Online Information

www.heule.com/en/drilling-and-chamfering-tool/vex

VEX

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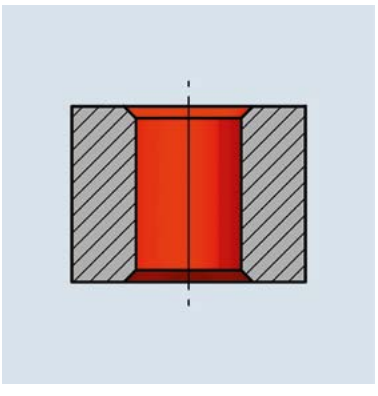
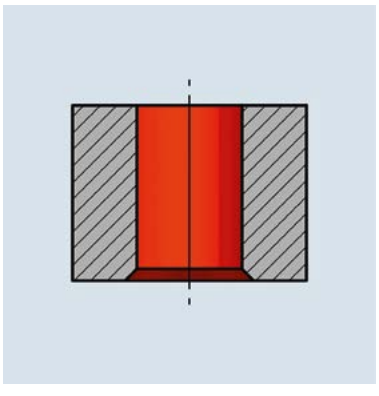
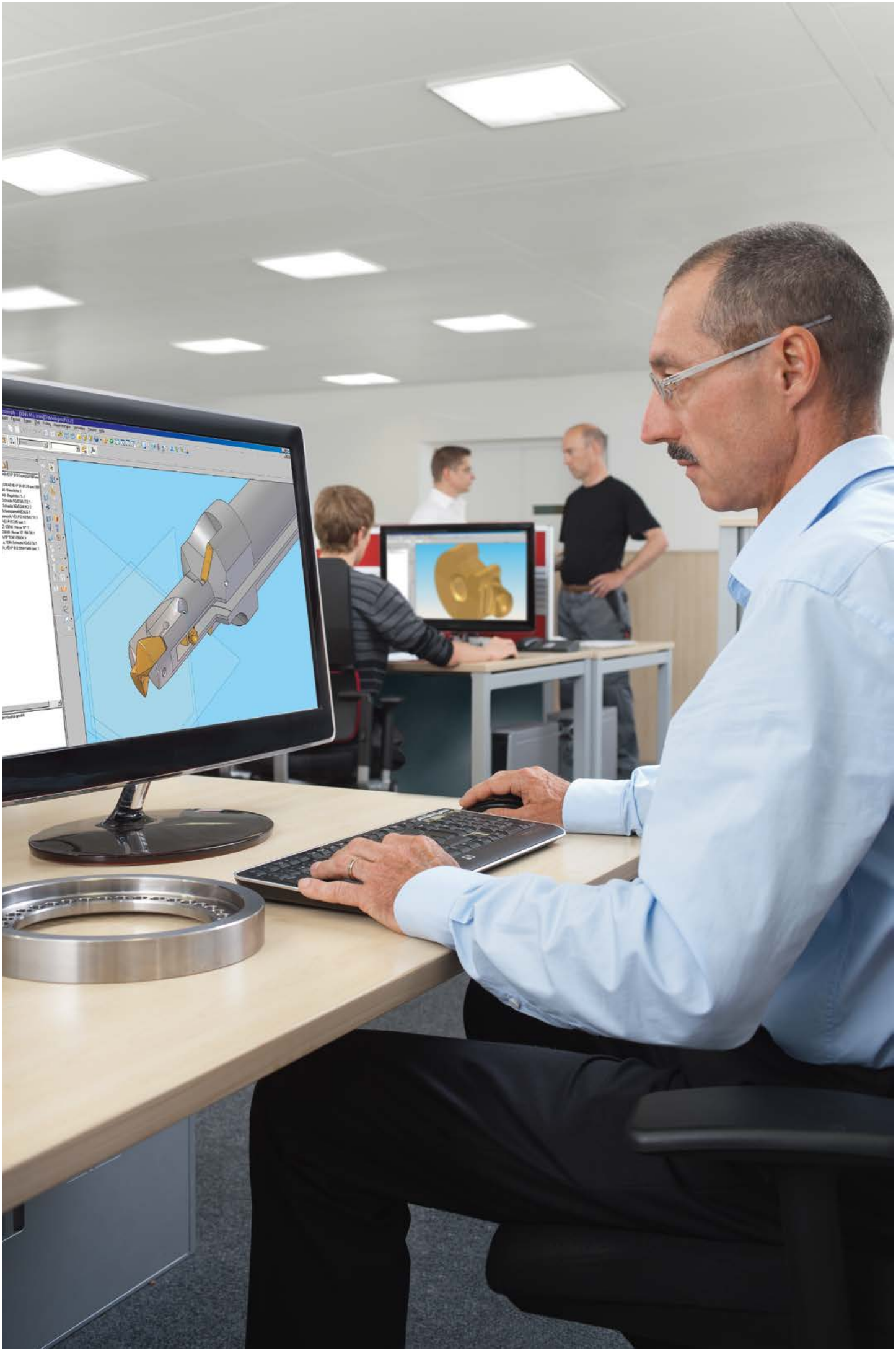
HEULE
PRECISION TOOLS

VEX

Efficient combination of drilling with front and back chamfering in one operation.





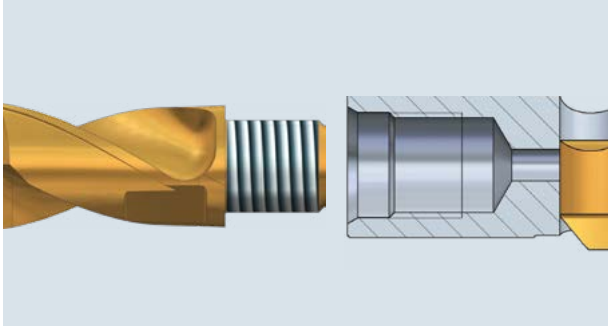


VEX – The combined Drilling and Chamfering Tool

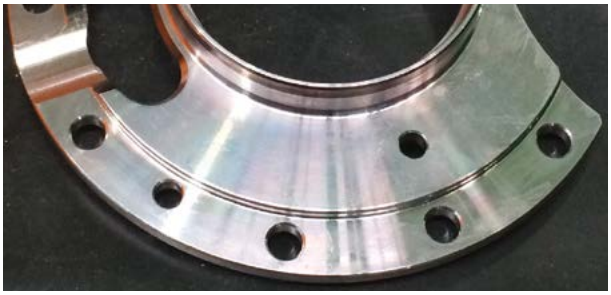
Efficient combination of drilling with front and back chamfering in one single pass for bore ranges of Ø5.0 mm - Ø11.49 mm.

VEX revolutionizes the drilling operation by combining the HEULE drill and chamfer technology into ***ONE*** **O**PERATION. One single pass and the bore is complete including the chamfer on both bore edges without a tool change or turning the workpiece. Both drill and chamfering blade are made of coated carbide and very easy to be replaced. VEX offers all you need for efficient production.

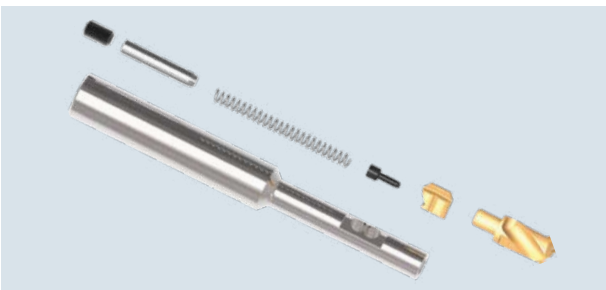
Characteristics and Advantages



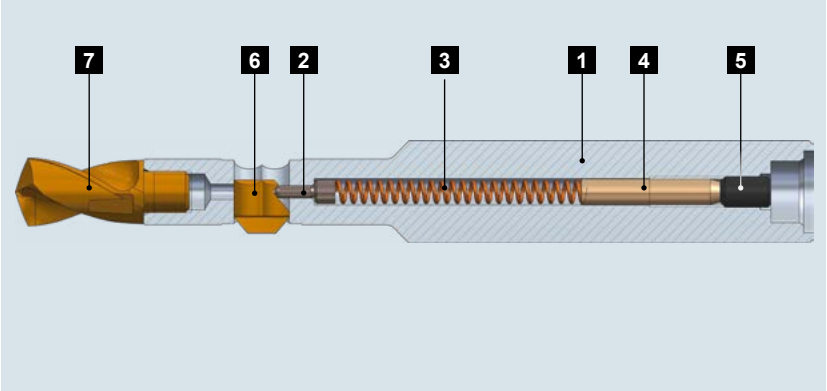
- Reduction of process times by performing two machining operations in ***ONE*** OPERATION.
- Easy-to-exchange carbide drill inserts with material-specific coatings, with or without inner coolant.



- For bores from diameter Ø5.0 mm to Ø11.5 mm and bore depths up to 2 times bore diameter.
- Manually exchangeable carbide chamfering blades with material-specific coatings.



- Short set-up and idle times due to easy handling.

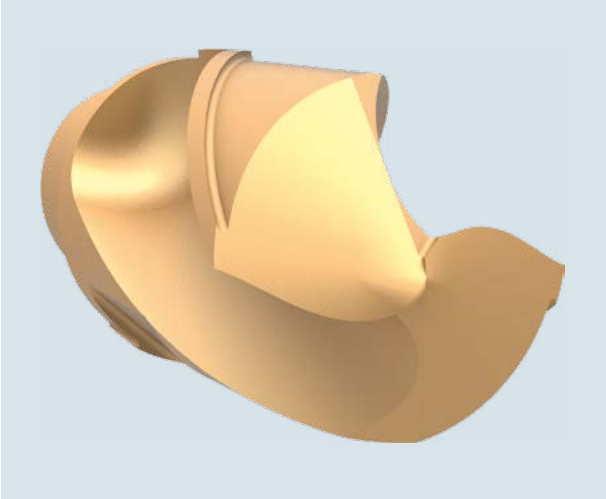


1 Tool body
2 Control bolt
3 Spring
4 Distance pin
5 Set screw
6 SNAP blade
7 Drill insert

The **VEX Combi-Tool** unifies a replaceable high performance twist drill with our proven SNAP deburring system. (See description of our SNAP system on page 266).

With this system, it is possible to combine drilling with front and back chamfering in one single operation.

The VEX twist drill incorporates the VEX self-centering high performance cutting geometry. The drill can be re-ground once and re-coated, ensuring best cost-effectiveness.



The **VEX twist drill** is a replaceable high performance drill that is available with or without through coolant, manufactured from high quality solid carbide in different coatings.

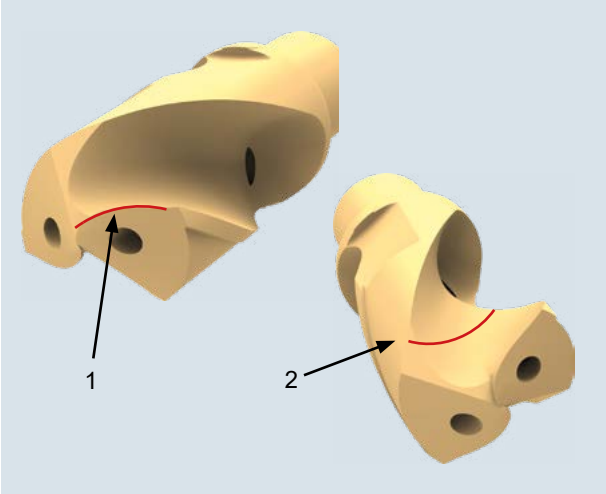
Internal coolant holes ensure that the coolant is delivered directly onto the end flank and therefore directly into the bore hole (see top of page 247).

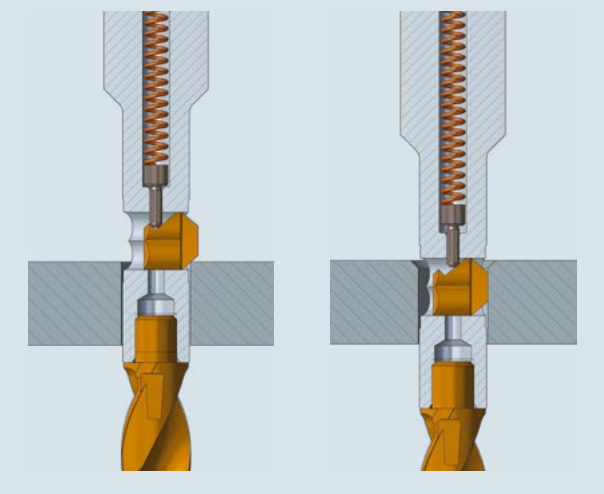
The specially developed connecting system ensures robust and accurate connection with the tool body, facilitates good transmission of power and also allows quick and easy replacement of the VEX twist drill.

Standard VEX tools are available for a range of bores from Ø5.0 mm to Ø11.49 mm with bore depths 1xd and 2xd. VEX drill inserts are available from Ø5.0 mm in steps of 0.1 mm. Intermediate sizes and other dimensions on request.

The chamfer blades correspond to the SNAP5 Series. They are available from Ø5.5x90° in steps of 0.5 mm, forward and backward cutting or backward-cutting only. Other dimensions available on request.

Function Principle

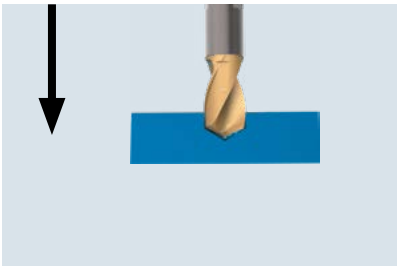




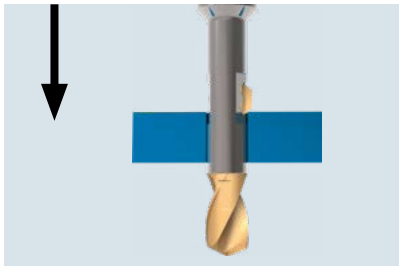
The patented VEX cutting geometry guarantees a high drilling performance with short chips. Due to the convex cutting edge (1), which merges into a concave chip angle (2) short chips are guaranteed even when machining long chipping material. A large chip channel also optimizes swarf evacuation.

The SNAP chamfering blade is held by a spring-loaded control bolt in the tool body allowing it to move. The specially-ground SNAP blade for front and back or only back-cutting produces the required chamfer in ***ONE*** **O**PERATION. As soon as the defined chamfer thickness has been achieved, the SNAP radially enters the tool body. The chamfer thickness and angle are geometrically defined on the SNAP blade and can only be modified by inserting a different SNAP blade.

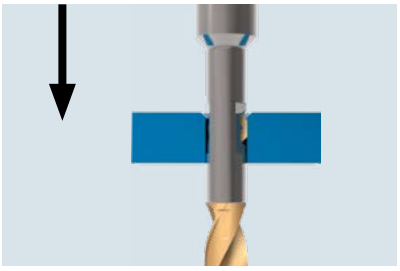
Process Steps Description



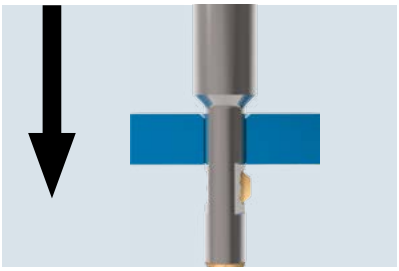
To do the drilling work, the tool is equipped with a screw-on high-performance helical drill bit.



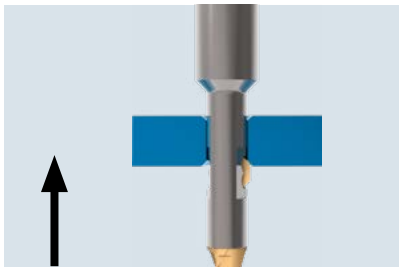
Drilling is followed by front and back chamfering using the integrated SNAP chamfering system. The specially ground SNAP blade for front and back or only back cutting produces the required chamfer.



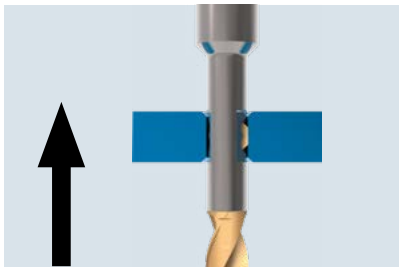
As soon as the defined chamfer thickness has been achieved, the SNAP radially enters the tool body.



When it exits the bore, the SNAP blade is returned by the spring-loaded control bolt to the initial position.



Without stopping the spindle or changing the sense of rotation, the tool produces the back chamfer on its way back.

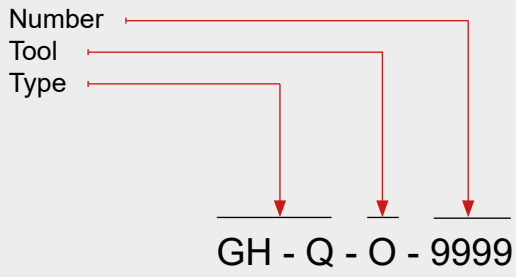


As soon as the back chamfer is completed, the tool can exit the workpiece in rapid traverse.

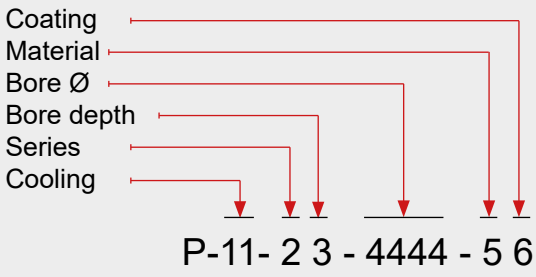
VEX Range Summary

Series	Bore range	Bore depth 1 x d	Bore depth 2 x d	Chamfer max.
B	Ø5.00 – Ø5.49 mm	5.5 mm	11.0 mm	Ø7.0 mm
	Ø5.50 – Ø5.99 mm	6.0 mm	12.0 mm	Ø7.5 mm
C	Ø6.00 – Ø6.49 mm	6.5 mm	13.0 mm	Ø8.0 mm
	Ø6.50 – Ø6.99 mm	7.0 mm	14.0 mm	Ø8.5 mm
D	Ø7.00 – Ø7.49 mm	7.5 mm	15.0 mm	Ø9.0 mm
	Ø7.50 – Ø7.99 mm	8.0 mm	16.0 mm	Ø9.5 mm
	Ø8.00 – Ø8.49 mm	8.5 mm	17.0 mm	Ø10.0 mm
E	Ø8.50 – Ø8.99 mm	9.0 mm	18.0 mm	Ø10.5 mm
	Ø9.00 – Ø9.49 mm	9.5 mm	19.0 mm	Ø11.0 mm
	Ø9.50 – Ø9.99 mm	10.0 mm	20.0 mm	Ø11.5 mm
	Ø10.00 – Ø10.49 mm	10.5 mm	21.0 mm	Ø12.0 mm
F	Ø10.50 – Ø10.99 mm	11.0 mm	22.0 mm	Ø12.5 mm
	Ø11.00 – Ø11.49 mm	11.5 mm	23.0 mm	Ø13.0 mm
	Ø 11.50 mm and larger upon request			

Part No.: Tool



Part No.: Helical Drill Bit



Tool type
Within the VEX tool range there are different tool sizes available. The tool types B / C / D / E / F are divided in so-called Series and show the partition of the tool sizes to the bore-Ø.

Tool size
The tool size is defined by the bore-Ø. Tool-Ø, bore-Ø and chamfer-Ø can be looked up in the tables.

Bore depth
The required bore depth defines the selection of the twist drill insert. VEX offers the possibility of 1xd and 2xd. This means that if the required bore depth exceeds the bore diameter by up to 100% maximum the 2xd-drill insert is the right choice.

Drill bits with internal coolant
Helical drill bits with internal coolant are available from Ø6.0 mm on only (please refer to page 252 and 256).

Clamping system
As standard, all tool will be manufactured with a cylindrical shank. Weldon / Whistle Notch clamping systems can be ordered upon request - but are not available from stock.
- HB = Weldon
- HE = Whistle Notch

- Example: GH-Q-O-4055-HB

11 Cooling

Without internal cool.	S (from Ø5.0 mm)
With internal coolant	SK (from Ø6.0 mm)

2 Series

Bore range Ø d	Series
5.00 – 5.99	B
6.00 – 6.99	C
7.00 – 8.49	D
8.50 – 10.49	E
10.50 – 11.49	F

3 Bore depth T

1 x d	2
2 x d	4

4444 Bore diameter d

Please insert the bore diameter here. Example: Ø 9.50 = 0950 standard per 0.1 mm

5 Cutting material

Carbide	1

6 Coating[1]

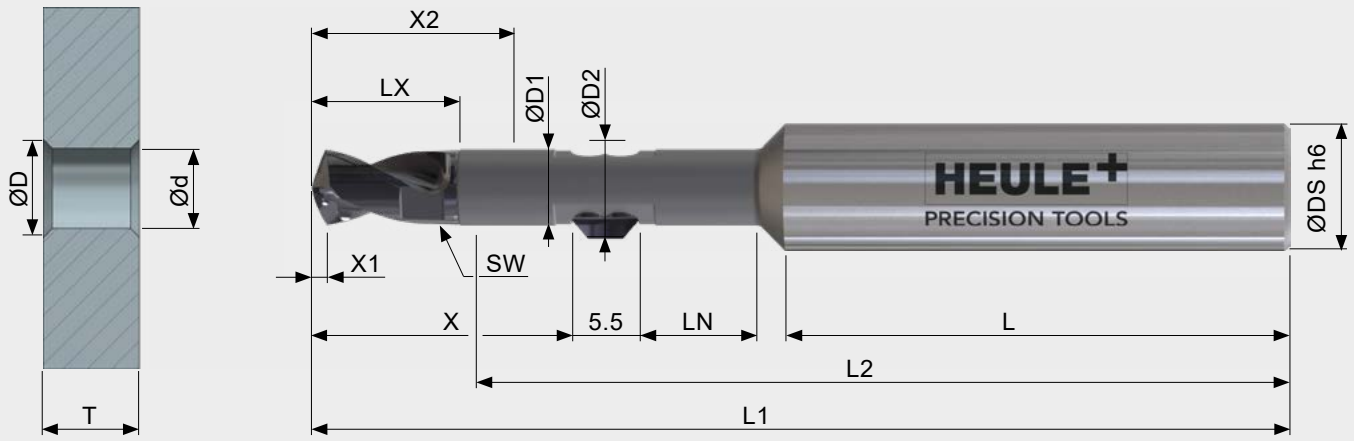
Coating for alloyed steel, titanium and Inconel	A
Coating for aluminium alloys only	D

[1] Alternative coatings upon request

Order example:

Material:	Steel
Bore Ø:	9.5 mm
Coating	A
Bore depth T	9.5 mm (1 x d)
Solution:	
Part Number:	**P-S-E2-0950-1A**

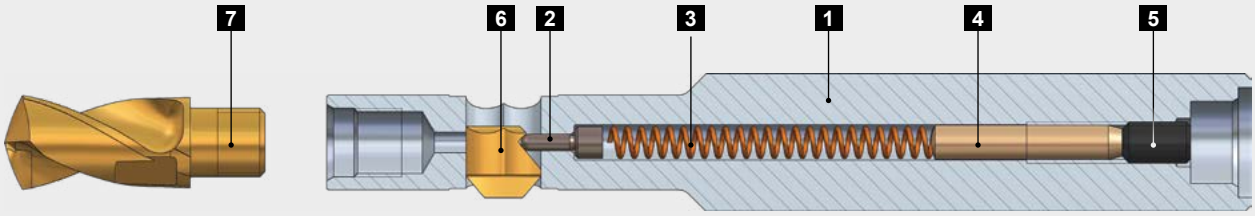
VEX Combi Ø5.0 to 11.0 mm without Internal Coolant – Bore Depth 1 x d



Tool Table

Bore range Ød	Bore depth T	Series	ØD	ØD1	ØD2	ØDS	L	L1	L2	LN	X	X1	Tool without Drill Bit without Blade Part No.
5.00-5.49	5.5	B	Chamfer-Ø D max. = Bore-Ø d min. + 2.0 mm	4.9	ØD2 = ØD + 0.6 mm	8.0	36.0	70.5	60.3	8.1	18.9	1.0	GH-Q-O-4000
5.50-5.99	6.0	B		5.4		8.0	36.0	71.6	60.5	8.6	19.8	1.1	GH-Q-O-4001
6.00-6.49	6.5	C		5.9		10.0	40.0	77.7	66.0	9.1	20.6	1.2	GH-Q-O-4002
6.50-6.99	7.0	C		6.4		10.0	40.0	78.9	66.2	9.6	21.6	1.3	GH-Q-O-4003
7.00-7.49	7.5	D		6.9		10.0	40.0	81.4	67.8	10.1	23.8	1.4	GH-Q-O-4004
7.50-7.99	8.0	D		7.4		10.0	40.0	82.4	68.0	10.6	24.6	1.5	GH-Q-O-4005
8.00-8.49	8.5	D		7.9		12.0	45.0	89.5	74.3	11.1	25.4	1.6	GH-Q-O-4006
8.50-8.99	9.0	E		8.4		12.0	45.0	90.9	74.8	11.6	26.6	1.7	GH-Q-O-4007
9.00-9.49	9.5	E		8.9		12.0	45.0	91.9	75.0	12.1	27.4	1.8	GH-Q-O-4008
9.50-9.99	10.0	E		9.4		12.0	45.0	93.1	75.3	12.6	28.3	1.9	GH-Q-O-4009
10.00-10.49	10.5	E		9.9		14.0	45.0	95.1	76.5	13.1	29.1	1.9	GH-Q-O-4010
10.50-10.99	11.0	F		10.4		14.0	45.0	96.4	77.3	13.6	30.1	2.1	GH-Q-O-4011
11.00-11.49	11.5	F		10.9		14.0	45.0	97.4	77.5	14.1	30.9	2.1	GH-Q-O-4012

ORDERING INFORMATION:
For tools and tool bodies with Weldon (-HB) or Whistle-Notch-Shank (-HE), please add -HB or -HE at the end of the part number (Order example: GH-Q-O-4000-HB).



Spare Parts

Pos.	Description	Part No.
1	Tool body	see page 264
2	Control bolt Ø1.2	GH-Q-E-0008
3	Spring Ø2.35xØ0.35x30.0	GH-H-F-0019
4	Distance pin Bore range 5.00 - 5.99 Distance pin Bore range 6.00 - 7.99 Distance pin Bore range 8.00 - 11.49	GH-Q-E-0052 GH-Q-E-0043 GH-Q-E-0048
5	Set screw M3x5.0 DIN913 Wrench for Pos. 5[1]	GH-H-S-0127 GH-H-S-2101
6	SNAP chamfer blade	see page 268
7	VEX helical drill bit Torque spanner for Pos. 7[1]	see below see page 265

[1)] Fork wrench for Pos. 5 and Pos. 7 to be ordered separately.

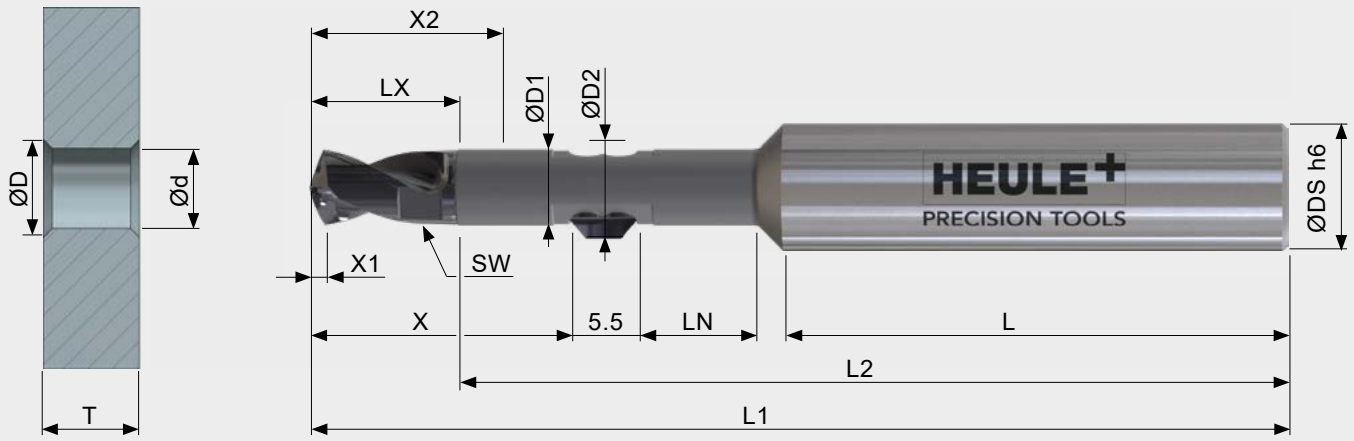
Helical Drill Bit

Dimension Table								Helical Drill Bit
Bore range Ød	Bore depth T	Series	X1	LX	X2	SW	Ncm	Part No.
5.00-5.49	5.5	B	1.00	10.2	14.7	4.0	170	Refer to page 249 for composing the part number
5.50-5.99	6.0	B	1.10	11.1	15.6	4.0	170	
6.00-6.49	6.5	C	1.20	11.7	16.2	5.0	250	
6.50-6.99	7.0	C	1.30	12.7	17.2	5.0	250	
7.00-7.49	7.5	D	1.35	13.6	19.1	6.0	400	
7.50-7.99	8.0	D	1.45	14.4	19.9	6.0	400	
8.00-8.49	8.5	D	1.55	15.2	20.7	7.0	400	
8.50-8.99	9.0	E	1.65	16.1	21.6	7.0	600	
9.00-9.49	9.5	E	1.75	16.9	22.4	8.0	600	
9.50-9.99	10.0	E	1.85	17.8	23.3	8.0	600	
10.00-10.49	10.5	E	1.90	18.6	24.1	9.0	600	
10.50-10.99	11.0	F	2.10	19.1	24.6	9.0	600	
11.00-11.49	11.5	F	2.20	19.9	25.4	9.0	600	

SNAP Chamfer Blade

The explanations about the SNAP chamfering technology as well as for the selection of the suitable blades are listed on page 266ff.

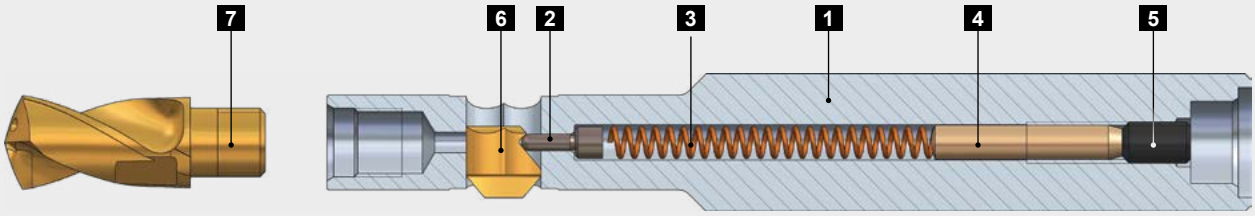
VEX Combi Ø6.0 to 11.0 mm with Internal Coolant – Bore Depth 1 x d



Tool Table

Bore range Ød	Bore depth T	Series	ØD	ØD1	ØD2	ØDS	L	L1	L2	LN	X	X1	Tool without Drill Bit without Blade Part No.
6.00-6.49	6.5	C	Chamfer-Ø D max. = Bore-Ø d min. + 2.0 mm	5.9	ØD2 = ØD + 0.6 mm	10.0	40.0	77.7	66.0	9.1	20.6	1.2	GH-Q-O-4022
6.50-6.99	7.0	C		6.4		10.0	40.0	78.9	66.2	9.6	21.6	1.3	GH-Q-O-4023
7.00-7.49	7.5	D		6.9		10.0	40.0	81.4	67.8	10.9	23.8	1.4	GH-Q-O-4024
7.50-7.99	8.0	D		7.4		10.0	40.0	82.4	68.0	10.6	24.6	1.5	GH-Q-O-4025
8.00-8.49	8.5	D		7.9		12.0	45.0	89.5	74.3	11.9	25.4	1.6	GH-Q-O-4026
8.50-8.99	9.0	E		8.4		12.0	45.0	90.9	74.8	11.6	26.6	1.7	GH-Q-O-4027
9.00-9.49	9.5	E		8.9		12.0	45.0	91.9	75.0	12.1	27.4	1.8	GH-Q-O-4028
9.50-9.99	10.0	E		9.4		12.0	45.0	93.1	75.3	12.6	28.3	1.9	GH-Q-O-4029
10.00-10.49	10.5	E		9.9		14.0	45.0	95.1	76.5	13.1	29.1	1.9	GH-Q-O-4030
10.50-10.99	11.0	F		10.4		14.0	45.0	96.4	77.3	13.6	30.1	2.1	GH-Q-O-4031
11.00-11.49	11.5	F		10.9		14.0	45.0	97.4	77.5	14.1	30.9	2.1	GH-Q-O-4032

ORDERING INFORMATION:
For tools and tool bodies with Weldon (-HB) or Whistle-Notch shank (-HE), please add -HB or -HE at the end of the part number (Order example: GH-Q-O-4022-HB).



Spare Parts

Pos.	Description	Part No.
1	Tool body	see page 264
2	Control bolt Ø1.2	GH-Q-E-0008
3	Spring Ø2.35xØ0.35x30.0	GH-H-F-0019
4	Distance pin Bore range 6.00 - 7.99 Distance pin Bore range 8.00 - 11.49	GH-Q-E-0043 GH-Q-E-0048
5	Set screw M3x5.0 DIN913 Wrench for Pos. 5*	GH-H-S-0127 GH-H-S-2101
6	SNAP chamfering blade	see page 268
7	VEX helical drill bit Torque spanner for Pos. 7*	see below see page 265

*) Fork wrench for Pos. 5 and Pos. 7 to be ordered separately.

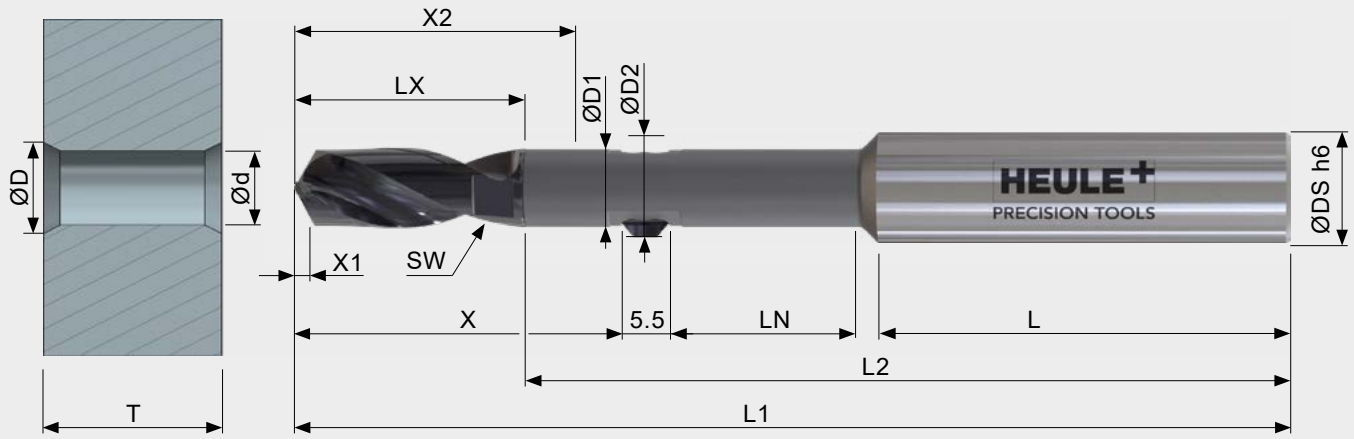
Helical Drill Bit

Dimension Table								Helical Drill Bit
Bore range Ød	Bore depth T	Series	X1	LX	X2	SW	Ncm	Part No.
6.00-6.49	6.5	C	1.20	11.7	16.2	5.0	250	Refer to page 249 for composing the part number
6.50-6.99	7.0	C	1.30	12.7	17.2	5.0	250	
7.00-7.49	7.5	D	1.35	13.6	19.1	6.0	400	
7.50-7.99	8.0	D	1.45	14.4	19.9	6.0	400	
8.00-8.49	8.5	D	1.55	15.2	20.7	7.0	400	
8.50-8.99	9.0	E	1.65	16.1	21.6	7.0	600	
9.00-9.49	9.5	E	1.75	16.9	22.4	8.0	600	
9.50-9.99	10.0	E	1.85	17.8	23.3	8.0	600	
10.00-10.49	10.5	E	1.90	18.6	24.1	9.0	600	
10.50-10.99	11.0	F	2.10	19.1	24.6	9.0	600	
11.00-11.49	11.5	F	2.20	19.9	25.4	9.0	600	

SNAP Chamfer Blades

The explanations about the SNAP chamfering technology as well as for the selection of the suitable blades are listed on page 266ff.

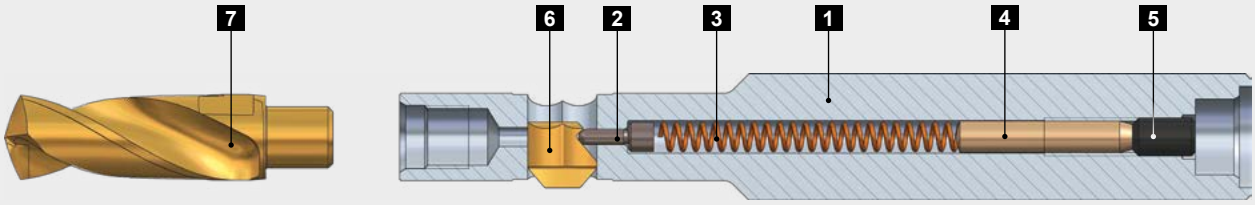
VEX Combi Ø5.0 - 11.0 mm without Internal Coolant – Bore Depth 2 x d



Tool Table

Bore range Ød	Bore depth T	Series	ØD	ØD1	ØD2	ØDS	L	L1	L2	LN	X	X1	Tool without Drill Bit without Blade Part No.
5.00-5.49	11.0	B	Chamfer-Ø D max. = Bore-Ø d min. + 2.0 mm	4.9	ØD2 = ØD + 0.6 mm	8.0	36.0	81.8	65.8	13.6	24.7	1.0	GH-Q-O-4050
5.50-5.99	12.0	B		5.4		8.0	36.0	82.9	65.5	13.6	26.1	1.1	GH-Q-O-4051
6.00-6.49	13.0	C		5.9		10.0	40.0	90.8	72.4	15.6	27.3	1.2	GH-Q-O-4052
6.50-6.99	14.0	C		6.4		10.0	40.0	93.3	73.3	16.7	28.9	1.3	GH-Q-O-4053
7.00-7.49	15.0	D		6.9		10.0	40.0	96.7	75.3	17.9	31.7	1.4	GH-Q-O-4054
7.50-7.99	16.0	D		7.4		10.0	40.0	98.7	76.0	18.6	32.9	1.5	GH-Q-O-4055
8.00-8.49	17.0	D		7.9		12.0	45.0	106.7	82.7	19.8	34.2	1.6	GH-Q-O-4056
8.50-8.99	18.0	E		8.4		12.0	45.0	109.2	83.8	20.6	35.9	1.7	GH-Q-O-4057
9.00-9.49	19.0	E		8.9		12.0	45.0	113.2	86.5	23.6	37.2	1.8	GH-Q-O-4058
9.50-9.99	20.0	E		9.4		12.0	45.0	113.4	85.3	22.6	38.6	1.9	GH-Q-O-4059
10.00-10.49	21.0	E		9.9		14.0	45.0	115.1	87.0	23.6	39.9	1.9	GH-Q-O-4060
10.50-10.99	22.0	F		10.4		14.0	45.0	118.5	88.3	24.6	41.2	2.1	GH-Q-O-4061
11.00-11.49	23.0	F		10.9		14.0	45.0	120.5	89.0	25.6	42.5	2.1	GH-Q-O-4062

ORDERING INFORMATION:
For tools and tool bodies with Weldon (-HB) or Whistle-Notch shank (-HE), please add -HB or -HE at the end of the part number (Order example: GH-Q-O-4022-HB).



Spare Parts

Pos.	Description	Part No.
1	Tool body	see page 264
2	Control bolt Ø1.2	GH-Q-E-0008
3	Spring Ø2.35xØ0.35x30.0	GH-H-F-0019
4	Distance pin Bore range 5.00 - 5.49 Distance pin Bore range 5.50 - 7.99 Distance pin Bore range 8.00 - 11.49	GH-Q-E-0043 GH-Q-E-0048 GH-Q-E-0039
5	Set screw M3x5.0 DIN913 Wrench zu Pos. 5[1]	GH-H-S-0127 GH-H-S-2101
6	SNAP chamfering blade	see page 268
7	VEX helical drill bit Torque spanner for Pos. 7[1]	see below see page 265

[1)] Fork wrench for Pos. 5 and Pos. 7 to be ordered separately.

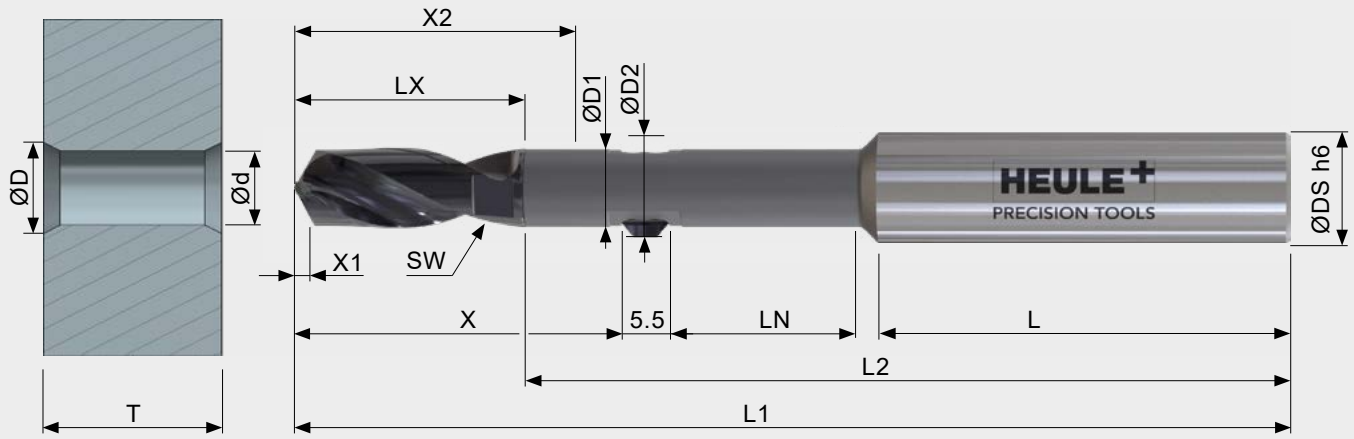
Helical Drill Bit

Dimension table								Helical Drill Bit
Bore range Ød	Bore depth T	Series	X1	LX	X2	SW	Ncm	Part No.
5.00-5.49	11.0	B	1.00	16.0	20.5	4.0	170	Refer to page 249 for composing the part number
5.50-5.99	12.0	B	1.10	17.4	21.9	4.0	170	
6.00-6.49	13.0	C	1.20	18.4	22.9	5.0	250	
6.50-6.99	14.0	C	1.30	20.0	24.5	5.0	250	
7.00-7.49	15.0	D	1.35	21.4	26.9	6.0	400	
7.50-7.99	16.0	D	1.45	22.7	28.2	6.0	400	
8.00-8.49	17.0	D	1.55	24.0	29.5	7.0	400	
8.50-8.99	18.0	E	1.65	25.4	30.9	7.0	600	
9.00-9.49	19.0	E	1.75	26.7	32.2	8.0	600	
9.50-9.99	20.0	E	1.85	28.1	33.6	8.0	600	
10.00-10.49	21.0	E	1.90	29.4	34.9	9.0	600	
10.50-10.99	22.0	F	2.10	30.2	35.7	9.0	600	
11.00-11.49	23.0	F	2.20	31.5	37.0	9.0	600	

SNAP Chamfer Blades

The explanations about the SNAP chamfering technology as well as for the selection of the suitable blades are listed on page 266ff.

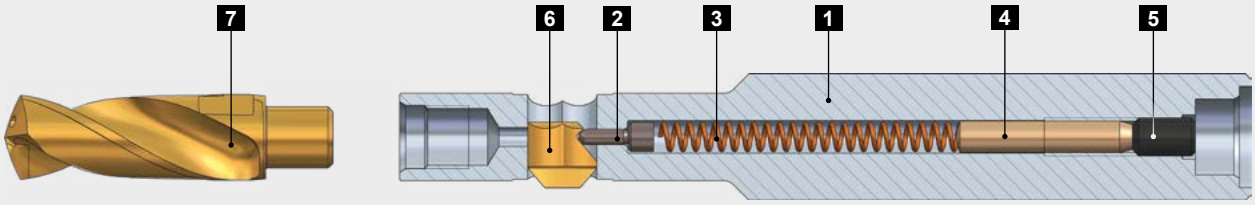
VEX Combi Ø6.0 - 11.0 mm with Internal Cooling – Bore Depth 2 x d



Tool Table

Bore range Ød	Bore depth T	Series	ØD	ØD1	ØD2	ØDS	L	L1	L2	LN	X	X1	Tool without Drill Bit without Blade Part No.
6.00-6.49	13.0	C	Chamfer-Ø D max. = Bore-Ø d min. + 2.0 mm	5.9	ØD2 = ØD + 0.6 mm	10.0	40.0	90.8	72.4	15.6	27.3	1.2	GH-Q-O-4072
6.50-6.99	14.0	C		6.4		10.0	40.0	93.3	73.3	16.7	28.9	1.3	GH-Q-O-4073
7.00-7.49	15.0	D		6.9		10.0	40.0	96.7	75.3	17.9	31.7	1.4	GH-Q-O-4074
7.50-7.99	16.0	D		7.4		10.0	40.0	98.7	76.0	18.6	32.9	1.5	GH-Q-O-4075
8.00-8.49	17.0	D		7.9		12.0	45.0	106.7	82.7	19.8	34.2	1.6	GH-Q-O-4076
8.50-8.99	18.0	E		8.4		12.0	45.0	109.2	83.8	20.6	35.9	1.7	GH-Q-O-4077
9.00-9.49	19.0	E		8.9		12.0	45.0	113.2	86.5	23.6	37.2	1.8	GH-Q-O-4078
9.50-9.99	20.0	E		9.4		12.0	45.0	113.4	85.3	22.6	38.6	1.9	GH-Q-O-4079
10.00-10.49	21.0	E		9.9		14.0	45.0	115.1	87.0	23.6	39.9	1.9	GH-Q-O-4080
10.50-10.99	22.0	F		10.4		14.0	45.0	118.5	88.3	24.6	41.2	2.1	GH-Q-O-4081
11.00-11.49	23.0	F		10.9		14.0	45.0	120.5	89.0	25.6	42.5	2.2	GH-Q-O-4082

ORDERING INFORMATION:
For tools and tool bodies with Weldon (-HB) or Whistle-Notch shank (-HE), please add -HB or -HE at the end of the part number (Order example: GH-Q-O-4072-HB).



Spare Parts

Pos.	Description	Part No.
1	Tool Body	see page 264
2	Control Bolt Ø1.2	GH-Q-E-0008
3	Spring Ø2.35xØ0.35x30.0	GH-H-F-0019
4	Distance pin Bore range 6.00 - 7.99 Distance pin Bore range 8.00 - 11.49	GH-Q-E-0048 GH-Q-E-0039
5	Set screw M3x5.0 DIN913 Wrench for Pos. 5[1]	GH-H-S-0127 GH-H-S-2101
6	SNAP chamfer blade	see page 268
7	VEX helical drill bit Torque Spanner for Pos. 7[1]	see below see page 265

[1)] Fork wrench for Pos. 5 and Pos. 7 to be ordered separately.

Helical Drill Bit

Dimension table								Helical Drill Bit
Bore range Ød	Bore depth T	Series	X1	LX	X2	SW	Ncm	Part No.
6.00-6.49	13.0	C	1.20	18.4	22.9	5.0	250	Refer to page 249 for composing the part number
6.50-6.99	14.0	C	1.30	20.0	24.5	5.0	250	
7.00-7.49	15.0	D	1.35	21.4	26.9	6.0	400	
7.50-7.99	16.0	D	1.45	22.7	28.2	6.0	400	
8.00-8.49	17.0	D	1.55	24.0	29.5	7.0	400	
8.50-8.99	18.0	E	1.65	25.4	30.9	7.0	600	
9.00-9.49	19.0	E	1.75	26.7	32.2	8.0	600	
9.50-9.99	20.0	E	1.85	28.1	33.6	8.0	600	
10.00-10.49	21.0	E	1.90	29.4	34.9	9.0	600	
10.50-10.99	22.0	F	2.10	30.2	35.7	9.0	600	
11.00-11.49	23.0	F	2.20	31.5	37.0	9.0	600	

SNAP Chamfer Blades

The explanations about the SNAP chamfering technology as well as for the selection of the suitable blades are listed on page 266ff.

Technical Data and Settings

Cutting Data Drilling VEX[1]

Recommended cutting data for helical drills for maximum bore depth < 2xd

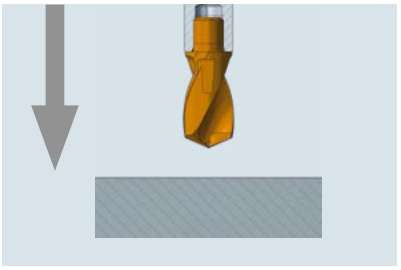
Material	Condition	Tensile stren. (N/mm²)	Hardness HB	Cutting speed (m/min)	Feed (mm/rev.)
Unalloyed steel		<500	<150	100-130	0.15-0.25
Cast steel		500 - 850	150 - 250	90-110	0.15-0.25
Grey cast iron		<500	<150	90-180	0.20-0.35
Ductile cast iron		300 - 800	90 - 240	90-160	0.15-0.30
Low alloy steel	annealed	<850	<250	80-130	0.15-0.25
	tempered	850 - 1000	250 - 300	70-110	0.15-0.25
	tempered	>1000 - 1200	>300 - 350	40-70	0.12-0.20
High alloy steel	annealed	<850	<250	40-70	0.12-0.20
	tempered	850 - 1100	250 - 320	35-50	0.12-0.15
Stainless steel	ferritic	450 - 650	130 - 190	30-50	0.08-0.12
	austenitic	650 - 900	190 - 270	30-40	0.08-0.12
	martensitic	500 - 700	150 - 200	20-30	0.08-0.12
Special alloy (Inconel, titanium, …)		<1200	<350	20-25	0.06-0.10
Wrought or cast aluminium alloys				120-250	0.25-0.35
Copper alloy	Brass			140-200	0.25-0.35
	Bronze short-chipping			60-100	0.20-0.30
	Bronze long-chipping			40-60	0.15-0.25

[1] Cutting data for deburring / chamfering (SNAP system) please see on page 267.

WARNING NOTICE
All listed cutting data are standard values only! The cutting values depend on the amount of slope of the uneven bore edge. (i.e. high slope ► low cutting value). The feed also depends on the sloping ratio. In case of hard to machine materials or uneven bore edges, we recommend to apply cutting speeds that are at the lower end of the range for uneven bore edges.

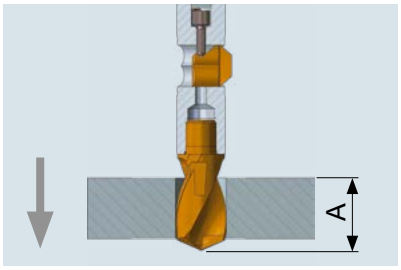
Programming Information VEX

It is not necessary to change the direction of rotation or to stop the spindle during the full process.

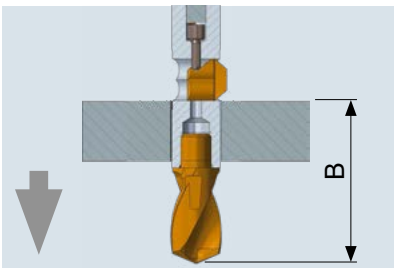


Rapid traverse of the tool to just above the top of the workpiece.

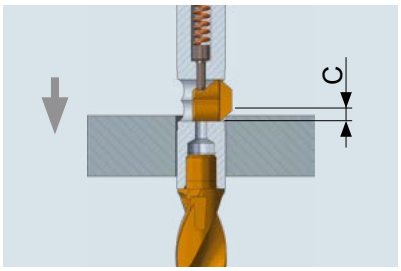
Pay attention to the clearance distance.



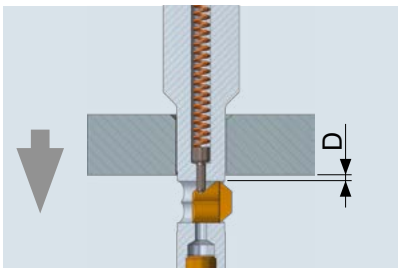
In forward linear feed the bore is produced. Continue in linear feed until the drill insert is completely clear of the bore.



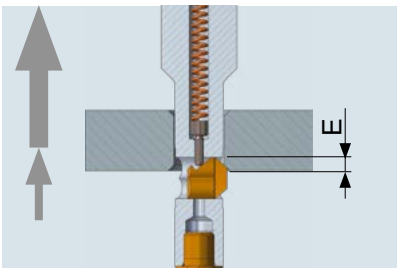
Position tool with SNAP blade in rapid feed, forward slightly above the top material surface of bore or burr.



In linear feed forward, the chamfer is generated. Continue in linear feed until the blade is completely retracted into the tool.



The tool can be passed through the hole in rapid feed forward until the SNAP blade is clear of the hole and fully extended.

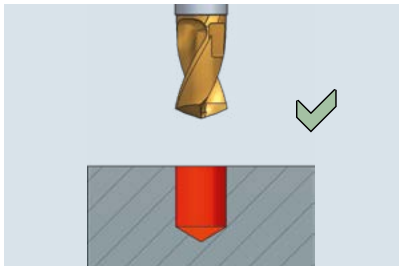


The back chamfer is machined by linear feed backward (no change of spindel direction). As soon as the SNAP blade is completely retracted into the tool, the tool can travel out of the hole in rapid feed backward.

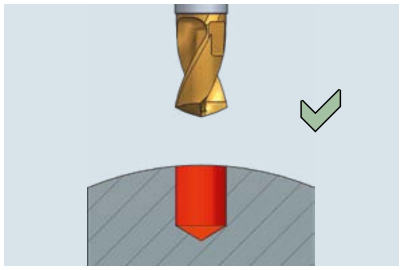
Dimension Table to Programming Information

	A		B		C		D		E	
Bore depth	1xd	2xd	1xd	2xd	1xd	2xd	1xd	2xd	1xd	2xd
Tool type										
Series B 5.0[1]	5.5	11.0	17.9	23.7	21.9	27.7	25.4	31.2	21.9	27.7
Series B 5.5[1]	6.0	12.0	18.8	25.1	22.8	29.1	26.3	32.6	22.8	29.1
Series C 6.0	6.5	13.0	19.6	26.3	23.6	30.3	27.1	33.8	23.6	30.3
Series C 6.5	7.0	14.0	20.6	27.9	24.6	31.9	28.1	35.4	24.6	31.9
Series D 7.0	7.5	15.0	22.8	30.7	26.8	34.7	30.3	38.1	26.8	34.7
Series D 7.5	8.0	16.0	23.6	31.9	27.6	35.9	31.1	39.4	27.6	35.9
Series D 8.0	8.5	17.0	24.4	33.2	28.4	37.2	31.9	40.7	28.4	37.2
Series E 8.5	9.0	18.0	25.6	34.9	29.6	38.9	33.1	42.4	29.6	38.9
Series E 9.0	9.5	19.0	26.4	36.2	30.4	40.2	33.9	43.7	30.4	40.2
Series E 9.5	10.0	20.0	27.3	37.6	31.3	41.6	34.8	45.5	31.3	41.6
Series E 10.0	10.5	21.0	28.1	38.9	32.1	42.9	35.6	46.4	32.1	42.9
Series E 10.5	11.0	22.0	29.1	40.2	33.1	44.2	36.6	47.7	33.1	44.2
Series F 11.0	11.5	23.0	29.9	41.5	33.9	45.5	37.4	49.0	33.9	45.5

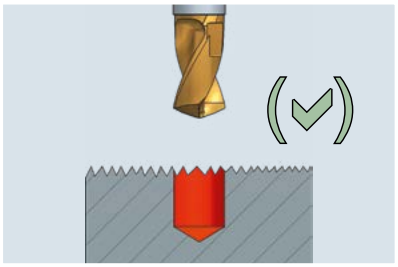
[1] Availabe only without internal cooling. VEX with internal cooling starts from bore-Ø 6.00 mm.



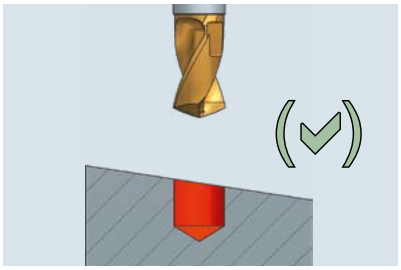
Drilling on even machined surfaces.



Drilling on central or convex surfaces[1].

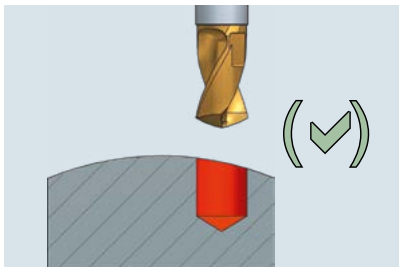


Drilling on uneven surfaces. If necessary reduce feed rate[1].



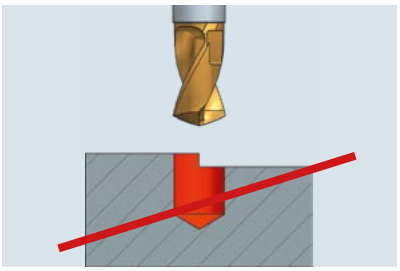
Drilling on sloped surfaces[1].

Only for tools < 2xd and up to 6° max. Reduce feed rate if 2° to 80%, if 5° to 70%, if 6° to 50%

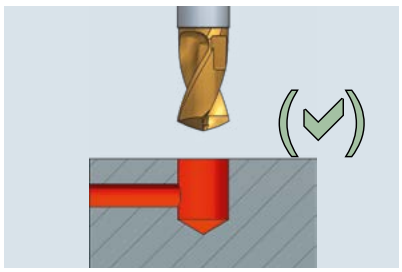


Drilling on not central or convex, concave surfaces[1].

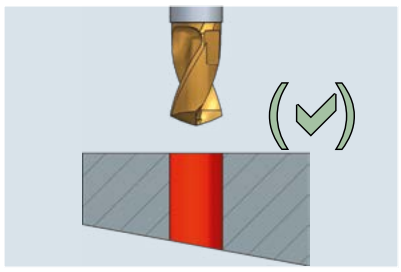
Only for tools < 2xd and up to 6° max. Reduce feed rate if 2° to 80%, if 5° to 70%, if 6° to 50%



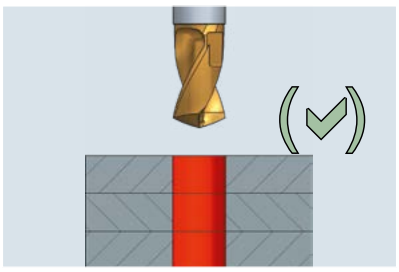
Drilling on an edge, forged or cast iron seam: Not possible.



Drilling through a cross hole. Ø cross bore max 0.5xmain bore. If necessary, reduce feed rate[2].



Sloped exit of the bore. Reduce feed rate to approx. 50-60%[1].



Drilling through several layers. Seamless clamping of the different workpieces is necessary.

[1] Chamfer will not be clean.
[2] Tool can break. Blade for deburring can get stuck in the cross hole. Drive through the bore with no rotation of the tool.

Cooling

Through tool coolant is necessary for the optimal swarf evacuation.

Use external cooling only up to max. 1xd and with reduced feed rate.

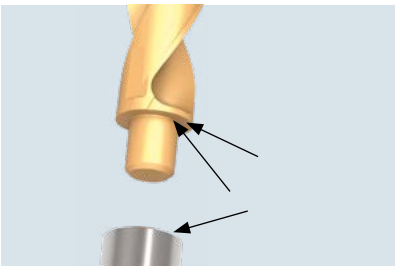
Coolant pressure for max. 2xd 8 bar at least. Flow rate 5 to 20 litre/min.

FAQ VEX

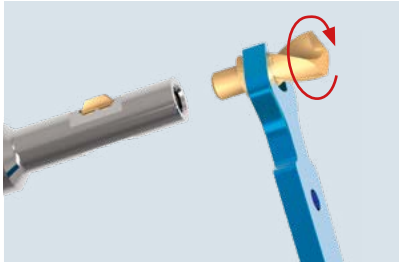
Built-up edge	Chip jam	Burr formation on the exit of the bore	Unsteady accuracy	Bad quality of the surface	Chatter	Wearing of major cutting edge	Wearing of cross cutting edge	Wearing of major chamfer	Wearing of clearance surface	Breakout of cutting edge	Breakout of the top of the drill bit	
■					■	■				■		Raise cutting speed
		■			■			■	■			Reduce cutting speed
				■	■							Raise feed rate
	■		■	■	■	■	■	■		■	■	Reduce feed rate
■	■	■	■	■	■	■	■	■	■	■	■	Raise coolant pressure
			■	■	■			■				Check radial run-out
			■			■	■	■		■	■	Check stability of spindle and setting
		■		■								Exchange worn drill bit
	■			■								Improve drilling cycle
■												Coating

Assembly / Dismantling

Assembly

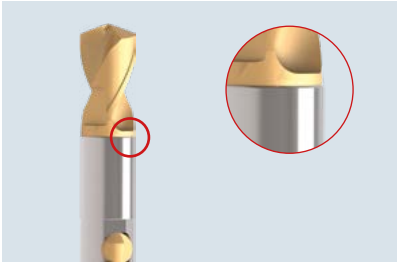


Clean the surfaces between the VEX drill bit and the tool body.



Screw tightly the drill bit with a flat wrench to the tool body.

For torque / torque spanner see page 265.

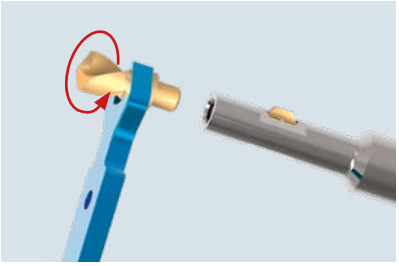


There should be a seamless transition between drill bit and tool body after the tightening of the drill bit (no light gap between tool body and drill bit).

Reasons for a Light Gap and How to Correct

Reason	Solution
Dirt between drill bit and tool body	Dismantle and clean.
Drill bit is not tightened enough.	Tighten drill bit once more.
Adaption areas are damaged	Exchange drill bit and/or tool body.

Dismantling



Unfasten the drill bit with a flat wrench in counter-clockwise direction from the tool body.

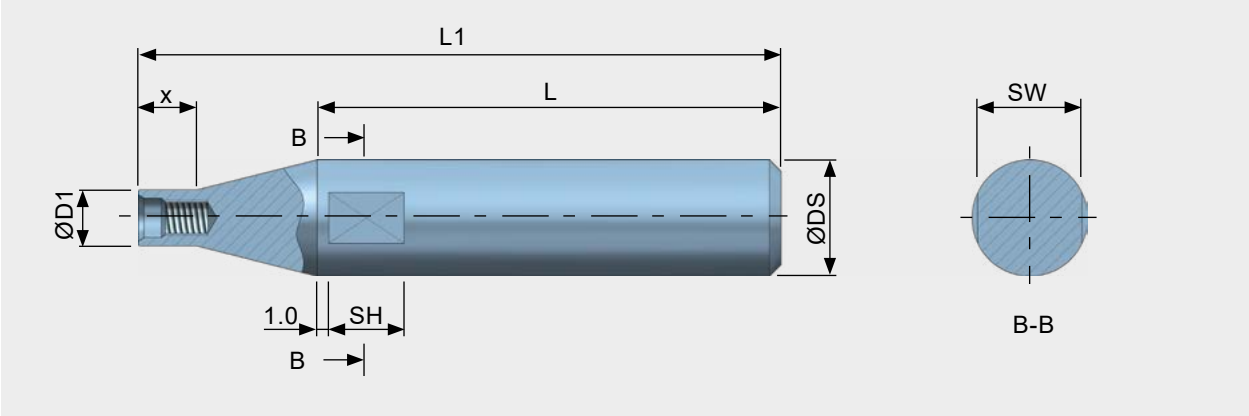
Re-grinding

All VEX drill bits can be re-ground once. We recommend the following parameter:

Nose angle: 140°
Clearance angle: 8°
Point thinning: regrind a little

Please note that the re-grinding will change the original VEX point geometry and therefore we recommend that only 1-2 mm maximum should be removed. The original grind form can only be reproduced by HEULE.

For the re-grinding of the helical drill bit we have created the following re-grinding device:



									Re-grinding device
Series	Thread	ØD1	ØDS	x	L	L1	SW	SH	Part No.
B	M3*0.35	4.8	10.0	5.0	40.0	55.4	9.0	6.5	GH-V-V-0052
C	M4*0.5	5.8	10.0	5.0	40.0	55.8	9.0	6.5	GH-V-V-0053
D	M5*0.5	6.8	10.0	5.0	40.0	56.0	9.0	6.5	GH-V-V-0054
E	M6*0.75	8.3	16.0	8.0	50.0	70.6	14.0	7.0	GH-V-V-0055
F	M8*0.75	10.3	16.0	8.0	50.0	70.3	14.0	7.0	GH-V-V-0056

Spare Parts

The spare parts that are not listed in this chapter can be found on the product selection pages of the specific product.

Tool Body

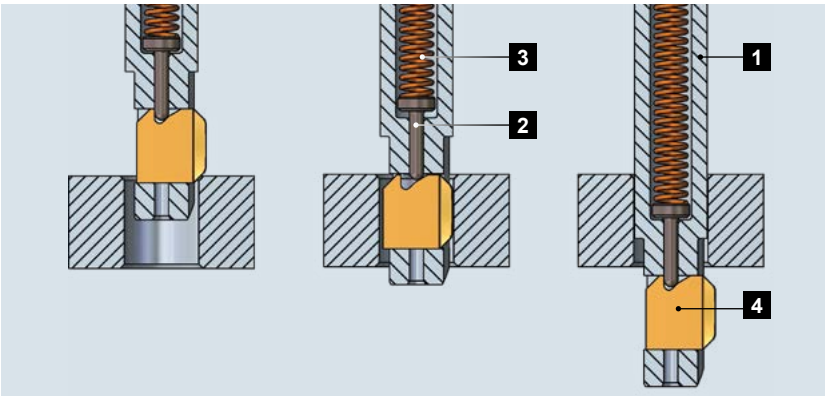
Bore depth 5.0 - 11.5			Tool body for bore depth 1 x d	
			with Internal cooling	without int. cooling
Bore range Ød	Bore depth T	Series	Part No.	Part No.
5.00-5.49	5.5	B	GH-Q-G-4000	- - -
5.50-5.99	6.0	B	GH-Q-G-4001	- - -
6.00-6.49	6.5	C	GH-Q-G-4002	GH-Q-G-4022
6.50-6.99	7.0	C	GH-Q-G-4003	GH-Q-G-4023
7.00-7.49	7.5	D	GH-Q-G-4004	GH-Q-G-4024
7.50-7.99	8.0	D	GH-Q-G-4005	GH-Q-G-4025
8.00-8.49	8.5	D	GH-Q-G-4006	GH-Q-G-4026
8.50-8.99	9.0	E	GH-Q-G-4007	GH-Q-G-4027
9.00-9.49	9.5	E	GH-Q-G-4008	GH-Q-G-4028
9.50-9.99	10.0	E	GH-Q-G-4009	GH-Q-G-4029
10.00-10.49	10.5	E	GH-Q-G-4010	GH-Q-G-4030
10.50-10.99	11.0	F	GH-Q-G-4011	GH-Q-G-4031
11.00-11.49	11.5	F	GH-Q-G-4012	GH-Q-G-4032

Bore depth 11.0 - 23.0			Tool body for bore depth 2 x d	
			with Internal cooling	without Int. cooling
Bore range Ød	Bore depth T	Series	Part No.	Part No.
5.00-5.49	11.0	B	GH-Q-G-4050	- - -
5.50-5.99	12.0	B	GH-Q-G-4051	- - -
6.00-6.49	13.0	C	GH-Q-G-4052	GH-Q-G-4072
6.50-6.99	14.0	C	GH-Q-G-4053	GH-Q-G-4073
7.00-7.49	15.0	D	GH-Q-G-4054	GH-Q-G-4074
7.50-7.99	16.0	D	GH-Q-G-4055	GH-Q-G-4075
8.00-8.49	17.0	D	GH-Q-G-4056	GH-Q-G-4076
8.50-8.99	18.0	E	GH-Q-G-4057	GH-Q-G-4077
9.00-9.49	19.0	E	GH-Q-G-4058	GH-Q-G-4078
9.50-9.99	20.0	E	GH-Q-G-4059	GH-Q-G-4079
10.00-10.49	21.0	E	GH-Q-G-4060	GH-Q-G-4080
10.50-10.99	22.0	F	GH-Q-G-4061	GH-Q-G-4081
11.00-11.49	23.0	F	GH-Q-G-4062	GH-Q-G-4082

					Flat wrench	Torque key insert	Torque Screw driver
Bore range Ød	Bore depth T	Series	Wrench-size SW	Tightening torque Ncm	Part No.	Part No.	Part No.
5.00-5.49	11.0	B	4.0	170	GH-H-S-2301	GH-H-S-2331	GH-H-S-2401
5.50-5.99	12.0	B	4.0	170	GH-H-S-2301	GH-H-S-2331	GH-H-S-2401
6.00-6.49	13.0	C	5.0	250	GH-H-S-2301	GH-H-S-2332	GH-H-S-2401
6.50-6.99	14.0	C	5.0	250	GH-H-S-2301	GH-H-S-2332	GH-H-S-2401
7.00-7.49	15.0	D	6.0	400	GH-H-S-2302	GH-H-S-2333	GH-H-S-2402
7.50-7.99	16.0	D	6.0	400	GH-H-S-2302	GH-H-S-2333	GH-H-S-2402
8.00-8.49	17.0	D	7.0	400	GH-H-S-2302	GH-H-S-2334	GH-H-S-2402
8.50-8.99	18.0	E	7.0	600	GH-H-S-2302	GH-H-S-2334	GH-H-S-2402
9.00-9.49	19.0	E	8.0	600	GH-H-S-2303	GH-H-S-2335	GH-H-S-2402
9.50-9.99	20.0	E	8.0	600	GH-H-S-2303	GH-H-S-2335	GH-H-S-2402
10.00-10.49	21.0	E	9.0	600	GH-H-S-2303	GH-H-S-2336	GH-H-S-2402
10.50-10.99	22.0	F	9.0	600	GH-H-S-2303	GH-H-S-2336	GH-H-S-2402
11.00-11.49	23.0	F	9.0	600	GH-H-S-2303	GH-H-S-2336	GH-H-S-2402

SNAP Chamfering Blades

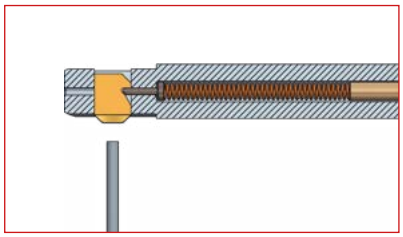
Function Principle



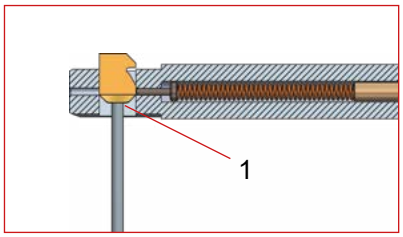
1 Tool Body
2 Control Bolt
3 Spring
4 SNAP Chamfer Blade

The SNAP deburring blade remains moveable in the tool body via a control bolt held under spring pressure. A specially ground forward and backward or backward cutting only blade produces the required chamfer while the tool enters the bore. Once the chamfer size is attained, the deburring blade continuously retracts into the tool body. On a specially designed gliding radii, the blade passes through the hole without damaging it. The deburring blade has a special recess which the control bolt engages and after exiting the hole brings the blade back into its starting position. A smooth deburring or chamfering operation forwards and backwards is the result of this machining operation. Chamfer size and chamfer angle are predetermined geometrically at the blade and can only be changed by the use of another blade of an adapted design.

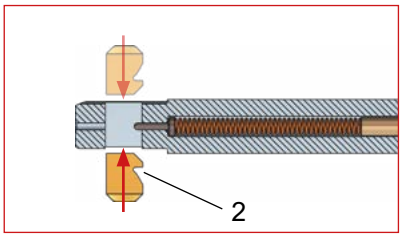
Blade Change



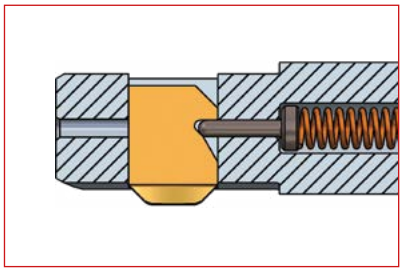
SNAP-Tool with assembled blade



The SNAP blade can be pushed through the tool with an edgeless object.
Put the aid on at the blade head (1).

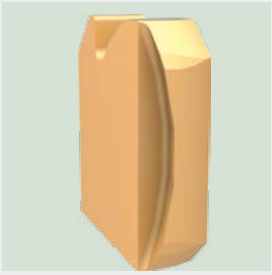


The deburring blade is pushed with its back first into the blade window of the tool until it engages. Please make sure that it is aligned with the recess (2) in the direction of the tool shank.

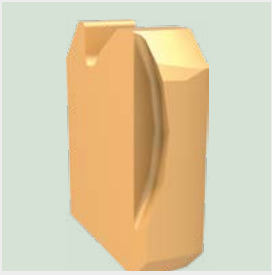


The control bolt has "snapped" into the blade recess. The tool is now ready for operation.

Blades with GS Geometry



forward and backward cutting



backward cutting only

The blade with the **GS geometry is the standard blade.** As a universal blade it is suitable for most deburring and easy chamfering operations. This blade can also be used in applications where there is slight unevenness on the surface of the component.

Front and back chamfering is achieved by linear feed forward and backward. For back cutting only, a front and back cutting blade can be used also by traversing through the hole in rapid feed without causing damage to either the front edge of the hole or to the tool.

Only when no deburring or chamfering is required or accepted on the front edge of the hole, it is necessary to use the back cutting only blades.

You will find the GS blades on page 268.

NOTE:
In case of increased requirements due to particularly hard materials or materials with large burr formation, please contact your HEULE sales person. After examination we are also able to offer application-specific blade geometries.

Cutting Data[1]

				SNAP 5 GS Geometry	
Material	Condition	Tensile strength (N/mm2)	Hard-ness HB	Cutting speed (m/min)	Feed (mm/rev)
Unalloyed steel		<500	<150	40-70	0.1-0.3
Cast steel		500 - 850	150 - 250	40-70	0.1-0.3
Grey cast iron		<500	<150	50-90	0.1-0.3
Ductile cast iron		300 - 800	90 - 240	40-70	0.1-0.3
Low alloy steel	annealed	<850	<250	40-70	0.1-0.3
	tempered	850 - 1000	250 - 300	30-50	0.1-0.2
	tempered	>1000 - 1200	>300 - 350	30-50	0.1-0.2
High alloy steel	annealed	<850	<250	20-50	0.1-0.2
	tempered	850 - 1100	250 - 320	15-30	0.1-0.15
Stainless steel	ferritic	450 - 650	130 - 190	15-30	0.05-0.15
	austenitic	650 - 900	190 - 270	10-20	0.05-0.15
	martensitic	500 - 700	150 - 200	15-30	0.02-0.15
Special alloy (Inconel, titanium)		<1200	<350	10-20	0.02-0.1
Wrought or cast aluminium alloys				70-120	0.1-0.3
Copper alloy	Brass			60-90	0.05-0.15
	Bronze short-chipping			30-50	0.05-0.15
	Bronze long-chipping			20-30	0.05-0.15

[1] All listed cutting data are standard values only! They can differ considerably according to the specific application (clamping of workpiece, machine or nature of workpiece). We recommend to apply cutting speeds that are at the lower end of the range for uneven bore edges.

SNAP5 Blades GS Geometry 90° for VEX Combi Tools

	Part No. forward and backward cutting		backward cutting only	
Chamfer Ø[1]	Coating A	Coating D	Coating A	Coating D
5.5	**GH-Q-M-30204***	GH-Q-M-30404	GH-Q-M-31204	GH-Q-M-31404
6.0	**GH-Q-M-30205***	GH-Q-M-30405	GH-Q-M-31205	GH-Q-M-31405
6.5	**GH-Q-M-30206***	GH-Q-M-30406	GH-Q-M-31206	GH-Q-M-31406
7.0	**GH-Q-M-30207***	GH-Q-M-30407	GH-Q-M-31207	GH-Q-M-31407
7.5	**GH-Q-M-30208***	GH-Q-M-30408	GH-Q-M-31208	GH-Q-M-31408
8.0	**GH-Q-M-30209***	GH-Q-M-30409	GH-Q-M-31209	GH-Q-M-31409
8.5	**GH-Q-M-30210***	GH-Q-M-30410	GH-Q-M-31210	GH-Q-M-31410
9.0	**GH-Q-M-30211***	GH-Q-M-30411	GH-Q-M-31211	GH-Q-M-31411
9.5	**GH-Q-M-30212***	GH-Q-M-30412	GH-Q-M-31212	GH-Q-M-31412
10.0	**GH-Q-M-30213***	GH-Q-M-30413	GH-Q-M-31213	GH-Q-M-31413
10.5	**GH-Q-M-30214***	GH-Q-M-30414	GH-Q-M-31214	GH-Q-M-31414
11.0	**GH-Q-M-30215***	GH-Q-M-30415	GH-Q-M-31215	GH-Q-M-31415
11.5	**GH-Q-M-30216***	GH-Q-M-30416	GH-Q-M-31216	GH-Q-M-31416
12.0	**GH-Q-M-30217***	GH-Q-M-30417	GH-Q-M-31217	GH-Q-M-31417
12.5	**GH-Q-M-30218***	GH-Q-M-30418	GH-Q-M-31218	GH-Q-M-31418
13.0	**GH-Q-M-30219***	GH-Q-M-30419	GH-Q-M-31219	GH-Q-M-31419

*) Standard items / Please enquire about stock or delivery times for all non-standard items.

1) The indicated dimension is the theoretically possible maximum.

Explanations to coatings

A: Coating for steel, titanium, Inconel

D: Coating for aluminium alloys only

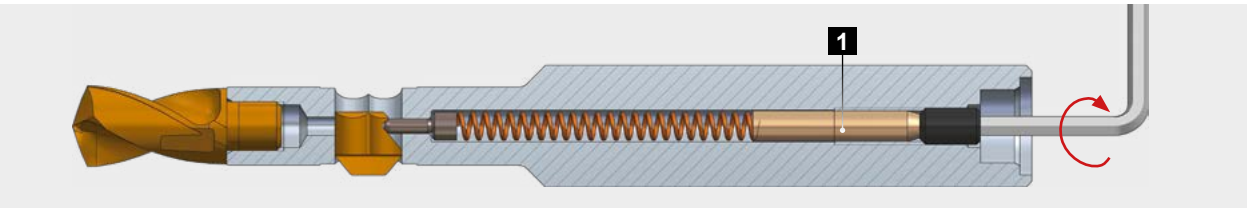
Adjusting the Chamfer Size

SNAP blades with GS geometry

In general, the chamfer size is defined by the selected blade (blade length). Each blade produces a defined chamfer size.

The theoretically possible chamfer size maximum can be taken from the column "chamfer-Ø max. D" in the blade tables.

Setting the Blade Force



The blade force can be adjusted by the set screw (1) in the rear of the shank. The blade force has to be sufficient to extend the blade to fully after passing the back end of the bore. This ensures that the blade can work with the necessary cutting performance. The tougher the material, the tougher the spring should be set. The blade force, however, does not influence the chamfer size. Working with the correct blade pressure increases the blade life and improves the chamfer quality. An extremely tough material requires a high spring force. For this purpose, the springs can be exchanged (SNAP5: GH-H-F-0041, SNAP8 und SNAP12: GH-H-F-0011).

Turning the set screw clockwise increases the blade force (tough steel, Inconel, titanium).
Turning the set screw counter-clockwise reduces the blade force (aluminium).

Adjustment Details Blade Force

Tool	Thread size	Screw-in depth max.	Revolutions (approx.)
SNAP5	M3	6.0 mm	12 x