MITSUBISHI MITSUBISHI MATERIALS TOOLS NEWS
2015.4 Update B160G

Face Milling Cutter for High Efficiency Machining of Cast Irons

AHX640W

Series Expansion

Heptagonal double sided insert offering a breakthrough in cast iron machining.

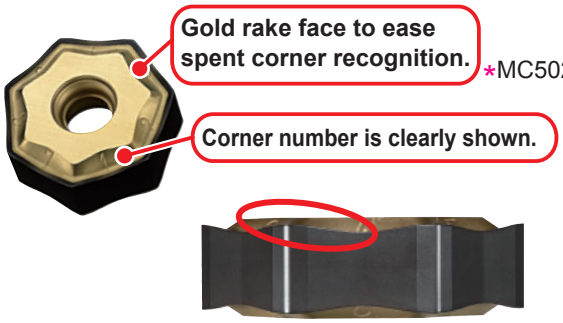
Face Milling Cutter for High Efficiency Machining of Cast Irons

AHX640W

Features

Unique 14 cornered insert

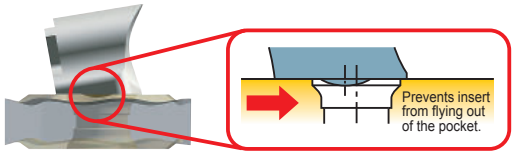
- Economical heptagonal double sided insert.
- Double positive cutting edge geometry offers lower cutting resistance for improved machining efficiency. (MK breaker)
- High rigidity inserts suitable for high feed milling of cast irons.



Sloped cutting edge and large rake angle

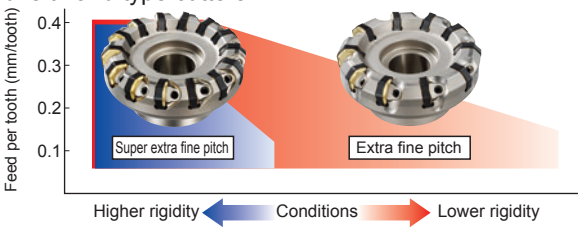
Innovative clamp system

- New wedge geometry developed to increase the permissible number of teeth.
- Unique wedge geometry uses a protruding section that fits inside the insert hole acts as an Anti-Fly Insert (AFI) mechanism.

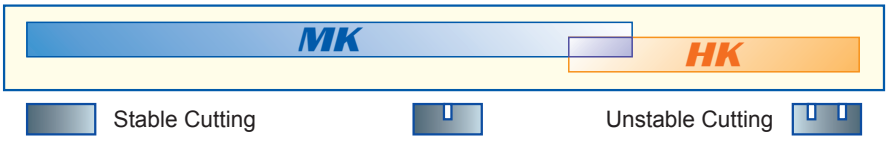


2 variations for different applications

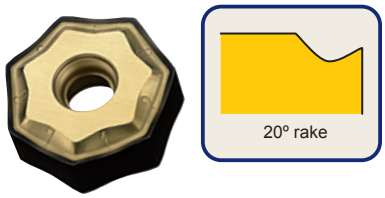
- Extra fine pitch and super extra fine pitch types allow high efficiency milling under various machining conditions. Additionally, left hand type for use on special machines are also available as standard. Inserts can be used with both right and left hand type cutters.



Insert applications



MK General-purpose insert

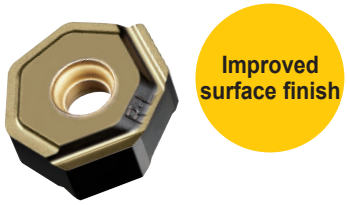


- High tolerance M-class insert.
- Neutral, double sided 14 corners.
- 20° rake angle for low cutting resistance. First recommendation for roughing and finishing.
- MC5020 grade for cast iron machining allows longer tool life.

HK Strong cutting edge insert

- High tolerance M-class insert.
- Neutral, double sided 14 corners.
- High cutting edge strength to prevent fracturing of the cutting edge during unstable machining of non-uniform work pieces and high feed machining.
- MC5020 grade for cast iron machining allows longer tool life.

WK Wiper insert



- Right-hand 2 corners, left-hand 2 corners.
- Based on the number of inserts and the cutting conditions, by using the wiper inserts it is possible to improve the overall surface finish.
- MC5020 grade for cast iron machining allows longer tool life.

FACE MILLING

<HIGH FEED CUTTING FOR CAST IRON>

40° Finishing Roughing

AHX640W

P M **K** N S H

- **Heptagonal double sided insert.**
- **Economical 14 cutting edge inserts.**
- **Multi insert design for high feed machining.**

Fig.1 ø80

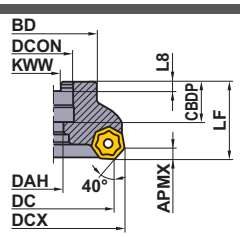


Fig.2 ø100 ø125 ø160

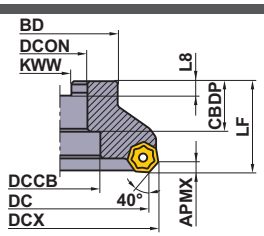


Fig.3 ø200 ø250

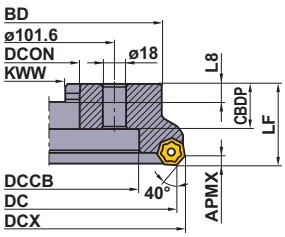
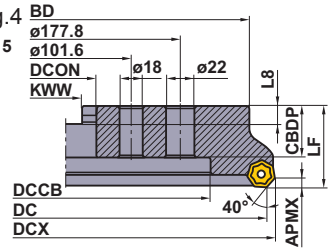


Fig.4 ø315

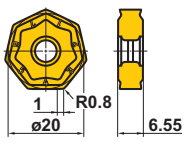
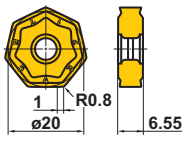
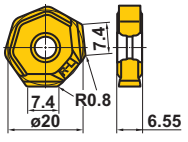


KAPR :40°
GAMP:-6° T :+10°
GAMF:-4° I :+9°—+10° (T,I : When using the MK breaker insert)

Right hand tool holder shown.

Type	Order Number	Stock R	Stock L	Number of Teeth	DC	DCX	LF	DCON	CBDP	DAH	DCCB	BD	KWW	L8	WT (kg)	APMX (mm)	Type (Fig.)
Extra Fine Pitch Type	**AHX640WR/L08008C**	●	●	8	80	92.6	50	25.4	26	13	—	56	9.5	6	1.5	6	1
	AHX640WR/L**10010D**	●	●	10	100	112.6	50	31.75	32	—	45	70	12.7	8	2.1	6	2
	AHX640WR/L**12512E**	●	●	12	125	137.6	63	38.1	35	—	56	80	15.9	10	3.5	6	2
	AHX640WR/L**16016F**	●	●	16	160	172.6	63	50.8	38	—	72	100	19.1	11	5.6	6	2
	AHX640WR/L**20020K**	●	●	20	200	212.6	63	47.625	35	—	140	175	25.4	14.22	9.0	6	3
	AHX640WR/L**25024K**	●	●	24	250	262.6	63	47.625	35	—	180	220	25.4	14.22	14.4	6	3
	AHX640WR/L**31528P**	●	●	28	315	327.6	63	47.625	40	—	225	285	25.4	14.22	23.8	6	4
Super Extra Fine Pitch Type	**AHX640WR/L08010C**	●	●	10	80	92.6	50	25.4	26	13	—	56	9.5	6	1.5	6	1
	AHX640WR/L**10014D**	●	●	14	100	112.6	50	31.75	32	—	45	70	12.7	8	2.1	6	2
	AHX640WR/L**12518E**	●	●	18	125	137.6	63	38.1	35	—	56	80	15.9	10	3.5	6	2
	AHX640WR/L**16022F**	●	●	22	160	172.6	63	50.8	38	—	72	100	19.1	11	5.6	6	2
	AHX640WR/L**20028K**	●	●	28	200	212.6	63	47.625	35	—	140	175	25.4	14.22	9.0	6	3
	AHX640WR/L**25036K**	●	●	36	250	262.6	63	47.625	35	—	180	220	25.4	14.22	14.4	6	3
	AHX640WR/L**31544P**	●	●	44	315	327.6	63	47.625	40	—	225	285	25.4	14.22	23.8	6	4

INSERTS

Shape	Order Number	Class	Honing	Coated MC5020	Coated VP15TF (NEW)	Coated VP20RT (NEW)	Geometry
MK Breaker  **General**	**NNMU200608ZEN-MK**	M	E	●	●	●	
HK Breaker  Strong Cutting Edge Type	**NNMU200608ZEN-HK**	M	E	●	●	●	
Wiper 	**WNEU2006ZEN7C-WK**	E	E	●			

Dimensions and symbols (ISO 13399 compliance)

DC = Cutting diameter
DCX = Maximum hole diameter
LF = Functional length
DCON = Fixing part depth
CBDP = Connection bore depth
DAH = Diameter access hole
DCCB = Fixing bolt seat diameter
BD = Body diameter
KWW = Keyway width
WT = Weight of item
APMX = Max. depth of cut

● : Inventory maintained in Japan. (10 inserts in one case)

Fig.1
ø80

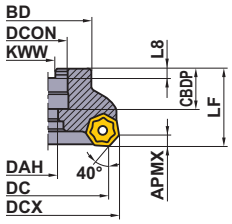


Fig.2
ø100
ø125

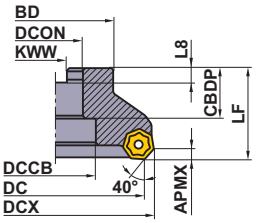


Fig.3
ø160

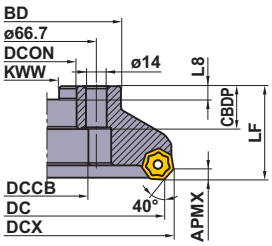
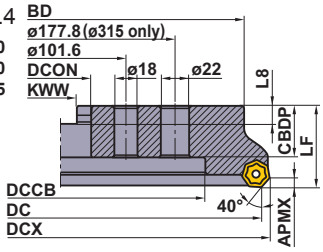


Fig.4
ø200
ø250
ø315



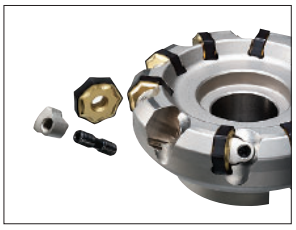
For metric arbor

The cutter bore diameter DCON is indicated in millimetre.

KAPR :40°
GAMP :-6° T :+10°
GAMF :-4° I :+9°—+10° (T,I : When using the MK breaker insert)

Right hand tool holder shown.

Type	Order Number	Stock R	Stock L	Number of Teeth	Dimensions(mm) DC	DCX	LF	DCON	CBDP	DAH	DCCB	BD	KWW	L8	WT (kg)	APMX (mm)	Type (Fig.)
Extra Fine Pitch Type	**AHX640W-080A08R/L**	●	●	8	80	92.6	50	27	23	13	—	56	12.4	7	1.5	6	1
	AHX640W-100B10R/L	●	●	10	100	112.6	50	32	32	—	45	70	14.4	8	2.1	6	2
	AHX640W-125B12R/L	●	●	12	125	137.6	63	40	32	—	56	80	16.4	9	3.1	6	2
	AHX640W-160C16R/L	●	●	16	160	172.6	63	40	29	—	56	100	16.4	9	5.6	6	3
	AHX640W-200C20R/L	●	●	20	200	212.6	63	60	32	—	135	155	25.7	14	8.0	6	4
	AHX640W-250C24R/L	●	●	24	250	262.6	63	60	32	—	180	200	25.7	14	12.6	6	4
	AHX640W-315C28R/L	●	●	28	315	327.6	80	60	57	—	225	285	25.7	14	31.5	6	4
Super Extra Fine Pitch Type	**AHX640W-080A10R/L**	●	●	10	80	92.6	50	27	23	13	—	56	12.4	7	1.5	6	1
	AHX640W-100B14R/L	●	●	14	100	112.6	50	32	32	—	45	70	14.4	8	2.1	6	2
	AHX640W-125B18R/L	●	●	18	125	137.6	63	40	32	—	56	80	16.4	9	3.1	6	2
	AHX640W-160C22R/L	●	●	22	160	172.6	63	40	29	—	56	100	16.4	9	5.6	6	3
	AHX640W-200C28R/L	●	●	28	200	212.6	63	60	32	—	135	155	25.7	14	8.0	6	4
	AHX640W-250C36R/L	●	●	36	250	262.6	63	60	32	—	180	200	25.7	14	12.6	6	4
	AHX640W-315C44R/L	●	●	44	315	327.6	80	60	57	—	225	285	25.7	14	31.5	6	4



SPARE PARTS

Tool Holder Number	 Wedge	 * Clamp Screw	 Wrench
AHX640W Type	CWAHX640WN	LS0622T	TKY15T

* Clamp Torque (N • m) : LS0622T=6.0

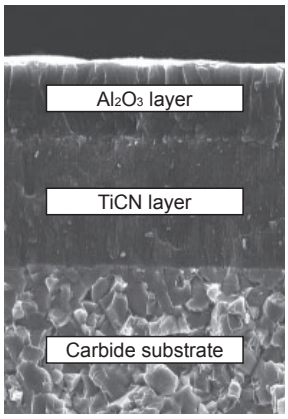
Dimensions and symbols (ISO 13399 compliance)

DC = Cutting diameter
DCX = Maximum hole diameter
LF = Functional length
DCON = Fixing part depth
CBDP = Connection bore depth
DAH = Diameter access hole
DCCB = Fixing bolt seat diameter
BD = Body diameter
KWW = Keyway width
WT = Weight of item
APMX = Max. depth of cut

● : **Inventory maintained in Japan.**

Features of MC5020

●MC5020 has excellent wear, chipping and thermal crack resistance. These features prevent the problems usually associated with machining cast irons over prolonged periods.



Structure of MC5020

Improved wear resistance

The micro-grain wear resistant Al_2O_3 and fibrous TiCN layers deliver excellent wear resistance when milling a wide range of cast irons.

Improved fracture resistance

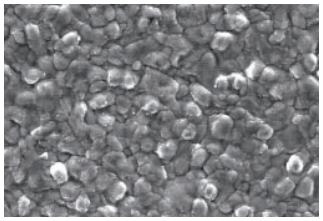
Use of a specially developed cemented carbide that provides superior resistance to fracture and thermal cracking prevents the cutting edge from sudden fracturing.

Reduced abnormal damage

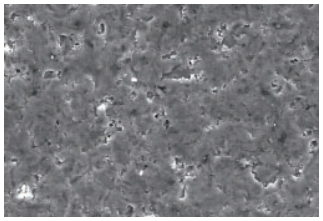
A black super-smooth coating prevents abnormal damage such as weld chipping.

Black super-smooth coating

Comparison of Coating Surface



Conventional coating

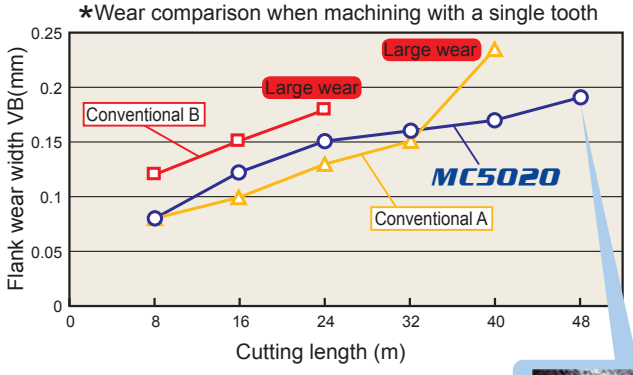


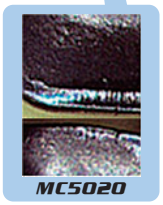
Black super-smooth coating

Cutting Performance

Wear Resistance

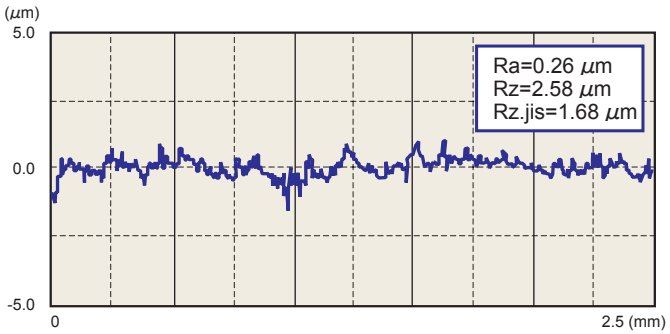
*Wear comparison when machining with a single tooth



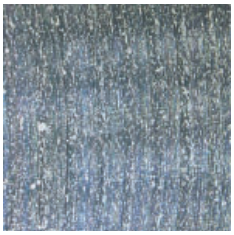


<Cutting Conditions>
Workpiece : FC300
Tool : AHX640WR10010D
Insert : NNMU200608ZEN-MK (1 piece)
Cutting speed : 300 m/min
Feed per Tooth : 0.3 mm/tooth
Axial Depth of Cut : 5 mm
Cutting mode : Dry

Surface Finish

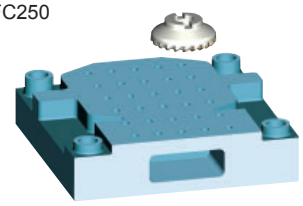
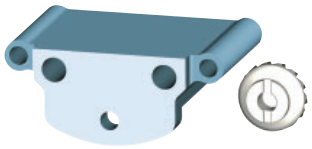


<Finish condition>



<Cutting Conditions>
Workpiece : FCD700
Tool : AHX640WR10014D
Insert : NNMU200608ZEN-MK(13 piece)
Wiper insert : WNEU2006ZEN7C-WK(1 piece)
Cutting speed : 350 m/min
Feed per Tooth : 0.1 mm/tooth
Axial Depth of Cut : 0.4 mm
Radial Width of Cut : 80 mm
Cutting mode : Air blow

APPLICATION EXAMPLE

Tool		AHX640WR16016F	AHX640WR12512E	AHX640WR10014D
Insert		NNMU200608ZEN-MK	NNMU200608ZEN-MK	NNMU200608ZEN-MK
Workpiece		FC250 	FC250 	FCD600 
Component		Press mold base	Housing case	Automotive suspension part
Cutting Conditions	Cutting Speed (m/min)	240	150	240
	Table Feed (mm/min)	3060	500	3000
	Feed per Tooth (mm/tooth)	0.4	0.1	0.28
	Axial Depth of cut ap (mm)	3–4	3	3–4
	Radial Width of cut ae (mm)	160	40	80
Cutting mode		Dry	Dry	Dry
Results		In comparison with the conventional insert that suffered sudden fracturing during machining of surface scale, AHX640W gave a stable performance even at 3 times higher table feeds, thus substantially improving machining efficiency and reliability.	In comparison with a conventional 8 corner insert that fractured while machining an unstable component, the AHX640W gave double tool life. In combination with the use of the extra cutting edges a substantial saving can be made.	Even when machining ductile cast irons, AHX640W gave double tool life compared to a conventional tool.

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

RECOMMENDED CUTTING CONDITIONS

GENERAL CUTTING

Work Material		Tensile Strength	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤350MPa	**MC5020**	220 (150—300)	0.3 (0.2—0.4)
			VP15TF VP20RT	180 (130—250)	0.3 (0.2—0.4)
	Ductile Cast Iron	≤450MPa	**MC5020**	200 (150—250)	0.2 (0.1—0.3)
			VP15TF VP20RT	170 (120—220)	0.2 (0.1—0.3)
		≤800MPa	**MC5020**	170 (150—200)	0.2 (0.1—0.3)
			VP15TF VP20RT	140 (100—180)	0.2 (0.1—0.3)

*Please use 2-3 pcs of Wiper inserts in case of 'over 6mm/rev'.

FINISHING (USE OF WIPER INSERTS)

Work Material		Grade	Axial Depth of Cut (mm)	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	**MC5020**	<0.5	320 (250—400)	0.2 (0.1—0.3)
			0.5—3	270 (200—350)	
	Ductile Cast Iron		<0.5	270 (200—350)	
			0.5—3	220 (200—250)	

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 driver. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

MITSUBISHI MATERIALS CORPORATION

MITSUBISHI MATERIALS CORPORATION

Overseas Sales Dept, Asian Region
KFC bldg., 8F, 1-6-1 Yokoami, Sumida-ku, Tokyo 130-0015, Japan
TEL +81-3-5819-8771 FAX +81-3-5819-8774

Overseas Sales Dept, European & American Region
KFC bldg., 8F, 1-6-1 Yokoami, Sumida-ku, Tokyo 130-0015, Japan
TEL +81-3-5819-8772 FAX +81-3-5819-8774

URL : http://www.mitsubishicarbide.com
(Tools specifications subject to change without notice.)

EXP-09-N040
2015.4.E(-)