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SUMITOMO

CARBIDE - CBN - DIAMOND

AC405K AC415K AC420K



Scan the bar code with
your smart phone to
see these products in
action



High Performance Turning Systems

CVD coated grades for gray & ductile cast iron turning



AC405K/AC415K/AC420K

for gray & ductile cast iron turning

AC405K: excellent wear & deformation resistance ideal for high speed and continuous turning

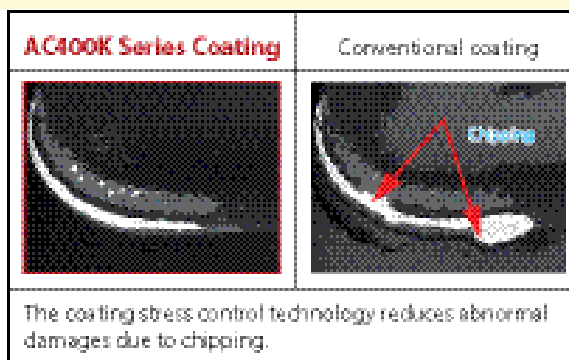
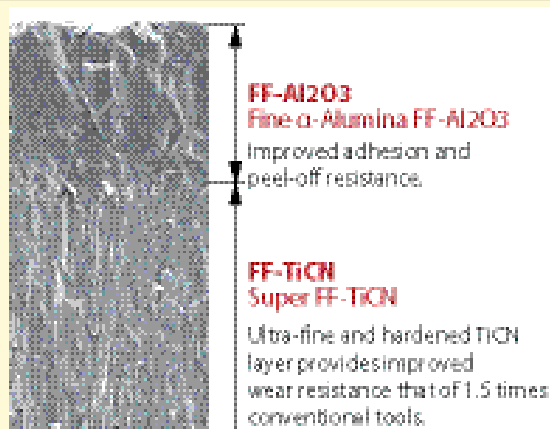
AC415K: Stability in a wide range of applications with long tool life, AC415K is the first choice for cast iron turning

AC420K: highly stable performance and longer tool life for medium to heavy interrupted cutting

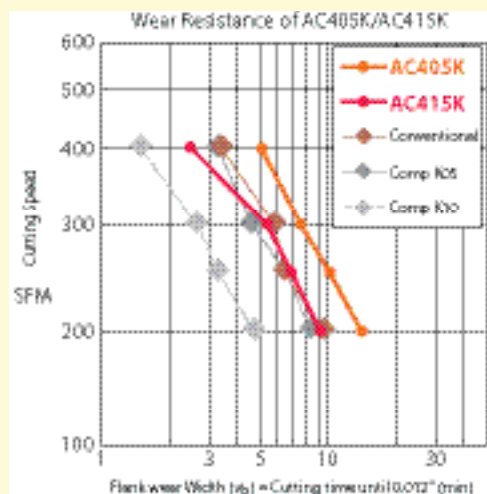
Features & Benefits

- **DOUBLE** the tool life of conventional cast iron grades as a result of its excellent wear resistance (AC405K), wide range of applications (AC415K) and superior toughness (AC420K)
- Ultra-thick coating provides excellent peeling resistance and improves overall insert stability
- High thermal resistance allows for higher cutting speeds

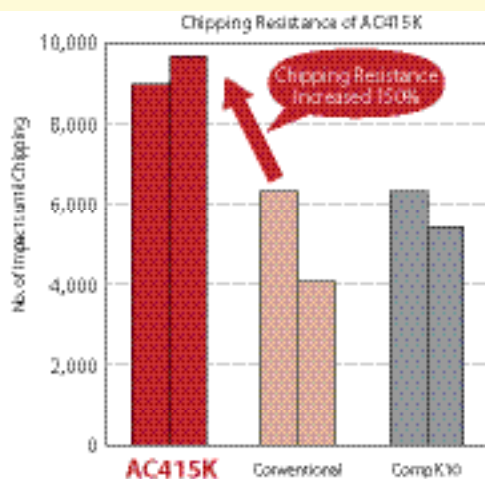
Coating Structure



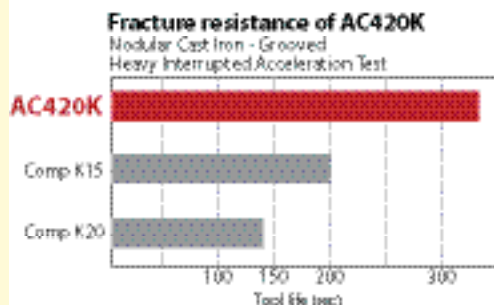
Performance



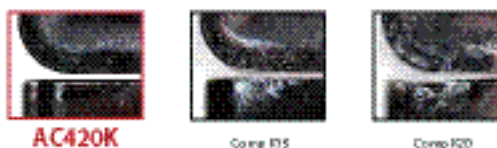
Work Material: Nodular Cast Iron Insert: CNMG432
Conditions: $v_c = 686 \sim 1312$ SFM $f = 0.012$ IPR $ap = 0.059"$ Wet.



Work Material: Nodular Cast Iron Insert: CNMG432
Conditions: $v_c = 984$ SFM $f = 0.010$ IPR $ap = 0.059"$ Wet.

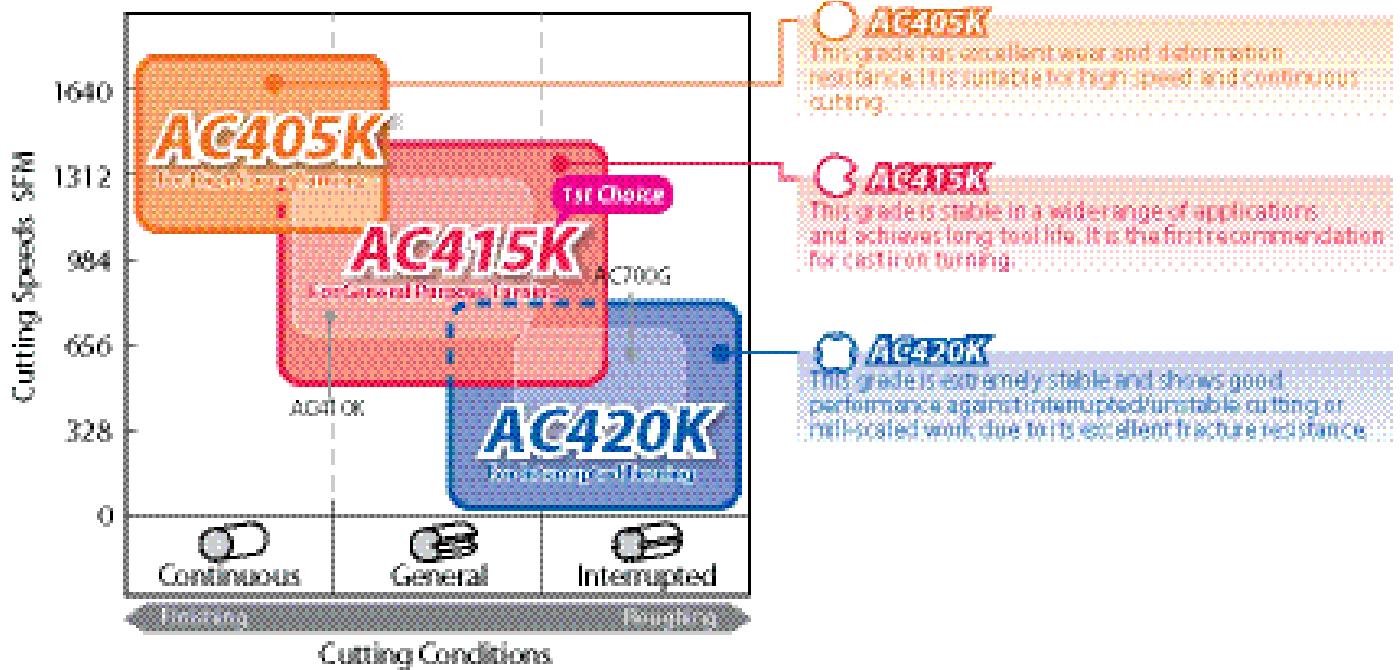


Edge Comparison (150 sec)



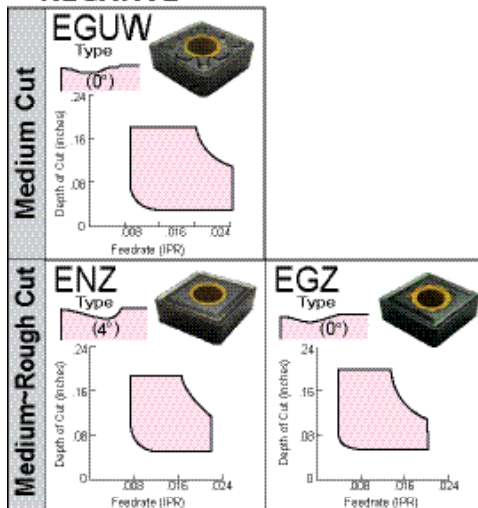
Work material: Nodular Cast Iron Holder: PCLNR2525-43 Insert: CNMG432
Conditions: $v_c = 1148$ SFM $f = 0.010$ IPR $ap = 0.059"$ Wet.

Application Range

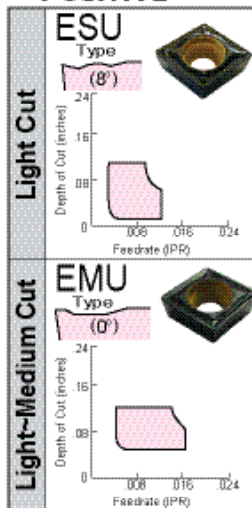


Chipbreaker Selection

● NEGATIVE

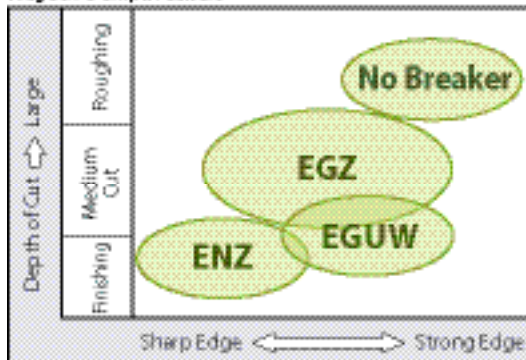


● POSITIVE

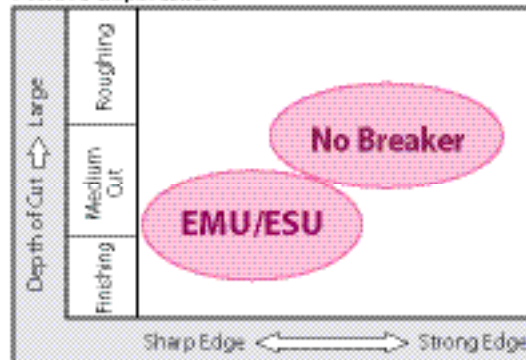


Chipbreaker Comparison

Negative Chipbreakers



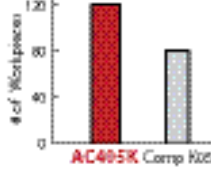
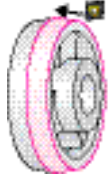
Positive Chipbreakers



Application Examples

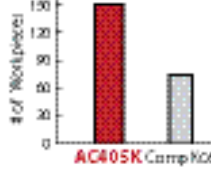
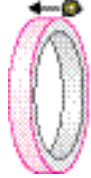
AC405K

Gray Cast Iron - Compressor



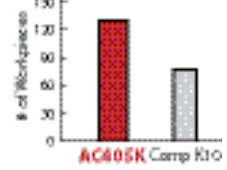
Insert: CNMG433 EGZ
Cutting Conditions: $v_c=1640$ SFM $f=0.010$ IPR
 $a_p=0.079''$ Dry

Gray Cast Iron - Ring



Insert: WNMG432 ENZ
Cutting Conditions: $v_c=1116$ SFM $f=0.012$ IPR
 $a_p=0.079''$ Wet

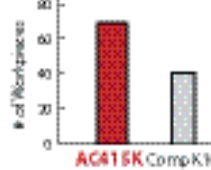
Nodular Cast Iron - Shaft



Insert: DNMG432 ENZ
Cutting Conditions: $v_c=656$ SFM $f=0.018$ IPR
 $a_p=0.010 \sim 0.016''$ Wet

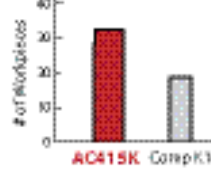
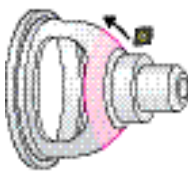
AC415K

Gray Cast Iron - Brake Disk



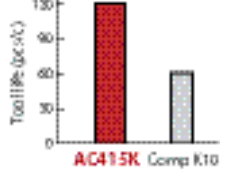
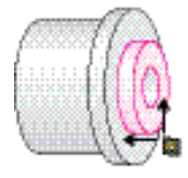
Insert: WNMA433
Cutting Conditions: $v_c=1476$ SFM $f=0.010$ IPR
 $a_p=0.059''$ Dry

Nodular Cast Iron - Differential Gear Case



Insert: CNMG432ENZ
Cutting Conditions: $v_c=787$ SFM $f=0.012$ IPR
 $a_p=0.079'' \sim 0.118''$ Wet

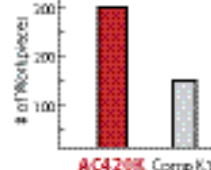
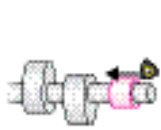
Nodular Cast Iron - Hub



Insert: CNMA432
Cutting Conditions: $v_c=755$ SFM $f=0.079 \sim 0.118$ IPR
 $a_p=0.059'' \sim 0.079''$ Wet

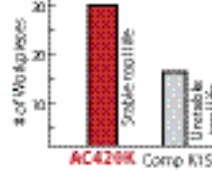
AC420K

Nodular Cast Iron - Cam Shaft



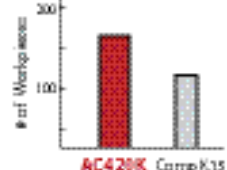
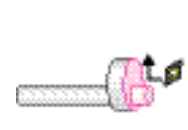
Insert: WNMA432
Cutting Conditions: $v_c=328 \sim 820$ SFM
 $f=0.006 \sim 0.012$ IPR $a_p=0.034''$ Wet

Nodular Cast Iron - Drive Sprocket



Insert: WNMA433
Cutting Conditions: $v_c=656$ SFM $f=0.013$ IPR
 $a_p=0.118''$ Wet

Nodular Cast Iron - Shaft



Insert: DNMG433EGZ
Cutting Conditions: $v_c=328 \sim 886$ SFM
 $f=0.006 \sim 0.016$ IPR $a_p=0.059''$ Wet

Recommended Cutting Conditions

Application	Application Type	Grade	Chipbreaker	Gray Cast Iron		Ductile Cast Iron	
				Cutting Speed (SFM)	Feed Rate (IPR)	Cutting Speed (SFM)	Feed Rate (IPR)
Finishing	Continuous	AC405K	ENZ	255 - 1312 - 1870	0.004 - 0.010 - 0.016	558 - 1148 - 1640	0.004 - 0.010 - 0.016
	General	AC415K	ENZ	656 - 1148 - 1640	0.004 - 0.010 - 0.016	492 - 984 - 1476	0.004 - 0.010 - 0.016
	Interrupted	AC415K	EGZ	820 - 902 - 1312	0.004 - 0.012 - 0.020	492 - 820 - 1148	0.004 - 0.012 - 0.020
Medium	Continuous	AC405k	EGZ	558 - 1034 - 1509	0.004 - 0.012 - 0.020	558 - 935 - 1312	0.004 - 0.012 - 0.020
	General	AC415K	EGZ	492 - 902 - 1312	0.004 - 0.012 - 0.020	492 - 820 - 1148	0.004 - 0.012 - 0.020
	Interrupted	AC420K	EGZ	328 - 656 - 984	0.004 - 0.012 - 0.020	262 - 492 - 722	0.004 - 0.012 - 0.020
Roughing	Continuous	AC415K	EGZ	492 - 902 - 1312	0.004 - 0.012 - 0.020	492 - 820 - 1148	0.004 - 0.012 - 0.020
	General	AC420K	EGZ	328 - 656 - 984	0.004 - 0.012 - 0.020	262 - 492 - 722	0.004 - 0.012 - 0.020
	Interrupted	AC420K	No Breaker	328 - 594 - 820	0.004 - 0.014 - 0.024	262 - 427 - 591	0.004 - 0.014 - 0.024

(Min - Optimum - Max)

Insert Availability-NEGATIVE

CNMA 80° Diamond/Negative							
Sumitomo Cat. No.	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
CNMA 431	CNMA 120404	●	●	●	.500	.1875	.0156 .2031
CNMA 432	CNMA 120408	●	●	●	.500	.1875	.0313 .2031
CNMA 433	CNMA 120412	●	●	●	.500	.1875	.0469 .2031
CNMA 434	CNMA 120416	●	●	●	.500	.1875	.0625 .2031
CNMA 543	CNMA 160612	●	●	●	.625	.250	.0469 .250
CNMA 544	CNMA 160616	●	●	●	.625	.250	.0625 .250
CNMA 643	CNMA 190612	●	●	●	.750	.250	.0469 .3126
CNMA 644	CNMA 190616	●	●	●	.750	.250	.0625 .3126

DNMG 55° Diamond/Negative							
Sumitomo Cat. No.	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
DNMG 431 EGZ	DNMG 150404N-GZ	●	●	●	.500	.1875	.0156 .2031
DNMG 432 EGZ	DNMG 150408N-GZ	●	●	●	.500	.1875	.0313 .2031
DNMG 433 EGZ	DNMG 150412N-GZ	●	●	●	.500	.1875	.0469 .2031
DNMG 431 ENZ	DNMG 150404N-UZ	●	●	●	.500	.1875	.0156 .2031
DNMG 432 ENZ	DNMG 150408N-UZ	●	●	●	.500	.1875	.0313 .2031
DNMG 433 ENZ	DNMG 150412N-UZ	●	●	●	.500	.1875	.0469 .2031
DNMG 442 ENZ	DNMG 150608N-UZ	●	●	●	.500	.250	.0313 .2031
DNMG 443 ENZ	DNMG 150612N-UZ	●	●	●	.500	.250	.0469 .2031

CNMG 80° Diamond/Negative							
CNMG 431 EGZ	CNMG 120404N-GZ	●	●	●	.500	.1875	.0156 .2031
CNMG 432 EGZ	CNMG 120408N-GZ	●	●	●	.500	.1875	.0313 .2031
CNMG 433 EGZ	CNMG 120412N-GZ	●	●	●	.500	.1875	.0469 .2031
CNMG 434 EGZ	CNMG 120416N-GZ	●	●	●	.500	.1875	.0625 .2031
CNMG 542 EGZ	CNMG 160608N-GZ	○	○	○	.625	.250	.0313 .250
CNMG 543 EGZ	CNMG 160612N-GZ	○	○	○	.625	.250	.0469 .250
CNMG 544 EGZ	CNMG 160616N-GZ	○	○	○	.625	.250	.0625 .250
CNMG 643 EGZ	CNMG 190612N-GZ	○	○	○	.750	.250	.0469 .3126
CNMG 644 EGZ	CNMG 190616N-GZ	○	○	○	.750	.250	.0625 .3126
CNMG 431 ENZ	CNMG 120404N-UZ	●	●	●	.500	.1875	.0156 .2031
CNMG 432 ENZ	CNMG 120408N-UZ	●	●	●	.500	.1875	.0313 .2031
CNMG 433 ENZ	CNMG 120412N-UZ	●	●	●	.500	.1875	.0469 .2031
CNMG 434 ENZ	CNMG 120416N-UZ	●	●	●	.500	.1875	.0625 .2031
CNMG 543 ENZ	CNMG 160612N-UZ	●	●	●	.625	.250	.0469 .250
CNMG 544 ENZ	CNMG 160616N-UZ	●	●	●	.625	.250	.0625 .250
CNMG 643 ENZ	CNMG 190616N-UZ	●	●	●	.750	.250	.0469 .3126
CNMG 644 ENZ	CNMG 190616N-UZ	●	●	●	.750	.250	.0625 .3126
CNMG 432 EGUW	CNMG 120408N-GUW	●	●	●	.500	.1875	.0313 .2031
CNMG 433 EGUW	CNMG 120412N-GUW	●	●	●	.500	.1875	.0469 .2031

RNMA Round/Negative							
RNMA 43	-	●	●	●	.500	.1875	- .250

SNMA 90° Square/Negative							
SNMA 322	SNMA 090308	●	●	●	.375	.125	.0313 .150
SNMA 431	SNMA 120404	●	●	●	.500	.1875	.0156 .2031
SNMA 432	SNMA 120408	●	●	●	.500	.1875	.0313 .2031
SNMA 433	SNMA 120412	●	●	●	.500	.1875	.0469 .2031
SNMA 434	SNMA 120416	●	●	●	.500	.1875	.0625 .2031
SNMA 435	SNMA 120420	●	●	●	.500	.1875	.0781 .2031
SNMA 543	SNMA 150612	●	●	●	.625	.250	.0469 .250
SNMA 643	SNMG 190612	●	●	●	.750	.250	.0469 .3126
SNMA 644	SNMG 190616	●	●	●	.750	.250	.0625 .3126

SNMG 90° Square/Negative							
SNMG 432 EGZ	SNMG 120408N-GZ	●	●	●	.500	.1875	.0313 .2031
SNMG 433 EGZ	SNMG 120412N-GZ	●	●	●	.500	.1875	.0469 .2031
SNMG 434 EGZ	SNMG 120416N-GZ	●	●	●	.500	.1875	.0625 .2031
SNMG 543 EGZ	SNMG 150612N-GZ	○	○	○	.625	.250	.0469 .250
SNMG 544 EGZ	SNMG 150616N-GZ	○	○	○	.625	.250	.0625 .250
SNMG 643 EGZ	SNMG 190612N-GZ	○	○	○	.750	.250	.0469 .3126
SNMG 644 EGZ	SNMG 190616N-GZ	○	○	○	.750	.250	.0625 .3126
SNMG 432 ENZ	SNMG 120408N-UZ	●	●	●	.500	.1875	.0313 .2031
SNMG 433 ENZ	SNMG 120412N-UZ	●	●	●	.500	.1875	.0469 .2031
SNMG 434 ENZ	SNMG 120416N-UZ	●	●	●	.500	.1875	.0625 .2031
SNMG 543 ENZ	SNMG 150612N-UZ	●	●	●	.625	.250	.0469 .250
SNMG 643 ENZ	SNMG 190612N-UZ	●	●	●	.750	.250	.0469 .3126
SNMG 644 ENZ	SNMG 190616N-UZ	●	●	●	.750	.250	.0625 .3126

DNMA 55° Diamond/Negative							
DNMA 431	DNMA 150408	●	●	●	.500	.1875	.0156 .2031
DNMA 432	DNMA 150408	●	●	●	.500	.1875	.0313 .2031
DNMA 433	DNMA 150412	●	●	●	.500	.1875	.0469 .2031
DNMA 442	DNMA 150608	●	●	●	.500	.250	.0313 .2031
DNMA 443	DNMA 150612	●	●	●	.500	.250	.0469 .2031

- = Stocked standard items
- ★ = Worldwide warehouse items
- = Available 1st Quarter 2013

SNMN 90° Square/Negative							
Sumitomo Cat. No.	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
SNMA 432	SNMA 120408	●	●	●	.500	.1875	.0313
SNMA 433	SNMA 120412	●	●	●	.500	.1875	.0469
SNMA 434	SNMA 120416	●	●	●	.500	.1875	.0625

TNMA 60° Triangle/Negative							
TNMA	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
TNMA 331	TNMA 160404	●	●	●	.375	.1875	.0156
TNMA 332	TNMA 160408	●	●	●	.375	.1875	.0313
TNMA 333	TNMA 160412	●	●	●	.375	.1875	.0469
TNMA 334	TNMA 160416	●	●	●	.375	.1875	.0625
TNMA 335	TNMA 160420	●	●	●	.375	.1875	.0781
TNMA 432	TNMA 220408	●	●	●	.500	.1875	.0313
TNMA 433	TNMA 220412	●	●	●	.500	.1875	.0469
TNMA 434	TNMA 220416	●	●	●	.500	.1875	.0625
TNMA 543	TNMA 270612	●	●	●	.625	.250	.0469
TNMA 544	TNMA 270616	●	●	●	.625	.250	.0625

TNMG 60° Triangle/Negative							
TNMG	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
TNMG 331 EGZ	TNMG 160404N-GZ	●	●	●	.375	.1875	.0156
TNMG 332 EGZ	TNMG 160408N-GZ	●	●	●	.375	.1875	.0313
TNMG 333 EGZ	TNMG 160412N-GZ	●	●	●	.375	.1875	.0469
TNMG 432 EGZ	TNMG 220408N-GZ	○	○	○	.500	.1875	.0313
TNMG 433 EGZ	TNMG 220412N-GZ	○	○	○	.500	.1875	.0469
TNMG 434 EGZ	TNMG 220416N-GZ	○	○	○	.500	.1875	.0625
TNMG 331 ENZ	TNMG 160404N-UZ	●	●	●	.375	.1875	.0156
TNMG 332 ENZ	TNMG 160408N-UZ	●	●	●	.375	.1875	.0313
TNMG 333 ENZ	TNMG 160412N-UZ	●	●	●	.375	.1875	.0469
TNMG 335 ENZ	TNMG 160420N-UZ	●	●	●	.375	.1875	.0781
TNMG 432 ENZ	TNMG 220408N-UZ	●	●	●	.500	.1875	.0313
TNMG 433 ENZ	TNMG 220412N-UZ	●	●	●	.500	.1875	.0469
TNMG 434 ENZ	TNMG 220416N-UZ	●	●	●	.500	.1875	.0625
TNMG 666 ENZ	TNMG 330924N-UZ	●	●	●	.750	.375	.0938

TNMN 60° Triangle/Negative							
TNMN	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
TNMN 332	TNMN 160408	●	●	●	.375	.1875	.0313
TNMN 333	TNMN 160412	●	●	●	.375	.1875	.0469
TNMN 334	TNMN 160416	●	●	●	.375	.1875	.0625

VNMA 35° Diamond/Negative							
VNMA	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
VNMA 331	VNMA 160404	●	●	●	.375	.1875	.0156
VNMA 332	VNMA 160408	●	●	●	.375	.1875	.0313
VNMA 333	VNMA 160412	●	●	●	.375	.1875	.0469

VNMG 35° Diamond/Negative							
VNMG	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
VNMG 331 EGZ	VNMG 160404N-GZ	●	●	●	.375	.1875	.0156
VNMG 332 EGZ	VNMG 160408N-GZ	●	●	●	.375	.1875	.0313
VNMG 333 EGZ	VNMG 160412N-GZ	●	●	●	.375	.1875	.0469
VNMG 331 ENZ	VNMG 160404N-UZ	●	●	●	.375	.1875	.0156
VNMG 332 ENZ	VNMG 160408N-UZ	●	●	●	.375	.1875	.0313

WNMA 80° Trigon/Negative							
WNMA	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
WNMA 432	WNMA 080408	●	●	●	.500	.1875	.0313
WNMA 433	WNMA 080412	●	●	●	.500	.1875	.0469
WNMA 434	WNMA 080416	●	●	●	.500	.1875	.0625

WNMG 80° Trigon/Negative							
WNMG	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
WNMG 332 EGZ	WNMG 060408N-GZ	●	●	●	.375	.1875	.0313
WNMG 333 EGZ	WNMG 060412N-GZ	●	●	●	.375	.1875	.0469
WNMG 431 EGZ	WNMG 080404N-GZ	●	●	●	.500	.1875	.0156
WNMG 432 EGZ	WNMG 080408N-GZ	●	●	●	.500	.1875	.0313
WNMG 433 EGZ	WNMG 080412N-GZ	●	●	●	.500	.1875	.0469
WNMG 431 ENZ	WNMG 080404N-UZ	●	●	●	.500	.1875	.0156
WNMG 432 ENZ	WNMG 080408N-UZ	●	●	●	.500	.1875	.0313
WNMG 433 ENZ	WNMG 080412N-UZ	●	●	●	.500	.1875	.0469
WNMG 432 EGUW	WNMG 080408N-GUW	●	●	●	.500	.1875	.0313
WNMG 433 EGUW	WNMG 080412N-GUW	●	●	●	.500	.1875	.0469

Insert Availability-POSITIVE

CCMA 80° Diamond/7° Positive							
Sumitomo Cat. No.	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
CCMA 21.51	CCMA 060204	●	●	●	.250	.094	.0156
CCMA 32.51	CCMA 09T304	●	●	●	.375	.156	.0156
CCMA 32.52	CCMA 09T308	●	●	●	.375	.156	.0313

CCMT 80° Diamond/7° Positive							
CCMT	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Hole Dia.
CCMT 21.51 ESU	CCMT 060204N-SU	●	●	●	.250	.094	.0156
CCMT 21.52 ESU	CCMT 060208N-SU	●	●	●	.250	.094	.0313
CCMT 32.51 ESU	CCMT 09T304N-SU	●	●	●	.375	.156	.0156
CCMT 32.52 ESU	CCMT 09T308N-SU	●	●	●	.375	.156	.0313
CCMT 32.51 EMU	CCMT 09T304N-MU	●	●	●	.375	.156	.0156
CCMT 32.52 EMU	CCMT 09T308N-MU	●	●	●	.375	.156	.0313

- = Stocked standard items
- ★ = Worldwide warehouse items
- = Available 1st Quarter 2013

CPMA 80° Diamond/11° Positive								
Sumitomo Cat. No.	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Nose Radius	Hole Dia.
CPMA 2.51.51	CPMA 080204			●	.3125	.094	.0156	.110
CPMA 2.51.52	CPMA 080208			●	.3125	.094	.0313	.110
CPMA 321	CPMA 090304			●	.375	.125	.0156	.1732
CPMA 322	CPMA 090308			●	.375	.125	.0313	.1732

CPMT 80° Diamond/11° Positive								
CPMT 2.51.51 EMU	CPMT 080204N-MU			●	.3125	.094	.0156	.134
CPMT 2.51.52 EMU	CPMT 080208N-MU			●	.3125	.094	.0313	.110
CPMT 321 EMU	CPMT 090304N-MU			●	.375	.125	.0156	.1732
CPMT 322 EMU	CPMT 090308N-MU			●	.375	.125	.0313	.1732

DCMA 55° Diamond/7° Positive								
DCMA 21.51	DCMA 070204	●	●	●	.250	.094	.0156	.110
DCMA 21.52	DCMA 070208	●	●	●	.250	.094	.0313	.110
DCMA 32.51	DCMA 11T304	●	●	●	.375	.156	.0156	.1732
DCMA 32.52	DCMA 11T308	●	●	●	.375	.156	.0313	.1732

DCMT 55° Diamond/7° Positive								
DCMT 21.51 ESU	DCMT 070204N-SU	●	●		.250	.094	.0156	.110
DCMT 21.52 ESU	DCMT 070208N-SU	●	●		.250	.094	.0313	.110
DCMT 32.51 ESU	DCMT 11T304N-SU	●	●		.375	.156	.0156	.1732
DCMT 32.52 ESU	DCMT 11T308N-SU	●	●		.375	.156	.0313	.1732
DCMT 32.51 EMU	DCMT 11T304N-MU	●	●	●	.375	.156	.0156	.1732
DCMT 32.52 EMU	DCMT 11T308N-MU	●	●	●	.375	.156	.0313	.1732

RCMX Round/7° Positive								
RCMX 100300	RCMX 1003MON-RP			●	.394	.125	-	.1417
RCMX 120400	RCMX 1204MON-RP			●	.472	.1875	-	.1654
RCMX 160600	RCMX 1606MON-RP			●	.630	.250	-	.2047

SCMT 90° Square/7° Positive								
SCMT 32.52 EMU	SCMT 09T308N-MU	★	★	●	.375	.156	.0156	.1732
SCMT 432 EMU	SCMT 120408N-MU	★	★	●	.500	.1875	.0313	.2165

SCMA 90° Square/7° Positive								
SCMA 32.52	SCMA 09T308			●	.375	.1256	.0313	.1732
SCMA 432	SCMA 120408			●	.500	.1875	.0313	.2165
SCMA 433	SCMA 120412			●	.500	.1875	.0469	.2165

SPMN 90° Square/7° Positive								
Sumitomo Cat. No.	ISO Cat. No.	AC405K	AC415K	AC420K	I.C.	Thickness	Nose Radius	Hole Dia.
SPMN 321	SPMN 090304		●	●	.375	.125	.0156	-
SPMN 322	SPMN 090308			●	.375	.125	.0313	-
SPMN 421	SPMN 120304		●	●	.500	.125	.0156	-
SPMN 422	SPMN 120308		●	●	.500	.125	.0313	-
SPMN 423	SPMN 120312			●	.500	.125	.0469	-

TCMA 60° Triangle/7° Positive								
TCMA 21.51	TCMA 110204	●	●	●	.250	.094	.0156	.110
TCMA 21.52	TCMA 110208	●	●	●	.250	.094	.0313	.110
TCMA 32.51	TCMA 11T304	●	●	●	.375	.156	.0156	.1693
TCMA 32.52	TCMA 11T308	●	●	●	.375	.156	.0313	.1693
TCMA 32.53	TCMA 16T312			●	.375	.156	.0469	.1693

TCMT 60° Triangle/7° Positive								
TCMT 21.51 ESU	TCMT 110204N-SU	●	●		.250	.094	.0156	.110
TCMT 21.52 ESU	TCMT 110208N-SU	●	●		.250	.094	.0313	.110
TCMT 32.51 ESU	TCMT 16T304N-SU	●	●		.375	.156	.0156	.1693
TCMT 32.52 ESU	TCMT 16T308N-SU	●	●		.375	.156	.0313	.1693

TPMN 60° Triangle/11° Positive								
TPMN 221	TPMN 110304			●	.250	.125	.0156	-
TPMN 222	TPMN 110308			●	.250	.125	.0313	-
TPMN 321	TPMN 160304			●	.375	.125	.0156	-
TPMN 322	TPMN 160308			●	.375	.125	.0313	-
TPMN 323	TPMN 160312			●	.375	.125	.0469	-

TPMT 60° Triangle/11° Positive								
TPMT 221 EMU	TPMT 110304N-MU			●	.250	.125	.0156	.130
TPMT 222 EMU	TPMT 110308N-MU			●	.250	.125	.0313	.130
TPMT 331 EMU	TPMT 160404N-MU			●	.375	.1875	.0156	.1693
TPMT 332 EMU	TPMT 160408N-MU			●	.375	.1875	.0313	.1693

VBMA 35° Diamond/5° Positive								
VBMA 331	VBMA 160404			●	.375	.1875	.0156	.1732
VBMA 332	VBMA 160408			●	.375	.1875	.0313	.1732

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○ = Available 1st Quarter 2013