



CUTTING CROSSVILLE PORCELAIN STONE

Wet saws are generally used when cutting tile. Crossville uses continuous rim diamond tip blades designed to cut porcelain tile and glass.

These blades have a softer rim that exposes a fresh diamond cutting edge when used on hard dense porcelain; also the diamonds are smaller and closer together providing a smoother cut and less chipping.

Best results have been when minimum but firm pressure is applied while pushing the tiles through.

Example:

- Felker TM-5 or the new Narrow-width TM-7
- MK-415 Super High Rim or the narrow MK-225 "Hot Dog"
- Rubi CPC 250 10"

If tiles crack or break during the cutting process, several factors could be the cause:

- Blade is old or worn out, bent or warped
- If the cutting head bearings are worn or loose, vibration can occur resulting in breakage.
- In some cases, dressing the blade with a dressing stone may prove helpful.

Should you have any questions, please call Tim J. Bolby, Director of Technical Services for Crossville, Inc. @ 931-456-3983.

On the following pages, information from **MK Saws and Blades (ph: 800-845-3729) www.mkdiamond.com** website or **Felker Saws and Blades (800-365-4003) www.felkersaws.com** describes proper blade selection and common blade problems!

Revised 09/13

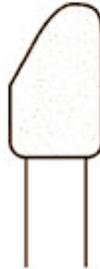
Blade Worn Out of Round

Cause	Shaft Bearings are worn (masonry and concrete).
Remedy	Install new blade shaft bearings or blade shaft, as required.
Cause	Engine not properly tuned on concrete saws, causing surges in blade rotation.
Remedy	Tune engine according to manufacturers' manual.
Cause	Blade arbor hole is damaged from previous mismounting.
Remedy	Replace worn shaft or mounting arbor bushing. Bond is too hard for material, causing a "rounding" and wearing one half of the blade more than the other. Make certain that drive pin is functioning. Use proper blade specification.

Blade Will Not Cut

Cause	Blade is too hard for material being cut.
Remedy	Use a softer bonded blade. Select proper blade specification for material being cut.
Cause	Blade has become dull as a result of being used on too hard a material
Remedy	Improper blade specification; blade is too hard for the material being cut. Use a softer bonded blade to reduce operating stresses.
Cause	"Dull" Blade
Remedy	"Open" blade by dressing segment on abrasive block.

Uneven Segment Wear



Cause	Insufficient water (usually on one side of blade).
Remedy	Flush out water system and check flow and distribution to both sides of blade.
Cause	Equipment defects cause the segments to wear unevenly.
Remedy	Replace bad bearings, worn arbor shaft or misalignment to spindle. Concrete saws, engine must run smoothly to prevent harmonic vibration.
Cause	Saw is misaligned.
Remedy	Check saw head alignment for squareness both vertically and horizontally

Arbor Hole Out-of-Round

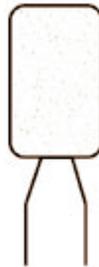
Cause Blade collar is not properly tightened, permitting blade rotation or vibration on the shaft.
Remedy Tighten the shaft nut with a wrench to make certain that the blade is adequately secured.

Cause Blade collars are worn or dirty, not allowing proper blade clamping.
Remedy Clean blade collars, making sure they are not worn.

Cause Blade is not properly mounted.
Remedy Make certain the blade is mounted on the proper shaft diameter before tightening shaft nut. Ensure the pin hole slides over drive pin. Make sure that drive pin is in pin hole.

Cause Loose Belt on saw.
Remedy Tighten belts. Check to see if arbor on saw is running true.

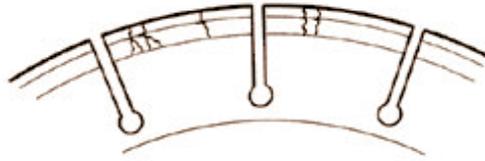
Undercutting the Steel Center



Cause Abrasion of steel center due to highly abrasive fines generated during cutting.
Remedy Use as much water as possible to flush out fines generated during cutting, or use wear-retardant cores.

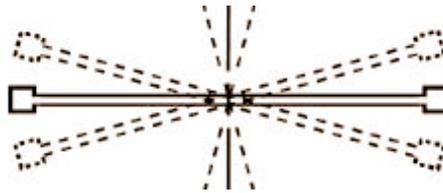
Cause Cutting through material into sub-base.
Remedy Wear-retardant cores are not always the ultimate solution to eliminating undercutting. Your best defense is to always provide an adequate water flow to the steel center area immediately adjacent to the segment. This is especially important when making deep cuts.

Segment Cracks



Cause	Blade is too hard for material being cut.
Remedy	Use a blade with a softer bond.
Cause	Blade being "forced" through the cut causing chattering
Remedy	Run Saw at normal speed. "Open" blade by resharpener in abrasive material.

Blade Wobbles



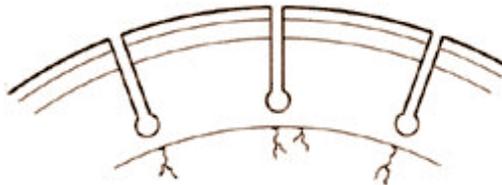
Cause	Blade runs at improper speed.
Remedy	Check for bad bearings, bent shaft, or worn mounting arbor. Speed of the saw is either too fast or too slow for the size of the blade: RPM of the saw should be verified to the specific speeds established by the NASI Standards for minimum and Maximum blade speeds; make certain that blade shaft is running at recommended RPM to match tensioned speed of blade. Should the blade continue to wobble after verification of the saw RPM, then the blade should be returned to the manufacturer to be retensioned and flattened.
Cause	Blade collar diameters are not identical.
Remedy	Check blade collar discs to make sure they are clean, flat and of correct diameter
Cause	Blade is bent as a result of dropping or being twisted in the cut during operation.
Remedy	Blade should be returned to the manufacturer to be retensioned and flattened.
Cause	Loss of blade tension.
Remedy	(see <u>loss of tension</u>)

Segment Loss



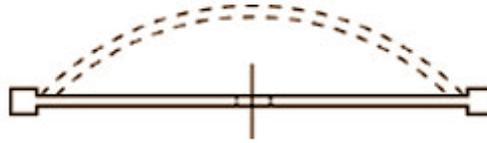
Cause	Overheating due to lack of water.
Remedy	Check water feed lines and make sure flow is adequate on both sides of blade.
Cause	Steel center is worn from undercutting.
Remedy	Use sufficient water to flush out the cut.
Cause	Defective blade collars are causing blade misalignment.
Remedy	Clean blade collars or replace if collars are under recommended diameter.
Cause	Blade is too hard for material being cut.
Remedy	Use proper blade specification for material being cut.
Cause	Blade is cutting out of round, causing a pounding motion.
Remedy	Replace worn bearings; realign blade shaft or replace worn blade mounting arbor.
Cause	Improper blade tension.
Remedy	Ensure blade is running at correct RPM. Blade is tensioned for correct RPM. Tune engine according to manufacturers' manual.

Cracks in Steel Center



Cause	Blade flutters in cut as a result of blade losing tension.
Remedy	Tighten the blade shaft nut. Make sure blade is running at proper tensioned speed and that drive pin is functioning properly.
Cause	Blade specification is too hard for the material being cut.
Remedy	Use a softer blade bond to eliminate stresses that create cracks.
Cause	Bad blade shaft bearing.
Remedy	Replace blade shaft bearing.
Cause	Overheating due to lack of water.
Remedy	Check water feed lines and make sure flow is adequate on both sides of blade.

Loss of Tension



Cause	Steel center has been overheating as a result of blade spinning on arbor.
Remedy	Check water flow, distribution and lines. Tighten the blade shaft nut. Make certain the drive pin is functioning (on concrete saws).
Cause	Steel center has been overheating from rubbing the side of material being cut.
Remedy	Make certain blade RPM is correct so the blade operates at its tensioned speed. Tune engine according to manufacturers' manual.
Cause	Unequal pressure at blade clamping collars.
Remedy	Blade clamping collars must be identical in diameter and the recommended size.

Short Blade Life

Cause	Blade bond or matrix too soft.
Remedy	Use a harder matrix blade.
Cause	Overheating due to lack of water.
Remedy	Check water feed lines and make sure flow is adequate on both sides of blade.

Diamond Blade Problem Solving

www.felkersaws.com

Felker Diamond Blades

Few Felker diamond blade problems are caused by warranty failures—less than 1/10% (.001). Most problems result from:

- Using the wrong blade for the job
- Using the blade improperly
- Equipment problems

This “Problem Solving” guide will help you identify, diagnose and correct diamond blade problems. The following are samples of some of the problems you may encounter in the field, with a cause and remedy guide to diagnose and correct these problems.

Loss of Tension

Cause: Blade being used on misaligned saw.

Remedy: Check for proper saw alignment.

Cause: Blade is excessively hard for the material being cut, creating stress on the steel center.

Remedy: Make certain blade is correct for material being cut.

Cause: Material slippage causing blade to twist and become kinked or bent.

Remedy: Maintain tight grip on material while sawing.

Cause: Utilizing blade flanges that are under size or not the same diameter, creating uneven pressure on the center.

Remedy: Make certain blade flanges are proper size and identical diameter, minimum 3-7/8", 4-1/2" on concrete saws, 6" minimum on diamond blades that are 30" diameter and larger.

Cause: Blade being used at improper RPM.

Remedy: Make certain blade shaft is turning at the proper RPM by using a tachometer. This is especially important with concrete saws.

Cause: Blade improperly mounted on arbor shoulder becomes bent when flanges are tightened.

Remedy: Hold blade securely on arbor shoulder until outside flange and nut are firmly tightened.

Segment Loss



Cause: The material slips during cutting which twists or jams the segments loose.

Remedy: Hold the material securely while cutting.

Cause: Blade is too hard for the material it is cutting, causing excessive dullness which causes the segment to pound off, or fatigue.

Remedy: Use a softer blade specification.

Cause: Worn blade flanges fail to provide proper support and cause the blade to deflect.

Remedy: Replace both blade flanges.

Cause: Out-of-round blade rotation resulting in pounding, caused by worn arbor or bad bearings in the shaft.

Remedy: Replace worn arbor and/or bearings.

Cause: Overheating. Usually easily detected by bluish color on steel center, generally confined to the area where the segment was lost.

Remedy: Check the water system for blocked water passages. Test pump to see if it is functioning. For dry cutting, it may be necessary to make shallower cuts and allow the blade to run freely every few minutes in order to let the air cool it.

REPAIR NOTE: It is possible to replace two or three missing diamond segments, providing the steel center is not cracked or undercut badly. If many segments are missing, or if there is less than 50% of blade life remaining, repairing the diamond blade may not be economical.

Be certain to eliminate mechanical or operational problems before installing replacement blades.

Cracked Segments



Cause: Blade is too hard for the material being cut.

Remedy: Use correct blade with softer bond.

Eccentricity



Cause: The bond is too hard for the material being cut. The hard bond retains the diamonds, and they begin to round off, causing the blade to become dull. Instead of cutting, the blade begins to “pound”, causing the blade to wear out-of-round.

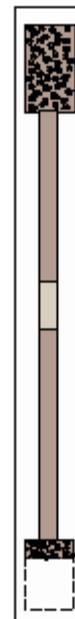
Remedy: Change to a softer bond, which will wear away more readily allowing the dull diamonds to be released and sharp, new cutting edges to become exposed.

Cause: The saw blade shaft may have a groove scored in it, caused by a blade spinning between the flanges. A new blade, installed on the arbor shaft, will seat into the groove, and immediately run eccentrically when the saw starts.

Remedy: Replace worn shaft.

Cause: If the blade shaft bearings are worn, the shaft and mandrel will run eccentrically, causing the blade to wear out-of-round. This happens most often with concrete saws when proper lubrication of the bearings is neglected.

Remedy: Install new blade shaft bearings. In some cases it might also be necessary to replace the blade shaft if it is worn or out of alignment.



Overheated Blade



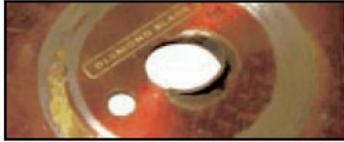
Cause: Adequate coolant was not provided.

Remedy: Check the water supply for adequate volume and for obstructions in the water system. Use dry blades ONLY for shallow cutting (1-2" deep) or step cutting. Allow blade to run freely every 10 to 15 seconds in order to increase cooling airflow.

Diamond Blade Problem Solving

www.felkersaws.com

Arbor Hole Out-of-Round



Cause: Saw arbor badly worn due to improperly seated blades.

Remedy: Be certain the blade is properly seated on arbor before tightening flange.

Cause: Blade flanges not properly tightened permitting blade to rotate on shaft.

Remedy: Always wrench tighten the arbor nut. Never hand tighten. Always use hex nuts. Never use wing nuts.

Cause: Blade flanges or arbor shaft worn and not providing proper blade support

Remedy: Check blade flanges or arbor shaft for wear. Both flanges should be no less than that recommended by the manufacturer. Replace worn parts.

Blade Won't Cut



Cause: Blade is too hard for materials being cut. (Examples: block or general purpose blade being used for extended period on hard brick. Asphalt blade being used to cut hard concrete.)

Remedy: Consult dealer or manufacturer for proper blade to cut materials on job.

Cause: Insufficient power to permit blade to cut properly. (Loose V-belts, low voltage, motor lacks horsepower.)

Remedy: Check belts, voltage, horsepower.

Cause: Blade has become dull because of continuous use on fairly hard or vitrified material.

Remedy: Dress with abrasive material until diamonds become exposed again. (This may be necessary occasionally, but if dullness occurs too often, then the blade is probably too hard for the material.)

Cause: Blade segments appear to still have plenty of life, but blade won't cut.

Remedy: Some harder-bonded blades designed for abrasive materials require a non-diamond bearing section at the base of the diamond segment for better adherence to the steel core. A blade used to this stage has worn out in the normal manner and should be replaced.

Excessive Wear

Cause: Using the wrong blade on highly abrasive material. (Example: glazed tile blade on concrete block.)

Remedy: Consult the dealer or manufacturer for the proper blade specification for abrasive material.

Cause: Lack of sufficient coolant to the blade. Often detected by excessive wear in the center of the segment. (NOTE: in both above cases, diamonds will usually be highly exposed.)

Remedy: Clean up water system. Make certain water pump is functioning properly.

Cause: Wearing out-of-round accelerates wear. Usually can be caused by bad bearings, worn shaft or using a blade too hard for the materials being cut.

Remedy: Check bearings and arbor. If worn, replace with new parts before installing another blade.

Cause: Insufficient power caused by loose V-belts, inadequate voltage, or improper RPM's.

Remedy: Tighten belts (taut). Replace worn belts. Check voltage. Use proper size extension core.

Cracked Core



Cause: Blade is too hard for material being cut.

Remedy: Use correct blade with softer bond.

Cause: Excessive cutting pressure, or jamming or twisting the blade in the cut can cause the blade core to bend or flex. When subjected to extreme stress and metal fatigue, the blade's steel core will eventually crack.

Remedy: The saw operator should use steady, even feed pressure, and be careful not to twist or jam the blade in the cut.

Cause: Overheating through inadequate water supply or improper use of dry cutting blades.

Remedy: Use adequate water to cool wet-cutting diamond blades (for example, 2-5 gallons per minute for concrete saws). Allow adequate airflow around dry-cutting diamond blades to prevent overheating.

NEVER USE A BLADE WITH A CRACKED CORE!

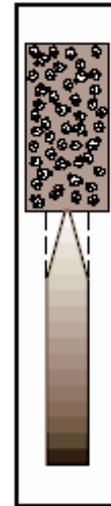
Undercutting



Cause: Undercutting is a condition in which the steel center wears faster than the diamond segment, especially in the areas where the segment and core are joined.

This is caused by highly abrasive material grinding against the blade during the sawing operation. Usually materials containing sand are responsible for this condition. (SEGMENT LOSS)

Remedy: The flow of swarf (abrasive cuttings) must be distributed over a wider area, away from the critical segment area with undercut retardant segments or other types of undercut protectors



specially positioned around the steel center to change the pattern of constant abrasion. Although successful in most cases, undercut protectors do not provide 100% protection.

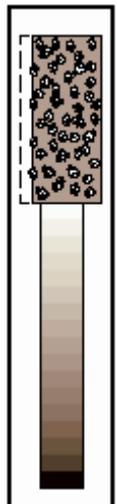
Uneven Segment Wear

Cause: Segments are worn on one side, reducing side clearance. It's usually caused by misalignment of the saw or a lack of sufficient water on both sides of the blade.

Remedy: Check saw alignment. Clean water system, making certain that water is properly applied to the leading edge of the blade flanges. Check to see if pump is supplying sufficient water.

Cause: Blade is worn out-of-round due to bad bearings, worn arbor or excessive dulling condition. (See section on EXCESSIVE WEAR.)

Remedy: Replace bearings or worn arbor as required.



Diamond Blade Operating Speeds

Diameter	Recommended Operating Speed (RPM)*	Maximum Safe Speed (RPM)**
4"	9072	15000
4-1/2"	8063	13300
5"	7257	12000
6"	6048	10185
7"	5184	8730
8"	4536	7640
9"	4032	6790
10"	3629	6115
12"	3024	5095
14"	2592	4365
16"	2268	3820
18"	2016	3395
20"	1814	3055

*Based on 11,000 SFPM (Surface Feet Per Minute) – the general optimum performance range for cutting is \pm 10%. For hard, dense materials such as stone and tile, the optimum performance speed is 10-25% less than the speeds shown.

Blade shaft speeds (RPMs at no load) for most tools will be higher than the recommended operating speeds shown at left. Under normal sawing conditions, the actual blade shaft speed of the tool will slow down under load, and should fall within the optimum speed range.

**This speed (RPM) represents the maximum safe speed in revolutions per minute (RPM) at which each blade can be used. Before using any blade, make sure the blade shaft (arbor) speed of the tool is within the maximum safe limit of the blade.

Maximum Blade Cutting Depths

Blade Diameter	Cutting Depth
Tile Saw Blades	
4"	—
4-1/2"	1"
5"	1-1/4"
6"	1-3/4"
7"	2-1/4"
8"	2-3/4"
9"	3-1/4"
10"	3-3/4"
Power Hand Saw Blades	
3-3/8"	—
4"	1"
4-1/2"	1-1/4"
5"	1-1/2"
7"	2-1/2"
8"	3"

Note: Diamond blade cutting depths listed above are approximate. Actual cutting depth will vary with the exact blade diameter or saw type (or brand), or the exact diameter of the blade collars (flanges). Cutting depth will also be reduced if saw components (motor housing, blade guard) extend below the blade collars (flanges).

When Choosing A Diamond Blade Ask:

- What is most important to you – the initial price of the blade or the cost per cut?
- What type of material are you cutting?
- What type of equipment is being used?
- Are you cutting wet or dry?

Wet or Dry Cutting

To keep your diamond blade cool, extend its life and improve the performance, always follow the coolant instructions for the diamond blade you are using.

 **Air/Water Cooled** – Dry-cutting diamond blades can be used wet or dry. These blades depend on airflow around the blade to prevent excessive heat build-up during cutting. Use dry diamond blades for “intermittent” sawing. After every 10 to 15 seconds of cutting, take pressure off the

blade and allow it to run back up to full speed for several seconds. This “cooling” interval allows air to flow around the blade and dissipate the heat. Use dry diamond blades ONLY for shallow cutting (1” to 2” deep) or step cutting (making several shallow passes to reach the full depth required).

 **Water Cooled** – Wet cutting diamond blades MUST be used with water to prevent excessive heat build-up during cutting. Using water on the blades also reduces dust and helps remove cuttings. A continuous water flow is critical. Using “wet” blades without water, even for a few seconds, causes excessive heat and blade damage and creates a safety hazard. Check the saw or tool carefully before using a wet cutting diamond blade. Make sure it is safe to use the saw or tool with water.