

WEL-CO TECHNICAL INFORMATION

HOW DIAMOND TOOLS WORK

Diamond saw blades come in a variety of bonds, designs and applications.

Diamond blades work by cutting with diamond crystals held together in a metal bond or matrix. As the blade cuts, the diamond crystals on the exposed edge will slowly fracture and wear down. At the same time the abrasive action of the material being cut erodes the bond exposing new diamonds.

Each diamond blade is designed for use on a specific range of materials. If the material being cut is soft or abrasive the bond is hard so the bond does not

prematurely release the diamonds. If the material being cut is hard or less abrasive the bond is softer so the diamonds release before they become too worn to cut.

Diamond blades are designed to be used for either wet or dry cutting. Wet cutting blades use water to cool the blade and flush away the cuttings. Dry cutting blades rely on airflow to cool the blade and remove the cuttings. Dry cutting blades can be used with water to control dust, but wet cutting blades cannot be used dry.

DIAMOND BLADE SPEED (RPM) AND DEPTH OF CUT

Blade Diameter	Depth of Cut	Recommended Operating Range	Maximum Safe Operating Speed	High Speed Dry Cutting Range
4"	1"	9000 to 1100 RPM	15000 RPM	8000 to 9000 RPM
4.5"	1.25"	8500 to 1000 RPM	13300 RPM	8000 to 9000 RPM
5"	1.5"	7500 to 9000 RPM	12000 RPM	7000 to 8000 RPM
6"	2"	6500 to 7500 RPM	10000 RPM	5000 to 7000 RPM
7"	2.5"	5500 to 6500 RPM	8500 RPM	5000 to 7000 RPM
8"	3"	4800 to 6000 RPM	7500 RPM	4500 to 6500 RPM
9"	3.25"	4300 to 5400 RPM	7000 RPM	3000 to 4000 RPM
10"	3.5"	3800 to 4600 RPM	6000 RPM	3000 to 4000 RPM
12" Hi Speed	4"	4500 to 5400 RPM	6300 RPM	4500 to 5400 RPM
12"	3.5"	3200 to 3800 RPM	5000 RPM	
14" Hi Speed	5"	4000 to 5000 RPM	5400 RPM	4000 to 5000 RPM
14"	4.5"	2800 to 3200 RPM	4400 RPM	
16" Hi Speed	6"	3000 to 4000 RPM	4500 RPM	3000 to 4000 RPM
16"	5.5"	2500 to 3000 RPM	3800 RPM	
18"	6.5"	2200 to 2600 RPM	3300 RPM	
20"	7.5"	1900 to 2300 RPM	3000 RPM	
22"	8.5"	1800 to 2200 RPM	2700 RPM	
24"	9.5"	1600 to 2200 RPM	2500 RPM	
26"	10.5"	1500 to 1900 RPM	2300 RPM	
28"	11.5"	1400 to 1700 RPM	2100 RPM	
30"	12"	1300 to 1600 RPM	2000 RPM	
32"	13"	1200 to 1500 RPM	1900 RPM	
36"	14"	1100 to 1300 RPM	1700 RPM	
42"	17"	900 to 1100 RPM	1400 RPM	
48"	19"	800 to 1000 RPM	1200 RPM	

BLADE PROBLEMS: CAUSES AND CURES

A small percentage of Wel-Co's diamond blades are returned for defects in manufacturing. Most blade problems arise from misapplication of the blade, abuse of the blade or defective equipment. The following is a guide to common problems associated with diamond blades.

BLADE WILL NOT CUT

A diamond tool will stop cutting if the exposed diamonds wear down quicker than the matrix can expose new diamonds. There are several reasons this can happen such as improper blade specification, failure to allow for break in, insufficient power or overheating the diamond rim.

The metal bonds used in diamond tools are designed for use on a specific range of materials. Softer bonds that wear faster are used on materials that are harder or less abrasive such as cured concrete and brick. Harder bonds that wear slower are used on materials that are softer or more abrasive, such as asphalt and cement block. If there are any questions about the material a blade is designed to cut, please consult the manufacturer.

Although diamond tools are dressed by the manufacturer there is an initial break in period. Tools forced too hard during this period may stop cutting. New diamond tools should be allowed to sharpen in the material being cut.

If the saw or drill does not have sufficient power to run the tool, the metal matrix may not break down properly. This will cause the tool to stop cutting. Check saws and drills to make sure they are working properly.

On dry cutting blades if the diamond rim becomes overheated it can mushroom or melt over the diamonds, causing the blade to stop cutting. Take proper precautions against overheating: such as taking shallow passes, allowing the blade to spin freely every 30 to 45 seconds and using on saws under 18 hp.

Once a diamond tool has stopped cutting there are several methods to sharpen the tool. Passing a saw blade through an abrasive material such as asphalt or cement block may sharpen the blade. A core bit can be sharpened by cutting back the water and allowing the bit to spin in the abrasive slurry. If the tool will not sharpen it needs to be returned to the manufacturer to be dressed.