

The Use of Raytech Blazer Diamond Blades and Lapidary Saws

Coolants

A coolant must always be used when cutting with a diamond blade. Your Raytech Diamond Saw is equipped with a plastic sump to hold the coolant. The saw blade dips into the coolant, carrying it to the rock being cut to keep the blade cool and lubricated, and also flush chips out of the cut area.

Filling the Saw

To determine the correct amount of coolant to add, simply pour the coolant slowly onto the saw table while the saw is running. The correct fill level has been reached when a steady stream flies off the blade and hits the table in front of the blade. When making deeper cuts with the thin blades, a much deeper immersion up to about 1-1/2" will reduce the blade distortion from heat and greatly improve the quality of the cuts and the blade life. On start-up, the deep immersion will cause the blade to throw an excess of oil, but this effect will disappear when the blade is up to speed.

Suggested Coolants

1. A light cutting oil such as Shell's Pella Oil, or Texaco's Almag is the best all-around coolant. Pella Oil is available from Raytech by the gallon (stock # 40-007). For safety, the oil should have a flash point higher than 200° F. Kerosene or diesel oil alone or in a mixture is NOT recommended.
2. For light duty trimming and slabbing of soft materials, Raytech's Ray-Cool water additive is satisfactory (#40-001, 1/2 pint). This is a non-fluorescent material and is especially recommended for fluorescent minerals because it will not spoil the fluorescence. Ray-Cool contains wetting agents and corrosion inhibitors, but does not contain lubricants. When using plain water or water plus Ray-Cool, it will be necessary to oil the sliding parts of your saw (such as vise rod) from time to time. NOTE: It is not recommended to use water or a water based coolant with Pro-Slicer blades.
3. Soluble oils such as Keystone's "Keycut" are also satisfactory for light trimming or light duty slabbing on soft materials. About 30 parts of water to one part of this soluble oil forms a milky emulsion which is suitable. If a water coolant is used and the saw sits idle for several days, it is recommended that the saw table be hinged to remove the blade from the coolant and prevent rusting at the water line.

Cleaning Your Saw

Chips removed in sawing will accumulate on the table, vise, and in the sump. Before slabbing with a power feed, make sure table is clean and vise slides freely. A piece of plastic such as a windshield scraper about 3" wide makes a useful tool for scraping the table clean. After the table is clean, your sump, whether removable or fixed, should be cleaned periodically. If you know that the saw will not be used for a while, it is easier to clean it while still wet rather than letting the sludge dry out in place.



Raytech Industries

A Division of Lyman Products

475 Smith Street, Middletown, CT 06457

Tel (860) 632-2020 Fax (860) 632-1699

Visit us on the web @ www.raytech-ind.com



Sump is easily cleaned as follows:

1. Hinge open belt guard and pry off motor pulley. (Simply hinge up the table on the 6" saw.)
2. Remove wing nut holding saw table down in front.
3. Slide vise to back of saw or engage power feed half nut to hold vise in place when table is raised on hinge.
4. After sludge in sump has settled, pour off liquid and tap out sump. Sump can be firmly tapped to remove sludge but a sharp tool should not be used for cleaning as the sump can be punctured.

If the saw is not used for a while, it is easier to clean it thoroughly while still wet rather than let the sludge dry out in place.

Sharpening Blazer Blades

Black Blazer and Green Blazer blades are dressed at the factory and, for best results, should be installed on the arbor in the same direction of rotation as the factory dressing. The correct rotation is indicated by an arrow on the side of the blade. Ultra thin mid Thin Kerf Blades can start equally well in either direction.

Raytech Blazer blades are exceptionally free cutting and many users find that their blades seldom, if ever, require sharpening. However, if the blade is used exclusively on Agate or Jade or if it has been used to cut hard materials with water based coolants, the metal matrix in which the diamond particles are locked may have dragged over the diamond cutting edges and the blade may require dressing (sharpening). If the blade is cutting freely, it does not require sharpening. If the blade won't cut, dress it.

You can effectively sharpen or dress your blade by cutting about 10 sq. in. of an old, worn-down, 100 grit or 220 grit silicone carbide lapidary grinding wheel. Do not use any other kind of grinding wheel as one with too hard a bond will not sharpen the blade and one with too soft a bond may wear the blade excessively.

Also, excellent for sharpening Blazer blades is a soft sand lime brick. A common clay brick can be used if it is soft enough so that it can be easily drilled with a screw driver blade pushed against its surface and rotated. About 10 or 20 sq. in. of cutting in soft brick will usually be sufficient to sharpen the blade.

Blade Speed

Raytech Green Blazer blades perform well at speeds of 4000-5000 SURFACE FEET PER MINUTE. Green Blazer and Black Blazer blades are generally used at the lower end of this range while thin Red Blazer blades are run at the upper end of the range.

To obtain a reasonable operating speed in RPM for Raytech Green Blazer or Black Blazer blades, divide the diameter of the blade in inches into 17,000. For example, a 10" blade should be run at a speed in the range of $17000 \div 10 = 1,700$. A Red Blazer blade would operate well at an RPM obtained by dividing the blade diameter into 20,000. For a 10" blade, that would be 2,000 RPM. In either case, a variation of speed of plus or minus 15% or so would be acceptable.

The Raytech 10" saw is usually driven by a 1750 RPM with a 2 1/2" diameter pulley producing an arbor speed of 1750 RPM. The 6" saw is usually driven with a 4" pulley on a 1750 RPM motor on an arbor speed of 3500 RPM. If just the heavier Green Blazer and Black Blazer blades are used on the 6" saw, the 3" pulley driving the arbor at 2600 RPM is satisfactory.

For smooth operation of the 6" saw at high speed with thin blades, be sure to use the specially made, smooth running belt supplied by Raytech.

Choice of Blades

- | | |
|---------------|---|
| Green Blazer | General purpose lapidary cutting. Continuous rim construction. |
| Black Blazer | A premium heavy-duty blade that has more diamonds and cuts longer and freer than any other heavy-duty lapidary blade. Especially recommended for the tough-to-cut material such as agate. |
| Yellow Blazer | A thin, continuous rim diamond-rich blade that cuts very freely and removes a minimum of stock. Recommended for gem materials of high value to the stock lost in cutting. |

Field Alignment of Raytech Diamond Saws

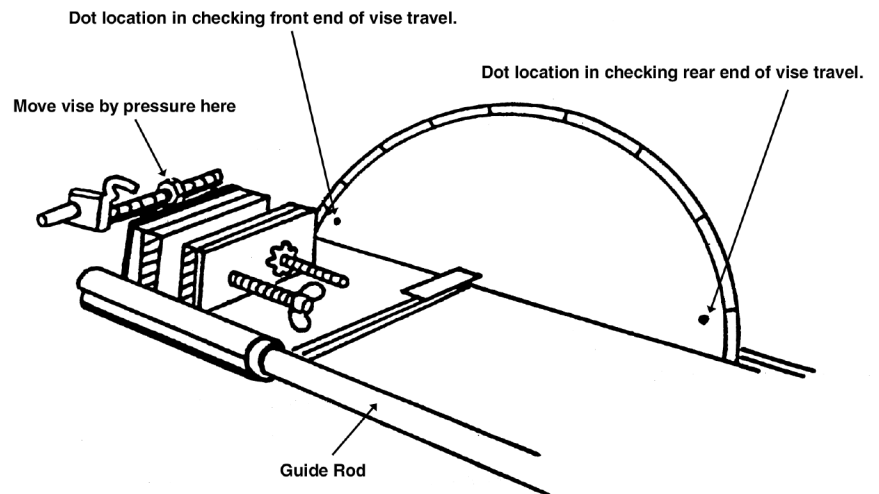
In the event your Raytech saw should lose its alignment, the following steps will serve as a guide to realignment without use of special equipment or return of the unit. In case of persistent difficulty, please contact the factory for assistance.

1. Disconnect the power cord.
2. Install blade on arbor, just as you would for normal cutting, seat squarely and secure nut against the clamping flange. Tighten the table-hold-down wing nut.
3. Using a marking device, such as a felt tip pen, place a dot on the right side of the blade near its rim.
4. Install indicator firmly in the vise jaws, with pointer tip as close to the saw table as practical. A dial indicator with .001" graduations is preferred if available, but a sharpened wood pencil is satisfactory. It will be necessary to place a block of wood in the vise so that the indicator would be clamped at the far end of the vise assembly. This is to insure that the indicator will reach both sides of the blade when the carriage assembly is moved from one end to the other.
5. Loosen the split nuts and be sure the vise travels freely on the guide rod, and that the vise hold down clip does not bind in the blade slot. In alignment, to move the vise backward and forward, apply pressure at the hex nut near the top center of the rear vise jaw - this is about central and will avoid side movement of the vise.
6. Rough check - move the vise forward and back and observe clearance of the vise hold down clip in the saw slot. The vise should be as far to the right as possible without this clip binding against the right edge of the slot.

Loosen the two hex nuts holding the front and rear vise positioning plates, one plate at a time, and adjust so vise travels nearly parallel with the saw slot as far to the right as possible. It is necessary to remove the power feed box cover to loosen the hex nuts holding the front plate.

7. Advance the cross feed so the indicator almost touches the saw blade at the mark. (If a dial indicator is used, it must contact the blade to obtain a reading). Tighten the wing nut, locking the vise jaws in position. Move the vise forward and back to compare relation of the indicator point to the dot at both ends of the vise travel. (rotate the blade so the dot is at the point in each position).

8. As in step 6, loosen the positioning plates one at a time, this time aligning the pointer with the dot at the same gap front and back. Again, keep the vise as far to the right as possible. It is desirable to advance the cross feed so the pointer is very close but not touching the blade. A flashlight or other light source backlighting the tip of the pointer enables reproduction of very small gaps, of about 1 or 2 thousandths of an inch. Return the vise to its forward and back position several times to check reproducibility of a setting. In using a dial indicator, the vise positioning plates are adjusted to give the same dial reading at each end of the vise travel. After the positioning plates have been tightened securely and alignment rechecked, replace the power feed cover.



Be Safe

- Wear appropriate eye protection when grinding or sawing.
- Inspect grinding wheels for crack or chips and make sure blades have clearance before using.
- Plug machine into grounded outlet.
- Don't leave running machine unattended.
- Run with appropriate guards installed (belt guard and wheel guards where appropriate). Operate at recommended speeds.

CAUTIONS

1. DO NOT EXCEED RECOMMENDED SPEEDS BY MORE THAN 15% (SEE BELOW)
2. GRINDING WHEELS AND BLADES IMPROPERLY USED ARE DANGEROUS.
3. COMPLY WITH ANSI B7 AND OSHA COVERING PROCEDURES, GENERAL OPERATION RULES, HANDLING STORAGE AND INSPECTION, AND GENERAL MACHINE CONDITIONS.
4. DO NOT EXCEED SPEEDS: 4"-10" DIA. BLADES-6000 RPM & 12"-24" DIA. BLADES-2400 RPM.

Calculating Blade Speed in Surface Feet per Minute to Obtain Proper RPM

Raytech Blazer Blades perform well at speeds of 4000-5000 SURFACE FEET PER MINUTE. Green Blazer and Black Blazer Blades are generally used at the lower end of this range while thin Red Blazer Blades are run at the upper end of the range. However, always remember that proper coolants must always be used. (see section entitled "Coolants" for further information).

To obtain a reasonable operating speed in RPM for Raytech Green Blazer or Black Blazer blades, divide the diameter of the blade in inches into 17,000. For example, a 10" blade should be run at a speed in the range of 17,000 divided by 10 = 1,700. A Red Blazer blade would operate best at a RPM obtained by dividing the diameter into 20,000. For a 10" blade, it would be 2,000. In any case, a variation of speed of plus or minus 15% or so would be acceptable.

The Raytech 10" saw is usually driven by a 1,750 RPM with a 2 W' diameter pulley producing an arbor speed of 1,750 RPM. The 6" saw is usually driven with a 4" pulley on a 1,750 RPM motor on an arbor speed of 3,500 RPM. If just the heavier Green Blazer and Black Blazer blades are used on the 6" saw, the 3" pulley driving the arbor at 2,600 RPM is satisfactory. For smooth operation of the 6" saw at high speed with thin blades, be sure to use the specially made, smooth running belt supplied by Raytech.