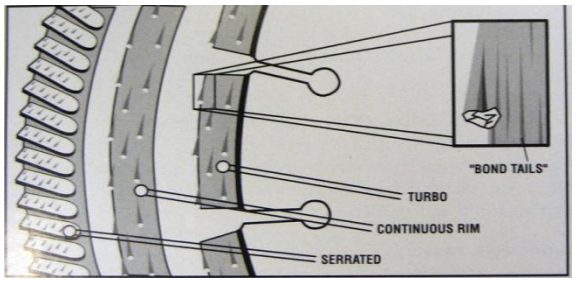
What is a Diamond Blade?



A diamond blade is a circular steel disc with a diamond bearing edge. The edge can have one of three configurations: segmented, continuous rim or turbo. The blade core is a precision-made, steel disc which may have slots. The slots (also called “gullets”) provide faster cooling by allowing water or air to flow between the segments. The slots also allow the blade to flex under cutting pressure.

Most blade cores are tensioned at the factory so the blade will run straight at proper cutting speeds. Proper tension also allows the blade to remain flexible enough to bend slightly under cutting pressure and “snap” back into position. Diamond segments or rims are made up of a mixture of diamonds and metal powders. Diamonds used in blades are almost exclusively manufactured diamonds in various grit sizes and quality grades. In the manufacturing process, the metal powder and diamond grit mixture is hot pressed at high temperatures to form a solid metal alloy (called the bond or matrix) in which the diamond grit is retained.

The segment or rim is slightly wider than the blade core. This side clearance allows the cutting edge to penetrate through the material without steel drag. To attach the diamond rim or segments securely to the steel core, several different processes are used.

1.Brazing Silver solder is placed between the segment or rim and the core. At high temperatures, the solder melts and bonds the two parts together.

2.Laser Welding The diamond segment and steel blade core are welded (fused) together by a laser beam.

3.Mechanical Bond A notched, serrated or textured blade core may be used to “lock” the diamond rim or segments onto the edge of the blade. Mechanical bonds usually include brazing or other metallurgical bonding processes to hold the rim or segments in place.

4.Diffusion Bond Mechanical bond process guaranteed for normal useful life of the blade.

How Do Diamond Blades Work

Diamond blades do not really “cut” like a knife… they grind. During the manufacturing process, individual diamond crystals are exposed on the outside edge and sides of the diamond segments or rim. These exposed surface diamonds do the grinding work. The metal “matrix” locks each diamond in place. Trailing behind each exposed diamond is a “bond tail” which helps support the diamond.

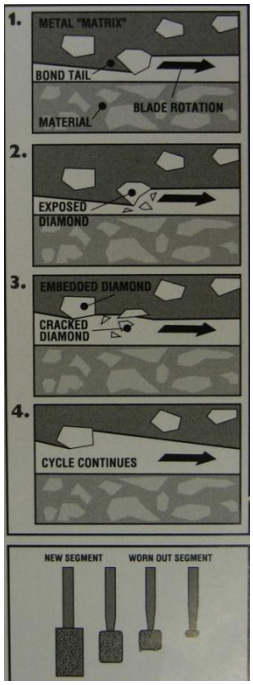
While the blade rotates on the arbor shaft of the saw, the operator pushes the blade into the material. The blade begins to cut through the material, while the material begins wearing away the blade.

Exposed, surface diamonds score the material, grinding it into a fine powder. Embedded diamonds remain beneath the surface.

Exposed diamonds crack or fracture as they cut, breaking down into even smaller pieces. Hard, dense materials cause the diamonds to fracture even faster.

The material also begins to wear away the metal matrix through abrasion. Highly abrasive materials will cause the matrix to wear faster, allowing new layers of diamond exposure to continue cutting.

This continuous grinding and wearing process continues until the blade is “worn out.” Sometimes a small, unusable part of the segments or rim may remain. It is important to understand that the diamond blade and the material must work together (or interact) for the blade to cut effectively.



In order for a diamond blade to work properly, the diamond type, quality and grit size must be suited for the saw and the material. The metal matrix must also be matched to the material to be cut.
Blades for cutting hard, dense (less abrasive) materials (such as tile, hard brick, stone or hard-cured concrete) require a softer metal matrix. The softer metal matrix. Wears faster, replacing worn-out diamonds fast enough for the blade to keep cutting.
Blades for soft, abrasive materials (such as block, green concrete or asphalt) must have a hard metal matrix to resist abrasion and hold the diamonds longer.