

TURN UP THE HEAT

NEW GRADES FOR TURNING HEAT RESISTANT ALLOYS



TS2000 & TS2500

SECO 

INSERTS THAT CUT FASTER, WORK HARDER AND LAST LONGER

TS2000 & TS2500

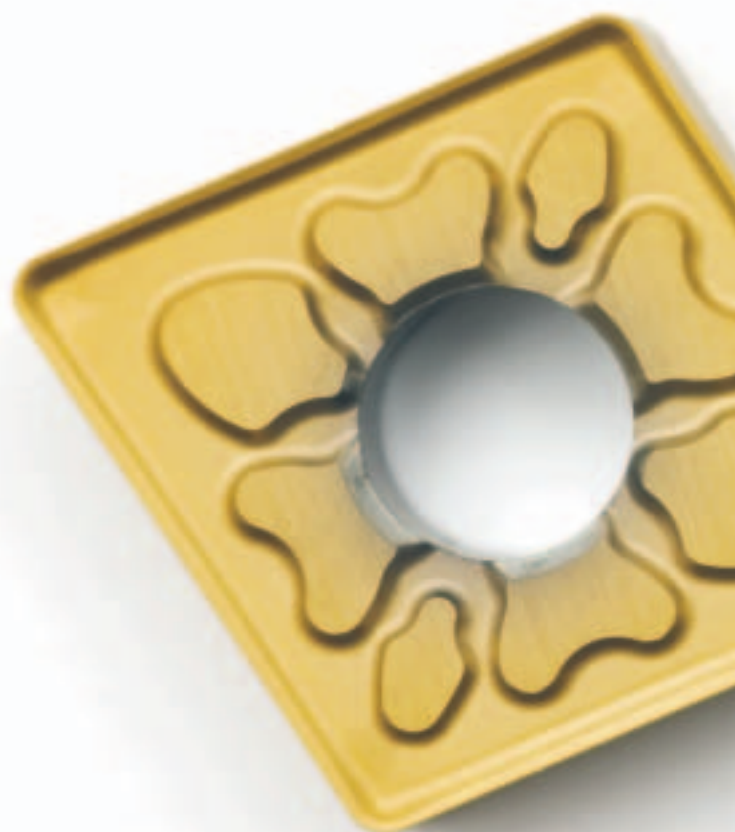
A NEW GENERATION OF GRADES FOR HEAT RESISTANT ALLOYS

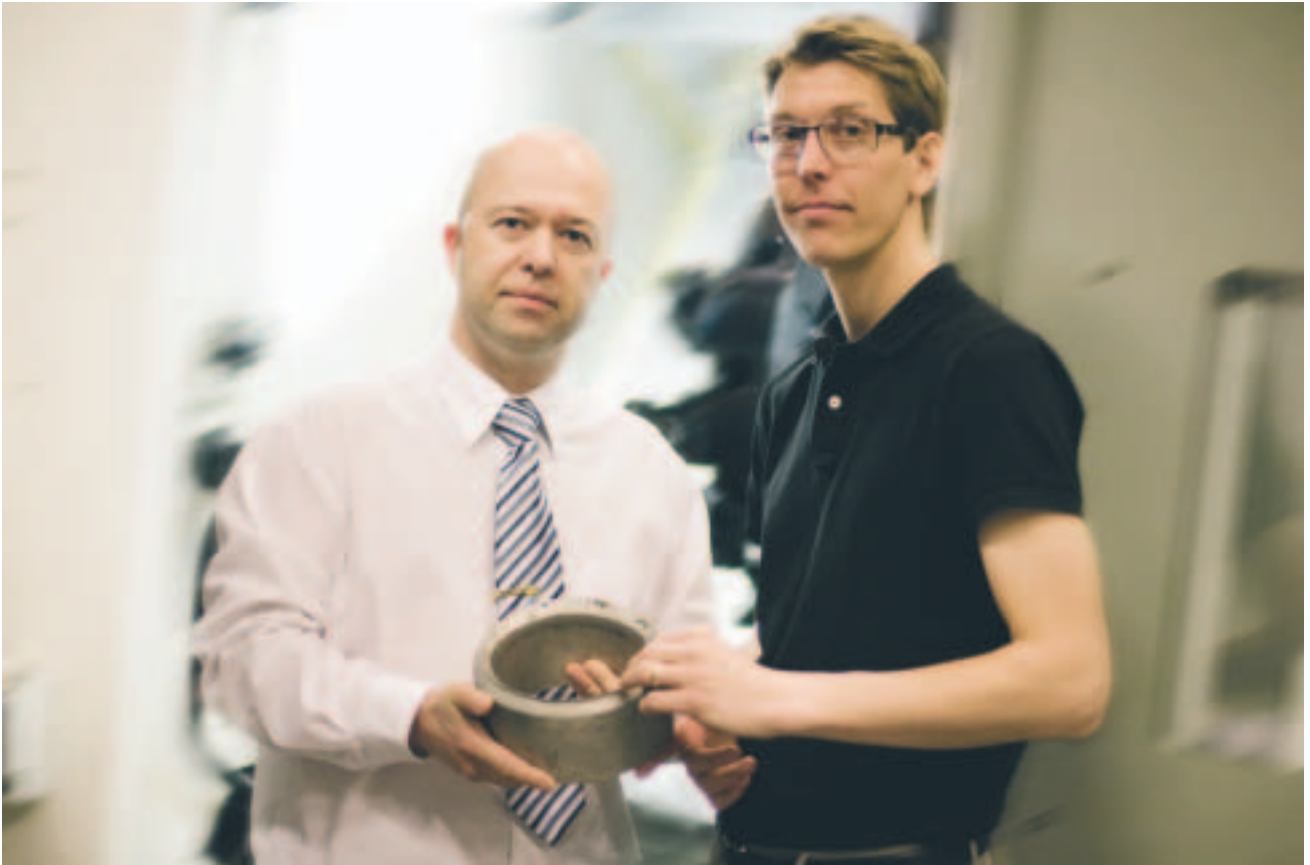
We fly more often and further away, we produce and consume more electricity every day, and we manufacture more and better products for healthcare ...

Aerospace, Power Generation and Biomedical Engineering, growing industries with large potentials, depending on first class production in heat resistant materials like superalloys and titanium alloys.

Turning heat resistant alloys is a difficult and demanding process which requires advanced technology cutting tools of the highest possible quality. To meet these challenges Seco has developed new turning grades for that specific area of metal cutting, high-quality tools with superior resistance to both heat and wear.

With TS2000 and TS2500, we have improved both quality and reliability by implementing the very latest manufacturing techniques.





“THE NEW COATING GIVES AN EXCELLENT WEAR RESISTANCE AND OFFERS INCREASED PRODUCTIVITY, AS WELL AS IMPROVED RELIABILITY”





**THE NEW GRADES
TS2000 & TS2500
HAVE LANDED**

NEW GRADES THAT KEEP YOUR PRODUCTION ON THE RIGHT TRACK

CONSISTENT AND RELIABLE

The new TS2000 and TS2500 are the ultimate grades for turning superalloys and titanium alloys.

Thanks to a new edge preparation process, the grades have a better edge integrity and an improved adhesion between substrate and coating which also improves surface quality on machined parts and gives the insert a more consistent tool life.

For TS2000 we have also developed a new unique PVD coating which gives an excellent wear resistance and offers improved reliability. The coating is thicker than present state of the art and reduces the risk of plastic deformation as well as crater wear caused by precipitates or other secondary particles.

FOR INCREASED PRODUCTIVITY

Field tests show that TS2000 and TS2500 increases both tool life and productivity significantly. The grades enable higher cutting speeds, which allow you to achieve higher productivity and lower manufacturing costs without sacrificing reliability.

TS2000 is the hardest and most wear resistant of the new grades and is aimed at high-quality finishing of heat resistant alloys, but with the strength to handle semi-roughing situations as well.

TS2500 is especially designed to handle interrupted cuts, tough cast skin and higher stress, and is the ideal grade for roughing and semi-roughing applications in various kinds of super and titanium alloys.

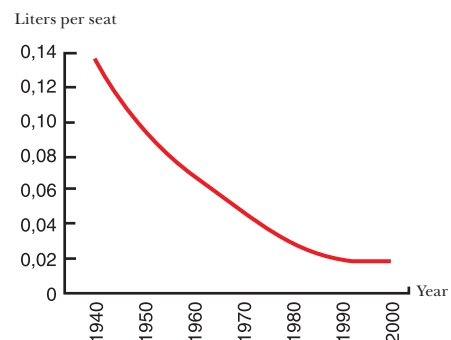


WORLD AVIATION TRAFFIC

FACTS

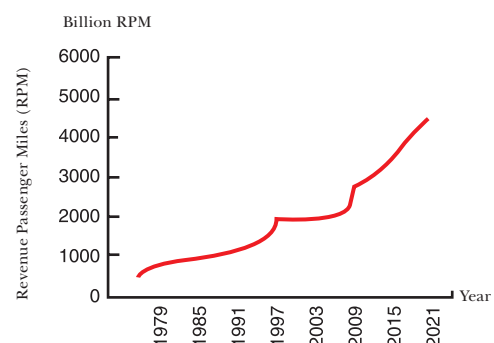
The Aerospace industry estimates that today's entire world aircraft fleet (14.000) will double in the next 20 years and that the industry will deliver 25.000 new aircraft. Improvement made on the planes' aerodynamics and engines have contributed to about a 15% decrease in fuel-consumption.

DECREASED FUEL CONSUMPTION



This reduction was possible with the increased use of difficult-to-machine materials, e.g. titanium and composites replacing aluminium and steel.

INCREASED TRAVELLING





THE NEW TURNING GRADES
TS2000 & TS2500
GIVE YOU MORE POWER

NEW GRADES THAT BRING MORE STRENGTH AND SPEED TO TURNING

AEROSPACE, POWER GENERATION AND BIOMEDICAL ENGINEERING

The new grades are designed for difficult to turn heat resistant alloys, which are widely used in aerospace, power generation industry and in chemical and biomedical engineering.

Thanks to the improved properties, such as edge integrity and adhesion of the coating, turning applications in these areas can be made with higher speeds resulting in more profitable production.

FOR SUPERALLOYS AND TITANIUM ALLOYS

Most superalloys are developed for applications demanding exceptional mechanical and chemical properties at elevated temperatures. Other areas are chemical, medical and structural engineering, where high temperature properties or corrosion and oxidation resistance is required.

Titanium alloys are high strength materials with low density and high melting temperatures widely used for lightweight constructions exposed to high dynamic load and high operating temperatures. They are also used, due to their excellent corrosion resistance, in many chemical and structural environments.

WITH EXCELLENT EDGE INTEGRITY AND NEW COATING

The metallurgical properties of these alloys make them very difficult to turn. The high mechanical strength results in high cutting forces and thermal load on the cutting edge which can cause edge chipping or edge deformation.

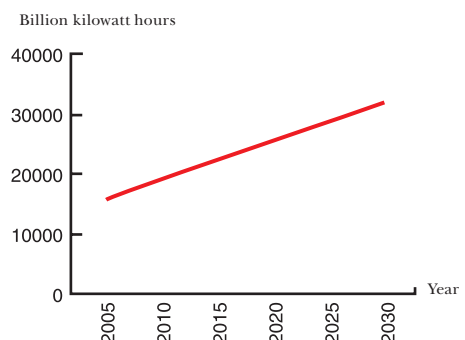
The new improved edge profile reduces the risk of edge chipping, which gives a more reliable, consistent tool wear and an excellent surface finish and dimensional accuracy.



WORLD DEMAND FOR ELECTRICITY

FACTS

Global electricity generation increases by 2.4 percent per year over the projection period, from 16,424 billion kilowatt hours in 2004 to more than 30 billion kilowatt hours in 2030.





THE NEW TURNING GRADES
TS2000 & TS2500
BRING YOU NEW POSSIBILITIES

NEW GRADES FOR A MORE FLEXIBLE AND VERSATILE PRODUCTION

INNOVATIVE TECHNOLOGY

TS2000 and TS2500 are two of the most powerful and productive high-quality turning grades for heat resistant superalloys and titanium alloys available on the market. Thanks to the improved properties, the new grades provide excellent possibilities to increase cutting data and tool life in a wide range of applications and workpiece materials.

They come in a range of insert styles that cover all turning applications from finishing to roughing, where long and predictable tool life and increased cutting data are of major importance.

FULL RANGE SUPPLIER

Seco Tools is well-known for a wide and powerful range of turning grades with superior quality. We offer high performance products for a more efficient and cost saving production, with more and better options for our customers.

For a complete solution, we also offer a new toolholder concept Jetstream Tooling, which improves chip control dramatically as well as the feed and speed capability, and lowers the costs related to machining heat resistant alloys.

EXPERIENCE AND KNOWLEDGE

Seco is a full range supplier of cutting tools and expertise. Our products are designed and manufactured with high precision and will perform consistently and productively for all kinds of applications.

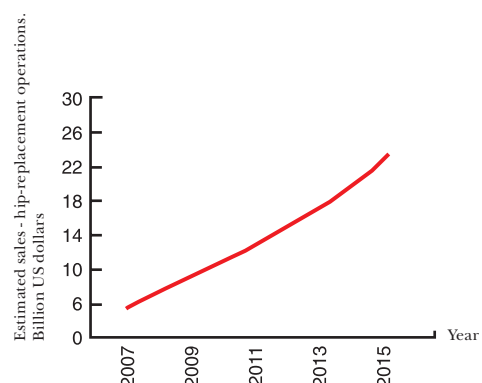
We have all the experience and knowledge needed to meet our customers' needs and to solve their problems.



GLOBAL HIP AND KNEE REPLACEMENTS

FACTS

The Biomedical Engineering Industry is growing at least 20% year on year. Orthopaedics sales 2008 is estimated to be 43 billion US dollars. Globally, 1,6 million knee-replacements, and 1,7 million hip-replacements are estimated to be carried out during 2008.





LATEST FIELD TESTS IN HEAT RESISTANT ALLOY TURNING

TS2000 & TS2500

The new grades, TS2000 and TS2500, are optimised for consistency, reliability and increased productivity. This is our contribution to make turning heat resistant alloys such as superalloys and titanium alloys both easy and profitable.

Real life applications show that Seco Tools is helping our customers to progress to the next level in machining heat resistant alloys.

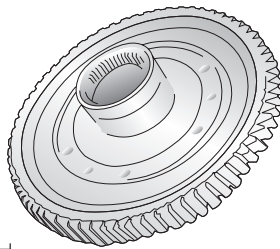
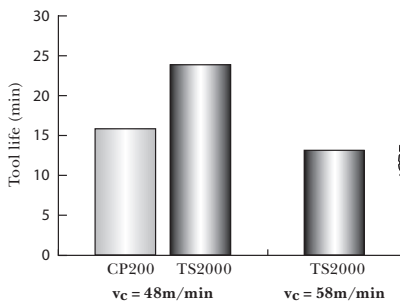
TS2000 – The perfect choice for finishing and semi-finishing of heat resistant alloys

TS2500 – The ideal grade for roughing and semi-roughing of heat resistant alloys

THE NEW GRADES CAN MORE THAN DOUBLE TOOL LIFE AND PRODUCTIVITY

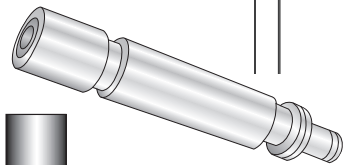
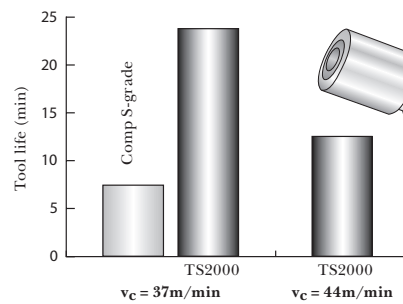
INCONEL 718 - (38-42 HRC) - TS2000

Operation	External Turning	
Component	Turbine Fan Disc	
Material	Inconel 718 (38-42 HRC)	
Insert	CNMG120408-MF1, TS2000 CNMG120408-MF1, CP200	
Cutting data	v_c	48 & 58 m/min
	f	0.15 mm/rev
	a_p	0.25 mm
	Coolant	Yes
Change criteria	Flank Wear	
Results	Tool life +33% or Productivity +20%	



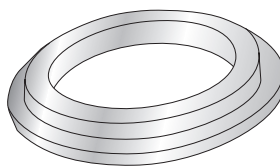
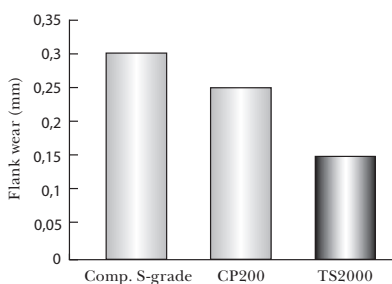
INCONEL 718 - (38-44 HRC) - TS2000

Operation	Internal Turning	
Component	Neutron Insert	
Material	Inconel 718 (38-44 HRC)	
Insert	CNMG120408-MR3, TS2000 CNMG120408-xx Competitor S-grade	
Cutting data	v_c	37 & 44 m/min
	f	0.25 mm/rev
	a_p	2.0 mm
	Coolant	Yes
Change criteria	Flank Wear	
Results	Tool life +200% or Productivity +20% and Tool life +100%	



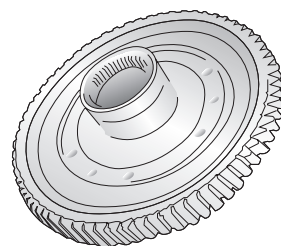
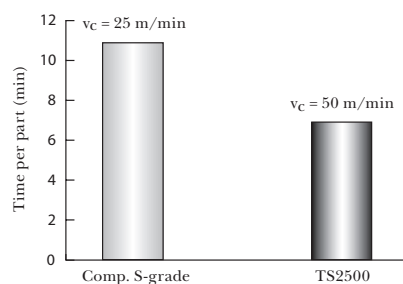
NIMONIC C263 - TS2000

Operation	Facing & External Turning	
Component	Ring	
Material	Nimonic C263 (Precipitation Hardened)	
Insert	CNMG120408-MF1, TS2000 CNMG120408-xx Competitor S-grade CNMG120408-MF1, CP200	
Cutting data	v_c	50 m/min
	f	0.25 mm/rev
	a_p	0.3 & 0.9 mm
	Coolant	Yes
Change criteria	Flank Wear after 6 min in cut	
Results	Reduced flank wear and improved tool life.	



INCONEL 718 - (38-42 HRC) - TS2500

Operation	Rough Internal Turning	
Component	Turbine Fan Disc	
Material	Inconel 718 (38-42 HRC)	
Insert	CNMG120408-MR4, TS2500 CNMG120412-xx Competitor S-grade	
Cutting data	v_c	25 & 50 m/min
	f	0.25 mm/rev
	a_p	2.0 mm
	Coolant	Yes
Change criteria	Flank Wear 0.2 mm	
Results	Speed capability +100% and Cycle time -35%	



JETSTREAM TOOLING™

COOLANT STRAIGHT TO THE EDGE

COOLANT STRAIGHT TO THE EDGE

Answering a call from the aerospace industry to improve the machining of difficult to machine alloys, Seco developed Jetstream Tooling – a revolutionary new coolant solution.

Jetstream Tooling works by delivering a concentrated high pressure jet of coolant at high velocity straight to the optimum position close to the cutting edge. This jet of coolant lifts the chip away from the rake face, improving chip control and tool life enabling increased cutting data to be applied.

EFFECTIVE HEAT REMOVAL

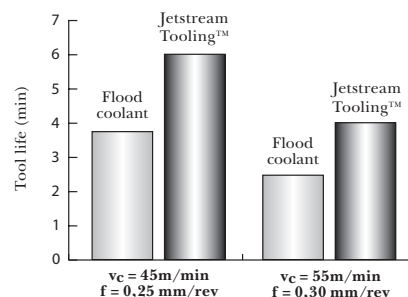
The effective removal of heat from the cutting zone is one of the most important considerations affecting cutting tool performance. For coolant to be really effective it needs to remove heat quickly from the cutting zone. A directed coolant flow which puts coolant precisely where it is required is much more efficient.

Jetstream Tooling is so effective at removing heat from the cutting zone that the chip rapidly cools, which hardens the chip making it brittle.

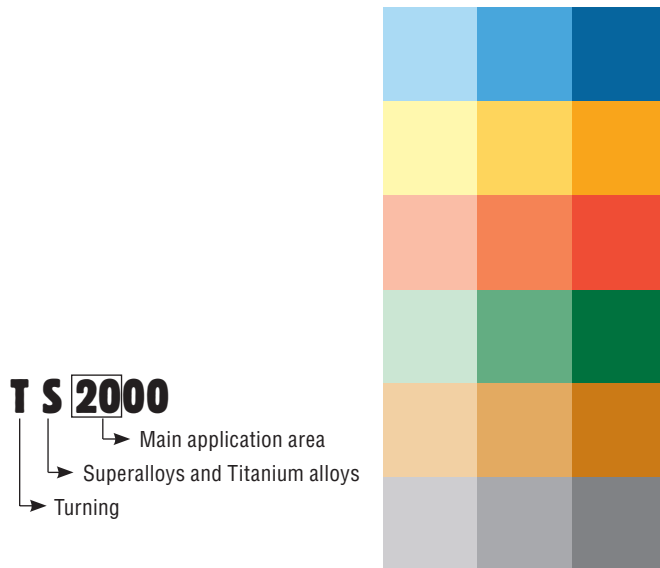
With Jetstream Tooling you no longer have to make a choice between tool life and productivity – now you can have both. With higher cutting speeds, longer tool life and improved chip control, low cost unmanned production is now a possibility.

JETSTREAM TOOLING – TS2000

Operation	External Rough Turning	
Component	Ring	
Material	Inconel 718 (38-42 HRc)	
Insert	CNMG120408-MF1, TS2000	
Cutting data	v_c	45 & 55 m/min
	f	0.25 & 0.30 mm/rev
	a_p	2.0 mm
	Coolant	Flood coolant High pressure coolant (p = 70 bar)
Change criteria	Flank Wear 0.3 mm	
Results	Tool life +50% or Productivity +25%	



SECO TOOLS – A FULL RANGE SUPPLIER



Today, Seco's family of grades provides excellent capability for the widest range of different kinds of materials such as steel, stainless steel and various heat resistant alloys. With the new TS2000 and TS2500, you have the easy first choice grades for superalloys and titanium alloys.

HEAT RESISTANT ALLOYS

- TS2000: First choice for high productivity finishing and semi-finishing and a perfect grade for high speed machining.
- TS2500: First choice for cost effective roughing and semi-roughing and a perfect grade to handle interrupted cuts and higher stress.

STEEL

- TP1500: **DURATOMIC™** First choice for high temperature and high speed machining and a perfect grade for high temperatures and high speeds.
- TP2500: **DURATOMIC™** First choice for general purpose steel turning and a perfect grade for high speed and interrupted cut machining.

STAINLESS STEEL

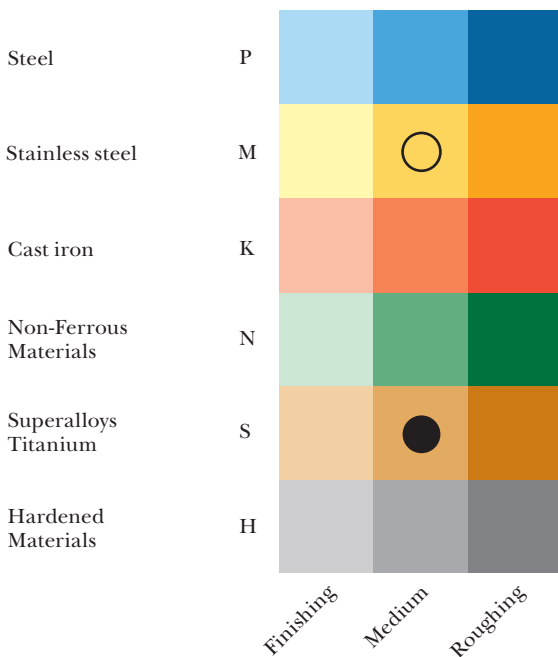
- TM2000: **DURATOMIC™** First choice for high productivity in high temperature applications and a perfect grade for high speed applications.
- TM4000 **DURATOMIC™** First choice for interrupted cut machining and a perfect grade when reliability is the most important requirement.

CUTTING DATA

GENERAL CUTTING DATA

TS2000 and TS2500 are designed for the machining of all kinds of heat resistant alloys. The recommended cutting speed v_c (m/min) in the table to the right are for 10 minutes tool life in Inconel 718 bar material.

Material	TS2000			TS2500			Feed (mm/rev)
	a_p			a_p			
	0,5	1,5	2,5	0,5	1,5	2,5	
Inconel 718 (bar, forge, ring)	60	55	50	55	50	45	0,1
	55	50	45	50	45	40	0,15
	50	45	40	45	40	35	0,2
	45	40	35	40	35	30	0,3



CUTTING DATA RECOMMENDATION

TS2000 and TS2500 inserts within the Secolor concept are labeled with cutting data recommendation on the boxes. The Secolor system is based on a matrix symbolizing different workpiece materials and different machining conditions. Black dots indicate main application areas and circles indicate secondary application areas.

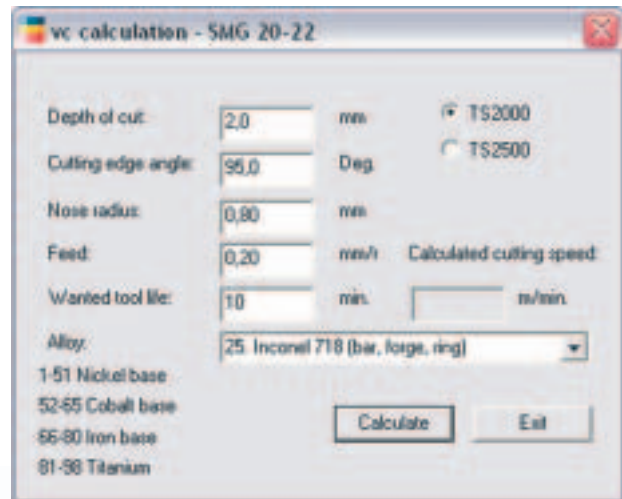
S01-S30



Superalloys and Titanium: Heat resistant special alloys based on iron, nickel and cobalt. Titanium and titanium alloys.

CUTTING DATA CALCULATOR

When machining workpiece materials corresponding to other material groups and with other depths of cut and/or feed rates, use the cutting data calculator on our website. The calculator can also be used for changing the required tool life.



INDIVIDUAL CUTTING DATA ON THE INSERT BOX

The cutting data located on the cover of the box refer to the black dots in the matrix. The cutting data includes depth of cut, feed rate and cutting speed recommendations in both metric and inch values. The values in brackets represent the total recommended working range. The cutting data is adapted for the specific insert style, chipbreaker, nose radius, depth of cut, feed rate and the generally used setting angle.



MACHINABILITY FACTORS

Seco Material Group No		Alloy	Machinability Factor
20	Ni-base alloys	Hastelloy B-2	1,4
		Hastelloy C (plate)	1,8
		Hastelloy C (cast)	1,4
		Hastelloy C-22	1,4
		Hastelloy C-276	1,3
		Hastelloy C-4	1,3
		Hastelloy G	1,3
		Hastelloy G-3	1,3
		Hastelloy N (bar, forge, ring)	1,4
		Hastelloy N (cast)	1,3
		Hastelloy S	1,8
		Hastelloy W	1,3
		Hastelloy X	1,3
		Inconel 600	1,4
		Inconel 601	1,4
		Inconel 625 (cast)	1,7
		Inconel 625 (tube)	1,3
		Inconel 706	1,4
		Inconel 708 (bar, forge, ring)	1,3
		Inconel X750 (sol. annealed)	1,4
	Nickel 210	4,3	
	Nimonic 105	1,3	
	Nimonic 80A	1,3	
	Nimonic 86	1,4	
	Nimonic 901	1,3	
	Fe-base alloys	A286 (plate)	1,4
		A286 (sol. annealed)	1,3
		AM350 (heat treated)	1,8
		AM350 (cast)	1,3
		IN 801	1,4
		Lapelloy	1,8
		M308	1,4
		N 155 (bar, forge, ring)	1,4
		17-4PH (sol. annealed)	2,1
		17-7PH (sol. annealed)	1,8
	Ni-base alloys	Inconel 625 (bar, forge, ring)	1,1
Inconel 713		1,1	
Inconel 718 (cast)		1,1	
Inconel 718 (bar, forge, ring)		1,0	
Inconel 718 (tube)		1,1	
Inconel 901		1,1	
Inconel X750 (prec. hardened)		1,0	
Mar-M-200		0,6	
Mar-M-247		0,7	
Nimonic 101		0,7	

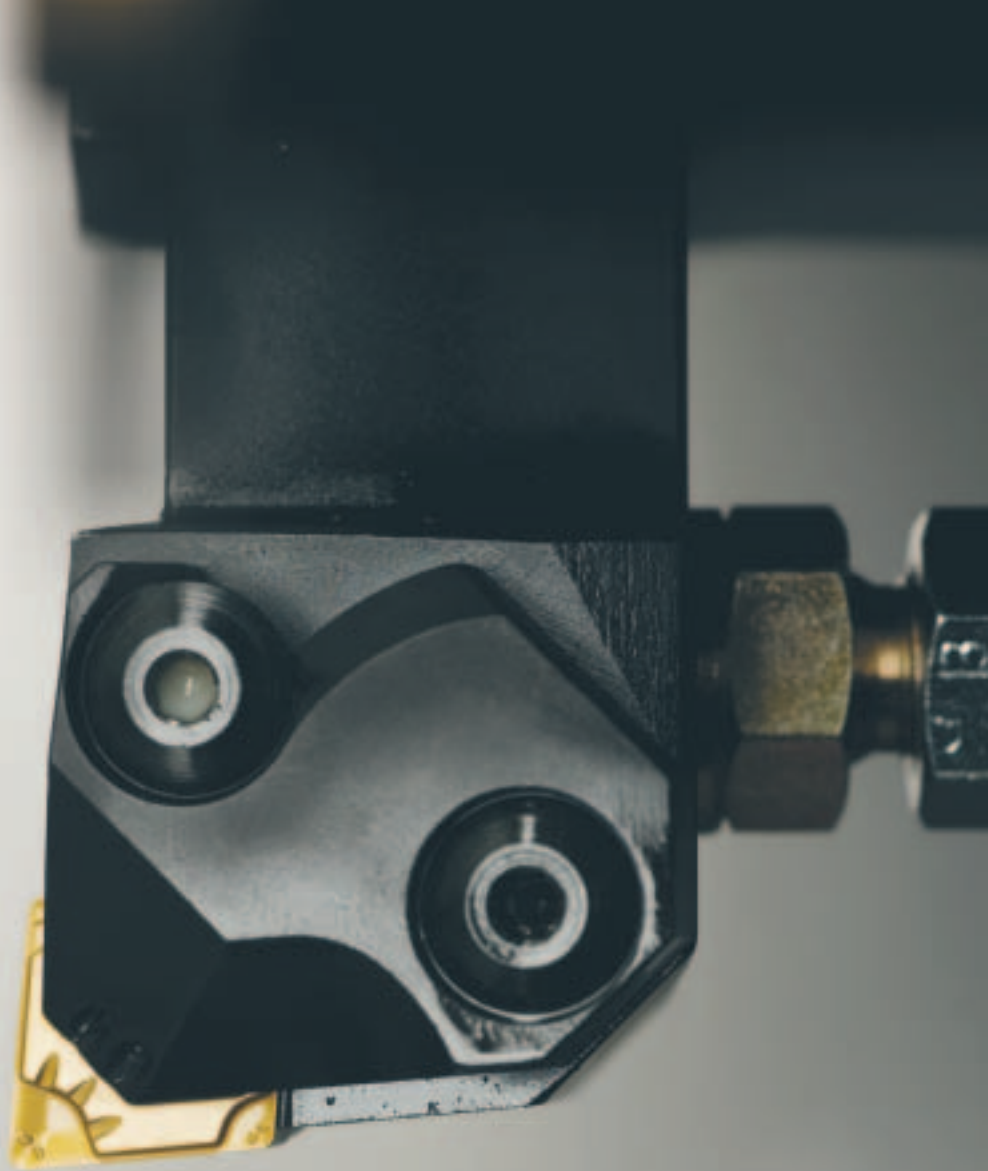
Seco Material Group No		Alloy	Machinability Factor	
21	Ni-base alloys	Nimonic 115	1,0	
		Nimonic 263	1,1	
		Nimonic 81	1,1	
		Nimonic 90	0,7	
		Nimonic 91	0,7	
		Rene 95	0,4	
		Udimet 500	0,9	
		Udimet 700	0,9	
		Waspalloy (cast)	1,1	
		Waspalloy (bar, forge)	1,0	
		Fe-base alloys	A286 (prec. hardened)	1,1
			AM355	1,1
	IN 800		1,1	
	Incoloy 909		1,1	
	N 155 (bar, forge, ring)		1,1	
	15-5PH		1,1	
	17-4PH (prec. hardened)		1,1	
	Co-base alloys	Air resist 13	0,3	
		H531	0,4	
		Haynes 25	0,9	
		Haynes 188 (bar, forge, ring)	0,9	
		Haynes 188 (tube)	1,0	
		Stellite 21	1,1	
		Stellite 30	1,1	
	Stellite 31	1,1		
	22	Titanium alloys	Ti (pure) - (tube)	4,3
Ti (pure) - (plate, bar, forge, ring)			3,2	
Ti 3Al-2.5V (bar, forge)			1,8	
Ti 3Al-2.5V (annealed tube)			4,3	
Ti 5Al-2.5Sn (annealed)			2,4	
Ti 5Al-2.5Sn (ELI)			2,9	
Ti 5Al-2.5Sn			2,5	
Ti 5Al-2.5Fe			2,1	
Ti 6-2-4-2 (prec. hardened)			1,8	
Ti 6-2-4-2 (annealed)			2,1	
Ti 6-2-4-6 (prec. hardened)			1,8	
Ti 6-2-4-6 (annealed)			2,5	
Ti 6Al-4V (annealed)			2,3	
Ti 6Al-4V (annealed casting)			2,5	
Ti 6Al-4V (prec.hard)			2,1	
Ti 6Al-4V (annealed tube)			2,1	
Ti 6Al-4V (extruded)			2,5	
Ti 6Al-4V (ELI)			2,9	
Ti 6Al-5Zr-0.5Mo-Si			1,4	
Ti 6Al-6V-2Sn			1,3	

The machinability factors are normed after the machinability of Inconel 718, bar material. Decreasing machinability factors indicates increasing machining difficulty. Use the machinability factors to calculate the recommended cutting speed for any specific alloy by multiplying its machining factor with the recommended cutting speed in the general cutting data table for Inconel 718 above.

GEOMETRIES FOR IMPROVED CHIP CONTROL AND TOOL LIFE

The complete programme of chipbreaker geometries includes both negative and positive inserts. For many applications the use of a chipbreaker will reduce the cutting forces produced and minimise the burr on the component. Use the recommendations below to select suitable chipbreaker geometry.

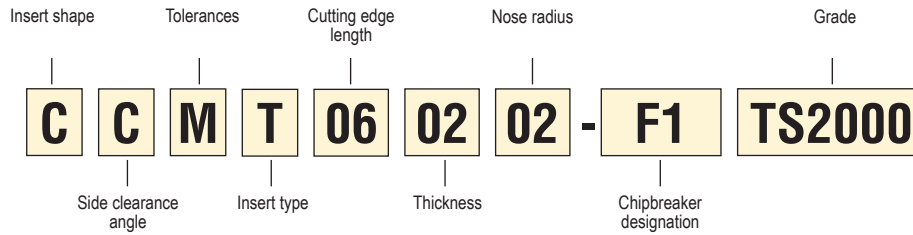
POSITIVE INSERTS			CORNER	CUTTING EDGE
	F1	For Finishing		
	F2	For Semi-Finishing to Medium-Roughing		
	46	For Semi-Finishing to Medium-Roughing		
	PS	For Finishing to Medium-Roughing		
NEGATIVE DOUBLE SIDED				
	MF1	For Finishing and Semi-Finishing		
	M1	For Semi-Finishing to Medium-Roughing		
	MF4	For Semi-Finishing to Roughing		
	MF5	For Medium-Roughing to Roughing		
	UX	For Semi-Finishing to Medium-Roughing		
	MR3	For Medium-Roughing to Roughing		
	MR4	For Medium-Roughing to Roughing		



CHOOSE **TS2000 & TS2500**
IF YOU ARE LOOKING FOR ...

IMPROVED RELIABILITY
HIGH CONSISTENCY
INCREASED PRODUCTIVITY
LONG TOOL LIFE
LOW COST

CODE KEY









INSERT PROGRAMME

Inserts	Part No.	Grades		Cutting data Inconel 718 (bar material)		
		TS2000	TS2500	ap	f	vc
	CCMT 060202-F1	■		0,5	0,08	80
	060204-F1	■		1	0,1	75
	09T304-F1	■		1	0,12	70
	09T304-F2	■		1	0,15	60
	09T308-F1	■		1,5	0,18	55
	120404-F1	■		1	0,22	45
	120408-F1	■		1,5	0,25	40
	CNGG 120401-MF1	■		0,3	0,08	80
	120402-MF1	■		0,5	0,08	80
	120402-M1	■	■	0,5	0,08	70
	120404-MF1	■		1	0,1	75
	120408-MF1	■		1,5	0,15	60
	CNMG 120404-M1	■		1	0,15	60
	120404-MF1	■		1	0,1	75
	120404-MF4	■		1	0,15	60
	120404-MF4	■	■	1	0,15	55
	120408-M1	■	■	2	0,2	45
	120408-MF1	■		1,5	0,15	60
	120408-MF4	■		1,5	0,25	40
	120408-MF4	■	■	1,5	0,25	35
	120408-MF5	■	■	0,7	0,3	40
	120408-MF5	■		0,7	0,3	45
	120408-MR3	■		2	0,2	45
	120408-MR4	■	■	3	0,25	30
	120412-MF4	■		2	0,25	40
	120412-MF4	■	■	2	0,25	35
	120412-MF5	■		1	0,35	35
	120412-MF5	■		1	0,35	35
120412-MR3	■		2,5	0,25	35	
120412-MR4	■	■	3	0,3	25	
120416-MR4	■		4	0,3	25	
160608-MR4	■	■	4	0,25	30	
160612-MR4	■	■	5	0,35	20	
190612-MR4	■	■	6	0,35	20	
	DCMT 070202-F1	■		0,5	0,08	80
	070204-F1	■		1	0,1	75
	11T304-F1	■		1	0,12	70
	11T304-F2	■		1	0,15	60
	11T308-F1	■		1,5	0,18	55
	DNGM 150408-MF1	■		1,5	0,15	60
	150608-MF1	■		1,5	0,15	60

Inserts	Part No.	Grades		Cutting data Inconel 718 (bar material)			
		TS2000	TS2500	ap	f	vc	
	DNMG 150404-MF1	■		1	0,1	75	
	150408-MF1	■		1,5	0,15	60	
	150408-MF4	■		1,5	0,25	40	
	150408-MF4	■	■	1,5	0,25	35	
	150408-MF5	■	■	0,7	0,3	40	
	150408-MF5	■		0,7	0,3	45	
	150408-MR3	■		2	0,2	45	
	150408-MR4	■	■	3	0,25	30	
	150412-MF4	■		2	0,25	40	
	150412-MF4	■	■	2	0,25	35	
	150412-MF5	■		1	0,35	35	
	150412-MF5	■	■	1	0,35	35	
	150412-MR3	■		2,5	0,25	35	
	150604-MF1	■		1	0,1	75	
	150604L-UX	■	■	2	0,15	50	
	150604R-UX	■	■	2	0,15	50	
	150608-MF1	■		1,5	0,15	60	
	150608-MR3	■		2	0,2	45	
	150608-MF4	■		1,5	0,25	40	
	150608-MF4	■	■	1,5	0,25	35	
	150608-MF5	■	■	0,7	0,3	40	
	150608-MF5	■		0,7	0,3	45	
	150608L-UX	■	■	3	0,25	30	
	150608R-UX	■	■	3	0,25	30	
	150612-MF4	■		2	0,25	40	
	150612-MF4	■	■	2	0,25	35	
	150612-MF5	■		1	0,35	35	
	150612-MF5	■	■	1	0,35	35	
		RCGS 12.7-46	■		2	0,3	35
		4.76-46	■		0,5	0,18	80
		4.76-PS	■		0,5	0,18	80
		6.35-46	■		1	0,2	65
6.35-PS		■		1	0,2	65	
9.525-46		■		1,5	0,25	50	
9.525-PS		■		1,5	0,25	50	
RCMT 0602M0-F2		■		0,5	0,18	80	
0803M0-F2		■		1	0,2	65	
10T3M0-F2		■		1,5	0,25	50	
1204M0-F2	■		2	0,3	35		
RNMG 120400-MR4	■		1,8	0,3	45		
190600-MR4	■		3,5	0,45	40		
250900-MR4	■		3,5	0,5	35		

INSERT PROGRAMME

Inserts	Part No.	Grades		Cutting data Inconel 718 (bar material)		
		TS2000	TS2500	ap	f	vc
	SNMG 120408-MF1	■		2	0,2	45
	120408-MR3	■		2	0,25	35
	120408-MR4		■	2,5	0,25	30
	120412-MF1	■		2	0,25	40
	120412-MR3	■		2,5	0,3	30
	120412-MR4		■	2,5	0,3	25
	120416-MR4		■	3	0,35	20
	150612-MR4		■	4	0,35	20
	190612-MR4		■	5	0,35	20
		TCMT 16T304-F1	■		1	0,12
16T308-F1		■		1,5	0,18	55
TNMG 160404-MF1		■		1	0,1	75
160404L-UX			■	2	0,15	50
160404R-UX			■	2	0,15	50
160408-MF1		■		1,5	0,15	60
160408-MF4		■		1,5	0,25	40
160408-MF4			■	1,5	0,25	35
160408-MF5			■	0,7	0,3	40
160408-MF5		■		0,7	0,3	45
	160408-MR4		■	3	0,25	30
	160408L-UX		■	2,5	0,25	30
	160408R-UX		■	2,5	0,25	30
	160412-MF1	■		2	0,2	50
	160412-MF4	■		2	0,25	40
	160412-MF4		■	2	0,25	35
	160412-MF5		■	1	0,35	35
	160412-MF5	■		1	0,35	35
	220408-M1		■	1,5	0,2	45
	220408-MR4		■	3	0,25	30
	220412-MR3	■		3	0,35	25
	220412-MR4		■	4	0,3	25
	220416-MR4		■	4,5	0,35	20
	220432-MR4		■	5	0,4	20
	270608-MR4		■	5	0,25	30
	VBMT 160404-F1	■		1	0,12	70
	160408-F1	■		1,5	0,18	55
	160408-F2	■		1,5	0,18	55

Inserts	Part No.	Grades		Cutting data Inconel 718 (bar material)			
		TS2000	TS2500	ap	f	vc	
	VNGG 160402-M1	■		0,5	0,08	80	
	160404-M1	■		1	0,1	75	
	160408-M1	■		1,5	0,15	60	
	220408-M1	■		2	0,2	45	
	VNMG 130408-M3	■		1,5	0,2	50	
	VNGM 160404-MF1	■		1	0,1	75	
	160408-MF1	■		1,5	0,15	60	
	160404-MF4	■		1	0,15	60	
	160404-MF4		■	1	0,15	55	
	160408-MF4		■	1,5	0,25	35	
	160408-MF4	■		1,5	0,25	40	
	160408-MR4		■	2	0,25	30	
	160412-MR4		■	2,5	0,3	25	
		WNGG 060402-MF1	■		0,5	0,08	80
		WVMG 060404-MF1	■		1	0,1	75
060408-MF1		■		1,5	0,15	60	
060408-MR3		■		2	0,2	45	
060412-MR3		■		2,5	0,25	35	
080404-MF1		■		1	0,1	75	
080408-MF1		■		1,5	0,15	60	
080408-MF4		■		1,5	0,25	40	
080408-MF4			■	1,5	0,25	35	
080408-MF5			■	0,7	0,3	40	
080408-MF5		■		0,7	0,3	45	
080412-MF4		■		2	0,25	40	
080412-MF4			■	2	0,25	35	
080412-MF5		■		1	0,35	35	
080412-MF5			■	1	0,35	35	

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