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MITSUBISHI MATERIALS

MITSUBISHI CARBIDE

TOOL NEWS

B158A

New Chip Breaker Inserts for Turning

MP Breaker

Offers the best performance for automotive parts applications !

■Smooth chip control even with varied depths of cut, feeds and cutting speeds !

New Chip Breaker Inserts for Turning

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Outline

For copying, cutting conditions such as the depth of cut, feed rate and cutting speed can vary. When carrying out such machining operations, a number of problems occur that can lead to reducing overall machining productivity, such as:

- Ineffective chip control due to the use of one breaker style.
- Machine down time due to chip jamming.
- Poor tool management due to the use of numerous insert geometries.

MP breaker employs a unique geometry that provides effective chip control over a wide application area, it also offers improved wear resistance due to lower cutting heat generation. Therefore contributing to a great increase in productivity.

Features

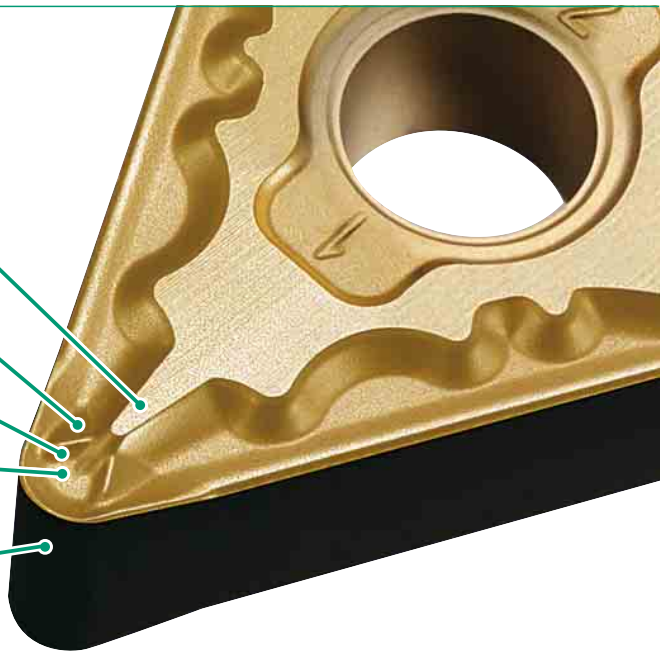
The peninsula provides effective chip control in the event the wings are worn away.

The wings are strategically located to delay wear propagation and effective chip control even as the insert wears.

The steep slope on the inner side of the winged sections achieves improved chip control at small depths of cut.

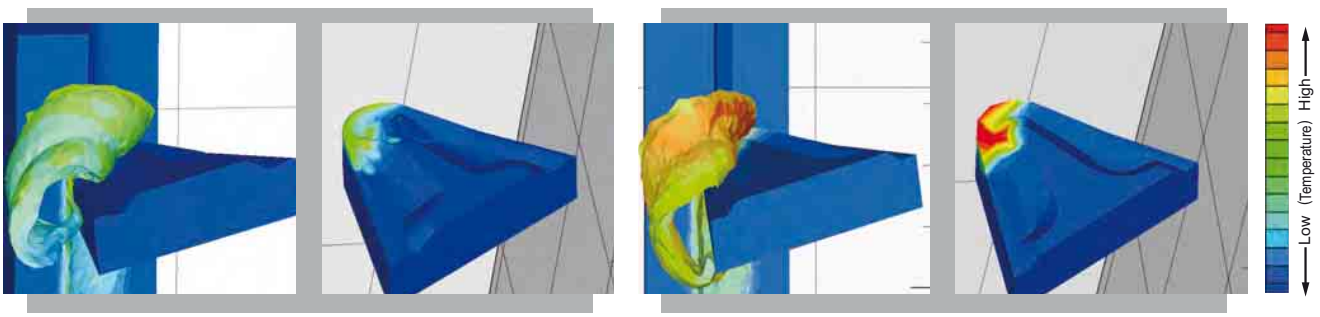
Wide chip pocket to allow effective chip control and reduced cutting resistance.

The MP breaker is available in high performance grades UE6105, UE6110, UE6020 and UC5115!



Analysis: Chip geometry and cutting edge temperatures

Low cutting heat reduces crater wear! Lower workpiece temperatures lead to higher dimensional accuracies!



MP Breaker Conventional breaker

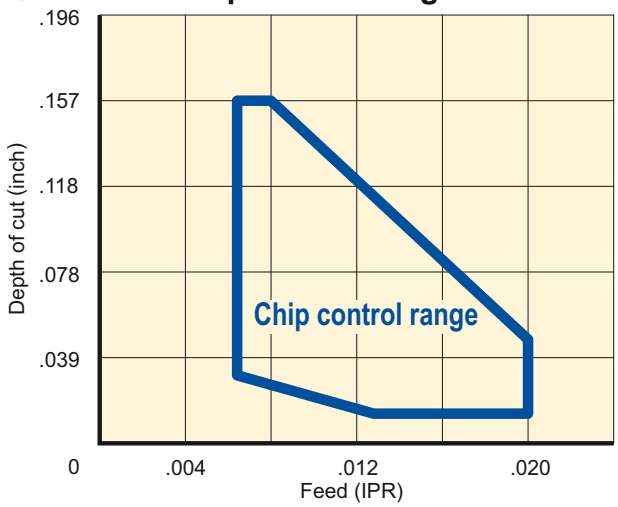
<Cutting Conditions>

Insert	: DNMG433○○	Feed	: .016 IPR
Workpiece	: AISI 1045	Depth of cut	: .079 inch
Cutting speed	: 655 SFM	Dry cutting	

MP Breaker

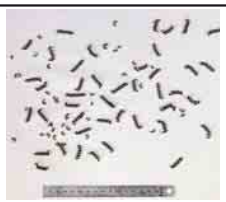
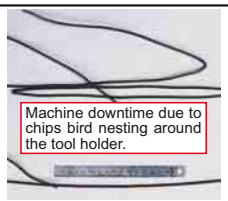
Cutting Performance

Effective chip control range

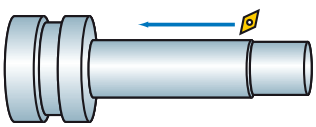


<Cutting Conditions>
Insert : CNMG432MP
Workpiece : AISI 5020
Cutting speed : 655 SFM
Wet cutting

Chip control comparison

Cutting speed	MP Breaker	Conventional breaker
655 SFM		
1310 SFM		

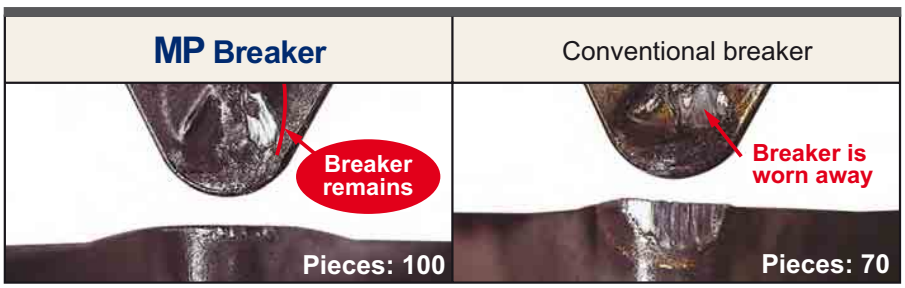
AISI 1045



<Cutting Conditions>
Insert : DNMG433○○
Feed : .018 IPR
Depth of cut : .039 inch
Wet cutting

Cutting edge comparison

<Cutting Conditions>
Workpiece : AISI 1055
Insert : DNMG433○○
Cutting speed : 755 SFM
Feed : .018–.020 IPR
Depth of cut : .016–.098 inch
Wet cutting

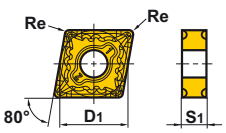
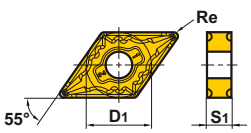
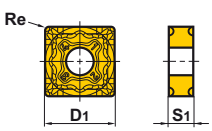
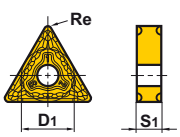
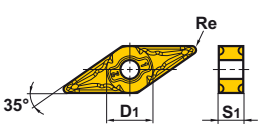
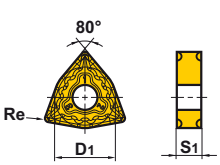


Recommended Cutting Conditions

Work Material		Hardness	Grade	Recommended Cutting Speed (SFM)
P	Mild Steel	≤180HB	**UE6105**	1215 (850–1540)
			UE6110	1115 (820–1375)
			UE6020	1015 (785–1245)
	Carbon Steel Alloy Steel	180–280HB	**UE6105**	950 (655–1215)
			UE6110	850 (620–1080)
			UE6020	785 (590–985)

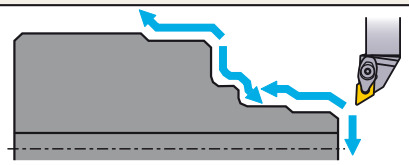
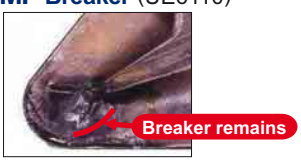
Work Material		Hardness	Grade	Recommended Cutting Speed (SFM)
K	Cast Iron	Tensile Strength ≤300MPa	**UC5115**	755 (525–985)
	Ductile Cast Iron	Tensile Strength ≤450MPa	**UC5115**	755 (525–985)
		Tensile Strength 500–800MPa	**UC5115**	655 (490–820)

Inserts

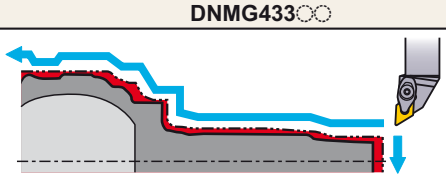
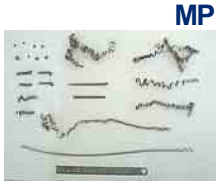
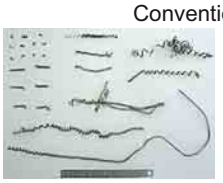
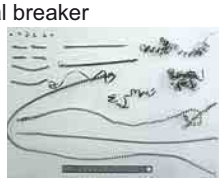
Shape	Order Number	(ISO) Number	Coated				Dimensions (inch)			Geometry
			UE6105	UE6110	UE6020	UC5115	D1	S1	Re	
	CNMG431MP	CNMG120404-MP	○	○	○	○	.500	.187	.016	
	432MP	120408-MP	●	●	●	●	.500	.187	.031	
	433MP	120412-MP	●	●	●	●	.500	.187	.047	
	434MP	120416-MP	○	○	○	○	.500	.187	.063	
	542MP	160608-MP	○	○	○	○	.625	.250	.031	
	543MP	160612-MP	●	●	●	●	.625	.250	.047	
	544MP	160616-MP	●	●	●	●	.625	.250	.063	
	DNMG431MP	DNMG150404-MP	○	○	○	○	.500	.187	.016	
	432MP	150408-MP	●	●	●	●	.500	.187	.031	
	433MP	150412-MP	●	●	●	●	.500	.187	.047	
	434MP	150416-MP	○	○	○	○	.500	.187	.063	
	441MP	150604-MP	○	○	○	○	.500	.250	.016	
	442MP	150608-MP	☆	★	★	★	.500	.250	.031	
	443MP	150612-MP	☆	★	★	★	.500	.250	.047	
	444MP	150616-MP	○	○	○	○	.500	.250	.063	
	SNMG431MP	SNMG120404-MP	○	○	○	○	.500	.187	.016	
	432MP	120408-MP	●	●	●	●	.500	.187	.031	
	433MP	120412-MP	●	●	●	●	.500	.187	.047	
	TNMG331MP	TNMG160404-MP	○	○	○	○	.375	.187	.016	
	332MP	160408-MP	●	●	●	●	.375	.187	.031	
	333MP	160412-MP	●	●	●	●	.375	.187	.047	
	432MP	220408-MP	○	○	○	○	.500	.187	.031	
	433MP	220412-MP	○	○	○	○	.500	.187	.047	
	VNMG331MP	VNMG160404-MP	○	○	○	○	.375	.187	.016	
	332MP	160408-MP	●	●	●	●	.375	.187	.031	
	333MP	160412-MP	○	○	○	○	.375	.187	.047	
	WNMG32.51MP	WNMG06T304-MP	○	○	○	○	.375	.156	.016	
	32.52MP	06T308-MP	○	○	○	○	.375	.156	.031	
	32.53MP	06T312-MP	○	○	○	○	.375	.156	.047	
	331MP	060404-MP	○	○	○	○	.375	.187	.016	
	332MP	060408-MP	○	○	○	○	.375	.187	.031	
	333MP	060412-MP	○	○	○	○	.375	.187	.047	
	431MP	080404-MP	○	○	○	○	.500	.187	.016	
	432MP	080408-MP	●	●	●	●	.500	.187	.031	
	433MP	080412-MP	●	●	●	●	.500	.187	.047	
	434MP	080416-MP	○	○	○	○	.500	.187	.063	

● : Inventory maintained.
○ : Inventory maintained. (Available Spring 2009)
★ : Inventory maintained in Japan.
☆ : Inventory maintained in Japan. (Available Spring 2009)

Application Examples

Insert		DNMG433○○
Workpiece		Carbon steel (AISI 1045) 
Component		Automotive part
Cutting Conditions	Cutting speed (SFM)	920
	Feed (IPR)	.008 – .016
	Depth of cut (Inch)	.016 – .039
	Coolant	Wet cutting
Results		**MP Breaker** (UE6110)  Conventional breaker  With conventional inserts, tool life was limited by rapidly deteriorating chip disposal conditions as the chip breaker eroded. The MP breaker precluded chip disposal problems extending tool life from 300 to 400 parts.

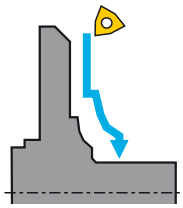
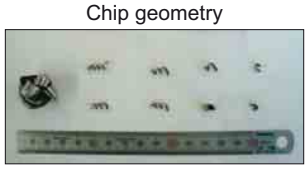
Insert		CNMG433○○
Workpiece		Carbon steel (AISI 1045) 
Component		Automotive part
Cutting Conditions	Cutting speed (SFM)	785
	Feed (IPR)	.010 – .014
	Depth of cut (Inch)	.039 – .059
	Coolant	Wet cutting
Results		**MP Breaker** (UC5115)  Conventional breaker  Edge chipping limited tool life with a conventional insert. The MP breaker delivered stable performance. Smooth edge wear without chipping reduces the risk of sudden fracturing.

Insert		DNMG433○○
Workpiece		Carbon steel (AISI 1055) 
Component		Automotive part
Cutting Conditions	Cutting speed (SFM)	755
	Feed (IPR)	.008 – .020
	Depth of cut (Inch)	.016 – .098
	Coolant	Wet cutting
Results		**MP Breaker**  Initial stage of machining  After machining 100 parts **No damage** Conventional breaker  Initial stage of machining  After machining 70 parts **Chips are tangled**

New Chip Breaker Inserts for Turning

MP Breaker

Application Examples

Insert		**WNMG432MP**
Workpiece		Carbon steel (AISI 1045) 
Component		Automotive part (Constant-velocity joint)
Cutting Conditions	Cutting speed (SFM)	740
	Feed (IPR)	.016
	Depth of cut (Inch)	.039 — .059
	Coolant	Wet cutting
Results		Chip geometry MP breaker (UE6020)  Conventional breaker  **MP Breaker** 

The conventional insert failed through sudden fracturing due to jamming of continuous chips.
The MP breaker produced freely broken chips and delivered stable machining performance.

For your safety
●Do not touch sharp parts or chips without wearing gloves. ●Use tools under recommended cutting conditions, and exchange tools before excessive wear occurs. ●Chips become extremely hot, scattered over and may be stretched. Ensure safety guards and goggles are used. ●In case of using non-water soluble oil, make sure to have a fire prevention countermeasure. ●Use the provided wrench, and ensure the inserts and spare parts are damped securely.

MITSUBISHI MATERIALS CORPORATION

Tsukuba Plant ISO 9001:2000 Registration No. JSAQ 080 Gifu Plant ISO 9001:2000 Registration No. JSAQ 094 — Tsukuba Plant ISO 14001:1996 Registration No. JSAE 036

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(Tools specifications subject to change without notice.)

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