MITSUBISHI MITSUBISHI MATERIALS TOOLS NEWS
2012.10 Update B183G

Strong Edge Insert Type Cutter for Cast Iron

VOX400

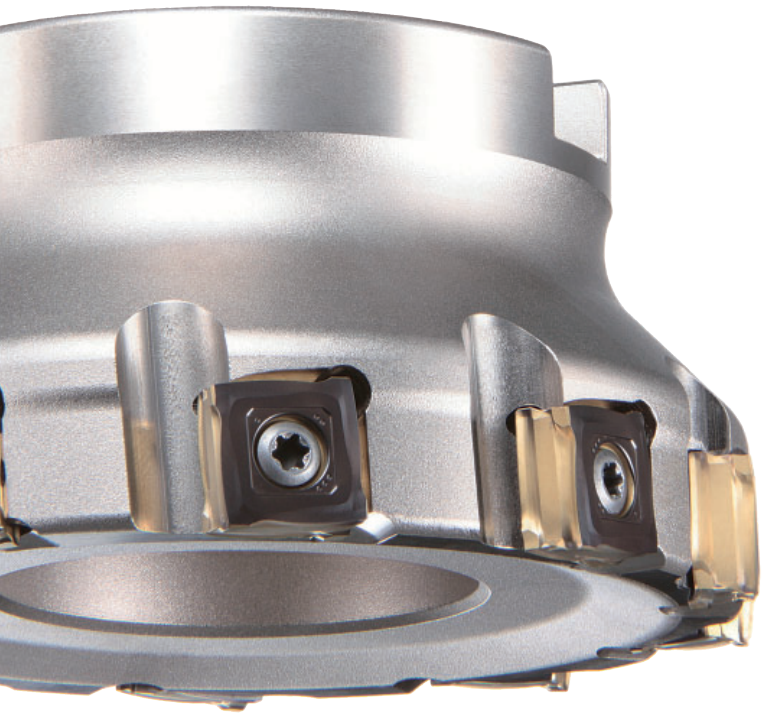
Series Expansion

New style face mill for cast iron milling

VOX cutter with vertical inserts for ultra high efficiency.

Vertical inserts with high strength cutting edge suitable for a wide range of cast iron rough milling applications

VOX400



Features of Cutter body

High rigidity design

Arranging the inserts vertically absorbs the principal cutting force through the thickness of the insert and achieves extremely high rigidity.

Easy to clamp insert

Inserts are screwed into the side of the holder, this simplifies clamping and unclamping for superior usability.

Wide selection of bodies

VOX400 meets the needs of a wide range of cast iron roughing applications with a coarse pitch type and a high-productivity fine pitch type.

Features of Insert

Long life insert grade

MC5020

- 1st recommendation for cast iron machining.
- Black super even coating technology is utilised to help prevent chip welding for long tool life.
- Dry cutting is recommended.

NEW

VP15TF

- A PVD coated grade for application versatility.
- Ideal for ductile cast iron, unstable cutting conditions and low rigidity workpieces.
- Wet cutting is possible.

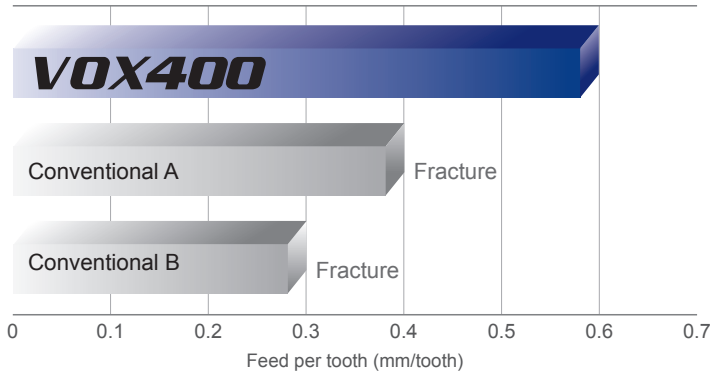
Unique vertical insert

- 8 usable corners with high strength cutting edge.
- The fracture resistance is significantly improved due to a convex curve cutting edge and a specially shaped relief face.
- Maximum depth of cut is 10mm.

Efficient cutting performance

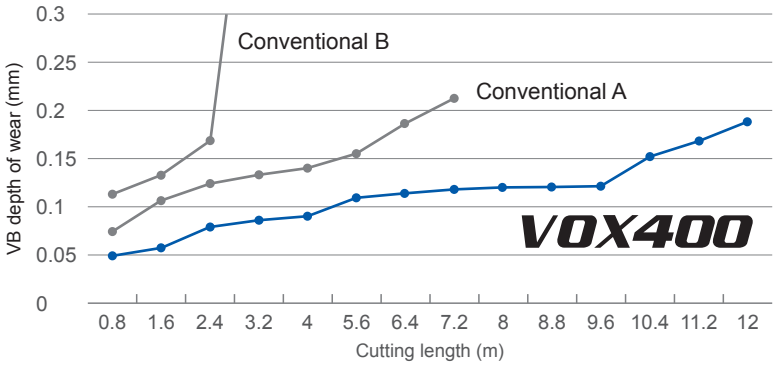
The original insert shape with convex cutting edge and shaped relief face offers excellent sharpness and extraordinary fracture resistance.

Fracture resistance



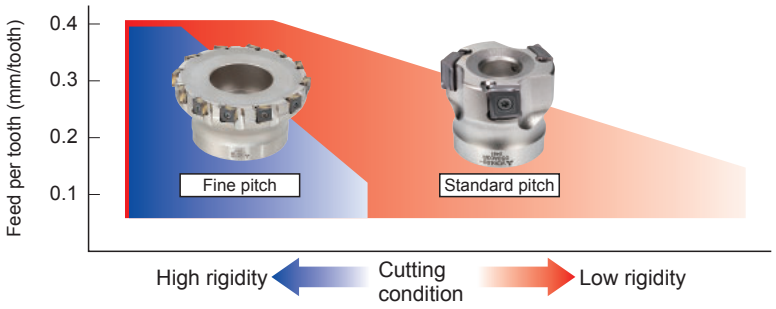
<Cutting Conditions>
Tool : VOX400R08008C(ø80)
Insert : SONX1206PER(MC5020)
Workpiece : FCD700
Cutting Speed : 200m/min
Feed : Var.
Depth of Cut : ap=5mm, ae=40mm
Coolant : Dry Cut

Test results of VP15TF tool life



<Cutting Conditions>
Tool : VOX400R08008C(ø80)
Insert : SONX1206PER(VP15TF)
Workpiece : FCD700
Cutting Speed : 120m/min
Feed : 0.2mm/tooth
Depth of Cut : ap=3mm, ae=50mm
Coolant : Wet Cut

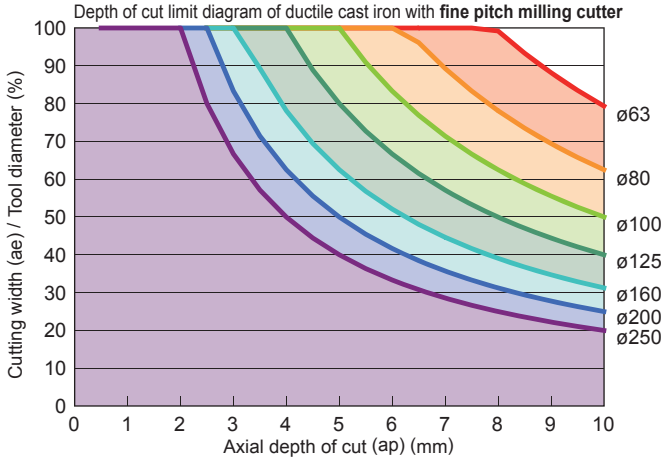
Selection of number of teeth

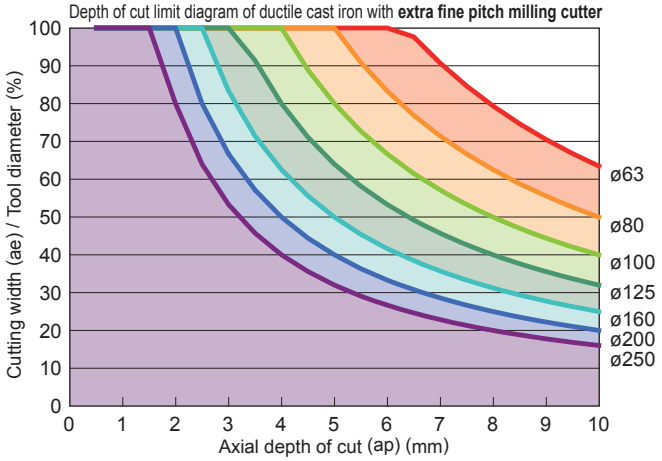


With stable workpiece and machine conditions, it is possible to increase the number of teeth used to promote higher efficiency. In these cases we recommend fine and super fine pitch cutters when machining gray cast iron.

How to use fine pitch and extra fine pitch.

When using fine and extra fine pitch cutters, care must be taken regarding elongated chips on materials such as FCD because the chip pocket is relatively small.
Refer to the charts below and ensure the axial depth and percentage of width of the cutter is not exceeded.





Strong Edge Insert Type Cutter for Cast Iron

VOX400

Arbor type

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	▬			

Fig.1

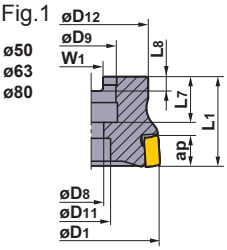


Fig.2

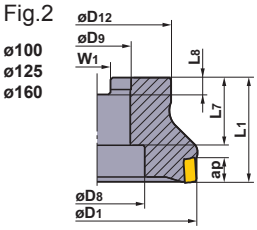
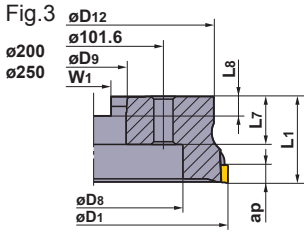


Fig.3

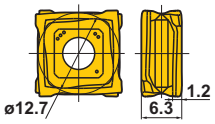


Right hand tool holder only.

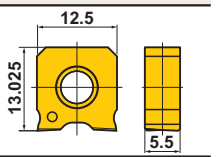
Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D11	D12	W1	L8	Mass (kg)	Max. Depth of Cut ap (mm)	Fig.	* Clamp Screw	Wrench
Coarse Pitch	**VOX400-050A03R**	●	3	50	40	22	20	11	17	50	10.4	6.3	0.3	10	1	CS401160T	TKY15T
	-063A04R	●	4	63	40	22	20	11	17	50	10.4	6.3	0.6	10	1	CS401160T	TKY15T
	R08004C	●	4	80	50	25.4	26	13	20	55	9.5	6	1.0	10	1	CS401160T	TKY15T
	R10006D	●	6	100	50	31.75	32	45	—	70	12.7	8	1.5	10	2	CS401160T	TKY15T
	R12508E	●	8	125	63	38.1	40	60	—	80	15.9	10	2.7	10	2	CS401160T	TKY15T
	R16010F	●	10	160	63	50.8	43	80	—	120	19.1	11	5.3	10	2	CS401160T	TKY15T
	R20012K	●	12	200	63	47.625	35	130	—	175	25.4	14.22	8.5	10	3	CS401160T	TKY15T
	R25016K	●	16	250	63	47.625	35	180	—	220	25.4	14.22	13.3	10	3	CS401160T	TKY15T
Fine Pitch	**VOX400-050A05R**	●	5	50	40	22	20	11	17	50	10.4	6.3	0.3	10	1	CS401160T	TKY15T
	-063A06R	●	6	63	40	22	20	11	17	50	10.4	6.3	0.6	10	1	CS401160T	TKY15T
	R08008C	●	8	80	50	25.4	26	13	20	55	9.5	6	1.0	10	1	CS401160T	TKY15T
	R10010D	●	10	100	50	31.75	32	45	—	70	12.7	8	1.5	10	2	CS401160T	TKY15T
	R12512E	●	12	125	63	38.1	40	60	—	80	15.9	10	2.7	10	2	CS401160T	TKY15T
	R16016F	●	16	160	63	50.8	43	80	—	120	19.1	11	5.3	10	2	CS401160T	TKY15T
	R20020K	●	20	200	63	47.625	35	130	—	175	25.4	14.22	8.5	10	3	CS401160T	TKY15T
	R25024K	●	24	250	63	47.625	35	180	—	220	25.4	14.22	13.3	10	3	CS401160T	TKY15T
Extra Fine Pitch	NEW **VOX400-063A08R**	●	8	63	40	22	20	11	17	50	10.4	6.3	0.5	10	1	CS401160T	TKY15T
	R08010C	●	10	80	50	25.4	26	13	20	55	9.5	6	1.0	10	1	CS401160T	TKY15T
	R10012D	●	12	100	50	31.75	32	45	—	70	12.7	8	1.4	10	2	CS401160T	TKY15T
	R12516E	●	16	125	63	38.1	40	60	—	80	15.9	10	2.6	10	2	CS401160T	TKY15T
	R16020F	●	20	160	63	50.8	43	80	—	120	19.1	11	5.1	10	2	CS401160T	TKY15T
	R20026K	●	26	200	63	47.625	35	130	—	175	25.4	14.22	8.2	10	3	CS401160T	TKY15T
	R25034K	●	34	250	63	47.625	35	180	—	220	25.4	14.22	13.0	10	3	CS401160T	TKY15T

* Clamp Torque (N • m) : CS401160T=3.5

INSERT

Shape	Order Number	Class	Horning	Coated MC5020	Coated NEW VP15TF	Geometry
	**SONX1206PER**	N	E	●	●	

WIPER INSERT

Shape	Order Number	Class	Horning	Coated VP15TF	Geometry
NEW 	**WOEX1206PER5C**	E	E	●	

● : Inventory maintained. (10 inserts in a case)

METRIC Standard

For metric arbors.

Fig.1

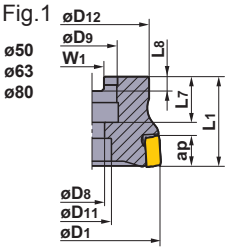


Fig.2

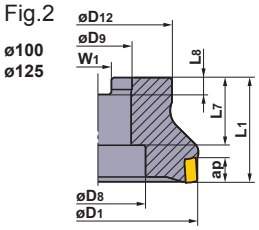
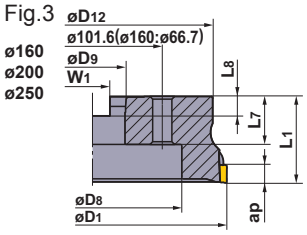


Fig.3



Right hand tool holder only.

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)									Mass (kg)	Max. Depth of Cut ap (mm)	Fig.	* Clamp Screw	Wrench
		R		D1	L1	D9	L7	D8	D11	D12	W1	L8					
Coarse Pitch	**VOX400-050A03R**	●	3	50	40	22	20	11	17	50	10.4	6.3	0.3	10	1	CS401160T	TKY15T
	-063A04R	●	4	63	40	22	20	11	17	50	10.4	6.3	0.6	10	1	CS401160T	TKY15T
	-080A04R	●	4	80	50	27	23	13	20	56	12.4	7	1	10	1	CS401160T	TKY15T
	-100B06R	●	6	100	50	32	32	45	—	78	14.4	8	1.7	10	2	CS401160T	TKY15T
	-125B08R	●	8	125	63	40	32	56	—	89	16.4	9	3	10	2	CS401160T	TKY15T
	-160C10R	●	10	160	63	40	29	56	—	120	16.4	9	5.4	10	3	CS401160T	TKY15T
	-200C12R	●	12	200	63	60	32	130	—	175	25.7	14.22	8.1	10	3	CS401160T	TKY15T
	-250C16R	●	16	250	63	60	32	180	—	210	25.7	14.22	11.8	10	3	CS401160T	TKY15T
Fine Pitch	**VOX400-050A05R**	●	5	50	40	22	20	11	17	50	10.4	6.3	0.3	10	1	CS401160T	TKY15T
	-063A06R	●	6	63	40	22	20	11	17	50	10.4	6.3	0.6	10	1	CS401160T	TKY15T
	-080A08R	●	8	80	50	27	23	13	20	56	12.4	7	1	10	1	CS401160T	TKY15T
	-100B10R	●	10	100	50	32	32	45	—	78	14.4	8	1.7	10	2	CS401160T	TKY15T
	-125B12R	●	12	125	63	40	32	56	—	89	16.4	9	3	10	2	CS401160T	TKY15T
	-160C16R	●	16	160	63	40	29	56	—	120	16.4	9	5.4	10	3	CS401160T	TKY15T
	-200C20R	●	20	200	63	60	32	130	—	175	25.7	14.22	8.1	10	3	CS401160T	TKY15T
	-250C24R	●	24	250	63	60	32	180	—	210	25.7	14.22	11.8	10	3	CS401160T	TKY15T
NEW Extra Fine Pitch	**VOX400-063A08R**	●	8	63	40	22	20	11	17	50	10.4	6.3	0.5	10	1	CS401160T	TKY15T
	-080A10R	●	10	80	50	27	23	13	20	56	12.4	7	1.0	10	1	CS401160T	TKY15T
	-100B12R	●	12	100	50	32	32	45	—	78	14.4	8	1.6	10	2	CS401160T	TKY15T
	-125B16R	●	16	125	63	40	32	56	—	89	16.4	9	2.8	10	2	CS401160T	TKY15T
	-160C20R	●	20	160	63	40	29	56	—	120	16.4	9	5.2	10	3	CS401160T	TKY15T
	-200C26R	●	26	200	63	60	32	130	—	175	25.7	14.22	7.9	10	3	CS401160T	TKY15T
	-250C34R	●	34	250	63	60	32	180	—	210	25.7	14.22	11.5	10	3	CS401160T	TKY15T

* Clamp Torque (N • m) : CS401160T=3.5

VOX400

RECOMMENDED CUTTING CONDITIONS

VOX400 (Standard pitch)

Work Material		Tensile Strength	Insert Grade	Cutting Speed (m/min)	ϕ63—ϕ250		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	MC5020	300(250—350)	≤D_1	≤10	0.4(0.3—0.5)
			VP15TF	250(200—300)	≤D_1	≤10	0.4(0.3—0.5)
		≤350MPa	MC5020	220(150—300)	≤D_1	≤10	0.3(0.2—0.4)
			VP15TF	200(150—300)	≤D_1	≤10	0.3(0.2—0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150—250)	≤D_1	≤10	0.3(0.2—0.4)
			VP15TF	170(150—200)	≤D_1	≤10	0.3(0.2—0.4)
		≤800MPa	MC5020	170(150—200)	≤D_1	≤10	0.2(0.1—0.3)
			VP15TF	150(100—200)	≤D_1	≤10	0.2(0.1—0.3)

VOX400 (Fine pitch)

Work Material		Tensile Strength	Insert Grade	Cutting Speed (m/min)	ϕ63			ϕ80		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	MC5020	300(250—350)	≤D_1	≤10	0.4(0.3—0.5)	≤D_1	≤10	0.4(0.3—0.5)
			VP15TF	250(200—300)	≤D_1	≤10	0.4(0.3—0.5)	≤D_1	≤10	0.4(0.3—0.5)
		≤350MPa	MC5020	220(150—300)	≤D_1	≤10	0.3(0.2—0.4)	≤D_1	≤10	0.3(0.2—0.4)
			VP15TF	200(150—300)	≤D_1	≤10	0.3(0.2—0.4)	≤D_1	≤10	0.3(0.2—0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150—250)	≤0.8D_1	≤10	0.3(0.2—0.4)	≤0.6D_1	≤10	0.3(0.2—0.4)
			VP15TF	170(150—200)	≤0.8D_1	≤10	0.3(0.2—0.4)	≤0.6D_1	≤10	0.3(0.2—0.4)
		≤800MPa	MC5020	170(150—200)	≤0.8D_1	≤10	0.2(0.1—0.3)	≤0.6D_1	≤10	0.2(0.1—0.3)
			VP15TF	150(100—200)	≤0.8D_1	≤10	0.2(0.1—0.3)	≤0.6D_1	≤10	0.2(0.1—0.3)

Work Material		Tensile Strength	Insert Grade	Cutting Speed (m/min)	ϕ100			ϕ125		
					Radial depth of cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	MC5020	300(250—350)	≤D_1	≤10	0.4(0.3—0.5)	≤D_1	≤10	0.4(0.3—0.5)
			VP15TF	250(200—300)	≤D_1	≤10	0.4(0.3—0.5)	≤D_1	≤10	0.4(0.3—0.5)
		≤350MPa	MC5020	220(150—300)	≤D_1	≤10	0.3(0.2—0.4)	≤D_1	≤10	0.3(0.2—0.4)
			VP15TF	200(150—300)	≤D_1	≤10	0.3(0.2—0.4)	≤D_1	≤10	0.3(0.2—0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150—250)	≤0.5D_1	≤10	0.3(0.2—0.4)	≤0.4D_1	≤10	0.3(0.2—0.4)
			VP15TF	170(150—200)	≤0.5D_1	≤10	0.3(0.2—0.4)	≤0.4D_1	≤10	0.3(0.2—0.4)
		≤800MPa	MC5020	170(150—200)	≤0.5D_1	≤10	0.2(0.1—0.3)	≤0.4D_1	≤10	0.2(0.1—0.3)
			VP15TF	150(100—200)	≤0.5D_1	≤10	0.2(0.1—0.3)	≤0.4D_1	≤10	0.2(0.1—0.3)

Work Material		Tensile Strength	Insert Grade	Cutting Speed (m/min)	ϕ160			ϕ200—ϕ250		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	MC5020	300(250—350)	≤D_1	≤10	0.4(0.3—0.5)	≤D_1	≤10	0.4(0.3—0.5)
			VP15TF	250(200—300)	≤D_1	≤10	0.4(0.3—0.5)	≤D_1	≤10	0.4(0.3—0.5)
		≤350MPa	MC5020	220(150—300)	≤D_1	≤10	0.3(0.2—0.4)	≤D_1	≤10	0.3(0.2—0.4)
			VP15TF	200(150—300)	≤D_1	≤10	0.3(0.2—0.4)	≤D_1	≤10	0.3(0.2—0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150—250)	≤0.3D_1	≤10	0.3(0.2—0.4)	≤0.2D_1	≤10	0.3(0.2—0.4)
			VP15TF	170(150—200)	≤0.3D_1	≤10	0.3(0.2—0.4)	≤0.2D_1	≤10	0.3(0.2—0.4)
		≤800MPa	MC5020	170(150—200)	≤0.3D_1	≤10	0.2(0.1—0.3)	≤0.2D_1	≤10	0.2(0.1—0.3)
			VP15TF	150(100—200)	≤0.3D_1	≤10	0.2(0.1—0.3)	≤0.2D_1	≤10	0.2(0.1—0.3)

- D_1 is cutter diameter.
- When using wiper insert, please reduce the feed per tooth to half the normal rate.

VOX400 (Extra fine pitch)

Work Material		Tensile Strength	Insert Grade	Cutting Speed (m/min)	ϕ63			ϕ80		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	MC5020	300(250－350)	≤D_1	≤10	0.4(0.3－0.5)	≤D_1	≤10	0.4(0.3－0.5)
			VP15TF	250(200－300)	≤D_1	≤10	0.4(0.3－0.5)	≤D_1	≤10	0.4(0.3－0.5)
		≤350MPa	MC5020	220(150－300)	≤D_1	≤10	0.3(0.2－0.4)	≤D_1	≤10	0.3(0.2－0.4)
			VP15TF	200(150－300)	≤D_1	≤10	0.3(0.2－0.4)	≤D_1	≤10	0.3(0.2－0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150－250)	≤0.6D_1	≤10	0.3(0.2－0.4)	≤0.5D_1	≤10	0.3(0.2－0.4)
			VP15TF	170(150－200)	≤0.6D_1	≤10	0.3(0.2－0.4)	≤0.5D_1	≤10	0.3(0.2－0.4)
		≤800MPa	MC5020	170(150－200)	≤0.6D_1	≤10	0.2(0.1－0.3)	≤0.5D_1	≤10	0.2(0.1－0.3)
			VP15TF	150(100－200)	≤0.6D_1	≤10	0.2(0.1－0.3)	≤0.5D_1	≤10	0.2(0.1－0.3)

Work Material		Tensile Strength	Insert Grade	Cutting Speed (m/min)	ϕ100			ϕ125		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	MC5020	300(250－350)	≤D_1	≤10	0.4(0.3－0.5)	≤D_1	≤10	0.4(0.3－0.5)
			VP15TF	250(200－300)	≤D_1	≤10	0.4(0.3－0.5)	≤D_1	≤10	0.4(0.3－0.5)
		≤350MPa	MC5020	220(150－300)	≤D_1	≤10	0.3(0.2－0.4)	≤D_1	≤10	0.3(0.2－0.4)
			VP15TF	200(150－300)	≤D_1	≤10	0.3(0.2－0.4)	≤D_1	≤10	0.3(0.2－0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150－250)	≤0.4D_1	≤10	0.3(0.2－0.4)	≤0.3D_1	≤10	0.3(0.2－0.4)
			VP15TF	170(150－200)	≤0.4D_1	≤10	0.3(0.2－0.4)	≤0.3D_1	≤10	0.3(0.2－0.4)
		≤800MPa	MC5020	170(150－200)	≤0.4D_1	≤10	0.2(0.1－0.3)	≤0.3D_1	≤10	0.2(0.1－0.3)
			VP15TF	150(100－200)	≤0.4D_1	≤10	0.2(0.1－0.3)	≤0.3D_1	≤10	0.2(0.1－0.3)

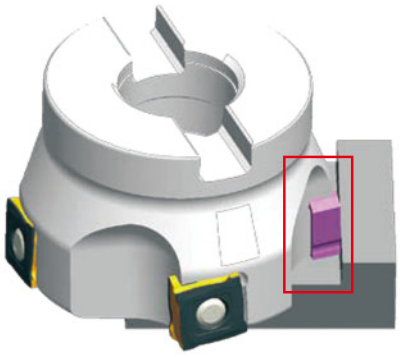
Work Material		Tensile Strength	Insert Grade	Cutting Speed (m/min)	ϕ160			ϕ200－ϕ250		
					Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)	Radial Depth of Cut ae (mm)	Depth of Cut ap (mm)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	MC5020	300(250－350)	≤D_1	≤10	0.4(0.3－0.5)	≤D_1	≤10	0.4(0.3－0.5)
			VP15TF	250(200－300)	≤D_1	≤10	0.4(0.3－0.5)	≤D_1	≤10	0.4(0.3－0.5)
		≤350MPa	MC5020	220(150－300)	≤D_1	≤10	0.3(0.2－0.4)	≤D_1	≤10	0.3(0.2－0.4)
			VP15TF	200(150－300)	≤D_1	≤10	0.3(0.2－0.4)	≤D_1	≤10	0.3(0.2－0.4)
	Ductile Cast Iron	≤450MPa	MC5020	200(150－250)	≤0.25D_1	≤10	0.3(0.2－0.4)	≤0.15D_1	≤10	0.3(0.2－0.4)
			VP15TF	170(150－200)	≤0.25D_1	≤10	0.3(0.2－0.4)	≤0.15D_1	≤10	0.3(0.2－0.4)
		≤800MPa	MC5020	170(150－200)	≤0.25D_1	≤10	0.2(0.1－0.3)	≤0.15D_1	≤10	0.2(0.1－0.3)
			VP15TF	150(100－200)	≤0.25D_1	≤10	0.2(0.1－0.3)	≤0.15D_1	≤10	0.2(0.1－0.3)

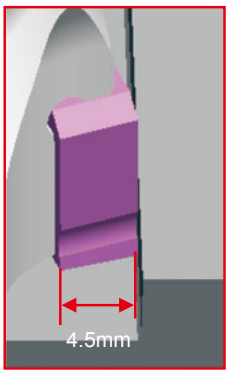
- D_1 is cutter diameter.
- When using wiper insert, please reduce the feed per tooth to half the normal rate.

Usable cutting edge width of wiper inserts

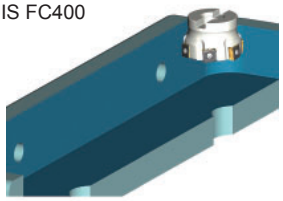
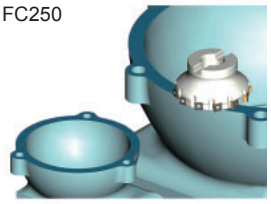
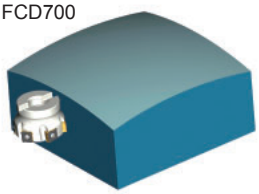
The width of the wiper insert itself is 5.5mm, however the actual functioning cutting edge width after installation to the body is 4.5mm, as shown in the diagram.

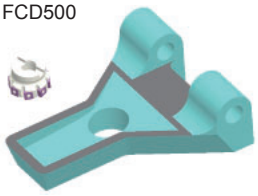
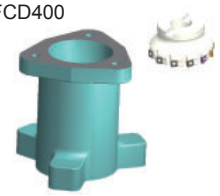
With one wiper insert, it is possible to machine up to fr=4mm feed per revolution. When exceeding fr=4mm, use two or more wiper inserts. Note that there is a possibility to exceed fr=4mm when using a holder with more than 24 inserts.





APPLICATION EXAMPLE

Tool		VOX400-063A06R (MC5020)	VOX400R12512E (MC5020)	VOX400-063A06R (MC5020)
Workpiece		JIS FC400 	JIS FC250 	JIS FCD700 
Component		Press mould base	Gear case	Press mould parts
Cutting Conditions	Cutting Speed (m/min)	228	120	200
	Table Feed (mm/min)	2046	733	800
	Feed per Tooth (mm/tooth)	0.31	0.2	0.14
	Radial Depth of cut ae (mm)	5	40	17
	Axial Depth of cut ap (mm)	10	3	3
Coolant		Dry cutting	Dry cutting	Dry cutting
Results		Conventional products required the axial depth of cut to be set at 5 mm for stable milling. But the VOX400 allowed stable milling with twice the depth of cut and produced a good wall surface accuracy.	Due to the unstable workpiece, conventional products were usually damaged and became unusable. VOX400 is more stable and gave 3 times tool life.	Due to the cutting resistance of earlier products, depth of cut in the radial direction was limited to 8.5 mm. But the low cutting resistance of the VOX400 allowed stable milling with double the depth of cut.

Tool		VOX400-080B10R (MC5020)	VOX400-063A08R (VP15TF)	VOX400-125B16R (Wiper Insert)
Workpiece		JIS FC300 	JIS FCD500 	JIS FCD400 
Component		Gear case	Automobile parts	Exhaust parts
Cutting Conditions	Cutting Speed (m/min)	700	285-356	235
	Table Feed (mm/min)	4200	1900-2300	789
	Feed per Tooth (mm/tooth)	0.15	0.15-0.16	0.11
	Radial Depth of cut ae (mm)	-	-	100
	Axial Depth of cut ap (mm)	1.5-2	2-4	0.15-0.25
Coolant		Dry cutting	Dry cutting	Dry cutting
Results		Vibration and chipping occurred with conventional products due to the low rigidity clamping. VOX400 allowed a more stable cutting performance without chipping and costs were reduced by 25%.	Compared to conventional products tool life was improved 30% and cutting resistance was reduced by 25%.	The surface finish was improved compared to the conventional products.

●With reference to the above examples, adjust the cutting conditions according to the machine specifications, workpiece geometry and clamping method used.

For Your Safety
●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When attaching inserts or spare parts, please use only the correct wrench or spanner. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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(Tools specifications subject to change without notice.)

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