

Quality Times



with Meister Abrasives

Winter 2009/10

Presented By



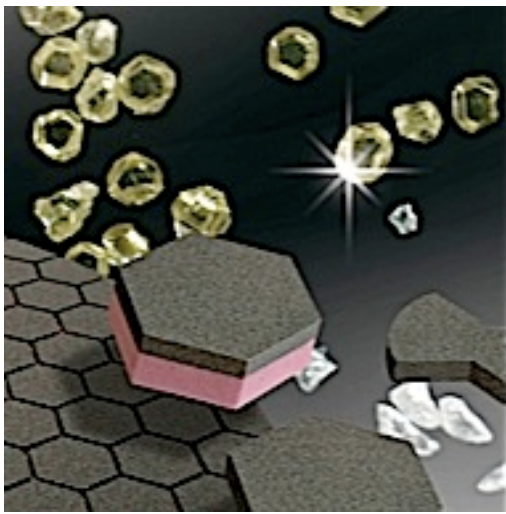
**hDD Hybrid
Diamond Dresser**

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How To Be A Smart Dresser: Improving grinding performance and throughput with vitrified bonded superabrasive wheels.

Why It Pays To Dress Better: Example: direction and speed ratio.

Meister Abrasive Points: New Products, Global Market Focus and IMTS in Chicago all coming up in 2010.

How To Be A Smart Dresser

Get the most out of your vitrified-bonded superabrasive grinding wheels by learning to fine tune your dressing process



Your local Meister Engineer may not show up in his Sunday best, but thanks to years of study along with trial and error experimentation, he is one smart dresser. Now the applications specialists of Meister Abrasives USA are prepared to reveal this hard-won dressing knowledge to users of Meister's superabrasive grinding wheels.

This newsletter provides an overview of the dressing process and why knowledge of it is essential to fine tuning grinding operations for optimal performance and productivity. This wide ranging topic could easily fill a book with useful information on dressing techniques, so this issue can only scratch the surface (so to speak).

However, once you have grasped the importance of improving your dressing skills, you can learn more by downloading the Meister Abrasives Dressing Tutorial PDF. [Click Here.](#)

In addition, Meister's experienced sales force routinely conducts in-plant training at our customer's facilities. If you are looking for a way to achieve consistently better grinding results, or training your staff to become smart dressers themselves, this would be a good way to start. Contact your Meister sales representative for more information.

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Hand-Set CVD rotary diamond dresser

Typical Dressing Tool Choices:
based on superabrasive wheel Type.

Not A Black Art: Contrary to popular belief, the dressing of vitrified-bonded superabrasive grinding wheels is not a black art. It is actually a well known

scientific process, much like the grinding process itself. Dressing is also a powerful tool that engineers can use for solving grinding problems. However before you can use this tool effectively, you have to have a basic understanding of various constituents of dressing processes.

Definition: Dressing is actually a combination of two processes, truing and sharpening. Truing is the procedure used to ensure that the wheel, once it has been installed on the spindle, is optimally round. it may also refer to the methods used to create shapes on grinding wheel surfaces. Sharpening involves removing bonding material from






between the abrasive grains to expose them so that they are ready to cut. For vitrified-bonded wheels these two processes occur simultaneously.

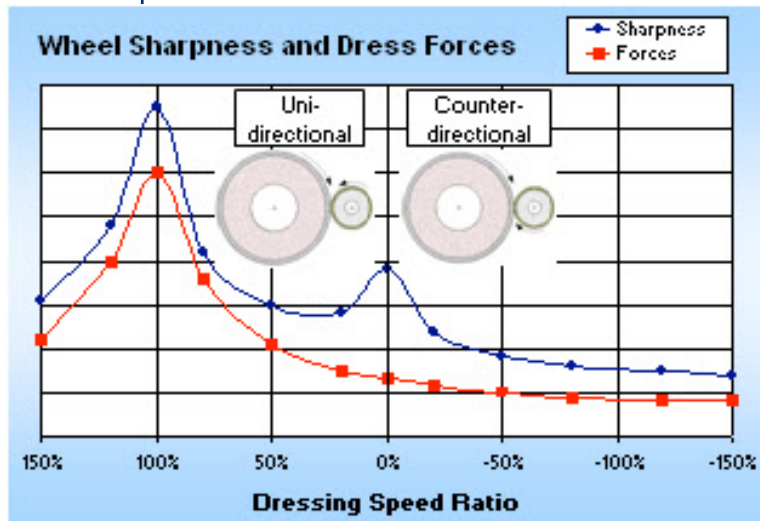
Dressing Tools: Numerous tools may be used to dress grinding wheels. They include simple handheld abrasive sticks; conventional abrasive rotary wheels used on driven or brake- controlled dressing spindles; single and multipoint stationery diamond tools; and a wide variety of rotary diamond tool configurations (cups, discs, and form rollers). Rotary tools are preferred for dressing superabrasive wheels, in particular vitrified-bonded CBN and diamond wheels. See table above for recommended dressing tools by grinding wheel type.

Dressing Variables: Once the dressing tool has been selected there are six variables that are most frequently adjusted to yield an optimal dressing and grinding process, opening up a whole new world of process improvement possibilities.(See Sidebar).

The Six Key Dressing Process Variables:

- 1. Wheel and dresser surface speeds:** Linear speed at the periphery of the wheel or dresser.
- 2. Direction at point of contact:** Unidirectional (wheel/dresser turning with each other), or counter-directional (wheel/dresser turning against each other).
- 3. Speed ratio:** The ratio of dresser surface speed divided by wheel surface speed.
- 4. Infeed amount:** The depth of cut taken per pass by the dresser on the grinding wheel.
- 5. Traverse speed:** The linear speed that the dresser travels across the wheel surface.
- 6. Overlap ratio:** The number of wheel revolutions for the dresser to traverse a distance equal to its contact width.

Wheel Type	For dressing CBN	For dressing Diamond
Bore Wheels (≤100mm)  Straight  Formed	Rotary Diamond with Metal, Vit, or Hybrid bond	Rotary Diamond with Metal bond
	Rotary Diamond with Metal, Plated, or Hand-set matrix Alternative: Plated form roll	Rotary Diamond with Plated or Hand-set matrix
External Wheels (>100mm)  Straight  Formed	Rotary Diamond with Metal or Hybrid bond	Rotary Dia. with Metal or Mono-layer; Alternative: conventional (SiC) wheel
	Rotary Diamond with Hand-set or Mono-layer matrix Alternative: Plated form roll	Rotary Diamond with Metal-bond (inverted) or Mono-layer matrix
Cup Wheels 	Rotary Diamond with Metal, Vit, or Hybrid bond	Conventional Rotary Wheel Alternative: Metal bonded Dia. followed by Alox stick
Fine Grinding Wheels 	Stationary Conventional blocks or rings (Alox)	Stationary Conventional blocks or rings (SiC and/or Alox)



Example: Speed Ratio

Increasing the speed ratio, especially with a uni-directional dress, increases the crushing action on the wheel surface, freeing more abrasive crystals for sharper cutting. However dressing forces are higher, requiring a stiffer setup.

Decreasing the speed ratio or running a counter-directional dress makes the wheel duller for better surface finish, with lower dressing forces.

Case Study Part	Hydraulic Sleeve Bore Grind
Material	Steel (58HRc)
Stock Removal	Ø0.4mm
Finish	0.8µm Ra
Wheel Speed	50m/s
Coolant	WSO
Wheel Size	Ø30x40 Vit CBN
Dressing	Rotary Diamond Ø120 hand-set
Parts/Dress Cycle	10
Reason for Dress	Loss of size or taper tolerance

Did You Know?

1. When Meister engineers are called out to help solve a customer's grinding problems, the vast majority of changes they make to the grinding process involve dressing.
2. You can make your vit-bonded CBN or diamond grinding wheel sharper for more aggressive cutting or duller for a smoother surface finish simply by adjusting the dressing variables.
3. Uni-directional rotary dressing gives you the flexibility needed to optimize your wheel for either aggressive roughing or smooth surface applications.



Why It Pays To Dress Better



Here is one real-life example of how tweaking the dressing process can significantly improve grinding performance. The part was a hydraulic sleeve and Meister's customer was dissatisfied with the results he was obtaining from a bore grinding process using a vit-bonded CBN wheel.

The customer was looking for a cycle of less than 37 seconds but was only getting 42 seconds.

Immediately after the dressing cycle, he was seeing (+) taper and an unacceptable drop in bore size, which only corrected itself after grinding 2-3 parts. After reviewing the grind process, wheel, and dresser designs, Meister engineers decided to have a closer look at the dressing process.

It was determined the dress process was unnecessarily dulling the CBN wheel, causing it to build too much pressure during the grind cycle. This resulted in quill deflection which, in turn, caused the taper and size control issues. Also, the customer's dressing process had a dulling effect that prevented the wheel from grinding at its full stock removal potential.

The following chart shows the steps that were taken to improve the dressing process.

	Before	After
Wheel Speed for Dress	30m/s (19,099 rpm)	30m/s (19,099 rpm)
Dresser Speed	50m/s (7,978)	24m/s (3,820 rpm)
Direction	counter-directional	unidirectional
Speed Ratio	-167%	+80%
Infeed	ø5µm	ø5µm
Traverse	750mm / min	1250mm / min
Overlap	25.5	15.3

Results: Moving from a counter-directional to a uni-directional dress (both wheel and dresser rotating in the same direction) exerted more crushing force on the abrasive bond, resulting in a more open and aggressive cutting wheel, so the customer was able to increase feed rates and get the cycle time down from 42 seconds to 36 seconds.

In addition, taper and size control dramatically improved, so there were no more dimensional issues after dressing. As a bonus, since the wheel was cutting more efficiently, the customer found he could increase skip dress from 10 to 15 parts, allowing a much improved wheel life

Want to Know More about dressing techniques for vit-bonded superabrasive wheels? Download Meister Abrasive's Dressing Tutorial PDF: [Click Here](#).

Meister Abrasive Points

Application Specific...

Meet our new **Applications Field Managers** (L to R) Thomas Schmid, Fuel Injection; Peter Kliestenec, Bearing; Daniel Schaufelberger, Fuel Injection; Bruce Northrup, General Manager, Meister USA; Elias Navarro, Automotive and Medical; and Carmine Sileno, Semiconductor.



Our General Manager, Bruce Northrup recently returned from a corporate planning meeting at Meister's world headquarters in Andelfingen Switzerland. He brought back news of exciting products in the works, plans for IMTS in September 2010 and an innovative market-

driven approach through a corporate team of Application Field Managers. These individuals bring many years of proven experience to particular market segments and will be available to assist us in solving your grinding problems.

Staffed and Ready...

This past year has been difficult for all. In our industry we've seen competitors merge in order to survive. Foreign subsidiaries have closed their doors. Industry layoffs have been the norm. Here at Meister USA you should know that we've maintained our full staff...no layoffs. And we've kept busy working with our customers on prototyping and testing so that they'll be ready when conditions improve.

Lately we've seen a bit of an uptick. Suddenly customers are looking for product and looking for it today rather than tomorrow. Some have depleted their inventories of abrasive product. Some are bringing back furloughed employees and restarting their processes. Hopefully this is a precursor of renewed confidence and growth. If so, there may be a big jolt when all your customers want

everything at once. There's the potential for long lead times. At Meister, we're fully staffed, equipped and ready to respond to whatever your needs may be in the coming year!

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Made In USA

To insure timely deliveries, nearly all Meister USA products are made to exacting international corporate standards at our state-of-the-art plant in North Kingstown, RI.



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