Tungaloy

Keeping the Customer First

Tungaloy Report No.367-E

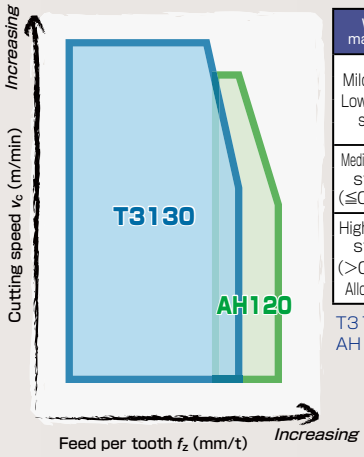
The Complete Solution
OSG TUNGALOY Global Alliance

New CVD coated grade for milling steels

T3130 series

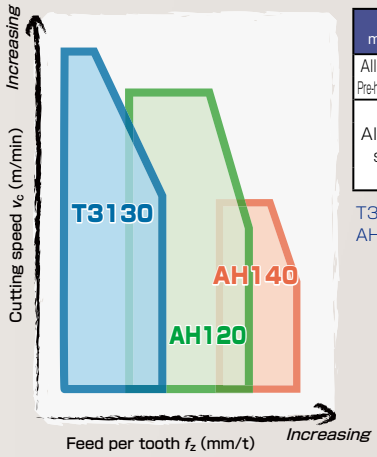
Highly Impact-resistant, Tough Coated Grades Ensure Outstanding Long Tool Life

■ Application areas



Work matetrial	Typical type (JIS)	Hardness
Mild steels Low-carbon steels	S10C	110 ~ 180HB
	S15C	
	S25C	
	SS400	
Medium-carbon steels (≦0.5%C)	S35C	150 ~ 280HB
	S45C	
	S50C	
High-carbon steels (>0.5%C) Alloy steels	S55C	180 ~ 350HB
	S58C	
	SCM440	
	SCr440	

T3130 : CVD coated grade
AH120 : PVD coated grade



Work matetrial	Typical type (JIS)	Hardness
Alloy steels Pre-hardened steels	SNCM447	~ 40HRC
	NAK80	
Alloy tool steels	SKD11	~ 280HB
	SKD61	
	SKT	
	SKS	

T3130 : CVD coated grade
AH120, AH140 : PVD coated grades

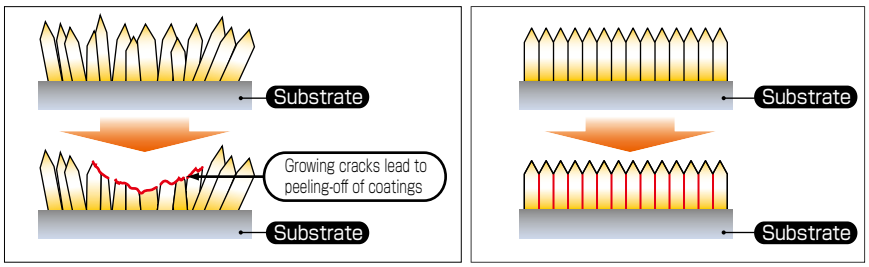
A Combination of New Coating and Specially Designed

Improved chipping resistance

●Continuously formed columnar crystal Ti(C, N) coating

Longitudinally stabilized columnar structure contributes to strong crystal structure, suppressing cracks and improving chipping resistance.

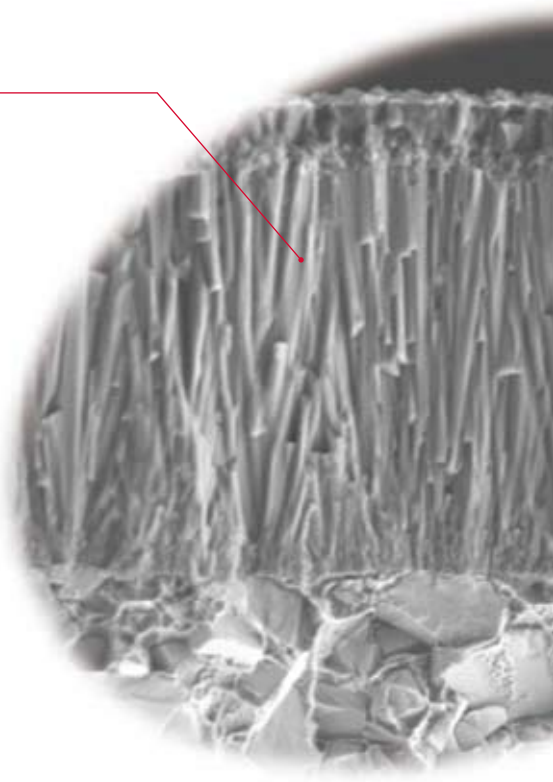
Schematic drawing



Conventional grade
- ●Irregularly oriented and unequally grown crystals
- ●Cracks develop in various directions.

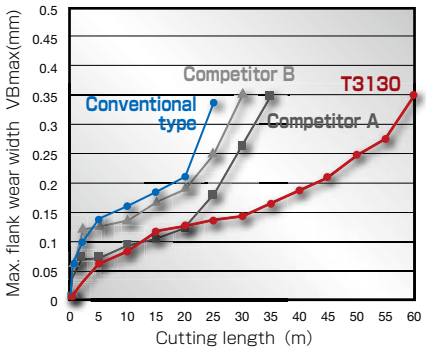
T3130
- ●Regularly oriented and equally grown crystals
- ●Direction of cracks is the same as the direction of the crystal growth.

The regularly oriented and equally grown columnar crystal coating layer can evenly disperse the stress even under heavy cutting load and suppress randomly developed cracks, cotributing to longer tool life!

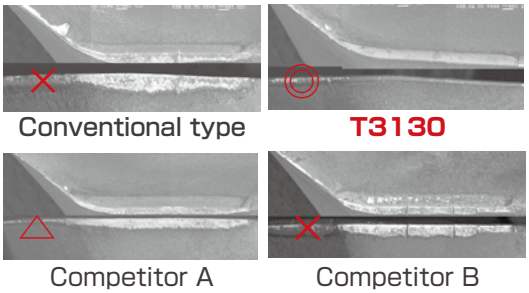


■ Comparison of wear resistance

Very slight damage compared to conventional type and competitor's products

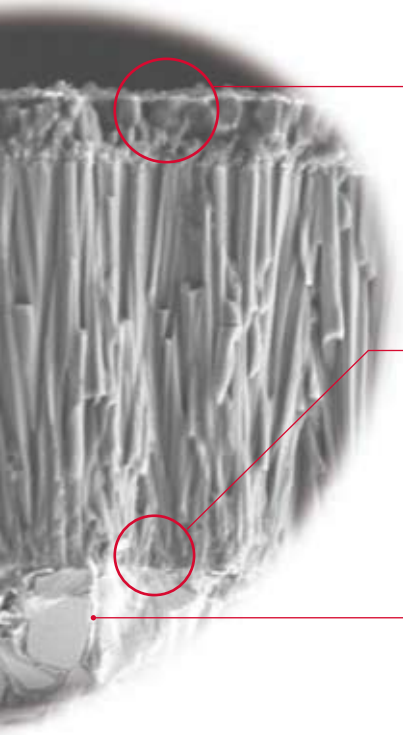


Tool: Screw-on type cutters ϕ100, 5 teeth
Inserts: Applicable inserts for the cutter above 45° corner type
Machine: Vertical M/C (BT50, 22kW)
Work material: Chromium molybdenum steel (JIS SCM440) (167HB ~ 172HB)
Cutting speed: v_c =150 m/min
Depth of cut: a_p =2.0 mm
Feed per tooth: f_z =0.25 mm/t
Cutting fluid: Dry cutting



Both conventional and competitor's grades reached the end of tool life due to heavy wearing and chipping. On the other hand, T3130 grade showed less wear and could continue further machining.

Substrate Ensures Excellent Wear and Impact Resistance!



Improved coating strength

●Smoothed coating surface

●Smoothed and refined coating surface improves the uniformity of the coating structure.

●Compared to conventional grades, stability and strength have been vastly improved.

Vastly improved adhesion between coating and substrate

●Newly developed special carbide substrate

●Newly developed, dedicated carbide substrate which has excellent affinity with coating can improve the adhesion between coating and the substrate, and suppress peeling-off of coating, realizing longer tool life.

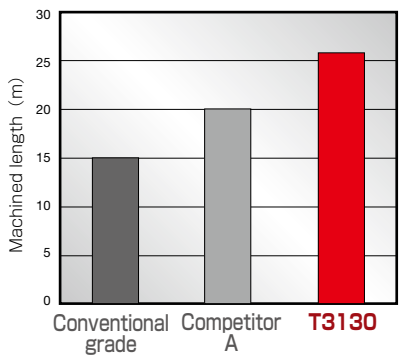
Dramatically improved impact resistance

●Specially engineered carbide substrate for higher toughness

●Newly developed, cobalt enriched special carbide substrate can improve the impact resistance and toughness.

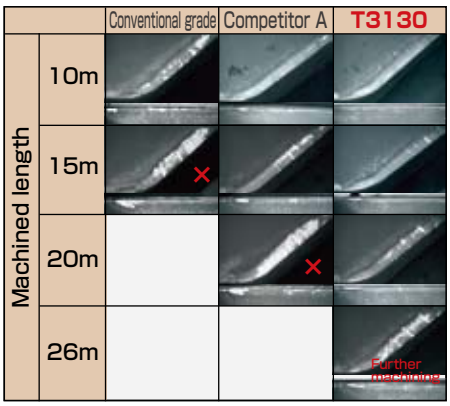
■ Comparison of tool life

Compared to conventional and competitor's grades, T3130 showed no chipping even after 10m of machining, proving longer tool life.

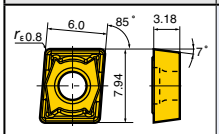
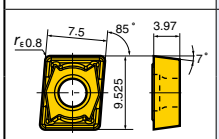
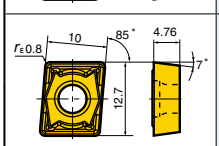
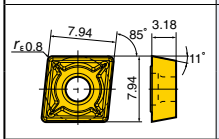
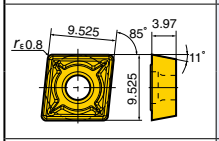
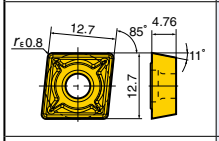
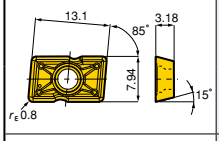
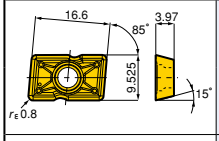
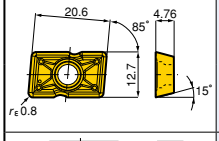
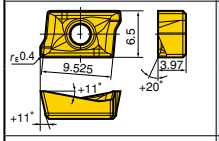
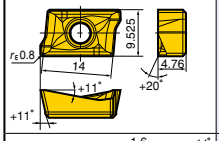
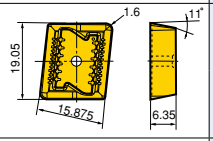
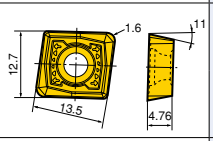
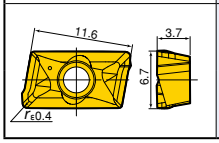


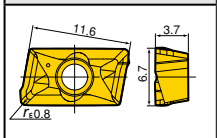
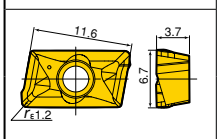
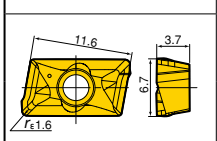
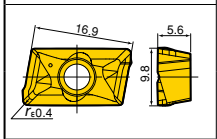
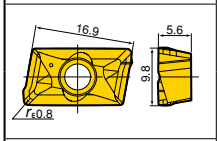
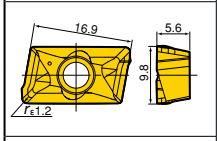
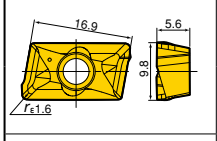
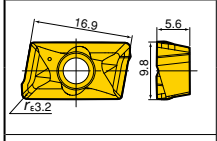
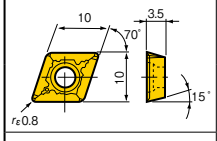
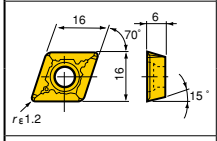
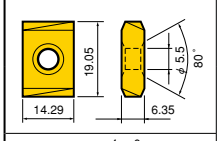
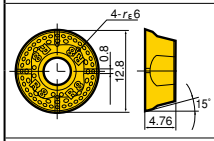
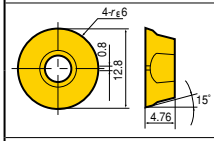
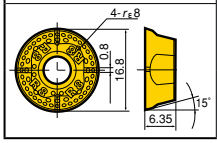
Tool:	TME4406RI (8 teeth)
Insert type:	Equivalent to SEEN type
Machine:	Vertical M/C (BT50、15kW)
Work material:	Carbon steel (JIS S50C)
Cutting speed:	v_c =250 m/min
Depth of cut:	a_p =1.5 mm
Feed per tooth:	f_z =0.15 mm/t
Cutting fluid:	Dry cutting

Tool life was ***1.7*** times that of conventional grade.

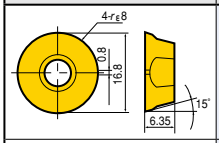
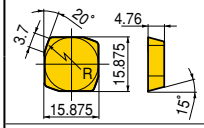
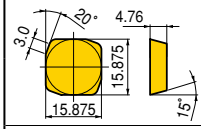
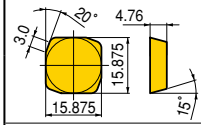
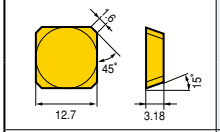
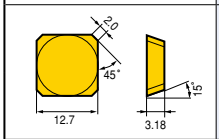
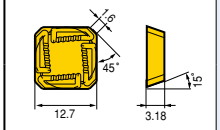
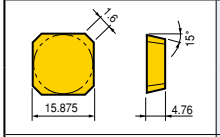
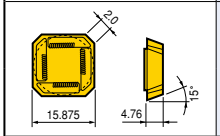
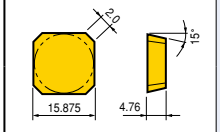
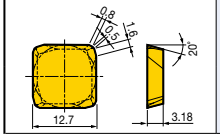
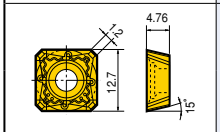
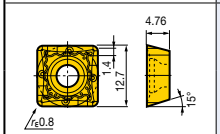
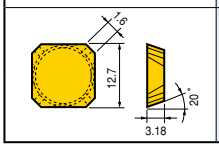


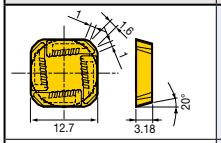
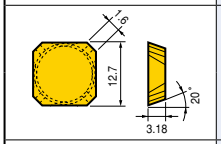
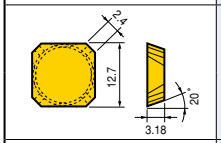
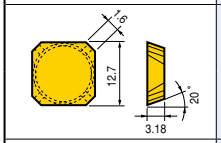
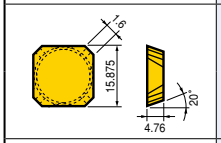
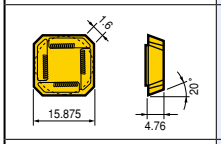
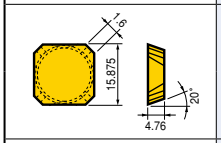
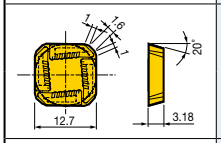
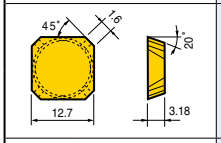
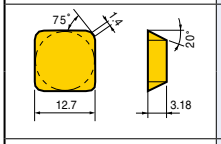
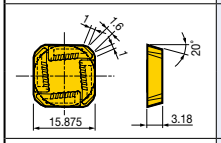
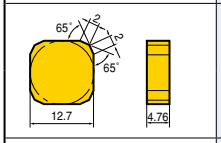
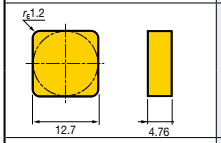
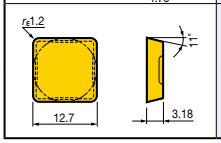
Stocked inserts

Shape and dimensions	Cat. No. (ISO based, Metric)	Accuracy	Honing	Grade T3130	Applicable TAC mills
	**ACMT060308PR-MJ** (ACMT060308PR-MJ)	M	With	●	ELP07
	**ACMT07T308PR-MJ** (ACMT07T308PR-MJ)	M	With	●	
	**ACMT100408PR-MJ** (ACMT100408PR-MJ)	M	With	●	ELP12
	**APMT070308PN-MJ** (APMT070308PN-MJ)	M	With	●	ELP07 ELP13025RA
	**APMT09T308PN-MJ** (APMT09T308PN-MJ)	M	With	●	ELP09 ELP17032RA
	**APMT120408PN-MJ** (APMT120408PN-MJ)	M	With	●	ELP12 ELP21040RA
	**ADMT130308PR-MJ** (ADMT130308PR-MJ)	M	With	●	ELP13025RA
	**ADMT17T308PR-MJ** (ADMT17T308PR-MJ)	M	With	●	ELP17032RA
	**ADMT210408PR-MJ** (ADMT210408PR-MJ)	M	With	●	ELP21040RA
	**ANMT09T3PPPR-MJ** (ANMT09T3PPPR-MJ)	M	With	●	EPN09
	**ANMT1404PPPR-MJ** (ANMT1404PPPR-MJ)	M	With	●	EPN14 TPN14
	**APMR190616PR-MJ** (APMR190616PR-MJ)	M	With	●	TZP19
	**APMT120416PR-MJ** (APMT120416PR-MJ)	M	With	●	TZP12
	**ASMT11T304PDPR-MJ** (ASMT11T304PDPR-MJ)	M	With	●	EPS11 TPS11

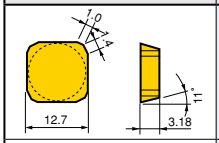
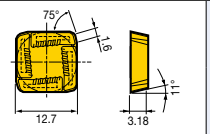
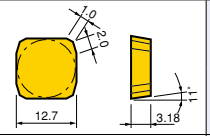
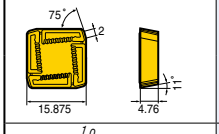
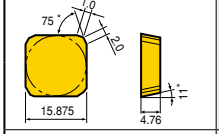
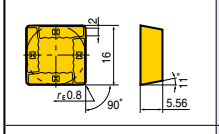
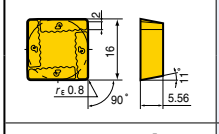
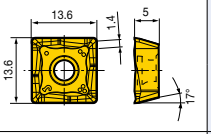
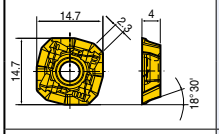
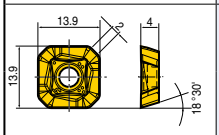
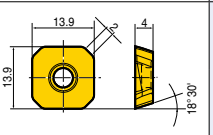
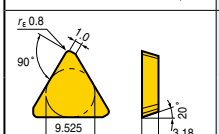
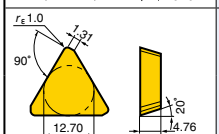
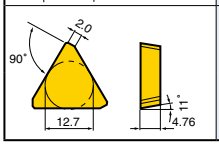
Shape and dimensions	Cat. No. (ISO based, Metric)	Accuracy	Honing	Grade T3130	Applicable TAC mills
	**ASMT11T308PDPR-MJ** (ASMT11T308PDPR-MJ)	M	With	●	EPS11 TPS11
	**ASMT11T312PDPR-MJ** (ASMT11T312PDPR-MJ)	M	With	●	
	**ASMT11T316PDPR-MJ** (ASMT11T316PDPR-MJ)	M	With	●	
	**ASMT170504PDPR-MJ** (ASMT170504PDPR-MJ)	M	With	●	EPS17 TPS17
	**ASMT170508PDPR-MJ** (ASMT170508PDPR-MJ)	M	With	●	
	**ASMT170512PDPR-MJ** (ASMT170512PDPR-MJ)	M	With	●	
	**ASMT170516PDPR-MJ** (ASMT170516PDPR-MJ)	M	With	●	
	**ASMT170532PDPR-MJ** (ASMT170532PDPR-MJ)	M	With	●	
	**GDMT10H3PDPR-MJ** (GDMT10H3PDPR-MJ)	M	With	●	ESD10 TSD10
	**GDMT17X6PDPR-MJ** (GDMT17X6PDPR-MJ)	M	With	●	ESD17 TSD17
	**LNCA64ZTR** (LNCA64ZTR)	C	With	●	VSN6000I
	**RDMT1204ZDPN-MJ** (RDMT1204ZDPN-MJ)	M	With	●	ERD12 TRD12
	**RDMW1204ZDSN** (RDMW1204ZDSN)	M	With	●	ERD12 TRD12
	**RDMT1606ZDPN-MJ** (RDMT1606ZDPN-MJ)	M	With	●	ERD16 TRD16

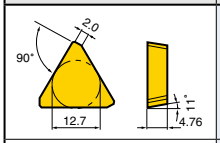
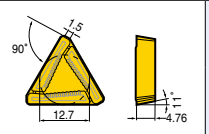
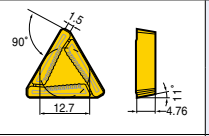
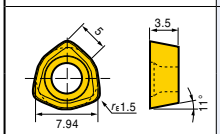
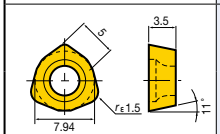
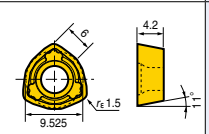
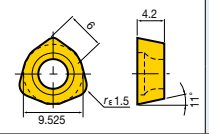
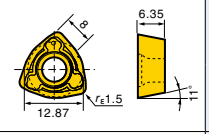
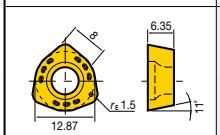
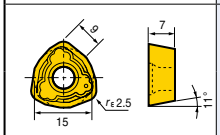
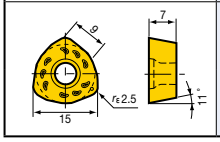
● : Stocked in Japan

Shape and dimensions	Cat. No. (ISO based, Metric)	Accuracy	Honing	Grade T3130	Applicable TAC mills
	**RDMW1606ZDSN** (RDMW1606ZDSN)	M	With	●	ERD16 TRD16
	**SDCN1504ZDSR** (SDCN1504ZDSR)	C	With	●	TXD15000R
	**SDEN1504ZDSR** (SDEN1504ZDSR)	E	With	●	
	**SDNN1504ZDSR** (SDNN1504ZDSR)	N	With	●	
	**SDKN42ZTN16** (SDKN1203AETN-16)	K	With	●	TMD4400I TGD4400-A TFD4400-A EMD4403RI-S32 EGD4400
	**SDEN42ZTN20** (SDEN1203AETN-20)	E	With	●	
	**SDKR42ZSR-MJ** (SDKR1203AESR-MJ)	K	With	●	
	**SDKN53ZTN16** (SDKN1504AETN)	K	With	●	TMD5400I
	**SDKR53ZSR-MJ** (SDKR1504AESR-MJ)	K	With	●	
	**SDEN53ZTN20** (SDEN1504AETN-20)	E	With	●	
	**SDKN42EFTR** (SDKN1203EFTR)	K	With	●	TMD4100I
	**SDMT1204AFPN-MJ** (SDMT1204AFPN-MJ)	M	With	●	EAD12 TAD12
	**SDMT1204PDSR-MJ** (SDMT1204PDSR-MJ)	M	With	●	EPD12 TPD12
	**SEKN1203AGTN** (SEKN42ZTN)	K	With	●	EME4400 TME4400

Shape and dimensions	Cat. No. (ISO based, Metric)	Accuracy	Honing	Grade T3130	Applicable TAC mills
	**SEKR1203AGSR-MJ** (SEKR1203AGSR-MJ)	K	With	●	EME4400 TME4400
	**SEKN1203AGTN-T** (SEKN42AGTN-T)	K	With	●	
	**SEEN1203AGTN-T** (SEEN42ZTN-T)	E	With	●	
	**SEEN1203AGTNCR** (SEEN42ZTNCR)	E	With	●	
	**SEKN1504AGTN** (SEKN53ZTN)	K	With	●	TME5400I
	**SEKR1504AGSR-MJ** (SEKR1504AGSR-MJ)	K	With	●	
	**SEKN1504AGTN-T** (SEKN53ZTN-T)	K	With	●	
	**SEKR42AFSR-MJ** (SEKR1203AFSR-MJ)	K	With	●	TGE4400I (Old product) EGE4400 (Old product)
	**SEKN42AFTN16** (SEKN1203AFTN-16)	K	With	●	
	**SEKN42EFTR** (SEKN1203EFTR)	K	With	●	EGE4100 (Old product)
	**SEKR1504AFSR-MJ** (SEKR1504AFSR-MJ)	K	With	●	
	**SNKN43ZTN** (SNKN1204NZTN)	K	With	●	TGN4200-A
	**SNMN120412TN** (SNMN120412TN)	M	With	●	TGN4200-A QGN4400
	**SPEN423TN** (SPEN120312TN)	E	With	●	TGP4100I TGP4200-A

● : Stocked in Japan

Shape and dimensions	Cat. No. (ISO based, Metric)	Accuracy	Honing	Grade T3130	Applicable TAC mills
	**SPKN42STR** (SPKN1203EDTR)	K	With	●	TGP4100
	**SPKR42SSR-MJ** (SPKR1203EDSR-MJ)	K	With	●	
	**SPKN42ZTR** (SPKN1203ZPTR)	K	With	●	TGP4200-A
	**SPKR53SSR-MJ** (SPKR1504EDSR-MJ)	K	With	●	TGP5100IA
	**SPKN53STR20** (SPKN1504EDTR-20)	K	With	●	
	**SPMR1605PPTR-MH** (SPMR1605PPTR-MH)	M	With	●	TPP16
	**SPMR1605PPTR-MJ** (SPMR1605PPTR-MJ)	M	With	●	
	**SWMT1304PDPR-MJ** (SWMT1304PDPR-MJ)	M	With	●	EPW13 TPW13
	**SWMT13T3AFPR-HJ** (SWMT13T3AFPR-HJ)	M	With	●	EAW13 TAW13
	**SWMT13T3AFPR-MJ** (SWMT13T3AFPR-MJ)	M	With	●	
	**SWMW13T3AFTR** (SWMW13T3AFTR)	M	With	●	
	**TEEN32ZTR** (TEEN1603PETR)	E	With	●	ESE3000 TSE3000IA
	**TEEN43ZTR** (TEEN2204PETR)	E	With	●	ESE4000A TSE4000IA
	**TPEN43ZTRCR** (TPEN2204PPTRCR)	E	With	●	TSP4000IA TFP4000IA

Shape and dimensions	Cat. No. (ISO based, Metric)	Accuracy	Honing	Grade T3130	Applicable TAC mills
	**TPKN43ZTR** (TPKN2204PPTR)	K	With	●	TSP4000IA TFP4000IA
	**TPKR43ZSR-MJ** (TPKR2204PDSR-MJ)	K	With	●	
	**TPMR2204PDSR-MJ** (TPMR2204PDSR-MJ)	M	With	●	
	**WPMT05H315ZPR-ML** (WPMT05H315ZPR-ML)	M	With	●	EXP05
	**WPMW05H315ZPR** (WPMW05H315ZPR)	M	With	●	
	**WPMT06X415ZPR-ML** (WPMT06X415ZPR-ML)	M	With	●	EXP06 TXP06
	**WPMW06X415ZPR** (WPMW06X415ZPR)	M	With	●	
	**WPMT080615ZPR-ML** (WPMT080615ZPR-ML)	M	With	●	EXP08 TXP08
	**WPMT080615ZSR** **(WPMT080615ZSR)**	M	With	●	
	**WPMT090725ZPR-ML** (WPMT090725ZPR-ML)	M	With	●	EXP09 TXP09
	**WPMT090725ZSR** (WPMT090725ZSR)	M	With	●	

● : Stocked in Japan

Standard cutting conditoins

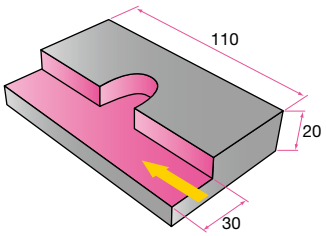
Work material	Typical JIS material symbols	Hardness	Cutting speed v_c (m/min)
Mild steels Low-carbon steels	S10C	110 ~ 180HB	150 - 300
	S15C		
	S25C		
	SS400		
Medium-carbon steel (≦0.5%C)	S35C	150 ~ 280HB	150 - 280
	S45C		
	S50C		
High-carbon steels (>0.5%C) Alloy steels	S55C	180 ~ 350HB	150 - 250
	S58C		
	SCM440		
	SCr440		
Alloy steels Pre-hardened steels	SNCM447	~ 40HRC	100 - 200
	NAK80		
Alloy tool steels	SKD11	~ 280HB	100 - 180
	SKD61		
	SKT		
	SKS		

Practical Examples

Inserts: ASMT170508PDPR-MJ (T3130)
Tool: EPS17032RSB (3 teeth)

Work material: Medium carbon steel (JIS S50C)
Cutting speed: v_c =160 m/min
Depth of cut: a_p =5 mm×3 passes
Feed per tooth: f_z =0.1 mm/t
Cutting fluid: Dry cutting

Current tool
Cutter body: Competitor's square shoulder cutter (3 teeth)
Inserts: PVD coated
Work material: Medium carbon steel (JIS S50C)
Cutting speed: v_c =120 m/min
Depth of cut: a_p =4 mm×4 passes
Feed per tooth: f_z =0.08 mm/t



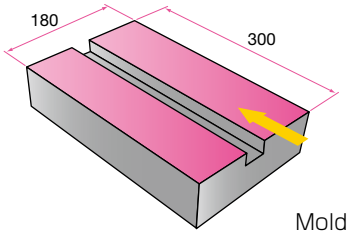
Spacer

Results: The previously used tool machined 5 pcs at most, and its machining was unstable due to the insert breakage. T3130 could consistently machine 7 pcs, which was 1.4 times that of previous tool. Productivity was also dramatically increased to 1.7 times.

Inserts: SDEN42ZTN20 (T3130)
Tool: TMD4408RI (10 teeth)

Work material: Mild steel (JIS SS400)
Cutting speed: v_c =179 m/min
Depth of cut: a_p =1 mm
Feed per tooth: f_z =0.14 mm/t
Cutting fluid: Dry cutting

Current tool
Cutter body: TMD4408RI (10 teeth)
Inserts: Conventional type (CVD coated)
Work material: Mild steel (JIS SS400)
Cutting speed: v_c =179 m/min
Depth of cut: a_p =1 mm
Feed per tooth: f_z =0.14 mm/t



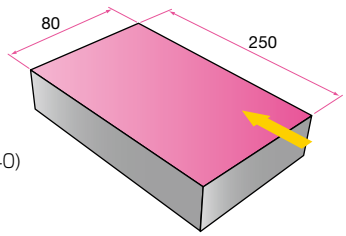
Mold plate

Results: Due to interrupted cutting, conventional type showed unexpected breakage and therefore varied in tool life. T3130 grade, making it possible to stabilize machining, could minimize the insert failure and increase machinable number of workpieces.

Inserts: WPMT080615ZPR-ML (T3130)
Tool: TXP08050R (3 teeth)

Work material: Chromium molybdenum steel (JIS SCM440)
Cutting speed: v_c =260 m/min
Depth of cut: a_p =1 mm×2 passes
Feed per tooth: f_z =1.42 mm/t
Cutting fluid: Dry cutting

Current tool
Cutter body: Competitor's cutter (3 teeth)
Inserts: PVD coated
Work material: Chromium molybdenum steel (JIS SCM440)
Cutting speed: v_c =260 m/min
Depth of cut: a_p =1 mm×2 passes
Feed per tooth: f_z =1.42 mm/t



Plate

Results: With competitor's cutter, only 20 pcs per cutting edge were machined. T3130 was able to machine 35 pcs per cutting edge, which was 1.7 times that of competitor's tool.

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