

**botek**<sup>®</sup>

DEEP HOLE DRILLING SYSTEMS  
SOLID CARBIDE TOOLS

# Deep hole drilling tools

## System BTA (STS)



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## The botek company

Manufacturing deep and precise holes is a technical challenge when processing metal. Accordingly specialising in deep hole drilling technology was the founding idea in 1974 of botek Präzisionsbohrtechnik GmbH in Riederich.

Botek grew to be an international supplier of deep hole drilling tools. Over 550 employees in the main company develop and manufacture single and two fluted tools, deep hole drilling tools BTA and Ejector systems as well as special tools.

A complete product program, regarding all deep hole drilling aspects and a team of highly qualified and dedicated cutting specialists make botek a competent partner for the automobile industry and their suppliers, shipbuilding industry, hydraulic industry as well as motor, gear and machine building companies.



- Please note our safety pointers at [www.botek.de](http://www.botek.de).
- Our General Standard Terms and Conditions, which we assume as known, apply.
- We reserve the right to make modifications in the interest of technical improvement. Such modifications cannot, in principle, be accepted as justifiable reasons for complaints.
- Subject to change. The manufacturer accepts no responsibility for misprints and other errors.

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## Overview of types

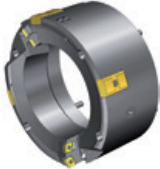
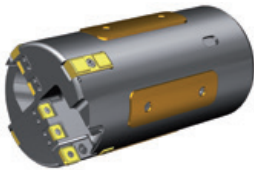
| 1-start<br>connection<br>thread internal                                                    | 4-start<br>connection<br>thread external                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                             |            | <b>Type 14 solid drilling tool</b> <ul style="list-style-type: none"> <li>- High cutting capacity and simple handling</li> <li>- Stable tool</li> <li>- Suitable for extremely close tolerances</li> <li>- Low up-front costs for small batches</li> </ul>                                                                                                                                                                                                                               |
|            |                                                                                             | <b>Type 17/18/20 solid drilling tool</b> <ul style="list-style-type: none"> <li>- Simple handling</li> <li>- Stable tool</li> <li>- Tools can be reground several times</li> <li>- Suitable for extremely close tolerances</li> <li>- Low up-front costs for small batches</li> </ul>                                                                                                                                                                                                    |
|            |            | <b>Type 11/61 solid drilling tool</b> <ul style="list-style-type: none"> <li>- Indexable inserts with various chip breakers available to suit processed material</li> <li>- Very economical, with optimal cutting capacity</li> <li>- No adjustment required when changing wear parts, no readjustment within +/- 0.01 mm</li> <li>- Tool adjustment range up to 0.5 mm using suitable replacement parts</li> <li>- Ø fine adjustment with stop plate</li> </ul>                         |
|           |           | <b>Type 12/64 solid drilling tool</b> <ul style="list-style-type: none"> <li>- New chip breakers for large feed rates and high productivity</li> <li>- No adjustment required when changing wear parts, no readjustment within +/- 0.01 mm</li> <li>- Tool adjustment range up to 0.5 mm using suitable replacement parts</li> <li>- Minimal axis deviation at large drilling depths</li> <li>- Ø fine adjustment with stop plate</li> </ul>                                             |
|          |          | <b>Type 70 A/B solid drilling tool</b> <ul style="list-style-type: none"> <li>- Very few wear parts over the whole drilling range</li> <li>- New chip breakers for large feed rates and high productivity</li> <li>- No adjustment after a change of indexable inserts</li> <li>- We keep wear parts in stock</li> </ul>                                                                                                                                                                 |
|          |          | <b>Type 43 A/B/F solid drilling tool</b> <ul style="list-style-type: none"> <li>- Simplest operation, change of wear parts without readjustment within +/- 0.01 mm</li> <li>- Wear parts can be exchanged on the machine</li> <li>- Tool adjustment range up to 10 mm using suitable replacement parts</li> <li>- New cutting geometries for high cutting capacity</li> <li>- Minimal axis deviation at large drilling depths</li> <li>- Ø fine adjustment with stop plate</li> </ul>    |
|          |          | <b>Type 13 A/B counterboring tool</b> <ul style="list-style-type: none"> <li>- New chip breakers for large feed rates and high productivity</li> <li>- No adjustment required when changing wear parts, no readjustment within +/- 0.01 mm</li> <li>- Tool adjustment range up to 0.5 mm using suitable replacement parts</li> <li>- Maximum shape accuracy and hole straightness</li> <li>- Ø fine adjustment with stop plate</li> </ul>                                                |
|          |          | <b>Type 34/35 counterboring tool</b> <ul style="list-style-type: none"> <li>- Tool adjustment range up to 50 mm</li> <li>- Low requirement for tools over the whole drilling range</li> <li>- Adjustment system for easy change of diameter</li> <li>- New patented adjustment system with a central adjusting ring from Ø 149 mm</li> <li>- No adjustment required when changing wear parts, no readjustment within +/- 0.01 mm</li> <li>- Ø fine adjustment with stop plate</li> </ul> |
|  1-start |  1-start | <b>Type 33/36 counterboring tool</b> <ul style="list-style-type: none"> <li>- Tool with fixed adjustment</li> <li>- No adjustment required when changing wear parts, no readjustment within +/- 0.01 mm</li> <li>- Type 33 tool adjustment range up to 50 mm</li> <li>- For internal machining of hydraulic cylinders</li> </ul>                                                                                                                                                         |
|          |          | <b>Type 38/58 pullboring tool</b> <ul style="list-style-type: none"> <li>- Bore tolerance in the range of IT7 (IT6) roundness/diameter</li> <li>- Tool adjustment range up to 5 mm</li> <li>- No adjustment required when changing wear parts, no readjustment within +/- 0.01 mm</li> <li>- Special tool for smallest centerline deviations</li> </ul>                                                                                                                                  |
|          |          | <b>Type 28/48 trepanning tool</b> <ul style="list-style-type: none"> <li>- Tool adjustment range up to 5 mm</li> <li>- No adjustment required when changing wearing parts, no readjustment within +/- 0.01 mm</li> <li>- For machines with insufficient spindle power</li> <li>- The core may be reused for new workpieces</li> <li>- Ø fine adjustment with stop plate</li> </ul>                                                                                                       |

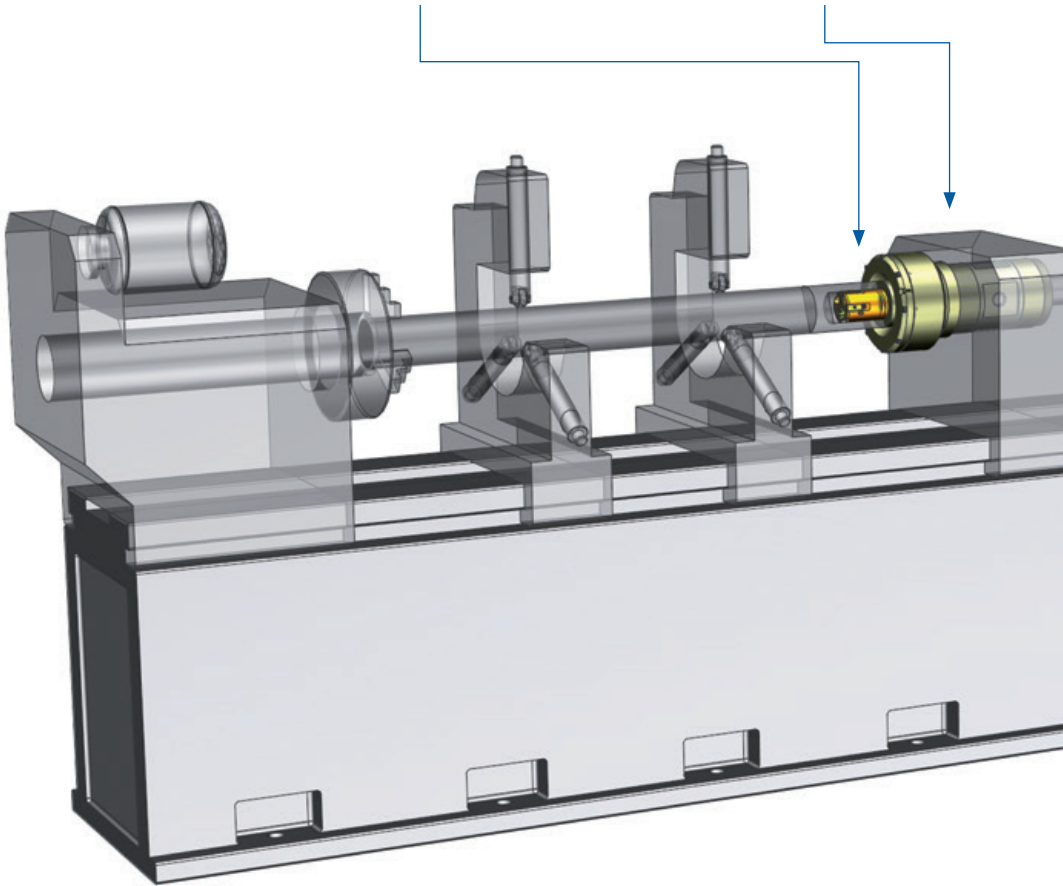
## Areas of application

| Page           | Surface quality<br>Ra | Drilling tolerance | Workpiece material |                 |           |                  |                       |
|----------------|-----------------------|--------------------|--------------------|-----------------|-----------|------------------|-----------------------|
|                |                       |                    | Steel              | Stainless steel | Cast iron | Aluminium alloys | Heat resisting alloys |
| 8, 9           | 2 µm                  | IT 8 (IT 7)        | • • •              | • • •           | • • •     | • • •            | • • •                 |
| 10, 11         | 2 µm                  | IT 8 (IT 7)        | • • •              | • •             | • • •     | • •              | •                     |
| 12, 13, 14, 15 | 2 µm                  | IT 8 (IT 7)        | • • •              | • • •           | • • •     | • • •            | • • •                 |
| 16, 17         | 2 µm                  | IT 8               | • • •              | • • •           | • • •     | • • •            | • • •                 |
| 18, 19         | 2 µm                  | IT 10              | • • •              | • • •           | • • •     | • • •            | • • •                 |
| 20, 21, 22, 23 | 2 µm                  | IT 8               | • • •              | • • •           | • • •     | • • •            | • • •                 |
| 24, 25         | 2 µm                  | IT 7               | • • •              | • • •           | • • •     | • • •            | • • •                 |
| 26, 27, 28, 29 | 2 µm                  | IT 7               | • • •              | • • •           | • • •     | • • •            | • • •                 |
| 30, 31         | 2 µm                  | IT 12              | • • •              | • •             | • • •     | • • •            | • •                   |
| 32, 33         | 2 µm                  | IT 7 (IT 6)        | • • •              | • • •           | • • •     | • • •            | • • •                 |
| 34, 35         | 2 µm                  | IT 9               | • • •              | • •             | • • •     | • •              | •                     |

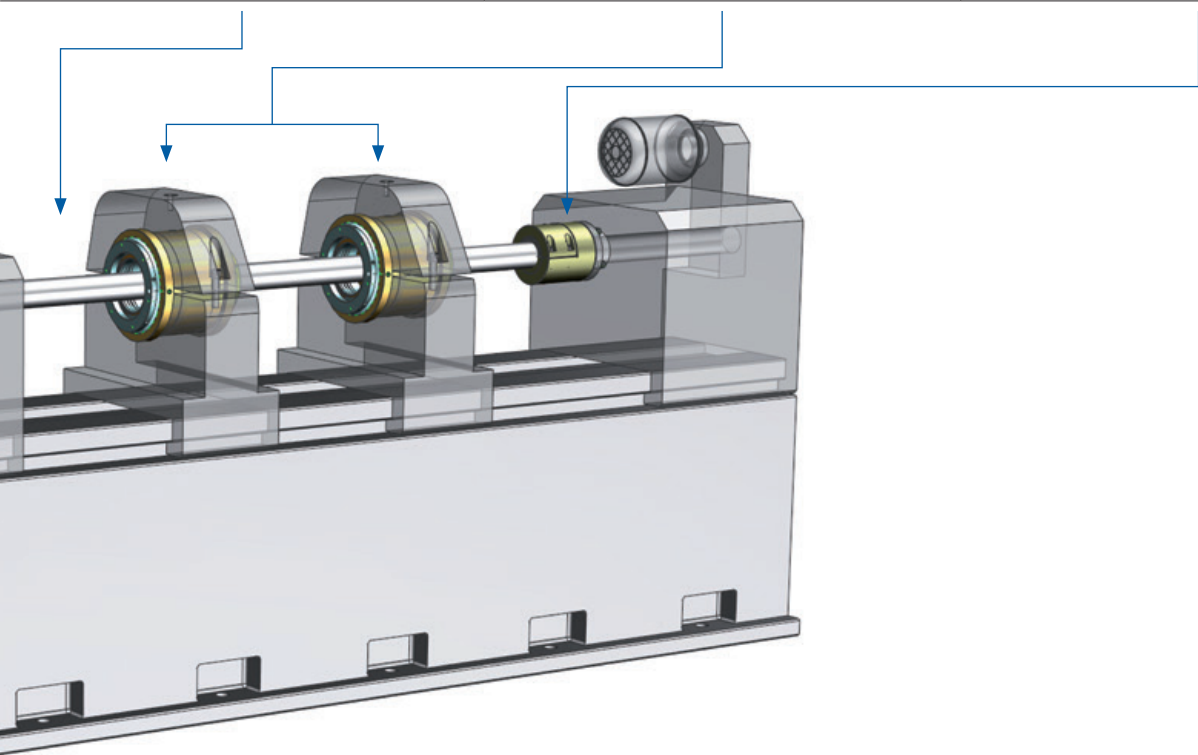
• • • = good • = on average

**BTA (STS) system**  
 Deep-hole drilling

| Drilling diameter (mm)      | Drilling methods                                                                                  | Oil pressure head (BOZA)                                                            |
|-----------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                             | Page 54, 55                                                                                       | Page 45                                                                             |
| 7.76 - 700<br>Page 8 - 23   | Solid drilling  |  |
| 28.71 - 800<br>Page 24 - 33 | Counterboring   |                                                                                     |
| 55.00 - 600<br>Page 34 - 35 | Trepanning       |                                                                                     |
| 15.00 - 300<br>Page 37      | Formboring    |                                                                                     |



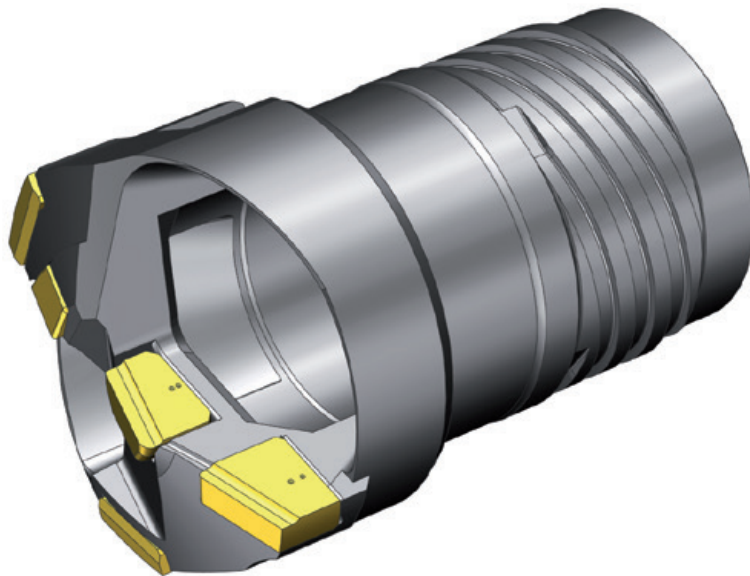
| Drill tube                                                                       | Vibration damper                                                                  | Drill tube clamping                                                                 |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Page 38 - 41                                                                     | Page 46, 47                                                                       | Page 48, 49                                                                         |
|  |  |  |



## Type 14

Solid drill head, brazed type

Ø 15.61 to 65.00 mm



Type 14

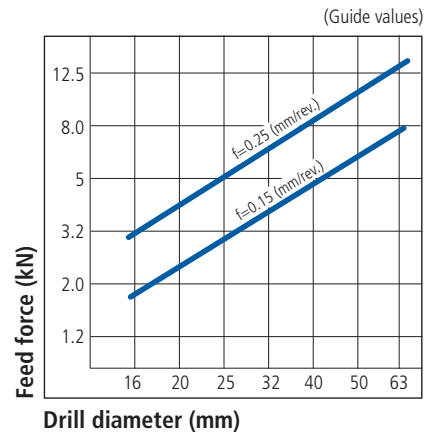
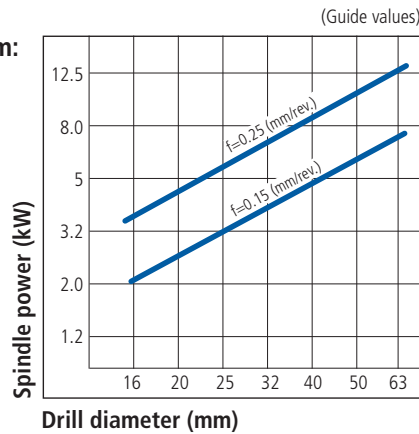
### Advantages:

- High cutting capacity and simple handling
- Stable tool
- Suitable for extremely close tolerances
- Low up-front costs for small batches

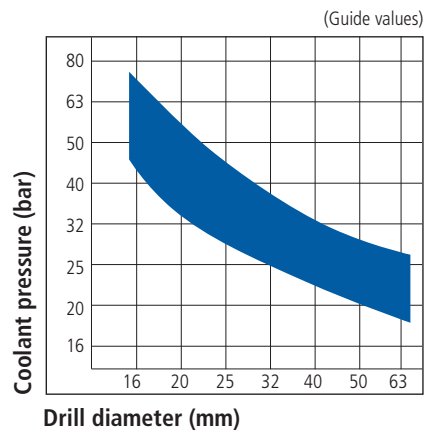
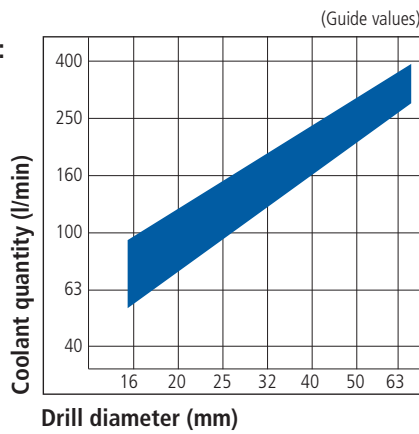
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**Performance diagram:**



**Coolant information:**



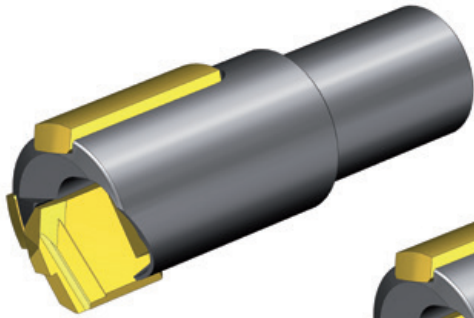
**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties         | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |               |               |               | Carbide grades |
|---------------------------------------------------|-----------------------|----------------------------------------|---------------|---------------|---------------|----------------|
|                                                   |                       | 15.61 - 20.00                          | 20.01 - 31.00 | 31.01 - 43.00 | 43.01 - 65.00 |                |
| Structural steel $\leq 700$ N/mm <sup>2</sup>     | 70 - 120              | 0.10 - 0.20                            | 0.15 - 0.25   | 0.15 - 0.30   | 0.18 - 0.32   | 020            |
| Case hardened steel $\leq 750$ N/mm <sup>2</sup>  | 70 - 100              | 0.10 - 0.20                            | 0.17 - 0.25   | 0.20 - 0.30   | 0.24 - 0.32   | 020            |
| Case hardened steel $\leq 1100$ N/mm <sup>2</sup> | 55 - 100              | 0.10 - 0.20                            | 0.17 - 0.25   | 0.20 - 0.30   | 0.24 - 0.32   | 020            |
| Heat treated steel $\leq 700$ N/mm <sup>2</sup>   | 70 - 100              | 0.10 - 0.20                            | 0.17 - 0.25   | 0.20 - 0.30   | 0.24 - 0.32   | 020            |
| Heat treated steel $\leq 1100$ N/mm <sup>2</sup>  | 55 - 100              | 0.10 - 0.20                            | 0.17 - 0.25   | 0.20 - 0.30   | 0.24 - 0.32   | 020            |
| Nitriding steel $\leq 1100$ N/mm <sup>2</sup>     |                       | 0.10 - 0.20                            | 0.17 - 0.25   | 0.20 - 0.30   | 0.24 - 0.32   | 020            |
| Ferritic steel $\leq 900$ N/mm <sup>2</sup>       | 40 - 85               | 0.12 - 0.20                            | 0.18 - 0.25   | 0.22 - 0.30   | 0.24 - 0.36   | 029*/020       |
| Austenitic steel (stainless)                      |                       | 0.10 - 0.20                            | 0.18 - 0.25   | 0.22 - 0.30   | 0.24 - 0.36   | 029*/020       |
| Heat resisting steel (stainless), Tool steel      | 50 - 100              | 0.10 - 0.20                            | 0.17 - 0.25   | 0.20 - 0.30   | 0.24 - 0.32   | 022            |
| Steel castings $\leq 700$ N/mm <sup>2</sup>       |                       | 0.12 - 0.20                            | 0.15 - 0.25   | 0.20 - 0.30   | 0.24 - 0.36   | 029*/020       |
| Nodular cast iron $\leq 1000$ N/mm <sup>2</sup>   |                       | 0.10 - 0.18                            | 0.15 - 0.22   | 0.20 - 0.28   | 0.24 - 0.32   | 022            |
| Cast iron unalloyed and alloyed                   | 60 - 100              | 0.10 - 0.18                            | 0.15 - 0.22   | 0.20 - 0.28   | 0.24 - 0.32   | 022            |
| Aluminium and Aluminium alloys                    | 65 - 130              | 0.10 - 0.20                            | 0.16 - 0.25   | 0.18 - 0.30   | 0.20 - 0.45   | 022            |
| Copper<br>Cu content < 99%                        |                       | 0.05 - 0.20                            | 0.05 - 0.25   | 0.05 - 0.30   | 0.05 - 0.45   | 022            |

\* First recommendation

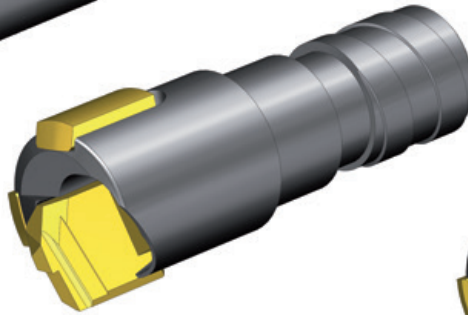
## Type 17/18/20

Solid drill head, brazed type  
Ø 7.76 to 36.99 mm



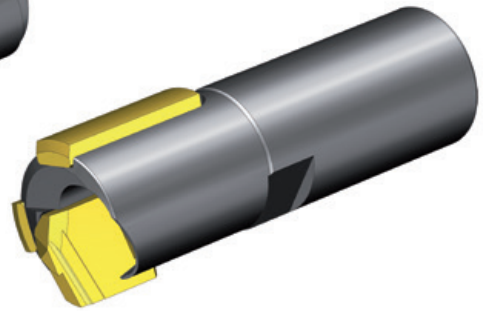
### Type 17

Drilling range Ø 7.76 - 15.50 mm  
without thread  
Drill head and drill tube are  
brazed together.



### Type 18

Drilling range Ø 12.21 - 15.50 mm  
1-start external thread



### Type 20

Drilling range Ø 14.51 - 36.99 mm  
1-start internal thread

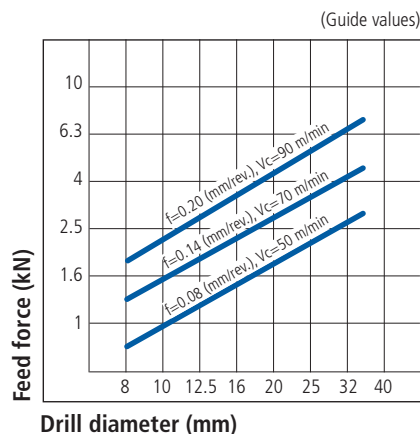
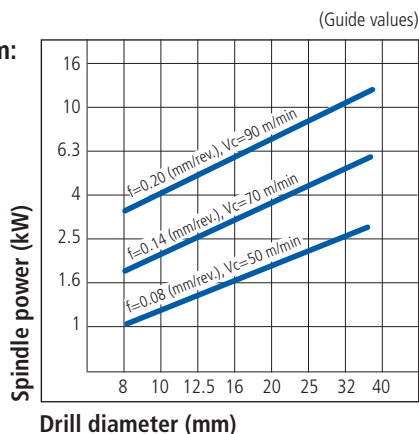
### Advantages:

- Simple handling
- Tools can be reground several times
- Stable tool
- Suitable for extremely close tolerances
- Low up-front costs for small batches

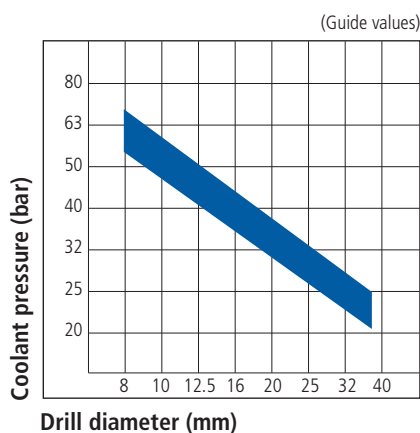
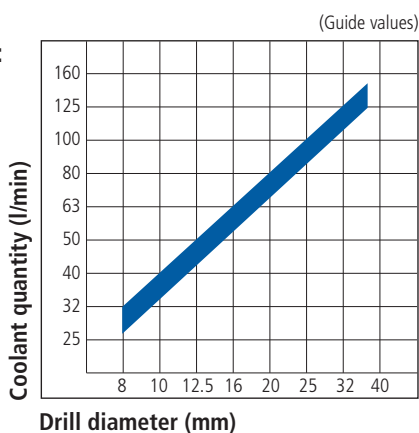
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**Performance diagram:**



**Coolant information:**



Guide values for deep hole drilling of different materials

| Material / Mechanical strength properties      | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |               |             | Carbide grades |              |
|------------------------------------------------|-----------------------|----------------------------------------|---------------|-------------|----------------|--------------|
|                                                |                       | 7.76 - 15.99                           | 16.00 - 24.99 | 25.00 - ... | Cutting plate  |              |
|                                                |                       |                                        |               |             | Type 17        | Type 18 + 20 |
| Structural steel $\leq 700 \text{ N/mm}^2$     | 80 - 100              | 0.02 - 0.04                            | 0.03 - 0.10   | 0.05 - 0.18 | 022            | 010          |
| Case hardened steel $\leq 750 \text{ N/mm}^2$  |                       | 0.02 - 0.04                            | 0.03 - 0.10   | 0.05 - 0.18 |                |              |
| Case hardened steel $\leq 1100 \text{ N/mm}^2$ | 70 - 80               | 0.02 - 0.04                            | 0.05 - 0.12   | 0.10 - 0.18 |                |              |
| Heat treated steel $\leq 700 \text{ N/mm}^2$   | 70 - 90               | 0.02 - 0.04                            | 0.05 - 0.12   | 0.10 - 0.20 |                |              |
| Heat treated steel $\leq 1100 \text{ N/mm}^2$  | 55 - 75               | 0.02 - 0.04                            | 0.05 - 0.12   | 0.10 - 0.20 |                | 022          |
| Nitriding steel $\leq 1100 \text{ N/mm}^2$     |                       | 0.02 - 0.04                            | 0.05 - 0.12   | 0.05 - 0.18 |                |              |
| Ferritic steel $\leq 900 \text{ N/mm}^2$       | 60 - 80               | 0.02 - 0.04                            | 0.02 - 0.06   | 0.02 - 0.10 |                |              |
| Austenitic steel (stainless)                   |                       | 0.02 - 0.04                            | 0.02 - 0.06   | 0.02 - 0.10 |                |              |
| Heat resisting steel (stainless), Tool steel   | 50 - 70               | 0.02 - 0.04                            | 0.05 - 0.12   | 0.05 - 0.18 |                | 010          |
| Steel castings $\leq 700 \text{ N/mm}^2$       | 60 - 80               | 0.02 - 0.04                            | 0.03 - 0.10   | 0.05 - 0.18 |                |              |
| Nodular cast iron $\leq 1000 \text{ N/mm}^2$   | 65 - 80               | 0.02 - 0.04                            | 0.05 - 0.15   | 0.10 - 0.23 | 022            | 022          |
| Cast iron unalloyed and alloyed                | 70 - 100              | 0.02 - 0.04                            | 0.05 - 0.12   | 0.05 - 0.18 |                |              |
| Aluminium and Aluminium alloys                 | 100 - 200             | 0.02 - 0.04                            | 0.05 - 0.18   | 0.10 - 0.25 |                |              |
| Copper<br>Cu content < 99%                     | 120 - ...             | 0.02 - 0.04                            | 0.02 - 0.10   | 0.02 - 0.15 |                |              |

## Type 11/61

Solid drill head with exchangeable inserts and guide pads  
Ø 14.55 to 17.95 mm



### Type 11

Drilling range Ø 14.55 - 17.95 mm

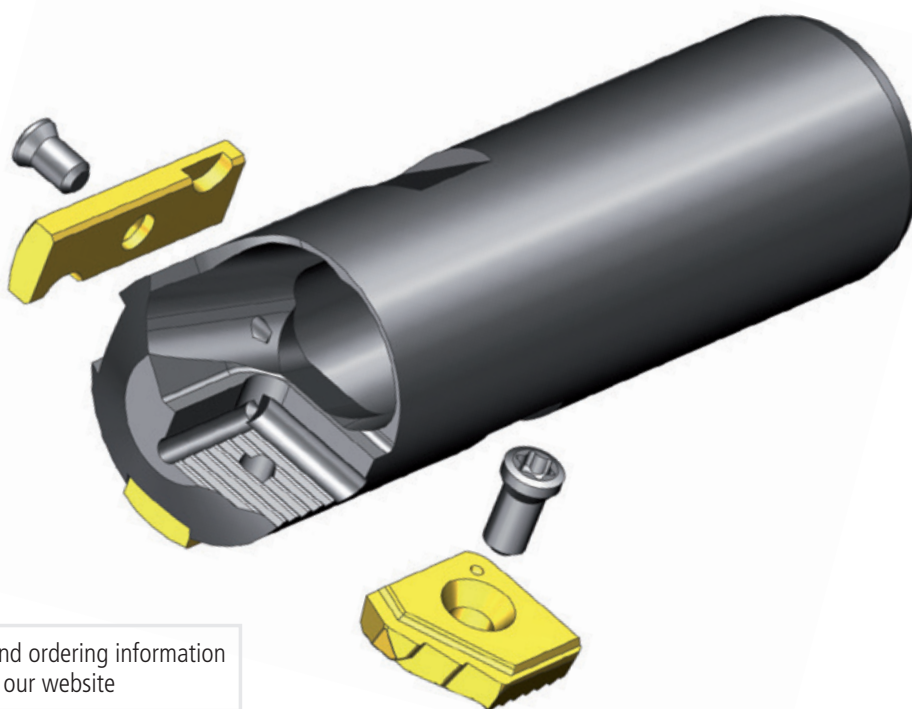


### Type 61

Drilling range Ø 15.65 – 17.95 mm

### Advantages:

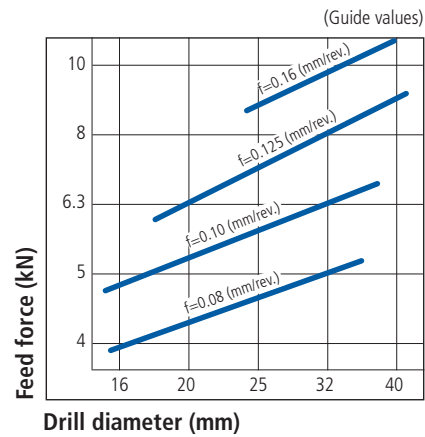
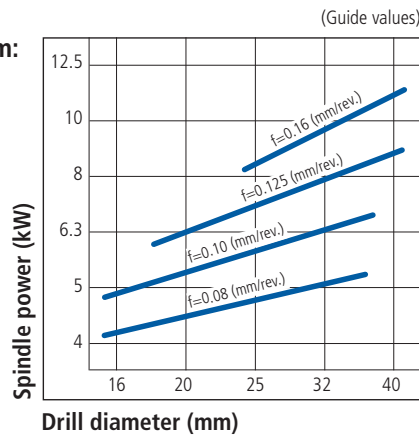
- Very economical, with optimal cutting performance
- Cutting inserts with various chip breakers available to suit processed material
- No adjustment required when changing wear parts, no re-adjustment within +/- 0.01 mm
- Tool adjustment range up to 0.5 mm using suitable replacement parts



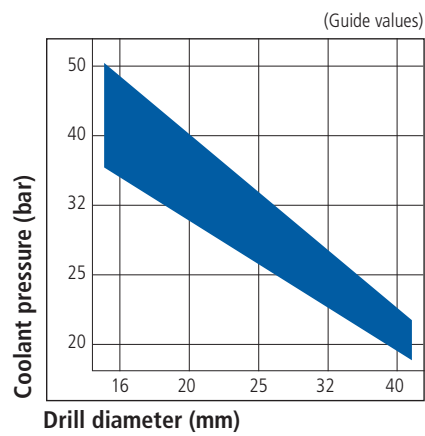
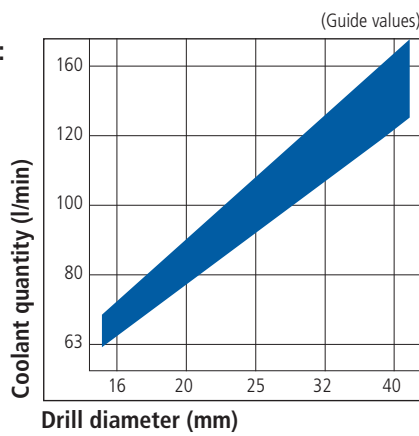
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**Performance diagram:**



**Coolant information:**



**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |               |               |             | Carbide grades   |              |           |
|----------------------------------------------|-----------------------|----------------------------------------|---------------|---------------|-------------|------------------|--------------|-----------|
|                                              |                       | 14.55 - 17.99                          | 18.00 - 24.99 | 25.00 - 31.99 | 32.00 - ... | Indexable insert |              | Guide pad |
|                                              |                       |                                        |               |               |             | up to Ø 17.99    | from Ø 18.00 |           |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.14   | 0.13 - 0.16 | K 30 B - 1       | P 25 B - 2   | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       |                                        |               |               |             |                  |              |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.13   | 0.12 - 0.15 | K 30 BX - 91     | P 25 BX - 91 |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.14   | 0.13 - 0.16 |                  |              |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.13   | 0.12 - 0.15 |                  |              |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.06 - 0.09                            | 0.08 - 0.10   | 0.09 - 0.12   | 0.11 - 0.14 |                  |              |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.14   | 0.13 - 0.16 | K 10 B - 1       | K 10 B - 2   |           |
| Austenitic steel (stainless)                 |                       | 0.06 - 0.09                            | 0.08 - 0.10   | 0.10 - 0.12   | 0.12 - 0.14 |                  |              |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.06 - 0.09                            | 0.08 - 0.10   | 0.10 - 0.12   | 0.12 - 0.14 | K 30 BX - 91     | P 25 BX - 91 |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.14   | 0.13 - 0.16 |                  |              |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.08 - 0.12                            | 0.10 - 0.13   | 0.12 - 0.15   | 0.14 - 0.18 |                  |              |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.08 - 0.12                            | 0.10 - 0.13   | 0.12 - 0.15   | 0.14 - 0.18 | K 10 - 1         | K 10 - 1     |           |
| Aluminium and Aluminium alloys               | 100 - 200             | 0.07 - 0.11                            | 0.09 - 0.12   | 0.10 - 0.14   | 0.12 - 0.18 |                  |              |           |
| Copper<br>Cu content < 99%                   | 120 - ...             | 0.04 - 0.09                            | 0.06 - 0.10   | 0.08 - 0.12   | 0.10 - 0.14 |                  |              |           |

## Type 11/61

Solid drill head with indexable inserts and guide pads  
Ø 18.00 to 36.99 mm



### Type 11

Drilling range Ø 18.00 - 36.99 mm



### Type 61

Drilling range Ø 18.00 - 36.20 mm

### Advantages:

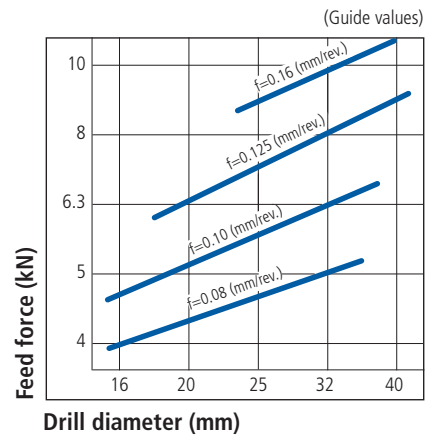
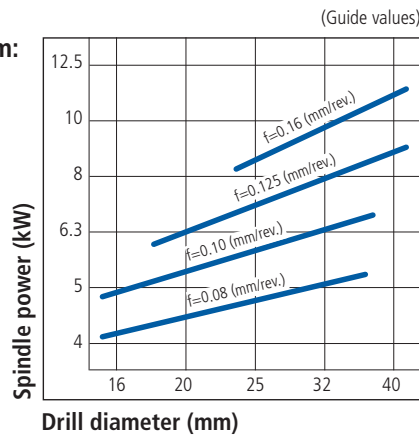
- Very economical, with optimal cutting performance
- Indexable inserts with various chip breakers available to suit processed material
- Tool adjustment range up to 0.5 mm using suitable replacement parts
- Ø fine adjustment with stop plate
- No adjustment required when changing wear parts, no re-adjustment within +/- 0.01 mm



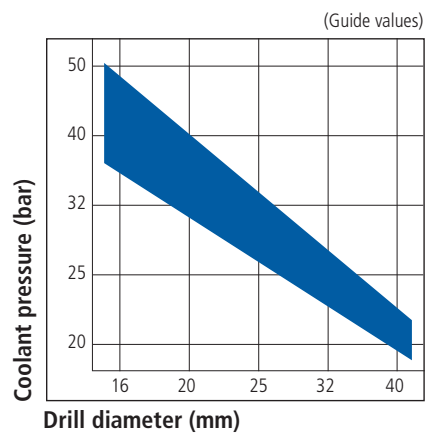
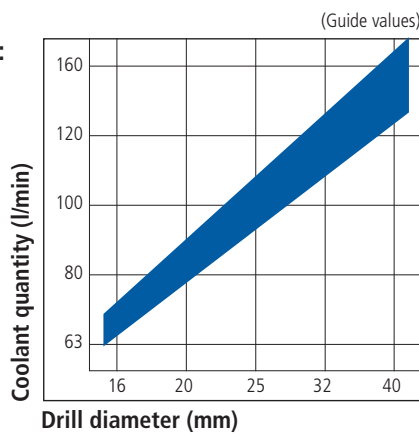
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**Performance diagram:**



**Coolant information:**



**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |               |               |             | Carbide grades   |              |           |
|----------------------------------------------|-----------------------|----------------------------------------|---------------|---------------|-------------|------------------|--------------|-----------|
|                                              |                       | 14,55 - 17,99                          | 18,00 - 24,99 | 25,00 - 31,99 | 32,00 - ... | Indexable insert |              | Guide pad |
|                                              |                       |                                        |               |               |             | up to Ø 17.99    | from Ø 18.00 |           |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.14   | 0.13 - 0.16 | K 30 B - 1       | P 25 B - 2   | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       |                                        |               |               |             |                  |              |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.13   | 0.12 - 0.15 | K 30 BX - 91     | P 25 BX - 91 |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.14   | 0.13 - 0.16 |                  |              |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.13   | 0.12 - 0.15 |                  |              |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.06 - 0.09                            | 0.08 - 0.10   | 0.09 - 0.12   | 0.11 - 0.14 |                  |              |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.14   | 0.13 - 0.16 | K 10 B - 1       | K 10 B - 2   |           |
| Austenitic steel (stainless)                 |                       | 0.06 - 0.09                            | 0.08 - 0.10   | 0.10 - 0.12   | 0.12 - 0.14 |                  |              |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.06 - 0.09                            | 0.08 - 0.10   | 0.10 - 0.12   | 0.12 - 0.14 | K 30 BX - 91     | P 25 BX - 91 |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.06 - 0.10                            | 0.08 - 0.11   | 0.10 - 0.14   | 0.13 - 0.16 |                  |              |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.08 - 0.12                            | 0.10 - 0.13   | 0.12 - 0.15   | 0.14 - 0.18 |                  |              |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.08 - 0.12                            | 0.10 - 0.13   | 0.12 - 0.15   | 0.14 - 0.18 | K 10 - 1         | K 10 - 1     |           |
| Aluminium and Aluminium alloys               | 100 - 200             | 0.07 - 0.11                            | 0.09 - 0.12   | 0.10 - 0.14   | 0.12 - 0.18 |                  |              |           |
| Copper<br>Cu content < 99%                   | 120 - ...             | 0.04 - 0.09                            | 0.06 - 0.10   | 0.08 - 0.12   | 0.10 - 0.14 |                  |              |           |

## Type 12/64

Solid drill head with indexable inserts and guide pads  
Ø 28.50 to 74.99 mm



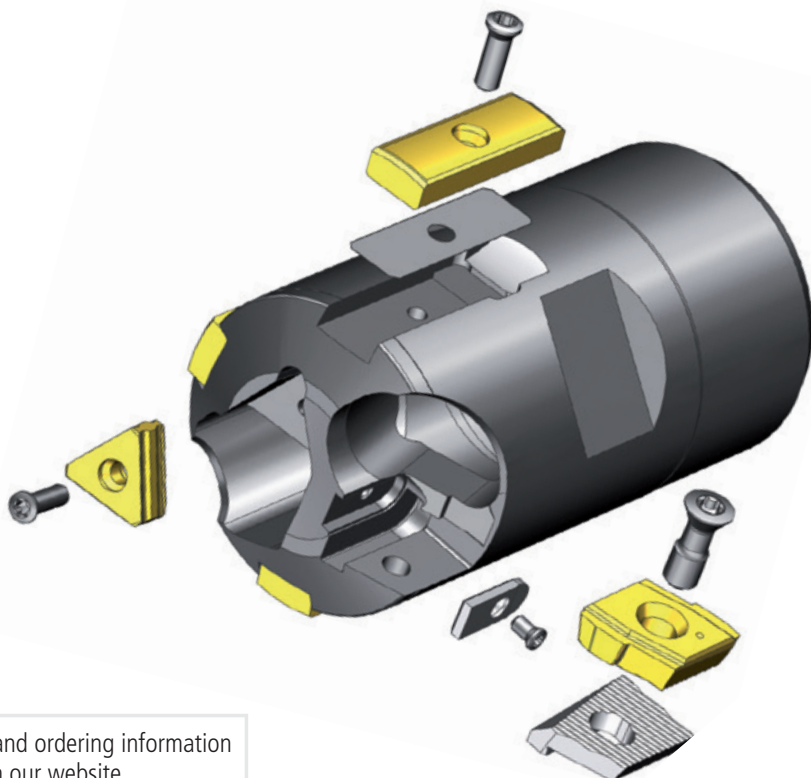
**Type 12**  
Drilling range Ø 28.50 - 74.99 mm



**Type 64**  
Drilling range Ø 28.71 - 74.99 mm

### Advantages:

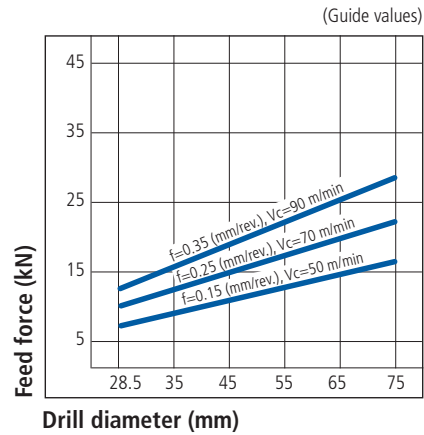
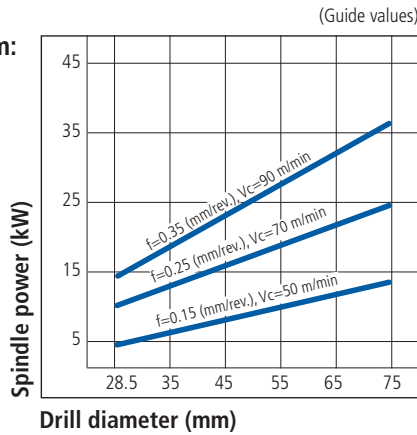
- New chip breakers for high feed rates and high productivity
- No adjustment required when changing wear parts, no re-adjustment within +/- 0.01 mm
- Tool adjustment range up to 0.5 mm using suitable replacement parts
- Minimal axis deviation at large drilling depths
- Ø fine adjustment with stop plate



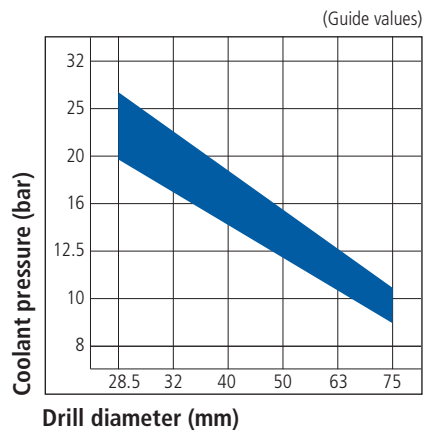
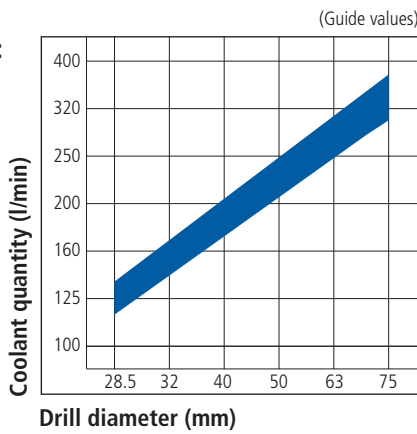
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**Performance diagram:**



**Coolant information:**



**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |               |               | Carbide grades    |               |           |
|----------------------------------------------|-----------------------|----------------------------------------|---------------|---------------|-------------------|---------------|-----------|
|                                              |                       | 28.50 - 39.99                          | 40.00 - 51.99 | 52.00 - 74.99 | Peripheral insert | Center insert | Guide pad |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.12 - 0.18                            | 0.15 - 0.20   | 0.15 - 0.22   | P 25 B - 2        | P 40 B - 1    | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       | 0.12 - 0.18                            | 0.15 - 0.20   | 0.15 - 0.22   | P 25 B - 1        |               |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.20 - 0.25                            | 0.20 - 0.30   | 0.20 - 0.35   | P 25 B - 5        |               |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.20 - 0.28                            | 0.20 - 0.35   | 0.20 - 0.40   |                   |               |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.20 - 0.25                            | 0.20 - 0.30   | 0.20 - 0.30   |                   |               |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.20 - 0.25                            | 0.20 - 0.30   | 0.20 - 0.30   | P 25 B - 1        |               |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.15 - 0.25                            | 0.15 - 0.30   | 0.20 - 0.30   | P 25 B - 2        |               |           |
| Austenitic steel (stainless)                 |                       | 0.08 - 0.12                            | 0.10 - 0.18   | 0.10 - 0.22   | K 10 BX - 2       |               |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.15 - 0.25                            | 0.20 - 0.25   | 0.20 - 0.30   | P 25 B - 5        | P 40 B - 1    |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.20 - 0.25                            | 0.20 - 0.35   | 0.20 - 0.35   |                   |               |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.20 - 0.35                            | 0.25 - 0.40   | 0.25 - 0.50   |                   |               |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0,20 - 0,35                            | 0.20 - 0.40   | 0.25 - 0.50   |                   |               |           |
| Aluminium and Aluminium alloys               | 100 - 200             | 0,08 - 0,25                            | 0.10 - 0.30   | 0.10 - 0.45   | K 10 B - 5        | K 10 B - 1    |           |
| Copper<br>Cu content < 99%                   | 120 - ...             | 0.07 - 0.15                            | 0.10 - 0.25   | 0.10 - 0.25   | K 10 - 1          | K 10 - 1      |           |

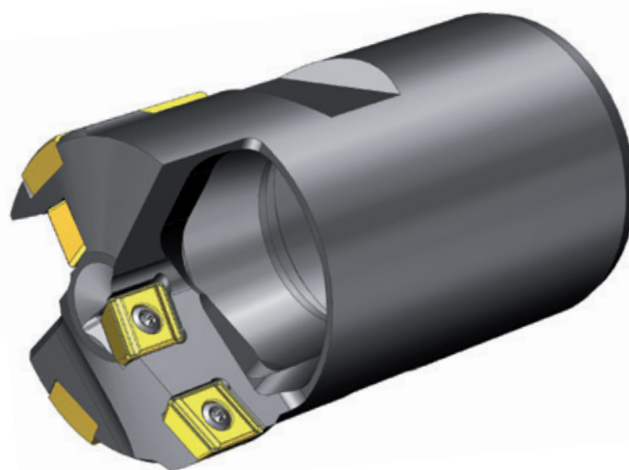
## Type 70 A/B

Solid drill head with indexable inserts and guide pads  
Ø 25.00 to 64.99 mm



### Type 70 A

Drilling range Ø 25.00 - 64.99 mm

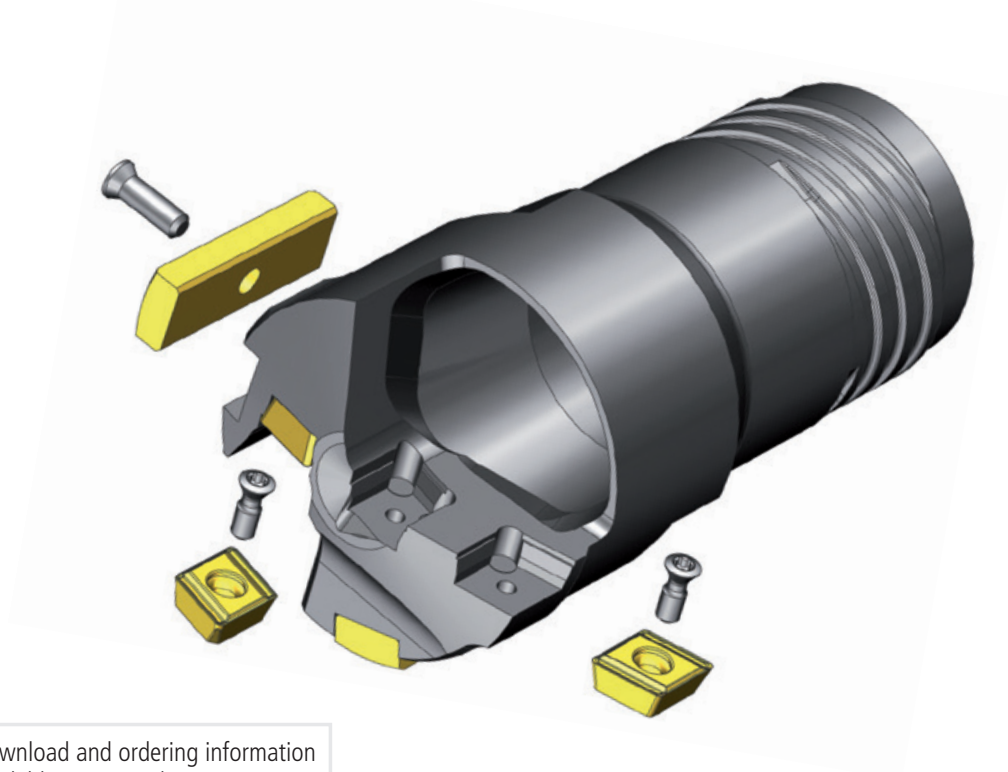


### Type 70 B

Drilling range Ø 25.00 - 64.99 mm

### Advantages:

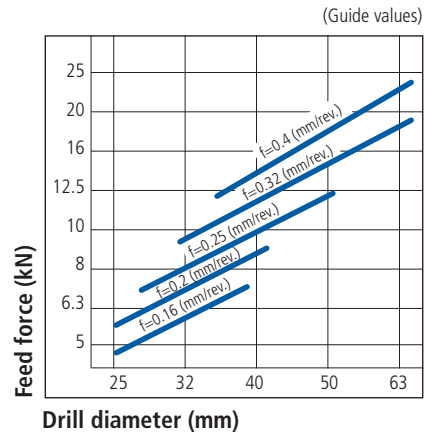
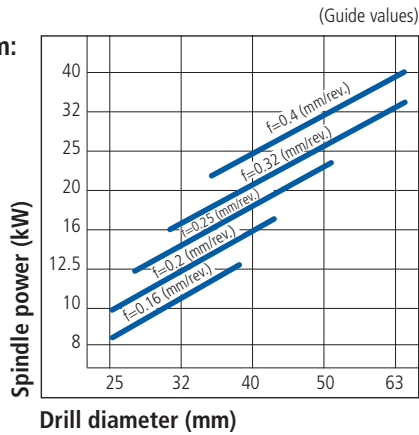
- Very few wear parts over the whole drilling range
- New chip breakers for high feed rates and high productivity
- No adjustment after a change of indexable inserts
- We keep wear parts in stock



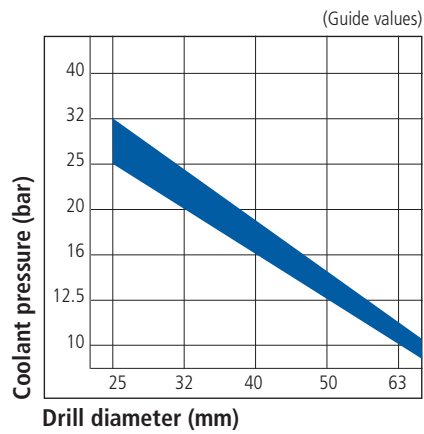
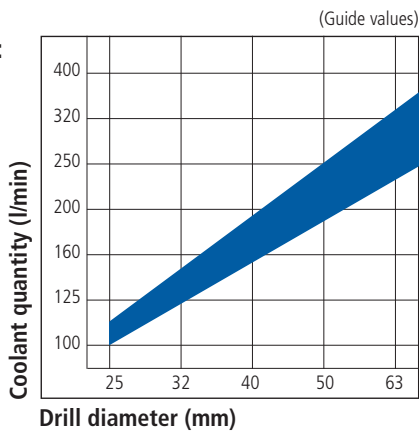
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**Performance diagram:**



**Coolant information:**



**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties      | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |               |               | Carbide grades                          |               |           |
|------------------------------------------------|-----------------------|----------------------------------------|---------------|---------------|-----------------------------------------|---------------|-----------|
|                                                |                       | 25.00 - 29.99                          | 30.00 - 44.99 | 45.00 - 64.99 | Peripheral insert + intermediate insert | Center insert | Guide pad |
| Structural steel $\leq 700 \text{ N/mm}^2$     | 80 - 100              | 0.10 - 0.25                            | 0.10 - 0.35   | 0.10 - 0.40   | U 225 BX - 5                            | U 440 BX - 5  | P 20 B    |
| Case hardened steel $\leq 750 \text{ N/mm}^2$  |                       | 0.10 - 0.25                            | 0.10 - 0.35   | 0.10 - 0.40   |                                         |               |           |
| Case hardened steel $\leq 1100 \text{ N/mm}^2$ | 70 - 80               | 0.20 - 0.25                            | 0.20 - 0.30   | 0.20 - 0.35   |                                         |               |           |
| Heat treated steel $\leq 700 \text{ N/mm}^2$   | 70 - 90               | 0.20 - 0.25                            | 0.25 - 0.30   | 0.25 - 0.40   |                                         |               |           |
| Heat treated steel $\leq 1100 \text{ N/mm}^2$  | 55 - 75               | 0.20 - 0.25                            | 0.25 - 0.30   | 0.25 - 0.30   |                                         |               |           |
| Nitriding steel $\leq 1100 \text{ N/mm}^2$     |                       | 0.15 - 0.20                            | 0.15 - 0.20   | 0.15 - 0.25   |                                         |               |           |
| Ferritic steel $\leq 900 \text{ N/mm}^2$       | 60 - 80               | 0.15 - 0.25                            | 0.25 - 0.30   | 0.25 - 0.30   |                                         |               |           |
| Austenitic steel (stainless)                   |                       | 0.20 - 0.27                            | 0.25 - 0.35   | 0.25 - 0.37   |                                         |               |           |
| Heat resisting steel (stainless), Tool steel   | 50 - 70               | 0.15 - 0.20                            | 0.15 - 0.20   | 0.15 - 0.25   |                                         |               |           |
| Steel castings $\leq 700 \text{ N/mm}^2$       | 60 - 80               | 0.20 - 0.25                            | 0.25 - 0.30   | 0.20 - 0.35   |                                         |               |           |
| Nodular cast iron $\leq 1000 \text{ N/mm}^2$   | 65 - 80               | 0.20 - 0.35                            | 0.25 - 0.40   | 0.30 - 0.40   |                                         |               |           |
| Cast iron unalloyed and alloyed                | 70 - 100              | 0.20 - 0.35                            | 0.30 - 0.40   | 0.30 - 0.40   |                                         |               |           |
| Aluminium and Aluminium alloys                 | 100 - 200             | 0.10 - 0.25                            | 0.15 - 0.30   | 0.15 - 0.45   |                                         |               |           |
| Copper<br>Cu content < 99%                     | 120 - ...             | 0.05 - 0.15                            | 0.05 - 0.15   | 0.05 - 0.15   |                                         |               |           |

## Type 43 A/B

Solid drill head with indexable inserts and guide pads  
Ø 60.00 to 149.99 mm



### Type 43 A

Drilling range Ø 60.00 - 149.99 mm

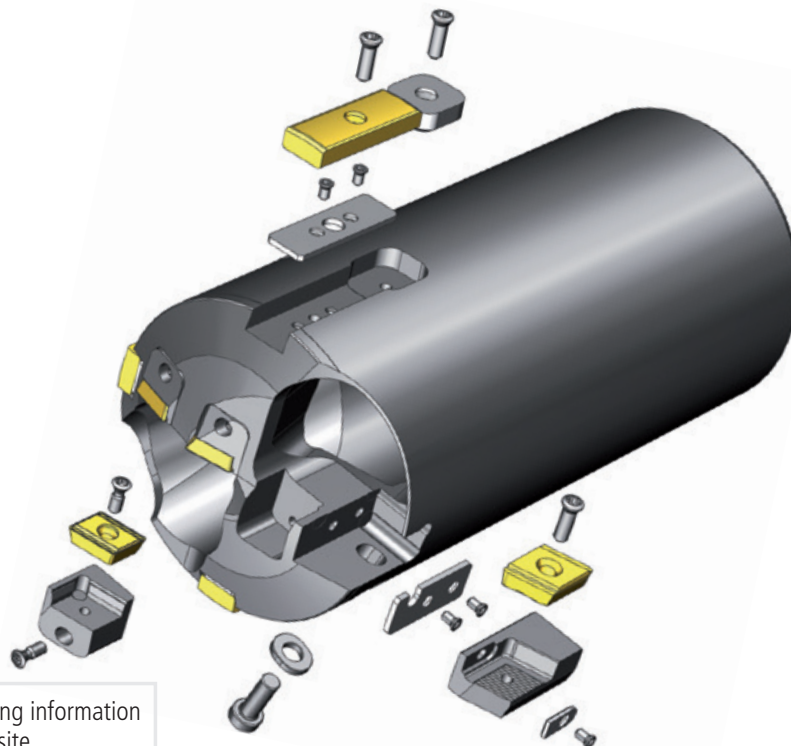


### Type 43 B

Drilling range Ø 60.00 - 149.99 mm

### Advantages:

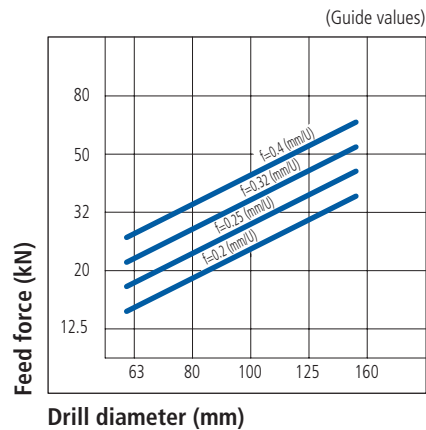
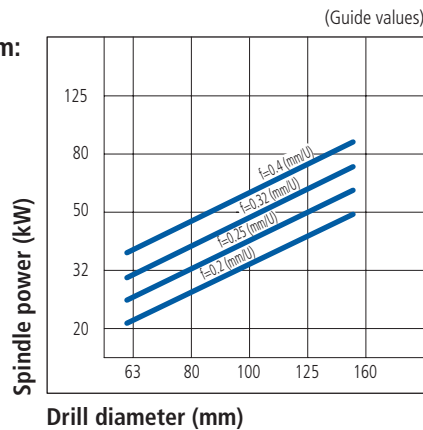
- Simplest operation, change of wear parts without re-adjustment within +/- 0.01 mm
- Wear parts can be exchanged on the machine
- Tool adjustment range depending on tool diameter up to 5 mm with replacement parts
- New cutting geometry for high cutting performance
- Minimal axis deviation at large drilling depths
- Ø fine adjustment with stop plate



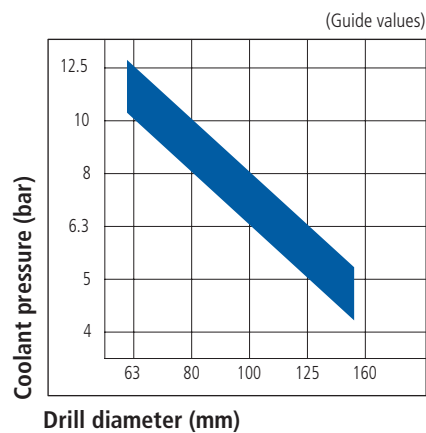
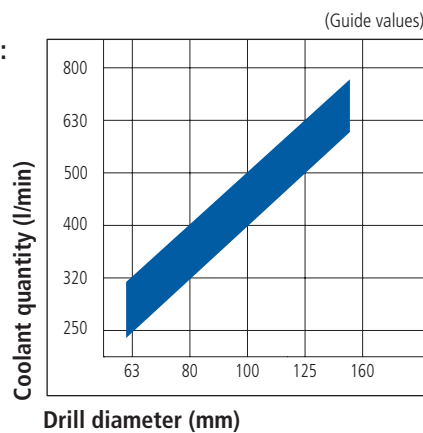
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**Performance diagram:**



**Coolant information:**

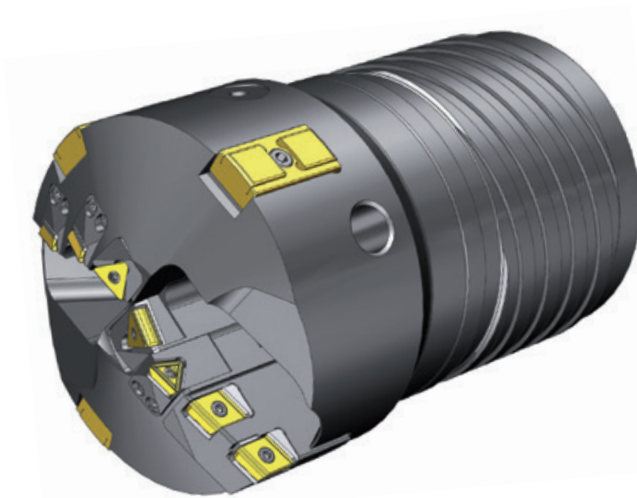


**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/ rev.) for drill diameter (mm) | Carbide grades/ chip breakers |                                |                     |               |                     |               |           |
|----------------------------------------------|-----------------------|-----------------------------------------|-------------------------------|--------------------------------|---------------------|---------------|---------------------|---------------|-----------|
|                                              |                       |                                         |                               | 60.00 - 69.99                  | 70.00 - 94.99       |               | 95.00 - 149.99      |               |           |
|                                              |                       | 60.00 - 149.99                          | Outer insert                  | Intermediate and center insert | Intermediate insert | Center insert | Intermediate insert | Center insert | Guide pad |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.15 - 0.30                             | P 25 B - 1                    | U 225 BX - 6                   | U 225 BX - 6        | U 440 BX - 6  | P 25 B - 5          | P 25 B - 5    | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       | 0.15 - 0.30                             |                               |                                |                     |               |                     |               |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.15 - 0.25                             | P 25 B - 5                    |                                |                     |               |                     |               |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.20 - 0.35                             |                               |                                |                     |               |                     |               |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.15 - 0.25                             | P 25 B - 1                    |                                |                     |               |                     |               |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.15 - 0.25                             |                               |                                |                     |               |                     |               |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.12 - 0.20                             | K 10 BX - 2                   |                                |                     |               |                     |               |           |
| Austenitic steel (stainless)                 |                       | 0.12 - 0.20                             |                               |                                |                     |               |                     |               |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.15 - 0.25                             | P 25 B - 5                    |                                |                     |               |                     |               |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.15 - 0.25                             |                               |                                |                     |               |                     |               |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.20 - 0.40                             |                               |                                |                     |               |                     |               |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.15 - 0.25                             |                               |                                |                     |               |                     |               |           |
| Aluminium and Aluminium alloys               | 80 - 150              | 0.25 - 0.60                             | P 25 B - 5                    |                                |                     |               |                     |               |           |
| Copper<br>Cu content < 99%                   | 120 - ...             | 0.05 - 0.25                             | K 10 - 1                      | U 225 BX - 5                   | U 225 BX - 5        | U 440 BX - 5  | P 25 - 5            | P 25 - 5      |           |

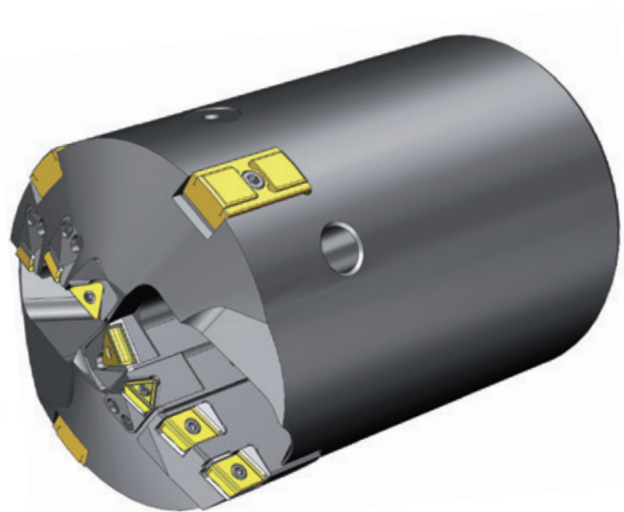
## Type 43 A/B/F

Solid drill head with indexable inserts and guide pads  
Ø 149.00 to 368.99 mm (larger diameters on request)



### Type 43 A

Drilling range Ø 149.00 - 368.99 mm

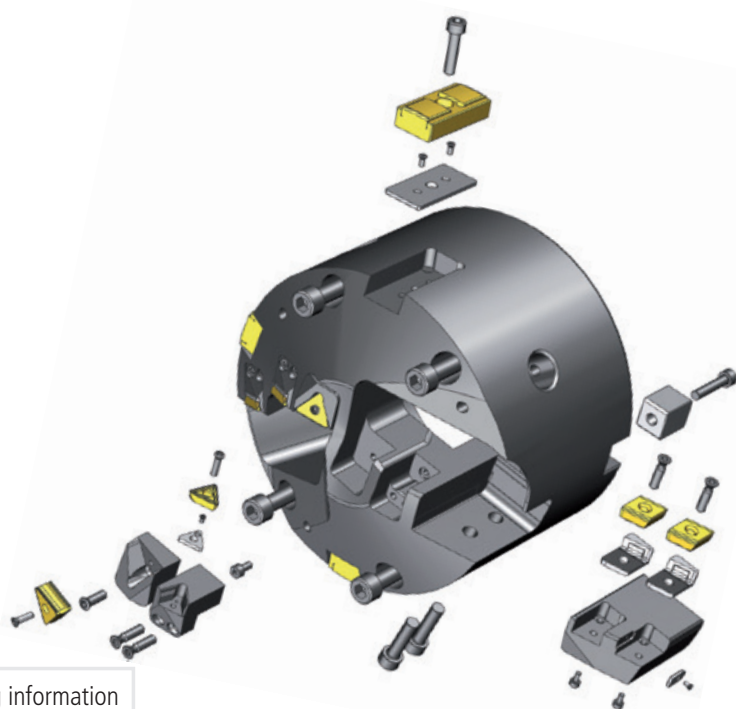


### Type 43 B

Drilling range Ø 149.00 - 368.99 mm

### Advantages:

- Simplest operation, change of wear parts without re-adjustment within +/- 0.01 mm
- Wear parts can be exchanged on the machine
- Tool dia. adjustment range up to 10 mm using suitable replacement parts
- New cutting geometry for high cutting performance
- Minimal axis deviation at large drilling depths
- Ø fine adjustment with stop plate

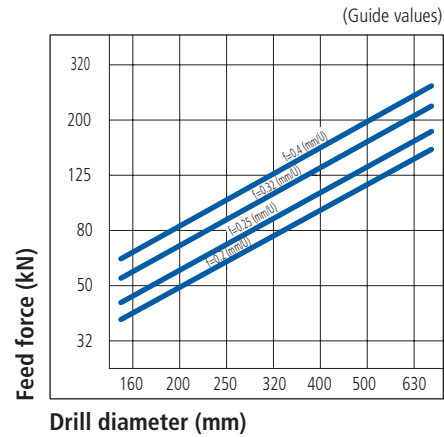
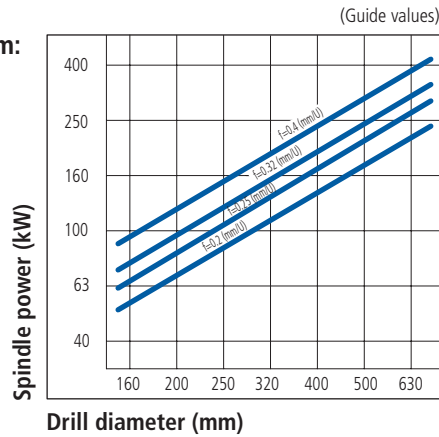


Type 43 F

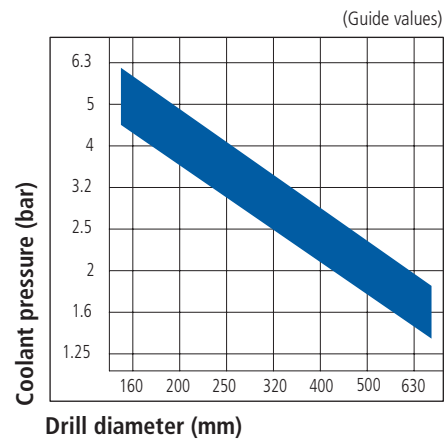
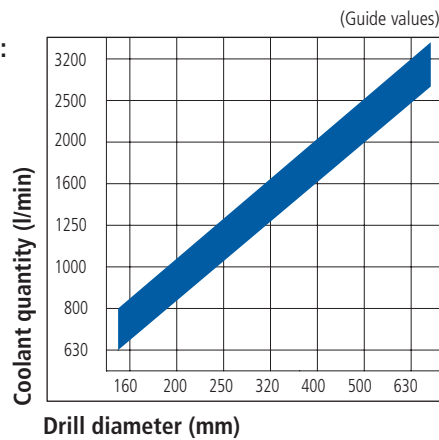
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**Performance diagram:**



**Coolant information:**



**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) | Carbide grades / chip breakers |                     |               |           |
|----------------------------------------------|-----------------------|----------------------------------------|--------------------------------|---------------------|---------------|-----------|
|                                              |                       | 149.00 - 700.00                        | Outer insert                   | Intermediate insert | Center insert | Guide pad |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.20 - 0.40                            | P 25 B - 1                     | P 25 B - 5          | P 25 B - 1    | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       | 0.25 - 0.40                            |                                |                     |               |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.20 - 0.35                            | P 25 B - 5                     |                     |               |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.25 - 0.40                            |                                |                     |               |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.20 - 0.35                            | P 25 B - 1                     |                     |               |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.20 - 0.35                            |                                |                     |               |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.18 - 0.30                            | K 10 BX - 2                    | P 25 BX - 2         | P 25 BX - 1   |           |
| Austenitic steel (stainless)                 |                       | 0.15 - 0.25                            |                                |                     |               |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.18 - 0.30                            | P 25 B - 5                     | P 25 B - 5          | P 25 B - 1    |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.20 - 0.30                            |                                |                     |               |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.25 - 0.50                            |                                |                     |               |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.25 - 0.50                            |                                |                     |               |           |
| Aluminium and Aluminium alloys               | 80 - 150              | 0.15 - 0.50                            | P 25 B - 5                     | P 25 - 5            | P 25 - 1      |           |
| Copper<br>Cu content < 99%                   | 120 - ...             | 0.10 - 0.25                            | K 10 - 1                       |                     |               |           |

## Type 13 A/B

Counterboring head with indexable inserts and guide pads  
Ø 28.50 to 74.99 mm



### Type 13 A

Drilling range Ø 28.71 - 74.99 mm

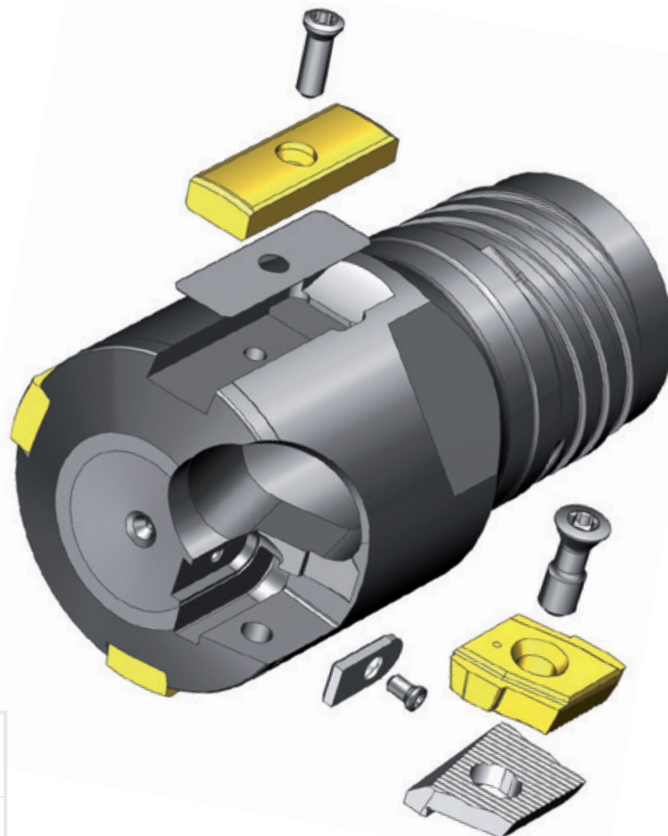


### Type 13 B

Drilling range Ø 28.50 - 74.99 mm

#### Advantages:

- New chip breakers for high feed rates and high productivity
- No adjustment required when changing wear parts, no re-adjustment within +/- 0.01 mm
- Tool adjustment range up to 0.5 mm using suitable replacement parts
- Maximum shape accuracy and hole straightness
- Ø fine adjustment with stop plate

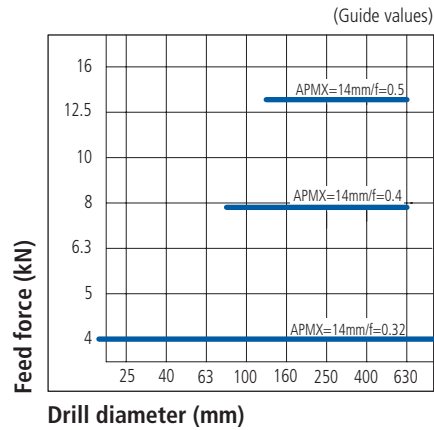
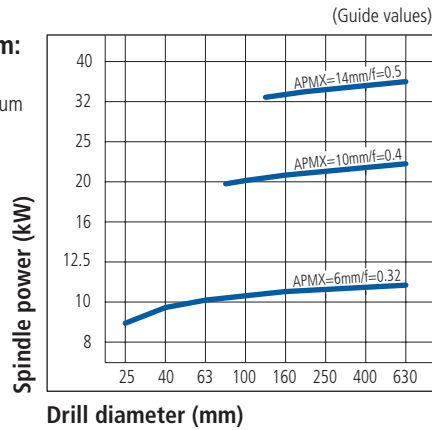


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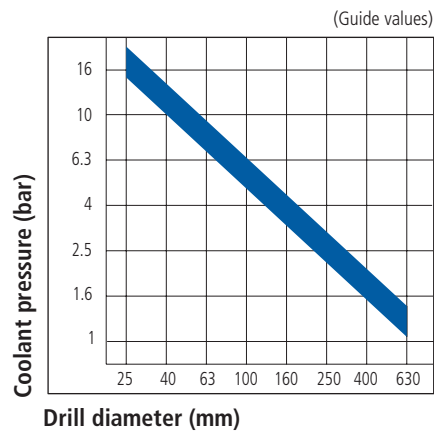
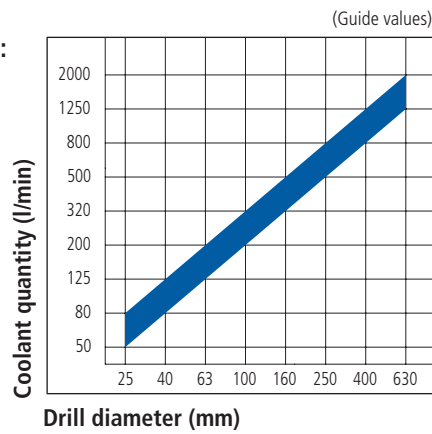
[www.botek.de](http://www.botek.de)

**Performance diagram:**

APMX = Depth of cut maximum



**Coolant information:**

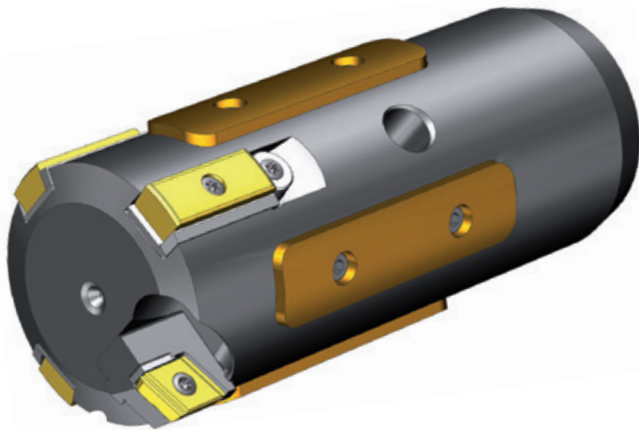


Guide values for deep hole drilling of different materials

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |                |             | Carbide grades / chip breakers |           |
|----------------------------------------------|-----------------------|----------------------------------------|----------------|-------------|--------------------------------|-----------|
|                                              |                       | 28.71 - 80.99                          | 81.00 - 123.99 | 124 - ...   | Outer insert                   | Guide pad |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.15 - 0.20                            | 0.20 - 0.30    | 0.30 - 0.45 | P 25 B - 1                     | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       | 0.15 - 0.20                            | 0.20 - 0.30    | 0.20 - 0.45 |                                |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.20 - 0.30                            | 0.20 - 0.35    | 0.25 - 0.40 | P 25 B - 5                     |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.20 - 0.30                            | 0.25 - 0.40    | 0.30 - 0.50 |                                |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.25 - 0.40 |                                |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.15 - 0.25                            | 0.20 - 0.25    | 0.25 - 0.32 | P 25 B - 1                     |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.15 - 0.20                            | 0.20 - 0.25    | 0.20 - 0.30 |                                |           |
| Austenitic steel (stainless)                 |                       | 0.12 - 0.18                            | 0.15 - 0.22    | 0.15 - 0.25 |                                |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.20 - 0.32 | P 25 B - 5                     |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.20 - 0.35 |                                |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.20 - 0.35                            | 0.25 - 0.40    | 0.25 - 0.50 |                                |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.15 - 0.25                            | 0.20 - 0.35    | 0.20 - 0.40 |                                |           |
| Aluminium and Aluminium alloys               | 80 - 150              | 0.08 - 0.25                            | 0.12 - 0.45    | 0.15 - 0.60 | K 10 B - 5                     |           |
| Copper<br>Cu content < 99%                   | 120 - ...             | 0.06 - 0.15                            | 0.06 - 0.20    | 0.06 - 0.20 | K 10 - 1                       |           |

## Type 34/54

Counterboring head with indexable inserts and guide pads  
Ø 44.00 to 353.99 mm



### Type 34

Drilling range Ø 44.00 - 353.99 mm

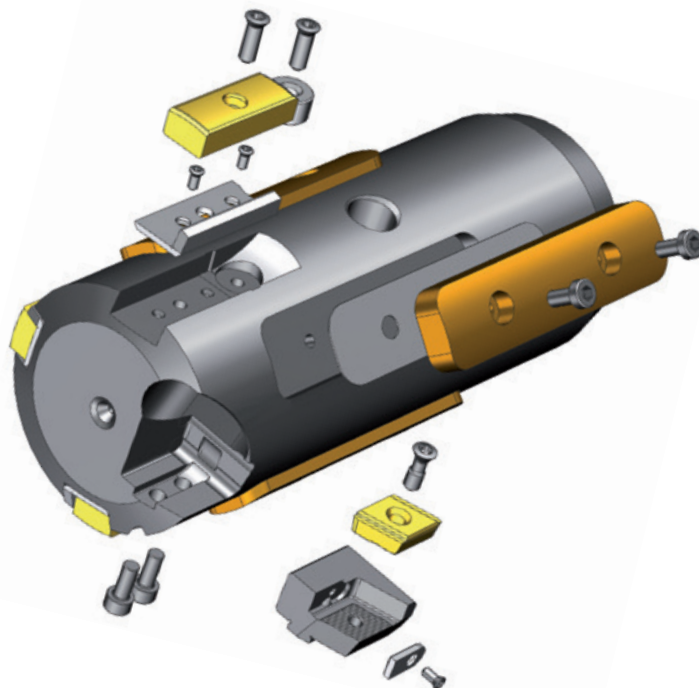


### Type 54

Drilling range Ø 47.00 - 353.99 mm

### Advantages:

- New chip breakers for high feed rates and high productivity
- No adjustment required when changing wear parts, no re-adjustment within +/- 0.01 mm
- Tool adjustment range depending on tool diameter up to 12 mm with replacement parts
- Maximum shape accuracy and hole straightness even at large drilling depths
- Internal 1-start connection thread - with additional fibre guide pads for large drilling depths
- Ø fine adjustment with stop plate

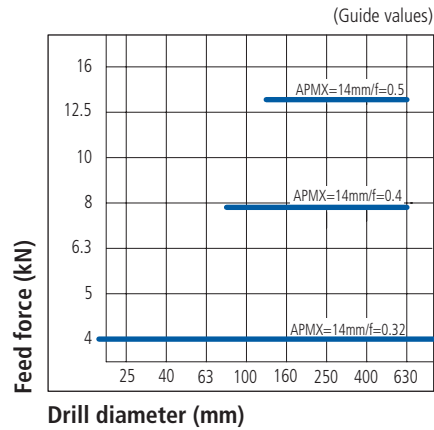
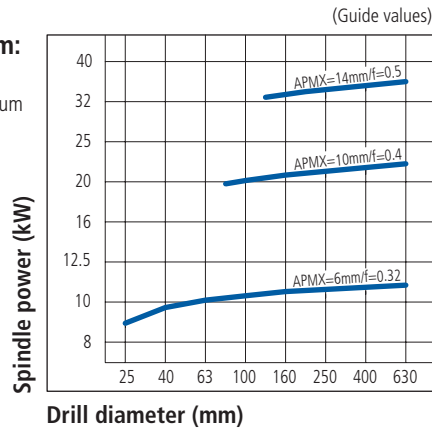


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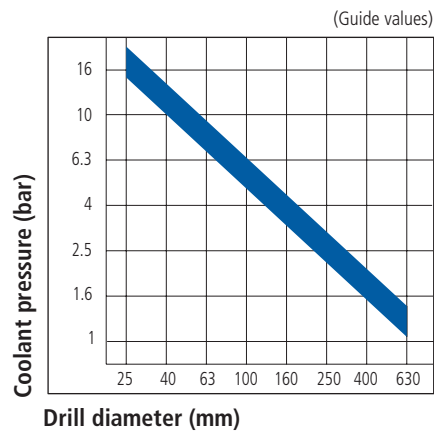
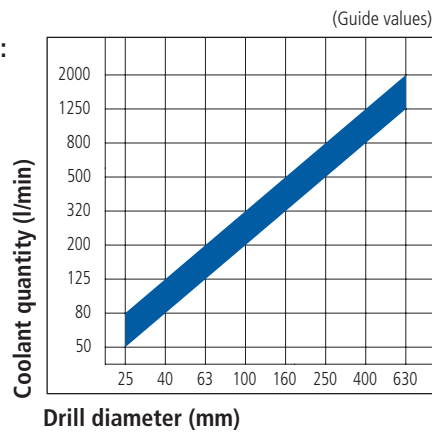
[www.botek.de](http://www.botek.de)

**Performance diagram:**

APMX = Depth of cut maximum



**Coolant information:**



**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |                |             | Carbide grades / chip breakers |           |
|----------------------------------------------|-----------------------|----------------------------------------|----------------|-------------|--------------------------------|-----------|
|                                              |                       | 28.71 - 80.99                          | 81.00 - 123.99 | 124 - ...   | Outer insert                   | Guide pad |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.15 - 0.20                            | 0.20 - 0.30    | 0.30 - 0.45 | P 25 B - 1                     | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       | 0.15 - 0.20                            | 0.20 - 0.30    | 0.20 - 0.45 |                                |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.20 - 0.30                            | 0.20 - 0.35    | 0.25 - 0.40 | P 25 B - 5                     |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.20 - 0.30                            | 0.25 - 0.40    | 0.30 - 0.50 |                                |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.25 - 0.40 |                                |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.15 - 0.25                            | 0.20 - 0.25    | 0.25 - 0.32 | P 25 B - 1                     |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.15 - 0.20                            | 0.20 - 0.25    | 0.20 - 0.30 |                                |           |
| Austenitic steel (stainless)                 |                       | 0.12 - 0.18                            | 0.15 - 0.22    | 0.15 - 0.25 |                                |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.20 - 0.32 | P 25 B - 5                     |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.20 - 0.35 |                                |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.20 - 0.35                            | 0.25 - 0.40    | 0.25 - 0.50 |                                |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.15 - 0.25                            | 0.20 - 0.35    | 0.20 - 0.40 |                                |           |
| Aluminium and Aluminium alloys               | 80 - 150              | 0.08 - 0.25                            | 0.12 - 0.45    | 0.15 - 0.60 | K 10 B - 5                     |           |
| Copper<br>Cu content < 99%                   | 120 - ...             | 0.06 - 0.15                            | 0.06 - 0.20    | 0.06 - 0.20 | K 10 - 1                       |           |

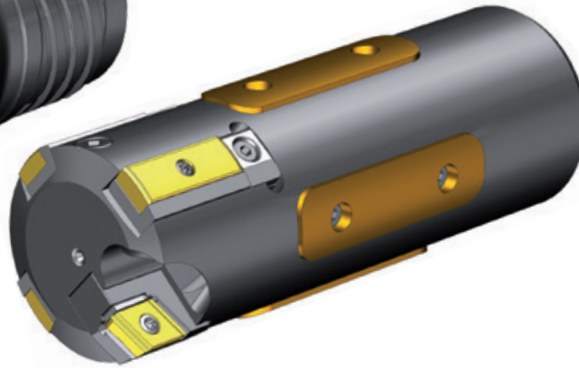
## Type 35 A/B/F

Counterboring head with large adjustment range  
Ø 61.00 to 498.99 mm



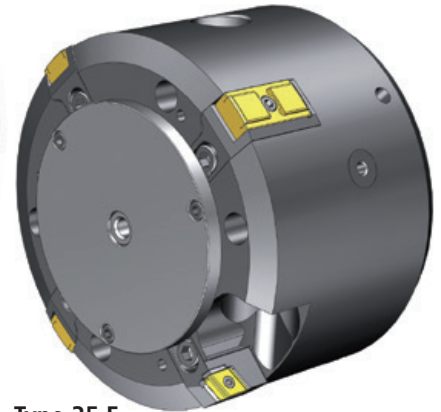
### Type 35 A

4-start external connection thread  
Drilling range Ø 61.00 - 223.99 mm



### Type 35 B

1-start internal connection thread  
Drilling range Ø 61.00 - 498.99 mm

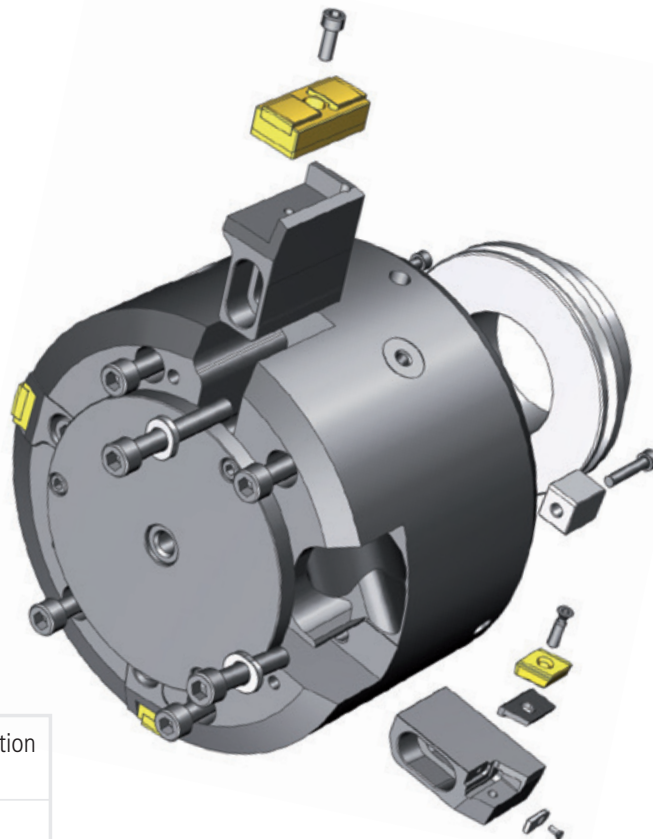


### Type 35 F

Flange connection  
Drilling range Ø 224.00 - 498.99 mm

### Advantages:

- Tool dia. adjustment range starting at 6 mm, from Ø 149 mm = 25 mm, from Ø 299 mm = 50 mm
- Low requirement for tools over the whole drilling range
- Adjustment system for easy change of diameter
- New patented adjustment system with a central adjusting ring from Ø 149 mm
- Simplest operation, change of wear parts without re-adjustment within +/- 0.01 mm
- Ø fine adjustment with stop plate

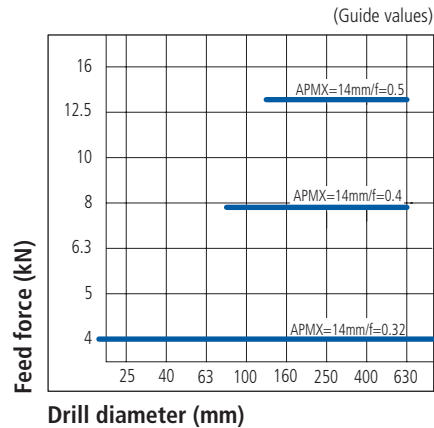
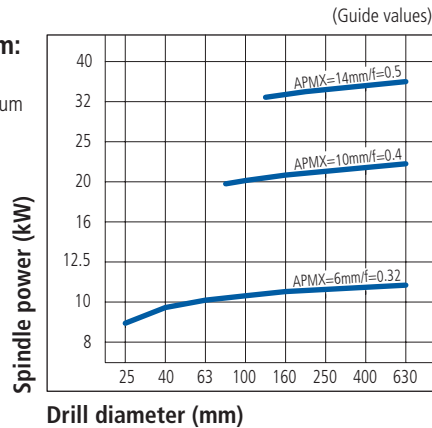


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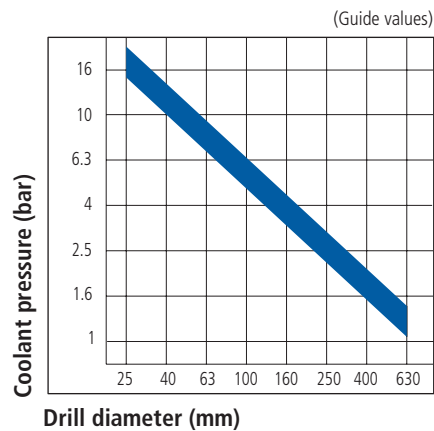
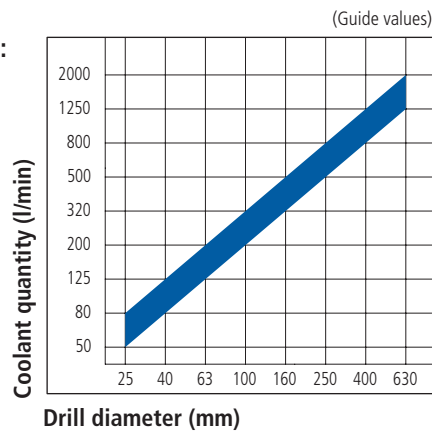
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### Performance diagram:

APMX = Depth of cut maximum



### Coolant information:



### Guide values for deep hole drilling of different materials

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |                |             | Carbide grades/chip breakers |           |
|----------------------------------------------|-----------------------|----------------------------------------|----------------|-------------|------------------------------|-----------|
|                                              |                       | 28.71 - 80.99                          | 81.00 - 123.99 | 124 - ...   | Outer insert                 | Guide pad |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.15 - 0.20                            | 0.20 - 0.30    | 0.30 - 0.45 | P 25 B - 1                   | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       | 0.15 - 0.20                            | 0.20 - 0.30    | 0.20 - 0.45 |                              |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.20 - 0.30                            | 0.20 - 0.35    | 0.25 - 0.40 | P 25 B - 5                   |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.20 - 0.30                            | 0.25 - 0.40    | 0.30 - 0.50 |                              |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.25 - 0.40 |                              |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.15 - 0.25                            | 0.20 - 0.25    | 0.25 - 0.32 | P 25 B - 1                   |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.15 - 0.20                            | 0.20 - 0.25    | 0.20 - 0.30 |                              |           |
| Austenitic steel (stainless)                 |                       | 0.12 - 0.18                            | 0.15 - 0.22    | 0.15 - 0.25 |                              |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.20 - 0.32 | P 25 B - 5                   |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.15 - 0.25                            | 0.20 - 0.30    | 0.20 - 0.35 |                              |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.20 - 0.35                            | 0.25 - 0.40    | 0.25 - 0.50 |                              |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.15 - 0.25                            | 0.20 - 0.35    | 0.20 - 0.40 |                              |           |
| Aluminium and Aluminium alloys               | 80 - 150              | 0.08 - 0.25                            | 0.12 - 0.45    | 0.15 - 0.60 | K 10 B - 5                   |           |
| Copper<br>Cu content ≤ 99%                   | 120 - ...             | 0.06 - 0.15                            | 0.06 - 0.20    | 0.06 - 0.20 | K 10 - 1                     |           |

## Type 33/36

Counterboring head for hydraulic cylinders

Chip removal in feed direction

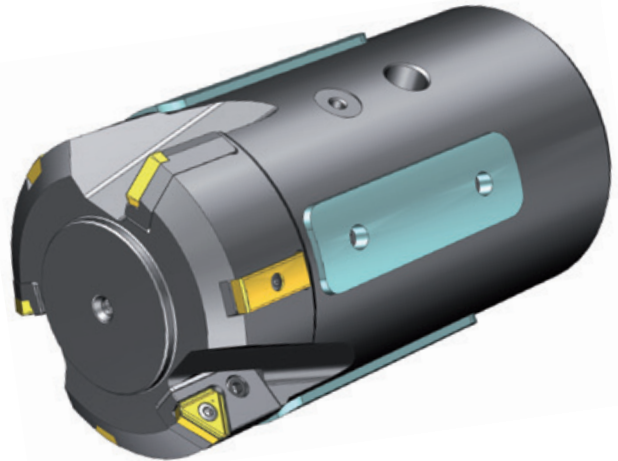
Ø 60.00 to 498.99 mm



### Type 33

Drilling range Ø 159.00 - 498.99 mm

On request



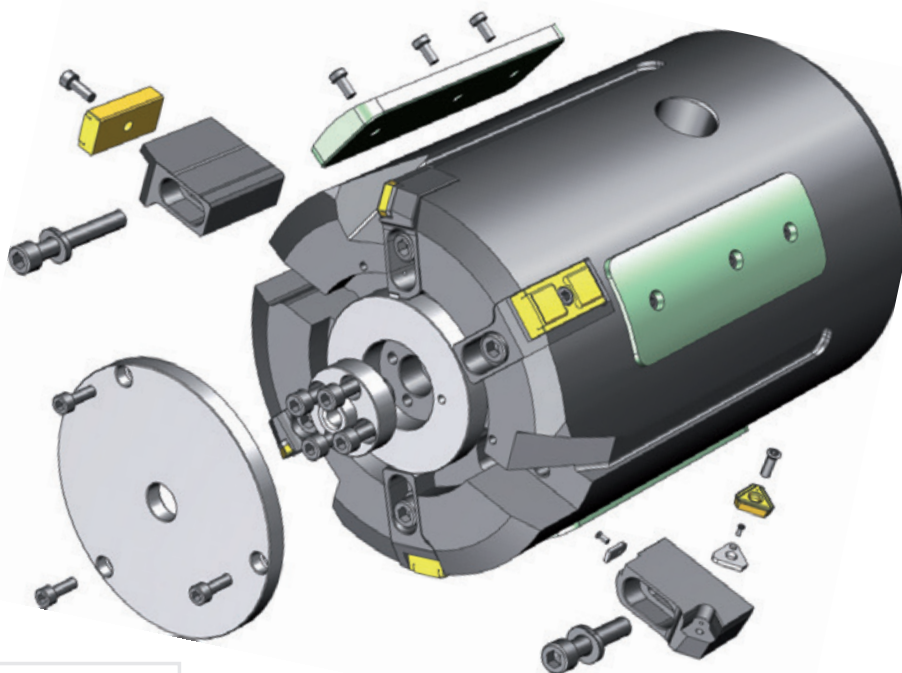
### Type 36

Bohrbereich Ø 60,00 - 250,00 mm

On request

### Advantages:

- Type 33: Newly patented adjustment system with central adjusting disc for easy diameter setting.  
From Ø 159 mm adjustment range = 25 mm, from tool diameter 299 mm = 50 mm
- Type 36 Ø 60 to 250 mm with radial and axial fixed adjustment
- No adjustment required when changing wear parts, no re-adjustment within +/- 0.01 mm

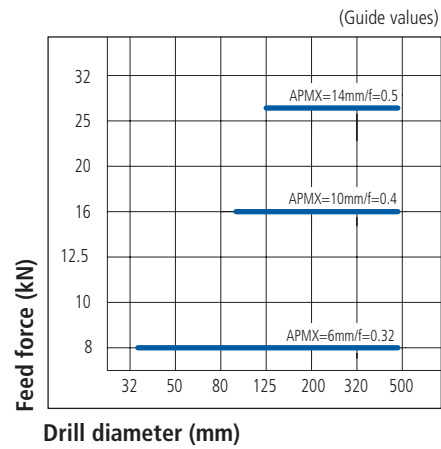
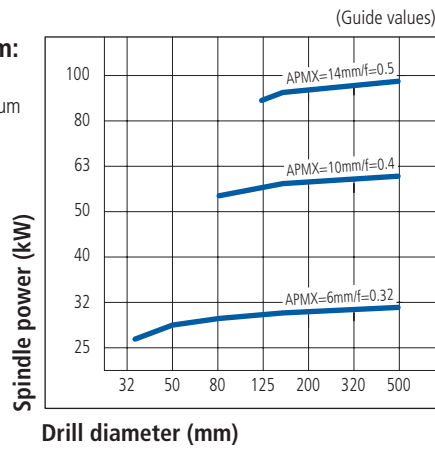


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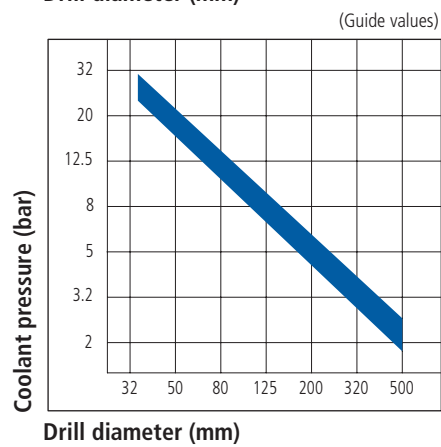
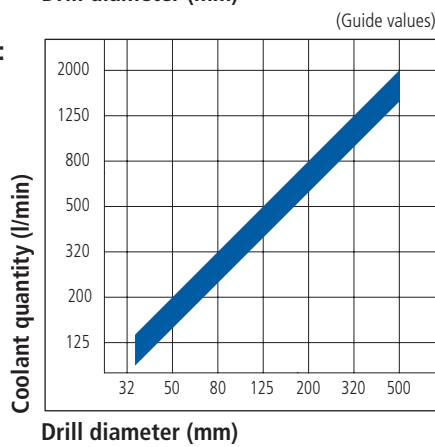
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**Performance diagram:**

APMX = Depth of cut maximum



**Coolant information:**



**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties      | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |               |                |                 |                 | Carbide grades / chip breakers |           |
|------------------------------------------------|-----------------------|----------------------------------------|---------------|----------------|-----------------|-----------------|--------------------------------|-----------|
|                                                |                       | 34.00 - 59.99                          | 60.00 - 79.99 | 80.00 - 119.99 | 120.00 - 299.99 | 300.00 - 498.99 | Cutting insert                 | Guide pad |
| Structural steel $\leq 700 \text{ N/mm}^2$     | 80 - 120              | 0.40 - 0.60                            | 0.60 - 1.00   | 0.80 - 1.20    | 1.00 - 1.50     | 1.00 - 1.50     | HC 115 - 5*                    | P 20      |
| Structural steel $\leq 1100 \text{ N/mm}^2$    | 60 - 70               | 0.50 - 0.80                            | 0.60 - 1.00   | 0.60 - 1.00    | 0.80 - 1.20     | 0.80 - 1.20     | P 25 B - 1                     |           |
| Case hardened steel $\leq 1100 \text{ N/mm}^2$ | **                    |                                        |               |                |                 |                 |                                |           |
| Heat treated steel $\leq 700 \text{ N/mm}^2$   |                       |                                        |               |                |                 |                 |                                |           |
| Heat treated steel $\leq 1100 \text{ N/mm}^2$  |                       |                                        |               |                |                 |                 |                                |           |
| Nitriding steel $\leq 1100 \text{ N/mm}^2$     |                       |                                        |               |                |                 |                 |                                |           |
| Ferritic steel $\leq 900 \text{ N/mm}^2$       |                       |                                        |               |                |                 |                 |                                |           |
| Austenitic steel (stainless)                   | 60 - 80               | 0.40 - 0.60                            | 0.50 - 0.80   | 0.60 - 1.00    | 0.80 - 1.20     | 0.80 - 1.20     | P 25 BX - 1                    |           |
| Heat resisting steel (stainless), Tool steel   | **                    |                                        |               |                |                 |                 |                                |           |
| Rust proof steel castings                      | 50 - 60               | 0.30 - 0.50                            | 0.40 - 0.60   | 0.50 - 1.00    | 0.80 - 1.20     |                 | HC 115 - 5                     |           |
| Steel castings $\leq 700 \text{ N/mm}^2$       | **                    |                                        |               |                |                 |                 |                                |           |
| Cast iron unalloyed and alloyed                |                       |                                        |               |                |                 |                 |                                |           |
| Aluminium and Aluminium alloys                 | 150 - 250             | 0.60 - 0.90                            | 0.80 - 1.20   | 1.00 - 1.50    | 1.00 - 1.80     | 1.00 - 2.00     | HC 115 - 5                     |           |
| Copper<br>Cu content < 99%                     | **                    |                                        |               |                |                 |                 |                                |           |

\* first recommendation

\*\* On request

## Type 38/58

Pull-boring head with indexable inserts and guide pads  
Ø 20.00 to 222.99 mm



**Type 38**

Drilling range Ø 20.00 - 222.99 mm

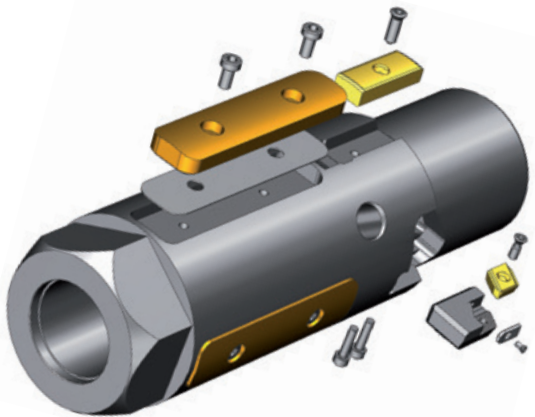


**Type 58**

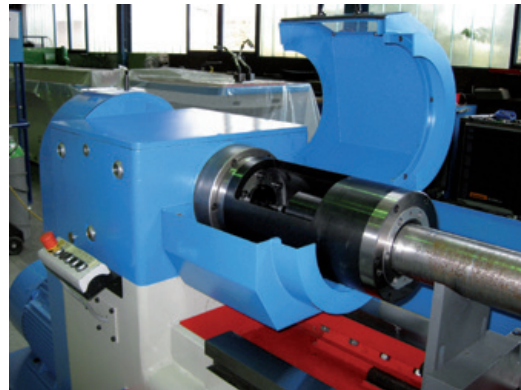
Drilling range Ø 20.00 - 222.99 mm

### Advantages:

- Tool adjustment range depending on tool diameter up to 5 mm with replacement parts
- Simplest operation, change of wear parts without re-adjustment within +/- 0.01 mm
- Minimal axis deviation at large drilling depths
- Bore tolerance in the range of IT7 (IT6) roundness/diameter

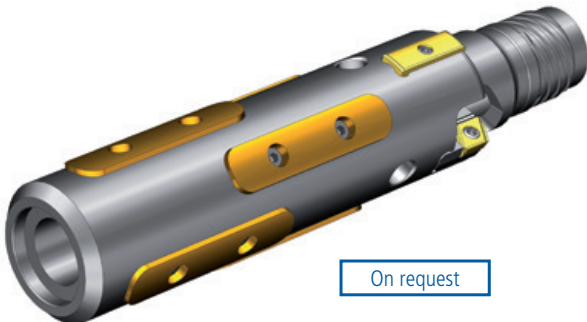


### Lantern (on request)



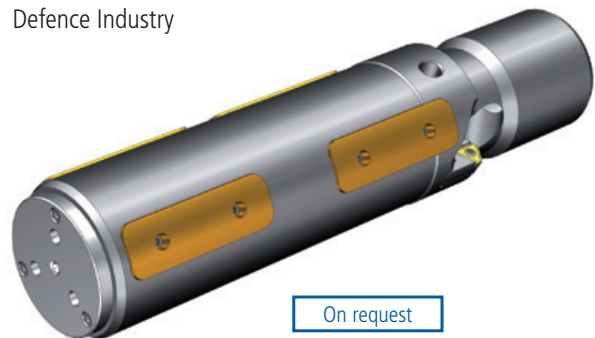
### Special pull-boring tool

Machining of twin screw extruders



On request

Defence Industry



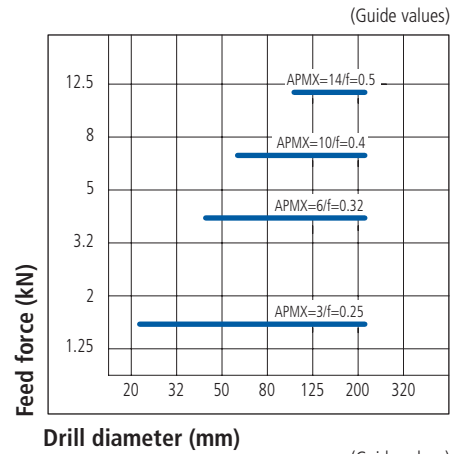
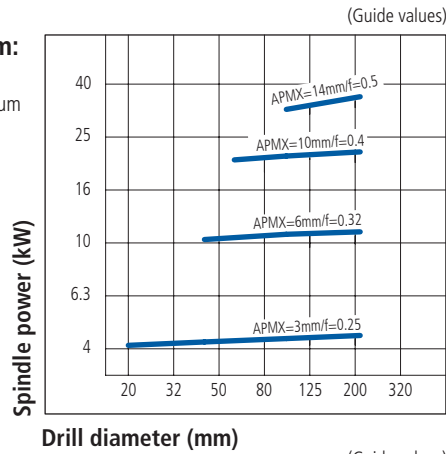
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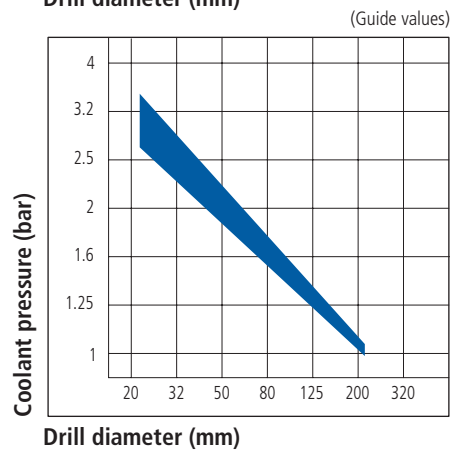
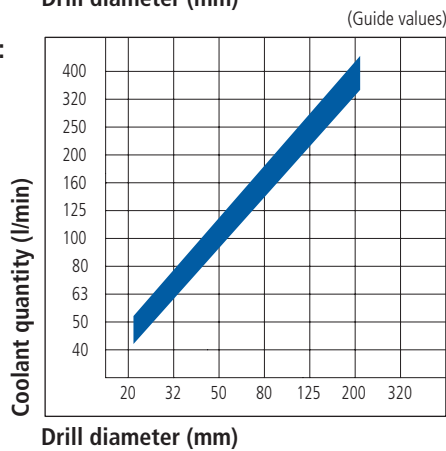
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**Performance diagram:**

APMX = Depth of cut maximum



**Coolant information:**

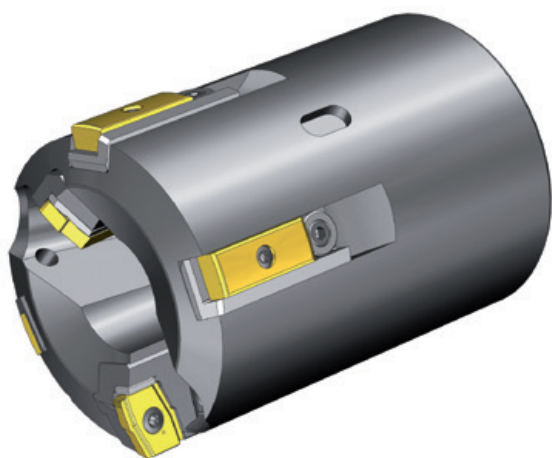


Guide values for deep hole drilling of different materials

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |               |                | Carbide grades / chip breakers |           |
|----------------------------------------------|-----------------------|----------------------------------------|---------------|----------------|--------------------------------|-----------|
|                                              |                       | 20.00 - 43.99                          | 44.00 - 90.99 | 91.00 - 222.99 | Outer insert                   | Guide pad |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.16 - 0.25                            | 0.20 - 0.32   | 0.20 - 0.40    | P 25 B - 2                     | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       | 0.16 - 0.25                            | 0.20 - 0.32   | 0.20 - 0.40    | P 25 B - 1                     |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.12 - 0.20                            | 0.15 - 0.25   | 0.20 - 0.32    |                                |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.16 - 0.25                            | 0.20 - 0.30   | 0.20 - 0.40    |                                |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.12 - 0.22                            | 0.20 - 0.25   | 0.20 - 0.30    |                                |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.12 - 0.20                            | 0.20 - 0.25   | 0.20 - 0.30    |                                |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.12 - 0.22                            | 0.15 - 0.25   | 0.20 - 0.30    | P 25 B - 2                     |           |
| Austenitic steel (stainless)                 |                       | 0.12 - 0.16                            | 0.15 - 0.20   | 0.15 - 0.25    | K 10 BX - 2                    |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.12 - 0.20                            | 0.15 - 0.22   | 0.20 - 0.30    | P 25 B - 1                     |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.15 - 0.25                            | 0.20 - 0.30   | 0.20 - 0.35    |                                |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.12 - 0.25                            | 0.28 - 0.30   | 0.25 - 0.35    |                                |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.20 - 0.30                            | 0.20 - 0.40   | 0.25 - 0.50    |                                |           |
| Aluminium and Aluminium alloys               | 80 - 150              | 0.20 - 0.30                            | 0.20 - 0.40   | 0.25 - 0.50    | K 10 B - 1                     |           |
| Copper<br>Cu content ≤ 99%                   | 120 - ...             | 0.07 - 0.15                            | 0.10 - 0.20   | 0.10 - 0.20    | K 10 - 1                       |           |

## Type 28/48

Trepanning head with indexable inserts and guide pads  
Ø 55.00 to 412.99 mm



### Type 28

Drilling range Ø 55.00 - 412.99 mm



### Type 48

Drilling range Ø 55.00 - 412.99 mm

### Advantages:

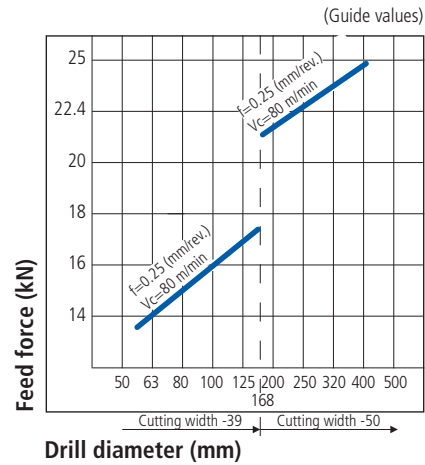
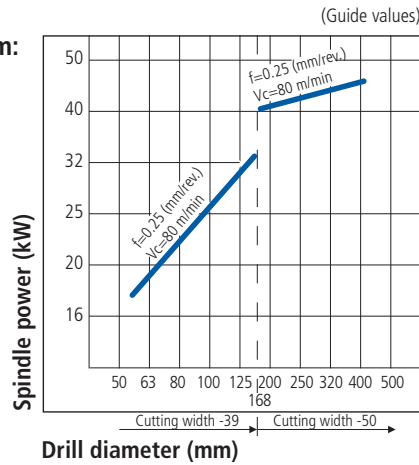
- No adjustment required when changing wear parts
- Simplest operation, change of wear parts without re-adjustment within +/- 0.01 mm
- Tool adjustment range depending on tool diameter up to 5 mm with replacement parts
- Ø fine adjustment with stop plate
- The core may be reused for new workpieces
- For machines with insufficient spindle power



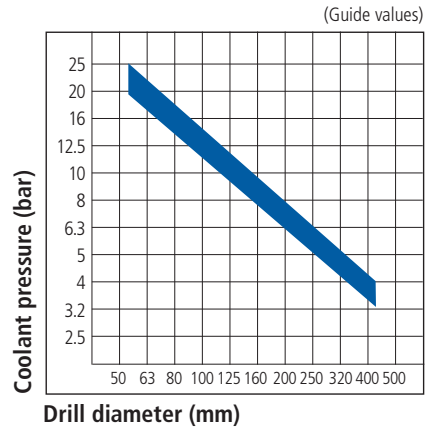
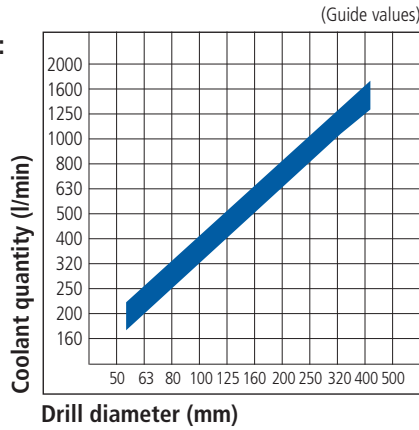
Download and ordering information  
available on our website

[www.botek.de](http://www.botek.de)

**Performance diagram:**



**Coolant information:**



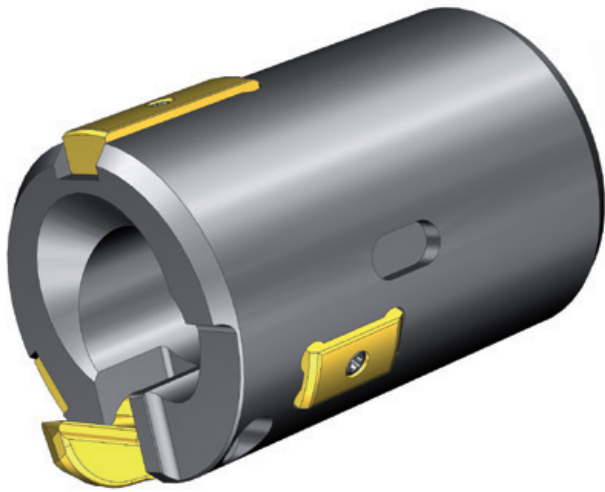
**Guide values for deep hole drilling of different materials**

| Material / Mechanical strength properties    | Cutting speed (m/min) | Feed (mm/rev.) for drill diameter (mm) |                |             | Carbide grades/chip breakers |                     |               |           |
|----------------------------------------------|-----------------------|----------------------------------------|----------------|-------------|------------------------------|---------------------|---------------|-----------|
|                                              |                       | 55.00 - 98.99                          | 99.00 - 167.99 | 168 - ...   | Outer insert                 | Intermediate insert | Center insert | Guide pad |
| Structural steel ≤ 700 N/mm²                 | 80 - 100              | 0.18 - 0.25                            | 0.20 - 0.30    | 0.20 - 0.40 | P 25 B - 2                   | P 25 B - 1          | P 25 B - 1    | P 20 B    |
| Case hardened steel ≤ 750 N/mm²              |                       | 0.18 - 0.25                            | 0.20 - 0.30    | 0.25 - 0.40 | P 25 B - 1                   |                     |               |           |
| Case hardened steel ≤ 1100 N/mm²             | 70 - 80               | 0.16 - 0.22                            | 0.20 - 0.30    | 0.20 - 0.30 |                              |                     |               |           |
| Heat treated steel ≤ 700 N/mm²               | 70 - 90               | 0.18 - 0.25                            | 0.20 - 0.35    | 0.25 - 0.40 |                              |                     |               |           |
| Heat treated steel ≤ 1100 N/mm²              | 55 - 75               | 0.16 - 0.22                            | 0.20 - 0.30    | 0.20 - 0.35 | P 25 B - 2                   |                     |               |           |
| Nitriding steel ≤ 1100 N/mm²                 |                       | 0.16 - 0.22                            | 0.20 - 0.30    | 0.20 - 0.35 |                              |                     |               |           |
| Ferritic steel ≤ 900 N/mm²                   | 60 - 80               | 0.16 - 0.22                            | 0.18 - 0.25    | 0.18 - 0.30 | K 10 BX - 2                  | K 10 BX - 2         | K 10 BX - 2   |           |
| Austenitic steel (stainless)                 |                       | 0.16 - 0.20                            | 0.16 - 0.25    | 0.18 - 0.28 |                              |                     |               |           |
| Heat resisting steel (stainless), Tool steel | 50 - 70               | 0.16 - 0.22                            | 0.18 - 0.25    | 0.18 - 0.30 | P 25 B - 1                   | P 25 B - 1          | P 25 B - 1    |           |
| Steel castings ≤ 700 N/mm²                   | 60 - 80               | 0.18 - 0.25                            | 0.20 - 0.30    | 0.20 - 0.30 |                              |                     |               |           |
| Nodular cast iron ≤ 1000 N/mm²               | 65 - 80               | 0.20 - 0.25                            | 0.20 - 0.35    | 0.25 - 0.40 |                              |                     |               |           |
| Cast iron unalloyed and alloyed              | 70 - 100              | 0.20 - 0.25                            | 0.20 - 0.35    | 0.25 - 0.40 |                              |                     |               |           |
| Aluminium and Aluminium alloys               | 80 - 150              | 0.10 - 0.25                            | 0.15 - 0.30    | 0.15 - 0.45 | K 10 B - 1                   | K 10 B - 1          | K 10 B - 1    |           |
| Copper<br>Cu content < 99%                   | 120 - ...             | 0.07 - 0.15                            | 0.10 - 0.20    | 0.10 - 0.20 | K 10 - 1                     | K 10 - 1            | K 10 - 1      |           |

## Type 29/49

Core cutting head

Ø 55.00 to 120.00mm



Type 29

On request



Type 49

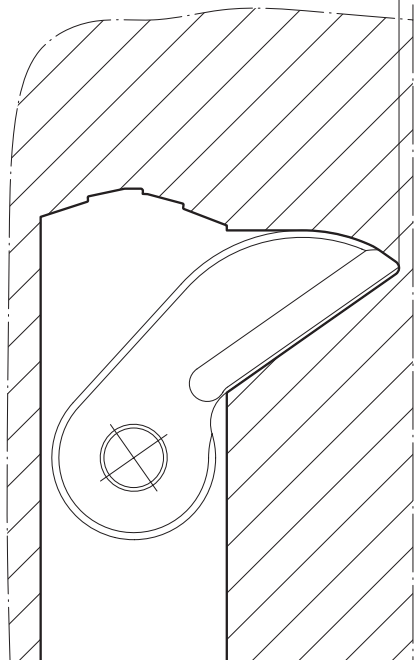
On request

### Application:

- Common application with turbine shafts and blind holes for energy technology
- The cores are needed for materials tests and tensile specimens
- Preparation of holes using trepanning tool Type 28/48

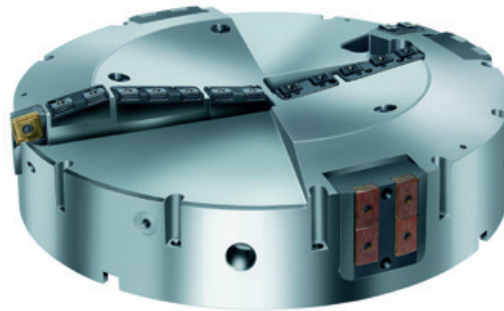


~ Ø 3  
Break-off Core



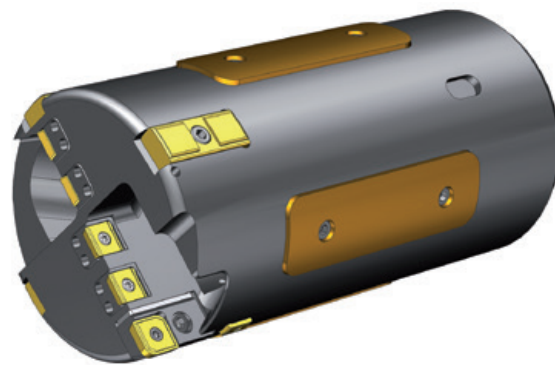
### Solid drill head up to Ø 700 mm

On request



### Flat bottom

On request



### Full radius

On request



### Cone

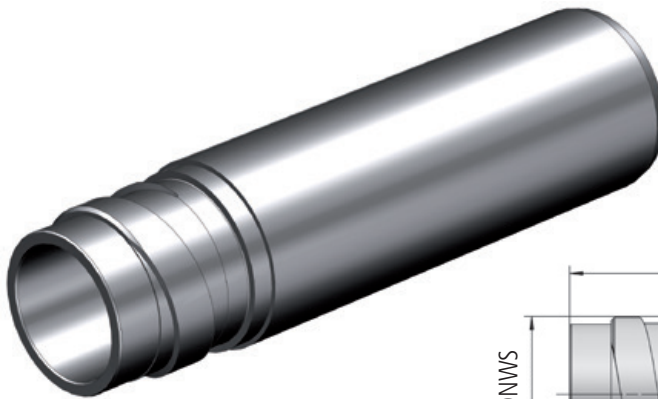
On request



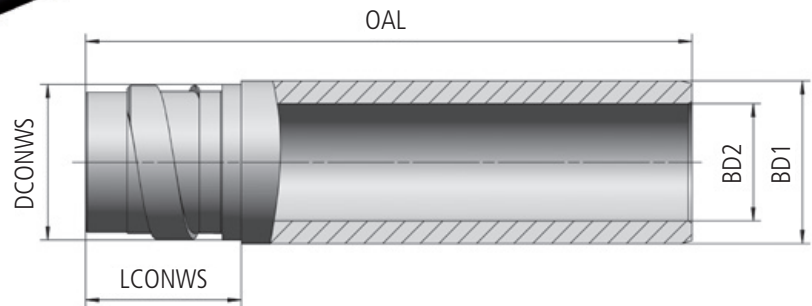
## Accessories

### Drill tubes Type 25

with 1-start external thread



BD = Body diameter  
 DCONWS = Connection diameter workpiece side  
 LCONWS = Connection length workpiece side  
 OAL = Overall length



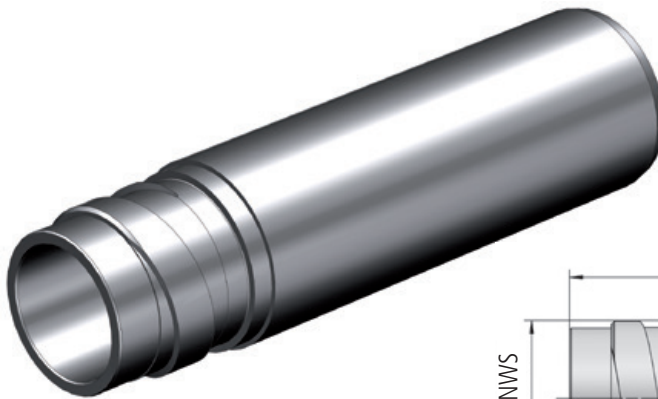
| Order no.   | BD1 <sub>h8</sub> | BD2   | DCONWS | LCONWS | Thread pitch |    |
|-------------|-------------------|-------|--------|--------|--------------|----|
| 25-9310-OAL | 12.0              | 8.0   | 11.5   | 23.3   | 6            |    |
| 25-9410-OAL | 13.0              | 8.5   | 11.8   |        |              |    |
| 25-9510-OAL | 13.0              | 8.5   | 12.4   |        |              |    |
| 25-9610-OAL | 14.0              | 9.0   | 12.7   |        |              |    |
| 25-9710-OAL | 14.0              | 9.0   | 13.4   |        |              |    |
| 25-9810-OAL | 15.0              | 10.0  | 13.7   |        |              |    |
| 25-9910-OAL | 15.0              | 10.0  | 14.4   |        |              |    |
| 25-0110-OAL | 16.5              | 11.0  | 15.5   | 23.0   |              |    |
| 25-0210-OAL | 18.0              | 12.0  | 16.5   | 26.0   |              | 10 |
| 25-0310-OAL | 20.0              | 13.0  | 19.0   |        |              |    |
| 25-0410-OAL | 22.0              | 14.0  | 20.0   |        |              |    |
| 25-0510-OAL | 24.0              | 15.5  | 22.0   |        |              |    |
| 25-0610-OAL | 26.0              | 17.0  | 24.0   |        |              |    |
| 25-0710-OAL | 28.0              | 18.5  | 26.0   |        |              |    |
| 25-0810-OAL | 30.0              | 20.0  | 27.0   | 41.0   | 20           |    |
| 25-0910-OAL | 33.0              | 23.0  | 30.0   |        |              |    |
| 25-1010-OAL | 36.0              | 25.5  | 33.0   |        |              |    |
| 25-1110-OAL | 39.0              | 28.0  | 37.0   |        |              |    |
| 25-1210-OAL | 43.0              | 31.0  | 41.0   |        |              |    |
| 25-1310-OAL | 47.0              | 35.0  | 44.0   |        |              |    |
| 25-1410-OAL | 51.0              | 39.0  | 49.0   |        |              |    |
| 25-1510-OAL | 56.0              | 43.0  | 53.0   | 71.0   | 40           |    |
| 25-1710-OAL | 62.0              | 48.0  | 59.0   |        |              |    |
| 25-1810-OAL | 68.0              | 53.0  | 65.0   |        |              |    |
| 25-1910-OAL | 75.0              | 59.0  | 71.0   |        |              |    |
| 25-2010-OAL | 82.0              | 66.0  | 79.0   |        |              |    |
| 25-2110-OAL | 94.0              | 78.0  | 90.0   |        |              |    |
| 25-2210-OAL | 106.0             | 88.0  | 102.0  |        |              |    |
| 25-2310-OAL | 118.0             | 94.0  | 114.0  |        |              |    |
| 25-2410-OAL | 130.0             | 104.0 | 126.0  |        |              |    |
| 25-2510-OAL | 142.0             | 116.0 | 139.0  |        |              |    |

Dimensions in mm

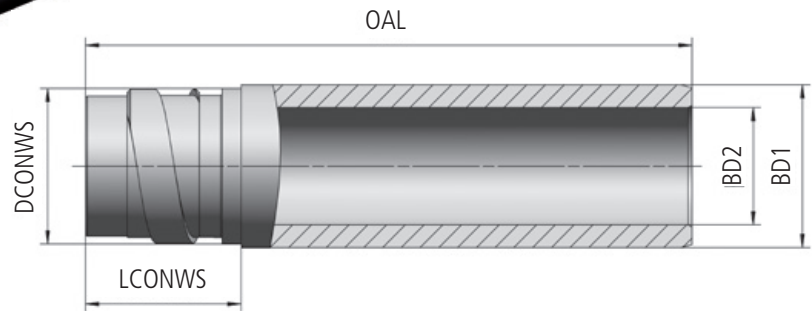
## Accessories

### Drill tubes Type 25

with 1-start external thread



BD = Body diameter  
 DCONWS = Connection diameter workpiece side  
 LCONWS = Connection length workpiece side  
 OAL = Overall length



| Order no.   | BD1 <sub>h8</sub> | BD2   | DCONWS  | LCONWS | Thread pitch |
|-------------|-------------------|-------|---------|--------|--------------|
| 25-2610-OAL | 154.0             | 128.0 | 151.0   | 86.0   | 56           |
| 25-2710-OAL | 166.0             | 136.0 | 163.0   |        |              |
| 25-2810-OAL | 178.0             | 145.0 | 175.0.0 |        |              |
| 25-2910-OAL | 190.0             | 154.0 | 187     |        |              |
| 25-3010-OAL | 202.0             | 166.0 | 199.0   |        |              |
| 25-3110-OAL | 214.0             | 178.0 | 211.0   |        |              |
| 25-3210-OAL | 226.0             | 190.0 | 223.0   |        |              |
| 25-3310-OAL | 238.0             | 202.0 | 235.0   |        |              |
| 25-3410-OAL | 250.0             | 214.0 | 247.0   | 121.0  | 56           |
| 25-3510-OAL | 262.0             | 226.0 | 259.0   |        |              |
| 25-3610-OAL | 274.0             | 238.0 | 271.0   |        |              |
| 25-3710-OAL | 286.0             | 250.0 | 283.0   |        |              |
| 25-3810-OAL | 298.0             | 262.0 | 295.0   |        |              |
| 25-3910-OAL | 310.0             | 274.0 | 307.0   |        |              |
| 25-4010-OAL | 322.0             | 286.0 | 319.0   |        |              |
| 25-4110-OAL | 334.0             | 298.0 | 331.0   |        |              |
| 25-4210-OAL | 346.0             | 310.0 | 343.0   |        |              |

Dimensions in mm

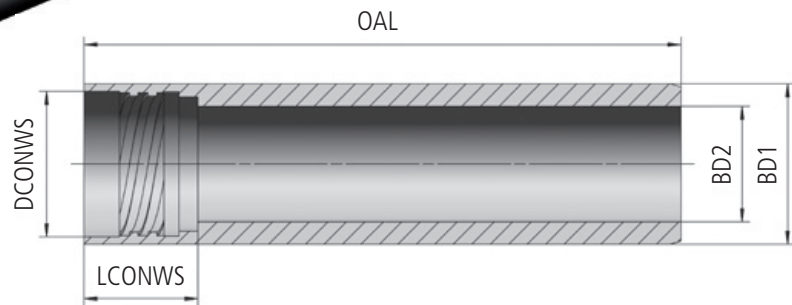
## Accessories

### Drill tubes Type 45

with 4-start internal thread



BD = Body diameter  
 DCONWS = Connection diameter workpiece side  
 LCONWS = Connection length workpiece side  
 OAL = Overall length



| Order no.   | BD1 <sub>h8</sub> | BD2   | DCONWS | LCONWS | Thread pitch |
|-------------|-------------------|-------|--------|--------|--------------|
| 45-9710-OAL | 14.0              | 9.0   | 12.6   | 21.0   | 8            |
| 45-9810-OAL | 15.0              | 10.0  | 13.6   |        |              |
| 45-9910-OAL | 16.0              | 10.5  | 14.5   | 22.0   |              |
| 45-0110-OAL | 17.0              | 11.5  | 15.5   |        |              |
| 45-0210-OAL | 18.0              | 12.0  | 16.0   | 21.5   | 10           |
| 45-0310-OAL | 20.0              | 13.0  | 18.0   |        | 12           |
| 45-0410-OAL | 22.0              | 14.0  | 19.5   |        |              |
| 45-0510-OAL | 24.0              | 15.5  | 21.0   |        |              |
| 45-0610-OAL | 26.0              | 17.0  | 23.5   | 24.5   | 16           |
| 45-0710-OAL | 28.0              | 18.5  | 25.5   |        |              |
| 45-0810-OAL | 30.0              | 20.0  | 28.0   |        |              |
| 45-0910-OAL | 33.0              | 23.0  | 30.0   | 30.5   | 20           |
| 45-1010-OAL | 36.0              | 25.5  | 33.0   |        |              |
| 45-1110-OAL | 39.0              | 28.0  | 36.0   |        |              |
| 45-1210-OAL | 43.0              | 31.0  | 39.0   |        |              |
| 45-1310-OAL | 47.0              | 35.0  | 43.0   | 34.5   | 24           |
| 45-1410-OAL | 51.0              | 39.0  | 47.0   |        |              |
| 45-1510-OAL | 56.0              | 43.0  | 51.0   |        |              |
| 45-1610-OAL | 56.0              | 43.0  | 52.0   | 75.0   | 32           |
| 45-1710-OAL | 62.0              | 48.0  | 58.0   |        |              |
| 45-1810-OAL | 68.0              | 53.0  | 63.0   |        |              |
| 45-1910-OAL | 75.0              | 59.0  | 70.0   | 97.0   | 44           |
| 45-2010-OAL | 82.0              | 66.0  | 77.0   |        |              |
| 45-2110-OAL | 94.0              | 78.0  | 89.0   |        |              |
| 45-2210-OAL | 106.0             | 88.0  | 101.0  | 118.0  | 60           |
| 45-2310-OAL | 118.0             | 94.0  | 113.0  |        |              |
| 45-2410-OAL | 130.0             | 104.0 | 125.0  |        |              |
| 45-2510-OAL | 142.0             | 116.0 | 137.0  | 139.0  | 72           |
| 45-2610-OAL | 154.0             | 128.0 | 149.0  |        |              |
| 45-2710-OAL | 166.0             | 136.0 | 161.0  |        |              |
| 45-2810-OAL | 178.0             | 145.0 | 173.0  | 144.0  | 80           |

Dimensions in mm

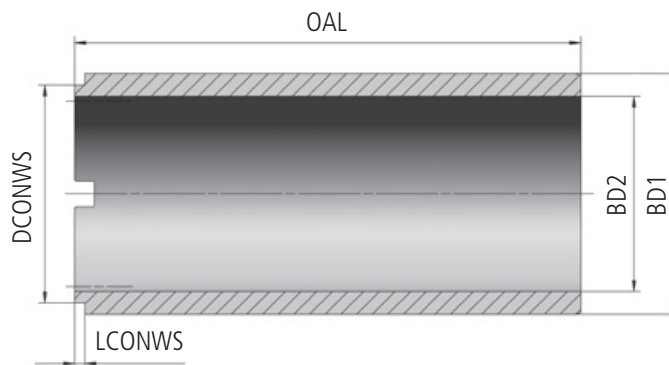
## Accessories

### Drill tubes Type 45

with flange connection



BD = Body diameter  
 DCONWS = Connection diameter workpiece side  
 LCONWS = Connection length workpiece side  
 OAL = Overall length



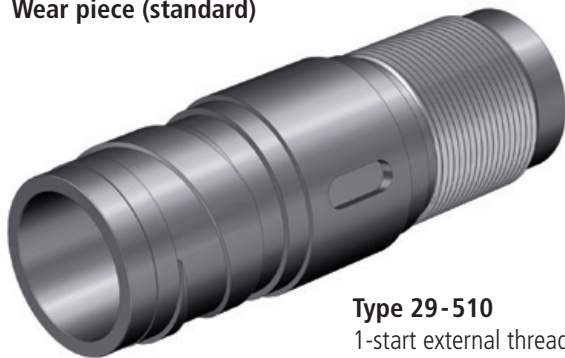
| Order no.   | BD1 <sub>h8</sub> | BD2   | DCONWS | LCONWS |
|-------------|-------------------|-------|--------|--------|
| 45-2910-OAL | 190.0             | 154.0 | 172.0  | 8.0    |
| 45-3010-OAL | 202.0             | 166.0 | 184.0  |        |
| 45-3110-OAL | 214.0             | 178.0 | 196.0  |        |
| 45-3210-OAL | 226.0             | 190.0 | 208.0  |        |
| 45-3310-OAL | 238.0             | 202.0 | 220.0  |        |
| 45-3410-OAL | 250.0             | 214.0 | 232.0  |        |
| 45-3510-OAL | 262.0             | 226.0 | 244.0  |        |
| 45-3610-OAL | 274.0             | 238.0 | 256.0  |        |
| 45-3710-OAL | 286.0             | 250.0 | 268.0  |        |
| 45-3810-OAL | 298.0             | 262.0 | 280.0  |        |
| 45-3910-OAL | 310.0             | 274.0 | 292.0  |        |
| 45-4010-OAL | 322.0             | 286.0 | 304.0  |        |
| 45-4110-OAL | 334.0             | 298.0 | 316.0  |        |
| 45-4210-OAL | 346.0             | 310.0 | 328.0  |        |
| 45-4310-OAL | 358.0             | 322.0 | 340.0  |        |
| 45-4410-OAL | 370.0             | 334.0 | 352.0  |        |
| 45-4510-OAL | 382.0             | 346.0 | 364.0  |        |
| 45-4610-OAL | 394.0             | 358.0 | 376.0  |        |
| 45-4710-OAL | 406.0             | 370.0 | 388.0  |        |
| 45-4810-OAL | 418.0             | 382.0 | 400.0  |        |
| 45-4910-OAL | 430.0             | 394.0 | 412.0  |        |
| 45-5010-OAL | 442.0             | 406.0 | 424.0  |        |
| 45-5110-OAL | 454.0             | 418.0 | 436.0  |        |
| 45-5210-OAL | 466.0             | 430.0 | 448.0  |        |
| 45-5310-OAL | 478.0             | 442.0 | 460.0  |        |
| 45-5410-OAL | 490.0             | 454.0 | 472.0  |        |

Dimensions in mm

## Accessories

### Thread wear piece/guide piece

#### Wear piece (standard)



**Type 29-510**  
1-start external thread

[On request](#)



**Type 49-510**  
4-start internal thread

[On request](#)

Wear pieces are inserted into the drill tube instead of the standard connection thread. They have less wear and tear, especially when tools have to be exchanged frequently. They are also used for repairing damaged threads. Drill tubes can be repaired on-site with the length remaining the same.

#### Retrac- wear piece



**Type 29-518**

[On request](#)

Retrac- wear pieces – mechanical or hydraulic – are used when counterboring, skiving and roller burnishing tools are being used. The activations are delivered by the tool supplier.

#### Guide piece



**Type 29-550/555**  
1-start external thread

[On request](#)



**Type 49-550/555**  
4-start internal thread

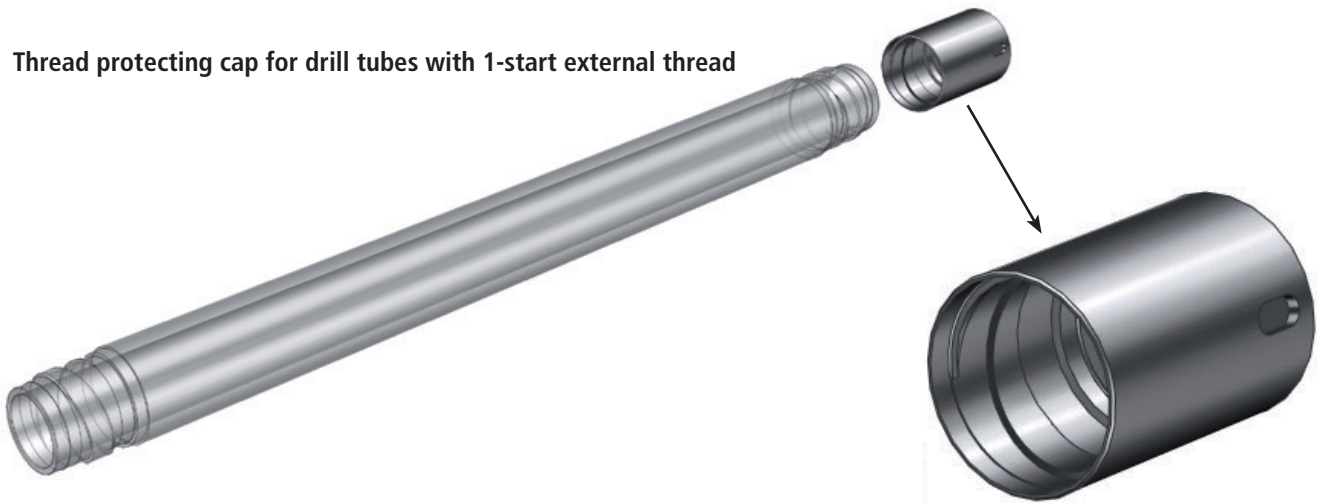
[On request](#)

Guide pieces are inserted between drill head and drill tube. They are used to pass cross holes. They are also suitable for minimizing drill hole deviation.

## Accessories

### Thread protecting cap

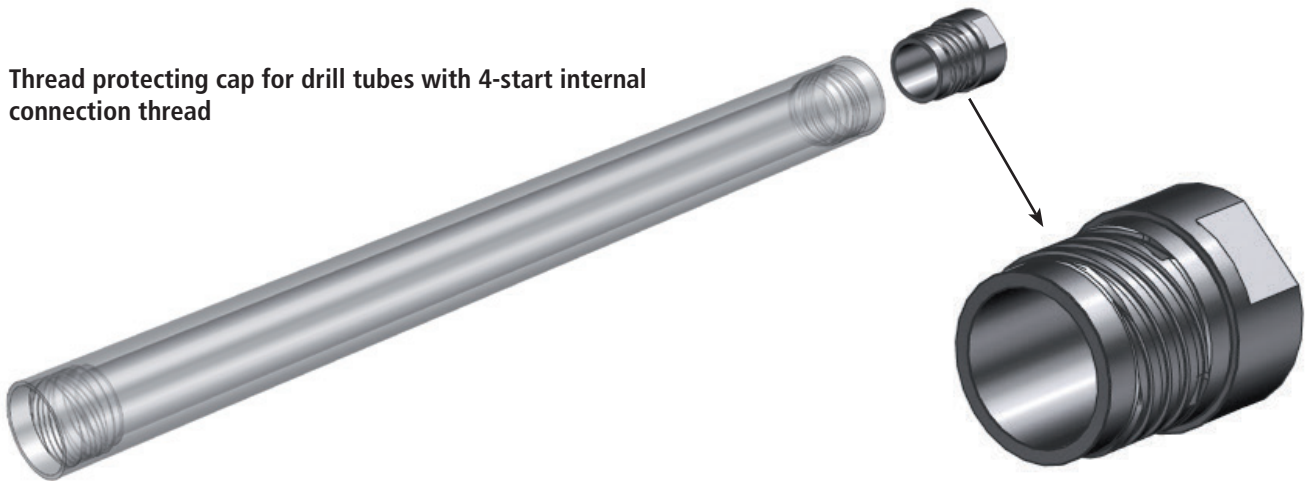
Thread protecting cap for drill tubes with 1-start external thread



**Type 29-500**

On request

Thread protecting cap for drill tubes with 4-start internal connection thread



**Type 49-500**

On request

Caps are used on drill tubes with threads on both ends. They prevent drill tube damages when clamping and/or by chips.

## Accessories

### Thread adapter



**Type 29-520**  
1-start/4-start

On request



**Type 29-530**  
1-start/1-start

On request



**Type 49-520**  
4-start/1-start

On request



**Type 49-530**  
4-start/4-start

On request



**Type 49-530**  
Flange/4-start

On request



**Type 49-520**  
Flange/1-start

On request

Thread adapters are used to connect tools and drill tubes with different connection threads and/or to reduce the number of drill tubes (with large-size reductions please consider the effect of the torque).

## Accessories

### Oil pressure head (BOZA) for rotating workpieces

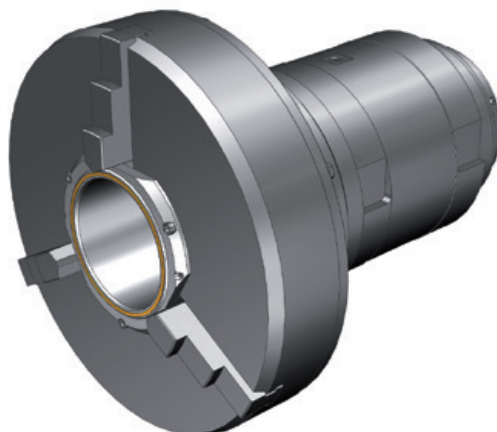
#### Cone clamping



Type 91

On request

#### Jaw chuck



Type 91

On request

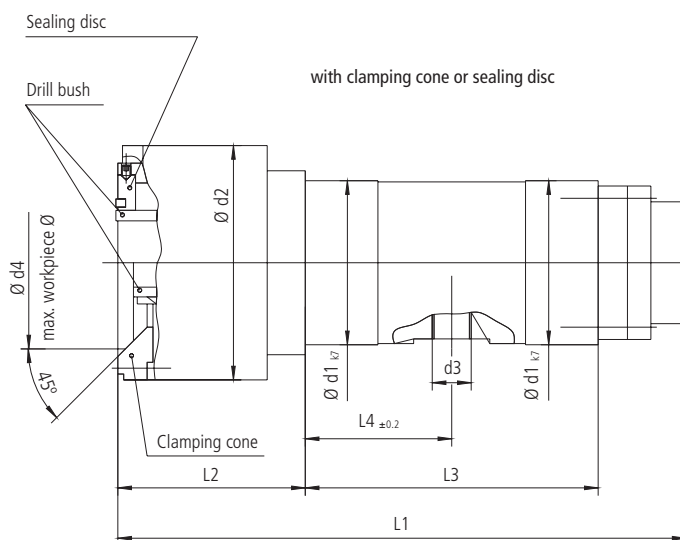
#### Face sealing



Type 91

On request

#### Installation dimensions



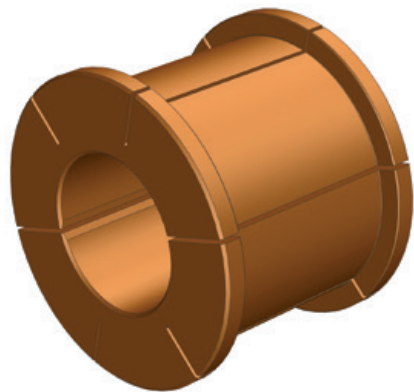
| Size | Drilling range  | d1 <sub>k7</sub> | d2    | L1     | L2    | L3    | L4 <sub>±0.2</sub> | d3    | d4    |
|------|-----------------|------------------|-------|--------|-------|-------|--------------------|-------|-------|
| 50   | 12.50 - 50.00   | 140.0            | 200.0 | 485.0  | 160.0 | 250.0 | 125.0              | R1"   | 150.0 |
| 100  | 25.00 - 100.00  | 180.0            | 250.0 | 510.0  | 160.0 | 250.0 | 125.0              | R1,5" | 200.0 |
| 200  | 50.00 - 200.00  | 355.0            | 400.0 | 535.0  | 160.0 | 300.0 | 125.0              | R2"   | 350.0 |
| 250  | 50.00 - 250.00  | 355.0            | 475.0 | 600.0  | 200.0 | 300.0 | 125.0              | R2"   | 425.0 |
| 400  | 100.00 - 400.00 | 490.0            | 625.0 | 750.0  | 200.0 | 425.0 | 175.0              | Ø 80  | 550.0 |
| 500  | 100.00 - 500.00 | 650.0            | 725.0 | 800.0  | 250.0 | 475.0 | 235.0              | Ø 100 | 600.0 |
| 600  | 200.00 - 600.00 | 750.0            | 975.0 | 1000.0 | 400.0 | 600.0 | 300.0              | Ø 100 | 750.0 |

Dimensions in mm

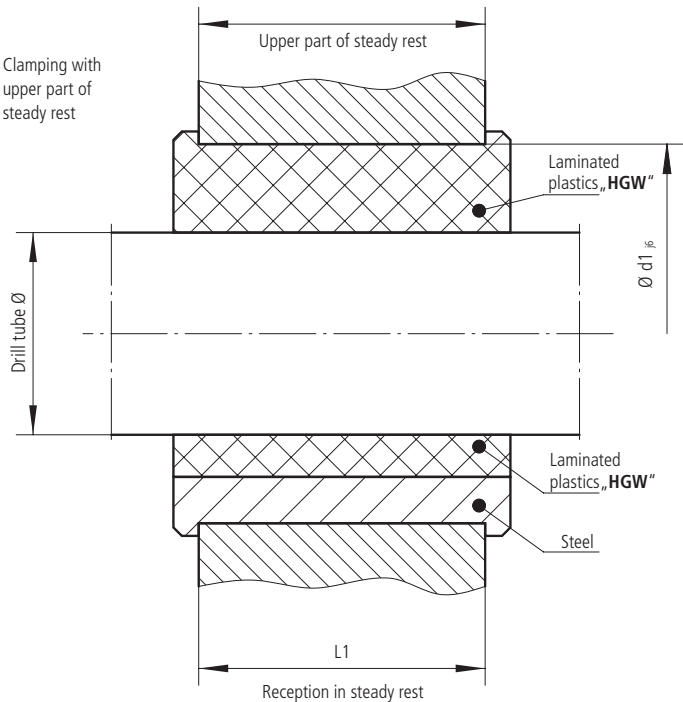
Accessories

Vibration dampers  
for non-rotating tools

Non-rotating tools



Type 91 -030



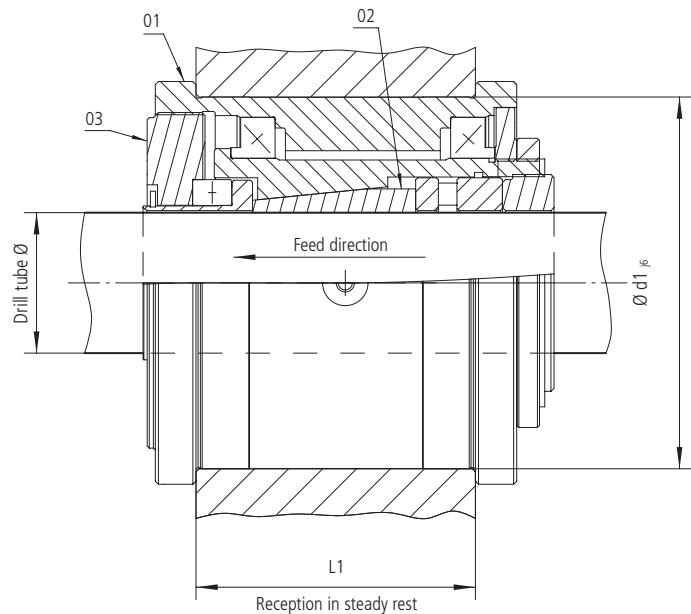
- Vibration dampers are built into a steady rest.
- The steady rest is clamped in its upper part. The vibration dampers for stationary tools consist of **two-piece damping sleeves**. These can also be supplied in a combination of steel and plastic.

| Drill tube $\varnothing$ max. (mm) | Size | Damper $\varnothing d1 \times L1$ (mm) | Order no.     |
|------------------------------------|------|----------------------------------------|---------------|
| 130                                | 0    | 150 x 135                              | 91-030000-000 |
| 154                                | 1    | 180 x 135                              | 91-030100-000 |
| 250                                | 2    | 280 x 165                              | 91-030200-000 |
| 310                                | 3    | 355 x 165                              | 91-030300-000 |

## Rotating tools



**Type 91-028**



- Vibration dampers are built into a steady rest.
- The damping pressure is adjusted on the pressure ring. The position of the damping cone is limited axially by the adjusting disc.
- The vibration damper works mechanically without any further intervention.

| Drill tube Ø (mm) | Size | Damper Ø d1 x L1 (mm) | Order no.     | max. speed (rpm) |
|-------------------|------|-----------------------|---------------|------------------|
| 11 - 68           | 1    | 180 x 135             | 91-028100-000 | 1200             |
| 43 - 142          | 2    | 280 x 165             | 91-028200-000 | 500              |
| 118 - 226         | 3    | 355 x 165             | 91-028300-000 | 250              |

## Accessories

### Drill tube clamping

#### Collet clamping

for drill tubes Ø 7.00 - 56.00 mm  
standard design for spindle nose DIN 55026-A



Type 91-045

| Drill tube Ø (mm) | Size | Spindle nose flange size | Order no.     |
|-------------------|------|--------------------------|---------------|
| 7 - 20            | 1    | 4                        | 91-045100-040 |
|                   |      | 6                        | 91-045100-060 |
| 16 - 33           | 2    | 6                        | 91-045200-060 |
|                   |      | 8                        | 91-045200-080 |
| 16 - 56           | 3    | 6                        | 91-045300-060 |
|                   |      | 8                        | 91-045300-080 |
|                   |      | 11                       | 91-045300-110 |

#### Further spindle nose flange versions on request

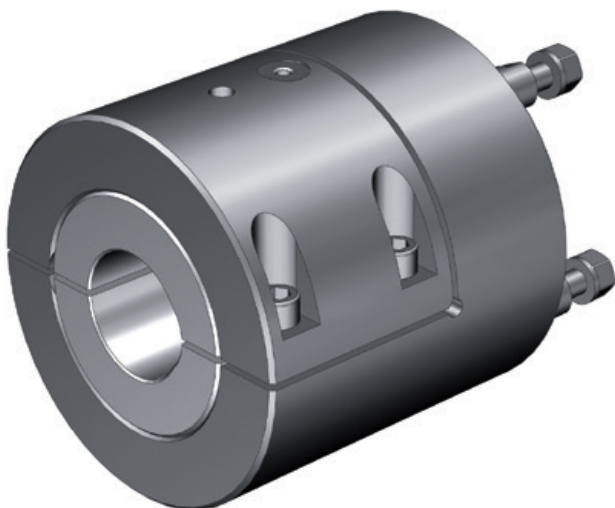
| Spindle nose                                                 |             | Flange          | Order no.        |
|--------------------------------------------------------------|-------------|-----------------|------------------|
| Screw connection from the front<br>a bolt hole circle extern | DIN 55026-A | DIN 55028-A     | 91-045...-... *  |
| Bayonet disc mounting                                        | DIN 55027   | DIN 55028-C     | 91-050...-... *  |
| Camlock                                                      | DIN 55029   | DIN 55029       | 91-051...-... *  |
| Special design                                               | —————       | Special flanges | 99-91.....-... * |

\* The order number depends on the design and will be added upon clarification of all technical details.

Specify inner diameter of the machines spindle passage to evaluate a possible chip congestion.

### Drill tube driver, split-bush style

for drill tubes Ø 62.00 mm and larger standard  
design for spindle nose DIN 55026-AA



Type 91-052

| Drill tube Ø (mm)           | Size | Spindle nose size | Order no.     |
|-----------------------------|------|-------------------|---------------|
| 36 - 68<br>(Special design) | 0    | 6                 | 91-052000-060 |
|                             |      | 8                 | 91-052000-080 |
| 62 - 106                    | 1    | 8                 | 91-052100-080 |
|                             |      | 11                | 91-052100-110 |
| 118 - 166                   | 2    | 11                | 91-052200-110 |
|                             |      | 15                | 91-052200-150 |
| 178 - 190                   | 3    | 11                | 91-052300-110 |
| 178 - 238                   |      | 15                | 91-052300-150 |
|                             |      | 20                | 91-052300-200 |
| 250 - 274                   | 4    | 15                | 91-052400-150 |
| 250 - 382                   |      | 20                | 91-052400-200 |

### Spindle nose mount in other designs on request

| Spindle nose                                                 |             | Flange          | Order no.        |
|--------------------------------------------------------------|-------------|-----------------|------------------|
| Screw connection from the front<br>a bolt hole circle extern | DIN 55026-A | DIN 55028-A     | 91-052...-... *  |
| Bayonet disc mounting                                        | DIN 55027   | DIN 55028-C     | 91-054...-... *  |
| Camlock                                                      | DIN 55029   | DIN 55029       | 91-055...-... *  |
| Special design                                               | —————       | Special flanges | 99-91.....-... * |

\* The order number depends on the design and will be added upon clarification of all technical details.

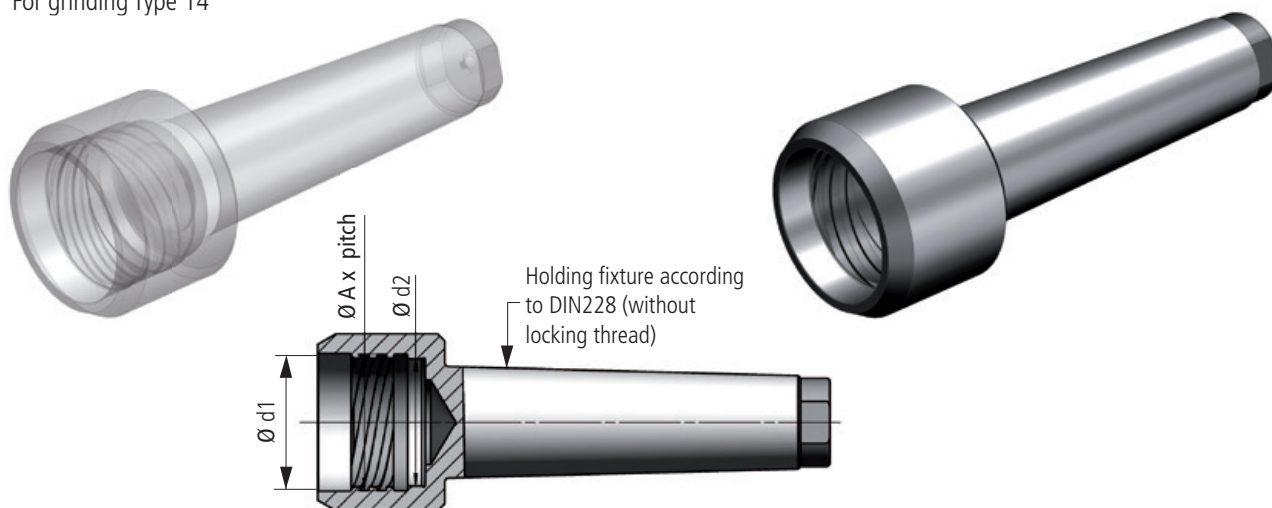
Specify inner diameter of the machines spindle passage to evaluate a possible chip congestion.

## Accessories

### Grinding arbor

#### Grinding arbor with 4-start thread

For grinding Type 14



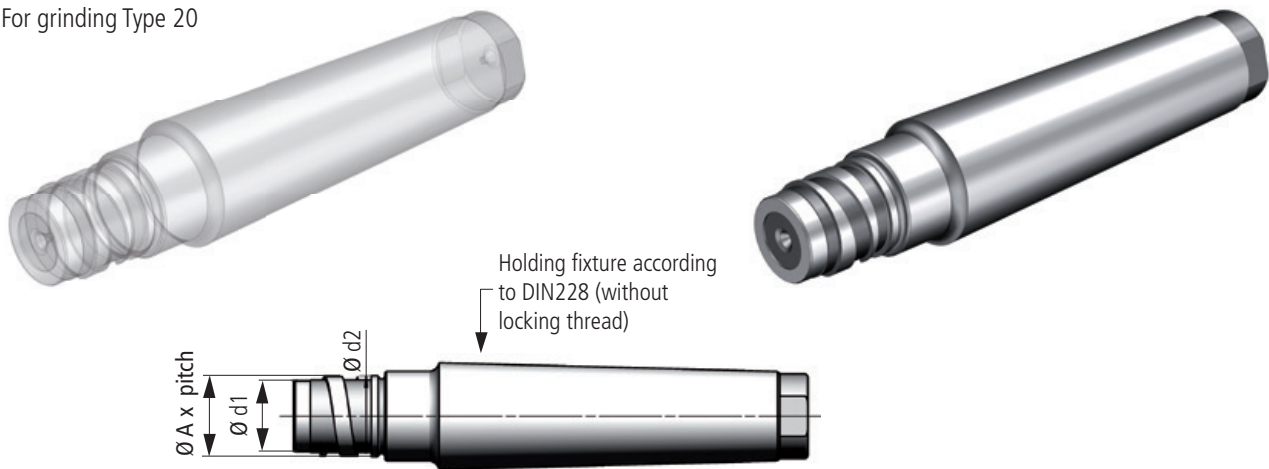
| Order no.   | Drill tube size | Drill tube Ø D (mm) | small fitting Ø d2 | large fitting Ø d1 | A x pitch    | Holder |
|-------------|-----------------|---------------------|--------------------|--------------------|--------------|--------|
| 49-9710-100 | 97              | 14.0                | 10.8               | 12.6               | 12.3 x 8.0   | MK 4   |
| 49-9810-100 | 98              | 15.0                | 11.8               | 13.6               | 13.3 x 8.0   | MK 4   |
| 49-9910-100 | 99              | 16.0                | 12.5               | 14.5               | 14.1 x 8.0   | MK 4   |
| 49-0110-100 | 01              | 17.0                | 13.5               | 15.5               | 15.1 x 8.0   | MK 4   |
| 49-0210-100 | 02              | 18.0                | 14.0               | 16.0               | 15.5 x 10.0  | MK 4   |
| 49-0310-100 | 03              | 20.0                | 16.0               | 18.0               | 17.5 x 12.0  | MK 4   |
| 49-0410-100 | 04              | 22.0                | 17.5               | 19.5               | 19.0 x 12.0  | MK 4   |
| 49-0510-100 | 05              | 24.0                | 19.0               | 21.0               | 20.5 x 12.0  | MK 4   |
| 49-0610-100 | 06              | 26.0                | 21.0               | 23.5               | 23.0 x 16.0  | MK 4   |
| 49-0710-100 | 07              | 28.0                | 23.0               | 25.5               | 25.0 x 16.0  | MK 4   |
| 49-0810-100 | 08              | 30.0                | 25.5               | 28.0               | 27.5 x 16.0  | MK 4   |
| 49-0910-100 | 09              | 33.0                | 27.0               | 30.0               | 29.4 x 20.0  | MK 4   |
| 49-1010-100 | 10              | 36.0                | 30.0               | 33.0               | 32.4 x 20.0  | MK 4   |
| 49-1110-100 | 11              | 39.0                | 33.0               | 36.0               | 35.4 x 20.0  | MK 4   |
| 49-1210-100 | 12              | 43.0                | 36.0               | 39.0               | 38.4 x 20.0  | MK 4   |
| 49-1310-100 | 13              | 47.0                | 39.5               | 43.0               | 42.4 x 24.0  | MK 4   |
| 49-1410-100 | 14              | 51.0                | 43.5               | 47.0               | 46.4 x 24.0  | MK 4   |
| 49-1510-100 | 15              | 56.0                | 47.5               | 51.0               | 50.4 x 24.0  | MK 4   |
| 49-1610-100 | 16              | 56.0                | 47.0               | 52.0               | 51.3 x 32.0  | MK 5   |
| 49-1710-100 | 17              | 62.0                | 53.0               | 58.0               | 57.3 x 32.0  | MK 5   |
| 49-1810-100 | 18              | 68.0                | 58.0               | 63.0               | 62.3 x 32.0  | MK 5   |
| 49-1910-100 | 19              | 75.0                | 64.0               | 70.0               | 69.0 x 44.0  | MK 5   |
| 49-2010-100 | 20              | 82.0                | 71.0               | 77.0               | 76.0 x 44.0  | MK 5   |
| 49-2110-100 | 21              | 94.0                | 83.0               | 89.0               | 88.0 x 44.0  | MK 5   |
| 49-2210-100 | 22              | 106.0               | 95.0               | 101.0              | 100.0 x 60.0 | MK 5   |
| 49-2310-100 | 23              | 118.0               | 107.0              | 113.0              | 112.0 x 60.0 | MK 5   |
| 49-2410-100 | 24              | 130.0               | 119.0              | 125.0              | 124.0 x 60.0 | MK 5   |
| 49-2510-100 | 25              | 142.0               | 131.0              | 137.0              | 136.0 x 72.0 | MK 5   |
| 49-2610-100 | 26              | 154.0               | 143.0              | 149.0              | 148.0 x 72.0 | MK 5   |
| 49-2710-100 | 27              | 166.0               | 155.0              | 161.0              | 160.0 x 72.0 | MK 5   |
| 49-2810-100 | 28              | 178.0               | 167.0              | 173.0              | 172.0 x 80.0 | MK 5   |

Hardened and ground

Dimensions in mm

### Grinding arbor with 1-start thread

For grinding Type 20



| Order no.   | Drill tube size | Drill tube Ø D (mm) | small fitting Ø d1 | large fitting Ø d2 | A x pitch    | Holder |
|-------------|-----------------|---------------------|--------------------|--------------------|--------------|--------|
| 29-9310-100 | 93              | 12.0                | 9.9                | 11.5               | 11.3 x 6.0   | MK 4   |
| 29-9410-100 | 94              | 13-1                | 10.2               | 11.8               | 11.6 x 6.0   | MK 4   |
| 29-9510-100 | 95              | 13-2                | 10.8               | 12.4               | 12.2 x 6.0   | MK 4   |
| 29-9610-100 | 96              | 14-1                | 11.1               | 12.7               | 12.5 x 6.0   | MK 4   |
| 29-9710-100 | 97              | 14-2                | 11.8               | 13.4               | 13.2 x 6.0   | MK 4   |
| 29-9810-100 | 98              | 15-1                | 12.1               | 13.7               | 13.5 x 6.0   | MK 4   |
| 29-9910-100 | 99              | 15-2                | 12.8               | 14.4               | 14.2 x 6.0   | MK 4   |
| 29-0110-100 | 01              | 16,5                | 13.5               | 15.5               | 15.3 x 6.0   | MK 4   |
| 29-0210-100 | 02              | 18.0                | 14.5               | 16.5               | 16.3 x 10.0  | MK 4   |
| 29-0310-100 | 03              | 20.0                | 16.0               | 19.0               | 18.5 x 10.0  | MK 4   |
| 29-0410-100 | 04              | 22.0                | 17.0               | 20.0               | 19.5 x 10.0  | MK 4   |
| 29-0510-100 | 05              | 24.0                | 19.0               | 22.0               | 21.5 x 10.0  | MK 4   |
| 29-0610-100 | 06              | 26.0                | 21.0               | 24.0               | 23.5 x 10.0  | MK 4   |
| 29-0710-100 | 07              | 28.0                | 23.0               | 26.0               | 25.5 x 10.0  | MK 4   |
| 29-0810-100 | 08              | 30.0                | 24.0               | 27.0               | 26.5 x 20.0  | MK 4   |
| 29-0910-100 | 09              | 33.0                | 27.0               | 30.0               | 29.5 x 20.0  | MK 4   |
| 29-1010-100 | 10              | 36.0                | 30.0               | 33.0               | 32.5 x 20.0  | MK 4   |
| 29-1110-100 | 11              | 39.0                | 34.0               | 37.0               | 36.5 x 20.0  | MK 4   |
| 29-1210-100 | 12              | 43.0                | 37.0               | 41.0               | 40.5 x 20.0  | MK 4   |
| 29-1310-100 | 13              | 47.0                | 40.0               | 44.0               | 43.5 x 20.0  | MK 4   |
| 29-1410-100 | 14              | 51.0                | 45.0               | 49.0               | 48.5 x 20.0  | MK 4   |
| 29-1510-100 | 15              | 56.0                | 49.0               | 53.0               | 52.5 x 20.0  | MK 4   |
| 29-1710-100 | 17              | 62.0                | 54.0               | 59.0               | 58.5 x 20.0  | MK 4   |
| 29-1810-100 | 18              | 68.0                | 60.0               | 65.0               | 64.5 x 40.0  | MK 5   |
| 29-1910-100 | 19              | 75.0                | 66.0               | 71.0               | 70.5 x 40.0  | MK 5   |
| 29-2010-100 | 20              | 82.0                | 74.0               | 79.0               | 78.5 x 40.0  | MK 5   |
| 29-2110-100 | 21              | 94.0                | 85.0               | 90.0               | 89.5 x 40.0  | MK 5   |
| 29-2210-100 | 22              | 106.0               | 97.0               | 102.0              | 101.5 x 40.0 | MK 5   |
| 29-2310-100 | 23              | 118.0               | 109.0              | 114.0              | 113.5 x 40.0 | MK 5   |
| 29-2410-100 | 24              | 130.0               | 121.0              | 126.0              | 125.5 x 40.0 | MK 5   |
| 29-2510-100 | 25              | 142.0               | 134.0              | 139.0              | 138.5 x 40.0 | MK 5   |
| 29-2610-100 | 26              | 154.0               | 145.0              | 151.0              | 150.5 x 56.0 | MK 5   |
| 29-2710-100 | 27              | 166.0               | 157.0              | 163.0              | 162.5 x 56.0 | MK 5   |
| 29-2810-100 | 28              | 178.0               | 169.0              | 175.0              | 174,5 x 56.0 | MK 5   |
| 29-2910-100 | 29              | 190.0               | 181.0              | 187.0              | 186.5 x 56.0 | MK 5   |
| 29-3010-100 | 30              | 202.0               | 193.0              | 199.0              | 198.5 x 56.0 | MK 5   |
| 29-3110-100 | 31              | 214.0               | 205.0              | 211.0              | 210.5 x 56.0 | MK 5   |
| 29-3210-100 | 32              | 226.0               | 217.0              | 223.0              | 222.5 x 56.0 | MK 5   |
| 29-3310-100 | 33              | 238.0               | 229.0              | 235.0              | 234.5 x 56.0 | MK 5   |

Hardened and ground

Dimensions in mm

## Accessories

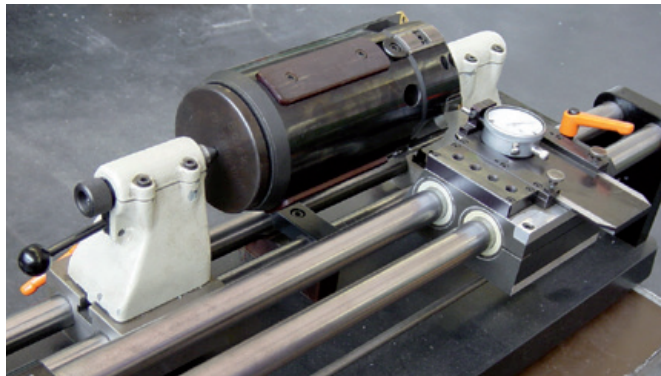
### Centre disc

for tools with 1-start thread internal

#### Centre disc cartridge

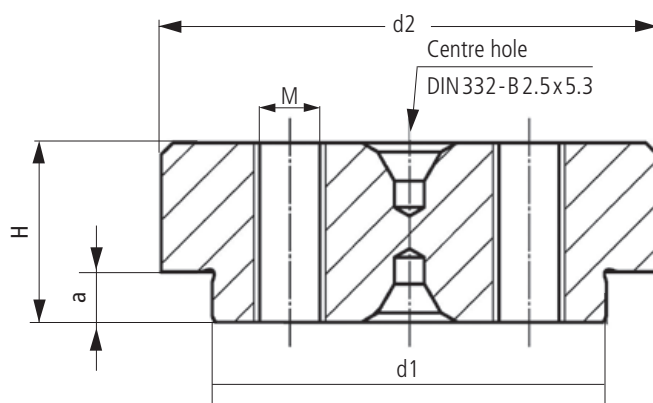


#### Example Type 36 – Installation and adjustment of cartridges



The centre disc is used to clamp the tools between centers.

With this the fibre guide pads can be reworked or the tool can be measured and adjusted between centers.

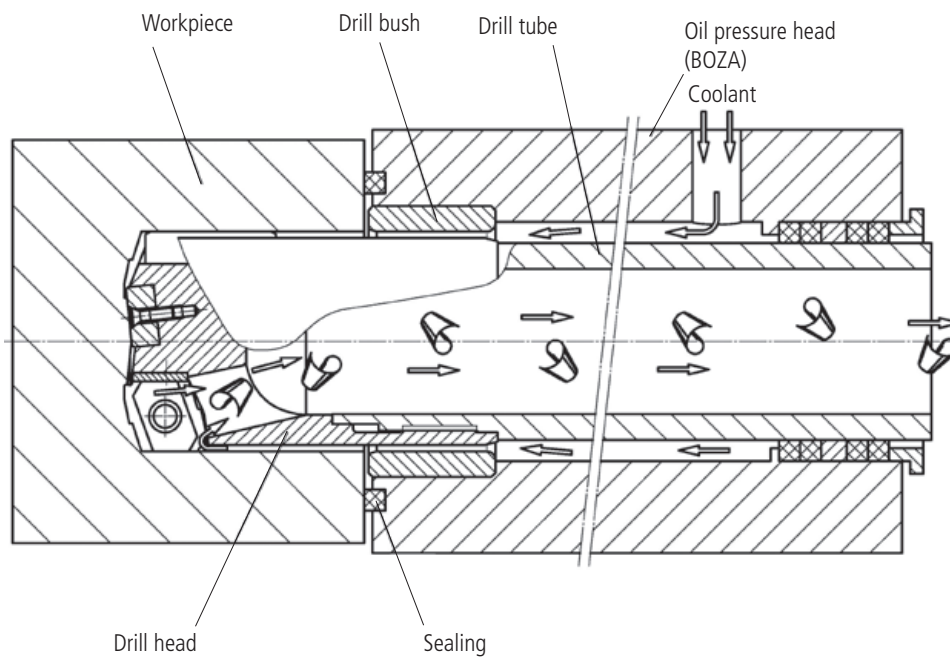


| Order no.   | Drill tube Ø | d1    | d2    | l1          | a   | H    | M           | Order no.   | Drill tube Ø | d1    | d2    | l1    | a     | H    | M  |
|-------------|--------------|-------|-------|-------------|-----|------|-------------|-------------|--------------|-------|-------|-------|-------|------|----|
| 39-1010-101 | 36.0         | 33.0  | 41.5  | 20.0        | 4.5 | 15.0 | M6          | 39-2810-101 | 178.0        | 175.0 | 190.0 | 110.0 | 4.5   | 20.0 | M8 |
| 39-1110-101 | 39.0         | 37.0  | 44.0  |             |     |      |             | 39-2910-101 | 190.0        | 187.0 | 198.0 |       |       |      |    |
| 39-1210-101 | 43.0         | 41.0  | 53.0  | 28.0        |     |      |             | 39-3010-101 | 202.0        | 199.0 | 215.0 |       |       |      |    |
| 39-1310-101 | 47.0         | 44.0  | 57.0  |             |     |      |             | 39-3110-101 | 214.0        | 211.0 | 226.0 |       |       |      |    |
| 39-1410-101 | 51.0         | 49.0  | 63.0  |             |     |      |             | 39-3210-101 | 226.0        | 223.0 | 238.0 |       |       |      |    |
| 39-1510-101 | 56.0         | 53.0  | 68.0  |             |     |      |             | 39-3310-101 | 238.0        | 235.0 | 245.0 |       |       |      |    |
| 39-1710-101 | 62.0         | 59.0  | 74.0  | 50.0        |     |      | 39-3410-101 | 250.0       | 247.0        | 260.0 | 160.0 | 11.0  |       |      |    |
| 39-1810-101 | 68.0         | 65.0  | 79.0  |             |     |      | 39-3510-101 | 262.0       | 259.0        | 270.0 |       |       |       |      |    |
| 39-1910-101 | 75.0         | 71.0  | 86.0  |             |     |      | 39-3610-101 | 274.0       | 271.0        | 280.0 |       |       |       |      |    |
| 39-2010-101 | 82.0         | 79.0  | 94.0  |             |     |      | 39-3710-101 | 286.0       | 283.0        | 3000  |       |       |       |      |    |
| 39-2110-101 | 94.0         | 90.0  | 105.0 |             |     |      | M8          | 39-3810-101 | 298.0        | 295.0 |       |       | 305.0 |      |    |
| 39-2210-101 | 106.0        | 102.0 | 111.0 |             |     |      |             | 39-3910-101 | 310.0        | 307.0 |       |       | 317.0 |      |    |
| 39-2310-101 | 118.0        | 114.0 | 129.0 | 39-4010-101 |     |      |             | 322.0       | 319.0        | 329.0 |       |       |       |      |    |
| 39-2410-101 | 130.0        | 126.0 | 141.0 | 39-4110-101 |     |      |             | 334.0       | 331.0        | 341.0 |       |       |       |      |    |
| 39-2510-101 | 142.0        | 139.0 | 154.0 | 39-4210-101 |     |      |             | 346.0       | 343.0        | 353.0 |       |       |       |      |    |
| 39-2610-101 | 154.0        | 151.0 | 166.0 |             |     |      |             |             |              |       |       |       |       |      |    |
| 39-2710-101 | 166.0        | 163.0 | 178.0 | 110.0       |     |      |             |             |              |       |       |       |       |      |    |

Dimensions in mm

## Technical appendix

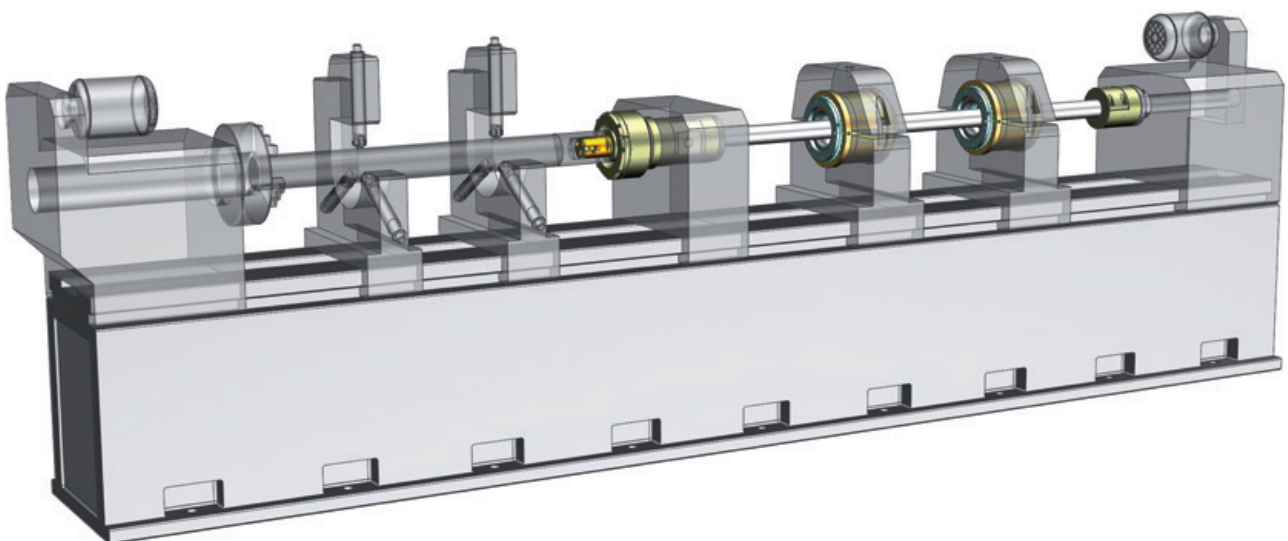
### BTA (STS) drilling process



The BTA (STS) drilling process is a deep-hole drilling method for special deep hole drilling machines with external coolant supply and inner chip removal (single tube process). To provide the coolant an oil pressure head with sealing to the workpiece is needed.

With this method drilling depths of up to  $250 \times D$  are possible. Solid drilling tools  $\varnothing 60.00 - 100.00$  mm are used up to a drilling depth of 17,000 mm. Tools for the BTA system are available in a diameter range from 7.76 mm to approx. 1,000 mm.

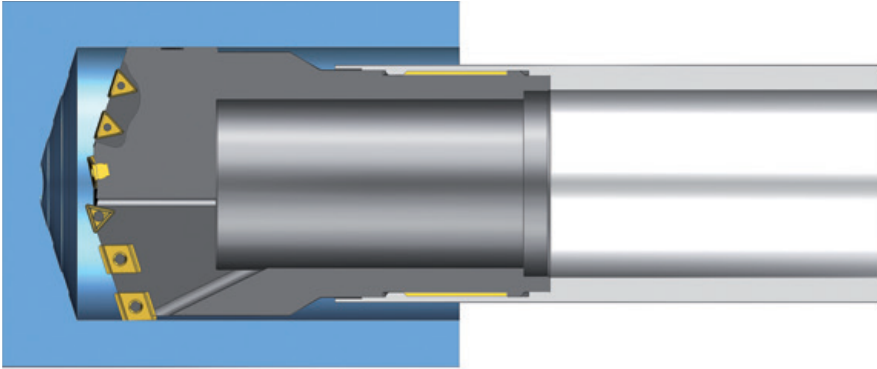
From a diameter of 16.00 mm and upwards, tools with exchangeable inserts and guide pads are used.



## Technical appendix

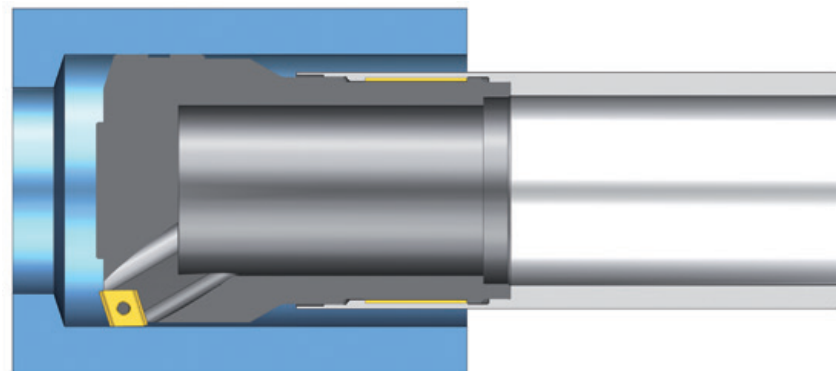
### Deep hole drilling methods

#### Solid drilling



To drill a hole into solid material. Solid drilling is the most commonly used method for drilling operations. Drill hole diameters using the BTA (STS) deep-hole drilling system range from approx. Ø 7.76 to 700.00 mm.

#### Counter-boring



Counter-boring is used for increasing the diameter of predrilled holes, cast holes (e.g. tubes and pipes) or rolled tubes and bores made by other methods. Generally, the work method counter-boring improves the hole quality.

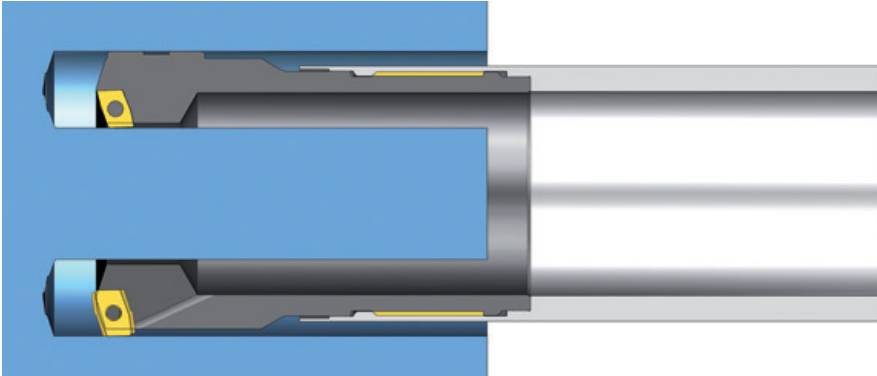
By counter-boring gradually the necessary drive power and feed force can be reduced. This is useful, when the desired drilling diameter cannot be produced in one work step because the spindle power of the machine is insufficient.

Single or multi-edged BTA tools can be used as counterboring tools.

In addition to push-boring heads, pull-boring heads are also used when highest quality is desired.

Using counter-boring tools allow an increased cutting speed, compared to solid drilling or trepanning tools.

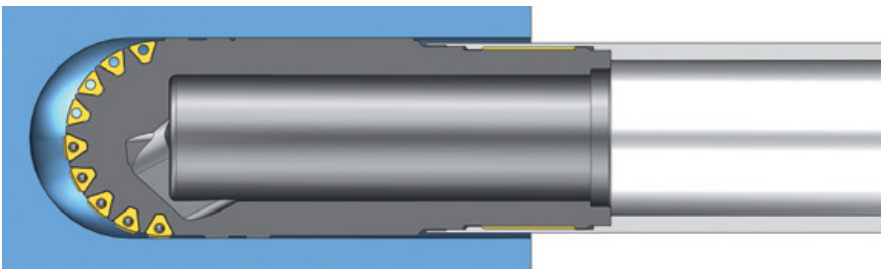
### Trepanning



With trepanning only a part of the full cross-section of a bore is cut. There are three reasons for this:

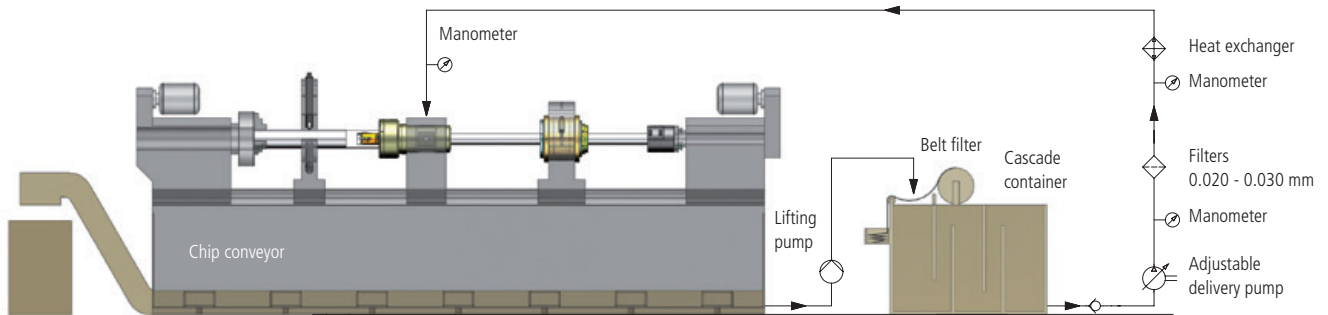
- A material sample should be taken.
- The core represents valuable material that can be processed even further (core is a “workpiece”).
- The machine’s drive power is not sufficient for a solid bore.

### Form counter-boring



Drilling contour sections that are incorporated into the tool.

### Schematic diagram of the coolant system



### Cooling lubricant system

The purpose of a cooling lubricant in a deep hole drilling system is:

- Cooling of tools.
- Discharge of heat energy generated in the drilling process.
- Reduce friction of elements involved in cutting and guiding.
- Extract the chips.

### Tank volume/tank size

- Tanks should be designed to have a volume approximately equivalent to ten times the maximum pump output.
- Baffles arranged in cascade form produce better settling of the suspended particles and air bubbles contained in the filtered coolant.

### The tank is heated by

90% of the operating energy for the drill is converted into heat energy.

95% of the pumping energy of all pressure and circulation pumps is converted into heat energy.

The frictional energy in the lines/fans/filters is converted into heat energy.

All this energy is absorbed by the cooling lubricant.

### The tank is cooled by

The tank gives off warmth to its environment as soon as the temperature of the cooling lubricant exceeds that of the environment. If the tank is not free-standing, heat transfer is strongly reduced.

The workpiece is normally at ambient temperature and thus has a cooling effect.

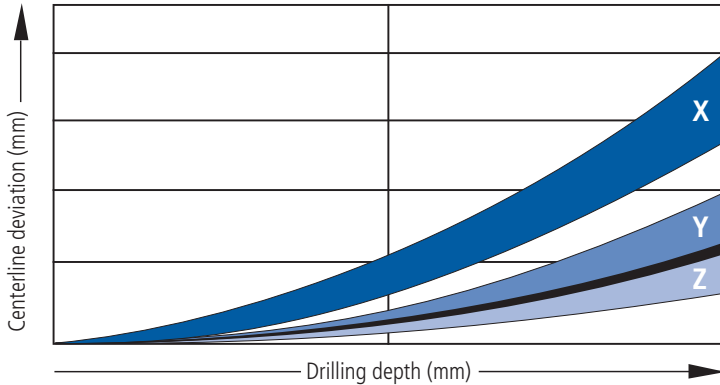
## Centre-line deviation

Centre-line deviation means the deviation of the drilling axis from the ideal axis. The centre-line deviation does not follow a straight line; the size of the deviation depends on many factors and cannot be predicted systematically. Guidelines are according to VDI 3210 Sheet 1/Part 1 Page 5.

### Decisive influencing variables:

- Working method
- Drilling process
- Machine geometry
- Homogeneity of workpiece material
- Workpiece orientation
- Tool adjustment
- Cutting values
- Wear and tear of tools and inserts

### Graphic representation: Working method and drilling process



### Working method

- X** Only tool rotating
- Y** Tool and workpiece rotating (counter rotation)
- Z** Only workpiece rotating

### Drilling process

- X** Solid drilling
- Y** Counter-boring
- Z** Pull-boring

(Please do not combine working method and drilling process.)

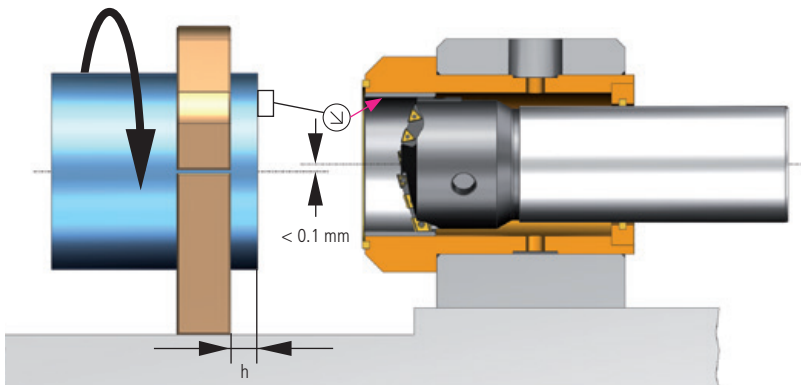
### BOZA with oil pressure head



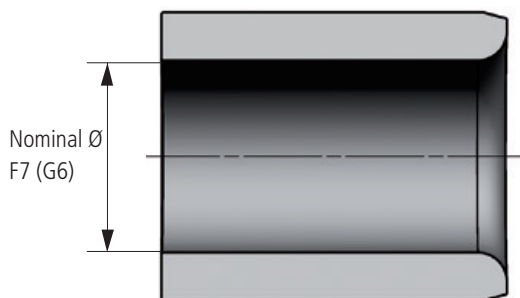
The steady rest of the tool should be as close as possible to BOZA (dimension "h"). This is the only way to achieve that the radial forces that transfer into the work-piece when beginning to drill are properly diverted into the machine bed.

Precise alignment of the axis of rotation between workpiece and drill bush is an absolute requirement in order to prevent damage to the tool and achieve a high bore quality.

### Work-piece alignment and stability when beginning to drill (tool-face sealing)



### Drill bushes and tolerances



The drill bush guides the tool during the beginning of the boring process.

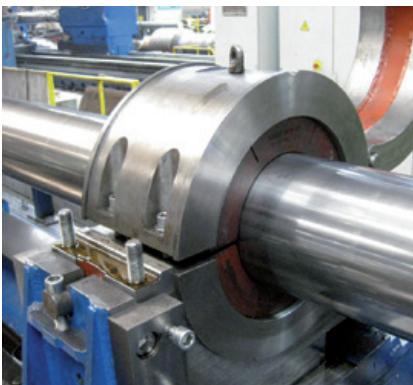
The quality of the bore depends on the drill bush tolerance.

For standard applications we recommend drill bushes with a (nominal Ø) tolerance of F7. For bores with highest requirements a tolerance of G6.

### Vibration dampers



Rotating and non-rotating tools

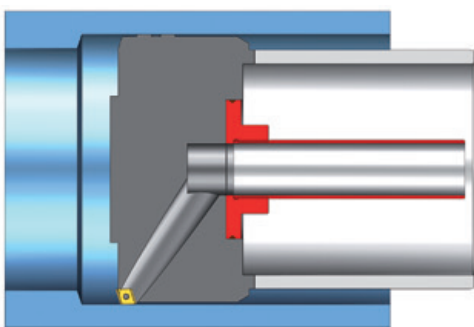


Non-rotating tools

The job of the vibration damper is both to support the drill tube and also to reduce the longitudinal and torsional vibrations occurring during the drilling process. By reducing the vibration amplitude the quality of the hole surface is improved and cutting wear is reduced.

The botek vibration damper works purely mechanically and can be used for both rotating and non-rotating applications. A pre-loaded spring presses the damping cone with constant force against the counter-bearing and balances any slight diameter differences the continuous drill tube might have. The damper is also used for **enclosed machines** or machines which are not accessible during drilling. If the vibration damper is not set correctly, it must be readjusted during the drilling process. Also applied for **pull-boring**. Since with pull-boring the tensile forces are low and the feed rate is small, the vibrations are reduced very well by the pressurized counter-bearing. The spring assembly can be fully loaded for this application.

### Chip tube



With long drill tubes in particular and large drill tube diameters it is advantageous to use a chip tube.

The flow velocity of the cooling lubricant is often not sufficient to divert chips safely from the process. Usually these chips build up in the drill tube just behind the drill head. By using a chip tube the flow velocity is increased enough so that chips can be flushed out safely. The chip tube cannot be used in trepanning operations. Please contact us for further information in this regard.

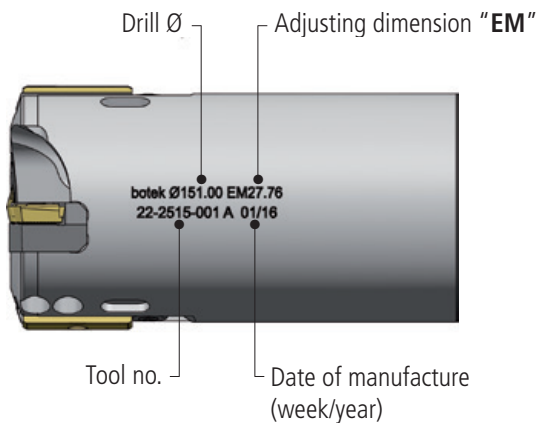
botek counter-boring tools diameter 162 mm and upwards are generally equipped with a chip tube connection.

## Technical appendix

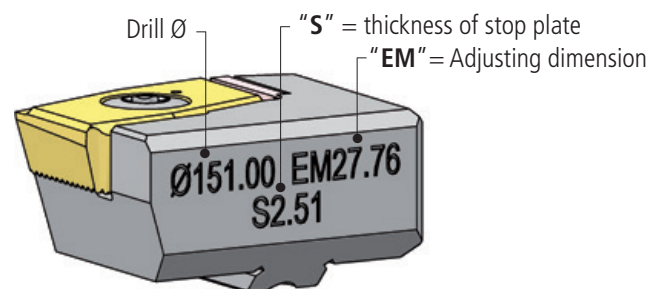
### Adjusting tools

When they leave the factory, tools are preset to the diameter stated in the order, and all **important** data (drill diameter, setting gauge and thickness of the stop plate) are engraved on the body or on the cartridge.

Example: Labelling - drill head



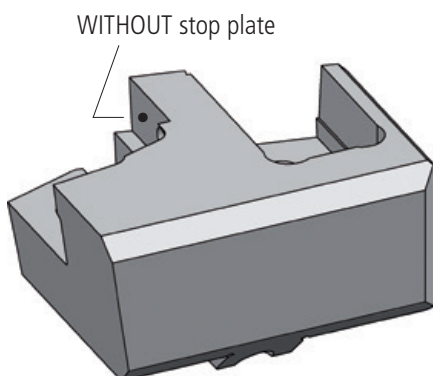
Example: Labelling - cartridge peripheral insert



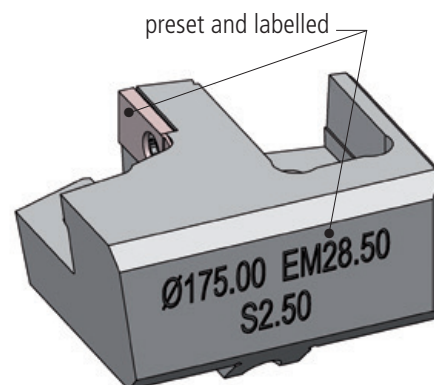
### Cartridges - replacement orders

When ordering replacement cartridges, always quote the information engraved on the body. Preset cartridges will then be supplied (please quote adjusting dimension "EM" and drill-Ø).

Example: If cartridges are ordered **without** stating the setting gauge, they will be supplied **without** fittings.

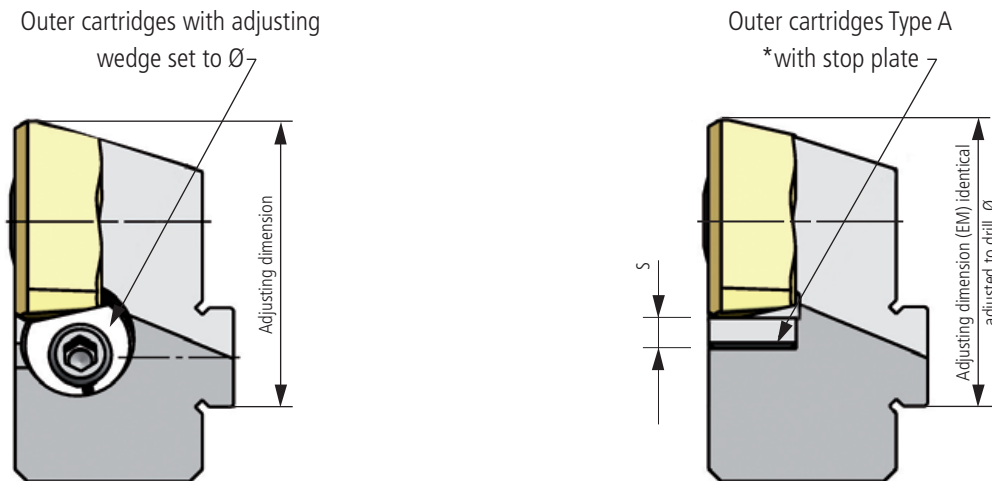


Example: If cartridges are ordered **stating** the "EM" size, they will be supplied **preset** and **labelled**.

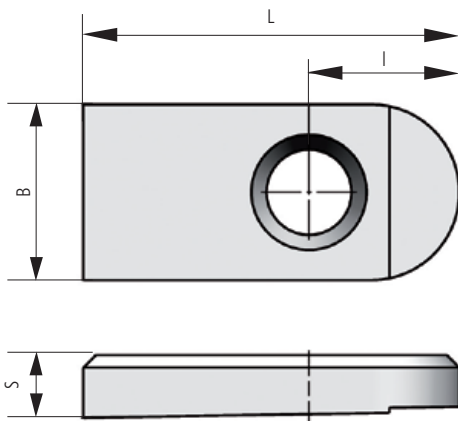


## Ordering information for type A cartridges

The following must be ensured when changing the outer cartridge from the version with adjusting wedge to the Type A design with stop plate (this also applies to exchange/replacement of Type A cartridges).



- When changing from cartridge with adjusting wedge to type A cartridges with stop plate, please quote order number and in addition the adjusting dimension ("EM") (take size from cartridge with adjusting wedge). The thickness of the stop plate (size "S") can thereby be determined and suitably supplied.
- When a drill head with type A outer cartridge is supplied, the adjusting dimension ("EM") for the drill head diameter supplied is engraved on the drill head and on the cartridge.
- When ordering a type A cartridge, quote adjusting dimensions ("EM") and drill Ø.
- Stop plates are available in thickness steps (dimension "S") of 0.01 mm. The respective thickness is engraved on the stop plate. For available S dimensions see VU-01-0056-B.
- It is advisable to store a certain assortment of these stop plates so that any diameter adjustments required can be made without delay.

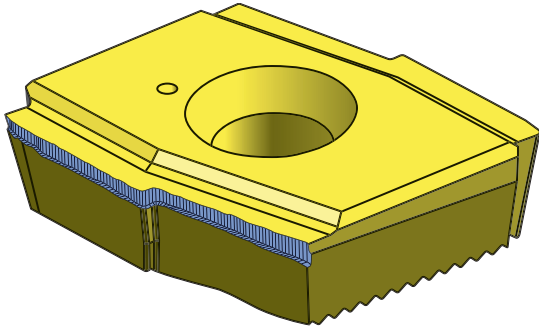


- \* Stop plates are available in thickness steps (dimension "S") of 0.01 mm. For range, see table. The respective thickness is engraved on the part. When reordering, quote the order number and in addition the dimension "S".

| Order no.        | S           | B   | L    | I   | d   | Screw       |            |
|------------------|-------------|-----|------|-----|-----|-------------|------------|
|                  |             |     |      |     |     | Order No.   | Dimensions |
| 01-2050-610-S... | 1.30 - 2.00 | 5.0 | 11.0 | 4.8 | 2.8 | 01-0200-860 | M2.5 x 4.3 |
| 01-2400-610-S... | 1.80 - 2.50 | 6.0 | 13.5 | 6.0 | 2.7 | 21-0200-860 | M2.5 x 4.7 |
| 01-3750-610-S... | 2.20 - 3.00 | 7.0 | 15.0 | 6.0 | 3.4 | 21-0600-860 | M3.0 x 6.7 |
| Dimensions in mm |             |     |      |     |     |             |            |

### Types of wear

#### Flank wear

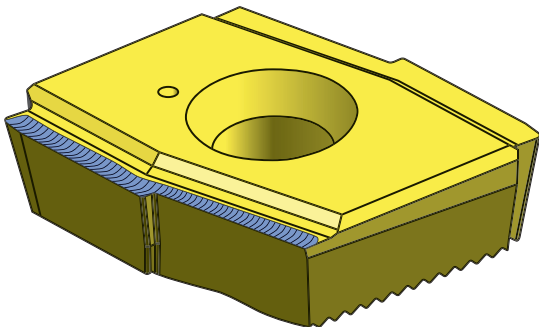


Abrasion of the cutting material almost parallel to the direction of cut because of the sliding abrasion at the cutting surface. Flank wear is normal wear that increases constantly over the operating lifetime.

To extend lifetime:

- use cutting material more resistant to wear
- lower cutting speed

#### Crater wear

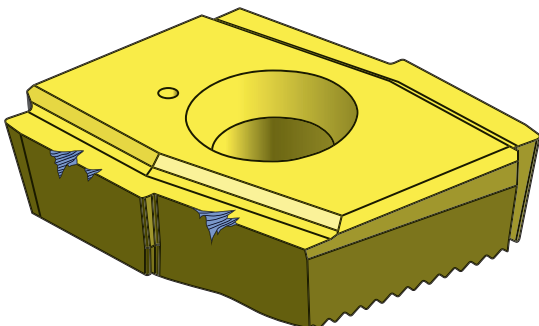


Erosion of the cutting material in the form of depressions behind the cutting edge caused by sliding wear from the chips exiting. Crater wear is normal wear that increases constantly over the operating lifetime.

To extend lifetime:

- suitable chip pilot stage
- greater cutting material strength
- alternative coating

#### Notch wear

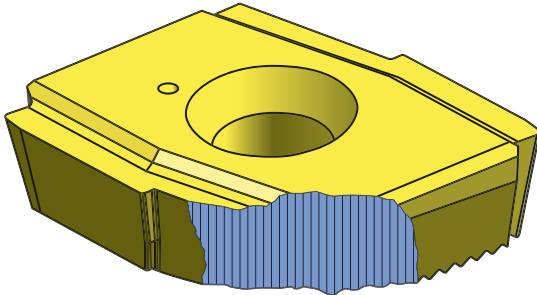


Erosion of the cutting material in the form of notches. Frequently occurs with counter-boring and is caused by a hard surface layer.

To extend lifetime:

- greater cutting material strength
- alternative coating
- regular exchange of indexable inserts

## Breakage



Forced breakage of the cutting material in the cutting plane caused by chip congestion, chip breakers too short, drill bush play and vibrations.

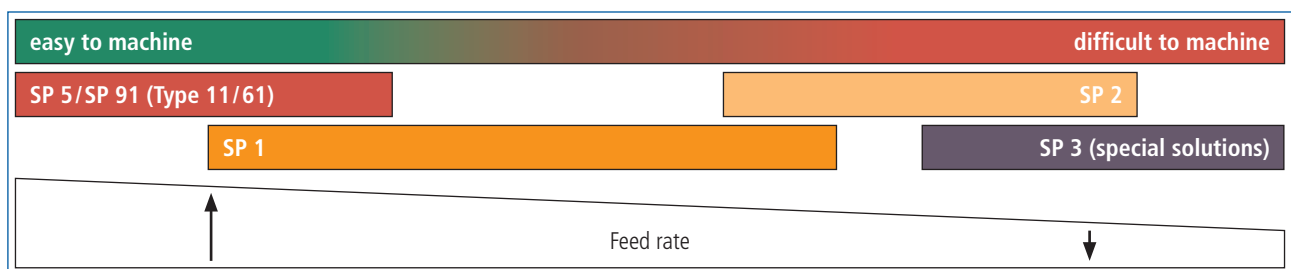
Remedial action:

- Chip congestion: Shorter chip breakers  
Adjust suitable quantity of cooling lubricant
- Chip breaker too short: Use longer chip breaker
- Drill bush play: Drill bush nominal dimension F7
- Vibrations: Unsupported drill tube length too long  
Setting of vibration damper  
Carbide selection

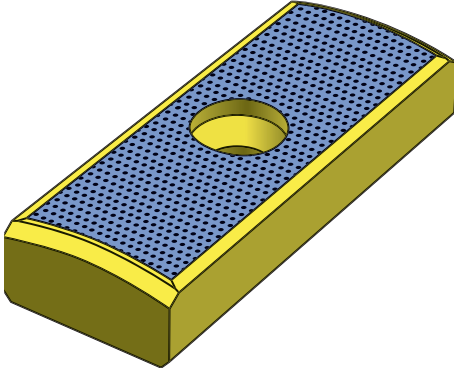
## Chip breaker

1. The chip breaker has a decisive part to play with the chip formation.
2. To obtain trouble-free chip flow along with optimum tool life, it is essential to aim for the most ideal chip formation possible.
3. The chips should be broken just short enough to ensure that there is no chip congestion in the flute of the drill.
4. Excessively short, crushed chips place strain on the cutting edges and lead to premature wear and will destroy the cutting edge.
5. For processing commonly used materials, indexable inserts are available from stock with chip breakers in accordance with model SP 1, SP 5 or model SP 2.

## Materials to be processed



Cobalt leaching

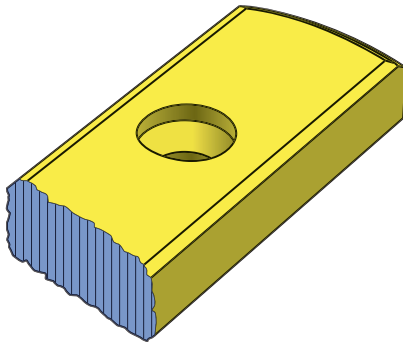


Material fatigue due to unsuitable lubricant

Remedial action:

- Use deep hole drilling oil.
- Use emulsion with high EP additive content.

Breakage

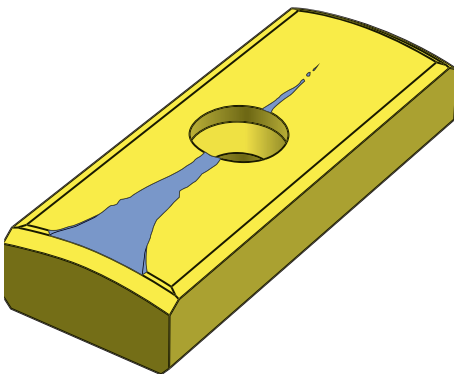


Overload breakage of the guide pad caused by chip congestion or rifling

Remedial action:

- |                   |                  |
|-------------------|------------------|
| - Chip congestion | Optimize process |
| - Rifling         | Optimize process |

Material abrasion



Surface abrasion of hard metal. This appearance is a normal wear, which increases continuously with the duration of use.

Remedial action:

- Observe max. tool life.
- Remove dirt particles from cooling lubricant (scale acts like emery).
- Increase lubricating effect of cooling lubricant (EP additives).

## Changing the drill head diameter

By replacing the accessories the diameter can be changed.

Depending on the type of tool stop plate, guide pads, shims and the cartridge of the peripheral insert must be replaced.

- Stop plate - Increments of 0.01 mm
- Cartridges - Please choose according to information given in our catalogues
- Guide pads - Are produced on diameter, alternatively shims can be supplied in thickness of 0.025; 0.05; 0.1 and 0.25 mm.  
Other dimensions must be sourced in locally.

**When re-ordering accessories please always state technical details.**

- Drill heads without cartridge (e.g. Type 60) → dimension "S" and drill Ø
- Drill heads with cartridge (e.g. Type 43) → adjusting dimension "EM" and drill Ø

## Examination

**Please check the correct setting after every diameter change by using the botek head setting gauge.**



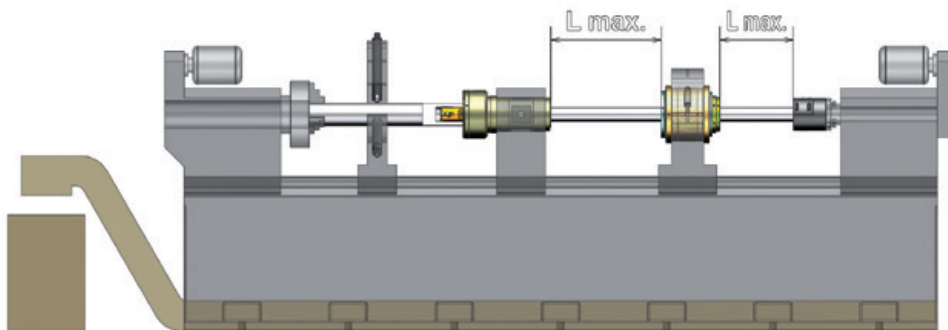
botek setting gauge, measurement range 100 - 600 mm

## Cutting tool data according to ISO 13399

| Short name | Preferred Name                     |
|------------|------------------------------------|
| APMX       | Depth of cut maximum               |
| BD         | Body diameter                      |
| DC         | Cutting diameter                   |
| DCON       | Connection diameter                |
| DCONWS     | Connection diameter workpiece side |
| LCF        | Length chip flute                  |
| LCON       | Connection length                  |
| LCONWS     | Connection length workpiece side   |
| LS         | Shank length                       |
| LSC        | Clamping length                    |
| LU         | Usable length (max. recommended)   |
| OAL        | Overall length                     |
| PL         | Point length                       |

## Application notes

1. **Before using the drills make sure the machine has the necessary equipment for proper deep hole drilling.**  
The machine should have suitable safety guarding for protection from cutting chips and coolant for operator.  
Check with machine builder!
2. **Improper use or handling of deep hole drilling tools can cause serious injuries,** e.g. skin cuts from the cutting edge.
3. **Tool support: Unsupported drill length** should never exceed the dimensions as shown on table.  
If the unsupported drill length is exceeded the drill might cause injury.



| Drill tube-Ø | Maximum unsupported tube length |
|--------------|---------------------------------|
| mm           | mm                              |
| 11           | 880                             |
| 12           | 960                             |
| 13           | 1040                            |
| 14           | 1120                            |
| 16           | 1360                            |
| 18 - 20      | 1530                            |
| 22 - 24      | 1760                            |
| 26 - 28      | 1950                            |
| 30 - 33      | 2100                            |
| 36 - 39      | 2340                            |
| 43 - 47      | 2580                            |
| 51 - 56      | 2703                            |
| 62 - 75      | 3100                            |
| 82 - 94      | 3690                            |
| 106 - 130    | 3922                            |
| 142 - 178    | 4544                            |
| 190 - 226    | 5130                            |
| 238 - 274    | 5474                            |
| 286 - 334    | 6006                            |

The values given in the table (L max.) are guide values for a maximum possible unsupported drill tube length in order to avoid risk of injury. However, the actual maximum possible unsupported drill tube length for a safe and reliable function of the drilling process can vary depending on the drilling application and the drilling process conditions.

We generally recommend the use of a vibration damper for unsupported drill tube lengths from 50% of the guide values (L max.) specified here.

If several vibration dampers are used, the first vibration damper should be positioned as close as possible behind the pressure head (BOZA).

4. Grinding of carbide produces dust (cobalt etc.) that may be potentially hazardous.  
Use adequate ventilation and safety glasses during grinding.
5. **Consequences of not following** our application notes 1-4.

**Please note that all application notes and values contained herein are intended as guidelines only.  
We do not accept any liability for damages caused by improper handling of botek deep hole  
drilling tools, operating errors, unsuitable machinery or misuse while using our tools!**

Do you have any further questions? Please call us on **T +49 7123 3808-0**. We will be pleased to offer you advice.

#### ISO 13399

Length specifications and tool data according to ISO 13399.



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