

INDEXABLE MILLING

MULTI FUNCTIONAL MILLING

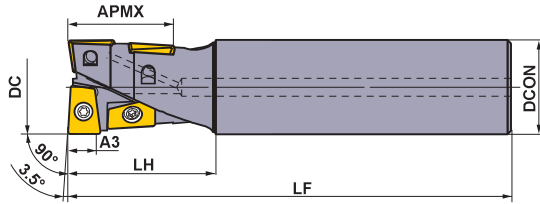


AQX

- P
Steel
- M
Stainless Steel
- K
Cast Iron
- N
Non-ferrous Metal
- S
Hardened Steel
- H



Number of Teeth : 4



- The center bottom cutting edge enables drilling without previously formed hole.
- With through coolant holes.

STANDARD EDGE TYPE

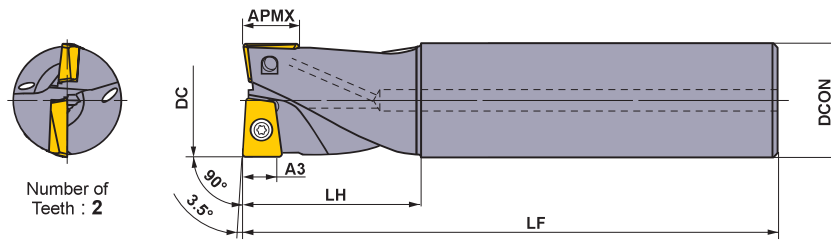
Right hand tool holder only.

Type	Order Number	Stock	Coolant Hole	Dimensions (mm)						Clamp Screw *3	Wrench	Insert
				DC	LF	DCON	LH	A3 *1	APMX *2			
Standard	AQXR164SA16S	●	○	16	120	16	30	4.5	17.6	TS2A	⊙TKY06F	QOG/MT0830R-G1/M2
	AQXR164SN16S	●	—	16	120	16	30	4.5	17.6	TS2A	⊙TKY06F	
	AQXR174SA16S	●	○	17	120	16	30	4.5	17.6	TS2A	⊙TKY06F	
	AQXR174SN16S	●	—	17	120	16	30	4.5	17.6	TS2A	⊙TKY06F	
	AQXR204SA20S	●	○	20	130	20	35	6	22	TS25	⊙TKY08F	QOG/MT1035R-G1/M2
	AQXR204SN20S	●	—	20	130	20	35	6	22	TS25	⊙TKY08F	
	AQXR214SA20S	●	○	21	130	20	35	6	22	TS25	⊙TKY08F	
	AQXR214SN20S	●	—	21	130	20	35	6	22	TS25	⊙TKY08F	
	AQXR254SA25S	●	○	25	140	25	40	7.5	27.5	TS33	⊙TKY08D	QOG/MT1342R-G1/M2
	AQXR254SN25S	●	—	25	140	25	40	7.5	27.5	TS33	⊙TKY08D	
	AQXR264SA25S	●	○	26	140	25	40	7.5	27.5	TS33	⊙TKY08D	
	AQXR264SN25S	●	—	26	140	25	40	7.5	27.5	TS33	⊙TKY08D	
	AQXR324SA32S	●	○	32	150	32	50	9.5	35.2	TS407	⊙TKY15D	QOG/MT1651R-G1/M2
	AQXR324SN32S	●	—	32	150	32	50	9.5	35.2	TS407	⊙TKY15D	
	AQXR334SA32S	●	○	33	150	32	50	9.5	35.2	TS407	⊙TKY15D	
	AQXR334SN32S	●	—	33	150	32	50	9.5	35.2	TS407	⊙TKY15D	
	AQXR354SA32S	●	○	35	150	32	50	11	40	TS407	⊙TKY15D	QOG/MT1856R-G1/M2
	AQXR354SN32S	●	—	35	150	32	50	11	40	TS407	⊙TKY15D	
AQXR404SA32S	●	○	40	160	32	60	12	44	TS55	⊙TKY25D	QOG/MT2062R-G1/M2	
AQXR404SN32S	●	—	40	160	32	60	12	44	TS55	⊙TKY25D		
AQXR504SA42S	●	○	50	170	42	70	15	55	TS6S	⊙TKY30T	QOG/MT2576R-G1/M2	
AQXR504SN42S	●	—	50	170	42	70	15	55	TS6S	⊙TKY30T		
Long	AQXR164SA16L	●	○	16	175	16	50	4.5	17.6	TS2A	⊙TKY06F	QOG/MT0830R-G1/M2
	AQXR164SN16L	●	—	16	175	16	50	4.5	17.6	TS2A	⊙TKY06F	
	AQXR174SA16L	●	○	17	175	16	30	4.5	17.6	TS2A	⊙TKY06F	
	AQXR174SN16L	●	—	17	175	16	30	4.5	17.6	TS2A	⊙TKY06F	
	AQXR204SA20L	●	○	20	185	20	60	6	22	TS25	⊙TKY08F	QOG/MT1035R-G1/M2
	AQXR204SN20L	●	—	20	185	20	60	6	22	TS25	⊙TKY08F	
	AQXR214SA20L	●	○	21	185	20	35	6	22	TS25	⊙TKY08F	
	AQXR214SN20L	●	—	21	185	20	35	6	22	TS25	⊙TKY08F	
	AQXR254SA25L	●	○	25	220	25	75	7.5	27.5	TS33	⊙TKY08D	QOG/MT1342R-G1/M2
	AQXR254SN25L	●	—	25	220	25	75	7.5	27.5	TS33	⊙TKY08D	
	AQXR264SA25L	●	○	26	220	25	40	7.5	27.5	TS33	⊙TKY08D	
	AQXR264SN25L	●	—	26	220	25	40	7.5	27.5	TS33	⊙TKY08D	
	AQXR324SA32L	●	○	32	230	32	90	9.5	35.2	TS407	⊙TKY15D	QOG/MT1651R-G1/M2
	AQXR324SN32L	●	—	32	230	32	90	9.5	35.2	TS407	⊙TKY15D	
	AQXR334SA32L	●	○	33	230	32	50	9.5	35.2	TS407	⊙TKY15D	
	AQXR334SN32L	●	—	33	230	32	50	9.5	35.2	TS407	⊙TKY15D	
	AQXR354SA32L	●	○	35	230	32	50	11	40	TS407	⊙TKY15D	QOG/MT1856R-G1/M2
	AQXR354SN32L	●	—	35	230	32	50	11	40	TS407	⊙TKY15D	
AQXR404SA32L	●	○	40	240	32	60	12	44	TS55	⊙TKY25D	QOG/MT2062R-G1/M2	
AQXR404SN32L	●	—	40	240	32	60	12	44	TS55	⊙TKY25D		
AQXR504SA42L	●	○	50	250	42	70	15	55	TS6S	⊙TKY30T	QOG/MT2576R-G1/M2	
AQXR504SN42L	●	—	50	250	42	70	15	55	TS6S	⊙TKY30T		

*1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts. *2 APMX : Maximum depth of cut.

*3 Clamp Torque (N • m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5, TS6S=10.0

● : Inventory maintained in Japan.



SHORT EDGE TYPE

Right hand tool holder only.

Type	Order Number	Stock	Coolant Hole	Dimensions (mm)						*3	① ② ③	Insert
				DC	LF	DCON	LH	A3 ^{*1}	APMX ^{*2}			
Standard	AQXR162SA16S	●	○	16	120	16	30	4.5	7.4	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	AQXR162SN16S	●	—	16	120	16	30	4.5	7.4	TS2A	①TKY06F	
	AQXR172SA16S	●	○	17	120	16	30	4.5	7.4	TS2A	①TKY06F	
	AQXR172SN16S	●	—	17	120	16	30	4.5	7.4	TS2A	①TKY06F	
	AQXR202SA20S	●	○	20	130	20	35	6	9.2	TS25	①TKY08F	QOG/MT1035R-G1/M2
	AQXR202SN20S	●	—	20	130	20	35	6	9.2	TS25	①TKY08F	
	AQXR212SA20S	●	○	21	130	20	35	6	9.2	TS25	①TKY08F	
	AQXR212SN20S	●	—	21	130	20	35	6	9.2	TS25	①TKY08F	
	AQXR252SA25S	●	○	25	140	25	40	7.5	11.5	TS33	②TKY08D	QOG/MT1342R-G1/M2
	AQXR252SN25S	●	—	25	140	25	40	7.5	11.5	TS33	②TKY08D	
	AQXR262SA25S	●	○	26	140	25	40	7.5	11.5	TS33	②TKY08D	
	AQXR262SN25S	●	—	26	140	25	40	7.5	11.5	TS33	②TKY08D	
	AQXR322SA32S	●	○	32	150	32	50	9.5	14.5	TS407	②TKY15D	QOG/MT1651R-G1/M2
	AQXR322SN32S	●	—	32	150	32	50	9.5	14.5	TS407	②TKY15D	
	AQXR332SA32S	●	○	33	150	32	50	9.5	14.5	TS407	②TKY15D	
	AQXR332SN32S	●	—	33	150	32	50	9.5	14.5	TS407	②TKY15D	
	AQXR352SA32S	●	○	35	150	32	50	11	16	TS407	②TKY15D	QOG/MT1856R-G1/M2
	AQXR352SN32S	●	—	35	150	32	50	11	16	TS407	②TKY15D	
AQXR402SA32S	●	○	40	160	32	60	12	18	TS55	②TKY25D	QOG/MT2062R-G1/M2	
AQXR402SN32S	●	—	40	160	32	60	12	18	TS55	②TKY25D		
AQXR502SA42S	●	○	50	170	42	70	15	23	TS6S	③TKY30T	QOG/MT2576R-G1/M2	
AQXR502SN42S	●	—	50	170	42	70	15	23	TS6S	③TKY30T		
Long	AQXR162SA16L	●	○	16	175	16	50	4.5	7.4	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	AQXR162SN16L	●	—	16	175	16	50	4.5	7.4	TS2A	①TKY06F	
	AQXR172SA16L	●	○	17	175	16	30	4.5	7.4	TS2A	①TKY06F	
	AQXR172SN16L	●	—	17	175	16	30	4.5	7.4	TS2A	①TKY06F	
	AQXR202SA20L	●	○	20	185	20	60	6	9.2	TS25	①TKY08F	QOG/MT1035R-G1/M2
	AQXR202SN20L	●	—	20	185	20	60	6	9.2	TS25	①TKY08F	
	AQXR212SA20L	●	○	21	185	20	35	6	9.2	TS25	①TKY08F	
	AQXR212SN20L	●	—	21	185	20	35	6	9.2	TS25	①TKY08F	
	AQXR252SA25L	●	○	25	220	25	75	7.5	11.5	TS33	②TKY08D	QOG/MT1342R-G1/M2
	AQXR252SN25L	●	—	25	220	25	75	7.5	11.5	TS33	②TKY08D	
	AQXR262SA25L	●	○	26	220	25	40	7.5	11.5	TS33	②TKY08D	
	AQXR262SN25L	●	—	26	220	25	40	7.5	11.5	TS33	②TKY08D	
	AQXR322SA32L	●	○	32	230	32	90	9.5	14.5	TS407	②TKY15D	QOG/MT1651R-G1/M2
	AQXR322SN32L	●	—	32	230	32	90	9.5	14.5	TS407	②TKY15D	
	AQXR332SA32L	●	○	33	230	32	50	9.5	14.5	TS407	②TKY15D	
	AQXR332SN32L	●	—	33	230	32	50	9.5	14.5	TS407	②TKY15D	
	AQXR352SA32L	●	○	35	230	32	50	11	16	TS407	②TKY15D	QOG/MT1856R-G1/M2
	AQXR352SN32L	●	—	35	230	32	50	11	16	TS407	②TKY15D	
AQXR402SA32L	●	○	40	240	32	60	12	18	TS55	②TKY25D	QOG/MT2062R-G1/M2	
AQXR402SN32L	●	—	40	240	32	60	12	18	TS55	②TKY25D		
AQXR502SA42L	●	○	50	250	42	70	15	23	TS6S	③TKY30T	QOG/MT2576R-G1/M2	
AQXR502SN42L	●	—	50	250	42	70	15	23	TS6S	③TKY30T		

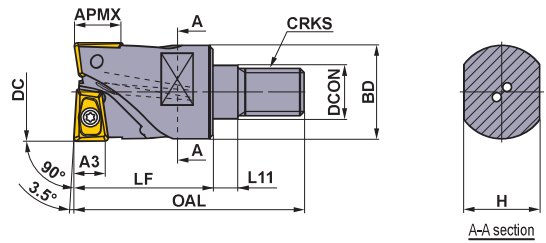
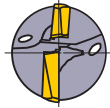
*1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts.

*2 APMX : Maximum depth of cut.

*3 Clamp Torque (N · m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5, TS6S=10.0

MILLING

INDEXABLE MILLING



SCREW-IN TYPE

Right hand tool holder only.

Order Number	Stock	Coolant Hole	Dimensions(mm)										*4 WT (kg)	*3		Insert
			DC	DCON	BD	OAL	LF	L11	H	CRKS	A3 ^{*1}	APMX ^{*2}		Clamp Screw	Wrench	
AQXR162M08A30	●	○	16	8.5	14.7	48	30	6	10	M8	4.5	7.4	0.1	TS2A	①TKY06F	QO○T0830R-○○
AQXR172M08A30	●	○	17	8.5	14.5	48	30	6	10	M8	4.5	7.4	0.1	TS2A	①TKY06F	
AQXR202M10A30	●	○	20	10.5	18.6	49	30	6	14	M10	6	9.2	0.2	TS25	①TKY08F	QO○T1035R-○○
AQXR212M10A30	●	○	21	10.5	18.5	49	30	6	14	M10	6	9.2	0.2	TS25	①TKY08F	
AQXR252M12A35	●	○	25	12.5	23.5	57	35	6	19	M12	7.5	11.5	0.2	TS33	②TKY08D	QO○T1342R-○○
AQXR262M12A35	●	○	26	12.5	23.5	57	35	6	19	M12	7.5	11.5	0.2	TS33	②TKY08D	
AQXR322M16A40	●	○	32	17	28.5	63	40	6	24	M16	9.5	14.5	0.3	TS407	②TKY15D	QO○T1651R-○○
AQXR332M16A40	●	○	33	17	28.5	63	40	6	24	M16	9.5	14.5	0.3	TS407	②TKY15D	
AQXR352M16A40	●	○	35	17	28.5	63	40	6	24	M16	11	16	0.3	TS407	②TKY15D	QO○T1856R-○○
AQXR402M16A45	●	○	40	17	28.5	68	45	6	24	M16	12	18	0.3	TS55	②TKY25D	QO○T2062R-○○

(Note) For screw-in type arbors, refer to page L145—L146.


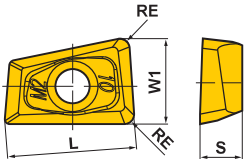

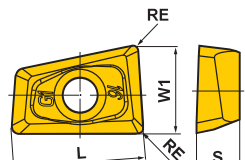
*1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts.

*2 APMX : Maximum depth of cut.

*3 Clamp Torque (N • m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5

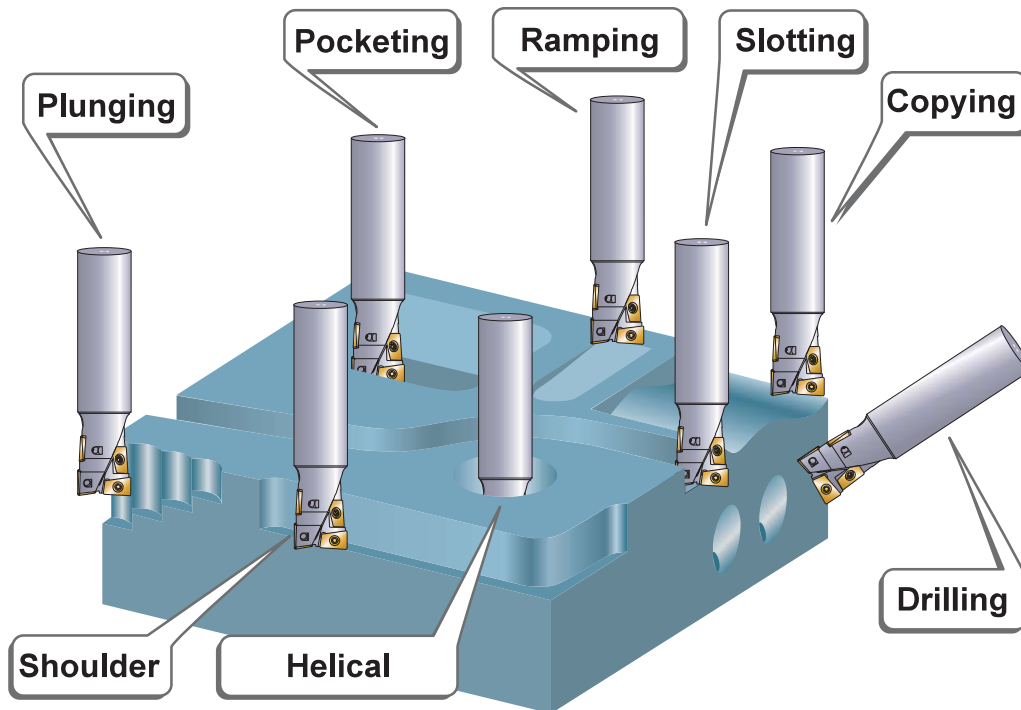
*4 WT : Tool Weight

INSERTS

Work Material	P	Steel	●	●						Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting			
	M	Stainless Steel	●	●									
Work Material	K	Cast Iron	●	●						Honing : E : Round F : Sharp			
	N	Non-ferrous Metal	●	●									
	S	Heat-resistant Alloy, Titanium Alloy	●	●									
Work Material	H	Hardened Steel	●	●									
Shape	Order Number	Endmill Dia.	Class	Honing	Coated		Carbide		Dimensions(mm)				Geometry
					VP15TF	VP30RT	HT10	L	W1	S	RE		
	QOMT0830R-M2	φ16,17	M	E	●	●			8.4	5.5	3	0.8	
	QOMT1035R-M2	φ20,21	M	E	●	●			10.6	7	3.5	0.8	
	QOMT1342R-M2	φ25,26	M	E	●	●			13.1	8.7	4.2	0.8	
	QOMT1651R-M2	φ32,33	M	E	●	●			16.5	11	5.1	0.8	
	QOMT1856R-M2	φ35	M	E	●	●			18	12	5.6	0.8	
	QOMT2062R-M2	φ40	M	E	●	●			20.4	13.6	6.2	0.8	
	QOMT2576R-M2	φ50	M	E	●	●			25.8	17.2	7.6	0.8	
	QOGT0830R-G1	φ16,17	G	F*	●		●		8.4	5.5	3	0.4	
	QOGT1035R-G1	φ20,21	G	F*	●		●		10.6	7	3.5	0.4	
	QOGT1342R-G1	φ25,26	G	F*	●		●		13.1	8.7	4.2	0.4	
	QOGT1651R-G1	φ32,33	G	F*	●		●		16.5	11	5.1	0.4	
	QOGT1856R-G1	φ35	G	F*	●		●		18	12	5.6	0.4	
	QOGT2062R-G1	φ40	G	F*	●		●		20.4	13.6	6.2	0.4	
	QOGT2576R-G1	φ50	G	F*	●		●		25.8	17.2	7.6	0.4	

* VP15TF insert honing is "E" type.

CUTTING MODE



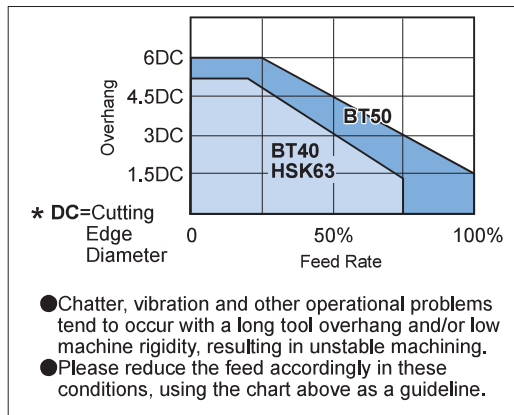
MILLING

RECOMMENDED CUTTING CONDITIONS

- Up to A3 depth of cut, the two lower cutting edges maintain contact with the workpiece.
- Beyond the range of A3, there is an area where the cutting edge contact with the workpiece becomes single bladed. Please pay special attention to the relationship between depth of cut and feed in this area.
- The insert in contact with the top edge of the workpiece tends to suffer from damage. At large depths of cut, applying depth of cut (t), where there are 2 inserts in contact is recommended to reduce wear and damage to the inserts.

Diameter	Recommended depth of cut t (mm)
φ16,17	12 — 14
φ20,21	14 — 17
φ25,26	17 — 22
φ32,33	22 — 28
φ35	25 — 32
φ40	28 — 35
φ50	35 — 45

* Figures for A3 and APMX are shown in the standard holder tables on the previous pages.



FOR SHOULDER MILLING

Work Material	Hardness	Grade	Cutting Speed (m/min)	φ16, φ17			φ20, φ21		
				Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)
P Mild Steel	≤180HB	VP15TF	180 (150—220)	—4.5	—8	0.25	—6	—10	0.30
				4.5—12	—5	0.16	6—14	—7	0.25
				12—17	—3	0.10	14—22	—4	0.18
Carbon Steel Alloy Steel	180—350HB	VP15TF	160 (120—200)	—4.5	—8	0.20	—6	—10	0.25
				4.5—12	—4	0.14	6—14	—6	0.20
				12—17	—2	0.08	14—22	—3	0.16
M Stainless Steel	≤270HB	VP30RT (VP15TF)	150 (120—180)	—4.5	—8	0.20	—6	—10	0.25
				4.5—12	—4	0.14	6—14	—6	0.20
				12—17	—2	0.08	14—22	—3	0.16
K Cast Iron	Tensile Strength ≤450MPa	VP15TF	180 (150—220)	—4.5	—8	0.25	—6	—10	0.30
				4.5—12	—5	0.16	6—14	—7	0.25
				12—17	—3	0.10	14—22	—4	0.18
N Aluminium Alloy	—	HTi10 (G1 Breaker)	500 (200—800)	—4.5	—11	0.30	—6	—14	0.35
				4.5—12	—8	0.21	6—14	—10	0.30
				12—17	—5	0.15	14—22	—6	0.23
H Hardened Steel	40—55HRC	VP15TF	80 (50—120)	—4.5	—5	0.16	—6	—6	0.20
				4.5—12	—3	0.10	6—14	—4	0.16
				12—17	—1	0.06	14—22	—2	0.12

(Note 1) Please pay special attention to the depth of cut when using the short edge type.

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

FOR SLOT MILLING

Work Material	Hardness	Grade	Cutting Speed (m/min)	φ16, φ17		φ20, φ21	
				Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)
P Mild Steel	≤180HB	VP15TF	180 (150—220)	—4.5	0.16	—6	0.18
				4.5—12	0.10	6—14	0.14
				12—17	0.07	14—22	0.10
Carbon Steel Alloy Steel	180—350HB	VP15TF	160 (120—200)	—4.5	0.14	—6	0.16
				4.5—12	0.09	6—14	0.12
				12—17	0.05	14—22	0.10
M Stainless Steel	≤270HB	VP30RT (VP15TF)	150 (120—180)	—4.5	0.14	—6	0.16
				4.5—12	0.09	6—14	0.12
				12—17	0.05	14—22	0.10
K Cast Iron	Tensile Strength ≤450MPa	VP15TF	180 (150—220)	—4.5	0.16	—6	0.18
				4.5—12	0.10	6—14	0.14
				12—17	0.07	14—22	0.10
N Aluminium Alloy	—	HTi10 (G1 Breaker)	500 (200—800)	—4.5	0.18	—6	0.20
				4.5—12	0.12	6—14	0.16
				12—17	0.09	14—22	0.12
H Hardened Steel	40—55HRC	VP15TF	80 (50—120)	—4.5	0.10	—6	0.12
				4.5—12	0.07	6—14	0.10

(Note 1) Please pay special attention to the depth of cut when using the short edge type.

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

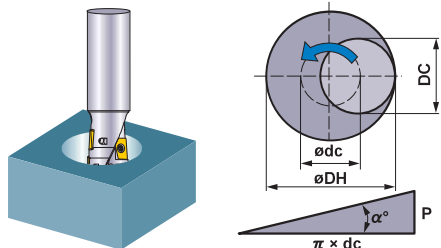
$\phi 25, \phi 26$			$\phi 32, \phi 33$			$\phi 35$			$\phi 40$			$\phi 50$		
Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)
-7.5	-12.5	0.35	-9.5	-16	0.40	-11	-17.5	0.45	-12	-20	0.50	-15	-25	0.60
7.5-17	-8	0.28	9.5-22	-11	0.32	11-25	-12	0.35	12-28	-13	0.40	15-35	-16	0.50
17-27	-5	0.20	22-35	-6	0.25	25-40	-6.5	0.28	28-44	-7	0.30	35-55	-10	0.35
-7.5	-12.5	0.30	-9.5	-16	0.35	-11	-17.5	0.37	-12	-20	0.40	-15	-25	0.50
7.5-17	-7	0.25	9.5-22	-10	0.28	11-25	-11	0.30	12-28	-12	0.32	15-35	-14	0.40
17-27	-4	0.18	22-35	-5	0.20	25-40	-5.5	0.22	28-44	-6	0.25	35-55	-8	0.30
-7.5	-12.5	0.30	-9.5	-16	0.35	-11	-17.5	0.37	-12	-20	0.40	-15	-25	0.50
7.5-17	-7	0.25	9.5-22	-10	0.28	11-25	-12	0.30	12-28	-12	0.32	15-35	-14	0.40
17-27	-4	0.18	22-35	-5	0.20	25-40	-6.5	0.22	28-44	-6	0.25	35-55	-8	0.30
-7.5	-12.5	0.35	-9.5	-16	0.40	-11	-17.5	0.45	-12	-20	0.50	-15	-25	0.60
7.5-17	-8	0.28	9.5-22	-11	0.32	11-25	-12	0.35	12-28	-13	0.40	15-35	-16	0.50
17-27	-5	0.20	22-35	-6	0.25	25-40	-6.5	0.28	28-44	-7	0.30	35-55	-10	0.35
-7.5	-17.5	0.40	-9.5	-23	0.45	-11	-24.5	0.50	-12	-28	0.55	-15	-35	0.65
7.5-17	-12.5	0.33	9.5-22	-16	0.37	11-25	-17.5	0.40	12-28	-20	0.45	15-35	-25	0.55
17-27	-7.5	0.25	22-35	-10	0.30	25-40	-10.5	0.32	28-44	-12	0.35	35-55	-15	0.40
-7.5	-7	0.22	-9.5	-8	0.25	-11	-9	0.28	-12	-10	0.30	-15	-14	0.35
7.5-17	-4	0.18	9.5-22	-5	0.20	11-25	-5.5	0.22	12-28	-6	0.24	15-35	-8	0.30
17-27	-2	0.14	22-35	-2	0.16	25-40	-2	0.17	28-44	-2	0.18	35-55	-4	0.22

$\phi 25, \phi 26$		$\phi 32, \phi 33$		$\phi 35$		$\phi 40$		$\phi 50$	
Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)
-7.5	0.20	-9.5	0.25	-11	0.27	-12	0.30	-15	0.35
7.5-17	0.16	9.5-22	0.20	11-25	0.22	12-28	0.25	15-35	0.30
17-27	0.12	22-35	0.14	25-40	0.16	28-44	0.18	35-55	0.22
-7.5	0.18	-9.5	0.20	-11	0.22	-12	0.25	-15	0.30
7.5-17	0.14	9.5-22	0.16	11-25	0.18	12-28	0.20	15-35	0.25
17-27	0.10	22-35	0.12	25-40	0.13	28-44	0.14	35-55	0.16
-7.5	0.18	-9.5	0.20	-11	0.22	-12	0.25	-15	0.30
7.5-17	0.14	9.5-22	0.16	11-25	0.18	12-28	0.20	15-35	0.25
17-27	0.10	22-35	0.12	25-40	0.13	28-44	0.14	35-55	0.16
-7.5	0.20	-9.5	0.25	-11	0.27	-12	0.30	-15	0.35
7.5-17	0.16	9.5-22	0.20	11-25	0.22	12-28	0.25	15-35	0.30
17-27	0.12	22-35	0.14	25-40	0.16	28-44	0.18	35-55	0.22
-7.5	0.22	-9.5	0.27	-11	0.30	-12	0.32	-15	0.37
7.5-17	0.18	9.5-22	0.22	11-25	0.25	12-28	0.27	15-35	0.32
17-27	0.14	22-35	0.16	25-40	0.18	28-44	0.20	35-55	0.25
-7.5	0.14	-9.5	0.16	-11	0.17	-12	0.18	-15	0.22
7.5-17	0.12	9.5-22	0.12	11-25	0.13	12-28	0.14	15-35	0.16

INDEXABLE MILLING

RECOMMENDED CUTTING CONDITIONS

FOR HELICAL CUTTING



● How to derive a locus of the center of the tool.

$$\varnothing dc = \varnothing DH - DC$$

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

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

(Note) $\alpha^\circ \leq 3^\circ$

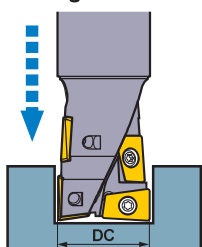
● Depth of cut for each pass.

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

Work Material	Hardness	Grade	Cutting Speed (m/min)	φ16, φ17				φ20, φ21				φ25, φ26				
				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	≤180HB	VP15TF	180 (150—220)	20	8	0.16	0.44	24	10	0.18	0.44	30	12.5	0.20	0.55	
				25	12	0.14	0.99	30	15	0.16	1.10	38	19	0.18	1.43	
				29	16	0.12	1.43	36	20	0.14	1.76	45	25	0.16	2.20	
	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	0.41
					25	12	0.12	0.74	30	15	0.14	0.82	38	19	0.16	1.07
					29	16	0.10	1.07	36	20	0.12	1.32	45	25	0.14	1.65
M Stainless Steel	≤270HB	VP30RT (VP15TF)	150 (120—180)	20	3	0.14	0.22	24	4	0.16	0.22	30	5	0.18	0.27	
				25	5	0.12	0.49	30	7	0.14	0.55	38	9	0.16	0.71	
				29	8	0.10	0.71	36	10	0.12	0.88	45	12.5	0.14	1.10	
K Cast Iron	Tensile Strength ≤450MPa	VP15TF	180 (150—220)	20	10	0.16	0.55	24	14	0.18	0.55	30	18	0.20	0.69	
				25	13	0.14	1.23	30	17	0.16	1.37	38	21	0.18	1.78	
				29	16	0.12	1.78	36	20	0.14	2.19	45	25	0.16	2.74	
N Aluminium Alloy	—	HT10 (G1 Breaker)	500 (200—800)	20	10	0.18	0.44	24	14	0.20	0.44	30	18	0.22	0.55	
				25	13	0.16	0.99	30	17	0.18	1.10	38	21	0.20	1.43	
				29	16	0.14	1.43	36	20	0.16	1.76	45	25	0.18	2.20	
H Hardened Steel	40—55HRC	VP15TF	80 (50—120)	20	3	0.10	0.22	24	4	0.12	0.22	30	5	0.14	0.27	
				25	5	0.08	0.49	30	7	0.10	0.55	38	9	0.12	0.71	
				29	8	0.06	0.71	36	10	0.08	0.88	45	12.5	0.10	1.10	

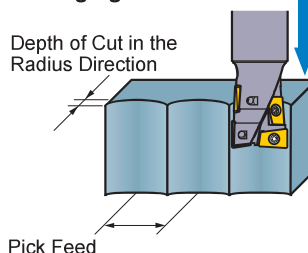
FOR DRILLING AND PLUNGING

● Drilling



- The recommended drilling depth is less than 0.5DC.
- 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 chips disposal is sufficiently achieved.
- The chips generated can disperse 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 Radius Direction	≤0.4DC
Pick Feed	≤0.5DC

Work Material	Hardness	Grade	Cutting Speed (m/min)	φ16, φ17		φ20, φ21		φ25, φ26	
				Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)
P Mild Steel	≤180HB	VP15TF	180 (150—220)	0.035	0.2	0.045	0.3	0.05	0.3
				0.03	0.2	0.04	0.3	0.045	0.3
Carbon Steel, Alloy Steel	180—350HB	VP15TF	160 (120—200)	0.03	0.2	0.04	0.3	0.045	0.3
M Stainless Steel	≤270HB	VP30RT (VP15TF)	150 (120—180)	0.03	0.15	0.04	0.25	0.045	0.25
K Cast Iron	Tensile Strength ≤450MPa	VP15TF	180 (150—220)	0.04	0.4	0.05	0.5	0.06	0.5
N Aluminium Alloy	—	HT10 (G1 Breaker)	500 (200—800)	0.04	0.2	0.05	0.3	0.06	0.3
H Hardened Steel	40—55HRC	VP15TF	80 (50—120)	0.02	0.15	0.03	0.25	0.035	0.25

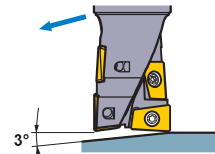
(Note) Helical grooving is strongly recommended for machining of tempered steel.

* When using the G1 breaker (VP15TF), reduce the feed rate by at least 20%.

	φ32, φ33				φ35				φ40				φ50			
	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)	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)
	38	16	0.25	0.66	42	18	0.28	0.77	48	20	0.30	0.88	60	25	0.35	1.10
	48	24	0.22	1.76	53	27	0.24	1.97	60	30	0.26	2.19	75	38	0.30	2.74
	58	32	0.20	2.85	63	35	0.21	3.07	72	40	0.22	3.51	90	50	0.26	4.39
	38	16	0.20	0.49	42	18	0.22	0.58	48	20	0.25	0.66	60	25	0.28	0.82
	48	24	0.18	1.32	53	27	0.2	1.48	60	30	0.22	1.65	75	38	0.26	2.06
	58	32	0.16	2.14	63	35	0.18	2.3	72	40	0.20	2.63	90	50	0.24	3.29
	38	6	0.20	0.33	42	7	0.22	0.38	48	8	0.25	0.44	60	10	0.28	0.55
	48	11	0.18	0.88	53	13	0.2	0.99	60	14	0.22	1.10	75	18	0.26	1.37
	58	16	0.16	1.43	63	18	0.18	1.53	72	20	0.20	1.75	90	25	0.24	2.19
	38	22	0.25	0.82	42	25	0.28	0.95	48	28	0.30	1.10	60	35	0.35	1.37
	48	27	0.22	2.19	53	30	0.24	2.47	60	34	0.26	2.74	75	43	0.30	3.43
	58	32	0.20	3.57	63	35	0.21	3.84	72	40	0.22	4.39	90	50	0.26	5.49
	38	22	0.27	0.66	42	25	0.3	0.77	48	28	0.32	0.88	60	35	0.37	1.10
	48	27	0.24	1.76	53	30	0.26	1.97	60	34	0.28	2.19	75	43	0.32	2.74
	58	32	0.22	2.85	63	35	0.21	3.07	72	40	0.24	3.51	90	50	0.27	4.39
	38	6	0.16	0.33	42	7	0.17	0.38	48	8	0.18	0.44	60	10	0.20	0.55
	48	11	0.14	0.88	53	13	0.15	0.99	60	14	0.16	1.10	75	18	0.18	1.37
	58	16	0.12	1.43	63	18	0.13	1.53	72	20	0.14	1.75	90	25	0.16	2.19

	φ32, φ33, φ35		φ40		φ50	
	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)
	0.055	0.3	0.06	0.3	0.065	0.3
	0.05	0.3	0.055	0.3	0.06	0.3
	0.05	0.25	0.055	0.25	0.06	0.25
	0.065	0.5	0.07	0.5	0.075	0.5
	0.065	0.3	0.07	0.3	0.075	0.3
	0.04	0.25	0.045	0.25	0.05	0.25

FOR RAMPING



- When machining steel the recommended ramping angle is 3°. If a ramping angle larger than 3° is used, then the chips may not be broken effectively resulting in chips wrapping around the tool.
- During ramping, it is recommended to reduce the feed rate by 40% from the cutting conditions on page L080.