



Tsukuba Plant
ISO 9001-1994
Registration No. JSAQ 080



Tsukuba Plant
ISO 14001-1996
Registration No. JSAE 036

*General purpose grade
for roughing of steels*

CVD coated grade for turning of steels

UE6020

(Patent pending)

Tough and versatile for reliable turning of steels



■ Application Range

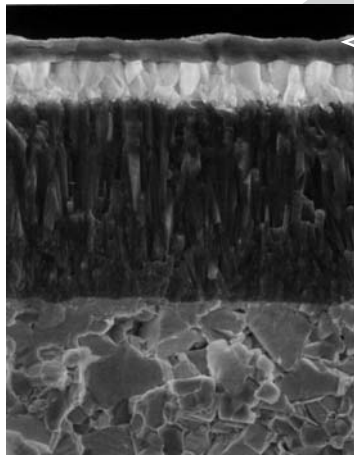
Workpiece	Hardness	Cutting conditions	Cutting speed (SFM)
Mild steel	≦ 180HB	General cutting	600 (450~800)
		Heavy cutting	400 (250~500)
Carbon steel Alloy steel	≧ 180HB	General cutting	500 (350~700)
		Heavy cutting	250 (150~400)

UE6020

Features of **UE6020**

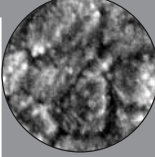
The Key to Preventing Trouble!

Today's machining at elevated speeds and the recent trend towards dry machining demands a highly fracture resistant grade without adversely effecting tool life. UE6020 is the long sought after grade that meets these needs. This all-new grade has greater resistance to Plastic while maintaining the toughness for interrupted cutting.

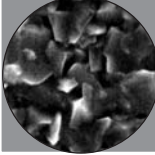


Micro-structure for **UE6020**

UE6020



Conventional coated grade



Coating technology of the New Frontier

- The surface texture of the special laminated titanium compound is vapor deposited by a newly developed Even Coating Technology. This very smooth and chemically stable surface helps in preventing built up edge and chip welding.
- A Flat Alumina (fine grained Aluminum Oxide with smooth surface) is used as the outer layer. It has superior strength at high temperature, which is important at higher cutting speeds.
- The Fibrous Crystalline Carbon Titanium Nitride inner layer withstands wear and increases fracture resistance at the same time
- Each layer of this triple constructed coating has an important function
- New Cemented Carbide substrate has been developed for UE6020, with a surface slanting structure having an extremely hard interior and a very tough surface.

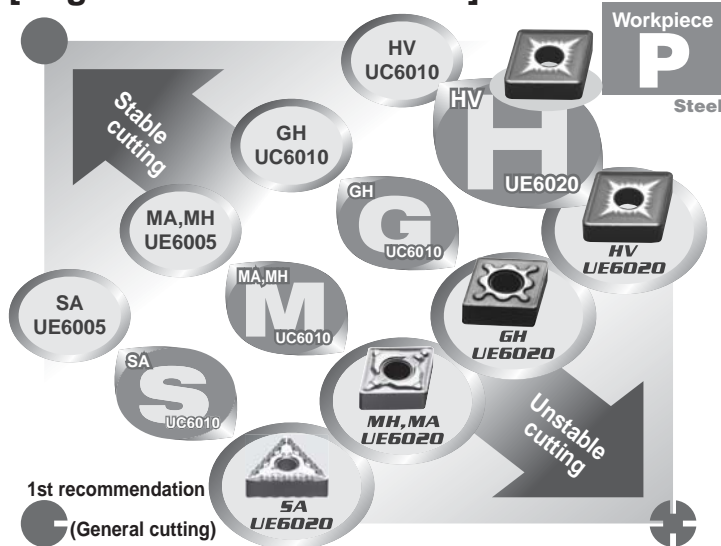
Application range and recommended cutting conditions for **UE6020**

TOOL NAVI SYSTEM

UE6020 is the most highly recommended grade for interrupted and continuous cutting of Carbon and Alloy Steels at moderate speeds.

Because of its resistance to Edge build up and chip welding, UE6020 may also be successfully utilized in Bearing Steel, Stainless Steels and Cast Irons.

[Negative indexable inserts]



● Cutting conditions



Stable cutting

Continuous cutting
Constant depth of cutting
Pre-machined
Securely clamped component cutting



General cutting



Unstable cutting

Heavy interrupted cutting
Irregular depth of cutting
Low clamping rigidity cutting

● Cutting area



Light cutting

($ap=0.020\sim0.100$ inch)



medium cutting

($ap=0.040\sim0.240$ inch)



Semi-heavy duty cutting

($ap=0.040\sim0.240$ inch)



Heavy duty cutting

($ap=0.050\sim0.700$ inch)

● Application range

ISO	Steel
P01	UE 6005
P10	UE 6010
P20	UE 6020
P30	UE 6035
P40	UE 6035

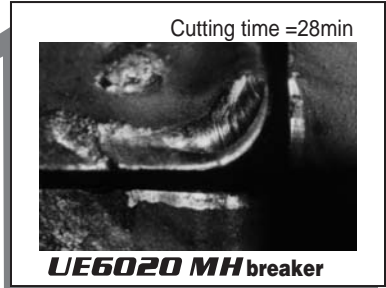
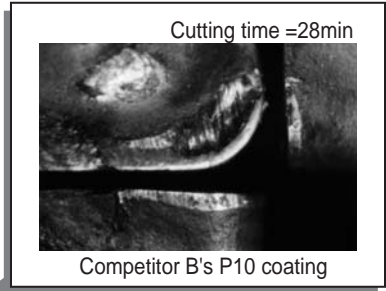
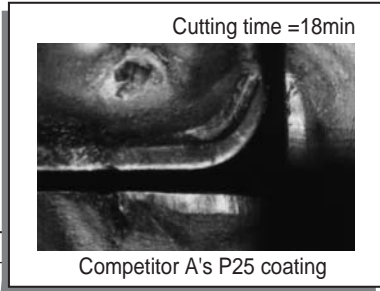
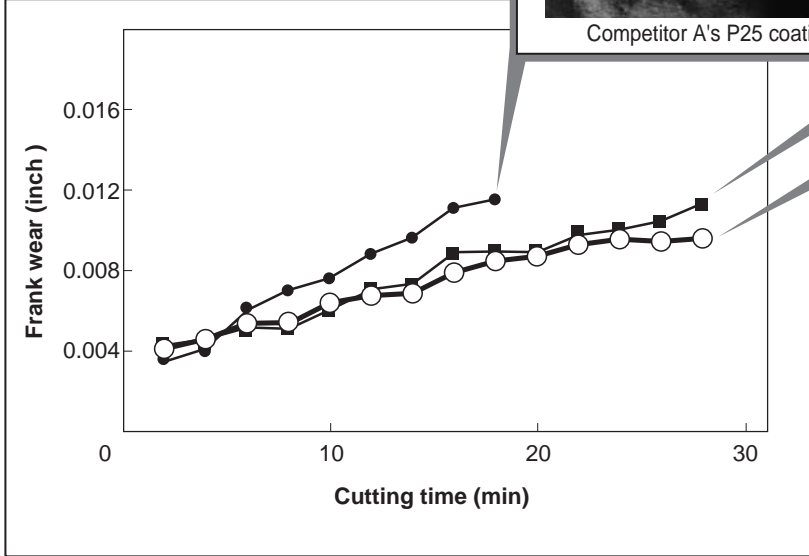
● Recommended cutting conditions

Workpiece	Hardness	Cutting conditions	Cutting speed (SFPM)
Mild steel	180HB	General cutting	650 (490 ~ 820)
		Heavy cutting	390 (260 ~ 490)
Carbon steel Alloy steel	180HB	General cutting	390 (325 ~ 820)
		Heavy cutting	325 (165 ~ 500)
Stainless steel	≤270HB	General cutting	460 (200 ~ 700)
Cast Iron	180~300 HB	General cutting	525 (450 ~ 750)

Cutting performance for **UE6020**

●Wear resistance

Alloy steel ANSI 4340 (270 HB)

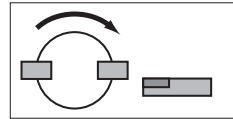


<Cutting conditions>

- Insert : CNMG432-○○○
- Tool : MCLNL16-4D
- Cutting speed : 590 SFPM
- Feed : 0.012 IPR
- Depth of cut : 0.060 inch
- Coolant : Dry
- indicates a chip breaker.

●Fracture resistance

Alloy steel for heavy interrupted cutting ANSI 4340 (270 HB)



Feed (IPR)	0.009		0.010		0.012		0.013	
Cutting time (min)	1	2	1	2	1	2	1	2
UE6020 MH breaker					○	○	○	○
Competitor A's P25 coating	○	○	○	○	○	×		
Competitor B's P25 coating	○	○	×	×				

- Normal wear
- × Fracture

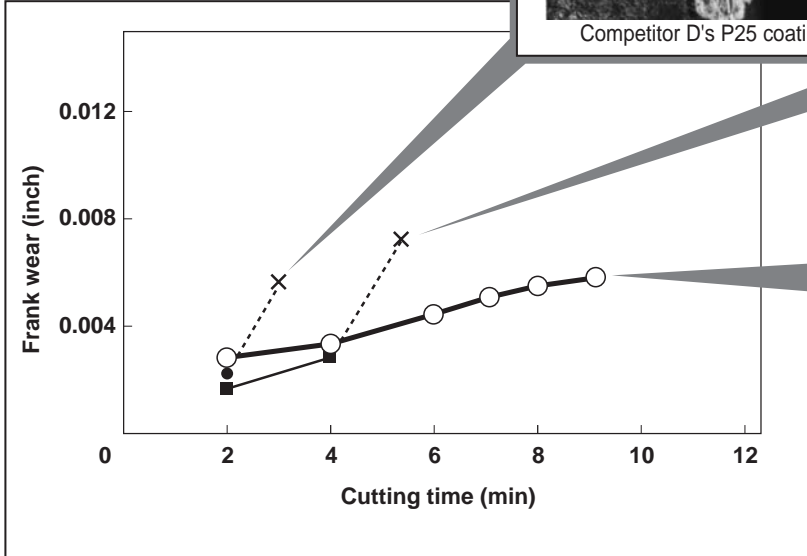
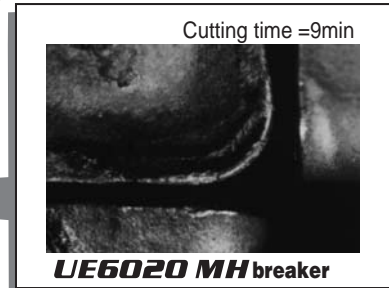
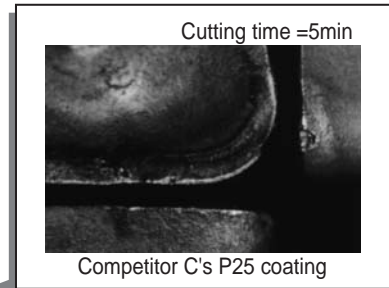
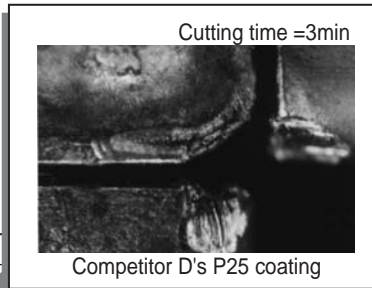
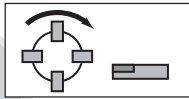
<Cutting conditions>

- Insert : CNMG432-○○○
- Tool : MCLNL16-4D
- Cutting speed : 330 SFPM
- Feed : 0.012 IPR
- Depth of cut : 0.120 min
- Coolant : Dry
- indicates a chip breaker.

Cutting performance for **UE6020**

● Fracture resistance

Alloy steel ANSI 4340 (270 HB)

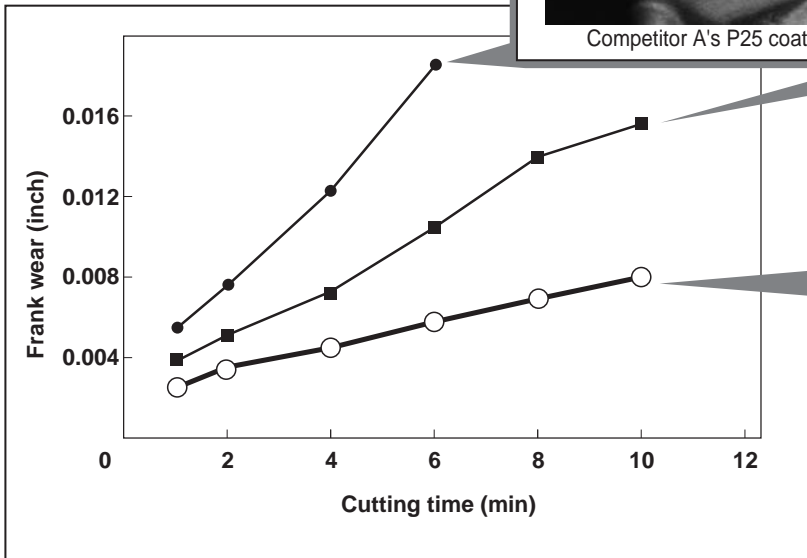
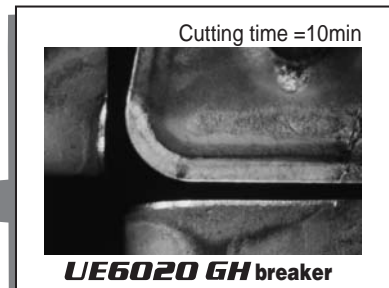
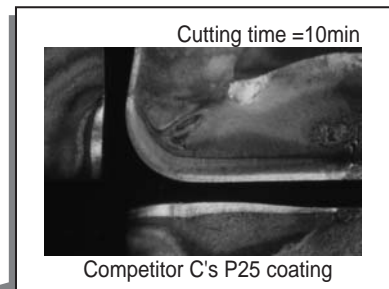
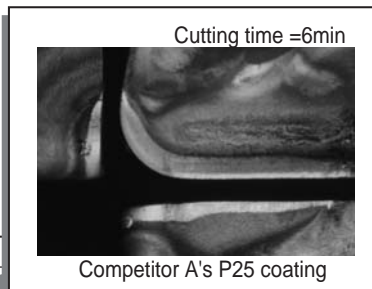


<Cutting conditions>

Insert : CNMG432-○○
 Tool : MCLNL16-4D
 Cutting speed : 750 SFPM
 Feed : 0.012 IPR
 Depth of cut : 0.060 inch
 Coolant : Dry
 ○○ indicates a chip breaker.

● Plastic deformation resistance

Alloy Steel ANSI 4340 (270 HB)



<Cutting conditions>

Insert : CNMG644-○○
 Tool : MCLNR20-6D
 Cutting speed : 330 SFPM
 Feed : 0.020 IPR
 Depth of cut : 0.200 inch
 Coolant : Dry
 ○○ indicates a chip breaker.

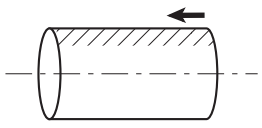
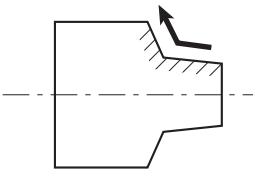
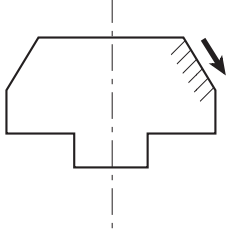
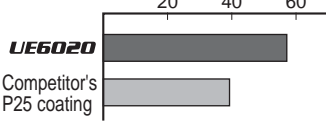
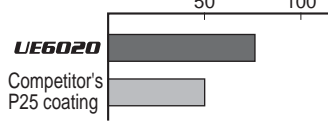
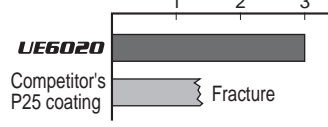
Geometry	Chipbreaker							
	STD	MA	MH	SA	GH	HV	FV	MS
CCMT21.50.5	+						+	
CCMT21.51	+						+	
CCMT21.52*	+							
CCMT32.50.5*	+							
CCMT32.51	+						+	
CCMT32.52	+						+	
CCMT431*	+							
CCMT432*	+							
CCMT433*	+							
CNMG431		+	+	+				
CNMG432	+	+	+	+	+			
CNMG433		+	+	+	+			
CNMG434			+					
CNMG542		+						
CNMG543		+	+		+			
CNMG642	+							
CNMG643	+		+		+			
CNMG431MS*								+
CNMG432MS*								+
CNMG433MS*								+
CNMM644						+		
CNMM646						+		
CNMM866						+		
DCMT21.50.5	+						+	
DCMT21.51	+						+	
DCMT32.50.5*	+							
DCMT32.51	+						+	
DCMT32.52	+						+	
DCMT432*	+							
DNMG431	+	+	+	+				
DNMG432		+	+	+				
DNMG433		+	+	+				
DNMG431MS*								+
DNMG432MS*								+
RCMM1003*	+							
RCMM1204*	+							
RCMM1606*	+							
RCMM2006*	+							
RCMM2507*	+							
RCMM3209*	+							
RNMG43	+							
RNMG64	+							
SCMT32.51							+	
SNMG321	+							
SNMG322	+							

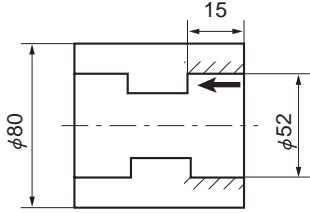
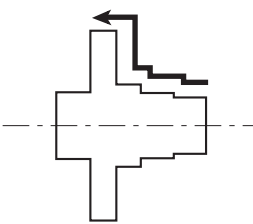
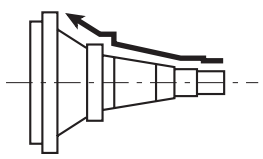
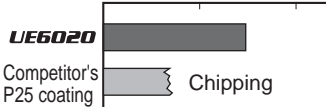
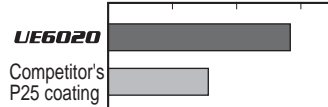
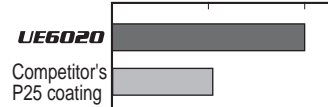
Geometry	Chipbreaker							
	STD	MA	MH	SA	GH	HV	FV	MS
SNMG432	+	+	+					
SNMG433		+	+					
SNMG434	+							
SNMG543	+	+						
SNMG643	+							
SNMG644	+	+						
SNMG432MS*								+
SNMM644						+		
SNMM646						+		
SNMM856						+		
SNMM866						+		
TCMT21.50.5*	+							
TCMT21.51	+						+	
TCMT2.521*	+							
TCMT32.51	+						+	
TNMG331	+	+	+	+				
TNMG332		+	+	+				
TNMG333		+	+	+				
TNMG431	+							
TNMG432	+	+	+	+	+			
TNMG433	+	+	+					
TNMG543	+	+			+			
TNMG331MS*								+
TNMG332MS*								+
TNMG432MS*								+
TNMM666							+	
VCMT221*	+							
VCMT331	+						+	
VCMT332	+						+	
VCMT333*	+							
VNMG331		+	+					
VNMG332		+	+					
WCMT020102*	+							
WCMT020104*	+							
WCMT040202*	+							
WCMT040204*	+							
WCMT040208*	+							
WCMT06T304*	+							
WCMT06T308*	+							
WNMG431		+	+					
WNMG432	+	+	+	+	+			
WNMG433	+	+	+		+			
WNMG543		+						
WNMG431MS*								+
WNMG432MS*								+
WNMG433MS*								+

* Available Summer 2001

⊕: Stock

Application examples of **UE6020**

Insert	CNMG432-MA	WNMG432-MA	CNMG646-HV
Workpiece	Carbon steel (ANSI 1035) 	Carbon steel (ANSI 1045) 	Alloy steel (ANSI 4130) 
	Cutting cond.		
	Cutting speed (SFPM) 590	660	260
	Feed (IPR) 0.016	0.014	0.024
	Depth of cut (inch) 0.140	0.060	0.275
	Coolant Dry	Dry	Dry
Results	•Tool life Pieces per corner 20 40 60 	•Tool life Pieces per corner 50 100 	•Tool life Cutting time (h) 1 2 3 

Insert	CNMG432-MA	WNMG432-MH	CNMG643
Workpiece	Bearing steel 	Carbon steel (ANSI 1060) 	Carbon steel (ANSI 1025) 
	Cutting cond.		
	Cutting speed (SFPM) 660	Continuous cutting 660 , Interrupted cutting 460	260
	Feed (IPR) 0.008	Continuous cutting 0.016 , Interrupted cutting 0.018	0.016
	Depth of cut (inch) 0.140	0.040	0.235
	Coolant Dry	Water soluble oil	Water soluble oil
Results	•Tool life Pieces per corner 50 100 	•Tool life Pieces per corner 50 100 150 	•Tool life 50 100(%) 

MITSUBISHI MATERIALS U.S.A. CORPORATION

17401 Eastman Street, Irvine, California 92614, U.S.A.

TEL. (800) 621-4486 FAX. (800) 643-4909

Customer Service: (800) 523-0800 Technical Support: (800) 486-2341

Chicago Branch Office: 5999 New Wilke Rd, Suite 200, Rolling Meadows, Illinois 60008, U.S.A.

TEL. 847-806-1550 FAX. 847-806-1563

Detroit Branch Office: 39303 Country Club Drive, Suite A-1, Farmington Hills, Michigan 48331, U.S.A.

TEL. 248-489-1000 FAX. 248-489-3008

Toronto Branch Office: 6535 Millcreek Drive, Unit 63 & 64, Mississauga, Ontario, Canada L5N 2M2

TEL. 905-814-0240 FAX. 905-814-0245

MMC METAL DE MEXICO SA. DE C.V.

Av. Alvaro Obregon #406, Col. Alameda, 38040 Celaya, GTO. Mexico

TEL. 011-52-461-613-9493 FAX. 011-52-461-612-9863