

(17-062) - Technical performance of nanostructured ceramics in wear tests

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Ceramic based cBN materials have been widely used as cutting tools for ferrous materials for which diamond materials have limitations. Like diamond, cBN has excellent properties, hardness in excess of 40 GPa, good thermal and chemical stability and good thermal conductivity. Several research studies have gone into the development of cBN materials, but very little has been done on determining the mechanical properties affecting them. It is important to know the mechanical properties of polycrystalline cBN materials such as hardness, fracture toughness and strength in order fully to understand the behavior of these materials in application. Ti and its compounds are widely used as binding phase in the cBN materials. However, there has not yet been an extensive mechanical testing out on cBN-TiB₂-Al composites. The results showed that the applied technology is efficient. Inserts were obtained with levels of densification above 95%. The microhardness values reached around 52 GPa and 12 MPa. In turning tests were analyzed mass loss of the inserts and the type of failure. It was observed that the inserts, one insert in comparison with commercial showed increased lifetime.
