CUBIC BORON NITRIDE (CBN)

Abrasive

IDENTITY INFORMATION

Superhard abrasives primarily consist of Diamond and Cubic Boron Nitride. Diamond's basic foundation is carbon. CBN's basic foundation is a combination of Boron and Nitrogen. The crystal structure of both are the same with all unit cells in the diamond crystal being of carbon atom, and the CBN crystal being of the boron atom alternating equally with the Nitrogen atom.

Diamond is the hardest known substance with CBN being about 1/2 as hard and Silicon Carbide being only about 1/5 as hard. Hardness is not the only variable when Diamond and CBN come in contact with specific substances. Normally, under lapping and polishing conditions, a great amount of heat occurs when Diamond and CBN abrasives are used. In this heat interface between the abrasive and the workpiece, Diamond and CBN react differently. Specifically, Diamond, when in contact with ferrous materials such as iron or hardened high speed steel, forms carbon monoxide or carbon dioxide when exposed to air at elevated temperatures.

Therefore, diamond abrasive is not normally used with workpieces of ferrous materials, and that is where CBN comes in and performs well. On the other hand, CBN reacts with aluminum and with iron and nickel alloys along with the oxygen in the air to form a protective boron oxide layer around the crystal, and thus Diamond would be used in this case for better performance. Also, CBN at elevated temperatures with a water soluble base, has a chemical reaction that limits its' use with most metal workpieces.

MOHS SCALE OF HARDNESS

Diamond	10.0
Cubic Boron Nitride (Borazon™ CBN)	9.9
Norbide, Boron Carbide	9.7
Crystolon, Silicon Carbide	9.5
Alundum, Aluminum Oxide	9
38 Whilte Aluminum Oxide	9
Linde "A" Alpha Alumina	9
Linde "C" Alpha Alumina	9
Lined "B" Gamma Alumina	8
Corundum	9
Levigated Alumina, Calcinated Alumina	8.5 to 9
E-67, Calcinated Alumina	8.5 to 9
E-111, Calcinated Alumina	8.5 to 9
E-330, Calcinated Alulmina	8.5 to 9
Green Rouge, Chromium Oxide	8.5
Cerium Oxide (estimated)	8
Garnet	8.5 to 9
Quartz	7
Red Rouge, Ferric Oxide	6.5
Aluminas (Hydrates)	5 to 7

**Note: There are many forms of hydrate aluminas, most are too soft to abrade metals and are used as polishing materials.*

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