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THE EXPERTS OF DIFFICULT MACHINING

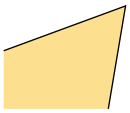
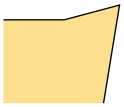
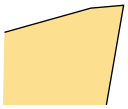
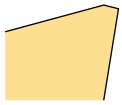
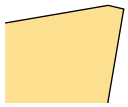
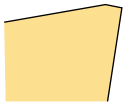
Milling Inserts

Geometry Application Guide

Materials				Milling geometry application table						
				FM2	MM3	MM4	MR2	MR6	RR2	HR2
ISO	Material classification	Tensile strength (N/mm^2)	Hardness (HB)	Suitable for machining aluminium alloy	Light cutting	General purpose	Medium machining	Roughing	Heavy roughing	Roughing
P	Unalloyed steel	<600	<180	-	◐	●	●	●	-	-
		<950	<280	-	◐	●	●	●	-	-
	Alloyed steel	700-950	200-280	-	◐	●	●	●	-	-
		950-1200	280-355	-	◐	●	●	●	-	-
		1200-1400	355-415	-	◐	●	●	●	-	-
M	Duplex stainless steel	778	230	-	◐	●	◐	-	-	-
	Austenitic stainless steel	675	200	-	◐	●	◐	-	-	-
	Precipitation-hardening stainless steel	1013	300	-	◐	●	◐	-	-	-
K	Grey cast iron	700	220	-	-	◐	●	●	●	●
	Nodular cast iron	880	260	-	-	◐	●	●	●	●
	Malleable cast iron	800	250	-	-	◐	●	●	●	●
N	Aluminum	260	75	●	-	-	-	-	-	-
	Aluminum alloy	447	130	●	-	-	-	-	-	-
S	Fe-based alloy	943	280	-	●	◐	◐	-	-	-
	Co-based alloy	1076	320	-	●	◐	◐	-	-	-
	Ni-based alloy	1177	350	-	●	◐	◐	-	-	-
	Ti-alloy	1262	370	-	●	◐	◐	-	-	-
H	Hardened steel	-	50-60HRC	-	-	◐	●	-	-	-
	Chilled cast iron	-	55HRC	-	-	◐	●	-	-	-

● 1st choice
◐ 2nd choice
- Inapplicable

Milling Geometry Introduction

Insert geometry	Edge shape	Application
FM2		▪ Low cutting force, for weak machining condition ▪ Sharp geometry ▪ For aluminium material machining
MM3		▪ Low cutting force, for weak machining condition ▪ Sharp geometry ▪ For steel, stainless-steel and heat resistant alloy machining.
MM4		▪ For medium machining condition ▪ Universal geometry ▪ For machining most materials
MR2		▪ For medium or better machining condition ▪ Universal geometry ▪ For machining most materials
MR6		▪ For stable machining condition ▪ Roughing geometry ▪ For machining most materials
HR2		▪ For stable machining condition ▪ Roughing geometry ▪ Mainly for cast iron machining
RR2		▪ For stable machining condition ▪ Heavy roughing geometry ▪ Mainly for cast iron and steel machining
IT		▪ Sharp geometry, for specified product
DT		▪ Universal geometry, for specified product

Grade Application Guide

Milling grade ISO group														
Material Group	Materials	ISO	coated											ISO
			PVD	PVD	PVD	PVD	PVD	PVD	PVD	PVD	CVD	CVD	Uncoated	
P	unalloy steels / Alloyed steels	P01												P01
		P05												P05
		P10												P10
		P15	AP251U											P15
		P20												P20
		P25									AC301P			P25
		P30		AP351U										P30
		P35			AP351M									P35
		P40												P40
		P45												P45
		P50												P50
M	Stainless steels	M01												M01
		M05												M05
		M10												M10
		M15	AP251U											M15
		M20												M20
		M25												M25
		M30			AP351M									M30
		M35					AP403S	AP403M						M35
		M40												M40
		M45												M45
		M50												M50
K	Cast iron	K01												K01
		K05												K05
		K10		AP151H							AC301K			K10
		K15	AP251K											K15
		K20												K20
		K25												K25
		K30												K30
		K35												K35
		K40												K40
		K45												K45
		K50												K50
N	Aluminum/ Aluminum alloys	N01												N01
		N05												N05
		N10											AW100K	N10
		N15												N15
		N20												N20
		N25												N25
		N30												N30
S	Heat resistant alloys	S01												S01
		S05												S05
		S10												S10
		S15												S15
		S20												S20
		S25		AP351M										S25
		S30												S30
		S35			AP403S	AP403M								S35
		S40												S40
		S45												S45
		S50												S50
H	Hardened steels/ Chilled cast iron	H01												H01
		H05												H05
		H10	AP151H											H10
		H15												H15
		H20												H20
		H25												H25
		H30												H30

Grade Application Guide

Materials				Milling grade application										
				PVD coated						CVD coated		PVD coated		Uncoated
ISO	Material classification	Tensile strength (N/mm^2)	Hardness (HB)	AP251U	AP351U	AP351M	AP401U	AP403S	AP403M	AC301P	AC301K	AP251K	AP151H	AW100K
P	Unalloyed steel	<600	<180	●	●	●	◐		●	●	◐	-	-	-
		<950	<280	●	●	●	◐		●	●	◐	-	-	-
	Alloyed steel	700-950	200-280	●	●	●	◐		●	●	◐	-	-	-
		950-1200	280-355	●	●	●	◐		●	●	◐	-	-	-
		1200-1400	355-415	●	●	●	◐		●	●	◐	-	-	-
M	Duplex stainless steel	778	230	◐	●	●	●	●	●	◐	-	-	-	-
	Austenitic stainless steel	675	200	◐	●	●	●	●	●	◐	-	-	-	-
	Precipitation-hardening stainless steel	1013	300	◐	●	●	●	●	●	◐	-	-	-	-
K	Grey cast iron	700	220	-	-	-	-	-	-	-	●	●	●	-
	Nodular cast iron	880	260	-	-	-	-	-	-	-	●	●	●	-
	Malleable cast iron	800	250	-	-	-	-	-	-	-	●	●	●	-
N	Aluminum	260	75	-	-		-			-	-	-	-	●
	Aluminum alloy	447	130	-	-		-			-	-	-	-	●
S	Fe-based alloy	943	280	-	◐	●	◐	●	●	-	-	-	-	-
	Co-based alloy	1076	320	-	◐	●	◐	●	●	-	-	-	-	-
	Ni-based alloy	1177	350	-	◐	●	◐	●	●	-	-	-	-	-
	Ti-alloy	1262	370	-	◐	●	◐	●	●	-	-	-	-	◐
H	Hardened steel	-	50-60HRC	-	-		-			-	-	-	●	-
	Chilled cast iron	-	55HRC	-	-		-			-	-	-	●	-

● 1st choice
◐ 2nd choice
- Inapplicable

Milling Grade Description

Grade for Normal Milling

P Steel, alloyed steel, unalloyed steel

Basic grade

AP251U P25(P15-P35)

PVD-coated grade, suitable for most applications. First choice for steel machining. It is recommended to be used in rough to finish machining of steel under stable working conditions, good for dry and wet machining with small cutting width, complex tool path and sticky materials.

AC301P P35(P25-P40)

CVD coated grade is suitable for big cutting depth, medium to high speed milling of steel under bad machining conditions.

Supplemental grade

AP351M P35(P25-P45)

PVD coated grade, medium hardness substrate, which is a supplement for AP251U in steel milling when high toughness is required.

AP351U P35(P30-P45)

PVD coated grade, medium hardness substrate, which is a supplement for AP251U in steel milling when high-toughness is required.

M Stainless steel, austenite stainless steel, martensite stainless steel

Basic grade

AP351M M35(M25-M45)

PVD coated grade is used for milling stainless steel and steel at medium and low speed under bad machining conditions.

AP403M M35(M35-M50)

Ultra-thick PVD coated grade is the first choice for stainless steel milling. It is suitable for rough milling of stainless steel under bad machining conditions.

Supplemental grade

AP251U M25(M15-M35)

PVD coated grade is used in rough and finish milling of stainless steel under very stable machining conditions.

AP403S M15(M35-M50)

PVD coated grade, the substrate has both toughness and hot hardness characteristics, and is the first choice for titanium alloy machining, as well as the machining of heat resistant alloy under weak rigidity. It is applicable to the milling at low cutting speed and can get longer tool life.

AP351U M35(M30-M45)

PVD coated grade, medium hardness substrate, which is a supplement for AP251U in steel milling when high-toughness is requested. On the way to phase out.

K Cast iron, grey cast iron, nodular cast iron

Basic grade

AC301K K25(K10-K35)

CVD coated grade, suitable for semi-finish milling and rough milling of grey cast iron at medium and high cutting speed, Recommended for dry cutting conditions, can achieve longer tool life.

AP251K K25(K15-K40)

PVD coated grade is suitable for semi-finish and rough milling of grey cast iron and nodular cast iron at medium and low cutting speed, and has good tool life under dry and wet conditions.

Supplemental grade

AP151H K15(K10-K20)

PVD coated grade is suitable for finish milling of grey cast iron and nodular cast iron, which can get constant surface quality and longer tool life.

N Non-ferrous metals

Basic grade

AW100K N15 (N10-N20)

Uncoated grade, combined with sharp cutting edge, used in aluminum alloy milling.

S Heat resistant alloy

Basic grade

AP403S S15(S35-S50)

PVD coated grade, the substrate has both toughness and red hardness characteristics, and is the first choice for titanium alloy machining, as well as the machining of heat resistant alloy under weak rigidity. It is applicable to the milling at low cutting speed and can get longer tool life.

Supplemental grade

AP351M S35(S25-S45)

PVD coated grade is suitable for semi-finishing to light rough machining of heat resistant alloy and titanium alloys.

AP403M S35(S35-S50)

The super-thick PVD coated grade is suitable for low-speed milling of heat resistant alloy and titanium alloys when high toughness is requested, especially in case of large cutting width.

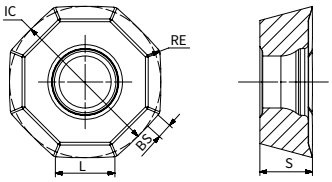
H Hard material, hardened steel

Basic grade

AP151H H15(H10-H20)

PVD coated grade, suitable for milling hardened steel, can be used in rough and finish milling, meeting the needs of most occasions.

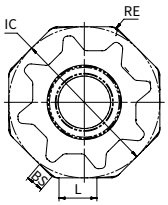
OD..06
Positive octagonal milling inserts

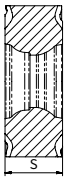


Inserts	Product code	Machining conditions					● Good condition ◐ General condition ✱ Bad condition						
							●	◐	◐	✱	●	●	●
		Dimension (in)					P			M	K		N
		L	IC	S	RE	BS	AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**ODET 0605APFN-FM2**	0.236	0.630	0.219	0.031	0.063							●
	**ODMT 060508EN-MM3**	0.236	0.630	0.219	0.031	-	●	●	●		●	●	
	ODMT 060512EN-MM3	0.236	0.630	0.219	0.047	-	●						
	ODHT 0605APEN-MM3	0.236	0.630	0.219	0.031	0.063	●	●			●	●	
	**ODEW 0605APSR-HR2**	0.236	0.630	0.219	-	0.063					●	●	
	ODMW 060512EN-HR2	0.236	0.630	0.219	0.047	-					●	●	

●: Stock available

ON..05
Negative octagonal milling inserts



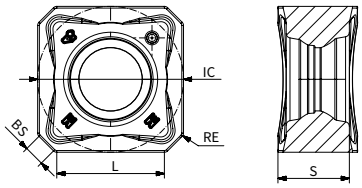


Inserts	Product code	Machining conditions: ● Good condition, ⬌ General condition, ✱ Bad condition												
							●	⬌	⬌	✱	●	●	●
		Dimension (in)					P			M	K		N
		L	IC	S	RE	BS	AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**ONHU 050408-MM3**	0.157	0.500	0.187	0.031	-	●						
	ONMU 050408-MM4	0.157	0.500	0.187	0.031	-	●	●			●	●	
	**ONHU 0504ZNR-MM3**	0.157	0.500	0.187	0.031	0.055	●						

●: Stock available

SN..12

Negative short wiper milling inserts(applicable to AFM45-SN12 milling cutter)

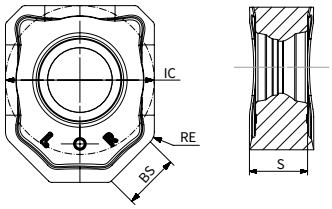


Inserts	Product code	Machining conditions					● Good condition ⬤ General condition ✱ Bad condition						
							●	⬤	⬤	✱	●	●	●
		Dimension (in)					P			M	K		N
		L	IC	S	RE	BS	AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**SNHX 1206ANN-FM2**	0.366	0.500	0.246	0.020	0.071							●
	SNGX 1206ANN-MM3	0.370	0.500	0.246	0.016	0.071	●	●	●		●	●	
	SNGX 1206ANN-MM4	0.370	0.500	0.246	0.016	0.071	●	●	●	●	●	●	
	SNGX 1206ANN-MR6	0.370	0.500	0.246	0.016	0.071	●	●	●		●	●	
	SNGX 1206ANN-RR2	0.366	0.500	0.246	0.020	0.071	●	●	●		●	●	
	SNMX 1206ANN-MM3	0.370	0.500	0.246	0.016	0.071	●	●	●		●	●	
	SNMX 1206ANN-MM4	0.370	0.500	0.246	0.016	0.071	●	●	●	●	●	●	
	SNMX 1206ANN-MR6	0.370	0.500	0.246	0.016	0.071	●	●	●		●	●	

●: Stock available

SNHX12

Negative long wiper milling inserts(applicable to AFM45-SN12 milling cutter)

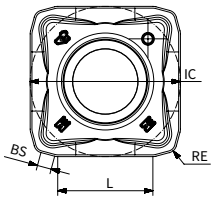


Inserts	Product code	Machining conditions					● Good condition ⬤ General condition ✱ Bad condition						
							●	⬤	⬤	✱	●	●	●
		Dimension (in)					P			M	K		N
		L	IC	S	RE	BS	AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**SNHX 1206ANN-W**	-	0.500	0.246	0.047	0.263	●				●		

●: Stock available

SN..12

Negative short wiper milling inserts (applicable to AFM75-SN12 milling cutter)

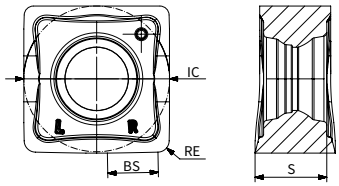


Inserts	Product code	Dimension (in)					Machining conditions: ● Good condition, ⬌ General condition, ✱ Bad condition						
							●	⬌	⬌	✱	●	●	●
							P			M	K		N
		L	IC	S	RE	BS	AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**SNGX 1206ENN-MM3**	0.319	0.500	0.250	0.032	0.047	●	●	●		●	●	
	SNGX 1206ENN-MM4	0.319	0.500	0.250	0.032	0.047	●	●	●		●	●	
	SNGX 1206ENN-MR6	0.319	0.500	0.250	0.032	0.047	●	●	●		●	●	
	SNMX 1206ENN-MM4	0.319	0.500	0.250	0.032	0.047			●			●	

●: Stock available

SNHX12

Negative long wiper milling inserts (applicable to AFM75-SN12 milling cutter)

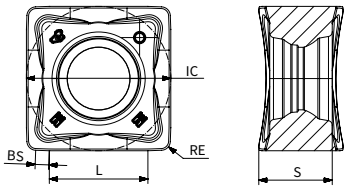


Inserts	Product code	Dimension (in)					Machining conditions: ● Good condition, ⬌ General condition, ✱ Bad condition						
							●	⬌	⬌	✱	●	●	●
							P			M	K		N
		L	IC	S	RE	BS	AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**SNHX 1206ENN-W**	-	0.500	0.246	0.024	0.047	●				●		

●: Stock available

SN..12

Negative short wiper milling inserts (applicable to AFM88-SN12 milling cutter)

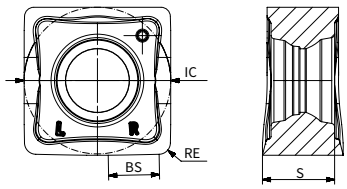


Inserts	Product code	Machining conditions: Dimension (in) L	IC	S	RE	BS	● Good condition ⊕ General condition ✱ Bad condition: P AP251U	P AP351U	P AC301P	M AP403M	K AC301K	K AP251K	N AW100K
	**SNHX 1206ZNN-FM2**	0.343	0.500	0.254	0.031	0.047							●
	SNGX 1206ZNN-MM4	0.343	0.500	0.254	0.031	0.047	●	●	●	●	●	●	
	SNGX 1206ZNN-MR6	0.343	0.500	0.254	0.031	0.047	●	●	●		●	●	
	SNGX 1206ZNN-MM3	0.343	0.500	0.254	0.031	0.047	●	●	●		●	●	
	SNMX 1206ZNN-MM4	0.343	0.500	0.254	0.031	0.047	●			●		●	

●: Stock available

SNHX12

Negative long wiper milling inserts (applicable to AFM88-SN12 milling cutter)

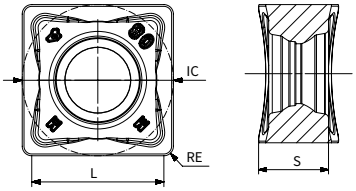


Inserts	Product code	Machining conditions: Dimension (in) L	IC	S	RE	BS	● Good condition ⊕ General condition ✱ Bad condition: P AP251U	P AP351U	P AC301P	M AP403M	K AC301K	K AP251K	N AW100K
	**SNHX 1206ZNN-W**	-	0.500	0.246	0.039	0.173	●				●		

●: Stock available

SN..12

Negative square milling inserts with corner radius

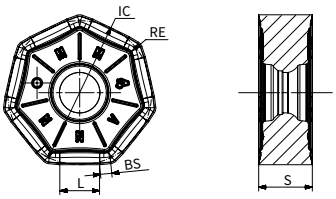


Inserts	Product code	Machining conditions					● Good condition ⬌ General condition ✱ Bad condition						
							●	⬌	⬌	✱	●	●	●
		Dimension (in)					P			M	K		N
		L	IC	S	RE	BS	AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**SNGX 120608-MM4**	0.437	0.500	0.252	0.031	-	●	●	●		●	●	
	SNGX 120612-MM4	0.406	0.500	0.252	0.047	-	●						
	**SNMX 120608-MM4**	0.437	0.500	0.252	0.031	-	●	●	●		●	●	
	SNMX 120612-MM3	0.406	0.500	0.252	0.047	-	●	●	●		●	●	
	SNMX 120612-MM4	0.406	0.500	0.252	0.047	-	●	●	●		●	●	
	SNMX 120612-MR6	0.406	0.500	0.252	0.047	-	●	●	●		●	●	
	SNMX 120612-RR2	0.406	0.500	0.252	0.047	-	●	●	●		●	●	
	SNMX 120620-MM4	0.343	0.500	0.252	0.079	-	●	●	●		●	●	
	SNMX 120620-RR2	0.343	0.500	0.252	0.079	-	●	●	●		●	●	
	**SNMX 120612R-MM4**	0.343	0.500	0.252	0.047	-	●	●	●	●	●	●	

●: Stock available

XN..07/09ANN

Negative heptagonal milling inserts with short wiper

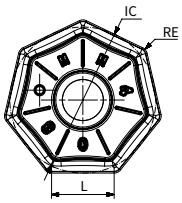


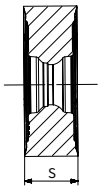
Inserts	Product code	Machining conditions: Dimension (in) L	IC	S	RE	BS	● Good condition ◐ General condition ✱ Bad condition: P AP251U	P AP351U	P AC301P	M AP403M	K AC301K	K AP251K	N AW100K
							●	◐	◐	✱	●	●	●
	**XNGU 0705ANN-MM3**	0.276	0.571	0.197	0.031	0.043	●	●			●		
	**XNGU 0705ANN-MM4**	0.276	0.571	0.197	0.031	0.043	●				●		
	XNMU 0705ANN-MM4	0.276	0.571	0.197	0.031	0.043	●	●	●		●	●	
	**XNMU 0705ANN-MR6**	0.276	0.571	0.197	0.031	0.043	●	●			●	●	
	**XNGU 0906ANN-MM3**	0.362	0.748	0.231	0.031	0.055	●	●	●		●		
	**XNGU 0906ANN-MM4**	0.362	0.748	0.231	0.031	0.055	●	●	●		●		
	**XNMU 0906ANN-MR6**	0.362	0.748	0.231	0.031	0.055	●				●	●	

●: Stock available

XN..07/09

Negative heptagonal milling inserts with corner radius



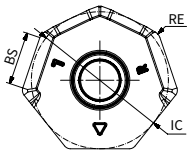


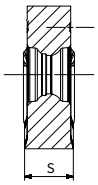
Inserts	Product code	Machining conditions: Dimension (in) L	IC	S	RE	BS	Good condition ● / General condition ⬌ / Bad condition ✱						
							●	⬌	⬌	✱	●	●	●
							P			M	K		N
							AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**XNMU 070508-MM4**	0.276	0.571	0.197	0.031	-	●	●		●	●	●	
	XNMU 090612-MM4	0.362	0.748	0.231	0.047	-	●	●		●	●	●	

●: Stock available

XNGX 07/09ANN-W

Negative milling inserts with long wiper



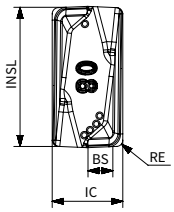


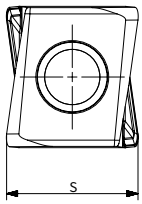
Inserts	Product code	Machining conditions: Dimension (in) L	IC	S	RE	BS	Good condition ● / General condition ⬌ / Bad condition ✱						
							●	⬌	⬌	✱	●	●	●
							P			M	K		N
							AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AW100K
	**XNGX 0705ANN-W**	0.236	0.591	0.197	0.039	0.043	●				●		
	XNGX 0906ANN-W	0.295	0.750	0.231	0.039	0.055	●				●		

●: Stock available

LNHU 0904..

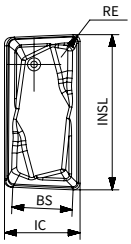
Negative square shoulder milling inserts

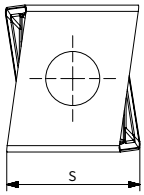




Inserts	Product code	Dimension (in)					Machining conditions: ● Good condition, ⬌ General condition, ✱ Bad condition						
							●	⬌	⬌	✱	●	●	●
							P		M		K		N
		INSL	IC	S	RE	BS	AP251U	AP351U	AP351M	AP403M	AC301K	AP251K	AW100K
	**LNHU 090404ER-FM2**	0.354	0.177	0.335	0.016	0.073							●
	LNHU 090404ER-MM3	0.354	0.177	0.335	0.016	0.073		●		●			
	LNHU 090404ER-MR2	0.354	0.177	0.335	0.016	0.073	●	●		●	●	●	
	LNHU 090408ER-MR2	0.354	0.177	0.331	0.031	0.038	●	●	●	●	●	●	
	LNHU 090412ER-MR2	0.354	0.177	0.327	0.047	0.039	●			●	●		
	LNHU 090416ER-MR2	0.354	0.177	0.324	0.063	0.025	●			●	●		
	LNHU 090420ER-MR2	0.354	0.177	0.320	0.079	0.025	●			●	●		

●: Stock available



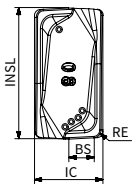


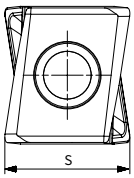
Inserts	Product code	Dimension (in)					Machining conditions: ● Good condition, ⬌ General condition, ✱ Bad condition							
							●	⬌	⬌	✱	●	⬌	●	●
							P		M		K			N
		INSL	IC	S	RE	BS	AP251U	AP351U	AP351M	AP403M	AC301K	AP251K	AP351K	AW100K
	**LNHU 0904PDER-W**	0.364	0.177	0.330	0.015	0.141	●				●			●

●: Stock available

LNHU 1306..

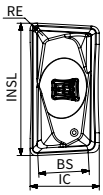
Negative square shoulder milling inserts

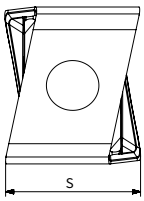




Inserts	Product code	Dimension (in)					Machining conditions: ● Good condition, ⇔ General condition, ✱ Bad condition						
							●	⇔	⇔	✱	●	●	●
							P		M		K		N
		INSL	IC	S	RE	BS	AP251U	AP351U	AP351M	AP403M	AC301K	AP251K	AW100K
	**LNHU 130608ER-FM2**	0.513	0.268	0.334	0.031	0.106							●
	LNHU 130608ER-MM3	0.513	0.268	0.467	0.031	0.106		●		●			
	LNHU 130608ER-MR2	0.513	0.268	0.467	0.031	0.106	●	●	●	●	●	●	
	LNHU 130612ER-MR2	0.513	0.268	0.462	0.047	0.051	●	●	●	●	●	●	
	LNHU 130616ER-MR2	0.513	0.268	0.457	0.063	0.075	●	●	●	●		●	
	LNHU 130620ER-MR2	0.513	0.268	0.454	0.079	0.059		●	●	●	●		
	LNHU 130624ER-MR2	0.513	0.268	0.449	0.094	0.039		●	●	●	●		
	LNHU 130631ER-MR2	0.513	0.268	0.442	0.122	0.016		●	●	●	●		

●: Stock available



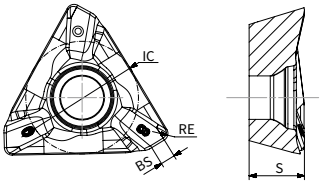


Inserts	Product code	Dimension (in)					Machining conditions: ● Good condition, ⇔ General condition, ✱ Bad condition							
							●	⇔	⇔	✱	●	⇔	●	●
							P		M		K			N
		INSL	IC	S	RE	BS	AP251U	AP351U	AP351M	AP403M	AC301K	AP251K	AP351K	AW100K
	**LNHU 1306PDR-W**	0.527	0.268	0.458	0.031	0.205	●						●	

●: Stock available

TDMT 1505..

Positive square shoulder triangle milling inserts

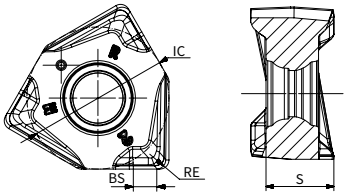


Inserts	Product code	Machining conditions: ● Good condition ◐ General condition ✱ Bad condition										
		●	◐	◐	✱	●	●	●				
		Dimension (in)				P		M		K		N
		IC	S	RE	BS	AP251U	AP351U	AP351M	AP403M	AC301K	AP251K	AW100K
	**TDMT 150508R-MM4**	0.449	0.220	0.031	0.059	●		●	●	●	●	
	TDMT 150512R-MM4	0.449	0.220	0.047	0.039	●		●	●	●	●	
	TDMT 150516R-MM4	0.449	0.220	0.063	0.037	●		●	●	●	●	
	TDMT 150520R-MM4	0.449	0.220	0.079	0.028	●			●		●	
	TDMT 150524R-MM4	0.449	0.220	0.094	0.023	●			●		●	
	TDMT 150531R-MM4	0.449	0.219	0.122	0.016	●			●		●	
	TDMT 150540R-MM4	0.449	0.219	0.157	0.016	●			●		●	
	TDMT 150508R-MM3	0.449	0.219	0.031	0.059	●			●		●	
	TDHT 150508R-MM4	0.449	0.220	0.031	0.059	●					●	

●: Stock available

WNGU 0806..

Negative square shoulder milling inserts

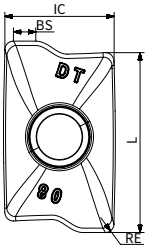


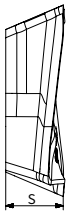
Inserts	Product code	Machining conditions				● Good condition ◐ General condition ✱ Bad condition				
						●	◐	✱	●	●
		Dimension (in)				P	M		K	
		IC	S	RE	BS	AP251U	AP401U	AP403M	AC301K	AP251K
	**WNMU 080608R-MR2**	0.492	0.260	0.031	0.091	●	●	●	●	●
	WNMU 080608R-MM4	0.492	0.259	0.031	0.091	●	●	●	●	●
	WNMU 080608R-MM3	0.492	0.259	0.031	0.091	●	●	●	●	●
	WNMU 080612R-MR2	0.492	0.255	0.047	0.047	●	●		●	●
	WNMU 080612R-MM4	0.492	0.255	0.047	0.046	●	●	●		●
	WNMU 080616R-MR2	0.492	0.256	0.063	0.032	●		●		
	WNMU 080616R-MM4	0.492	0.256	0.063	0.031	●		●		

●: Stock available

APKT 1705..-DT..

Positive square shoulder milling inserts



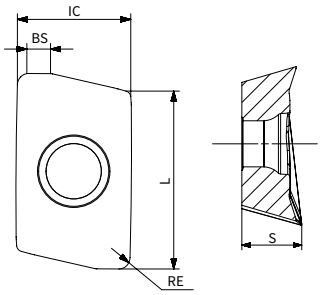


Inserts	Product code	Machining conditions: Dimension (in) L	IC	S	RE	BS	● Good condition ◐ General condition ✱ Bad condition							
							●	◐	◐	✱	●	●	●	✱
							P		M		K		N	S
							AP251U	AP351U	AP351M	AP403M	AC301K	AP251K	AW100K	AP403S
	**APKT 1705PER-DT**	0.685	0.424	0.222	0.031	0.085	●	●		●		●	●	
	APKT 170516R-DT	0.685	0.423	0.222	0.063	0.068	●					●		
	APKT 170524R-DT	0.685	0.424	0.222	0.094	0.037	●		●	●		●		
	APKT 170530R-DT	0.685	0.424	0.222	0.118	0.058	●		●	●		●		
	APKT 170540R-DT	0.685	0.424	0.222	0.157	-	●		●	●				

●: Stock available

AOMT 1204..-MM4..

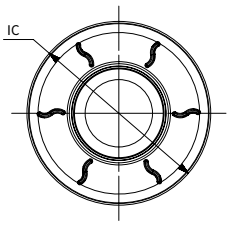
Positive square shoulder milling inserts

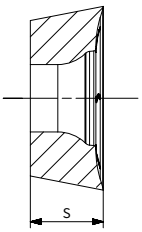


Inserts	Product code	Dimension (in)					Machining conditions: ● Good condition, ⬌ General condition, ✱ Bad condition					
							●	⬌	⬌	✱	●	✱
							P		M		K	S
		L	IC	S	RE	BS	AP251U	AP351U	AP351M	AP403M	AP251K	AP403S
	**AOMT 120408ER-MM4**	0.504	0.321	0.200	0.031	0.061	●		●	●	●	●
	AOMT 120412ER-MM4	0.504	0.321	0.200	0.047	0.046			●	●		●
	AOMT 120416ER-MM4	0.504	0.321	0.200	0.063	0.047			●	●		●
	AOMT 120420ER-MM4	0.504	0.321	0.200	0.079	0.039	●		●	●		●
	AOMT 120424ER-MM4	0.504	0.321	0.200	0.094	0.035	●		●	●		●
	AOMT 120431ER-MM4	0.504	0.321	0.200	0.122	0.024			●	●		●
	AOMT 120440ER-MM4	0.504	0.321	0.200	0.157	0.031			●	●		●

●: Stock available

RO..T
Profile milling inserts





Inserts	Product code	Machining conditions: Dimension (in) IC	S	● Good condition ◐ General condition ✱ Bad condition						
				●	◐	◐	✱	●	●	✱
				P			M	K		S
				AP251U	AP351U	AC301P	AP403M	AC301K	AP251K	AP403S
	**ROHT 10T3M8E-MM3**	0.394	0.156				●			●
	ROHT 1204M4E-MM3	0.472	0.187				●			●
	ROHT 1204M6E-MM3	0.472	0.187				●			●
	**ROMT 10T3M4E-MR6**	0.394	0.156				●			●
	ROMT 1204M6E-MR6	0.472	0.187				●			●

●: Stock available

Cutting Parameter Recommendation Table

Materials																		
ISO	Material classification			Brinell hardness (HB)	Tensile strength Rm(lbs/in²)	AP251U PVD P15-P35 M15-M35 – – – –			AC301P CVD P25-40 – – – –			AP351U PVD P30-P45 M25-M35 S25-S35 – –			AP351M PVD P20-P40 M20-M40 – S20-S40 – –		
						1/10	1/5	1/1	1/10	1/5	1/1	1/10	1/5	1/1	1/10	1/5	1/1
P	Unalloyed steel	C ⩽ 0.25%	Annealed	125	62000	1050	920	790	1250	980	850	920	790	660			
		0.25 < C ⩽ 0.55%	Annealed	190	92700	950	790	660	1150	820	720	820	690	560			
		0.25 < C ⩽ 0.55%	Heat-treated	210	103000	850	690	560	1020	720	620	750	590	460			
		C > 0.55%	Annealed	190	92700	950	790	660	1150	820	720	820	690	560			
		C > 0.55%	Heat-treated	300	147000	690	560	430	820	560	490	520	430	330			
		Free cutting steel (short-chip)	Annealed	220	108000	820	660	520	980	690	590	720	560	430			
	Low-alloyed steel	Annealed		175	85700	950	820	660	1120	980	820	890	750	590			
		Heat-treated		285	146900	820	690	520	950	820	660	750	620	460			
		Heat-treated		380	186000	750	620	460	820	690	520	690	560	390			
		Heat-treated		430	214200	620	490	360	690	560	430	560	430	300			
	High-alloyed steel and high-alloyed tool steel	Annealed		200	97900	720	620	520	790	690	590	660	560	460			
		Hardened and tempered		300	147000	560	460	360	620	520	430	490	430	300			
		Hardened and tempered		400	197000	490	390	300	520	430	330	430	330	230			
	Stainless steel	Ferritic/martensitic, annealed		200	97900	620	520	430	660	560	460	520	460	360	590	490	390
		Martensitic, heat-treated		330	162000	520	390	300	560	460	360	460	360	260	490	390	300
M	Stainless steel	Austenitic, quench hardened		200	97900	590	490	390				560	460	360	560	490	390
		Austenitic, precipitation hardened (PH)		300	147000	520	430	330				490	390	300	490	430	330
		Austenitic/ferritic, duplex		230	113000	560	460	360				520	430	330	520	460	360
K	Malleable cast iron	Ferritic		200	58000												
		Pearlitic		260	101000												
	Grey cast iron	Low tensile strength		180	29000												
		High tensile strength/austenitic		245	50800												
	Nodular cast iron	Ferritic		155	58000												
		Pearlitic		265	101000												
	GGV(CGI)			230	58000												
N	Wrought aluminium alloys	Non-aging		30	-												
		Aged		100	49300												
	Cast aluminium alloys	⩽ 12% Si, non-aging		75	37700												
		⩽ 12% Si, aged		90	45000												
		> 12% Si, non-aging		130	65300												
	Magnesium alloys			70	36300												
	Copper and copper alloys	Unalloyed, electrolytic copper		100	49300												
		Brass, bronze, red brass		90	45000												
		Cu alloys, short-chipping		110	55100												
		High-tensile, Ampco alloy		300	146500												
S	Heat-resistant alloys	Fe-based	Annealed	200	98600							300	260	230	330	300	260
			Hardened	280	136000							250	200	160	260	230	200
		Ni or Co based	Annealed	250	122000							260	180	150	230	200	160
			Hardened	350	171000							200	160	110	200	160	130
			Cast	320	156600							200	180	130	210	180	150
	Titanium alloys	Pure titanium		200	98600							360	300	260	390	330	300
		α and β alloys, hardened		375	182700							160	130	100	180	150	110
		β alloys		410	203000							160	130	100	180	150	110
	Tungsten alloys			300	146500							210	200	160	230	210	180
	Molybdenum alloys			300	146500							210	200	160	230	210	180
H	Hardened steel	Hardened and tempered		50HRC													
		Hardened and tempered		55HRC													
		Hardened and tempered		60HRC													
	Chilled cast iron	Hardened and tempered		50HRC													

*The recommended cutting conditions always refer to general conditions. These cutting conditions should be adjusted according to the practical machine rigidity, tools, workpiece clamping and coolant. Average chip thickness (hm)=fz x sinkr.

Milling grade application range																					
	AP403M			AP401U			AP403S			AC301K			AP251K			AP151H			AW100K		
	PVD			PVD			PVD			CVD			PVD			PVD			Uncoated		
	P30-P45			P20-P40			–			–			–			–			–		
	M30-M45			M20-M40			M30-M45			–			–			–			–		
	–			–			–			K10-K35			K15-K40			K15-K40			–		
	S30-S45			–			S30-S45			–			–			–			–		
	–			–			–			–			–			–			N05-N15		
	–			–			–			H15-H25			–			H15-H25			–		
	Feed(mm/z)-according to the value of ae/Dc																				
	1/10	1/5	1/1	1/10	1/5	1/1	1/10	1/5	1/1	1/10	1/5	1/1	1/10	1/5	1/1	1/10	1/5	1/1	1/10	1/5	1/1
	Cutting speed (ft/min)																				
	560	460	360	520	460	360															
	460	360	260	460	360	260															
	520	460	360	520	460	360	620	520	460												
	460	390	300	490	430	300	560	460	390												
	490	430	330	490	430	330	520	430	360												
										790	690	590	720	620	520	590	490	390			
										720	620	520	660	560	460	520	430	330			
										920	820	720	850	750	660	690	590	490			
										790	690	590	690	620	520	590	490	390			
										850	750	660	790	690	590	620	520	430			
										620	520	430	560	460	360	490	390	300			
										660	560	460	590	490	390	520	430	330			
																			7220	7220	6560
																			5910	5910	5250
																			1970	1970	1640
																			1640	1640	1310
																			920	920	660
																			1310	1310	980
																			980	980	820
																			660	660	520
	310	280	250				360	330	300												
	260	210	180				300	260	230												
	280	200	160				260	230	200												
	210	180	110				250	210	160												
	210	200	150				250	210	180												
	390	310	280				390	330	300												
	160	130	100				200	160	130												
	160	130	100				200	160	130												
	230	200	160				230	210	200												
	230	200	160				230	210	200												
										230	200	160				210	180	150			
																200	160	130			
																200	160	130			