DWAE DRILLS FOR SWISS AND AUTOMATIC LATHES

The special purpose DWAE drills have been designed from the outset specifically for drilling in the confined spaces of Swiss type and automatic lathes. Several important parameters were set to be achieved before they were launched. The most important of these parameters was low cutting resistance to provide reliability and excellent chip control that is necessary to prevent chips wrapping the component and clogging the confined work spaces. To achieve this, several features were built into the geometry, substrate and coating of the drills.

Optimum cutting edge and flute design
Mitsubishi’s wavy type cutting edge is utilised because this provides both sharpness and cutting edge strength by resisting wear to the outer cutting edge. This geometry also provides an even load for the ideal solution to successfully machine low rigidity workpieces. This reduction of cutting forces is also helped by the efficient geometry of the flutes that breaks the chips into smaller more manageable pieces. In addition, the flute length has been specifically engineered in shorter than conventional lengths to meet the compact needs and limited space of small CNC lathes. To complete the combination of features that provides the low cutting force and efficient chip breaking, is the special Z form web thinning at the point of the drill.

The substrate and coating technology
To complement all the advanced geometrical features, a carbide grade, DP102A, was developed to optimise the overall performance and reliability of the DWAE series. A substrate with an ideal balance of hardness and toughness was developed and a suitable PVD coating added to provide wear resistance to the substrate’s natural fracture resistance. The coating was found to be particularly effective against wear at medium to low cutting speeds. A smoothening treatment has also been applied to the surface of the drills to further reduce binding with the work material and to also facilitate excellent chip disposal. This feature helps especially because the drills are fed only with an external coolant supply. In cutting tests when drilling DIN CF53 material with external coolant, at Vc [m/min] 80 with a feed rate of fr [mm/rev] 0.2, the DWAE drill gave more than double the tool life compared to other similar products.

Availability and choice
The drills are available in a wide range of sizes from Ø3.0 through to Ø14 in 0.1 mm increments and in both 2 x D and 4 x D flute lengths. For ease of use, the shank diameters are also made to suit standard collet sizes.