

MASTER ABRASIVES

Master offers new 3D bond technology

The need to achieve better fuel economy is driving the requirement of increasingly tighter tolerances for fuel injector bores. Meister set out to test the viability of the new 3D Abrasive Technology for improving bore tolerances without sacrificing other important variables such as surface finish, cycle time, or wheel life. Trials were conducted on a fully instrumented UVA U80 bore grinding machine using a benchmark standard Vitrified CBN wheel and then with a 3D Vitrified CBN wheel. The CBN type, grit size, concentration, wheel hardness, and the shank were all held constant. Identical process conditions, including grind and dressing parameters, were also held constant.

Bore Grinding
Standard Vit-CBN vs. 3D Vit-CBN
identical grinding/dressing conditions



| Standard Vit CBN | 3D Vit CBN |
|----------------------|----------------------|
| | |
| | |
| Taper -1.44 µm | Taper -0.22 µm |
| Cylindricity 0.74 µm | Cylindricity 0.11 µm |
| Finish Rz 0.71 µm | Finish Rz 0.76 µm |
| Cycle time 23 sec | Cycle time 23 sec |

The results show a seven times improvement in taper and a seven times improvement in cylindricity with virtually no change in the required surface finish or cycle time. In this application, 3D Abrasives significantly outperformed the best available abrasives technology without sacrificing cutting ability or wheel life.

During this study, no adjustments were made to the grinding parameters to achieve a different balance of results, for example sacrificing some of the taper improvements to obtain faster cycles and greater productivity. These considerations, of course, would be part of a normal grinding process development protocol.

Meister engineers attribute the success of the 3D product in this application to the extreme porosity of the wheel, which carry coolant, flush away swarf, reduce grinding forces, and limit the potential for burning. There are many other grinding applications in which 3D Abrasives Technology is under consideration for extending grinding performance beyond the limitations of current best practice solutions.

As the UK representative for Meister, Master Abrasives works with customers to develop the optimum solution for their grinding processes. Master Abrasives precision product range includes conventional grinding wheels, superfinishing stones, dressers, coolant nozzles and grinding machines.



Meister Abrasives UVA U80 Bore-Grinding Test Centre

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