

Drilling Insert Denomination System

S
1


P
2

M
3


T
4

1- Shape/Code










S



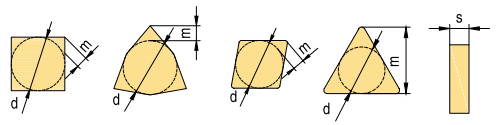
W



2- Clearance Angle

A	B	C	D	E
				
F	G	N	P	O
				Other clearance angle

3- Tolerance

















Class	Unit	In.Circle dimension d	Nose height m	Thickness s
A	mm	± 0,025	± 0,005	± 0,025
C	mm	± 0,025	± 0,013	± 0,025
E	mm	± 0,025	± 0,025	± 0,025
F	mm	± 0,013	± 0,005	± 0,025
G	mm	± 0,025	± 0,025	± 0,13
H	mm	± 0,013	± 0,013	± 0,025
J	mm	*	± 0,005	± 0,025
K	mm	*	± 0,013	± 0,025
L	mm	*	± 0,025	± 0,025
M	mm	*	*	± 0,127
U	mm	*	*	± 0,127
N	mm	*	*	± 0,025

* For details refer to right and below tables

IC	Shape: C, E, H, M, O, P, S, T, R, W			
	d		m	
	J,K,L,M,N	U	M, N	U
4.76	± 0,05	± 0,08	± 0,08	± 0,13
5.56	± 0,05	± 0,08	± 0,08	± 0,13
6	± 0,05	± 0,08	± 0,08	± 0,13
6.35	± 0,05	± 0,08	± 0,08	± 0,13
7.94	± 0,05	± 0,08	± 0,08	± 0,13
8	± 0,05	± 0,08	± 0,08	± 0,13
9.525	± 0,05	± 0,08	± 0,08	± 0,13
10	± 0,05	± 0,08	± 0,08	± 0,13
12	± 0,08	± 0,13	± 0,13	± 0,2
12.7	± 0,08	± 0,13	± 0,13	± 0,2
15.875	± 0,1	± 0,18	± 0,15	± 0,27
16	± 0,1	± 0,18	± 0,15	± 0,27
19.05	± 0,1	± 0,18	± 0,15	± 0,27
20	± 0,1	± 0,18	± 0,15	± 0,27
25	± 0,13	± 0,25	± 0,18	± 0,38
25.4	± 0,13	± 0,25	± 0,18	± 0,38
31.75	± 0,15	± 0,25	± 0,2	± 0,38
32	± 0,15	± 0,25	± 0,2	± 0,38

M&N shape	D shape		V shape	
	d	m	d	m
5.56	± 0,05	± 0,11		
6.35	± 0,05	± 0,11	± 0,05	± 0,16
7.94	± 0,05	± 0,11	± 0,05	± 0,16
9.525	± 0,05	± 0,11	± 0,05	± 0,16
12.7	± 0,08	± 0,15	± 0,08	± 0,2
15.875	± 0,10	± 0,18	± 0,10	± 0,27
19.05	± 0,10	± 0,18	± 0,10	± 0,27

4- Clamping Type

A	B	C	F	G
				
H	J	M	N	Q
				
R	T	U	W	Z
				Special

06	02	04	E	-	DP
5	6	7	8	-	9

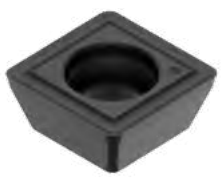

5- Cutting Edge Length				
In.Circle Dimension (mm)	S Code	S Length	W Code	W Length
5.56			03	3.8
6.35	06	6.35	04	4.3
7.94			05	5.4
8.0	08	8.0		
9.525	09	9.525	06	6.5
12.7	12	12.7	08	8.7

7- Corner Radius	
Example	
04	= 0.4mm
08	= 0.8mm
12	= 1.2mm

8- Cutting Edge Shape	
Example	Description
E	Honed cutting edge
F	Sharp cutting edge
T	Negative land

6- Insert Thickness(mm)		
Thickness description	Thickness mark	Example
		00 = 0.79
		T0 = 0.99
		01 = 1.59
		T1 = 1.98
		02 = 2.38
		T2 = 2.58
		03 = 3.18
		T3 = 3.97
		04 = 4.76
		T4 = 4.96
		05 = 5.56
		T5 = 5.95
		06 = 6.35
		07 = 7.94
		09 = 9.53
		11 = 11.11
		12 = 12.70
		14 = 14.29
		15 = 15.88

Insert thickness "S" refers to the distance between cutting edge nose and bottom

9- Geometry Code	
<p>DP</p> <ol style="list-style-type: none"> 1. DP geometry has high efficiency. Suitable for short hole high speed drilling. 2. Strong square insert with reinforced geometry offers excellent hole straightness. 3. Drilling holder with helical flute provides excellent chip evacuation and high hole precision. 	
<p>DU/DG</p> <ol style="list-style-type: none"> 1. Suitable cutting angle makes perfect balance for the cutting force. 2. General purpose geometry combined with two grades are suitable for P, M, K, S materials, especially good for the chip control in soft materials. 3. Obtains good surface finish. 4. Good versatility. It's suitable for rotating and non-rotating machining. 	

Drilling holder

Drilling Grade Application Guide

Drilling insert grade ISO group													
Material Group	Materials	ISO	Coated										Uncoated
			PVD	PVD	PVD	PVD	PVD	PVD	PVD	PVD	CVD	CVD	
P	Unalloy steels / Alloyed steels	P01											
		P05											
		P10											
		P15											
		P20	AP301U										
		P25		AP351M									
		P30			AP351U								
		P35											
		P40											
		P45											
		P50											
M	Stainless steels	M01											
		M05											
		M10											
		M15											
		M20											
		M25	AP351M										
		M30		AP351U									
		M35											
		M40											
		M45											
K	Cast iron	K01											
		K05											
		K10											
		K15											
		K20											
		K25											
		K30											
		K35											
		K40											
		K45											
		K50											
N	Aluminum/ Aluminum alloys	N01											
		N05											
		N10											
		N15											
		N20											
		N25											
		N30											
S	Heat resistant alloys	S01											
		S05											
		S10											
		S15											
		S20											
		S25	AP351M										
		S30		AP351U									
		S35											
		S40											
		S45											

Drilling Grade Description

P

Steel, cast steel, ferritic / martensitic stainless steel, malleable cast iron

Basic grade

AP301U(P15-P35)

Recommended grade for steel drilling.

High strength and wear resistance ultra fine carbide substrate with nanostructured PVD coating in controllable layers, high coating adhesion, wear-resistance and strength.

AP351M(P25-P40)

Recommended grade for drilling steel parts under unstable working conditions.

Good toughness and wear resistance ultrafine crystalline substrate combined with nanostructure PVD coating.
Good thermal cracking resistance, wear resistance and coating strength.

AP351U(P30-P45)

Recommended grade for drilling steel parts under complex working conditions. Very tough substrate with nanostructured PVD coating.
Good wear resistance and impact resistance.

M

Austenitic stainless steel, cast steel, manganese steel, alloyed cast iron, malleable cast iron, easy to cut steel

Basic grade

AP351M(M25-M40)

Recommended grade for stainless steel drilling.

Very tough and good wear resistance ultrafine crystalline substrate with nanostructured PVD coating.
Good thermal cracking resistance, wear resistance and coating strength.

S

Heat resistant alloy

Basic grade

AP351M(S25-S40)

Recommended grade for heat resistant alloy drilling.

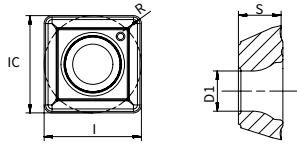
Good toughness and wear resistance ultrafine crystalline substrate combined with nanostructure PVD coating,
good resistance to thermal cracking resistance, wear resistance and coating strength.

AP351U(S30-S45)

Recommended grade for heat resistant alloy drilling under unstable working conditions and low speed.

Very tough substrate with nanostructured PVD coating, good wear resistance and impact resistance.

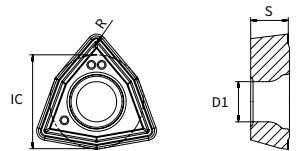
SPMT-DP Drilling Insert



Inserts	Product code	Dimensions(in)					Machining conditions					
		I	IC	S	R	D1	● Good condition ✦ Bad condition			✦ General condition		
							P	M	K	N		
							AP301U	AP351U	AC301P	AP351M	AP301U	AW100K
	SPMT 050204E-DP	0.197	0.197	0.094	0.016	0.089	●	●	●	●	●	
	SPMT 060204E-DP	0.236	0.236	0.094	0.016	0.103	●	●	●	●	●	
	SPMT 07T308E-DP	0.313	0.313	0.156	0.031	0.112	●	●	●	●	●	
	SPMT 090408E-DP	0.386	0.386	0.169	0.031	0.159	●	●	●	●	●	
	SPMT 110408E-DP	0.453	0.453	0.189	0.031	0.175	●	●	●	●	●	
	SPMT 140512E-DP	0.563	0.563	0.205	0.047	0.226	●	●	●	●	●	

● Stocked ○ Unstocked

WCMT-DU Drilling Insert

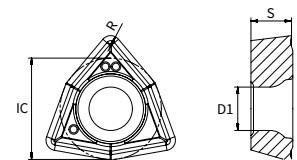


Inserts	Product code	Dimensions(in)					Machining conditions					
		I	IC	S	R	D1	● Good condition ✦ Bad condition			✦ General condition		
							P	M	K	N		
							AP301U	AP351U	AC301P	AP351M	AP301U	AW100K
	WCMT 030208E-DU	0.150	0.219	0.094	0.031	0.110	●	●				
	WCMT 040208E-DU	0.169	0.250	0.094	0.031	0.118	●	●				
	WCMT 050308E-DU	0.213	0.313	0.125	0.031	0.134	●	●				
	WCMT 06T308E-DU	0.256	0.375	0.156	0.031	0.154	●	●				
	WCMT 080412E-DU	0.343	0.500	0.187	0.047	0.173	●	●				

Remark: DU series are universal inserts, no toolholder is provided.

● Stocked ○ Unstocked

WCMT-DG Drilling Insert



Inserts	Product code	Dimensions(in)					Machining conditions					
		I	IC	S	R	D1	● Good condition ✦ Bad condition			✦ General condition		
							P	M	K	N		
							AP301U	AP351U	AC301P	AP351M	AP301U	AW100K
	WCMT 030204E-DG	0.150	0.219	0.094	0.016	0.098	▲	▲				
	WCMT 040204E-DG	0.169	0.250	0.094	0.016	0.110	▲	▲				
	WCMT 050308E-DG	0.213	0.313	0.125	0.031	0.134	▲	▲				
	WCMT 06T308E-DG	0.256	0.375	0.156	0.031	0.175	▲	▲				
	WCMT 080408E-DG	0.343	0.500	0.187	0.031	0.217	▲	▲				

● Stocked ○ Unstocked

Cutting Parameter Recommendation

Materials		SP drilling insert series grade application range & cutting parameter recommendation																													
ISO	Material classification	Tensile strength (lbs/in ²)	Hardness (HB)	Grade						Feed (in/rev)						Feed (in/rev)															
				AP301U		AP351U		AP351M		AC301P		P15-35		P20-35		P25-40		M15-35		M20-35		M20-35		M20-35		M20-35					
				Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	
				Cutting speed (ft/min)																											
				Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min				
P	Unalloyed steel	<87,022	<180	853	787	735	722	607	492	787	722	656	574	492	0.002-0.003	0.002-0.004	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005	0.002-0.005			
		<137,785	<280	820	689	558	656	558	459	754	623	525	623	533	443	0.002-0.005	0.003-0.006	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007		
		101,526-137,785	200-280	787	656	525	623	525	426	722	590	492	590	492	394	0.002-0.004	0.003-0.006	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007		
M	Alloyed steel	137,785-174,044	280-355	689	558	426	558	426	295	623	492	361	525	426	0.002-0.005	0.003-0.006	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007			
		174,044-203,052	355-415	558	459	361	525	394	262	492	394	295	459	361	262	0.002-0.004	0.003-0.006	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007	0.004-0.007		
		112,839	230	853	656	459	590	443	295	787	590	394	-	-	0.002-0.004	0.002-0.005	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006		
K	Austenitic stainless steel	97,900	200	722	558	394	394	213	197	656	492	328	-	-	0.002-0.004	0.002-0.005	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006	0.003-0.006		
		146,923	300	590	459	328	295	213	131	525	394	262	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		101,526	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
N	Aluminum alloy	127,633	260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		116,030	250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		37,709	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
S	Fe-based alloy	64,831	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		136,770	280	-	-	-	131	98	66	148	115	82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		156,060	320	-	-	-	115	82	49	131	98	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		170,709	350	-	-	-	115	82	49	131	98	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		183,037	370	-	-	-	131	98	66	148	115	82	-	-	0.002-0.004	0.002-0.006	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	0.003-0.007	
H	Hardened steel	-	50-60HRC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		-	55HRC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*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.



Deep-hole Drilling Product Introduction

Achteck has general-purpose deep-hole drilling inserts, which offer high productivity for many industries: energy, engineering machinery, injection molding, aircraft, shipbuilding, military, etc. It can achieve good hole straightness in deep hole drilling and good surface finish. Existing geometries and grades cover steel, stainless steel and heat resistant alloy drilling.

Product application and features

- The inserts can be mounted on the deep-hole drilling head.
- AP301U(N) is the first choice for drilling steel and stainless steel
- All geometries offer good chip-breaking result
- Increased efficiency due to high feed rate
- Reduces the cost per hole




Grade	Coating	Workpiece material					
		P	M	K	N	S	H
AP301U(N)	PVD	●	●			○	

● Marked: 1st Choice ○ Marked: Supplemental application

ISO P : (P15-P35) General-purpose PVD coating with excellent wear-resistance and toughness.

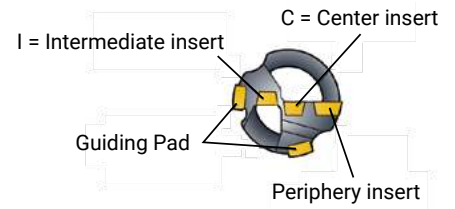
ISO M :(M15-M35) General-purpose grade for ISO-M applications, PVD coating with excellent toughness and resistance to built-up edges.

Geometry Types and Features

Geometry	Edge shape	Application
DH		<ul style="list-style-type: none"> • For general purpose. • Suitable for high cutting speed and feed. • Good chip control in most of materials.
DL		<ul style="list-style-type: none"> • Suitable for long chip materials (such as low carbon alloyed steel and duplex stainless steel). • Obtain a reliable production process in drilling materials where chip jamming can be a problem.
LH		<ul style="list-style-type: none"> • With open geometry; • Suitable for high cutting speed and feed.

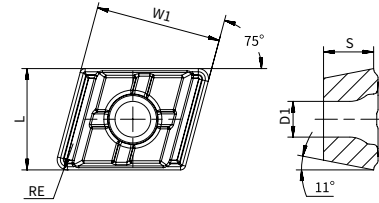
Drilling holder


Ejector Drill Matching Table



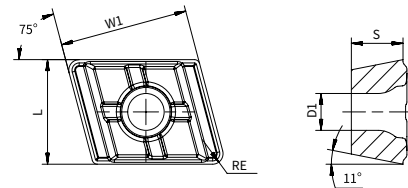
Hole diameter range (mm)	Center insert	Hole diameter range (mm)	Intermediate insert	Hole diameter range (mm)	Periphery insert	Hole diameter range (mm)	Guiding pad
26.00-28.70	EPMT 050308C	26.00-31.00	EPMT 050308I	26.00-31.00	APHT 060308P	26.00-31.00	GPAD-06A
28.71-33.99	EPMT 06T308C	31.01-34.99	EPMT 06T308I	31.01-38.99	APHT 08T308P	31.01-39.60	GPAD-07A
34.00-43.00	EPMT 08T308C	35.00-54.99	EPMT 08T308I	39.00-49.99	APHT 09T308P	39.61-47.00	GPAD-08A
43.01-47.00	EPMT 10T308C	55.00-65.00	EPMT 12T308I	50.00-65.00	APHT 11T308P	47.01-54.99	GPAD-10A
47.01-49.99	EPMT 12T308C	-	-	-	-	55.00-65.00	GPAD-12A
50.00-57.99	EPMT 10T308C	-	-	-	-	-	-
58.00-65.00	EPMT 12T308C	-	-	-	-	-	-


Deep-Hole Drilling Inserts
DH geometry



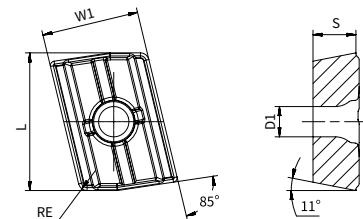
Center insert	Product code	Dimensions (in)					Stock
		L	W1	S	RE	D1	
	EPMT 050308C-DH AP301U(N)	0.219	0.315	0.125	0.031	0.098	●
	EPMT 06T308C-DH AP301U(N)	0.250	0.389	0.156	0.031	0.110	●
	EPMT 08T308C-DH AP301U(N)	0.313	0.389	0.156	0.031	0.110	●
	EPMT 10T308C-DH AP301U(N)	0.375	0.389	0.156	0.031	0.110	●
	EPMT 12T308C-DH AP301U(N)	0.500	0.389	0.156	0.031	0.110	●


● Stock available



Intermediate insert	Product code	Dimensions (in)					Stock
		L	W1	S	RE	D1	
	EPMT 050308I-DH AP301U(N)	0.219	0.315	0.125	0.031	0.098	●
	EPMT 06T308I-DH AP301U(N)	0.250	0.389	0.156	0.031	0.110	●
	EPMT 08T308I-DH AP301U(N)	0.313	0.389	0.156	0.031	0.110	●
	EPMT 12T308I-DH AP301U(N)	0.500	0.389	0.156	0.031	0.110	●

● Stock available

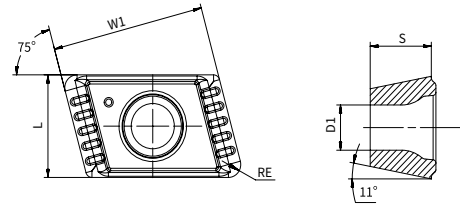



Periphery insert	Product code	Dimensions (in)					Stock
		L	W1	S	RE	D1	
	APHT 060308P-DH AP301U(N)	0.256	0.315	0.125	0.031	0.098	●
	APHT 08T308P-DH AP301U(N)	0.335	0.354	0.156	0.031	0.110	●
	APHT 09T308P-DH AP301U(N)	0.380	0.354	0.156	0.031	0.110	●
	APHT 11T308P-DH AP301U(N)	0.502	0.354	0.156	0.031	0.110	●

● Stock available

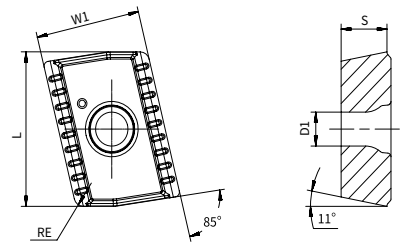
Drilling holder


Deep-Hole Drilling Inserts
DL geometry



Intermediate insert	Product code	Dimensions (in)					Stock
		L	W1	S	RE	D1	
	EPMT 050308I-DL AP301U(N)	0.219	0.315	0.125	0.031	0.098	●
	EPMT 06T308I-DL AP301U(N)	0.250	0.389	0.156	0.031	0.110	●
	EPMT 08T308I-DL AP301U(N)	0.313	0.389	0.156	0.031	0.110	●
	EPMT 12T308I-DL AP301U(N)	0.500	0.389	0.156	0.031	0.110	●

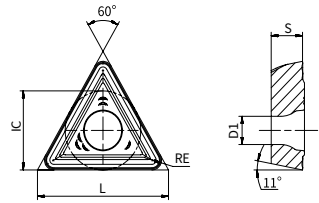
● Stock available




Periphery insert	Product code	Dimensions (in)					Stock
		L	W1	S	RE	D1	
	APHT 060308P-DL AP301U(N)	0.256	0.315	0.125	0.031	0.098	●
	APHT 08T308P-DL AP301U(N)	0.335	0.354	0.156	0.031	0.110	●
	APHT 09T308P-DL AP301U(N)	0.380	0.354	0.156	0.031	0.110	●
	APHT 11T308P-DL AP301U(N)	0.502	0.354	0.156	0.031	0.110	●

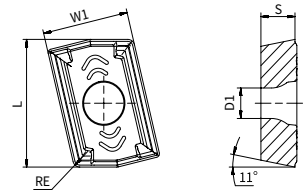
● Stock available


Deep-Hole Drilling Inserts
DH geometry



Center/Intermediate insert	Product code	Dimensions (in)					Stock
		L	IC	S	RE	D1	
	TPMT 16T312R-DH AP301U(N)	0.650	0.375	0.156	0.047	0.134	●
	TPMT 220612R-DH AP301U(N)	0.866	0.500	0.250	0.047	0.173	●

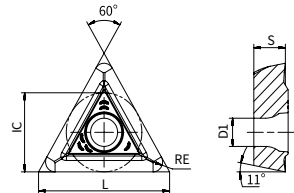
● Stock available




Periphery insert	Product code	Dimensions (in)					Stock
		L	W1	S	RE	D1	
	APMT 13T308-DH AP301U(N)	0.575	0.394	0.156	0.031	0.134	●
	APMT 180608-DH AP301U(N)	0.811	0.453	0.250	0.031	0.173	●

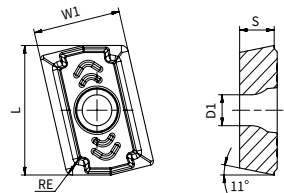
● Stock available


Deep-Hole Drilling Inserts
LH geometry



Center/Intermediate insert	Product code	Dimensions (in)					Stock
		L	IC	S	RE	D1	
	TPMT 16T312R-LH AP301U(N)	0.650	0.375	0.156	0.047	0.134	●
	TPMT 220612R-LH AP301U(N)	0.866	0.500	0.250	0.047	0.173	●

● Stock available

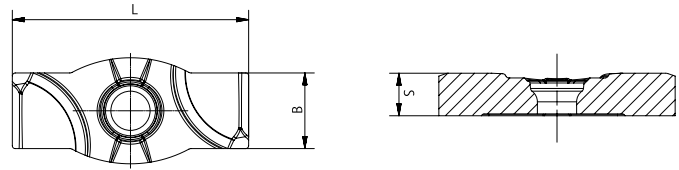



Periphery insert	Product code	Dimensions (in)					Stock
		L	W1	S	RE	D1	
	APMT 13T308-LH AP301U(N)	0.575	0.394	0.156	0.031	0.134	●
	APMT 180608-LH AP301U(N)	0.811	0.453	0.250	0.031	0.173	●

● Stock available

Drilling holder

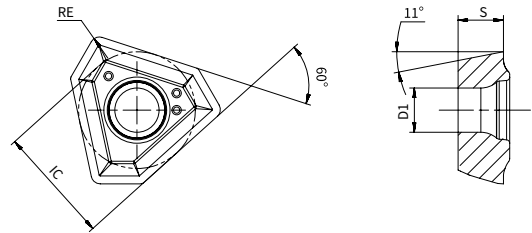
Deep-Hole Drilling Inserts
Guiding pad




Guiding pad	Product code	Dimensions (in)			Stock
		B	L	S	
	GPAD-07A AC301K	0.272	0.787	0.138	●
	GPAD-08A AC301K	0.315	0.984	0.177	●
	GPAD-10A AC301K	0.394	1.181	0.177	●

● Stock available

TPMX Series



Sharp	Product code	Dimensions (in)				Stock
		S	IC	RE	D1	
	TPMX 1403R-DH AP301U(N)	0.138	0.333	0.031	0.113	●
	TPMX 1704R-DH AP301U(N)	0.157	0.406	0.031	0.154	●
	TPMX 2405R-DH AP301U(N)	0.217	0.559	0.047	0.173	●
	TPMX 2405L-DH AP301U(N)	0.217	0.559	0.047	0.173	●
	TPMX 2807R-DH AP301U(N)	0.295	0.669	0.063	0.217	●

● Stock available

Recommended Cutting Speed for Materials(Dia 0.98-2.56in)

	Workpiece material		Brinell hardness (HB)	Grade			Cutting speed Vc ft/min	Feed fn in/rev		
				Insert				Drilling dia in		
				P	I	C		0.985-1.692	1.693-2.559	
P	Unalloyed steel	C=0.05-0.10%	125	AP301U(N)			230-426	0.004-0.016	0.006-0.018	
		C=0.10-0.25%	125				230-426	0.004-0.016	0.006-0.018	
		C=0.25-0.55%	150				230-426	0.004-0.016	0.006-0.018	
		C=0.55-0.80%	170				230-426	0.004-0.016	0.006-0.018	
	High carbon steel	Carbon tool steel	210	AP301U(N)			230-394	0.004-0.016	0.008-0.018	
	Low-alloyed steel	Non-Hardened		180	AP301U(N)			180-361	0.004-0.016	0.008-0.018
		Tempered		275				230-394	0.004-0.016	0.008-0.018
		Tempered		350				230-394	0.004-0.016	0.008-0.018
	High-alloyed steel	Annealed		200	AP301U(N)			180-361	0.004-0.015	0.008-0.016
		Hardened tool steel		325				180-361	0.008-0.015	0.008-0.016
Cast steel	Non-alloyed steel		180	AP301U(N)			180-361	0.004-0.016	0.008-0.018	
	Low-alloy (alloy<5%)		200				180-361	0.004-0.016	0.008-0.018	
M	Stainless steel	Non-Hardened/Ferritic/martensitic		200	AP301U(N)			131-361	0.004-0.016	0.008-0.018
		Austenitic		200				131-361	0.004-0.016	0.008-0.018
		Austenitic, precipitation hardened (PH)		300				131-361	0.004-0.013	0.008-0.014
		Austenitic/ferritic, duplex		230				131-262	0.004-0.013	0.008-0.014
K	Malleable cast iron	Ferritic		200	AP301U(N)			262-394	0.004-0.015	0.009-0.016
		Pearlitic		260				262-394	0.004-0.015	0.009-0.016
	Grey cast iron	Low tensile strength		180	AP301U(N)			197-361	0.004-0.015	0.009-0.016
		High tensile strength		245				197-361	0.004-0.015	0.009-0.016
	Nodular cast iron	Ferritic		160	AP301U(N)			164-361	0.004-0.015	0.009-0.016
		Pearlitic		250				164-361	0.004-0.015	0.009-0.016
GGV (CGI)				230						
N	Wrought aluminium alloys	non-aging		30	AP301U(N)			213-492	0.004-0.013	0.009-0.016
		aged		100				213-492	0.004-0.013	0.008-0.013
	Cast aluminium alloys	≤ 12% Si, non-aging		75	AP301U(N)			213-492	0.004-0.013	0.008-0.013
		≤ 12% Si, aged		90				213-492	0.004-0.013	0.008-0.013
		> 12% Si, non-aging		130				213-492	0.004-0.013	0.008-0.013
	Magnesium alloy			70						
	Copper and copper alloys (bronze/brass)	Unalloyed, electrolytic copper		100	AP301U(N)			213-492	0.004-0.013	0.008-0.013
		Brass, bronze, red brass		90	AP301U(N)			213-492	0.004-0.013	0.008-0.013
Cu alloys, short-chip		110	213-492	0.004-0.013				0.008-0.013		
High tensile, Ampco alloy		300	213-492	0.004-0.013				0.008-0.013		
S	Heat-resistant alloys	Fe-based annealed		200	AP301U(N)			33-180	0.004-0.012	0.008-0.013
		Fe-based hardened		280				33-180	0.004-0.012	0.008-0.013
		Ni or Co-based annealed		250				33-180	0.004-0.012	0.008-0.013
		Ni or Co-based hardened		350				33-180	0.004-0.012	0.008-0.013
		Ni or Co-based cast		320				33-180	0.004-0.012	0.008-0.013
	Titanium alloys	Pure titanium		200	AP301U(N)			98-197	0.004-0.012	0.008-0.013
		α alloys		375				98-197	0.004-0.012	0.008-0.013
		α and β alloys		375				98-197	0.004-0.012	0.008-0.013
		β alloys		410				98-197	0.004-0.012	0.008-0.013
H	Hardened steel	Hardened and tempered		43-47 HRC						
	Chilled cast iron			47-60 HRC						

*) Insert position-P, I, C
 P=peripheral insert, I=intermediate insert, C=center insert

Drilling holder

Recommended Cutting Speed for Materials(Dia ≥2.50in)

	Workpiece material		Brinell hardness (HB)	Grade			Cutting speed Vc ft/min	Feed fn in/rev	
				Insert				Drilling dia in	
				P	I	C		≥2.5	
P	Unalloyed steel	C=0.05-0.10%	125	AP301U(N)			262-328	0.007-0.014	
		C=0.10-0.25%	125				262-328	0.007-0.014	
		C=0.25-0.55%	150				262-328	0.007-0.014	
		C=0.55-0.80%	170				262-328	0.007-0.014	
	High carbon steel	Carbon tool steel	210	AP301U(N)			230-328	0.007-0.012	
	Low-alloyed steel	Non-Hardened		180	AP301U(N)			197-328	0.006-0.014
		Tempered		275				230-328	0.007-0.012
		Tempered		350				230-328	0.007-0.012
	High-alloyed steel	Annealed		200	AP301U(N)			197-328	0.006-0.012
		Hardened tool steel		325				197-328	0.006-0.012
Cast steel	Non-alloyed steel		180	AP301U(N)			164-328	0.006-0.012	
	Low-alloy (alloy<5%)		200				164-328	0.006-0.012	
M	Stainless steel	Non-Hardened/Ferritic/martensitic		200	AP301U(N)			164-295	0.006-0.014
		Austenitic		200				164-295	0.006-0.014
		Austenitic, precipitation hardened (PH)		300					
		Austenitic/ferritic, duplex		230					
K	Malleable cast iron	Ferritic		200	AP301U(N)				
		Pearlitic		260					
	Grey cast iron	Low tensile strength		180	AP301U(N)				
		High tensile strength		245					
	Nodular cast iron	Ferritic		160	AP301U(N)				
		Pearlitic		250					
GGV (CGI)				230					
N	Wrought aluminium alloys	non-aging		30	AP301U(N)			213-426	0.004-0.012
		aged		100				213-426	0.004-0.012
	Cast aluminium alloys	≤ 12% Si, non-aging		75	AP301U(N)			213-426	0.004-0.012
		≤ 12% Si, aged		90				213-426	0.004-0.012
		> 12% Si, non-aging		130				213-426	0.004-0.012
	Magnesium alloy			70					
	Copper and copper alloys (bronze/brass)	Unalloyed, electrolytic copper		100	AP301U(N)			213-426	0.004-0.012
		Brass, bronze, red brass		90				213-426	0.004-0.012
Cu alloys, short-chip		110	213-426	0.004-0.012					
High tensile, Ampco alloy		300	213-426	0.004-0.012					
S	Heat-resistant alloys	Fe-based annealed		200	AP301U(N)			66-213	0.006-0.012
		Fe-based hardened		280				66-213	0.006-0.012
		Ni or Co-based annealed		250				66-213	0.006-0.012
		Ni or Co-based hardened		350				66-213	0.006-0.012
		Ni or Co-based cast		320					
	Titanium alloys	Pure titanium		200	AP301U(N)			98-328	0.006-0.012
		α alloys		375				98-328	0.006-0.012
α and β alloys		375	98-328	0.006-0.012					
		β alloys		410				98-328	0.006-0.014
H	Hardened steel	Hardened and tempered		43-47 HRC					
	Chilled cast iron			47-60 HRC					

*) Insert position-P, I, C
P=peripheral insert, I=intermediate insert, C=center insert