

MillLine



DOPENT

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Tungaloy Report No. 372S1-G

New grades and **cutters** for improved productivity machining large components of various materials

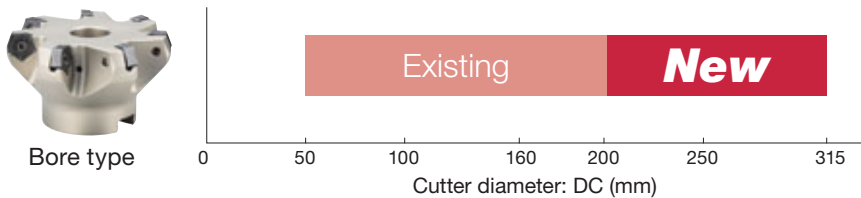


INDUSTRY 4.0
FEED the SPEED!



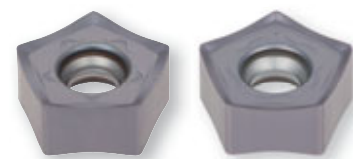
Addition of cutters with large diameters improves machining efficiency of large components

DoPent's new cutters with 200, 250, and 315 mm diameters are also available in variable-pitch design for reduced chatter and vibration during machining.

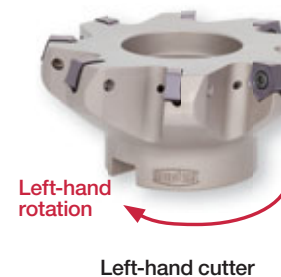


A combination of new grades and neutral cutting edges boosts productivity in a wider application range

- For steel: **AH3225** PVD grade offers a good combination of wear and fracture resistance. **NS740** cermet grade is an excellent option for finishing steel.
- For hardened materials: **AH8015** PVD grade exhibits a good balance between wear and fracture resistance.



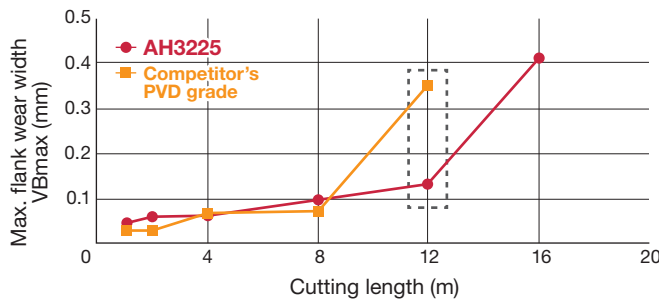
Since neutral inserts can be mounted on either the left- or right-hand cutter, DoPent is an ideal solution for duplex milling applications where the workpiece is machined with two spindles simultaneously.



CUTTING PERFORMANCE

AH3225 **P**

- Excellent resistance to wear, fracture, and oxidation
- First choice grade for steel machining with the latest nano-multilayer coating technology combined with a dedicated carbide substrate



Cutter : TEN09R063M22.0-04 (ø63 mm, z = 1)
 Insert : PNMU0905GNEN-MJ AH3225
 Workpiece material : S55C / C55 (200HB)
 Cutting speed : Vc = 200 m/min
 Feed per tooth : fz = 0.2 mm/t
 Depth of cut : ap = 2 mm
 Depth of width : ae = 50 mm
 Coolant : Dry

After 12 m



Competitor's PVD grade

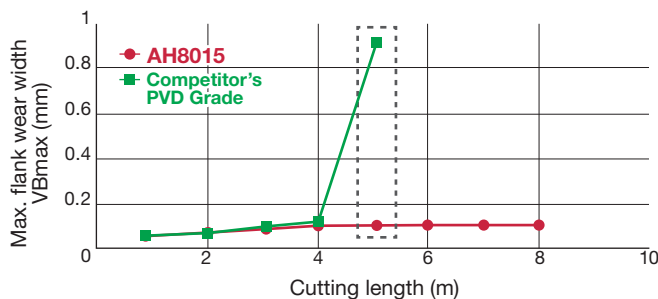


AH3225

Reduced crater wear

AH8015 **H K**

- Extremely hard coating and carbide substrate
- First choice grade for hardened materials with superior resistance to wear, thermal shock, and welding



Cutter : TEN09R063M22.0-04 (ø63 mm, z = 1)
 Insert : PNMU0905GNEN-MJ AH8015
 Workpiece material : SKD61 / X40CrMoV5-1 (52HRC)
 Cutting speed : Vc = 100 m/min
 Feed per tooth : fz = 0.1 mm/t
 Depth of cut : ap = 0.5 mm
 Depth of width : ae = 30 mm
 Coolant : Dry

After 5 m



Competitor's PVD grade



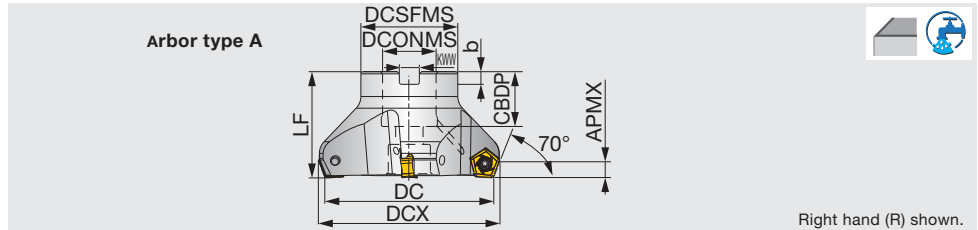
AH8015

... and still could have continued

TEN09R/L

70° face mill, with screw clamp system, for double sided pentagonal inserts

GAMP=-6°, GAMF=-10°~-2°

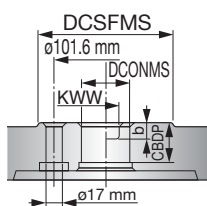


Designation	APMX	DC	CICT	DCX	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert	Arbor type
TEN09R050M22.0-03	6.4	50	3	56	41	40	22	20	10	6	0.3	With	PN*U0905...	A
TEN09R050M22.0-04	6.4	50	4	56	41	40	22	20	10	6	0.3	With	PN*U0905...	A
TEN09R050M22.0-06	6.4	50	6	56	41	40	22	20	10	6	0.3	With	PN*U0905...	A
TEN09R050M22.0E04	6.4	50	4	56	41	40	22	20	10.4	6.3	0.3	With	PN*U0905...	A
TEN09R050M22.0E06	6.4	50	6	56	41	40	22	20	10.4	6.3	0.3	With	PN*U0905...	A
TEN09R063M22.0-04	6.4	63	4	69	41	40	22	20	10	6	0.5	With	PN*U0905...	A
TEN09R063M22.0-06	6.4	63	6	69	41	40	22	20	10	6	0.5	With	PN*U0905...	A
TEN09R063M22.0-08	6.4	63	8	69	41	40	22	20	10	6	0.5	With	PN*U0905...	A
TEN09R063M22.0E06	6.4	63	6	69	41	40	22	20	10.4	6.3	0.5	With	PN*U0905...	A
TEN09R063M22.0E08	6.4	63	8	69	41	40	22	20	10.4	6.3	0.5	With	PN*U0905...	A
TEN09R080M25.4-04	6.4	80	4	86	46	50	25.4	26	9.5	6	0.9	With	PN*U0905...	A
TEN09R080M25.4-07	6.4	80	7	86	46	50	25.4	26	9.5	6	0.9	With	PN*U0905...	A
TEN09R080M25.4-10	6.4	80	10	86	46	50	25.4	26	9.5	6	0.9	With	PN*U0905...	A
TEN09R080M27.0E07	6.4	80	7	86	50	50	27	22	12.4	7	0.9	With	PN*U0905...	A
TEN09R080M27.0E10	6.4	80	10	86	50	50	27	22	12.4	7	1	With	PN*U0905...	A
TEN09R100M31.7-05	6.4	100	5	106	60	50	31.75	32	12.7	8	1.3	With	PN*U0905...	A
TEN09R/L100M31.7-08*	6.4	100	8	106	60	50	31.75	32	12.7	8	1.3	With	PN*U0905...	A
TEN09R100M31.7-12	6.4	100	12	106	60	50	31.75	32	12.7	8	1.4	With	PN*U0905...	A
TEN09R/L100M32.0E08*	6.4	100	8	106	60	50	32	28.5	14.4	8	1.3	With	PN*U0905...	A
TEN09R100M32.0E12	6.4	100	12	106	60	50	32	28.5	14.4	8	1.4	With	PN*U0905...	A
TEN09R125M38.1-06	6.4	125	6	131	80	63	38.1	38	15.9	10	2.6	With	PN*U0905...	A
TEN09R/L125M38.1-10*	6.4	125	10	131	80	63	38.1	38	15.9	10	2.7	With	PN*U0905...	A
TEN09R125M38.1-16	6.4	125	16	131	80	63	38.1	43	15.9	10	2.9	With	PN*U0905...	A
TEN09R/L125M40.0E10*	6.4	125	10	131	71	63	40	32	16.4	9	2.3	With	PN*U0905...	A
TEN09R125M40.0E16	6.4	125	16	131	71	63	40	32	16.4	9	2.5	With	PN*U0905...	A
TEN09R160M50.8-07	6.4	160	7	166	100	63	50.8	46	19	11	4.4	Without	PN*U0905...	A
TEN09R/L160M40.0E12*	6.4	160	12	166	100	63	40	29	16.4	9	4	Without	PN*U0905...	A
TEN09R160M40.0E20	6.4	160	20	166	100	63	40	29	16.4	9	4.3	Without	PN*U0905...	A
TEN09R/L160M50.8-12*	6.4	160	12	166	100	63	50.8	46	19	11	4.6	Without	PN*U0905...	A
TEN09R160M50.8-20	6.4	160	20	166	100	63	50.8	46	19	11	4.9	Without	PN*U0905...	A
New TEN09R200M47.6-10	6.4	200	10	206	130	63	47.625	38	25.4	14	6.5	Without	PN*U0905...	B
New TEN09R200M60.0E14	6.4	200	14	206	130	63	60	38	25.7	14	6.34	Without	PN*U0905...	B
New TEN09R250M47.6-12	6.4	250	12	256	130	63	47.625	38	25.4	14	12.94	Without	PN*U0905...	B
New TEN09R250M60.0E16	6.4	250	16	256	130	63	60	38	25.7	14	13.46	Without	PN*U0905...	B
New TEN09R315M47.6-14	6.4	315	14	321	220	63	47.625	38	25.4	14	17.9	Without	PN*U0905...	C

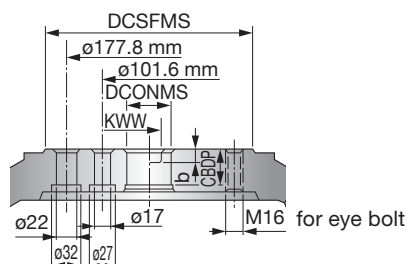
*Please use neutral hand inserts for TEN09L (left hand cutter).

Arbor type

Arbor type B



Arbor type C



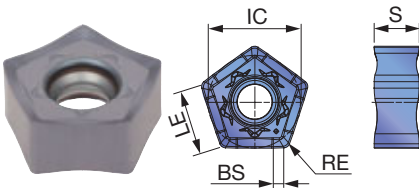
SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Shell locking bolt 1	Shell locking bolt 2	Torx bit
TEN09R050 - 063...	CSTR-4L100	H-TBS	M-1000	-	CM10X30H	BT15S
TEN09R080...	CSTR-4L100	H-TBS	M-1000	-	CM12X30H	BT15S
TEN09R/L100...	CSTR-4L100	H-TBS	M-1000	TMBA-M16H	-	BT15S
TEN09R125...06	CSTR-4L100	H-TBS	M-1000	TMBA-M20H	-	BT15M
TEN09R/L125M...10	CSTR-4L100	H-TBS	M-1000	TMBA-M20H	-	BT15M
TEN09R125M...16	CSTR-4L100	H-TBS	M-1000	TMBA-M20H	-	BT15S
TEN09R160M...07	CSTR-4L100	H-TBS	M-1000	-	-	BT15M
TEN09R/L160M...12	CSTR-4L100	H-TBS	M-1000	-	-	BT15M
TEN09R160M...20	CSTR-4L100	H-TBS	M-1000	-	-	BT15S
TEN09R200M...	CSTR-4L100	H-TBS	M-1000	-	-	BT15M
TEN09R250M...	CSTR-4L100	H-TBS	M-1000	-	-	BT15M
TEN09R315M...	CSTR-4L100	H-TBS	M-1000	-	-	BT15L

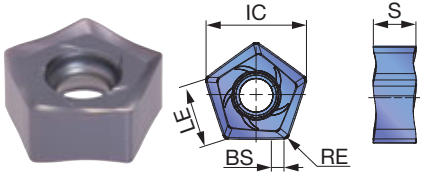
*Recommended clamping torque (N·m): CSTR-4L100=3.5

INSERTS

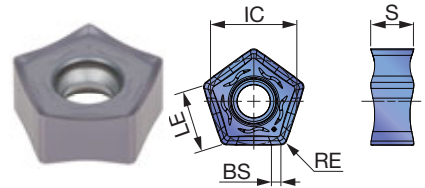
PN*U0905GNEN-MJ (Neutral)



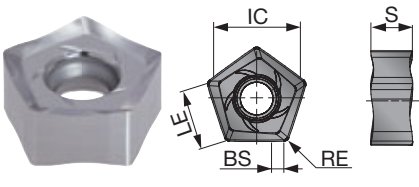
PNCU0905GNER-MJ (Right hand)



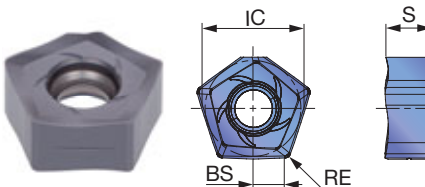
PNCU0905-ML (Neutral)



PNCU0905-AJ (Right hand)



PNCU0905-W (Right hand)



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated										Cermet	Uncoated	LE	S	IC	BS		
			AH3225	AH8015	AH3135	AH120	AH140	AH725	T1215	T1115	T3225	T3130							NS740	TH10
PNMU0905GNEN-MJ	0.8	6.4	●	●	●	●		●	●	●	●	●	●							
PNCU0905GNEN-MJ	0.8	6.4	●	●	●	●		●	●	●	●	●	●							
PNCU0905GNER-MJ	0.8	6.4				●	●	●		●	●	●	●							
PNCU0905GNEN-ML	0.8	6.4	●	●	●															
PNCU0905GNFR-AJ	0.8	6.4												●						
PNCU0905GNER-W	0.8	2						●												

● : New

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness HB	Selection criteria	Recommended grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steels S15C, C15E4, etc. C15, etc.	200 - 300 HB	First choice	AH3225	MJ	100 - 250	0.1 - 0.4
		200 - 300 HB	Low cutting force	AH3225	ML	100 - 250	0.1 - 0.3
		200 - 300 HB	Wear resistance	T3225	MJ	200 - 350	0.1 - 0.3
		200 - 300 HB	Surface quality	NS740	MJ	100 - 250	0.1 - 0.3
	High carbon steels, alloyed steels S45C, SCM440, etc. C45, 42CrMo4, etc.	150 - 300 HB	First choice	AH3225	MJ	100 - 250	0.1 - 0.35
		150 - 300 HB	Low cutting force	AH3225	ML	100 - 250	0.1 - 0.3
		150 - 300 HB	Wear resistance	T3225	MJ	180 - 300	0.1 - 0.3
		150 - 300 HB	Surface quality	NS740	MJ	100 - 250	0.1 - 0.3
	Prehardened steels NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3225	MJ	100 - 200	0.1 - 0.3
		30 - 40 HRC	Low cutting force	AH3225	ML	100 - 200	0.1 - 0.25
30 - 40 HRC		Wear resistance	T3225	MJ	150 - 250	0.1 - 0.25	
M	Stainless steels SUS304, etc. X5CrNi18-9, etc.	- 200 HB	First choice	AH3135	ML	100 - 200	0.1 - 0.3
		- 200 HB	Fracture resistance	AH3135	MJ	100 - 200	0.1 - 0.35
		- 200 HB	Wear resistance	T3225	MJ	100 - 250	0.1 - 0.3
K	Grey cast irons FCD400, etc. 250, etc.	150 - 250 HB	First choice	T1215	MJ	100 - 300	0.1 - 0.35
		150 - 250 HB	Fracture resistance	AH120	MJ	100 - 250	0.1 - 0.4
	Ductile cast irons FCD400, etc. 400-15S, etc.	150 - 250 HB	First choice	T1215	MJ	100 - 300	0.1 - 0.35
		150 - 250 HB	Fracture resistance	AH120	MJ	80 - 200	0.1 - 0.4
N	Aluminium alloys Si < 13%	-	First choice	TH10	AJ	500 - 1500	0.1 - 0.5
	Aluminium alloys Si ≥ 13%	-	First choice	TH10	AJ	150 - 500	0.1 - 0.5
S	Titanium alloys Ti-6Al-4V, etc.	- 40 HRC	First choice	AH3135	ML	30 - 60	0.1 - 0.3
		- 40 HRC	Fracture resistance	AH3135	MJ	30 - 60	0.1 - 0.3
	Heat-resistant alloys Inconel 718, etc.	- 40 HRC	First choice	AH725	MJ	10 - 40	0.04 - 0.1
H	Hardened materials SKD61, X40CrMoV5-1, etc.	- 45 HRC	First choice	AH8015	MJ	80 - 150	0.05 - 0.15
		- 45 HRC	Low cutting force	AH8015	ML	80 - 150	0.05 - 0.15

- Remove excessive chips with an air blast to prevent chip jamming.
- Use water-soluble coolant to avoid built-up edge in case extreme welding occurs on cutting edges. (ex. aluminium machining).
- For operations with a varied depth of cut (ex. casting skin) and machining of workpiece materials with interrupted surface, the feed (fz) should be set to the lower recommended value shown in the above table.

- Cutting conditions may be limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

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