WE/WF Chipbreaker

Negative Wiper Inserts for Steel Turning

Increased Productivity with Newly Designed Wiper Edge Geometries

WE Chipbreaker for Finishing-Medium (for Improved Machining Efficiency)

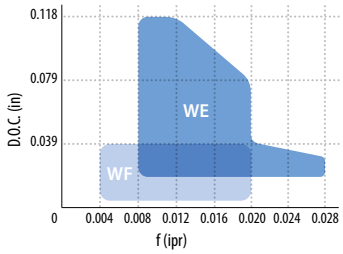
Faster Feed Rates Yield Productivity Gains Through Reduced Cycle Times
Stable Chip Control in a Wide Range of Applications

WF Chipbreaker for Finishing (for Excellent Surface Roughness)

Smooth Chip Control in Finishing Operations
Excellent Surface Roughness by Reducing Edge Build-up

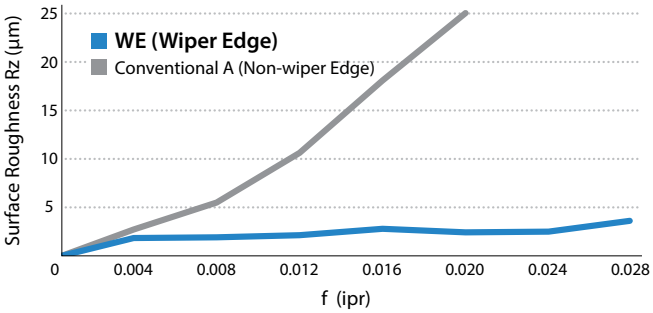
WE Chipbreaker (Finishing-Medium)

Faster Feed Rates Yield Productivity Gains Through Reduced Cycle Times
Stable Chip Control in a Wide Range of Applications

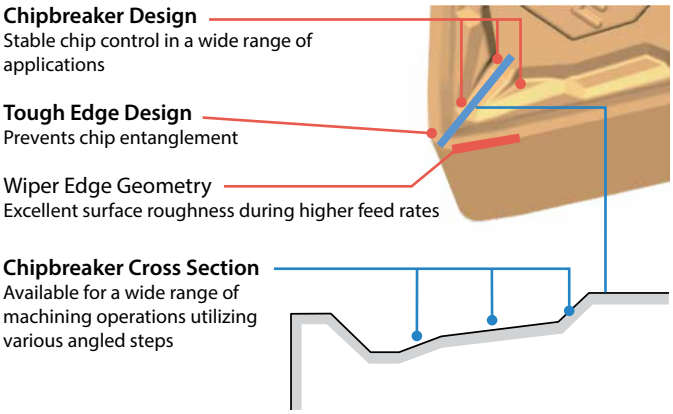


1 3 Times the Feed Rate of Standard Inserts with Excellent Surface Roughness

Surface Finish Comparison (Internal Evaluation)



Cutting Conditions: Vc = 820 sfm, D.O.C. = 0.012", f = 0.004 - 0.028 ipr, Wet
CNMG432 Insert Workpiece: 4137



2 Reduces the Number of Machining Passes from 2 to 1

Conventional Machining Process Cutting Time (2 Passes) : 22.1 Sec

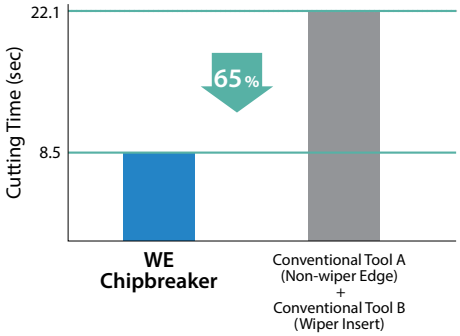
Pass 1 : Conventional Tool (Non-wiper Insert)
Vc = 660 sfm, D.O.C. = 0.059", f = 0.010 ipr, Wet, CNMG432 Insert

Pass 2 : Conventional Tool (Wiper Insert)
Vc = 660 sfm, D.O.C. = 0.020", f = 0.016 ipr, Wet, CNMG432 Insert
Workpiece : Chromium Steel (Diameter of Material Ø1.575" × 5.906" L, Cutting Length 3.937")

Recommended Machining Process Cutting Time (1 Pass) : 8.5 Sec

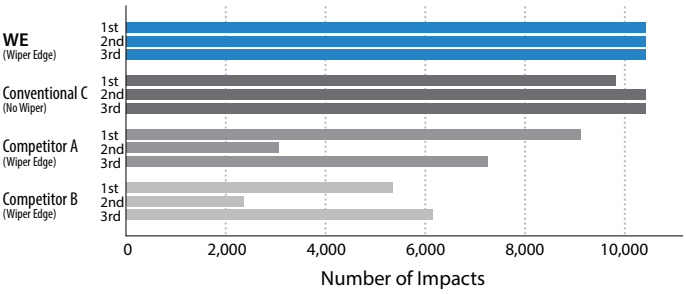
Pass 1 : WE Chipbreaker (Wiper Insert)
Vc = 660 sfm, D.O.C. = 0.079", f = 0.016 ipr, Wet, CNMG432 Insert
Workpiece : Chromium Steel (Diameter of Material Ø1.575" × 5.906" L, Cutting Length 3.937")

Cutting Time Comparison (Internal Evaluation)



3 Stable Cutting at 0.028 ipr Feed Rate

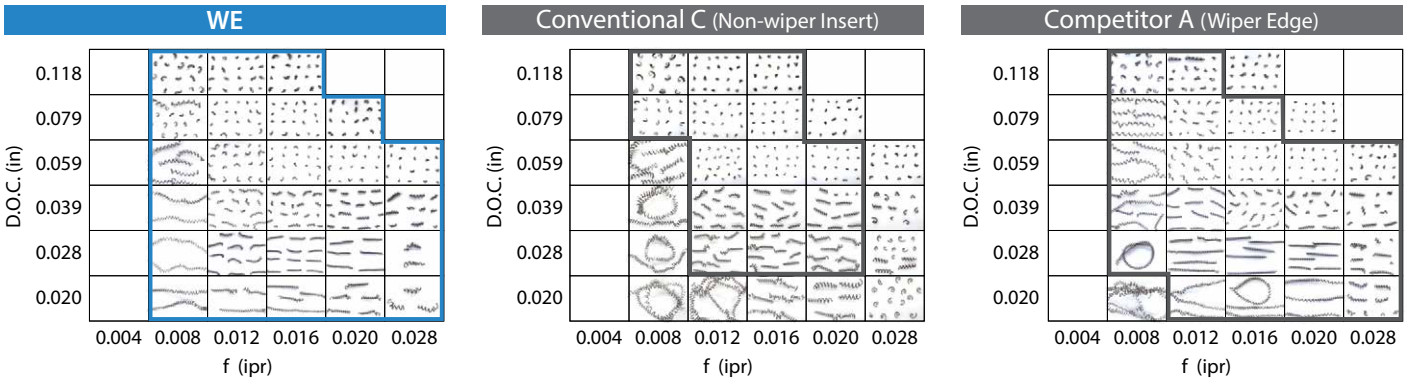
Fracture Resistance Comparison (Internal Evaluation)



Cutting Conditions: Vc = 490 sfm, D.O.C. = 0.039", f = 0.028 ipr, Wet
CNMG432 Insert (Insert Grade: P25 Grade), Fracture Resistance Comparison (3 Tests)
Workpiece: 4140 (4 Grooves in Workpiece)

4 Stable Chip Control in a Wide Range of Applications

Chip Control Comparison (Internal Evaluation)

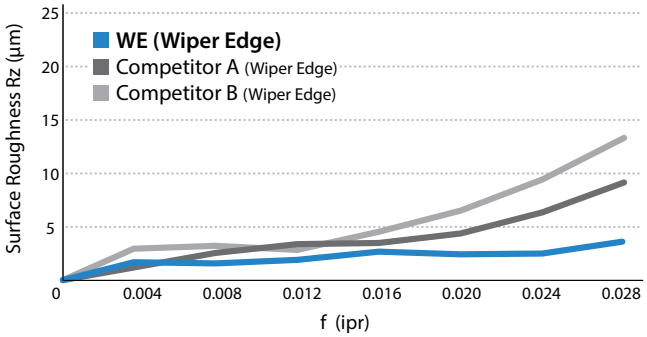


Cutting Conditions: Vc= 660 sfm, D.O.C. = 0.020" - 0.118", f = 0.004 - 0.028 ipr, Wet, CNMG432 Insert
Workpiece: Chromium Steel

5 Stable Chip Control in a Wide Range of Applications

Excellent Surface Roughness During High Feed Machining

Surface Finish Comparison (Internal Evaluation)

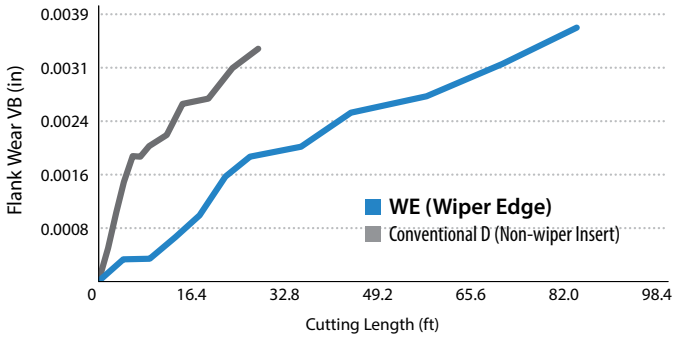


Cutting Conditions: Vc = 820 sfm, D.O.C. = 0.012", f = 0.004 - 0.028 ipr, Wet, CNMG432 Insert
Workpiece: 4137

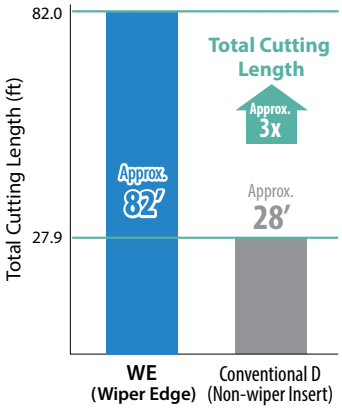
6 Long Tool Life

WE Chipbreaker Reduces Cutting Time with Increased Feed Rate and Extended Tool Life

Wear Resistance Comparison (Internal Evaluation)



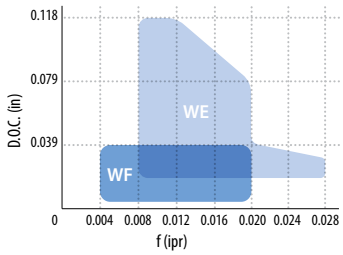
Total Cutting Length Comparison (Internal Evaluation)



Cutting Conditions:
Vc = 820 sfm
D.O.C. = 0.020"
f = 0.004 ipr (No Wiper)
f = 0.012 ipr (Wiper Edge)
Wet, CNMG432 Insert
(Insert Grade: P25 Grade)
Workpiece: 4137

WF Chipbreaker (Finishing)

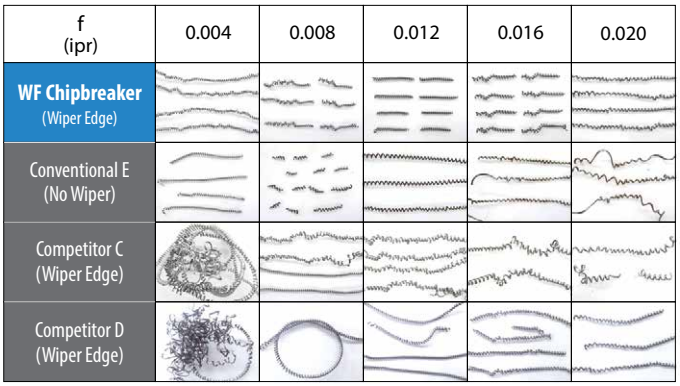
Smooth Chip Control Improves Cutting Performance in Finishing Operations
Excellent Surface Roughness by Reducing Edge Build-up



1 Excellent Chip Control

WF Chipbreaker Provides Excellent Chip Control During High Feed Machining

Chip Control Comparison (Internal Evaluation)

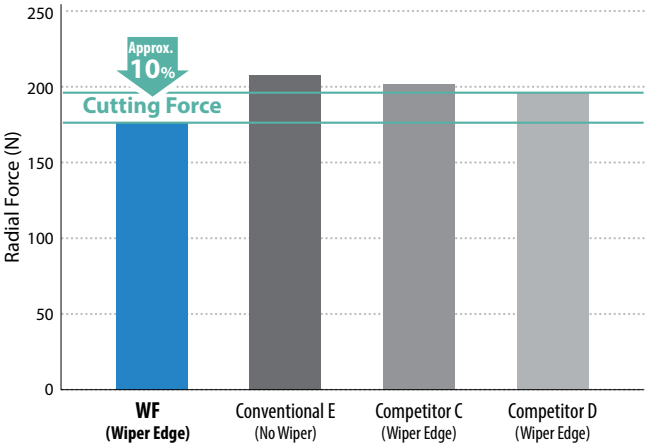


Cutting Conditions:Vc = 660 sfm, D.O.C. = 0.020", f = 0.004 - 0.020 ipr, Wet
CNMG432 Insert
Workpiece: Chromium Steel

2 Excellent Surface Roughness

Prevents Tool Deflection by Reducing Radial Forces

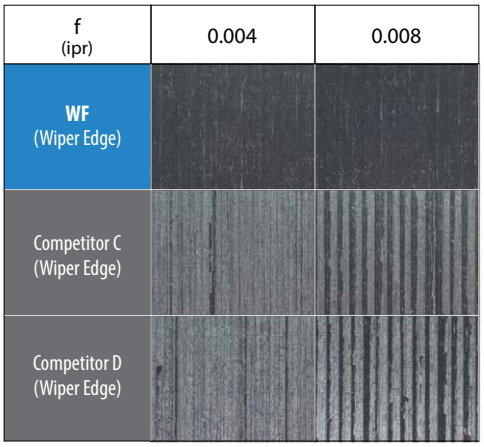
Cutting Force Comparison (Internal Evaluation)



Cutting Conditions: Vc = 660 sfm, D.O.C. = 0.020", f = 0.012 ipr, Wet
CNMG432 Insert
Workpiece: Chromium Steel

WF Chipbreaker Reduces Tearing of the Finished Surface by Controlling Adhesion with the Newly Designed Wiper Edge

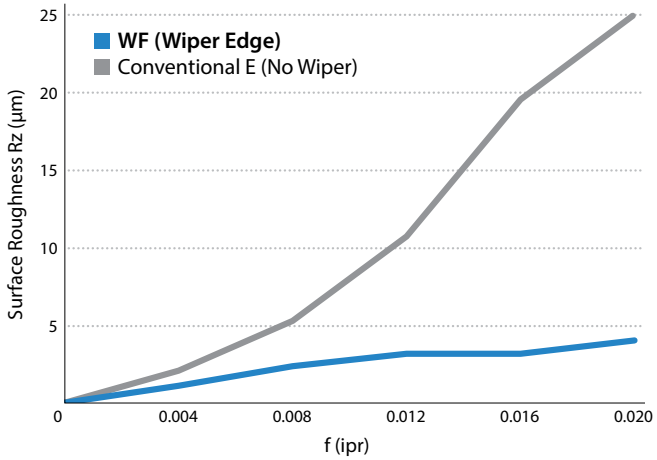
Surface Finish Comparison (Internal Evaluation)



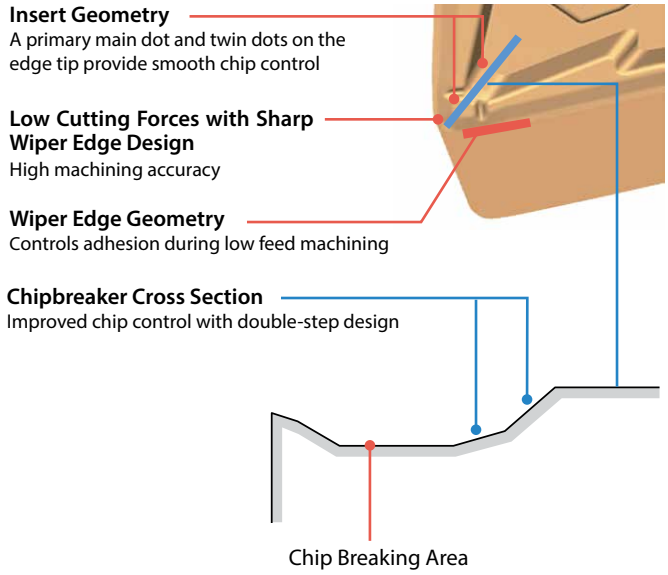
Cutting Conditions: Vc = 660 sfm, D.O.C. = 0.012", f = 0.004 - 0.008 ipr, Wet
CNMG432 Insert
Workpiece: Chromium Steel

3 Excellent Surface Roughness with Twice the Feed Rate and Half the Cutting Time

Surface Finish Comparison (Internal Evaluation)



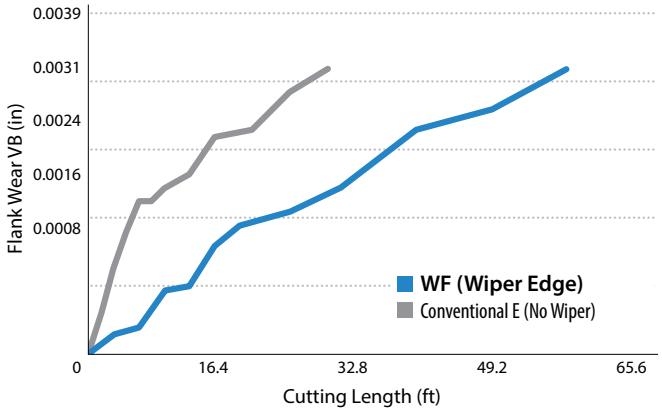
Cutting Conditions: Vc = 820 sfm, D.O.C. = 0.012", f = 0.004 - 0.020 ipr, Wet
CNMG432 Insert
Workpiece: 4137



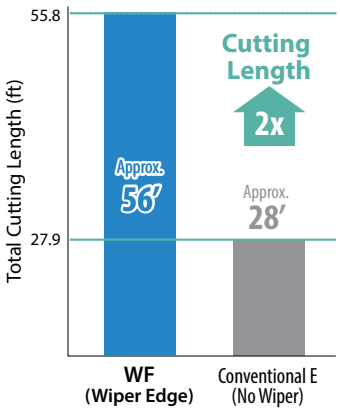
4 Long Tool Life

WF Chipbreaker Reduces Cutting Time with Increased Feed Rate and Extended Tool Life

Wear Resistance Comparison (Internal Evaluation)



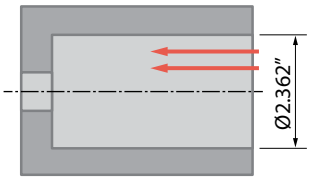
Total Cutting Length Comparison (Internal Evaluation)



Cutting Conditions:
Vc = 820 sfm
D.O.C. = 0.020"
f = 0.004 ipr (No Wiper)
f = 0.008 ipr (WF Chipbreaker)
Wet, CNMG432 Insert
Insert Grade: P25 Grade
Workpiece: 4137

Case Studies

Housing, 1010



Vc = 850 sfm, D.O.C. = 0.039" - 0.059"
f = 0.014" ipr, Wet (Water Soluble)
CNMG432WE CA525

Chip Control

WE Chipbreaker (CA525) Competitor E

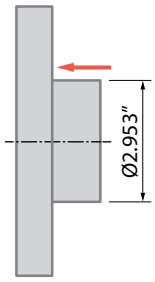
D.O.C. = 0.059"

WE chipbreaker (CA525) improved chip control during high feed machining compared to Competitor E

(Customer Evaluation)

Pulley, Sintered Metal

Vc = 820 sfm
D.O.C. = 0.008"
f = 0.005 ipr
Wet (Water Soluble)
CNMG432WE
PV720



Cutting Time

WE Chipbreaker (PV720)

3.2 sec.

Cutting Efficiency **1.4x**

Competitor F

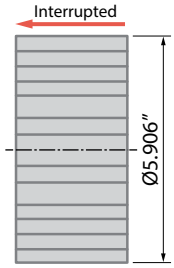
4.5 sec.

WE chipbreaker (PV720) reduced cutting time by increasing feed rate with superior surface finish and excellent surface roughness compared to Competitor E

(Customer Evaluation)

Drum, Cold-rolled Steel Sheet

Vc = 440 sfm
ap = 0.010"
f = 0.024 ipr
Wet (Water Soluble)
CNMG432WE
CA530



Surface Roughness

WE Chipbreaker (CA530)

9.5μmRz (100pcs/corner)

Less than 1/4 Surface Roughness

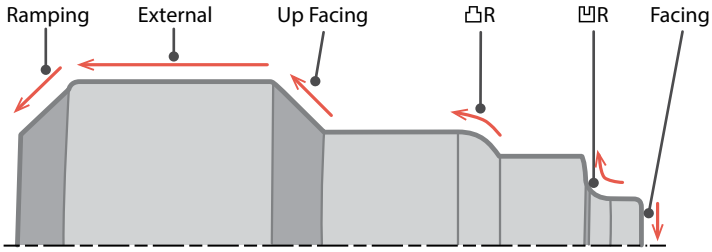
Competitor G

Rz 40~60μm (After Machining 100pcs)

WE chipbreaker (CA530) improved surface roughness with no chip entanglement

(Customer Evaluation)

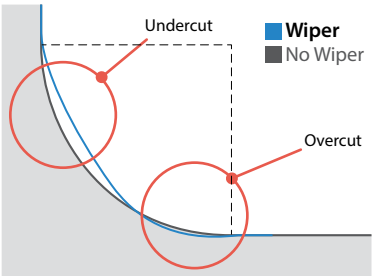
Caution (Finished Edge Line)



Application	Caution
External / Facing	Please check the applicable toolholder to confirm the lead angle matches the angle of the wiper.
Up Facing Ramping	For D type and T type inserts, Z-axis program corrections are required.
凹R・凸R	Do not use wiper inserts if a precise radial shape is needed.

Radius Cutting (Differences from Non-wiper Insert)

When machining a profile or radius on a workpiece, please note that DNMX and TNMX wiper inserts have some limitations.
Please refer to the list on the right for finished dimensions.



DNMX Inserts Unit: in

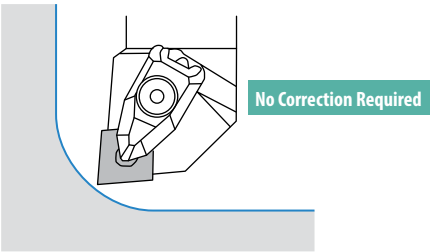
Nominal Corner R	Finished Dimension
0.016 (1/64)	R0.016 $^{+0.016}_{-0}$
0.032 (1/32)	R0.032 ±0.008
0.047 (3/64)	R0.047 $^{+0.012}_{-0.016}$

TNMX Inserts Unit: in

Nominal Corner R	Finished Dimension
0.016 (1/64)	R0.016 $^{+0.016}_{-0}$
0.032 (1/32)	R0.032 ±0.008
0.047 (3/64)	R0.047 $^{+0}_{-0.016}$

There is No Limit When Using CNMG/WNMG inserts

CNMG/WNMG inserts meet ISO standard

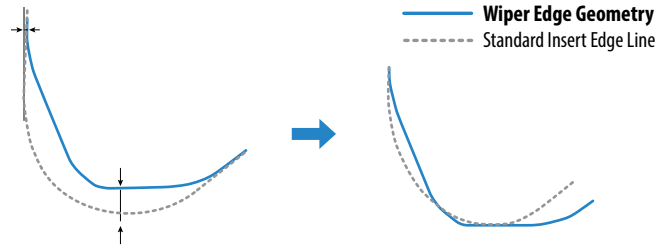


Cutting Edge Offsets of Negative Wiper Inserts

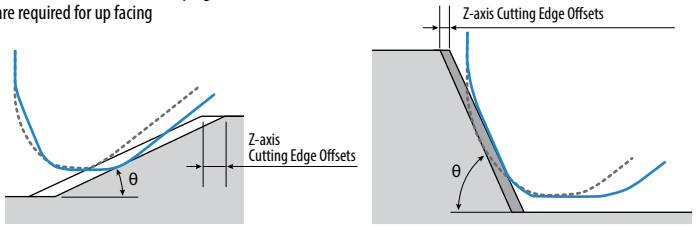
Cutting Edge Offsets (in)					
DNMX431WF DNMX441WF		**DNMX432WF DNMX442WF**		**DNMX433WF DNMX443WF**	
X-axis	Z-axis	X-axis	Z-axis	X-axis	Z-axis
0.0094	0.0008	0.0055	0.0004	0.0043	0.0004

Cutting Edge Offsets (in)					
TNMX331WF		**TNMX332WF**		**TNMX333WF**	
X-axis	Z-axis	X-axis	Z-axis	X-axis	Z-axis
0.0094	0.0004	0.0063	0.0000	0.0043	0.0000

For **DNMX** and **TNMX** inserts, cutting edge offsets are required



For **DNMX** and **TNMX** inserts, program corrections are required for up facing



DNMX43 Insert
DNMX44 Insert

Z-axis Cutting Edge Offsets (in)

Corner-R (rε) (in)	Ramping Angle θ					
	0°	5°	10°	15°	20°	25°
1/64	0.0000	-0.0134	-0.0138	-0.0142	-0.0142	-0.0142
1/32	0.0000	-0.0102	-0.0102	-0.0098	-0.0094	-0.0087
3/64	0.0000	-0.0059	-0.0067	-0.0063	-0.0059	-0.0059

Z-axis Cutting Edge Offsets (in)

Corner-R (rε) (in)	Up Facing Angle θ																		
	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
1/64	0.0000	-0.0008	-0.0012	-0.0012	-0.0016	-0.0020	-0.0024	-0.0028	-0.0031	-0.0035	-0.0039	-0.0043	-0.0047	-0.0039	-0.0031	-0.0024	-0.0016	-0.0008	0.0000
1/32	0.0000	0.0051	0.0047	0.0043	0.0035	0.0028	0.0020	0.0016	0.0008	0.0000	-0.0008	-0.0020	-0.0028	-0.0024	-0.0016	-0.0008	-0.0004	-0.0004	0.0000
3/64	0.0000	0.0142	0.0134	0.0122	0.0106	0.0094	0.0079	0.0063	0.0051	0.0035	0.0020	0.0000	-0.0016	-0.0016	-0.0012	-0.0008	-0.0004	-0.0004	0.0000

TNMX33 Insert

Z-axis Cutting Edge Offsets (in)

Corner-R (rε) (in)	Ramping Angle θ					
	0°	5°	10°	15°	20°	25°
1/64	0.0000					
1/32	0.0000					
3/64	0.0000					

Do not use TNMX33 insert for ramping

Z-axis Cutting Edge Offsets (in)

Corner-R (rε) (in)	Up Facing Angle θ																		
	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
1/64	0.0000	-0.0024	-0.0020	-0.0020	-0.0024	-0.0028	-0.0031	-0.0031	-0.0035	-0.0039	-0.0043	-0.0047	-0.0051	-0.0047	-0.0039	-0.0028	-0.0020	-0.0008	0.0000
1/32	0.0000	0.0043	0.0043	0.0039	0.0031	0.0024	0.0016	0.0008	0.0000	-0.0008	-0.0016	-0.0024	-0.0031	-0.0031	-0.0024	-0.0016	-0.0008	-0.0004	0.0000
3/64	0.0000	0.0134	0.0126	0.0114	0.0098	0.0087	0.0075	0.0059	0.0055	0.0031	0.0016	0.0000	-0.0020	-0.0020	-0.0012	-0.0004	0.0000	0.0000	0.0000

Applicable Toolholders for Negative Wiper Inserts

Insert Installation

Insert	Cutting Edge Angle
CNMG43 Type	95°
WNMG43 Type	95°
DNMX43/44 Type	93°
TNMX33 Type	91°

List of Applicable Toolholders

Insert	Application	Part Number	Applicable
CNMG43 Type	External Turning	PCLN	Yes
		DCLN	
	Boring	S–PCLN	
		A–DCLN	
		HA–PCLN12	
WNMG43 Type	External Turning	PWLN	Yes
		DWLN	
		WWLN	
	Boring	S–PWLN	
		A–DWLN	
		S–WWLN08-E	

List of Applicable Toolholders

Insert	Application	Part Number	Applicable
DNMX43/44 Type	External Turning	PDJN	Yes
		DDJN	
		~~PDHN~~	No
		~~DDHN~~	
	Boring	S–PDUN15	Yes
		A–DDUN	
		HA–PDUN15	
		S–PDZN15	
		~~S–PDQN15~~	No
TNMX33 Type	External Turning	PTGN	Yes
		DTGN	
		PTFN	
		WTJN–N	Limited Wiper Effect
		~~WTKN–N~~	No
		~~WTEN–N~~	
	Boring	A–DTFN	Yes
		S–PTUN	Limited Wiper Effect
		HA–PTFN16	

Negative Inserts

WE Chipbreaker

✖ Interruption / 1st Choice
◐ Light Interruption / 1st Choice
● Continuous / 1st Choice
○ Continuous / 2nd Choice

Shape	Part Number	Corner-R (rε)	Cermet TN610	Cermet TN620	MEGACOAT NANO Cermet PV710	MEGACOAT NANO Cermet PV720	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530
	P	●	◐	●	◐	○	●	◐	✖	
	CNMG 431WE	1/64	○	○	●	●	○	●	●	○
	432WE	1/32	○	○	●	●	○	●	●	○
	433WE	3/64	○	○	●	●	○	●	●	○
	WNMG 431WE	1/64	○	○	●	●	○	●	●	○
	432WE	1/32	○	○	●	●	○	●	●	○
	433WE	3/64	○	○	●	●	○	●	●	○

Dimensions

(in)

Part Number	I.C.	Thickness	Hole
CNMG43…	1/2	3/16	0.203
DNMX43…	1/2	3/16	0.203
DNMX44…		1/4	
TNMX33…	3/8	3/16	0.150
WNMG43…	1/2	3/16	0.203

WF Chipbreaker

✖ Interruption / 1st Choice
◐ Light Interruption / 1st Choice
● Continuous / 1st Choice
○ Continuous / 2nd Choice

Shape	Part Number	Corner-R (rε)	Cermet TN610	Cermet TN620	MEGACOAT NANO Cermet PV710	MEGACOAT NANO Cermet PV720	CVD Coated Carbide CA510	CVD Coated Carbide CA515	CVD Coated Carbide CA525	CVD Coated Carbide CA530
	P	●	◐	●	◐	○	●	◐	✖	
	CNMG 431WF	1/64	○	○	●	●	●	●	●	○
	432WF	1/32	○	○	●	●	●	●	●	○
	DNMX 431WF	1/64	○	○	●	●	●	●	●	○
	432WF	1/32	○	○	●	●	●	●	●	○
	433WF	3/64	○	○	●	●	●	●	●	○
	DNMX 441WF	1/64	○	○	●	●	●	●	●	○
	442WF	1/32	○	○	●	●	●	●	●	○
	443WF	3/64	○	○	●	●	●	●	●	○
	TNMX 331WF	1/64	○	○	●	●	●	●	●	○
	332WF	1/32	○	○	●	●	●	●	●	○
	333WF	3/64	○	○	●	●	●	●	●	○
	WNMG 431WF	1/64	○	○	●	●	●	●	●	○
	432WF	1/32	○	○	●	●	●	●	●	○

● : U.S. Stock ○ : World Express (Shipping: 7-10 Business Days)

Inserts sold in 10 piece boxes

Recommended Cutting Conditions

WE Chipbreaker

Workpiece	Insert Grade	Min. - Recommendation - Max. Cutting Speed Vc (sfm)	D.O.C. (in)	f (ipr)
Carbon Steel Alloy Steel	TN610	390 - 720 - 1120	0.020 - 0.028 - 0.118	0.008 - 0.018 - 0.028
	TN620	330 - 660 - 980		
	PV710	430 - 920 - 1180		
	PV720	430 - 820 - 1120		
	CA510	620 - 920 - 1180		
	CA515	520 - 850 - 1120		
	CA525	490 - 790 - 1050		
	CA530	430 - 660 - 890		

WF Chipbreaker

Workpiece	Insert Grade	Min. - Recommendation - Max. Cutting Speed Vc (sfm)	D.O.C. (in)	f (ipr)
Carbon Steel Alloy Steel	TN610	390 - 720 - 1120	0.004 - 0.020 - 0.039	0.004 - 0.012 - 0.020
	TN620	330 - 660 - 980		
	PV710	430 - 920 - 1180		
	PV720	430 - 820 - 1120		
	CA510	620 - 920 - 1180		
	CA515	520 - 850 - 1120		
	CA525	490 - 790 - 1050		
	CA530	430 - 660 - 890		

Positive Wiper Insert

WP Chipbreaker

Excellent Surface Roughness and Smooth Chip Control During High Feed Machining
High Quality Surface Finish with No Galling
High Machining Accuracy with Low Cutting Forces

See our WP Positive Wiper Insert brochure at www.kyoceraprecisiontools.com/indexable/brochures/turning

KYOCERA

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