



1. DIAMOND AND CUBIC BORON NITRIDE (CBN) WHEELS

Diamond wheels feature low wear even at high material removal rates. This applies especially to materials that are particularly resistant to wear and also materials that are easily affected by heat during the grinding process. (One can still achieve the required shape, dimensional and surface tolerance) It therefore became necessary to develop suitable abrasives to grind and re-sharpen these materials, hence diamond and CBN wheels were developed.

The **DIAMOND**, which can be considered the hardest abrasive available, is of increasing importance for grinding tungsten carbide, silicon carbide and ceramics.

CUBIC BORON NITRIDE is used for work hardened steels, high speed steels (HSS), tool steels, carburized steels and chilled cast iron.

Diamond and cubic boron nitride are superior to conventional abrasive materials owing to their hardness and fine-grained structure and the resultant properties, such as high wear resistance and excellent cutting edge stability.

Cost comparisons between conventional abrasives (Aluminum Oxide and silicon carbide) shows that diamond used on suitable grinding machines to be more economical.



2. RESINOID-BONDED DIAMOND AND CBN PRECISION TOOLS.

The best grinding performance with diamond and cubic boron nitride can only be achieved if all factors influencing the grinding process are accurately adjusted to suit the operation.

Naturally a machine of stable and rigid construction with exact and sensitive feed mechanisms will permit the best chipping operations and hence result in the most economical operation.

As in other grinding operations, the choice of efficient diamond or CBN grinding wheels is based mainly on the principle and the realization that the wheel, its shape, size and composition, the work piece and the machine (with its operating data constitute one inseparable whole.

The correct application of diamond and CBN grinding tools allow high stock removal rates and thus shorter grinding times and cooler grinding. Available bond types are suitable for dry and wet grinding, hand grinding, and grinding on automatic machines. Owing to their structure resinoid-bonded grinding tools can be used within a wide field of parameters. If the bond is correctly selected and the wheel prepared in the best possible way (dressing, roughening), a self-sharpening grinding process can be achieved after a short period of use.

Diamond and CBN wheels consist of high precision support body with an abrasive coating applied. Besides factors influenced by the machine (in-feed, pressure, rpm, peripheral speed, diameter of the wheel), the shape and size of the grinding wheel is also influenced by the type and shape of the workpiece. Wheels of larger diameter and with thicker abrasive layer are generally more advantageous and their cost proportionately less than a smaller diameter wheel. The external diameter should always be chosen with the economical peripheral speed in mind

Grinding wheel diameter:

A grinding wheel is more economical the greater its diameter. (Volume of abrasive in grinding rim is greater) Owing to the longer cooling phase, the abrasive grain (diamond or CBN) is also less susceptible to wear – this has a very positive effect on wheel life. Determining the diameter depends mainly on observing the recommended operational wheel speed.

Coating thickness:

Thicker coatings are more economical! The higher diamond or cubic boron nitride (CBN) content does not influence the manufacturing costs of the grinding wheels. This results in an advantage for the user (lower grinding costs).

