fracture mark.-----*-----**-----*

Think of how they cut glass in the hardware store! They score it with a cutting wheel or a diamond scribe. The strain on this line is so great the glass breaks cleanly all the way through. Look at such a scored line! Familiar? Doesn't it look JUST LIKE the scratches you are seeing from using a coarse grit early on?

If you have a #170 or a #180/220 "split grit" lap, and are not prepared to take off a lot of material with a #600 or #1200, THROW THE COARSE LAP AWAY or give it to a cabber. Often you may be surprised to find that a finer lap in good condition can actually cut faster because there are more diamond particles bonded to the lap per unit area.

THINGS WE LEARNED OVER TIME:

Faster easier charging, for polish or prepolish grits:

- Take a clean dry BATT™ or BA5T lap.
- Wipe lightly with a WD-40 dampened tissue.
- Wipe nearly dry.
- Rub on with a clean fingertip a thin 'monolayer' of your chosen diamond powder, such as 50K for polish or 3K for prepolish.
- Use a test piece of corundum to set the diamond powder...OR just start polishing.
- When polish rate slows down, wipe off swarf and "Black Stuff" & repeat previous steps.

SWARF IS YOUR ENEMY! IT CAUSES DRAG, SCRATCHING, and HEATING!

Especially on CZ and garnets! (Remember, ALWAYS sweep the lap)

As you use the lap, less and less charge will be needed. This is neater and faster than the method shown in the video and produces an amazingly FAST polish!!!

Try it on a 3000 prepolish lap and watch what happens!

Too much lubricant prevents Work from being put into the stone, and causes hydroplaning and "Jetting" which transfers machining marks to the facet.

FRIABLE DIAMOND COMPOUNDS marketed for ceramic lap users do wonders for speed on ceramic laps because they break down the way cerium oxide does, giving superior speed, and ending with a beautiful polish.

They are **NOT** appropriate for these tin alloy laps, however, because the laps so readily take up diamond that the agglomerates do not receive enough shearing to fully break up. I found this out recently with a 60K product.

BATT™ for CUTTING!

I suppose everyone has heard about it by now, but some adventurous souls have been charging BATT™ laps with coarser diamond and using them for CUTTING. Because the charges are renewable, quartz fouling is no longer a nuisance.

Grits from #325 to #600 and #1200 have been used. Water coolant quickly turns white like milk because of the material removal rate loading the water with rock dust.

I myself intended the laps to be used for polishing and prepolishing, which proves the Manufacturer does not know EVERYTHING about the product's uses!

The material above has been taken from the Manufacturer's website (with permission).

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