Operating Instructions

Raytech

These instructions cover a series of Raytech Stone Finishing Kits: GSU-1 (35-056), GSH-2 (35-057)

Note: These instructions are broken down into three categories: Rotary Tumbling, Vibratory Laps, & Vibratory Tumbling. Also note that all kits except the GS-L1 Vibrating Lap Instructions, could be used for Vibratory or Rotary Tumblers. The following chart refers to the contents of each kit.

KIT TYPE	100/120	700F	IOLOX	RAYBRITE TL	IRONOX	GLOSSINE	CERAMBITS
GSU-1	*	*	*	*	*	*	*
GSH-2	*	*	*	*			

Section 1: Vibrating Lap Kit Instructions

- **Leveling The Lap:** Before starting work, the lap should be level. The degree of levelness is easily determined while the lap is running by checking the surface of a thin layer of water on a bare lap pan. Adjust the level of the lap until the film of water is even over the lap surface.

- **Quality Of The Starting Surface:** The time required to smooth a sawed stone surface on the vibrating lap depends, of course, on the quality of the surface to start with. A good, flat, ungrooved sawed surface may lap smooth in a few hours while a dished or grooved surface may take several days to finish. Before lapping is started, any protruding bumps or sharp edges on the stones should be ground smooth so that the fragments do not chip loose and scratch the surface being finished.

- **Weighting The Specimens:** Thin, unweighted slabs will take an excessive time to lap smooth and polish. If the stones to be finished are less than 1" thickness, it is recommended that weights, usually steel or lead, be attached to the specimen to bring the weight to about 1/4 pound for each square inch of stone surface being finished. Since specimens bang against each other and chip, it is recommended that rubber bands or plastic rings be placed around each specimen to isolate it from the others. While the chipped edges themselves may not be too objectionable, a more serious problem is that the chips may damage the surface of the specimen being smoothed.

Lapping Instructions

Step I - Rough Lapping: Pour water into the pan to a depth of about 1/4" and add 100/120 Grit which consists of 4 tablespoons for a 10" or 15" Vibrating Lap. Allow specimens to lap until all saw marks are removed. Since the rough lapping step will produce a very dull non-reflecting surface, it is difficult to discern when the lapped surfaces are completely flat and free of saw marks. A good way to check for flatness is to draw a pencil line across the specimen. In a few minutes, further lapping will remove the lines and thus the specimen is flat. The lapping operation should be checked periodically to make sure that the water lost by evaporation is replaced. Several specimens can be lapped at one time. In fact, the pan can be practically filled and still function so long as there is still room for circulation of the specimens. For smooth finishing in all steps of lapping, it is best if the stones travel around the lap rather than stand still. If they remain in one spot, circular marks will be produced in the surface. If the lap is level and there is a sufficient number of specimens placed on it, there is usually little difficulty in keeping the specimens moving.

STONE KITS

Step II - Fine Lapping: First the pan should be removed from the machine and thoroughly washed to clean it completely. If a fine surface suitable for polishing is to be produced, it is essential that all coarse grit be removed from the lap. A good brush scrubbing with plenty of water is recommended. CAUTION: Do not wash lapping/tumbling sludge or grit into any drain. Grit will settle into traps and low spots in the piping and can cause serious stoppages. After the lap is thoroughly cleaned, it is to be refilled with 1/4" water and 4 tablespoons of 700F fine grit in the pan. Continue the fine lapping until the total lapped surface has a uniform luster. Any saw marks remaining from the first operation will soon show up in the fine grinding step. If a few of these show up, it is recommended that these be set aside and recycled through the lapping step with a subsequent batch.

Step III - Polishing:

- Clean the lap pan and bumper ring thoroughly. A single grain of coarse grit can ruin an otherwise beautiful polish. An old toothbrush makes a good scrubbing tool. Use plenty of running water while washing the pan.
- Thoroughly soak the polish pad in water and hold it by one edge to let the water drain from it. Allow the water to drain from the pad for a minute or two until it no longer forms a steady stream, but drips from the edge.
- Place the polishing pad in the pan, resin-coated side downward, and retain it with the bumper ring.
- Charge the polishing pad by sprinkling 4 tablespoons of Syntin & 1 teaspoon of Glossine polish evenly over the total pad surface.
- Rub the polish into the pad with the heel of the spoon, and then sprinkle on a little water to make a thick, creamy polish paste. One ounce of water should be sufficient for the 15" lap. Rub the polish into the pad once again.
- Scrub the fine lapped specimens thoroughly to remove any traces of grit. Be very careful to clean out any grit, which may be lodged in the cracks and crevices.
- Place the specimens on the charged pad, turn on the machine, and check the progress every hour or so. On small well-lapped specimens, a polish can be produced in 1-4 hours. Make sure the specimens circulate in the pan and add a little water from time to time if the pad becomes too dry.
- Once the pad is fully charged, it can be reused without washing or recharging as long as it does not become contaminated. The polish pad can be stored in a plastic bag to keep it clean. A little polish is usually added each time a new batch is processed. Note: may users prefer to use separate pans for each step in order to minimize the lap cleaning required. It is particularly helpful to save a separate pan for polishing since complete cleanliness is so important in the polishing step.

Section II: Rotary Tumbler Instructions

- **Barrel Fill Level:** The tumbler barrel should be approximately 2/3 to 3/4 full. A greater fill will reduce the grinding rate but will also reduce impact damages on the edges of the stone. A somewhat lower fill will increase the grinding speed and also any damage to delicate stones. Impact damages show up as a poor non-existent polish on the thin edges of the larger stones in the batch. It can be minimized by (a) increasing the fill level, (b) tumbling only smaller stones, (c) reducing the tumbler speed and (d) adding a cushioning agent. Plastic pellets are commonly used as a cushioning agent but are relatively ineffective when compared to a soluble cushioning agent such as Raytech's Glossine.
- **Tumbler Speed:** Tumbler manufacturers have determined suitable speeds for each of their machines. Greater speeds (up to the point where the stones are thrown rather than rolled) will grind faster. Slower speeds will cause less damage. Some tumblers have a fast speed for grinding and a slow speed for polishing.
- **Burping The Tumbler** Unless your tumbler is an open self-venting type, chemical reactions resulting from the tumbling operation may build up a pressure of explosive gasses. It is important that your tumbler be opened (burped) to eliminate the pressure each day unless you have determined through experience that your tumbler will not build up gas with the particular combination of barrel, grit, rock, water, etc that you are using.
- **Tumbling Procedure**
  The following instructions are for a batch of 1 quart of broken rock (approximately 3 pounds). This will require about 1 pint of water. In any case, the tumbler should be about 2/3 to 3/4 full and the amounts of grits and polishes for batches larger or smaller than 1 quart should be measured proportionately. For example, if your

tumbler will be 2/3 to 3/4 full with just 1 pint of broken rock, the amounts of grits and polishes are shown in the instructions should be cut in half (1 pint = 1/2 quart).

Step I: Rough Grinding:

Add 3 tablespoons of 100/120 grit per quart of broken rock. Add water just until the level can just be seen between the rocks on the surface. Tumble 2 weeks or more if the tumbler has a fast speed for grinding. Tumble 3 weeks or more if the tumbler is a single speed machine. Continue this step until the undesirable irregularities in the stones are eliminated. It is usually most practical to remove the stones which still have rough areas after 2 or 3 weeks and recycle them with the next tumbler batch. An excellent procedure is to rough tumble two batches and to select the best half of the lot to make up one batch for Step II. If the tumbler is an open type and looses water through evaporation, a small amount of water can be added to keep the grit water slurry to a creamy consistency. If, after 2 or 3 weeks of rough grinding, most of the stones are still not smooth to your satisfaction, it may be necessary to wash out the old grinding sludge and start over with new grit. In this case, it is important that the second tumbling in 100/120 rough grit continue for at least 2 to 3 weeks before proceeding to Step II. This is necessary so that the coarse grit will be crushed fine from the tumbling and produce a smooth surface ready for Step II, fine grinding.

CAUTION: Do not ever wash tumble grit or slurry down the drain.
The grit and slurry will settle in low spots in the pipes and seriously plug the plumbing.

Step II - Fine Grinding & Pre-Polishing: Add 2 tablespoons of Iolox per quart of rock. Add water until it can be seen between the rocks. Tumble 4-8 days until the stone surfaces are smooth with a satin luster. Finishes are usually improved with longer tumbling times. Burp daily.

Step III - Polishing: Add 2 tablespoons of Raybrite TL for hard stones or 2 tablespoons of Ironox for soft stones. Add water until it can be seen between the stones. Tumble 4-8 days until satisfactory polish is obtained. Burp daily or as required. If desired, stones may now be tumbled at a low speed with a water detergent for 10-20 minutes to wash off any adhering polish.

Washing Stones Between Steps: It is essential that between each step of tumbling, the stones and the tumbler barrel be very thoroughly washed to remove all adhering grit before going to the next step. Remember that just one grain of abrasive remaining in a crevice in a stone can ruin the results of the next step. After each step of tumbling, it is best to remove all stones with cracks and crevices and recycle them with the coarse grit in the next tumble batch. One way of cleaning the stones is to scrub each stone with a stiff brush such as a toothbrush. Tumbling the stones in a tumbler barrel with water and detergent is also helpful in cleaning both the barrel and stones. Since it is difficult to clean perfectly both the tumbler barrel and the stones, it is recommended that a separate barrel be kept for the polishing.

Section III: Vibratory Tumbler Instructions

The capacity of tumblers in gem rock is as follows: 8" bowl = 4 pounds & 10" bowl = 8 pounds. The tumbler bowl must be filled close to capacity for the tumbling action to be effective. If too much volume of stones is lost in the rough grinding step, it is better to take 2 batches of rough ground rock and choose only the best to continue with the subsequent steps. The stones will finish best if there is a mixture of sizes included. A considerable portion of small pieces of stones are helpful in finishing the hollow areas. For hard stones such as agates or jaspers, 1/4 cup in the 8" bowl and 1/3 cup in the 10" bowl or Cerambits used in step 2, 3 & 4 will provide excellent finishes in the hollow areas. Please note that Cerambits are reusable after cleaning. Stones of mixed hardness usually do not finish well if combined in the same batch. In most cases it is best to finish only one type of material at a time. It is also important that contamination from one step to the next be avoided if results are to be obtained. The stones should be washed and scrubbed thoroughly between steps. A second bowl is recommended for best result, otherwise, residual grit may imbed in the bowl and can prevent attainment of a good polish.

NOTE: All Containers Are Sold By Volume. Some Settling Will Occur In Shipping/ Handling.

Vibratory Tumbling Kit Chart:

Product/Grit	Quantity	Water Required	Typical Cycle Time	Comments
Silicone Carbide 100/120	2 tsp. - 8" bowl 2 tbs. -10" bowl	If Rocks Are Dry, Add 4 tbs. for 8" Bowl Or 2 Oz. For 10" Bowl. If Rocks Are Wet From Rinsing, Add Half The Quantities Above. If Tumbling Action Slows Down From Evaporation, Add Enough Water To Restore Action.	5 -10 Days	Rough Grinding Step
Silicone Carbide 700F	Same As Above	Same As Above	1- 2 Days	Fine Grinding Step
Turkish Emery Iolox	Same As Above	Same As Above, Double If Glossine Is Used.	1 Day	Excellent Pre-Polish Step For Hard Stones
Hard Stone Polish Raybrite TL	Same As Above	Same As Above, Double If Glossine Is Used.	1- 2 Days	Eliminate This Step For Soft Stones.
Soft Stone Polish Ironox	Same As Above	Same As Above, Double If Glossine Is Used.	1- 2 Days	Add Glossine For Soft Stone Polishing.
Cerambits	1/4 Cup - 8" bowl 1/3 Cup -10" bowl	N/A	N/A	Can Be Used On Any Step To Better Process Hollow Areas. Do Not Reuse For Polish.
Glossine	1 tsp - 8" bowl 1 tbs - 10" bowl	Same As Above, Double If Glossine Is Used.	N/A	Effective With Iolox, Ironox, & Raybrite TL As A Cushioning Agent

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