

CERAMIC^SMILL^{PEED}

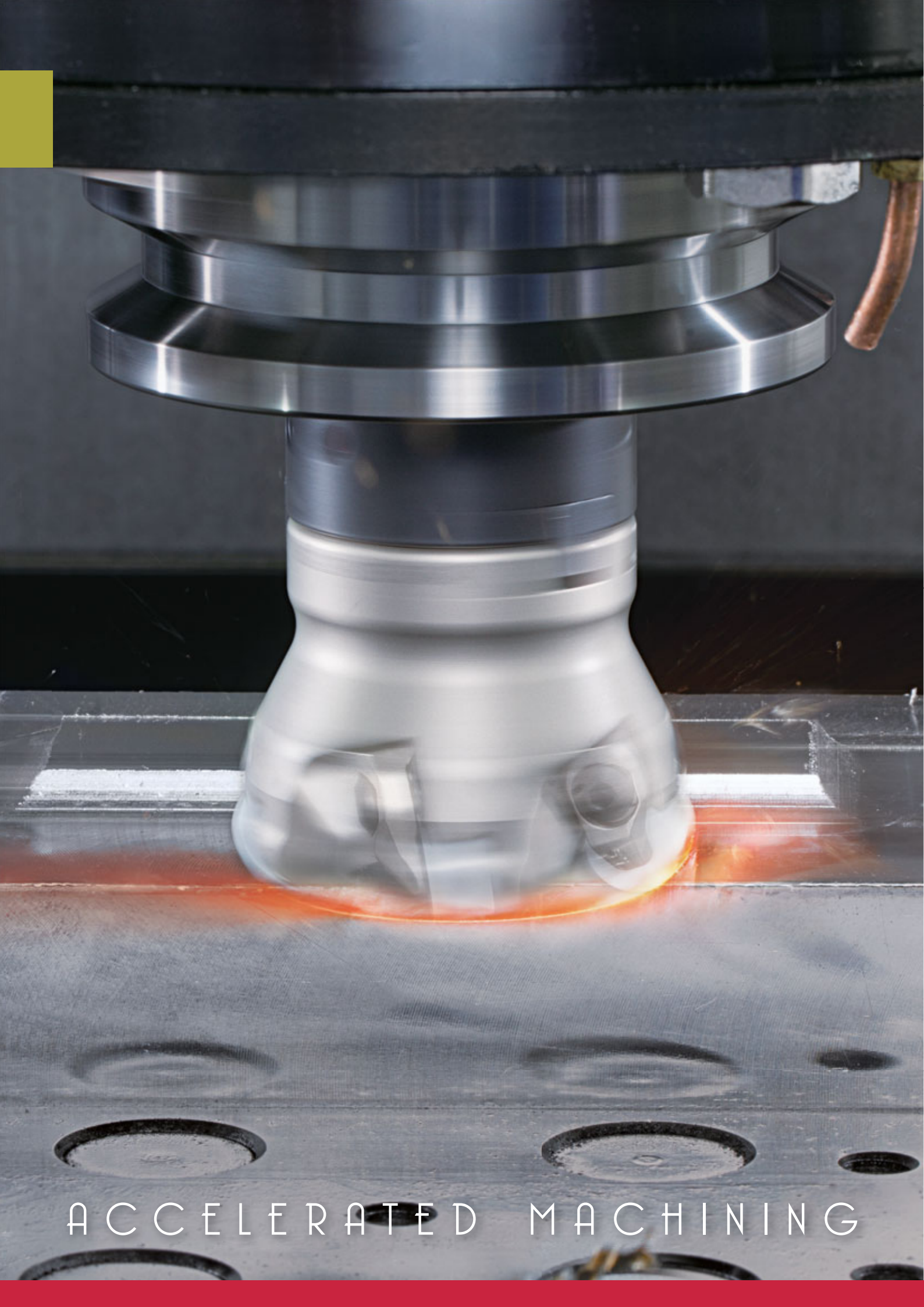
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Tungaloy Report No. 527-G

High efficiency milling cutter with ceramic inserts for high temperature alloy machining



INDUSTRY 4.0
FEED the SPEED!



ACCELERATED MACHINING



MillLine

CERAMIC⁵ SPEED
MILL
TUNGALOY

TUNG **FORCE** **MILL**
ACCELERATED MACHINING



Milling cutter with round negative insert
for high utilization in face milling operations

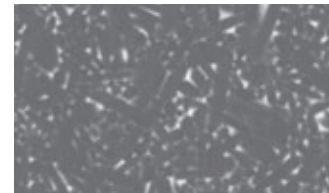
High reliable face mill and SiAlON inserts for high temperature alloy machining

New SiAlON grade inserts for high reliability

These two new ceramic grades are characterized by their excellent toughness and anti-chipping capabilities

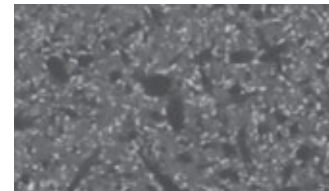
TS200

- Superior wear resistance due to high chemical stability
- Superior flank and notch wear resistance



TS300

- Extreme toughness allows for higher feed and greater depth of cut machining
- Suitable for scaling and roughing applications



High efficiency milling cutter with ceramic inserts

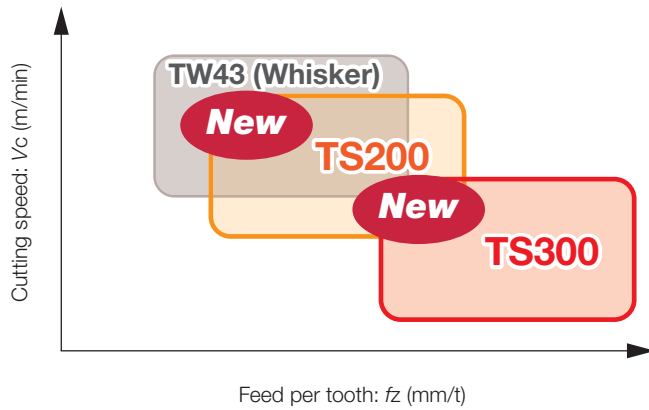
Tungaloy offers the most dense cutter in the market for the diameters of 63 mm

Close pitch cutter design for high efficiency milling

$z = 5$ for cutter diameter $\phi 63$ mm (Existing $z = 4$ for the same ϕ)

Cutter diameter (mm)	Number of teeth		
	Tungaloy	Competitor A	Competitor B
63	5	4	4
80	5	5	5

APPLICATION RANGE (high temperature alloys)



TS200: High speed finishing
TS300: Scaling and roughing

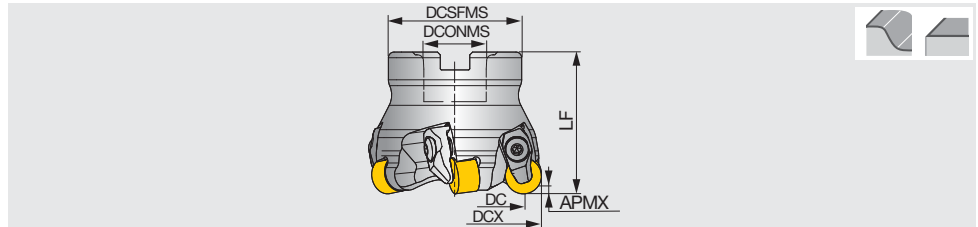
STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Grades	Cutting speed V_c (m/min)	Feed per tooth f_z (mm/t)	Depth of cut a_p (mm)
S	Ni-based super alloys	TS200	550 - 1300	0.05 - 0.2	0.1 - 2
		TS300	270 - 550	0.05 - 0.2	0.1 - 2
	Co-based super alloys	TS200	550 - 1500	0.05 - 0.2	0.1 - 2
		TS300	270 - 550	0.05 - 0.2	0.1 - 2

TFMRN

Face milling cutter for high temperature alloy applications, Tool dia. $\phi 63 - \phi 80$ mm

GAMP = -7°, GAMF = +15°



Designation	APMX	DC	DCX	CICT	DCONMS	LF	DCSFMS	WT(kg)	Insert
TFMRN563-22R-12FL	2	50.35	63	5	22	50	47	0.6	RNGN120700...
TFMRN580-27R-12FL	2	67.37	80	5	27	50	58	0.9	RNGN120700...

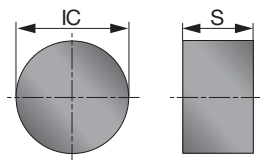
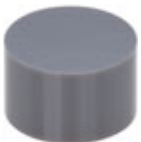
SPARE PARTS



Designation	Clamp	Screw	Snap ring
TFMRN**-**R-12FL	CCL-5S-F	CLS3C	CSR2

INSERT

RNGN120700



P Steel										
M Stainless										
K Cast iron										
N Non-ferrous										
S Superalloys		★	★							
H Hard materials										

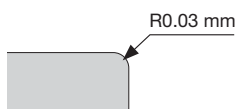
★ : First choice

Designation	APMX	Edge prep.*	Ceramic										IC	S		
			TS200	TS300												
RNGN120700-E	2	E	●												12.7	7.94
RNGN120700-T1	2	T1	●												12.7	7.94
RNGN120700-E	2	E		●											12.7	7.94
RNGN120700-T1	2	T1		●											12.7	7.94

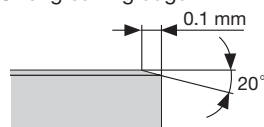
* Types of cutting edge preparations

●: Line up


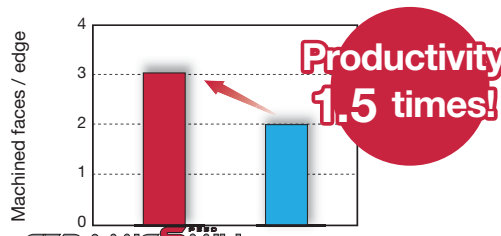
E: Low cutting force



T1: Strong cutting edge



PRACTICAL EXAMPLES

Workpiece type		Aircraft parts	
Cutter	TFMRN563-22R-12FL (ø63 mm, z = 5)		
Insert	RNGN120700E		
Grade	TS300		
Workpiece material	INCONEL718		
			S
Cutting conditions	Cutting speed: V_c (m/min)	500	
	Feed per tooth: f_z (mm/t)	0.1	
	Feed speed: V_f (mm/min)	1,255	
	Depth of cut: a_p (mm)	0.5	
	Machining	Face milling	
	Coolant	Dry	
	Machine	Vertical M/C	
Results	 <p>Productivity 1.5 times!</p> <p>CERAMICSMILL Competitor</p> <p>The TS300, which is excellent in fracture resistance, was able to high DOC machining, so it was possible to reduce the machining pass.</p>		

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