



Advanced Vitrified Bonding Technology Has Wheel Life and Performance Advantages

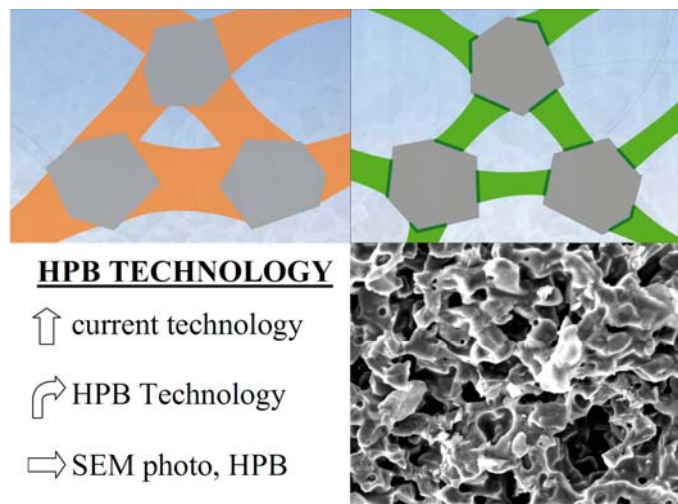
Vitrified bonds are the most recently developed and advanced bonding systems for superabrasive grinding wheels. Unlike other bonding systems such as resin or metal, the vitrified bond structure is both very porous and very wear resistant.

A new HPB high performance bonding technology (developed by Meister Abrasives) further improves on vitrified bonding to manufacture grinding wheels that last significantly longer or cut faster or both (depending on how various properties are balanced during the wheel manufacturing process). Users of the HPB CBN wheels have reported improvements in wheel life up to 100% and manufacturing throughput improvements up to 25% vs. other vitrified bond CBN abrasive products.

How It Works

Vitrified bondings are composed of sintered glass and are initially mixed in powdered form along with the CBN abrasive. Each component of the mix is precisely determined by the required characteristics of the final wheel. After pressing to shape, the vitrified bonded wheels are fired in a high-temperature kiln.

HPB technology involves both a new bonding material chemistry and modified manufacturing processes which result in a stronger bond that wets completely to fully envelope each abrasive crystal. Because the bond is so strong, less bonding material may be used to create more porosity in the wheel. Conversely, using conventional amounts of bonding material results in wheels with exceptional wear resistance with standard porosity.





The HPB manufacturing process also incorporates modified curing cycles that enhance the properties of the CBN abrasive crystals themselves. These modified CBN crystals fracture more readily to stay sharper during use.

Advantages

The HPB manufacturing process improves grit exposure. This, in turn, allows the modified CBN crystals to make sharper cuts with less grinding force. More efficient cutting and better chip clearance cool the grinding action. This combination of attributes results in more precise geometries with less subsurface damage to the part.

Optimized bond-grit interface engendered by the HPB technology increases grit retention in the bonding matrix to improve the grinding wheels' wear resistance characteristics and lengthen dressing intervals.

HPB bonding technology is always adapted to customer-specific criteria to make wheels that last longer, machine cycles that run shorter or both. The user gets to choose the balance of properties that are most appropriate for the particular grinding application.

Some current superabrasive users have saved tens of thousands of dollars by adapting the new grinding wheel technology to their manufacturing processes. Based on this level of cost/performance improvement, it is anticipated that many manufacturers who have considered but rejected superabrasive grinding in the past will now re-evaluate and select this option.

Examples

Fine Grinding: users of HPB technology for fine grinding report they are able to grind up to 25% faster on a larger number of parts/carrier. They are also able to grind a wide variety of stainless steels, powdered metals, chrome or Nickel platings, and even non-hardened metals with ease.



Internal bore grinding:

For bore grinding applications some users report skip dress and wheel life increases up to 100% under the same operating conditions, plus higher throughput resulting from 50% less wheel dressing and wheel change time.



Aerospace and Power Generation:

HPB technology can provide significant improvements in part quality and reduced subsurface damage when grinding sensitive components such as turbine vanes, blades, and seal rings, in even the most exotic new super-alloys.



Meister Abrasives USA, Inc.
201 Circuit Drive
North Kingstown, RI 02852
Tel 401-294-2530
Fax 401-294-7326
Email sales@meister-abrasives-usa.com
Web www.meister-abrasives-usa.com



Meister Abrasives USA
Make A Quality Decision
United States of America

Medical Tools and Implants:

In this industry users are experiencing improvements in material removal rates for stainless steels up to 25% compared to resin bonded abrasive products. HPB wheels also allow for automatic in-process dressing in automated production cells.



CAM grinding:

Users of HPB Technology for Cam grinding report improved wheel life, removal rate, and less burn, even at operating speeds of 140m/s (27,560 SFPM) or more.



Technology Extensions

High Performance Bonding technology was originally developed to enhance the cost/performance of small internal grinding wheels. The focus on small internal grinding wheels made it necessary for the researchers to pay very close attention to the consistency and quality of superabrasive materials and bonding system performance. Even small variations in these attributes show up quickly in internal grinding because the life of a small wheel is relatively short to begin with.

Today, this technology has been transferred to larger CBN external wheels as well as lapping and fine-grinding plates. HPB for external grinding wheels still maintains a high level of wheel-to-wheel consistency so important for manufacturing process control.

HPB technology became commercially available for internal wheel users in the USA in 2006. The option for external wheels was introduced here in 2007. HPB technology for diamond abrasive wheels is currently being developed in Europe and will be introduced in the United States in 2008.

For more information, please visit the Meister web site at meister-abrasives-usa.com, or call 1-888-MEISTER.

