



INSTRUCTIONS FOR COVINGTON # 383 SPHERE MACHINE

INTRODUCTION

Almost any compact gem material of sufficient size can be utilized for sphere cutting. Making a sphere is relatively simple. It is, however, time consuming and thorough clean up of the machine and cutter cups is necessary between cutting cycles.

DESCRIPTION

Sphere unit is mounted on a lami-cushion base and comes complete with three 1/6 HP, 110V gear-motors, three cutter cups, a grit catch bucket, a gravity feed water supply, a grit feed system, instructions and guarantee.

PREFORMING OF MATERIAL

Select material that is free of visible fractures or defects. Saw the material into a cube larger than the sphere to be made. Cut all corners from the cube. A minimum of twelve to sixteen cuts is preferred. Another thing to remember, the more cuts that are done in the sawing process will save time in the grinding process. Complete the preforming process by grinding off all corners and sharp edges until the cube is a rough sphere. The closer it is to a perfect sphere before placing it into the sphere machine will greatly decrease the grinding time.

INSTALLATION

Safety: *Before plugging your unit into your electrical supply, read the Covington Safety Demand Sheet.*

Lubricate the threaded ends of the cup shafts with marine grease, or white lithium grease, and install fiber washers so the cups will not rust onto the shaft.

Install cutter cups that are $\frac{1}{2}$ to $\frac{3}{4}$ of the diameter of the preformed sphere. Next, adjust the motor guides either by bringing them closer together or apart so that the perform fits snugly between the cutter cups. This is done with the spin handles on the outside corners. *Note; try to position the sphere in the approximate center of the machine.* The motors should be level or slightly pointed up. Next adjust the grit feed and the water supply so it is approximately $\frac{3}{4}$ of an inch above the preformed sphere.

PREPARATION

Start with 80 grit silicon carbide (60-90) and "Old Miser" grit carrier; make a mixture of 4 parts grit to 1 part "Old Miser". Place dry powder into the grit feed dispenser using a funnel to keep mixture off motors. Fill water supply container about $\frac{3}{4}$ full of tap water.

OPERATION

First plug in the grit feed system (this should be the plug marked for grit feed). On the neck of the grit feed is a white plastic pipe cap, tighten this to decrease the flow of grit and loosen it to increase grit flow. Do not get the cap wet, as it will stop the grit from flowing. Turn on the water supply slowly by turning the valve located under the water container. Start the motors and make sure there is ample water on the performed sphere. Add just enough water to make a creamy slurry, too much water just washes off the grit. Adjust the tension on the cutter cups to ensure abrasive grinding, but not hard enough to cause the cups to groove the sphere. The sphere should constantly change position (also known as orbital, spinning in all directions), so the abrasive grinding will not groove or wear a wart on the inside of a cup. To achieve this one can adjust the tension on any one of the three sides where the perform seems to be "sticking". Check frequently that the mixture of grit and water is the proper consistency (creamy slurry) and the preform sphere is spinning in all directions.

IMPORTANT Adjust tension on the cups occasionally so good cutting action is maintained.

FINISHING

There are usually four steps to the grinding process. First the 80 grit (60-90), second 220 grit (120-220), third 400 grit (3F), and the fourth 600 grit (5F). After all the low spots have disappeared (no flat spots), and the sphere has a perfect 80 grit texture all over, it is ready for the 220 grit. This changing of grit requires a **COMPLETE** clean up. In between each step the cutter cups, shaft adaptors, and the grit feed dispenser must be cleaned so there will be no contamination to the next step. Contamination will cause scratches. Should one grain of coarser grit be carried from one operation to another, a final polish will never be obtained. When the 220 grit texture is obtained over the entire surface of the sphere, clean up and change to 400 grit. If the surface texture is satisfactory and there are no scratches, proceed with the polishing cycle.

Each finished cycle should take out the scratches from the previous step. All steps can be completed with steel cups, but it is recommended for the 600 grit cycle, to place a piece of clean 10 oz. Canvas, or light rug over each cup and secure so the canvas will turn with the cup (a rubber band usually works very well). Abrade with 600 grit until the surface has a uniform fine texture. Make a thorough clean up before starting the polish cycle.

POLISHING

For this and all following steps place a piece of clean 10 oz. Canvas, or light rug over each cup and secure so the canvas will turn with the cup Use the final polish procedure.

Pre-polish: If working with glass or a similar material, a pre-polish cycle using 2F pumice powder is recommended.

Polish: Again, after a thorough clean up, prepare for the final polish cycle. Install clean canvas over the cups as before. Prepare the cerium oxide, or other polish, by mixing with water to the consistency of thick cream. Brush the polish into the canvas "pockets" and proceed with the polish cycle.

The finished product will be a beautiful sphere.

383 Sphere Machine

Facts about the three headed sphere machine

The motors are 1/6 Horsepower, 60 hz, 110 volt, or 50 hz, 220 volt for overseas.

156 RPM Gear motors, and 60 inch pound torque, the 220 volt is 130 RPM.

The unit stands 36 inches high with water and grit feed stand. Without stand it's 18 inches.

With the motors tilted back a little it will handle up to a 12" sphere.

Each motor is independently mounted on a swivel base.

Easy to use for beginners and the experts alike.

Large spin handles for quick adjustments.

Heavy steel frame and guides.

