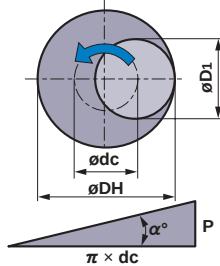
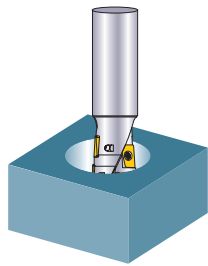


ROTATING TOOLS

RECOMMENDED CUTTING CONDITIONS

FOR HELICAL CUTTING



- How to derive a locus of the centre of the tool.

$$\phi dc = \phi DH - \phi D1$$

Locus of the centre of the tool Desired hole diameter Cutting edge diameter

- Depth of cut per pass.

$$P = \pi \times dc \times \tan \alpha^\circ$$

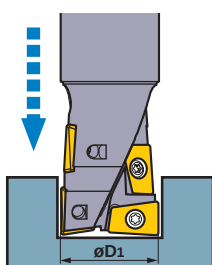
$\star \alpha^\circ \leq 3^\circ$

- Min. machined hole diameter for helical cutting : 1.2D1
Max. machined hole diameter for helical cutting : 1.8D1
- For chip discharge, please always apply air blow.
(When aluminium cutting, please use coolant.)
- When using G1 breaker (VP15TF), please reduce the feed rate by 20%.

Work Material	Hardness	Grade	Cutting Speed (m/min)	$\phi 16, \phi 17$				$\phi 20, \phi 21$				$\phi 25, \phi 26$			
				Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)
P	Mild Steel	$\leq 180\text{HB}$	VP15TF	180 (150–220)	20	8	0.16	0.44	24	10	0.18	0.44	30	12.5	0.20
					25	12	0.14	0.99	30	15	0.16	1.10	38	19	0.18
					29	16	0.12	1.43	36	20	0.14	1.76	45	25	0.16
M	Carbon Steel Alloy Steel	180–350HB	VP15TF	160 (120–200)	20	8	0.14	0.33	24	10	0.16	0.33	30	12.5	0.18
					25	12	0.12	0.74	30	15	0.14	0.82	38	19	0.16
					29	16	0.10	1.07	36	20	0.12	1.32	45	25	0.14
M	Stainless Steel	$\leq 270\text{HB}$	VP30RT (VP15TF)	150 (120–180)	20	3	0.14	0.22	24	4	0.16	0.22	30	5	0.18
					25	5	0.12	0.49	30	7	0.14	0.55	38	9	0.16
					29	8	0.10	0.71	36	10	0.12	0.88	45	12.5	0.14
K	Cast Iron	Tensile Strength $\leq 450\text{MPa}$	VP15TF	180 (150–220)	20	10	0.16	0.55	24	14	0.18	0.55	30	18	0.20
					25	13	0.14	1.23	30	17	0.16	1.37	38	21	0.18
					29	16	0.12	1.78	36	20	0.14	2.19	45	25	0.16
N	Aluminium Alloy	—	HTi10 (G1 Breaker)	500 (200–800)	20	10	0.18	0.44	24	14	0.20	0.44	30	18	0.22
					25	13	0.16	0.99	30	17	0.18	1.10	38	21	0.20
					29	16	0.14	1.43	36	20	0.16	1.76	45	25	0.18
H	Hardened Steel	45–55HRC	VP15TF	80 (50–120)	20	3	0.10	0.22	24	4	0.12	0.22	30	5	0.14
					25	5	0.08	0.49	30	7	0.10	0.55	38	9	0.12
					29	8	0.06	0.71	36	10	0.08	0.88	45	12.5	0.10

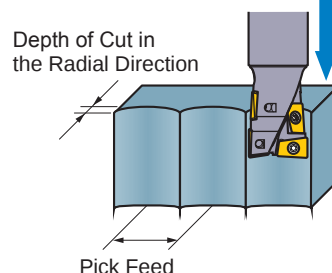
FOR DRILLING AND PLUNGING

Drilling



- The recommended drilling depth is less than 0.5D1.
- Use step feed when drilling (0.25–0.5mm) to ensure that the chips are effectively broken.
- Use internal or external cooling to ensure that the chip disposal is sufficiently achieved.
- The chips generated can dispel in any direction, so ensure that adequate safety precautions are taken.

Plunging



- The feed for plunging is the same as the feed for drilling.
- No step feed necessary.
- Please refer to the following table for the depth of cut at plunging operations.

Depth of Cut in the Radial Direction	$\leq 0.4D1$
Pick Feed	$\leq 0.5D1$

Work Material	Hardness	Grade	Cutting Speed (m/min)	$\phi 16, \phi 17$		$\phi 20, \phi 21$		$\phi 25, \phi 26$	
				Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)
P	Mild Steel	$\leq 180\text{HB}$	VP15TF	180 (150–220)	0.035	0.2	0.045	0.3	0.05
	Carbon Steel Alloy Steel	180–350HB	VP15TF	160 (120–200)	0.03	0.2	0.04	0.3	0.045
M	Stainless Steel	$\leq 270\text{HB}$	VP30RT (VP15TF)	150 (120–180)	0.03	0.15	0.04	0.25	0.045
K	Cast Iron	Tensile Strength $\leq 450\text{MPa}$	VP15TF	180 (150–220)	0.04	0.4	0.05	0.5	0.06
N	Aluminium Alloy	—	HTi10 (G1 Breaker)	500 (200–800)	0.04	0.2	0.05	0.3	0.06
H	Hardened Steel	45–55HRC	VP15TF	80 (50–120)	0.02	0.15	0.03	0.25	0.035

(Note 1) Helical grooving is strongly recommended for machining tempered steel.

(Note 2) When using G1 breaker (VP15TF), please reduce the feed rate by 20%.