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INSTRUCTIONS FOR 6" COMBINATION UNITS
SILICON CARBIDE & DIAMOND

INTRODUCTION

The combination lapidary unit is a complete machine designed to saw, grind, sand and polish gemstone material. It will perform all the necessary functions for making cabochons.

DESCRIPTION

The unit is made with a heavy cast aluminum tank and pan. Sealed bearings mounted in rubber ensure a quiet and smooth operation. Speed control allows shaft rotation to vary between 1100 and 1725 RPM. An adjustable cab and wheel rest provide cabbing convenience. Removable hood permits quick access to wheels and drum.

Silicon Carbide Combination Unit comes with: 6" Covington Gold Blade, slab vise, water valves, wipers and drains, 100 grit and 220 grit 6" X 1" silicon carbide grinding wheels, expandable drum and leather polish buff. Starter kit includes koolerant, polish, brush, dop stick, dop wax, instructions and guarantee.

Diamond Combination Unit comes with: 6" Covington Gold Blade, slab vise, water valves, wipers and drains, 100 grit and 220 grit 6" X 1-1/2" metal bond diamond grinding wheels, expandable drum, 1200 grit diamond sanding belt and leather polish buff. Starter kit includes koolerant, dop stick, dop wax, 5- 400g silicon carbide abrasive belts, 5 gram syringe of 50,000 mesh diamond compound, 2 ounces of extender fluid, "How to Use Diamond Abrasives" book, instructions and guarantee.

Above units completely assembled with 1/3 HP, 110v Motor, cord switch, V-belt, belt guard mounted on Lam-I-Cushion base. Size: 25"L X 25"W X 14"H. Shipping weight 75 lbs.

INSTALLATION

Before plugging your unit into your electrical supply, read the Covington Safety Demands Sheet.

The unit base should be located on a sturdy, level bench to avoid vibration.

Rotation of the shaft should turn the blade or wheel toward you and down. Belt and guards should be in place.

MAINTENANCE

Proper care of blades and grinding wheels is essential. IMPORTANT - Follow the manufacturers instructions.

DIAMOND BLADES: **DO NOT RUN DRY** or the heat generated will ruin the blade. Eventually the blade may become dull. This is caused by matrix residue glazing over the diamonds. To sharpen, use a 220 grit soft bond silicon carbide dressing stick. Mortar or soft red brick is also useful in removing the glaze.

SILICON CARBIDE GRINDING WHEELS: Keep the wheel flushed clean so dust will not form, it is hazardous to your health to breathe the dust. Heat generated by dry grinding can damage the material being ground. DO NOT ALLOW WATER TO BE ABSORBED BY THE WHEEL AS IT WILL UPSET ITS BALANCE.

The wheel will wear with use, although not rapidly. If the surface becomes grooved or wavy, it may be dressed by using a coarse (60 grit) silicon carbide dressing stick. Run dressing stick across the face of the wheel using heavy pressure and continuous water spray. Flush away all loose grit.

CABOCHON CUTTING

Cabochon cutting may be divided into four separate operations: (1) sawing, (2) grinding, (3) sanding, (4) polishing. The rough gem material as found or mined often requires reduction to proper shape, hence sawing is usually the first operation.. The grinding wheels reduce the stone to the proper shape, while the sanding and polishing operations give the surface of the cabochon a high glossy finish.

PREPARING TO SAW

Before you begin to saw, check to make sure that the arbor hole in the blade is the correct size for the shaft; there must be no play. Shaft collars must fit evenly against the blade. Be sure there is no dirt between the collars and the blade. Koolerant should be poured into the tank until the surface level comes up about 1/4 inch onto the rim of the blade. When the blade is running it should bring up a constant, fine spray of Koolerant. DO NOT put in so much Koolerant that it splashes. Use a small sponge placed flat in the back of the tank to prevent splashing, if necessary.

Eventually the Koolerant will become dirty and full of sludge. Then the tank should be thoroughly cleaned and new Koolerant added.

SLAB VISE

Fit the vise guide over the left sidewall of the tank. Move the vise adjacent and in front of the blade. Adjust load laterally for the desired slab thickness. Gently push the load into the revolving blade. The result should be a slab of uniform thickness.

TRIMMING ROUGH MATERIAL AND PEBBLES

Small pieces or rough gem material may be trimmed by placing a reasonably flat side on the trim saw table. Grip both sides of the material firmly. Gently push the material into the revolving blade, sawing only in straight lines. If there are no flat spots on the material, flatten one side on a grinding wheel. Pebbles may be handled the same way, but be careful that they do not roll or slip from your fingers. A much safer way to saw pebbles is to use a sawing jig or small vise.

TRIMMING SLABS

Gemstone slabs are much easier to trim than rough material or pebbles. First, make the design you wish to cut on the side of the slab that will be the bottom of the gem. mark straight lines around the design then saw along the lines with firm but gentle pressure. If you must make an angling cut, first saw a slight notch at the edge of the stone, then turn the slab to the angle desired and continue sawing.

DOPPING

Prior to grinding or sanding, it is advisable to mount or "dop" the gemstone on a small rounded wooden stick. Mounted in this fashion, the stone is much easier to handle in the grinding, sanding, and polishing operations.

Melt some of the dop wax over a low flame and at the same time warm the stone. Dip the end of the stick into the melted dop wax and press on to the bottom of the stone to be worked.

GRINDING

After outlining the gem's design, grind away material around the outline. Hold the stone so the wheel cuts from the bottom to the top of the gem. **USE LIGHT PRESSURE**. Space does not permit detailed instruction on grinding techniques; however, a number of good reference books are available.

The coarse (100 grit) wheel is used for shaping the cabochon: the medium (220 grit) wheel for refining the shape, i.e. removing ridgelines.

SANDING

Expand belt sanding will remove the bumps and scratches left by the grinding process and give the cabochon its final shape and size. A 400 grit silicon carbide belt is recommended for this.

After sanding, dry the cabochon and inspect it under a bright light. All scratches and blemishes must be removed during this process.

A 1200 grit diamond belt is an excellent pre-polish smoother for the final preparation of the cabochon before polishing. It should be used only to remove slight imperfections and hairline scratches.

POLISHING

The final step is polishing. Polishing does not remove any material. If scratches develop, the stone must be re-sanded.

Polish Powder: Mix some polish powder with water to the consistency of cream. Brush this mixture on the buff. Another method is to dip the gem into water and then the polish powder. The powder will transfer from the stone to the buff during polishing. Work the stone on the buff with light pressure. Occasionally you may need to add powder to the buff (use sparingly). IMPORTANT - DO NOT allow the stone to get too hot.

Diamond Compound: Diamond compound is available in syringes that make it easy to apply. Along the sides of the syringes are graduated marks that let you know how to use. Apply the compound in tiny dots. After the dots have been applied, spread them evenly across the leather pad with your fingertip. To finish spreading the diamond, add a few drops of diamond extender fluid. Again, spread it with your fingertip.

Rotate the part being ground and check frequently for overheating. You can make the work surface cooler by adding an occasional drop of extender fluid and moving the part toward the center of the buff. Recharge the buff only when necessary. The diamond lasts a long time.

If you have done a good sanding job, a fine polish will soon appear. Wash the gem. Place the gem and dop stick in a glass of crushed ice for a few moments. The gem will easily snap off the dop stick.

HELPFUL HINTS & HARMFUL ERRORS

Water: Water for the unit can be provided by a gravity feed from a can or a city water connection by using a 1/8" copper or plastic tube to the overhead valves. Drain the water pan to ensure the grinding wheels will not stand in water. The portion of the wheel submerged in water will absorb moisture. The resulting effect will make the wheel "out of balance" and cause the unit to vibrate.

Balance: First check the silicon carbide wheel for cracks and, if found, replace. Dress all silicon carbide wheels that have become grooved or out of round. Hold the diamond dresser, or coarse dressing block, firmly on the wheel rest while shaping the wheel. Use lots of water on the wheel during the dressing process.

If you still have excess vibration, loosen the grinding wheels and rotate one wheel one quarter turn; then re-tighten and test. If balance is not obtained on the first try, it will be necessary to repeat the process rotating the same wheel again.

Blade Removal: Remove the trim saw table top and guard. Next, remove diamond blade by unscrewing the large left hand nut on shaft end. Now reassemble blade and table top.

Wheel Removal: First remove the diamond saw blade so it will not bend. Now remove the two hand knobs on top of the hood and lift the hood away. Next remove the buff and nut from the right end of shaft (right hand thread). Now remove the grinding wheels. Be sure and lay each item on shaft out in a line so you can reassemble everything back as it was. Do not get the spacers mixed. Now, reassemble items on shaft and tighten large nut. Do not install set screws in the right hand grinding wheel flange or in the right hand bearing. Tighten the hood down to lock the bearings in place.

Belt Change: When installed, the slots in the expand drum should point toward the operator and down. When rotating, the drum will then expand and hold its sanding belt firmly in place.

The drum slots and the belt direction arrow should point the same direction. To install a belt, place the edge of the belt flat on a table and work the drum down into the belt.

Buff Change: The leather buff is installed on the rubber face of the 6" head with a tacky adhesive such as “Stick-N-Peel.” This type of adhesive will permit easy removal of the buff and installation of another.

Speed Control: Speed is changed by turning the hand wheel in the front of the unit clockwise to increase RPM speed and counterclockwise to reduce. Speed control allows shaft rotation to vary between 1100 and 1725 RPM. IMPORTANT: Motor must be running when speed is changed.