

# DURATOMIC™

## INTRODUCING THE NEW TP3500



TP1500 • TP2500 • TP3500 <sup>NEW</sup>

**SECO** 



# SECO SETS THE STANDARD OTHERS FOLLOW

Seco's  $\alpha$ -based Duratomic cutting tool technology is not available from any other supplier, it's that unique. Its remarkable performance characteristics originate with the specially tailored and textured aluminum oxide coating layer. Exceptional durability and speed capability establish the Duratomic as the industry standard in coating technology.

## TP3500 – THE TOUGH CHOICE THAT WILL BOOST YOUR PRODUCTIVITY

Presenting the new TP3500 – a highly versatile grade that completes Seco's Duratomic grade chain for steel turning. It's tough and it will meet your most rugged demands. For applications where harder and more wear-resistant grades show unpredictable behavior, TP3500 is a top performer that will increase your productivity.

TP3500 is the tough choice that makes your choice of inserts easy by fitting precisely into Seco's Duratomic grade chain for steel turning inserts.

# COMPLETING THE DURATOMIC CHAIN FOR STEEL TURNING

With three grades and a large number of chip breaker geometries adapted to insert grade, type and size, Seco now has powerful Duratomic solutions for all steel turning applications.



## WEAR RESISTANCE

**TP1500** Specially designed to give long and reliable tool life at high temperatures and speeds during stable conditions. The grade for the highest productivity.



## VERSATILITY

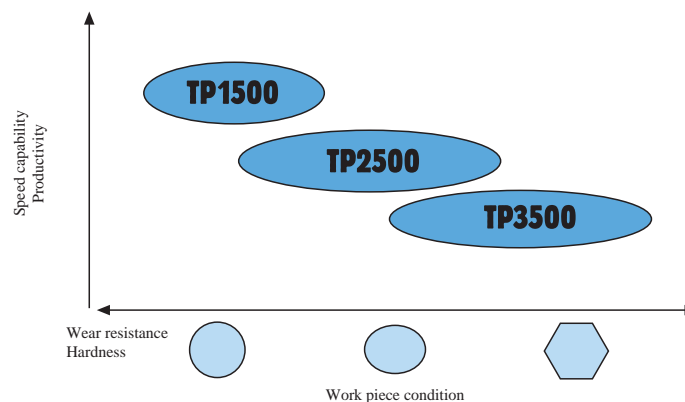
**TP2500** First choice for general purpose steel turning. Wide working window, capability to handle high speeds as well as moderately interrupted cuts. Also performs well in ISO M and K applications



## TOUGHNESS

**TP3500** Offers long, predictable tool life in unstable conditions where high edge security is needed and harder, more wear resistant grades show unpredictable behavior. Also offers a level of toughness suitable for ISO M applications.

## DURATOMIC SOLUTIONS FOR ALL STEEL TURNING



## STAINLESS STEEL:

- TM2000: **DURATOMIC™** First choice for the highest productivity in situations where the cut generates high heat, e.g. high speed machining.
- TM4000: **DURATOMIC™** First choice for unstable conditions when high productivity and reliability is the most important requirement.

# TP3500 – THE SECURE CHOICE

## **INCREASED TOUGHNESS**

TP3500 offers you increased edge toughness and the increased wear resistance of the Duratomic coating. This improved edge integrity and overall increased toughness make it the secure choice for applications where the cutting conditions may vary over time.

## **LONG TOOL LIFE**

In applications that require toughness, TP3500 offers you longer, more consistent tool life – an important benefit in unmanned production.

## **WIDE WORKING WINDOW**

TP3500 gives you the same high performance in a range of operations, from finishing to heavy interruptions. Whether you're working with rough and intermittent turning, small part turning or stainless steel turning, the new Duratomic TP3500 grade offers you a level of toughness that will ensure high productivity for your operation, even under severe conditions.

## **BOOST YOUR BOTTOM LINE**

High feeds and speeds mean high metal removal rates. These factors increase your productivity and reduce the need for different inserts, helping you reduce your stock and saving you money. It all adds up to an improved bottom line for your operation.

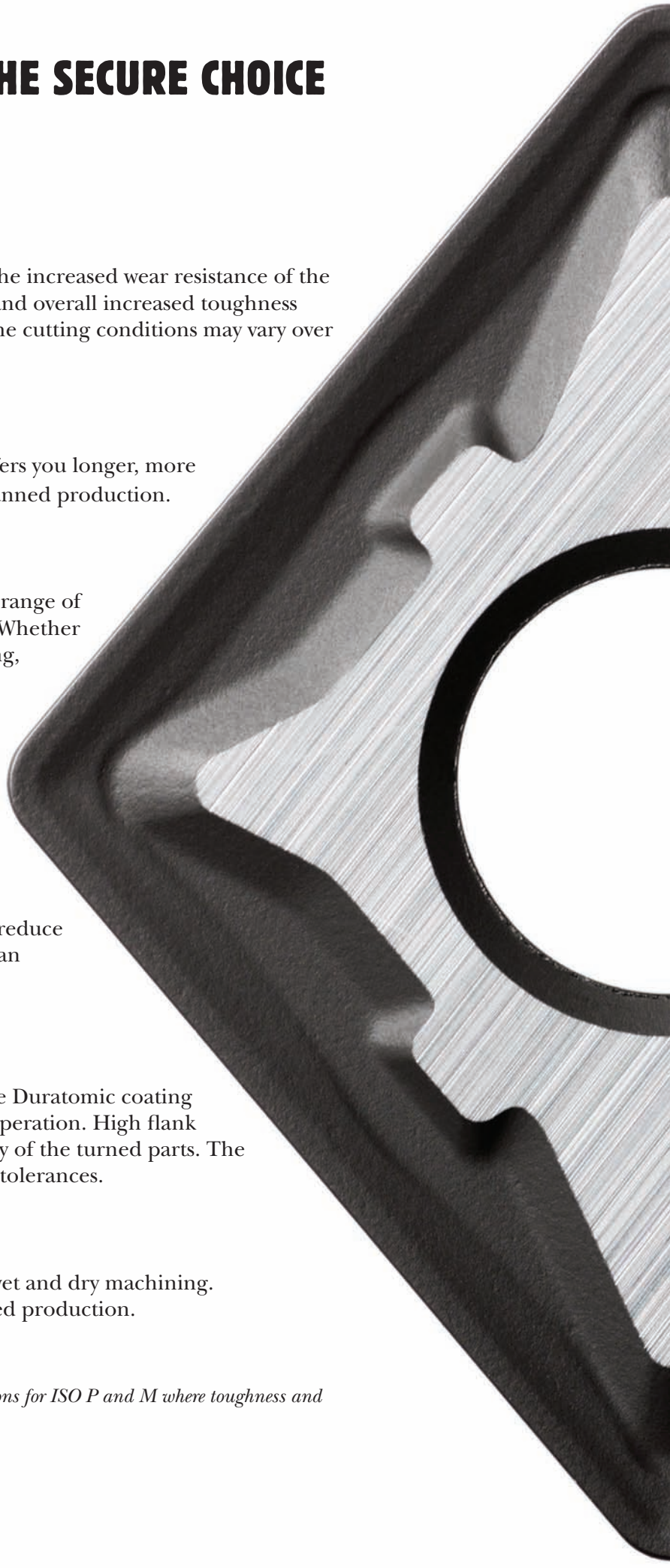
## **QUALITY IS ASSURED**

The reduced built-up edge tendency offered by the Duratomic coating ensures a high surface finish for your machining operation. High flank wear resistance contributes to the finished accuracy of the turned parts. The Duratomic coating gives you higher precision and tolerances.

## **VERSATILE AND RELIABLE**

TP3500 is reliable, versatile and can handle both wet and dry machining. Therefore, it's a good choice if you work with mixed production.

*The insert program for TP3500 covers most turning applications for ISO P and M where toughness and reliability are of primary importance.*



# TOUGH ON THREE LEVELS

## TAKE THE DURATOMIC COATING

The increased wear resistance of the Duratomic coating makes it possible to widen the application window, utilizing tougher substrates. This effect is predominant when the “time in cut” is short or the cut is interrupted.

## ADD ADDITIONAL BULK TOUGHNESS

When compared to the earlier grade TP3000 the new substrate of TP3500 has been adjusted for additional bulk toughness.

## ADD INCREASED SURFACE ZONE TOUGHNESS

TP3500 features a cobalt enriched zone. This results in increased toughness in the surface zone compared to the bulk toughness.

**AND THE RESULT IS IMPRESSIVE EDGE TOUGHNESS WITH LONG RELIABLE TOOL LIFE.**

## THE TP3500 GRADE



### COATING:

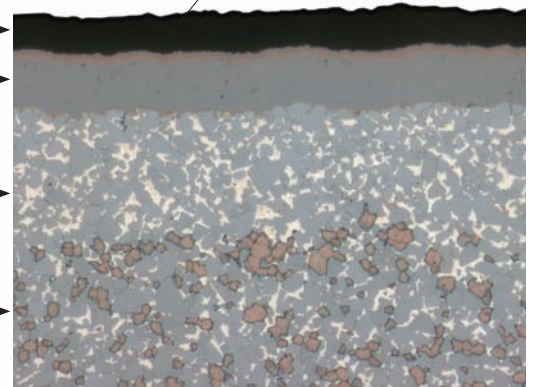
Duratomic  $\text{Al}_2\text{O}_3$

Ti(C,N)

### SUBSTRATE WC + Co BASED:

With binder phase enrichment

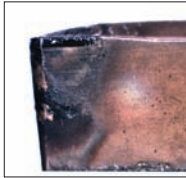
With cubic carbides



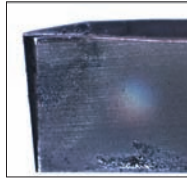
# TP3500 TEST RESULTS

## LONGITUDINAL TURNING OF CONICAL PART

<b>Component</b>	Pressure pipe stud
<b>Operation</b>	Longitudinal turning of conical part
<b>Material</b>	1042, SMG 4
<b>Insert</b>	Seco: VBMT 21.51-F1, TP3500 Competitor: VBMT 21.51-F1, TP3000
<b>Cutting data</b>	$v_c$ 330-660 sfpm
	$f$ 0.0018 ipr
	$a_p$ 0.025"
<b>Coolant</b>	Oil
<b>Number of parts</b>	750 pcs
<b>Criterion</b>	Flank wear
<b>Result</b>	TP3500 shows better edge integrity and less flank wear compared to TP3000.



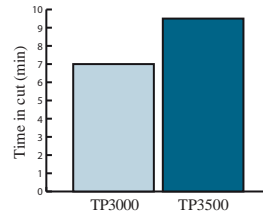
TP3000  
 $V_b = 0.008''$



TP3500  
 $V_b = 0.006''$

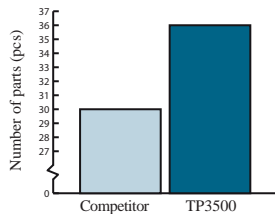
## DRY FACING SIDE PLATE; HEAVY INTERRUPTION

<b>Component</b>	Crankshaft	
<b>Operation</b>	Wet OD turning of main bearing	
<b>Material</b>	DIN 44MnSiVS 6 BY, 1000 N/mm <sup>2</sup> , Forged, SMG 5	
<b>Insert</b>	Seco: CNMG 433-M5, TP3500 Competitor: CNMG 433-M5, TP3000	
<b>Cutting data</b>	Facing side plate	Turning main bearing
	$v_c$ 560 sfpm	$v_c$ 560 sfpm
	$f$ 0.010-0.012 ipr	$f$ 0.020 ipr
	$a_p$ 0.080"	$a_p$ 0.160"
<b>Coolant</b>	No	Yes
<b>Time in cut</b>	TP3500: 9.5 min TP3000: 7 min	
<b>Criterion</b>	Flank wear	
<b>Result</b>	TP3500 has 26% longer tool life compared to TP3000	



## FACING AND LONGITUDINAL

<b>Component</b>	Forged gear wheel
<b>Operation</b>	Facing and longitudinal
<b>Material</b>	DIN 20MnCrS5, 200-220HB, SMG 4
<b>Insert</b>	Seco: CNMG 543-M5, TP3500 Competitor: CNMG 543
<b>Cutting data</b>	$v_c$ 720 sfpm
	$f$ 0.016 ipr
	$a_p$ 0.120-0.160"
<b>Coolant</b>	Yes
<b>Number of parts</b>	TP3500: 36 pcs Competitor: 30 pcs
<b>Criterion</b>	Flank wear, $V_b = 0.030''$

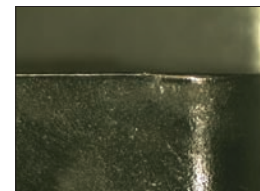


## INTERNAL LONGITUDINAL TURNING

<b>Component</b>	Synchronisation ring
<b>Operation</b>	Internal longitudinal turning
<b>Material</b>	SMG 4
<b>Insert</b>	Seco: DNMG 433-M3, TP3500 Competitor: DNMG 433
<b>Cutting data</b>	$v_c$ 925 sfpm
	$f$ 0.016-0.020 ipr
	$a_p$ 0.080-0.120"
<b>Coolant</b>	Yes
<b>Number of parts</b>	100 pcs
<b>Criterion</b>	Plastic deformation




Competitor




TP3500

### EXTERNAL COPYING AND FACING

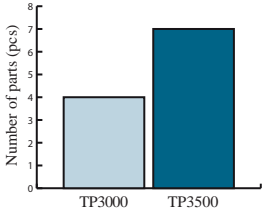
<b>Component</b>	16" Flange	
<b>Operation</b>	External copying and facing	
<b>Material</b>	AISI 304L, SMG 8, Forged	
<b>Insert</b>	Seco: CNMG 644-MR7, TP3500 Competitor: CNMG 644-MR7, TP3000	
<b>Cutting data</b>	$v_c$	400 sfpm
	$f$	0.020 ipr
	$a_p$	0.160"
<b>Coolant</b>	Yes	
<b>Number of parts</b>	TP3500: 7 pcs TP3000: 4 pcs	
<b>Criterion</b>	Flank wear $V_b = 0.012"$	



TP3500



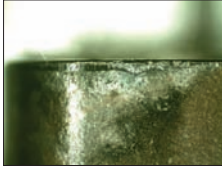
TP3000



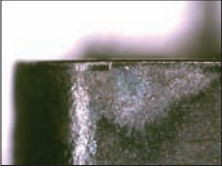
Tool	Number of parts (pcs)
TP3000	4
TP3500	7

### OD TURNING WITH INTERRUPTED CUTS

<b>Component</b>	Eccentric shaft	
<b>Operation</b>	OD turning with interrupted cuts (variation of stock allowance)	
<b>Material</b>	5115, SMG 4, Forged	
<b>Insert</b>	Seco: WNMG 433-M5, TP3500 Competitor: WNMG 433	
<b>Cutting data</b>	$v_c$	900 sfpm
	$f$	0.014 ipr
	$a_p$	0.080-0.120"
<b>Coolant</b>	No	
<b>Total cutting length</b>	6.7"	
<b>Total cutting time</b>	62 min (200 parts)	
<b>Result</b>	TP3500 shows better edge integrity and more controlled wear. Better reliability!	




Competitor




TP3500

### FACING

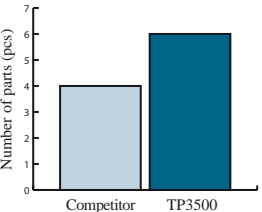
<b>Component</b>	6" Flange	
<b>Operation</b>	Facing	
<b>Material</b>	AISI 304L, SMG 8, Forged	
<b>Insert</b>	Seco: CNMG 544-MR7, TP3500 Competitor: CNMG 544	
<b>Cutting data</b>	$v_c$	500 sfpm
	$f$	0.018 ipr
	$a_p$	0.140"
<b>Coolant</b>	Yes	
<b>Time in cut</b>	TP3500: 29.5 min Competitor: 19 min	
<b>Criterion</b>	Flank wear $V_b = 0.016"$	



TP3500




Competitor




Tool	Number of parts (pcs)
Competitor	4
TP3500	6

### LONGITUDINAL TURNING

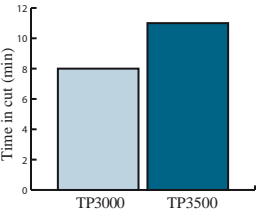
<b>Component</b>	Cylindrical bar with four slots	
<b>Operation</b>	Longitudinal turning	
<b>Material</b>	DIN Ck45, SMG 4	
<b>Insert</b>	Seco: DNMG 444-M3, TP3500 Competitor: DNMG 444-M3, TP3000	
<b>Cutting data</b>	$v_c$	900 sfpm
	$f$	0.014 ipr
	$a_p$	0.080-0.120"
<b>Coolant</b>	No	
<b>Time in cut</b>	TP3500: 11 min TP3000: 8 min	
<b>Criterion</b>	Edge chipping	



TP3500 (8 min)



TP3000 (8 min)



Tool	Time in cut (min)
TP3000	8
TP3500	11

# CUTTING DATA

## CUTTING DATA EXAMPLES

The recommended cutting speeds in the tables are calculated for 15 minutes tool life, in Seco's material groups 1-6 (steel). In Seco's material groups 8-11 (stainless steel) the cutting speeds are calculated for 10 minutes tool life when coolant is applied.

Reference	CCMT 32.51-F1, ap = 0.040"								
Seco material group No.	TP1500			TP2500			TP3500		
	Feed rate, $f_n$ (in/rev)			Feed rate, $f_n$ (in/rev)			Feed rate, $f_n$ (in/rev)		
	0.003 ipr	0.005 ipr	0.008 ipr	0.003 ipr	0.005 ipr	0.008 ipr	0.003 ipr	0.005 ipr	0.008 ipr
1	3850	3474	2950	3510	3100	2560	1805	1805	1670
2	3260	2950	2510	2970	2640	2165	1525	1525	1410
3	2700	2445	2065	2460	2180	1790	1260	1260	1165
4	2300	2080	1770	2100	1850	1525	1080	1080	1000
5	1920	1740	1475	1740	1540	1280	900	900	835
6	1690	1525	1295	215	1360	1115	790	790	720
8	-	-	-	1080	1295	1295	1375	1360	1150
9	-	-	-	850	1015	1015	1080	1065	900
10	-	-	-	690	835	835	885	870	735
11	-	-	-	510	625	635	655	655	540

General Turning, Ver. 1.0

Reference	CNMG 432-M5, ap = 0.100"								
Seco material group No.	TP1500			TP2500			TP3500		
	Feed rate, $f_n$ (in/rev)			Feed rate, $f_n$ (in/rev)			Feed rate, $f_n$ (in/rev)		
	0.008 ipr	0.012 ipr	0.016 ipr	0.008 ipr	0.012 ipr	0.016 ipr	0.008 ipr	0.012 ipr	0.016 ipr
1	2740	2310	2015	2360	1920	1640	1575	1360	1200
2	2330	1970	1705	2000	1625	1395	1328	1150	1000
3	1920	1625	1410	1655	1345	1150	1100	950	835
4	1640	1375	1215	1410	1150	985	935	820	705
5	1360	1150	1000	1180	950	820	790	670	590
6	1200	1015	885	1030	835	720	690	590	525
8	-	-	-	1210	970	755	1050	790	605
9	-	-	-	950	770	590	820	625	475
10	-	-	-	770	625	490	670	510	395
11	-	-	-	575	460	360	510	375	280

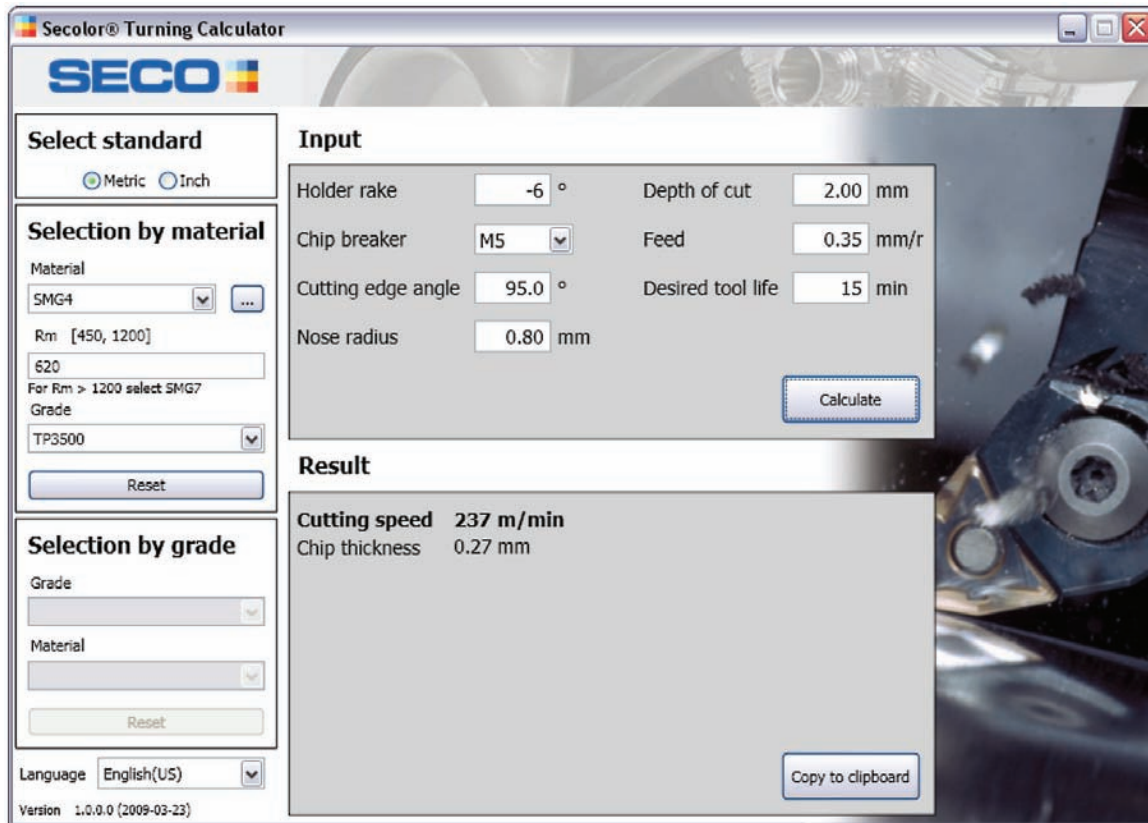
General Turning, Ver. 1.0

Reference	CNMG 544-MR7, ap = 0.200"								
Seco material group No.	TP1500			TP2500			TP3500		
	Feed rate, $f_n$ (in/rev)			Feed rate, $f_n$ (in/rev)			Feed rate, $f_n$ (in/rev)		
	0.016 ipr	0.024 ipr	0.032 ipr	0.016 ipr	0.024 ipr	0.032 ipr	0.016 ipr	0.024 ipr	0.032 ipr
1	2000	1605	1345	1605	1230	1015	1180	920	740
2	1690	1360	1150	1360	1050	850	1000	770	640
3	1395	1115	950	1130	870	705	820	640	525
4	1200	950	800	970	740	605	705	540	440
5	1000	805	670	805	625	510	590	460	375
6	870	705	590	705	540	440	510	395	330
8	-	-	-	740	440	280	575	360	230
9	-	-	-	575	345	230	460	280	180
10	-	-	-	475	280	180	375	230	150
11	-	-	-	345	215	130	280	165	115

General Turning, Ver. 1.0

# CUTTING DATA CALCULATOR

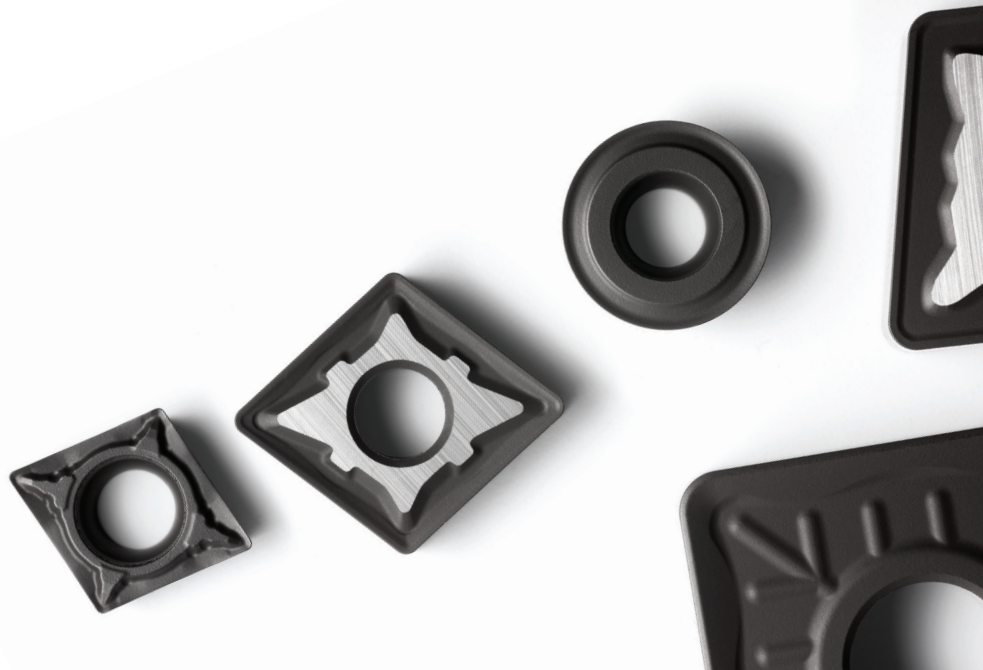
Calculations for other workpiece materials using alternative depths of cut, feed rates, tool life and lead angles can be made using our cutting data calculator. This can be downloaded from the Seco website.



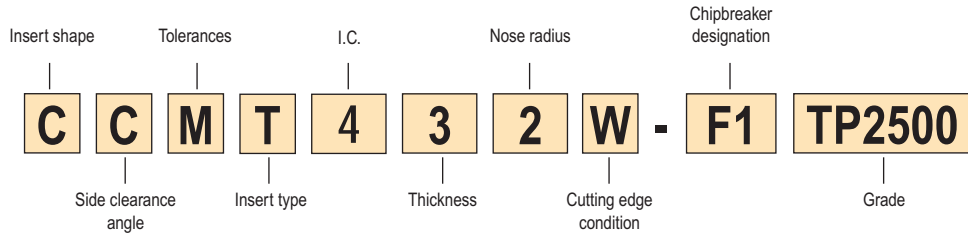
The screenshot shows the 'Secolor® Turning Calculator' software window. It features a sidebar on the left with three selection sections: 'Select standard' (Metric/Inch), 'Selection by material' (Material: SMG4, Rm: [450, 1200], Grade: TP3500), and 'Selection by grade'. The main area is divided into 'Input' and 'Result' sections. The 'Input' section includes fields for Holder rake (-6°), Depth of cut (2.00 mm), Chip breaker (M5), Feed (0.35 mm/r), Cutting edge angle (95.0°), Desired tool life (15 min), and Nose radius (0.80 mm). A 'Calculate' button is located below the input fields. The 'Result' section displays 'Cutting speed 237 m/min' and 'Chip thickness 0.27 mm'. A 'Copy to clipboard' button is at the bottom right. The background of the software window shows a close-up of a lathe tool cutting a metal part.

Parameter	Value
Holder rake	-6 °
Depth of cut	2.00 mm
Chip breaker	M5
Feed	0.35 mm/r
Cutting edge angle	95.0 °
Desired tool life	15 min
Nose radius	0.80 mm
Cutting speed	237 m/min
Chip thickness	0.27 mm

Read more about the Secolor Turning Calculator at:  
[www.secotools.com/service\\_support](http://www.secotools.com/service_support)



# CODE KEY









## INSERT PROGRAM FOR STEEL – POSITIVE INSERTS

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
	CCMT21.50.5-F1	■	■	■	.020	.004
	CCMT21.50.5-F2	■	■	■	.039	.004
	CCMT21.50.5-FF1		■		.020	.004
	CCMT21.51-F1	■	■	■	.020	.005
	CCMT21.51-F2	■	■	■	.039	.007
	CCMT21.51-FF1		■		.020	.004
	<b>CCMT21.51W-F1</b>	■	■		.020	.010
	CCMT21.52-F1	■	■	■	.031	.008
	CCMT21.52-F2	■	■	■	.039	.008
	CCMT321-F2		■		.039	.007
	CCMT32.50.5-F1	■	■	■	.031	.004
	CCMT32.50.5-F2	■	■		.039	.004
	CCMT32.51-F1	■	■	■	.039	.005
	CCMT32.51-F2	■	■	■	.039	.007
	CCMT32.51-FF1		■		.028	.004
	<b>CCMT32.51W-F1</b>	■	■		.020	.010
	CCMT32.52-F1	■	■	■	.039	.008
	CCMT32.52-F2	■	■	■	.039	.010
	<b>CCMT32.52W-F1</b>	■	■		.039	.016
	<b>CCMT32.52W-F2</b>	■			.039	.016
	CCMT32.53-F2	■	■		.039	.012
	CCMT431-F1		■	■	.039	.005
	CCMT431-F2	■	■	■	.059	.007
	<b>CCMT431W-F1</b>	■	■		.039	.010
	CCMT432-F1	■	■	■	.059	.010
	CCMT432-F2	■	■	■	.059	.012
	<b>CCMT432W-F1</b>	■	■		.059	.016
	CCMT433-F1		■		.059	.014
	CCMT433-F2	■	■	■	.059	.016
	CCMT53.52-F2		■		.118	.016
	DCMT21.50.5-F1		■	■	.020	.004
	DCMT21.50.5-F2	■	■		.039	.004
	DCMT21.51-F1	■	■	■	.020	.004
	DCMT21.51-F2	■	■	■	.039	.007
	DCMT21.52-F1	■	■		.031	.006



Part No. in bold are High Feed wiper inserts

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
	DCMT21.52-F2	■	■	■	.039	.010
					.000	.000
	DCMT32.50.5-F1		■	■	.020	.004
	DCMT32.50.5-F2	■	■		.039	.004
	DCMT32.50.5-FF1		■		.039	.004
	DCMT32.51-F1	■	■	■	.020	.005
	DCMT32.51-F2	■	■	■	.039	.007
	DCMT32.51-FF1		■		.039	.007
	<b>DCMX32.51W-F1</b>	■	■		.020	.008
	DCMT32.52-F1	■	■	■	.031	.007
	DCMT32.52-F2	■	■	■	.039	.010
	DCMT32.52-FF1		■		.039	.010
	<b>DCMX32.52W-F1</b>	■	■		.039	.010
	DCMT32.53-F1	■	■		.047	.008
					.000	.000
	DCMT431-F2	■	■	■	.039	.007
	DCMT432-F2	■	■	■	.059	.011
	DCMT433-F2	■	■	■	.059	.014
	RCMT0602M0-F1		■		.020	.012
	RCMT0602M0-F2	■	■		.035	.020
	RCMT0803M0-F1		■		.039	.016
	RCMT0803M0-F2	■	■		.047	.024
	RCMT10T3M0-F1		■	■	.059	.018
	RCMT10T3M0-F2	■	■	■	.059	.028
	RCMT1204M0-F1		■	■	.063	.020
	RCMT1204M0-F2	■	■	■	.071	.039
	RCMT1606M0-F1	■			.079	.028
	RCMT1606M0-F2	■	■	■	.094	.047
	RCMX100300		■	■	.079	.028
	RCMX43	■	■	■	.098	.039
	RCMX160600	■	■		.118	.047

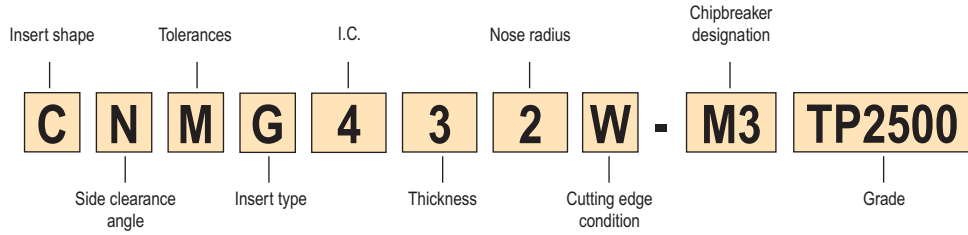
## Insert program

	Part No.	Grades			Cutting data		
		TP1500	TP2500	TP3500	ap	f	
	RCMX200600	■	■	■	.197	.026	
	RCMX250700	■	■	■	.256	.031	
	RCMX320900	■	■	■	.315	.039	
	SCMT21.51-F2		■		.024	.005	
	SCMT222-F2		■	■	.024	.010	
	SCMT32.51-F1	■	■	■	.031	.006	
	SCMT32.51-F2		■	■	.039	.006	
	SCMT32.52-F1	■	■	■	.039	.010	
	SCMT32.52-F2	■	■	■	.039	.010	
	SCMT32.53-F1			■			
	SCMT432-F1		■	■	.059	.010	
	SCMT432-F2	■	■	■	.059	.012	
	SCMT433-F1	■			.059	.014	
	SCMT866T-F2		■		.394	.039	
		SPMR321-F1		■		.039	.004
		SPMR322-F1		■		.039	.006
SPMR322-FF1			■		.039	.006	
SPMR421-F1			■		.079	.006	
SPMR422-F1			■		.079	.010	
SPMR422-F2			■		.118	.012	
SPMR423-F1			■		.118	.012	
	TCMT21.50.05-F1			■	.020	.004	
	TCMT21.51-F1	■	■	■	.020	.005	
	TCMT21.52-F1	■	■	■	.031	.008	
	TCMT32.50.5-F1			■	.020	.004	
	TCMT32.51-F1	■	■	■	.039	.005	
	TCMT32.51-F2	■	■	■	.079	.007	
	TCMT32.52-F1	■	■	■	.079	.008	
	TCMT32.52-F2	■	■	■	.079	.010	
	<b>TCMX32.52W-F1</b>	■	■		.039	.012	
	TCMT32.53-F1			■	.079	.010	
TCMT432-F2	■	■	■	.079	.008		
	TPMR221-F1	■	■		.020	.006	
	TPMR222-F1		■		.031	.010	
	TPMR321-F1	■	■		.039	.006	
	TPMR321-F2		■		.079	.008	
	TPMR322-F1	■	■		.079	.010	
	TPMR322-F2		■		.079	.010	
	TPMR323-F1		■		.079	.012	
	TPMR432-F2		■		.118	.014	
	TPMR433-F2		■		.118	.016	
	VBMT21.50.05-F1		■	■	.020	.004	
	VBMT21.51-F1		■	■	.020	.005	
	VBMT21.52-F1		■		.031	.008	


Part No. in bold are High Feed wiper inserts

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
	VBMT220.5-F1		■		.020	.004
	VBMT221-F1		■		.020	.005
	VBMT222-F1		■		.031	.008
	VBMT330.5-F1		■	■	.020	.004
	VBMT331-F1	■	■	■	.031	.005
	VBMT331-F2	■	■	■	.039	.007
	VBMT332-F1	■	■	■	.039	.008
	VBMT332-F2	■	■	■	.039	.010
	VBMT333-F1	■	■	■	.039	.010
	VBMT333-F2	■	■	■	.039	.012
	WCMT32.52-F1		■		.039	.008



# CODE KEY









## INSERT PROGRAM FOR STEEL – NEGATIVE INSERTS

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
			CNMG321-M3	■		
	CNMG322-M3	■	■		.059	.008
	CNMG431-FF1	■	■		.039	.005
	CNMG431-M3	■	■	■	.079	.008
	CNMG431-M5	■	■	■	.098	.008
	CNMG431-MF2	■	■	■	.059	.006
	CNMG431-MF3	■	■	■	.079	.008
	<b>CNMG431W-MF2</b>	■	■		.028	.012
	CNMG432-FF1	■			.039	.005
	CNMG432-M3	■	■	■	.079	.011
	CNMG432-M5	■	■	■	.118	.014
	CNMG432-MF2	■	■	■	.059	.008
	CNMG432-MF3			■	.079	.012
	CNMG432-MF4		■	■	.059	.014
	CNMG432-MF5	■	■	■	.028	.016
	CNMG432-MR6	■	■	■	.098	.014
	CNMG432-MR7	■	■	■	.118	.014
	<b>CNMG432W-M3</b>	■	■		.059	.020
	<b>CNMG432W-MF2</b>	■	■		.039	.016
	<b>CNMG432W-MF5</b>	■	■		.028	.020
	CNMG433-M3	■	■	■	.118	.014
	CNMG433-M5	■	■	■	.118	.016
	CNMG433-MF2	■	■		.059	.010
	CNMG433-MF3			■	.098	.014
	CNMG433-MF4		■	■	.079	.014
	CNMG433-MF5	■	■	■	.039	.020
	CNMG433-MR6	■	■	■	.098	.018
	CNMG433-MR7	■	■	■	.118	.018
	<b>CNMG433W-M3</b>	■	■		.079	.020
	CNMG434-M3	■	■		.118	.016
	CNMG434-M5	■	■	■	.157	.020
	CNMG434-MF5	■	■	■	.079	.022
	CNMG434-MR6	■	■	■	.098	.022
	CNMG434-MR7	■	■	■	.157	.022
	CNMG443-MR6	■	■	■	.118	.018
	CNMG444-MR6	■	■	■	.118	.022






Part No. in bold are High Feed wiper inserts

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
			CNMG542-M3	■	■	■
	CNMG542-M5	■	■	■	.157	.014
	CNMG542-MR7			■	.157	.014
	CNMG543-M3	■	■	■	.118	.016
	CNMG543-M5	■	■	■	.197	.018
	CNMG543-MR6	■	■	■	.138	.018
	CNMG543-MR7	■	■	■	.197	.018
	CNMG544-M3	■			.118	.016
	CNMG544-M5	■	■	■	.197	.020
	CNMG544-MR6	■	■	■	.138	.022
	CNMG544-MR7	■	■	■	.197	.022
	CNMG546-MR6	■	■	■	.138	.028
	CNMG546-MR7	■			.197	.028
	CNMG642-M3	■	■	■	.118	.012
	CNMG642-M5	■	■	■	.236	.014
	CNMG642-MR7			■	.236	.014
	CNMG643-M3	■	■	■	.118	.016
	CNMG643-M5	■	■	■	.236	.018
	CNMG643-MR6	■	■	■	.177	.018
	CNMG643-MR7	■	■	■	.236	.018
	CNMG644-M3		■	■	.236	.022
	CNMG644-M5	■	■	■	.236	.022
	CNMG644-MR6	■	■	■	.177	.022
	CNMG644-MR7	■	■	■	.236	.022
	CNMG646-MR6	■	■	■	.177	.031
	CNMG646-MR7	■	■		.236	.028
	CNMG866-MR7	■	■	■	.315	.031
	CNMM432-R4	■	■	■	.157	.014
	CNMM432-R6		■	■	.157	.016
	CNMM432-RR6		■	■	.157	.014
	<b>CNMM432W-R4</b>	■			.157	.024
	CNMM433-R4	■	■	■	.157	.018
	CNMM433-R6		■	■	.157	.018
	CNMM433-RR6		■	■	.157	.020



# Insert program

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
	<b>CNMM433W-R4</b>	■			.157	.028
	CNMM434-R4	■	■		.157	.024
	CNMM543-MR6	■	■	■	.157	.018
	CNMM543-R4	■	■	■	.197	.020
	CNMM543-R6			■	.197	.020
	CNMM543-R7	■		■	.197	.020
	CNMM543-RR6		■		.197	.024
	CNMM544-MR6	■	■	■	.157	.022
	CNMM544-R4	■	■	■	.197	.024
	CNMM544-R5	■	■		.197	.024
	CNMM544-R7	■	■	■	.197	.024
	CNMM544-RR6	■	■		.197	.024
	CNMM546-MR6	■	■	■	.157	.028
	CNMM546-R7	■	■		.197	.028
	CNMM643-57	■			.236	.020
	CNMM643-MR6	■	■	■	.197	.018
	CNMM643-R4	■	■	■	.236	.018
	CNMM643-R6			■	.236	.020
	CNMM643-R7	■	■	■	.236	.020
	CNMM643-RR6		■		.236	.020
	CNMM644-57		■		.236	.024
	CNMM644-MR6	■	■		.197	.022
	CNMM644-R4	■	■	■	.236	.024
	CNMM644-R5	■	■	■	.236	.024
	CNMM644-R7	■	■	■	.236	.024
	CNMM644-R8			■	.236	.024
	CNMM644-RR6	■	■	■	.236	.024
	<b>CNMM644W-R7</b>	■	■		.236	.035
	CNMM646-57	■			.236	.028
	CNMM646-MR6	■	■		.197	.031
	CNMM646-R4	■	■	■	.236	.028
	CNMM646-R5	■	■		.236	.028
	CNMM646-R7	■	■	■	.236	.028
CNMM646-RR6		■	■	.236	.028	
<b>CNMM646W-R7</b>		■		.236	.035	
	DNMM442-R4	■	■	■	.157	.014
	DNMM443-R4	■	■	■	.157	.018
	DNMM444-R4	■	■		.157	.022
	LNMX191940-MF	■	■		-	-
	LNMX191940-MR	■	■		-	-
	LNMX301940-MF	■	■		-	-
	LNMX301940-MR	■	■		-	-
	RNMG43-M3	■	■	■	.071	.039
	SNMG321-MF2		■		.031	.006
	SNMG322-M5		■	■	.039	.012
	SNMG322-MF2	■			.039	.010



Part No. in bold are High Feed wiper inserts

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
	DNMG433-M3	■	■	■	.079	.012
	DNMG433-M5	■	■	■	.098	.016
	DNMG433-MF2	■	■		.079	.010
	DNMG433-MF5	■	■		.039	.020
	DNMG433-MR6	■	■		.098	.018
	DNMG434-MF5		■		.059	.022
	DNMG441L-UX		■		.079	.010
	DNMG441R-UX		■		.079	.010
	DNMG441-M3	■	■	■	.079	.008
	DNMG441-M5	■	■	■	.079	.008
	DNMG441-MF2	■	■	■	.039	.006
	DNMG441-MF3			■	.039	.008
	DNMG442L-UX		■		.118	.014
	DNMG442R-UX		■		.118	.014
	DNMG442-M3	■	■	■	.079	.011
	DNMG442-M5	■	■	■	.098	.014
	DNMG442-MF2	■	■	■	.079	.010
	DNMG442-MF3			■	.079	.012
	DNMG442-MF4		■		.059	.014
	DNMG442-MF5	■	■	■	.039	.016
	DNMG442-MR6	■	■	■	.098	.014
	DNMG442-MR7	■			.098	.014
	<b>DNMX442W-M3</b>	■			.047	.012
	DNMG443-M3	■	■	■	.079	.014
	DNMG443-M5	■	■	■	.118	.018
	DNMG443-MF2	■	■		.079	.010
	DNMG443-MF5	■	■	■	.039	.020
	DNMG443-MR6	■	■	■	.098	.018
	DNMG443-MR7	■		■	.118	.018
	<b>DNMX443W-M3</b>	■			.059	.016
	DNMG444-M3	■	■		.079	.018
DNMG444-M5	■	■	■	.118	.022	
DNMG444-MF5	■	■		.059	.022	
DNMG444-MR6	■	■		.098	.022	
	DNMM442-R4	■	■	■	.157	.014
	DNMM443-R4	■	■	■	.157	.018
	DNMM444-R4	■	■		.157	.022
						
	RNMG43-M3	■	■	■	.071	.039
	SNMG321-MF2		■		.031	.006
	SNMG322-M5		■	■	.039	.012
	SNMG322-MF2	■			.039	.010





## Insert program

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
	SNMG431-M3	■	■	■	.079	.007
	SNMG432-M3	■	■	■	.079	.011
	SNMG432-M5	■	■	■	.098	.014
	SNMG432-MF2	■	■	■	.059	.010
	SNMG432-MR6	■	■	■	.098	.014
	SNMG432-MR7	■	■	■	.098	.014
	SNMG433-M3	■	■	■	.079	.016
	SNMG433-M5	■	■	■	.098	.018
	SNMG433-MF2	■	■	■	.059	.012
	SNMG433-MR6	■	■	■	.098	.018
	SNMG433-MR7	■	■	■	.098	.018
	SNMG434-M3	■	■	■	.079	.016
	SNMG434-M5	■	■	■	.098	.022
	SNMG434-MR6	■	■	■	.098	.022
	SNMG434-MR7	■	■	■	.118	.022
	SNMG443-MR6	■	■	■	.118	.018
	SNMG444-MR6	■	■	■	.118	.022
	SNMG442-M5	■	■	■	.118	.014
	SNMG443-M3	■	■	■	.157	.016
	SNMG443-M5	■	■	■	.157	.018
	SNMG443-MR6	■	■	■	.138	.018
	SNMG443-MR7	■	■	■	.157	.020
	SNMG444-M5	■	■	■	.157	.022
	SNMG444-MR6	■	■	■	.138	.022
	SNMG444-MR7	■	■	■	.157	.024
	SNMG546-MR6	■	■	■	.138	.031
	SNMG643-M3	■	■	■	.197	.016
	SNMG643-M5	■	■	■	.197	.018
	SNMG643-MR7	■	■	■	.197	.020
	SNMG644-M3	■	■	■	.197	.016
	SNMG644-M5	■	■	■	.197	.022
	SNMG644-MR7	■	■	■	.197	.020
	SNMG646-MR7	■	■	■	.197	.028
SNMG866-MR7	■	■	■	.276	.031	
	SNMM432-R4	■	■	■	.118	.014
	SNMM433-R4	■	■	■	.118	.018
	SNMM443-MR6	■	■	■	.157	.018
	SNMM443-R4	■	■	■	.197	.018
	SNMM444-MR6	■	■	■	.157	.022
	SNMM546-MR6	■	■	■	.157	.031
	SNMM546-R7	■	■	■	.197	.031
	SNMM643-R4	■	■	■	.177	.018
	SNMM643-R6	■	■	■	.236	.020
	SNMM643-R7	■	■	■	.236	.020
	SNMM643-RR6	■	■	■	.236	.020
	SNMM644-56	■	■	■	.236	.024
	SNMM644-57	■	■	■	.236	.028
	SNMM644-R4	■	■	■	.236	.024
	SNMM644-R5	■	■	■	.236	.028
	SNMM644-R6	■	■	■	.236	.028
	SNMM644-R7	■	■	■	.236	.028
	SNMM644-R8	■	■	■	.236	.028
	SNMM644-RR6	■	■	■	.236	.028
	SNMM646-57	■	■	■	.236	.031
	SNMM646-R4	■	■	■	.236	.028



Part No. in bold are High Feed wiper inserts

	Part No.	Grades			Cutting data		
		TP1500	TP2500	TP3500	ap	f	
	SNMM646-R5	■	■	■	.236	.031	
	SNMM646-R7	■	■	■	.236	.031	
	SNMM646-RR6	■	■	■	.236	.031	
	<b>SNMM646W-R7</b>	■	■	■	.236	.035	
	SNMM646-57	■	■	■	.236	.031	
	SNMM856-56	■	■	■	.394	.031	
	SNMM856-57	■	■	■	.394	.031	
	SNMM856-R7	■	■	■	.394	.031	
	SNMM856-RR6	■	■	■	.394	.035	
	SNMM856-RR9	■	■	■	.394	.035	
	SNMM866-R7	■	■	■	.394	.035	
		TNMG221-MF2	■	■	■	.020	.006
		TNMG322-M5	■	■	■	.118	.012
		TNMG322-MF3	■	■	■	.079	.012
		TNMG331R-UX	■	■	■	.079	.010
TNMG331L-UX		■	■	■	.079	.010	
TNMG331-M3		■	■	■	.059	.007	
TNMG331-M5		■	■	■	.059	.008	
TNMG331-MF2		■	■	■	.039	.006	
TNMG331-MF3		■	■	■	.059	.008	
TNMG332-FF1		■	■	■	.028	.005	
TNMG332-M3		■	■	■	.079	.011	
TNMG332-M5		■	■	■	.118	.014	
TNMG332-MF2		■	■	■	.039	.010	
TNMG332-MF3		■	■	■	.098	.012	
TNMG332-MF4		■	■	■	.059	.014	
TNMG332-MF5		■	■	■	.028	.016	
TNMG332-MR6		■	■	■	.098	.014	
TNMG332-MR7		■	■	■	.118	.014	
TNMG332L-UX		■	■	■	.098	.012	
TNMG332R-UX		■	■	■	.098	.012	
<b>TNMX332W-M3</b>		■	■	■	.047	.012	
TNMG333-M3		■	■	■	.079	.014	
TNMG333-M5		■	■	■	.118	.016	
TNMG333-MF2		■	■	■	.039	.010	
TNMG333-MF5		■	■	■	.039	.020	
TNMG333-MR6		■	■	■	.098	.018	
TNMG333-MR7		■	■	■	.118	.018	
<b>TNMX333W-M3</b>		■	■	■	.059	.016	
TNMG431-M5		■	■	■	.059	.008	
TNMG431-MF2		■	■	■	.059	.006	
TNMG431-MF3		■	■	■	.059	.008	
TNMG432-M3		■	■	■	.118	.011	
TNMG432-M5		■	■	■	.118	.014	
TNMG432-MF2	■	■	■	.059	.010		
TNMG432-MF3	■	■	■	.098	.012		
TNMG432-MR6	■	■	■	.138	.014		
TNMG432-MR7	■	■	■	.118	.014		
TNMG433-M3	■	■	■	.118	.014		
TNMG433-M5	■	■	■	.118	.016		
TNMG433-MR6	■	■	■	.138	.018		
TNMG433-MR7	■	■	■	.157	.018		
TNMG434-M5	■	■	■	.157	.020		
TNMG542-M5	■	■	■	.197	.014		
TNMG543-M3	■	■	■	.197	.016		

## Insert program

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
	TNMG543-M5	■	■	■	.197	.018
	TNMG543-MR7		■	■	.197	.020
	TNMG544-M5	■	■	■	.197	.022
	TNMG544-MR7		■	■	.197	.024
	TNMG666-MR7		■	■	.236	.039
	TNMM331-R6			■	.079	.010
	TNMM332-R4		■	■	.157	.014
	TNMM333-R4	■	■		.157	.018
	TNMM432-R4		■	■	.157	.014
	TNMM433-R4	■	■	■	.197	.018
	TNMM434-R4	■	■	■	.197	.024
	TNMM434-R6			■	.157	.024
	VNMMU2.531-M3	■	■	■	.059	.007
	VNMMU2.532-M3	■	■	■	.059	.011
	VNMG331-FF1	■			.031	.006
	VNMG331-M3	■	■	■	.079	.007
	VNMG331-MF2		■		.039	.006
	VNMG331-MF3			■	.059	.007
	VNMG332-M3	■	■	■	.079	.011
	VNMG332-MF2	■	■		.059	.012
	VNMG332-MF3			■	.079	.010
	VNMG333-MF2			■	.059	.018
		WNMG330.5-M3		■		.039
WNMG331-M3		■	■	■	.059	.007
WNMG331-MF2		■	■	■	.059	.006
WNMG331-MF5			■		.020	.008
<b>WNMG331W-MF2</b>			■		.028	.012
WNMG332-M3		■	■	■	.079	.011
WNMG332-M5		■	■	■	.079	.014
WNMG332-MF2		■	■	■	.059	.008
WNMG332-MF3				■	.059	.012
WNMG332-MF4			■		.059	.012
WNMG332-MF5		■	■	■	.028	.016
<b>WNMG332W-M3</b>		■	■		.059	.020
<b>WNMG332W-MF2</b>		■	■		.039	.016
<b>WNMG332W-MF5</b>		■	■		.020	.020
WNMG333-M3		■	■	■	.079	.014
WNMG333-M5			■	■	.079	.016
WNMG333-MF2			■		.059	.010
WNMG333-MF5		■	■		.039	.020
<b>WNMG333W-M3</b>		■	■		.059	.020
WNMG431-M3		■	■	■	.079	.007
WNMG431-MF2		■	■		.059	.006
<b>WNMG431W-MF2</b>			■		.028	.012
WNMG432-M3		■	■	■	.079	.011
WNMG432-M5		■	■	■	.118	.014
WNMG432-MF2		■	■		.059	.010
WNMG432-MF3				■	.079	.012
WNMG432-MF4			■	■	.059	.014
WNMG432-MF5		■	■	■	.028	.016
WNMG432-MR6		■	■	■	.098	.014
WNMG432-MR7			■	■	.118	.014
<b>WNMG432W-M3</b>		■	■		.059	.020
<b>WNMG432W-MF2</b>		■	■		.039	.016
<b>WNMG432W-MF5</b>		■	■		.028	.020

Part No. in bold are High Feed wiper inserts

	Part No.	Grades			Cutting data	
		TP1500	TP2500	TP3500	ap	f
	WNMG433-M3	■	■	■	.118	.014
	WNMG433-M5	■	■	■	.118	.016
	WNMG433-MF4		■		.079	.014
	WNMG433-MF5	■	■	■	.039	.020
	WNMG433-MR6	■	■	■	.098	.018
	WNMG433-MR7	■	■	■	.118	.018
	<b>WNMG433W-M3</b>	■	■		.079	.020
	WNMG434-M3	■	■		.118	.016
	WNMG434-M5	■	■	■	.157	.020
	WNMG434-MF5	■	■		.079	.022
	WNMG434-MR6	■	■		.118	.022
	WNMG434-MR7	■	■	■	.157	.022
	WNMG442-M5			■	.157	.016
	WNMG443-M5		■	■	.197	.020
	WNMG443-MR6	■	■	■	.118	.018
WNMG444-M5	■	■	■	.197	.022	
WNMG444-MR6	■	■		.118	.022	
	WNMM432-R6			■	.118	.016

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