Steel Turning Technology Breakthrough
Super FF Coated Turning Inserts

ACE COAT AC820P / AC830P

- High Performance Grades for Steel Turning
- Wide Application Range
- Outstanding Wear and Breakage Resistance
- Increases Feed Rates for Improved Productivity
- Increases Tool Life for Improved Profitability

SUMITOMO
CARBIDE - CBN - DIAMOND

ACE COAT
AC820P / AC830P

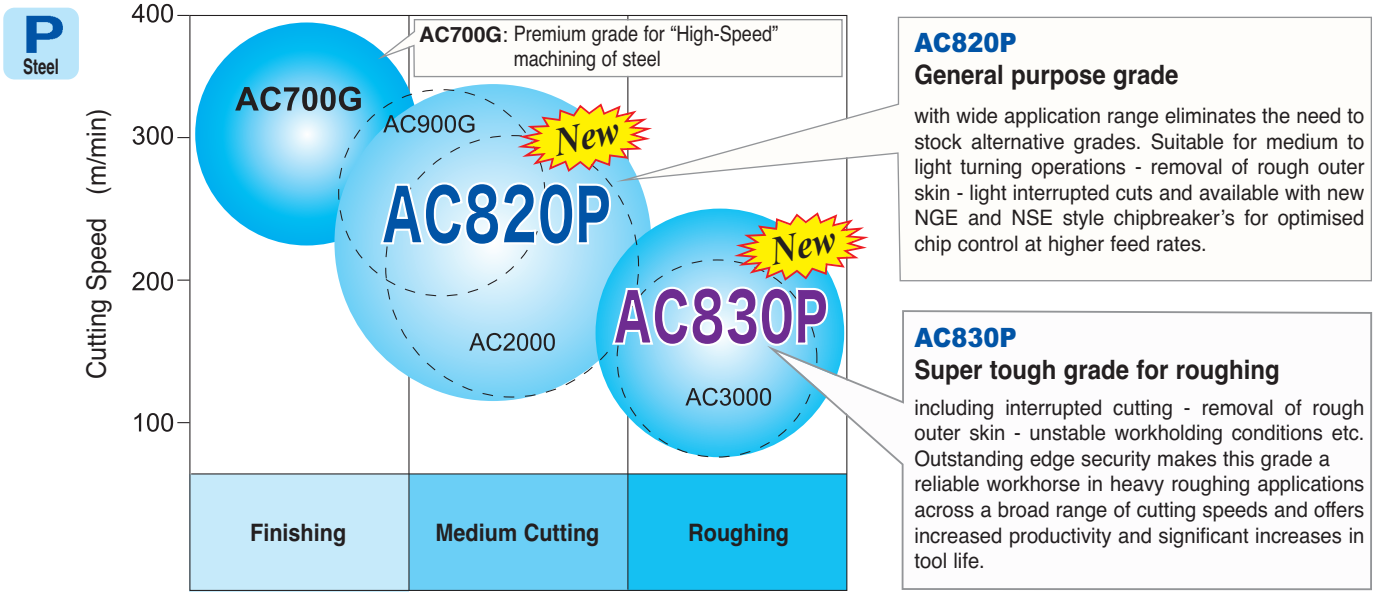
Increased feed rates – Increased tool life

Improved profitability

Super FF coat is a “steel turning technology breakthrough” as the ultra hard coating reduces tool wear even at higher cutting speeds, and the ultra smooth surface via heat reduction at the cutting edge improves surface finish, tool life, and size control. The strong cutting edge enables unfavourable turning applications including interrupted cuts, whilst ceramic layers improve thermal resistance necessary for higher cutting speeds and dry cutting applications.

AC820P/AC830P efficiently turns steels across a wide application band and is suitable for low batch quantities and mass production. Increased feed rates improve productivity and increased tool life reduces monthly tooling bills.

■ Application Range



AC820P
General purpose grade

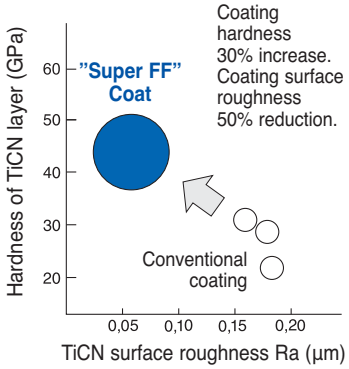
with wide application range eliminates the need to stock alternative grades. Suitable for medium to light turning operations - removal of rough outer skin - light interrupted cuts and available with new NGE and NSE style chipbreaker’s for optimised chip control at higher feed rates.

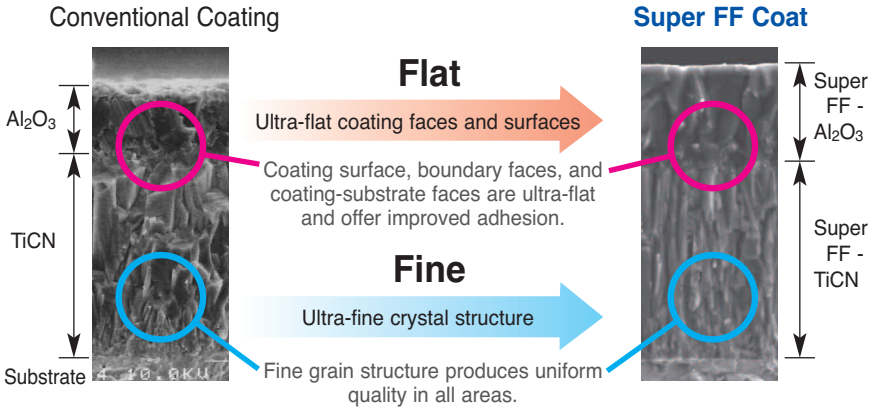
AC830P
Super tough grade for roughing

including interrupted cutting - removal of rough outer skin - unstable workholding conditions etc. Outstanding edge security makes this grade a reliable workhorse in heavy roughing applications across a broad range of cutting speeds and offers increased productivity and significant increases in tool life.

■ Characteristics / Performance

● Characteristics of Films





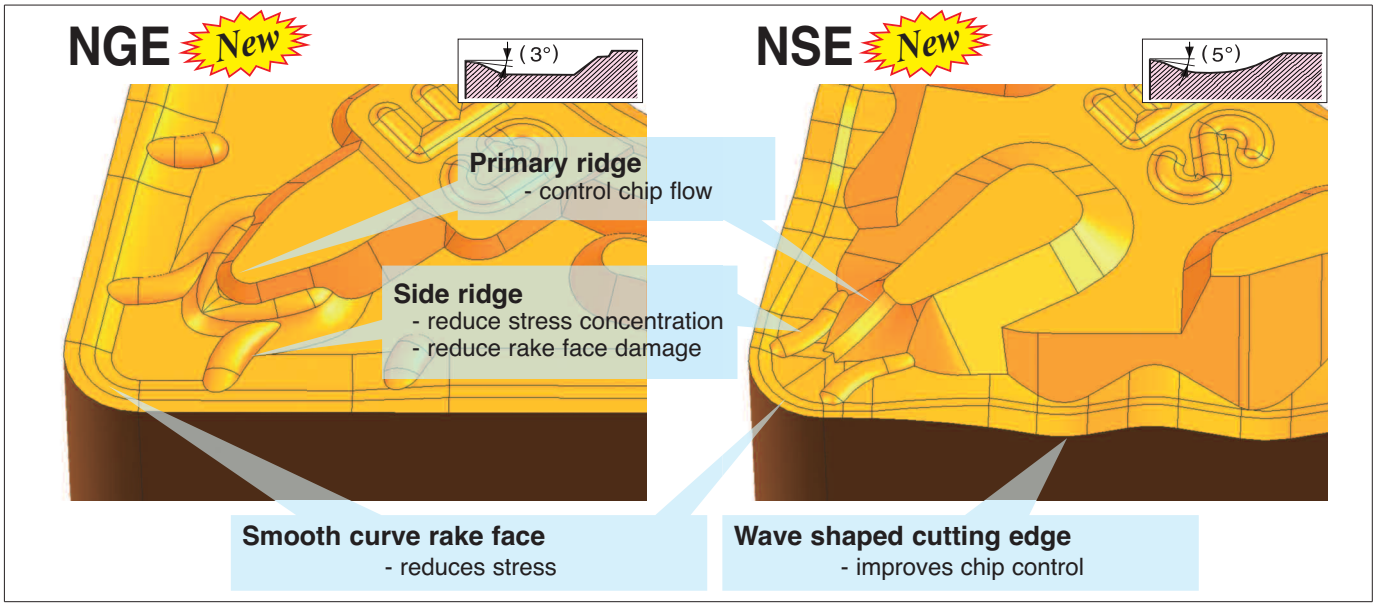
- High bonding strength of coating layers prevents premature edge failure
- 30% increase in coating hardness and a 50% reduction in coating surface
- 50% increase in feed rates possible for increased

High Feed Chipbreakers NSE / NGE

The ability to control chip size and chip direction is vital for efficient production, unmanned machining and protection of the tool / workpiece.

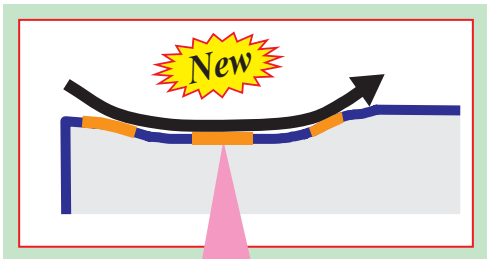
The unique design of two new chipbreakers NGE for general purpose turning and NSE for finishing applications enables smooth chip flow across a wide range of feed rates even at elevated cutting speeds and increased depths of cut.

■ Features



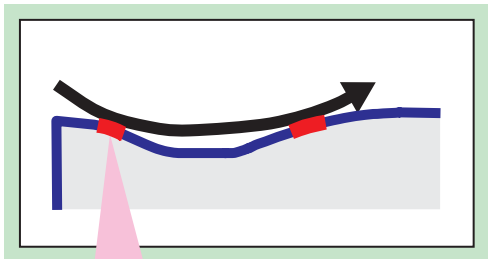
■ Chip Control by NSE and NGE

New chip control by NSE / NGE



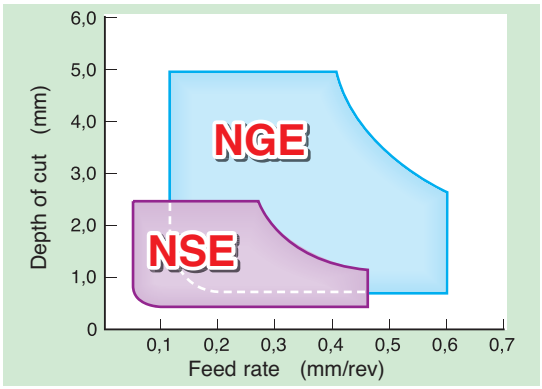
Smooth flow improves chip direction and shape.

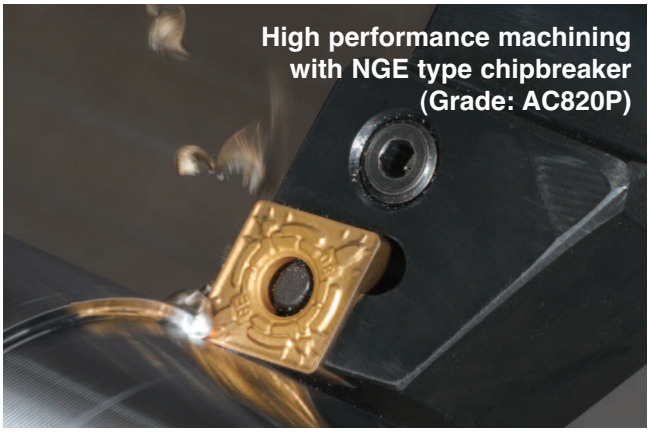
Conventional chip flow



Limited chip contact area increases stress and causes insert damage

■ Application Range





ACE COAT
AC820P / AC830P

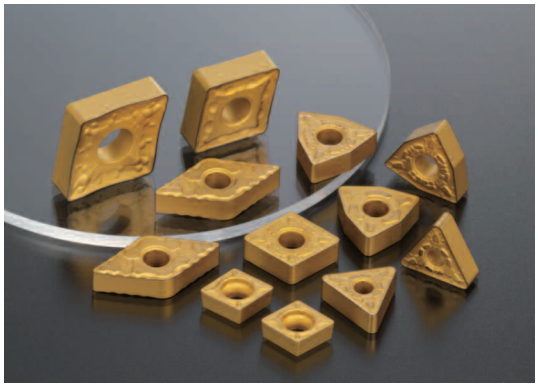
Increased feed rates – Increased tool life

Improved profitability

■ AC820P Recommended Cutting Conditions

Optimum (Min.- Max.)

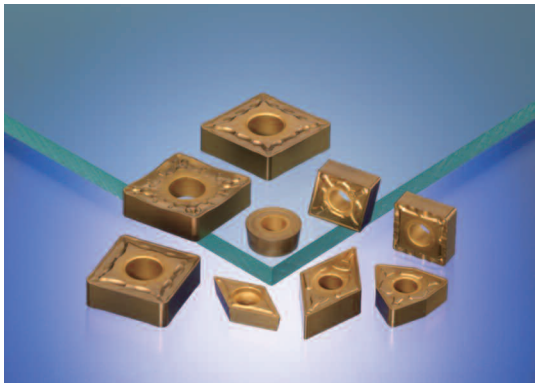
Insert Specification and Chipbreaker		Mild Steel Low carbon Steel Low Alloy Steel (Below HB180)			High carbon Steel High Alloy Steel (Avobe HB180)		
		v_c (m/min)	f (mm/rev)	d_{oc} (mm)	v_c (m/min)	f (mm/rev)	d_{oc} (mm)
CN□□12.. DN□□15.. SN□□12.. TN□□16.. WN□□08..	NLU NSU	**250** (150-350)	**0,2** (0,1-0,4)	**1,5** (0,5-2)	**210** (120-300)	**0,2** (0,1-0,4)	**1,5** (0,5-2)
	NSE		**0,3** (0,1-0,45)			**0,3** (0,1-0,45)	
	NGU NUX	**230** (150-300)	**0,3** (0,1-0,45)	**2,2** (0,8-5)	**180** (100-270)	**0,3** (0,1-0,45)	**2,2** (0,8-5)
	NGE		**0,4** (0,1-0,6)			**0,4** (0,1-0,6)	
	NMU	**200** (130-280)	**0,35** (0,2-0,6)	**3** (1,8-6)	**150** (80-230)	**0,35** (0,2-0,6)	**3** (1,8-6)
	NMP NHG	**180** (100-260)	**0,4** (0,35-0,8)	**4,5** (3-8)	**130** (60-200)	**0,4** (0,35-0,8)	**4,5** (3-8)
CN□□16.. SN□□15..	NGU NUX	**200** (130-280)	**0,3** (0,15-0,45)	**3,5** (0,8-5)	**160** (100-230)	**0,3** (0,15-0,45)	**3,5** (0,8-5)
	NGE		**0,4** (0,1-0,6)			**0,4** (0,1-0,6)	
	NMU	**180** (100-260)	**0,4** (0,2-0,6)	**4,5** (1,8-6)	**140** (80-210)	**0,4** (0,2-0,6)	**4,5** (1,8-6)
	NMP NHG	**160** (80-240)	**0,6** (0,35-0,8)	**5** (3-8)	**120** (70-180)	**0,6** (0,35-0.8)	**5** (3-8)
CN□□19.. DN□□19.. SN□□19.. TN□□22..	NMU	**180** (100-260)	**0,4** (0,2-0,6)	**5** (1,8-6)	**140** (80-210)	**0,4** (0,2-0,6)	**5** (1,8-6)
	NMP NHG	**160** (80-240)	**0,4** (0,35-0,8)	**6,5** (3-9)	**120** (70-180)	**0,4** (0,35-0,8)	**6,5** (3-9)



■ AC830P Recommended Cutting Conditions

Optimum (Min.- Max.)

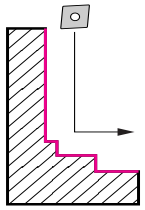
Insert Specification and Chipbreaker		Mild Steel Low carbon Steel Low Alloy Steel (Below HB180)			High carbon Steel High Alloy Steel (Above HB180)		
		v_c (m/min)	f (mm/rev)	d_{oc} (mm)	v_c (m/min)	f (mm/rev)	d_{oc} (mm)
CN□□12.. DN□□15.. SN□□12.. TN□□16.. WN□□08..	NLU NSU	**200** (120-300)	**0,2** (0,1-0,4)	**1,3** (0,5-2)	**180** (120-250)	**0,2** (0,1-0,4)	**1,3** (0,5-2)
	NSE		**0,3** (0,1-0,45)			**0,3** (0,1-0,45)	
	NGU NUX	**200** (120-300)	**0,3** (0,1-0,45)	**2,2** (0,8-5)	**150** (100-200)	**0,3** (0,1-0,45)	**2,2** (0,8-5)
	NGE		**0,4** (0,1-0,6)			**0,4** (0,1-0,6)	
	NMU	**180** (100-250)	**0,35** (0,2-0,6)	**3** (1,8-6)	**130** (80-180)	**0,35** (0,2-0,6)	**3** (1,8-6)
	NMP NHG	**150** (100-200)	**0,4** (0,35-0,8)	**4,5** (3-8)	**100** (70-160)	**0,4** (0,35-0,8)	**4,5** (3-8)
CN□□16.. SN□□15..	NGU NUX	**180** (100-250)	**0,3** (0,15-0,45)	**3,5** (0,8-5)	**130** (90-170)	**0,3** (0,15-0,45)	**3,5** (0,8-5)
	NGE		**0,4** (0,1-0,6)			**0,4** (0,1-0,6)	
	NMU	**150** (100-200)	**0,4** (0,2-0,6)	**4,5** (1,8-6)	**110** (70-150)	**0,4** (0,2-0,6)	**4,5** (1,8-6)
	NMP NHG	**130** (80-180)	**0,6** (0,35-0,8)	**5** (3-8)	**100** (60-140)	**0,6** (0,35-0.8)	**5** (3-8)
CN□□19.. DN□□19.. SN□□19.. TN□□22..	NMU	**150** (100-200)	**0,4** (0,2-0,6)	**5** (1,8-6)	**110** (70-150)	**0,4** (0,2-0,6)	**5** (1,8-6)
	NMP NHG	**130** (80-180)	**0,4** (0,35-0,8)	**6,5** (3-9)	**100** (60-140)	**0,4** (0,35-0,8)	**6,5** (3-9)

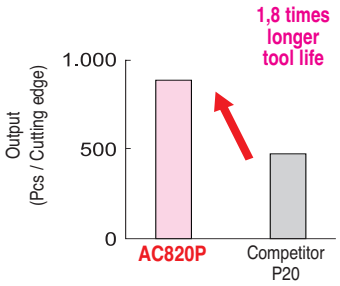


■ AC820P Application Examples

● Turbine Hub / 15CrMo5

Insert: CNMG 120408 NGU
Conditions: v_c=200m/min, f=0,25mm/rev, d_{oc}=2,0mm, Wet



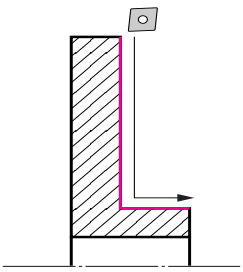


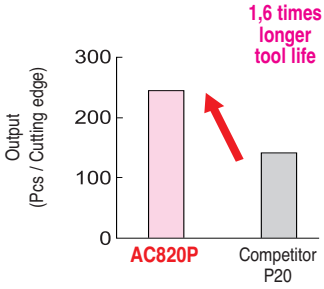
Excellent surface finish on low alloy steel

Using the same cutting data as a competitors P20 grade, we increased tool life by 180%.

● Turbine Hub / Ck45

Insert: CNMG 120408 NGE
Conditions: v_c=210m/min, f=0,3mm/rev, d_{oc}=1,0mm, Wet



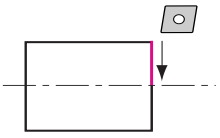


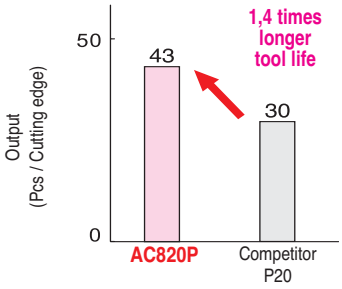
Removing rough outer skin

When we tested AC820P against P20 grades from the competition using the same cutting speeds to remove the outer skin of raw material during a roughing cycle - tool life improved by 160%.

● Transmission parts / Ck50

Insert: CNMG 120408 NSE
Conditions: v_c=220m/min, f=0,3mm/rev, d_{oc}=0,2mm, Wet





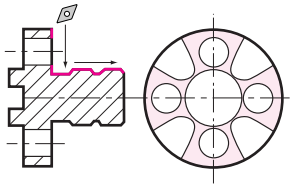
Good chip control and increase tool life

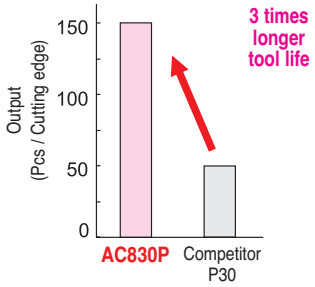
When rake face damage dimished using AC820P against a competitors P20 grade - tool life improved by 140%.

■ AC830P Application Examples

● Hub / Ck55

Insert: DNMG 150412 NUX
Conditions: v_c=150m/min, f=0,25mm/rev, d_{oc}=1,0mm, Wet



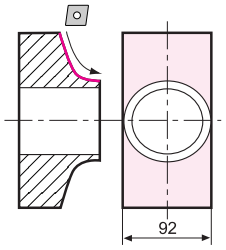


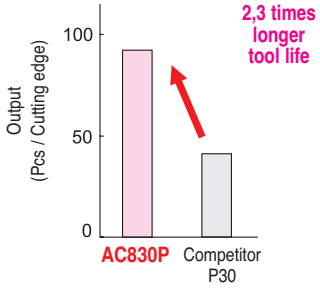
Continuous cutting with heavy interruptions

When machining a component with continuous and interrupted cuts AC830P compared with a P30 competitor's grade increased tool life by 160%.

● Machine Component / Ck50

Insert: CNMG 120412 NMU
Conditions: v_c=120~150m/min, f=0,25mm/rev, d_{oc}=1,5mm, Wet



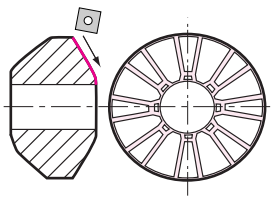


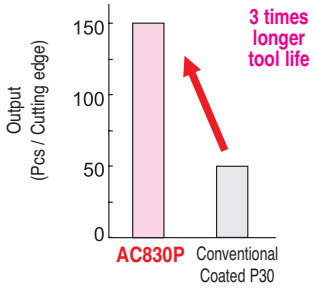
Higher productivity – Improved Tool Life

Using AC830P against a competitors P30 grade, we increased our cutting speeds by 25% and recorded a tool increase of 230%.

● Pinion Gear / 20Cr4

Insert: SNMG 120412 NUX
Conditions: v_c=170m/min, f=0,35mm/rev, d_{oc}=1,5mm, Wet





Tool life increase on heavy interrupted cuts

It is reasonable to assume some edge condition failure on heavily interrupted cuts but against a competitor's tool at the same cutting speeds the tool life of AC830P increased by 300%.

80° Diamond Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NFL	CNMG 090308 NFL	○		9,525	3,18	3,81	0,8
	CNMG 120404 NFL	○		12,70	4,76	5,16	0,4
	CNMG 120408 NFL	○					0,8
NLU	CNMG 090304 NLU	●		9,525	3,18	3,81	0,4
	CNMG 090308 NLU	●					0,8
	CNMG 120404 NLU	●		12,70	4,76	5,16	0,4
	CNMG 120408 NLU	●					0,8
	CNMG 120412 NLU	●					1,2
NLUW	CNMG 120404 NLU-W	●		12,70	4,76	5,16	0,4
	CNMG 120408 NLU-W	●					0,8
	CNMG 120412 NLU-W	●					1,2
NSU	CNMG 090304 NSU	●		9,525	3,18	3,81	0,4
	CNMG 090308 NSU	●					0,8
	CNMG 09T304 NSU	○		9,525	3,97	3,81	0,4
	CNMG 09T308 NSU	○					0,8
	CNMG 090404 NSU	○		9,525	4,76	3,81	0,4
	CNMG 090408 NSU	○					0,8
	CNMG 120404 NSU	●	○	12,70	4,76	5,16	0,4
	CNMG 120408 NSU	●	○				0,8
	CNMG 120412 NSU	●	○				1,2
New NSE	CNMG 120404 NSE	●	○	12,70	4,76	5,16	0,4
	CNMG 120408 NSE	●	○				0,8
	CNMG 120412 NSE	●	○				1,2
NGU	CNMG 090304 NGU	●	○	9,525	3,18	3,81	0,4
	CNMG 090308 NGU	●	○				0,8
	CNMG 120404 NGU	●	●	12,70	4,76	5,16	0,4
	CNMG 120408 NGU	●	●				0,8
	CNMG 120412 NGU	●	●				1,2
	CNMG 120416 NGU	●	●				1,6
	CNMG 160608 NGU	●	●	15,875	6,35	6,35	0,8
	CNMG 160612 NGU	●	●				1,2
	CNMG 160616 NGU	●	●				1,6
NGUW	CNMG 120408 NGU-W	●		12,70	4,76	5,16	0,8
	CNMG 120412 NGU-W	●					1,2
New NGE	CNMG 120404 NGE	●	●	12,70	4,76	5,16	0,4
	CNMG 120408 NGE	●	●				0,8
	CNMG 120412 NGE	●	●				1,2
	CNMG 160612 NGE	●	●	15,875	6,35	6,35	1,2
	CNMG 160616 NGE	●	●				1,6
NUP	CNMG 120404 NUP	●	●	12,70	4,76	5,16	0,4
	CNMG 120408 NUP	●	●				0,8
	CNMG 120412 NUP	●	●				1,2
	CNMG 160612 NUP		●	15,875	6,35	6,35	1,2
	CNMG 190612 NUP	●	●	19,05	6,35	7,94	1,2
NMU	CNMG 120408 NMU	●	●	12,70	4,76	5,16	0,8
	CNMG 120412 NMU	●	●				1,2
	CNMG 120416 NMU	●	●				1,6
	CNMG 160608 NMU	●	●	15,875	6,35	6,35	0,8
	CNMG 160612 NMU	●	●				1,2
	CNMG 160616 NMU	●	●				1,6
	CNMG 190608 NMU		●	19,05	6,35	7,94	0,8
	CNMG 190612 NMU	●	●				1,2
	CNMG 190616 NMU	●	●				1,6
NUX	CNMG 120404 NUX	●	●	12,70	4,76	5,16	0,4
	CNMG 120408 NUX	●	●				0,8
	CNMG 120412 NUX	●	●				1,2
	CNMG 120416 NUX	●	●				1,6
	CNMG 160608 NUX	●	●	15,875	6,35	6,35	0,8
	CNMG 160612 NUX	●	●				1,2
	CNMG 160616 NUX	●	●				1,6
	CNMG 190608 NUX		●	19,05	6,35	7,94	0,8
	CNMG 190612 NUX	●	●				1,2
	CNMG 190616 NUX	●	●				1,6
NMX	CNMG 120408 NMX	●	●	12,70	4,76	5,16	0,8
	CNMG 120412 NMX	●	●				1,2
	CNMG 120416 NMX	●	●				1,6
	CNMG 160608 NMX	●		15,875	6,35	6,35	0,8
	CNMG 160612 NMX	●	●				1,2
	CNMG 160616 NMX	●	●				1,6
	CNMG 190612 NMX	●	●	19,05	6,35	7,94	1,2
	CNMG 190616 NMX	●	●				1,6

80° Diamond Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NMP	CNMM 120408 NMP	●	●	12,70	4,76	5,16	0,8
	CNMM 120412 NMP	●	●				1,2
	CNMM 120416 NMP	●	●				1,6
	CNMM 160608 NMP	●	●	15,875	6,35	6,35	0,8
	CNMM 160612 NMP	●	●				1,2
	CNMM 160616 NMP	●	●				1,6
	CNMM 160624 NMP	●					2,4
	CNMM 190608 NMP	●	●	19,05	6,35	7,94	0,8
	CNMM 190612 NMP	●	●				1,2
	CNMM 190616 NMP	●	●				1,6
	CNMM 190624 NMP	●	●				2,4
	CNMM 250724 NMP	○		25,4	7,94	9,2	2,4
	CNMM 250924 NMP	○		25,4	9,52	9,2	2,4
NHG	CNMM 120408 NHG	●	●	12,70	4,76	5,16	0,8
	CNMM 120412 NHG	●	●				1,2
	CNMM 160612 NHG	●	●	15,875	6,35	6,35	1,2
	CNMM 160616 NHG	●	●				1,6
	CNMM 190612 NHG	●	●	19,05	6,35	7,94	1,2
	CNMM 190616 NHG	●	●				1,6
	CNMM 190624 NHG	●	●				2,4
NHP	CNMM 120408 NHP	●	●	12,70	4,76	5,16	0,8
	CNMM 120412 NHP	●	●				1,2
	CNMM 160608 NHP		●	15,875	6,35	6,35	0,8
	CNMM 160612 NHP		●				1,2
	CNMM 160616 NHP		●				1,6
	CNMM 190608 NHP		●	19,05	6,35	7,94	0,8
	CNMM 190612 NHP	●	●				1,2
	CNMM 190616 NHP	●	●				1,6
	CNMM 190624 NHP	●	●				2,4
R/L	CNMX 120408 L	●		12,70	4,76	5,16	0,8
	CNMX 120408 R	●					0,8

55° Diamond Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NFL	DNMG 150404 NFL	○		9,525	4,76	3,81	0,4
	DNMG 150408 NFL	○					0,8
	DNMG 150604 NFL	○		12,70	6,35	5,16	0,4
	DNMG 150608 NFL	○					0,8
NLU	DNMG 110404 NLU	●	●	12,70	4,76	5,16	0,4
	DNMG 110408 NLU	●	●				0,8
	DNMG 150404 NLU	○		12,70	4,76	5,16	0,4
	DNMG 150408 NLU	○					0,8
	DNMG 150412 NLU	○					1,2
	DNMG 150604 NLU	●		12,70	6,35	5,16	0,4
	DNMG 150608 NLU	●					0,8
	DNMG 150612 NLU	●					1,2
NSU	DNMG 110404 NSU	●		9,525	4,76	3,81	0,4
	DNMG 110408 NSU	●					0,8
	DNMG 150404 NSU	○	○	12,70	4,76	5,16	0,4
	DNMG 150408 NSU	○	○				0,8
	DNMG 150412 NSU	○					1,2
	DNMG 150604 NSU	●	○	12,70	6,35	5,16	0,4
	DNMG 150608 NSU	●	○				0,8
	DNMG 150612 NSU	●	○				1,2
New NSE	DNMG 150404 NSE	○	○	12,70	4,76	5,16	0,4
	DNMG 150408 NSE	○	○				0,8
	DNMG 150412 NSE	○	○				1,2
	DNMG 150604 NSE	●		12,70	6,35	5,16	0,4
	DNMG 150608 NSE	●					0,8
	DNMG 150612 NSE	●					1,2
NGU	DNMG 110404 NGU	●	○	9,525	4,76	3,81	0,4
	DNMG 110408 NGU	●	○				0,8
	DNMG 110412 NGU	●					1,2
	DNMG 150404 NGU	○	○	12,70	4,76	5,16	0,4
	DNMG 150408 NGU	○	○				0,8
	DNMG 150412 NGU	○	○				1,2
	DNMG 150604 NGU	●	●	12,70	6,35	5,16	0,4
	DNMG 150608 NGU	●	●				0,8
	DNMG 150612 NGU	●	●				1,2

● = Euro stock
○ = Stock item in Japan

AC820P / AC830P

55° Diamond Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
New NGE	DNMG 150404 NGE	❍	❍	12,70	4,76	5,16	0,4
	DNMG 150408 NGE	❍	❍				0,8
	DNMG 150412 NGE	❍	❍				1,2
	DNMG 150604 NGE	●	●	12,70	6,35	5,16	0,4
	DNMG 150608 NGE	●	●				0,8
	DNMG 150612 NGE	●	●				1,2
NUP	DNMG 150404 NUP	❍	❍	12,70	4,76	5,16	0,4
	DNMG 150408 NUP	❍	❍				0,8
	DNMG 150412 NUP	❍	❍				1,2
	DNMG 150604 NUP	●	●	12,70	6,35	5,16	0,4
	DNMG 150608 NUP	●	●				0,8
	DNMG 150612 NUP		●				1,2
NMU	DNMG 150408 NMU	❍	❍	12,70	4,76	5,16	0,8
	DNMG 150412 NMU	❍	❍				1,2
	DNMG 150416 NMU	❍	❍				1,6
	DNMG 150608 NMU	●	●	12,70	6,35	5,16	0,8
	DNMG 150612 NMU	●	●				1,2
	DNMG 150616 NMU	●					1,6
NUX	**DNMG 110408 NUX**		❍	9,525	4,76	3,81	0,8
	DNMG 150404 NUX	❍	❍	12,70	4,76	5,16	0,4
	DNMG 150408 NUX	❍	❍				0,8
	DNMG 150412 NUX	❍	❍				1,2
	DNMG 150604 NUX	●	●	12,70	6,35	5,16	0,4
	DNMG 150608 NUX	●	●				0,8
	DNMG 150612 NUX	●	●				1,2
	DNMG 150616 NUX	●					1,6
NMX	DNMG 150408 NMX	❍	❍	12,70	4,76	5,16	0,8
	DNMG 150412 NMX	❍	❍				1,2
	DNMG 150608 NMX	●		12,70	6,35	5,16	0,8
	DNMG 150612 NMX	●					1,2
NMP	DNMM 150404 NMP	❍	❍	12,70	4,76	5,16	0,4
	DNMM 150408 NMP	❍	❍				0,8
	DNMM 150412 NMP	❍	❍				1,2
	DNMM 150604 NMP	●	●	12,70	6,35	5,16	0,4
	DNMM 150608 NMP	●	●				0,8
	DNMM 150612 NMP	●	●				1,2
	DNMM 150616 NMP	●	●				1,6
NHG	**DNMM 150604 NHG**	●		12,70	6,35	5,16	0,4
	DNMM 150608 NHG	●	●				0,8
	DNMM 150612 NHG	●	●				1,2
	DNMM 150616 NHG	●	●				1,6
NHP	DNMM 150404 NHP		❍	12,70	4,76	5,16	0,4
	DNMM 150408 NHP		❍				0,8
	DNMM 150412 NHP		❍				1,2
	DNMM 150608 NHP	●	●	12,70	6,35	5,16	0,8
	DNMM 150612 NHP	●	●				1,2
R/L	**DNMX 150608 R**	●		12,70	6,35	5,16	0,8
	DNMX 150608 L	●					0,8

Square Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NLU	**SNMG 120408 NLU**	●		12,70	4,76	5,16	0,8
	SNMG 120412 NLU	●					1,2
NSU	**SNMG 120408 NSU**	●	❍	12,70	4,76	5,16	0,8
NGU	**SNMG 090304 NGU**	❍		9,525	3,18	3,81	0,4
	SNMG 090308 NGU	❍	❍				0,8
	SNMG 120404 NGU	●	●	12,70	4,76	5,16	0,4
	SNMG 120408 NGU	●	●				0,8
	SNMG 120412 NGU	●	●				1,2
	SNMG 120416 NGU	●	●				1,6
	SNMG 150612 NGU	❍	❍	15,875	6,35	6,35	1,2
New NGE	**SNMG 120408 NGE**	●	●	12,70	4,76	5,16	0,8
	SNMG 120412 NGE	●	●				1,2
	SNMG 120416 NGE	●	●				1,6
NUP	**SNMG 120404 NUP**	●	●	12,70	4,76	5,16	0,4
	SNMG 120408 NUP	●	●				0,8
	SNMG 120412 NUP	●	●				1,2
NMU	**SNMG 120408 NMU**	●	●	12,70	4,76	5,16	0,8
	SNMG 120412 NMU	●	●				1,2
	SNMG 120416 NMU	●	●				1,6
	SNMG 150612 NMU	●	●	15,875	6,35	6,35	1,2
	SNMG 150616 NMU	●	●				1,6
	SNMG 190612 NMU	●	●	19,05	6,35	7,94	1,2
	SNMG 190616 NMU	●	●				1,6
NUX	**SNMG 120408 NUX**	●	●	12,70	4,76	5,16	0,8
	SNMG 120412 NUX	●	●				1,2
	SNMG 120416 NUX	●	●				1,6
	SNMG 190612 NUX	●	●	19,05	6,35	7,94	1,2
	SNMG 190616 NUX	●	●				1,6
NMX	**SNMG 120408 NMX**	●	●	12,70	4,76	5,16	0,8
	SNMG 120412 NMX	●	●				1,2
	SNMG 120416 NMX	●	●				1,6
	SNMG 150612 NMX	●	●	15,875	6,35	6,35	1,2
	SNMG 150616 NMX	●	●				1,6
	SNMG 190612 NMX	●	●	19,05	6,35	7,94	1,2
	SNMG 190616 NMX	●	●				1,6
NMP	**SNMM 120408 NMP**	●	●	12,70	4,76	5,16	0,8
	SNMM 120412 NMP	●	●				1,2
	SNMM 120416 NMP	●	●				1,6
	SNMM 120420 NMP	●	●				2,0
	SNMM 150612 NMP	●	●	15,875	6,35	6,35	1,2
	SNMM 150616 NMP	●	●				1,6
	SNMM 190612 NMP	●	●	19,05	6,35	7,94	1,2
	SNMM 190616 NMP	●	●				1,6
	SNMM 190624 NMP	●	●				2,4
	SNMM 250724 NMP	❍	●	25,4	7,94	9,2	2,4
	SNMM 250924 NMP	❍		25,4	9,52	9,2	2,4
	SNMM 310924 NMP	❍		31,75	9,52	8,8	2,4
NHG	**SNMM 120408 NHG**	●	●	12,70	4,76	5,16	0,8
	SNMM 120412 NHG	●	●				1,2
	SNMM 120416 NHG	●	●				1,6
	SNMM 150612 NHG			15,875	6,35	6,35	1,2
	SNMM 150616 NHG	❍					1,6
	SNMM 190612 NHG	●	●	19,05	6,35	7,94	1,2
	SNMM 190616 NHG	●	●				1,6
	SNMM 190624 NHG	●	●				2,4
NHP	**SNMM 120408 NHP**	●	●	12,70	4,76	5,16	0,8
	SNMM 120412 NHP	●	●				1,2
	SNMM 120416 NHP		●				1,6
	SNMM 150612 NHP		●	15,875	6,35	6,35	1,2
	SNMM 190612 NHP	●	●	19,05	6,35	7,94	1,2
	SNMM 190616 NHP	●	●				1,6
	SNMM 190624 NHP	●	●				2,4
	SNMM 250724 NHP	❍	❍	25,4	7,94	9,2	2,4
	SNMM 250924 NHP	❍		25,4	9,52	9,2	2,4
	SNMM 310924 NHP	❍		31,75	9,52	8,8	2,4
NHW	**SNMM 250724 NHW**	❍		25,4	7,94	9,2	2,4
	SNMM 250924 NHW	❍		25,4	9,52	9,2	2,4
	SNMM 310924 NHW	❍		31,75	9,52	8,8	2,4
NHU	**SNMM 250724 NHU**	❍		25,4	7,94	9,2	2,4
	SNMM 250924 NHU	❍		25,4	9,52	9,2	2,4
	SNMM 310924 NHU	❍		31,75	9,52	8,8	2,4

Triangle Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NFL	**TNMG 160404 NFL**	❍		9,525	4,76	3,81	0,4
	TNMG 160408 NFL	❍					0,8
NLU	**TNMG 160404 NLU**	●		9,525	4,76	3,81	0,4
	TNMG 160408 NLU	●					0,8
	TNMG 160412 NLU	●					1,2
NSU	**TNMG 160404 NSU**	●	❍	9,525	4,76	3,81	0,4
	TNMG 160408 NSU	●	❍				0,8
	TNMG 160412 NSU	●					1,2
New NSE	**TNMG 160404 NSE**	●	❍	9,525	4,76	3,81	0,4
	TNMG 160408 NSE	●	❍				0,8
	TNMG 160412 NSE	●	❍				1,2

● = Euro stock
❍ = Stock item in Japan

Triangle Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NGU	TNMG 160404 NGU	●	●	9,525	4,76	3,18	0,4
	TNMG 160408 NGU	●	●				0,8
	TNMG 160412 NGU	●	●				1,2
	TNMG 160416 NGU	●	●				1,6
	TNMG 220404 NGU	○		12,70	4,76	5,16	0,4
	TNMG 220408 NGU	○	○				0,8
	TNMG 220412 NGU	○	○				1,2
New NGE	TNMG 160408 NGE	●	●	9,525	4,76	3,18	0,8
	TNMG 160412 NGE	●	●				1,2
	TNMG 220408 NGE	●	●	12,70	4,76	5,16	0,8
NUP	TNMG 160404 NUP	●	●	9,525	4,76	3,18	0,4
	TNMG 160408 NUP	●	●				0,8
	TNMG 160412 NUP	●					1,2
	TNMG 220408 NUP	○	○	12,70	4,76	5,16	0,8
	TNMG 220412 NUP	○	○				1,2
NMU	TNMG 160408 NMU	●	●	9,525	4,76	3,18	0,8
	TNMG 160412 NMU	●	●				1,2
	TNMG 220408 NMU	●	●	12,70	4,76	5,16	0,8
	TNMG 220412 NMU	●	●				1,2
	TNMG 220416 NMU	●	●				1,6
	TNMG 270612 NMU	○	○	15,875	6,35	6,35	1,2
	TNMG 270616 NMU	○					1,6
NUX	TNMG 160404 NUX	●	●	9,525	4,76	3,18	0,4
	TNMG 160408 NUX	●	●				0,8
	TNMG 160412 NUX	●	●				1,2
	TNMG 220408 NUX	●	○	12,70	4,76	5,16	0,8
	TNMG 220412 NUX	●	○				1,2
NMX	TNMG 160408 NMX	●	●	9,525	4,76	3,18	0,8
	TNMG 160412 NMX	●	●				1,2
	TNMG 220408 NMX	○	○	12,70	4,76	5,16	0,8
	TNMG 220412 NMX	○	○				1,2
NMP	TNMM 160408 NMP	●	●	9,525	4,76	3,18	0,8
	TNMM 160412 NMP	●	●				1,2
	TNMM 160416 NMP	●					1,6
	TNMM 220408 NMP	●	●	12,70	4,76	5,16	0,8
	TNMM 220412 NMP	●	●				1,2
	TNMM 220416 NMP	●	●				1,6
NHG	TNMM 160408 NHG		●	9,525	4,76	3,18	0,8
	TNMM 160412 NHG		●				1,2
	TNMM 220408 NHG	●	●	12,70	4,76	5,16	0,8
	TNMM 220412 NHG	●	●				1,2
	TNMM 220416 NHG	●	●				1,6
NHP	TNMM 160408 NHP	●	●	9,525	4,76	3,18	0,8
	TNMM 160412 NHP	●	●				1,2
	TNMM 220412 NHP	●	●	12,70	4,76	5,16	1,2
	TNMM 220416 NHP	●	●				1,6

35° Diamond Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NFL	VNMG 160404 NFL	○		9,525	4,76	3,81	0,4
	VNMG 160408 NFL	○					0,8
NLU	VNMG 160404 NLU	●		9,525	4,76	3,81	0,4
	VNMG 160408 NLU	●					0,8
NSU	VNMG 160404 NSU	●	○	9,525	4,76	3,81	0,4
	VNMG 160408 NSU	●	○				0,8
NGU	VNMG 160404 NGU	●	○	9,525	4,76	3,81	0,4
	VNMG 160408 NGU	●	○				0,8
	VNMG 160412 NGU	●					
New NGE	VNMG 160408 NGE	●	●	9,525	4,76	3,81	0,8
NUP	VNMG 160404 NUP	●	●	9,525	4,76	3,81	0,4
	VNMG 160408 NUP	●	●				0,8
NUX	VNMG 160404 NUX	●	●	9,525	4,76	3,81	0,4
	VNMG 160408 NUX	●	●				0,8
	VNMG 160412 NUX	●	●				1,2

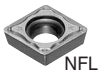
80° Trigon Type

Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NFL	WNMG 080404 NFL	○		12,70	4,76	5,16	0,4
	WNMG 080408 NFL	○					0,8
NLU	WNMG 080404 NLU	●		12,70	4,76	5,16	0,4
	WNMG 080408 NLU	●					0,8
	WNMG 080412 NLU	●					1,2
NLUW	WNMG 060404 NLU-W	●		9,525	4,76	3,81	0,4
	WNMG 060408 NLU-W	●					0,8
	WNMG 080404 NLU-W	●		12,70	4,76	5,16	0,4
	WNMG 080408 NLU-W	●					0,8
	WNMG 080412 NLU-W	●					1,2
NSU	WNMG 060404 NSU	●	○	9,525	4,76	3,81	0,4
	WNMG 060408 NSU	●	○				0,8
	WNMG 080404 NSU	●	○	12,70	4,76	5,16	0,4
	WNMG 080408 NSU	●	○				0,8
	WNMG 080412 NSU	●	○				1,2
New NSE	WNMG 080404 NSE	●	○	12,70	4,76	5,16	0,4
	WNMG 080408 NSE	●	○				0,8
	WNMG 080412 NSE	●	○				1,2
NGU	WNMG 060404 NGU	●	○	9,525	4,76	3,81	0,4
	WNMG 060408 NGU	●					0,8
	WNMG 060412 NGU	●					1,2
	WNMG 080404 NGU	●		12,70	4,76	5,16	0,4
	WNMG 080408 NGU	●	●				0,8
	WNMG 080412 NGU	●	●				1,2
NGUW	WNMG 080408 NGU-W	●	●	12,70	4,76	5,16	0,8
	WNMG 080412 NGU-W	●					1,2
		●					
New NGE	WNMG 060408 NGE			9,525	4,76	3,81	0,8
	WNMG 060412 NGE	●	●				1,2
	WNMG 080408 NGE	●	●	12,70	4,76	5,16	0,8
	WNMG 080412 NGE	●	●				1,2
NUP	WNMG 080408 NUP	●	●	12,70	4,76	5,16	0,8
	WNMG 080412 NUP	●	●				1,2
		●	●				
NUX	WNMG 080404 NUX			12,70	4,76	5,16	0,4
	WNMG 080408 NUX	●	●				0,8
	WNMG 080412 NUX	●	●				1,2
NMU	WNMG 060408 NMU	●	●	9,525	4,76	3,81	0,8
	WNMG 060412 NMU	●	●				1,2
	WNMG 080408 NMU	●	●	12,70	4,76	5,16	0,8
	WNMG 080412 NMU	●	●				1,2
	WNMG 080416 NMU	●	●				1,6
NMX	WNMG 080408 NMX	●	●	12,70	4,76	5,16	0,8
	WNMG 080412 NMX	●	●				1,2
		●	●				
NMP	WNMM 080408 NMP			12,70	4,76	5,16	0,8
	WNMM 080412 NMP	●	●				1,2
		●	●				

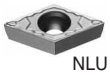
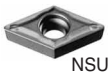
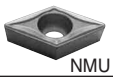
● = Euro stock
○ = Stock item in Japan

AC820P / AC830P

80° Diamond Type

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
 NFL	7°	CCMT 060202 NLU	❍		6,35	2,38	2,8	0,2
		CCMT 060204 NLU	❍					0,4
		CCMT 09T304 NLU	●		9,525	3,97	4,4	0,4
		CCMT 09T308 NLU	●					0,8
 NFLW	7°	CCMT 09T304 NLU-W	●		9,525	3,97	4,4	0,4
		CCMT 09T308 NLU-W	●					0,8
 NSU	7°	CCMT 060202 NSU	●	❍	6,35	2,38	2,8	0,2
		CCMT 060204 NSU	●	❍				0,4
		CCMT 060208 NSU	●	❍				0,8
		CCMT 09T302 NSU	●	❍	9,525	3,97	4,4	0,2
		CCMT 09T304 NSU	●	❍				0,4
		CCMT 09T308 NSU	●	❍				0,8
		CCMT 120404 NSU	●	❍	12,7	4,76	5,5	0,4
		CCMT 120408 NSU	●	❍				0,8
 NSK	7°	CCMT 060204 NSK	●	●	6,35	2,38	2,8	0,4
		CCMT 060208 NSK	●	●				0,8
		CCMT 09T304 NSK	●	●	9,525	3,97	4,4	0,4
		CCMT 09T308 NSK	●	●				0,8
		CCMT 120404 NSK	●	●	12,7	4,76	5,5	0,4
		CCMT 120408 NSK	●	●				0,8
 NMU	7°	CCMT 09T304 NMU	●	●	12,7	4,76	5,5	0,4
		CCMT 09T308 NMU	●	●				0,8

55° Diamond Type

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
 NLU	7°	DCMT 070202 NLU	●		6,35	2,38	2,8	0,2
		DCMT 070204 NLU	●					0,4
		DCMT 11T302 NLU	●		9,525	3,97	4,4	0,2
		DCMT 11T304 NLU	●					0,4
		DCMT 11T308 NLU	●					0,8
 NSU	7°	DCMT 070202 NSU	●	❍	6,35	2,38	2,8	0,2
		DCMT 070204 NSU	●	❍				0,4
		DCMT 070208 NSU	●	❍				0,8
		DCMT 11T302 NSU	●	❍	9,525	3,97	4,4	0,2
		DCMT 11T304 NSU	●	❍				0,4
		DCMT 11T308 NSU	●	❍				0,8
 NSK	7°	DCMT 070204 NSK	●	●	6,35	2,38	2,8	0,2
		DCMT 070208 NSK	●	●				0,4
		DCMT 11T304 NSK	●	●	9,525	3,97	4,4	0,8
		DCMT 11T308 NSK	●	●				0,4
		DCMT 11T312 NSK	●					0,8
 NMU	7°	DCMT 11T304 NMU	●	●	9,525	3,97	4,4	0,4
		DCMT 11T308 NMU	●	●				0,8

Round Type

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
 NRX	7°	RCMT 1003M0 NRX	●	●	10	3,18	3,6	–
		RCMT 10T3M0 NRX	●	●	10	3,97	3,6	–
		RCMT 1204M0 NRX	●	●	12	4,76	4,2	–
		RCMT 1606M0 NRX	●	●	16	6,35	5,2	–
		RCMT 2006M0 NRX	●	●	20	6,35	6,5	–
		RCMT 2507M0 NRX	●	●	25	7,94	7,2	–
 NRP	7°	RCMX 1003M0 NRP	●	●	10	3,18	3,6	–
		RCMX 1204M0 NRP	●	●	12	4,76	4,2	–
		RCMX 1606M0 NRP	●	●	16	6,35	5,2	–
		RCMX 2006M0 NRP	●	●	20	6,35	6,5	–
		RCMX 2507M0 NRP	●	❍	25	7,94	7,2	–

Square Type (With Insert Hole)

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
 NSU	7°	SCMT 09T304 NSU	●	❍	9,525	3,97	4,4	0,4
		SCMT 09T308 NSU	●	❍				0,8
		SCMT 120404 NSU	●	❍	12,70	4,76	5,5	0,4
		SCMT 120408 NSU	●	❍				0,8
 NSK	7°	SCMT 09T304 NSK	●	●	9,525	3,97	4,4	1,2
		SCMT 09T308 NSK	●	●				0,8
		SCMT 120404 NSK	●		12,70	4,76	5,5	0,8
		SCMT 120408 NSK	●	●				
		SCMT 120412 NSK	●					0,4
 NMU	7°	SCMT 09T308 NMU	●	●	9,525	3,97	4,4	0,8
		SCMT 120408 NMU	●	●	12,70	4,76	5,5	
 NSF	11°	SPMT 090304 NSF	●	●	12,70	4,76	5,5	
		SPMT 090308 NSF	●	●				

Square Type (Without Insert Hole)

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
 NSF	11°	SPMR 090304 NSF	❍	❍	9,525	3,18	–	0,4
		SPMR 090308 NSF	●	●				0,8
		SPMR 120304 NSF	●	●	12,70	3,18	–	0,4
		SPMR 120308 NSF	●	●				0,8
		SPMR 120312 NSF	●					1,2

Triangle Type (With Insert Hole)

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
 NLU	7°	TCMT 110204 NLU	●		6,35	2,38	2,8	0,4
		TCMT 110208 NLU	●					0,8
 NSU	7°	TCMT 110204 NSU	●	❍	6,35	2,38	2,8	0,4
		TCMT 110208 NSU	●	❍				0,8
		TCMT 16T304 NSU	●	❍	9,525	3,97	4,3	0,4
		TCMT 16T308 NSU	●	❍				0,8
 NSK	7°	TCMT 110204 NSK	●	●	6,35	2,38	2,8	0,4
		TCMT 110208 NSK	●	●				0,8
		TCMT 16T304 NSK	●	●	9,525	3,97	4,3	0,4
		TCMT 16T308 NSK	●	●				0,8
		TCMT 16T312 NSK	●					1,2
 NSU	11°	TPMT 110302 NSU	❍	❍	6,35	3,18	3,3	0,2
		TPMT 110304 NSU	●	❍				0,4
		TPMT 110308 NSU	●	❍				0,8
		TPMT 160404 NSU	●	❍	9,525	4,76	4,3	0,4
		TPMT 160408 NSU	●	❍				0,8
 NMU	11°	TPMT 110304 NMU	❍		6,35	3,18	3,3	0,4
		TPMT 110308 NMU	❍					0,8
		TPMT 160404 NMU	❍		9,525	4,76	4,3	0,4
		TPMT 160408 NMU	❍					0,8

Triangle Type (With Insert Hole)

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
 NSF	11°	TPMH 110304 NSF	●	●	6,35	3,18	3,3	0,4
		TPMH 110308 NSF	●	●				0,8
		TPMT 160404 NSF	●	●	9,525	4,76	4,3	0,4
		TPMT 160408 NSF	●	●				0,8

Triangle Type (Without Insert Hole)

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
 NSF	11°	TPMR 110304 NSF	●	●				0,4
		TPMR 110308 NSF	●	●				0,8
		TPMR 160304 NSF	●	●				0,4
		TPMR 160308 NSF	●	●				0,8
		TPMR 160312 NSF	●					1,2

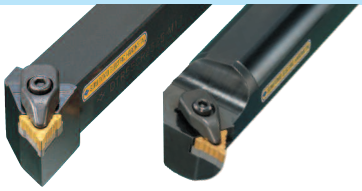
● = Euro stock
❍ = Stock item in Japan

Pos. Type Inserts

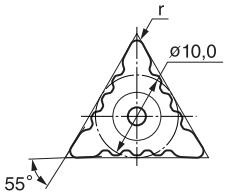
35° Diamond Type

Shape	Relief Angle	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
NLU	5°	VBMT 110304 NLU	○		6,35	3,18	2,8	0,4
		VBMT 160404 NLU	●		9,525	4,76	4,4	0,4
		VBMT 160408 NLU	●					0,8
NSU	5°	VBMT 110204 NSU	●		6,35	2,38	2,8	0,4
		VBMT 110208 NSU	●					0,8
		VBMT 110304 NSU	●		6,35	3,18	2,8	0,4
		VBMT 110308 NSU	●					0,8
		VBMT 160404 NSU	●	○	9,525	4,76	4,4	0,4
		VBMT 160408 NSU	●	○				0,8
NSK	5°	VBMT 110204 NSK	●	●	6,35	2,38	2,8	0,4
		VBMT 110208 NSK	●	●				0,8
		VBMT 160404 NSK	●	●	9,525	4,76	4,4	0,4
		VBMT 160406 NSK	●	●				0,6
		VBMT 160408 NSK	●	●				0,8
		VBMT 160412 NSK	●	●				1,2
NSU	7°	VCMT 160404 NSU	●	○	9,525	4,76	4,4	0,4
		VCMT 160408 NSU	●	○				0,8
NSK	7°	VCMT 160404 NSK	●	●	9,525	4,76	4,4	0,4
		VCMT 160408 NSK	●	●				0,8

T-REX Inserts



Neg. Type



Shape	Ordering number	Stock AC820P	Stock AC830P	Dimensions (mm) Inscribed Circle	Thickness	Hole	Corner Radius
-LU	TRM 551704 -LU	●		10,0	5,0	–	0,4
	TRM 551708 -LU	●					0,8
	TRM 551712 -LU	●					1,2
-SU	TRM 551704 -SU	●		10,0	5,0	–	0,4
	TRM 551708 -SU	●					0,8
	TRM 551712 -SU	●					1,2
-GU	TRM 551704 -GU	●	●	10,0	5,0	–	0,4
	TRM 551708 -GU	●	●				0,8
	TRM 551712 -GU	●	●				1,2

● = Euro stock
○ = Stock item in Japan

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