

Three Bond Types

There are three principal bond types. A description of what they are and their major characteristics follows:

Vitrified Bond is used for over 75 percent of the grinding wheels manufactured. This bond is not affected by water, acid, oils or ordinary temperature conditions. It

is a rigid bond, somewhat fragile, used primarily for precision grinding and finishing applications.

Resinoid Bond is a synthetic organic compound and resinoid bonded wheels can be made in various structures from hard, dense, coarse wheels to soft, open, fine wheels.

They cut cool, remove stock rapidly

and can be run at high speeds, making them particularly suitable for roughing applications.

Rubber Bond is used where a good finish is required. Because of its strength and toughness, this bond is extensively used in making extremely thin wheels, and centerless regulating wheels.

1 - Abrasive Type

A - Aluminum Oxide is a tough, sharp grained abrasive whose chemical formula is Al_2O_3 . It is for use when grinding or cutting high tensile strength materials, such as alloy steel, annealed malleable iron and tough bronze.

C - Silicon Carbide is a very hard, sharp abrasive grain, the chemical formula for which is SiC . It is for use in the grinding and cutting of low tensile strength materials such as cast iron, bronze, aluminum, copper and non-metallic materials. In Position Number 1, in addition to the Abrasive Type Symbols - A&C, there frequently appears a prefix known as Grain Type, which indicates the variations of grain characteristics. These variations are representative of the fact that an abrasive grain can be controlled to shape, chemical composition, crystal structure and temper.

Grinding Wheel Marking System

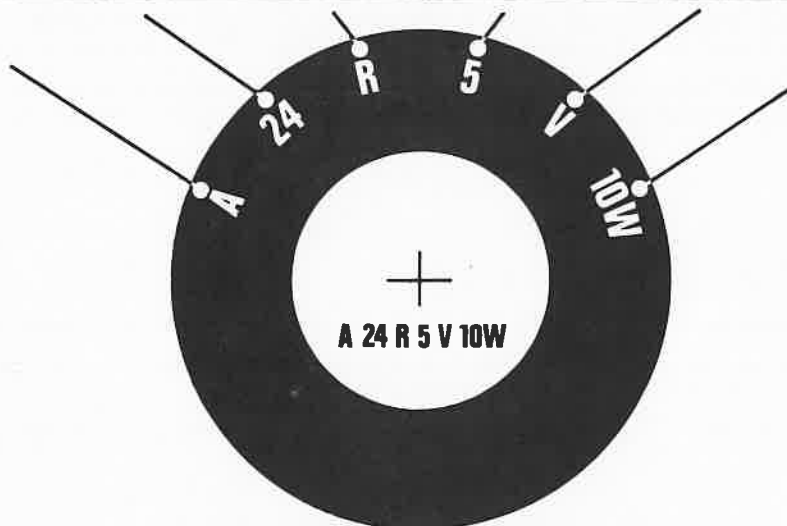
A Bonded Marking System codes the elements which have been built into a grinding wheel.

Each element is capable of different variations to meet specific grinding conditions and each element has its own place within the bonded marking system.

It is necessary to recognize the elements contained in each bonded marking symbol not only because it is the means of indentifying the product of each grinding wheel manufacturer, but because it permits accurate description of the wheel.

Each Carborundum Marking consists of six parts in the following sequence:

1	2	3	4	5	6
Abrasive Type	Grain Size	Grade or Hardness	Structure	Bond Type	Manufacturer's Symbol
A	24	R	5	V	10W



Aloxite "A" - Used for grinding and finishing all types of steel, except those sensitive to heat. It is the toughest of the aluminum oxide grains.

Aloxite "AA" - Used for grinding high tensile strength and high-hardness steels. This white, fine type aluminum oxide cuts cool and therefore avoids heat or hardening changes.

Aloxite "DA" - Used for grinding steels that are less heat sensitive, this intermediate grain type combines "A" and "AA".

Aloxite "PA" - Used for materials that are heat sensitive and have low machining requirements. This type is a refined aluminum oxide. It is harder than "A", but not as tough, falling between type "DA" and "AA" grains.

Carborundum "C" - Used for grinding low tensile strength materials such as cast iron, aluminum, bronze, copper and non metallic materials, this grain is very hard with sharp cutting edges.

Carborundum "WC" - Used for heavy grinding on cast parts.

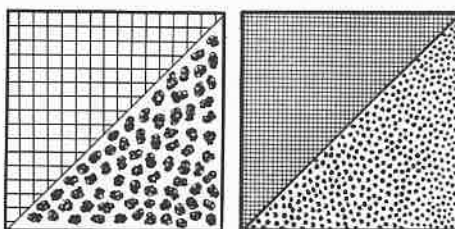
Carborundum "GC" - Used for grinding and sharpening tungsten carbide, this green silicon carbide type is harder than "C" and has high friability.

Carborundum "RC" - Used for machining low tensile strength and high-hardness materials, it is a mixture of "C" and "GC" grains. "CA" Type: A mixture of grains "A" and "C" and acts in a way that is intermediate to those two grains. Used to machine materials of low tensile strength.

2 - Grain Size

Grain size or grit is a numeral that indicates the size of grain particles used in a grinding wheel. Uniform grain particles for each size group are processed by passing grain through screens having a certain number of openings per linear inch. There are variations of grit running from (6), coarsest, to (1000), finest. The selection of the correct grit depends on the grinding problem. In general, for rapid stock removal where finish is not a factor, select a grit in the coarse range. If a good finish is required select a grit in the fine range. If both rapid stock removal

and good finish are required, select a grit from the medium range.



3 - Grade or Hardness

The number three position consists of letters of the alphabet used in sequence: A indicating softest to Z indicating hardest.

In general, select a hard grade for soft materials and a softer grade for hard materials. When the area of contact between wheel and work is small, a harder wheel grade is recommended and vice versa.

Heavy, rigid machines permit the use of softer grades, whereas machines with loose spindles, insecure or shaky foundations, require harder grades.

4 - Structure

In the number four or "Structure" position, numerals are used to indicate grain spacing.

Where 1 is the most dense, 5 is

medium and 12 the most open. As a general rule, the more open the wheel structure becomes, the cooler the wheel cuts, the more chip clearance it provides and the less tendency it has to load or fill. However, the more open the wheel structure is, the greater becomes the tendency toward rapid wheel wear.

On the other hand, the more dense the wheel structure, the slower the cutting action.

5 - Bond

The fifth position in the standard wheel marking is a letter indicating the type of bond used in the construction of the grinding wheel. There are 3 bond types:

- V - Vitrified
- B - Resinoid (Synthetic resins)
- R - Rubber

6 - Manufacturer's Symbol

The last symbol on the wheel marking chart is the manufacturer's symbol and indicates the method of wheel fabrication used by The Carborundum Company, assuring the product quality and tradition.

Diagram for the Grinding Wheel Marking System

A	24	R	5	V	10W
Abrasive Type	Grain Size	Hardness	Structure	Bond	Manufacturer's Symbol
A	6 30 180	Soft	1	V - Vitrified	V10W
	8 36 220	A	2		V30W
DA	10 46 240	B	3	B - Resinoid	V40W
PA	12 54 280	C	4		VGW
	14 60 320	D	5		VDW
AA	16 80 400	E	6		VRW
	20 100 500	F	7		BW
	24 120 600	G	8		B5W
C	150	H	9		B5RW
CA		I	10		B-14
WC		J	11		BDW
		K	12		+BFW
GC		L			+BFIW
RC					+BFIW
ZA				+BF6	
AZA				+BZ6	
3AZA					
		Hard		R - Rubber	RW
					RGRW

+ = Reinforced
 ++ = Hot Pressed