



END MILLING SYSTEMS

DM System

The new Horn DM Series end milling system is designed for rough and semi finish end milling using a unique design of replaceable insert. The tips locate in a common holder using a bayonet locking system. Inserts are manufactured to very tight tolerances using Horn's proprietary insert injection moulding process and the cutting edges are precision ground.



In comparative trials Horn DM tooling has demonstrated tool life between 66 per cent and 150 per cent greater than other replaceable tip end milling systems.

The 12 mm DM system has also exhibited excellent stability at spindle speeds of over 20000 rev/min whilst its rigidity provides excellent performance on deep pocket milling applications.

DM is also much easier to use as it addresses many of the disadvantages suffered by other replaceable tip milling systems such as ease of tip change, consistency of length, rigidity and run-out.

Most of these problems are traceable to the means of locating the insert in the shank. The Horn location system offers very high repeatability of insert location using a uniquely engineered tip/holder interface.

- Horn DM tips can be removed and replaced without removing the shank/holder from the machine.
- Repeatability of location/length is within 30 microns - so for most applications no re-setting of tool length offset is required.
- Horn DM edge position does not vary during machining as the location design prevents the tip from 'sinking' into the holder during machining.
- Unlocking the insert from the holder is reliably easy as the bayonet location/locking system is designed for immunity from seizure.

The key technology incorporated into Horn DM Series tooling is the location system is as follows.

- The holder nose is machined with a conical seat and a helical internal groove, accessed via an asymmetric 'coffin shaped' plug-in port. This last prevents mis-orientation of the insert.
- DM inserts are moulded with a T-head location pin mating with a correspondingly shaped locator.
- The conical seating on the insert has three raised pads. This three point location ensures that the insert sits squarely on its conical seat while the gap maintained by the pads prevents cold welding of the insert to the holder. Torque is transmitted mainly by the location pin.
- Tightening the insert into the holder to a torque of 6Nm using the Horn-supplied torque spanner provides an absolutely secure location.
- Removal of a worn or damaged insert is a simple matter using the same tool.
- Run-out accuracy of the assembled tool is within 20 microns TIR.



The Horn DM location has been engineered to allow the assembled tool to behave 'as solid'. The tooling is capable of class leading machining performance under the majority of machining conditions. Combined with its ease of use and inherent accuracy the system offers many of the improvements that the precision milling market requires. Horn DM Series is launching as a 12 mm diameter system and a 10 mm diameter system. Through tool coolant is available on the 12 mm system only. A 6 mm diameter Horn DM system is under development.

DS High Precision end milling system



The DS Series is a premium grade range of solid carbide tooling, compliant with H5 run-out standards on both shank and cutting edge, and is developed for the most exacting requirements.

Two steel cutting carbide grades with a variety of coatings are available for machining soft and hard materials. In addition a diamond coated grade has been developed for aluminium machining applications.

Horn DS has been developed to complement the DM Series replaceable tip end mill range. Though the DM Series is capable of a high standard of machined finish, DS has been developed to meet the needs of the top end of the market. Roughing and finishing tool geometries are available

Around 250 DS variants are already available to cover full radius, ball nose, end milling and single flute cutting for aluminium. Tool diameters range from 0.3 mm to 12.0 mm and the tools are available in two micro grain carbide grades for machining normal and pre-hardened materials.

Various coatings are available including multi-layer TiN, and diamond coatings for aluminium machining.

Horn's development of its end milling program is considered a natural development of the company's traditional interest in grooving technology. Groove milling is a major area of activity for the company, but is normally carried out as part of a cycle that includes other milling operations. Until now Horn has been unable to furnish a complete solution.

"The Horn end milling program will enable us to engineer complete solutions for a much higher proportion of specials projects," comments Mike Green, national sales manager for Horn UK. "In addition the products will open the door to other areas of manufacturing industry, allowing us to build on the strength of the Horn brand."

