

## HONING TECHNOLOGY FOR MACHINING CENTERS



### coolEX® tool system

The coolEX® tool system allows the integration of the honing operation into standard machining centers, in lathes and in milling machines without the need of technical modification of the machine itself. The honing tools are hydraulically expanded by the internal cooling (coolant-through-spindle) of the machine, the process control is done by timer or by an air measurement system. The coolEX®2 tool system is a double expansion system (e.g. rough-honing and plateau-honing) in a single tool. The coolEX®TB tool system is a refinement of the coolEX® basic system and was developed for use in BTA deep drilling machines. A further development is the coolEXact® tool system, giving full size control to the process by mechanical process shutdown without any modification on the machining center.



### Xstep® tool system

The Xstep® tool system allows the integration of honing operations with step-mechanical expansion into a machining center. The step-mechanical expansion is either done by a push and pull rod available in the spindle of the machining center or by an exchangeable U-axis system (such as the KOMET KomTronic®). The process control is integrated and CNC-controlled by the step-mechanical expansion, the bore size measurement can be done downstream outside of the machine, thus not interfering the main machining time. The Xstep®2 tool system integrates a double expansion system (e.g. rough-honing and plateau-honing) in a single tool, both expansion systems fully CNC-size controlled.



### coolEXstep® tool system

The coolEXstep® tool system is based on a combination of the coolEX® and Xstep® tool system. This combination allows multiple expansion systems (2 or more honing operations) in a single tool combining the advantages of both systems. It is especially suitable for plateau honing operations by the size-controlled pre-honing (to a well-defined diameter), followed by the hydraulic plateau honing to achieve the required surface parameters. The activation of the individual honing operations is done without interrupting the honing kinematics, which results in very short cycle times.



### Fixed diameter tool system

Fixed diameter honing tools are especially suited for honing of interrupted bores. The tool diameter is preset to the finish diameter and the machining of the bore is done in one double stroke (tool enters and exits the bore). The tool diameter adjustment can be done manually or machine controlled. Fixed diameter honing tools are suitable for use in standard machining centres, on lathes, milling and drilling machines, and for small diameters on manual hand drilling machines.

## SERVICES



### Services

We offer support for our customers in all aspects of the honing process such as training and consulting on honing operations, as well as honing process design and optimisation. In order to keep our customer's production without any interruption, we offer a full-service tool maintenance including fixtures and measuring devices. Honing tool rental and job honing of small production lots allows our customers to bridge any time gaps until delivery of new tools.

## HONING TECHNOLOGY FOR HONING MACHINES



### Single- and multi-stone honing tools

The single stone honing tool guarantees the best possible correction of geometrical deviations, such as straightness, roundness and cylindricity. At the start of the honing operation, the tool rotates at a slight offset from the bore axis (3-point support: 1 working stone and 2 guiding stones) and moves into the bore axis with increasing material removal. Multi stone honing tools are designed and optimised for a high chipping rate, good correction of geometrical deviation, such as straightness, roundness or cylindricity and to keep tight tolerances to surface parameters.



### System honing tools

The system honing tools, with standardised honing stone dimensions in practical gradations of the sizes, cover specific diameter ranges: the multi-stone honing tools of the ML series for machining through bores and those of the MLS series for blind bores, the THT series for horizontal tube honing and the SHT series as shell honing tools for interrupted bores. All system honing tools are interchangeable in a modular system with the required machine connectors (Gehring, Nagel, Kadia, SUNNEN and others).



### Fixed diameter tool system

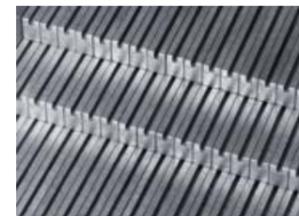
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### Custom honing tools

Custom honing tools are designed and built especially for the planned application. Various honing tool types are applicable depending on the bore and part geometry: shell honing tools and sleeve honing tools for interrupted bores (e.g. keyways or open ports), coaxial honing tools for tandem bores with the same or even different diameters or double honing tools, with 2 honing operations aligned on the same tool body.

## SUPER ABRASIVES / HONES



### Super abrasives / hones

To achieve optimum results during honing operations, special care and experience must be used in the selection of the super abrasives. Our first step is to ask the customer for all data relevant to the process (e.g. part sketches, material and allowances). Our application engineers determine the specification of the hones by the selection of size, type and concentration of the abrasives (diamond, CBN or others), type of bond plus additives to achieve the requirements. A continuous optimisation process done by our application engineers ensures that the honing process of our customer always remains up front of the technological development.



## + General information about the company

For more than 25 years DIAHON Werkzeuge GmbH & Co. KG is supplying honing tools, metal bond CBN- and diamond hones (super abrasives), fixtures and other accessories for honing operations. Quick response, short delivery times and accompanying consulting ensures timely streamlined process optimisation. Re-tipping of honing tools, honing tool repairs and the provision or production of replacement tools guarantee our customers uninterrupted production processes. DIAHON tools and super abrasives are used in the automotive industry and their suppliers, in the hydraulic and aerospace industry and in the defence industry. In 2006 DIAHON successfully introduced the newly developed honing tool systems for standard machining centers in the market (coolEX® and Xstep®). The use of these technologies enables our customers to finish their parts without the need of a honing machine.

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