

ACHTECK • DRILL

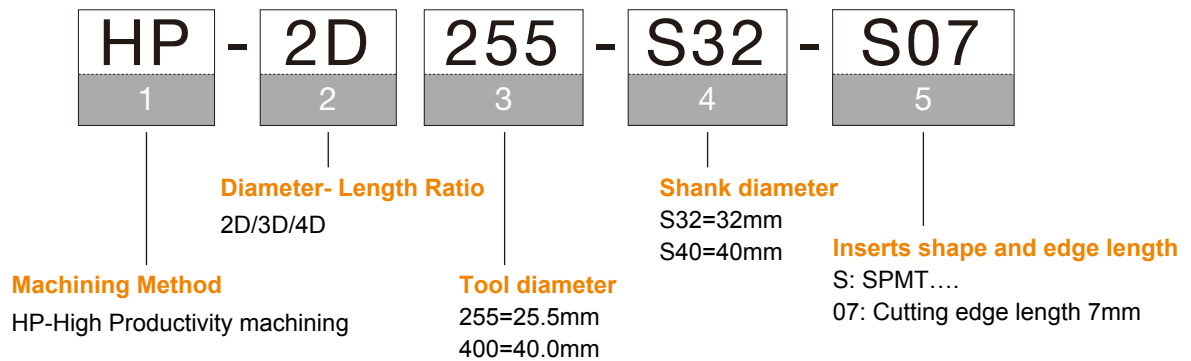
DP Series

Indexable Drills



www.achtecktool.com

Indexable Drilling Holder Designation System



ACHTECK new product

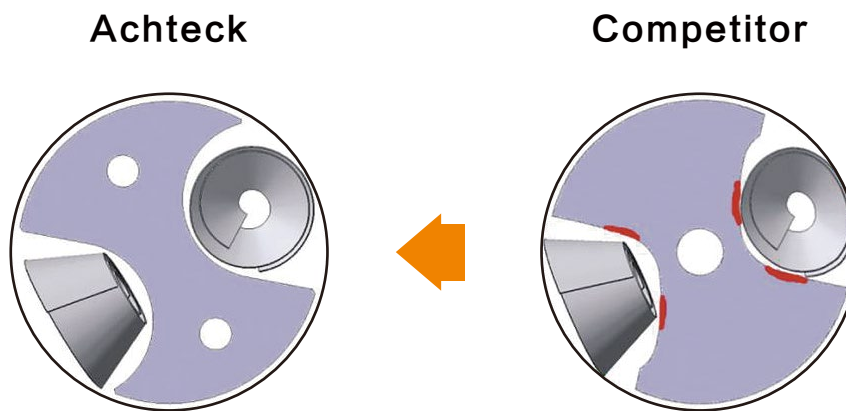
Drilling tool DP series

Achieving high efficiency for shallow hole machining

◆ Drilling Body Advantages



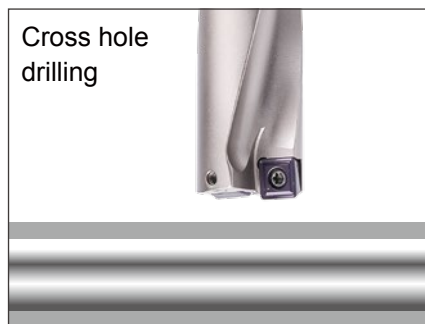
- ① Installed indexable insert with 4 cutting edge; the balancing cutting force from exactly layout of peripheral insert and center insert.
- ② Optimized chip flute has bigger space and smooth chip evacuation merits, which ensures the holder stability.
- ③ Nickel-plated body improves wear resistance and corrosion resistance, and more attractive as well.
- ④ Weldon shank ensures holder tightly installed on the machine by well location and fasten clamping.



- Double coolant holes make sure efficient cutting lubrication and chip evacuation
- Low cutting force and high hole accuracy
- High productivity by high cutting parameter

◆ Machining Diagram

Machining Diagram



Work piece profile view



Work piece with good surface finishing and straightness. It can also drill on ramp or uneven conditions.

◆ Material Introduction

AP301U

Coating type:PVD coating

High strength ultra-fine crystal carbide substrate deposited with TiALN PVD coating gets good combination property and chip evacuation; suitable for steel, stainless steel, high temperature alloy and cast iron machining.

AP351U

Coating type:PVD coating

High toughness grade with TiALN coating is suitable for steel, stainless steel and high temperature alloy machining. Recommended for harsh conditions or chipping of AP301U.

◆ Insert Chip Breaker Introduction

New Chip Breaker-DP

DP series is high efficiency drill with four cutting edges, and is suitable for shallow hole high speed drilling.

- Square insert with strong cutting edge gets excellent straightness.
- Optimized chip flute provides excellent chip breaking and evacuation.
- DP series is suitable for steels and cast iron machining.



◆ Chips comparison graph

Drilling holder designation: HP-3D250-032-S06

Insert designation: SPMT 060204E-DP AP301U

Material: 4340

Coolant type: Inner coolant



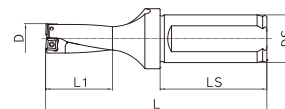
Vc=170m/min	fr=0.10mm/r	fr=0.12mm/r	fr=0.14mm/r
Achteck			
Competitor			

◆ Application Range

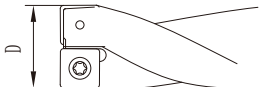
It's available for construction machinery industry, general machinery industry, power industry and Automotive industry.



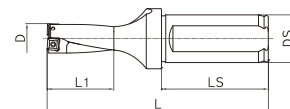
Diameter- Length Ratio : 2D
2D holder



Designation	Dimensions(mm)					Insert
	D	L1	L	Ds	Ls	
HP-2D130-S20-S05	13.0	29	99	20	50	SPMT 050204E-DP
HP-2D135-S20-S05	13.5	30	100	20	50	
HP-2D140-S20-S05	14.0	31	101	20	50	
HP-2D145-S20-S05	14.5	32	102	20	50	
HP-2D150-S20-S05	15.0	33	103	20	50	
HP-2D155-S25-S06	15.5	34	115	25	56	SPMT 060204E-DP
HP-2D160-S25-S06	16.0	35	116	25	56	
HP-2D165-S25-S06	16.5	36	117	25	56	
HP-2D170-S25-S06	17.0	37	118	25	56	
HP-2D175-S25-S06	17.5	38	119	25	56	
HP-2D180-S25-S06	18.0	39	120	25	56	
HP-2D185-S25-S06	18.5	40	121	25	56	
HP-2D190-S25-S06	19.0	41	122	25	56	
HP-2D195-S25-S06	19.5	42	123	25	56	
HP-2D200-S25-S06	20.0	43	124	25	56	
HP-2D205-S25-S06	20.5	44	125	25	56	
HP-2D210-S25-S06	21.0	45	126	25	56	
HP-2D215-S25-S06	21.5	46	127	25	56	
HP-2D220-S32-S07	22.0	47	137	32	60	SPMT 07T308E-DP
HP-2D225-S32-S07	22.5	48	138	32	60	
HP-2D230-S32-S07	23.0	49	139	32	60	
HP-2D235-S32-S07	23.5	50	140	32	60	
HP-2D240-S32-S07	24.0	51	141	32	60	
HP-2D245-S32-S07	24.5	52	142	32	60	
HP-2D250-S32-S07	25.0	53	143	32	60	
HP-2D255-S32-S07	25.5	54	144	32	60	
HP-2D260-S32-S07	26.0	55	145	32	60	
HP-2D265-S32-S07	26.5	56	146	32	60	
HP-2D270-S32-S07	27.0	57	147	32	60	
HP-2D275-S32-S07	27.5	58	148	32	60	

Dimensions (mm)	Spare parts	
Body diameter	Screw	Wrench
		
13-15	AST2043-60	AWF-T06
15.5-21.5	AST2255-60	AWF-T06
22-27.5	AST25065-60S	AWF-T08

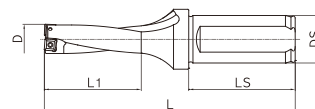
Diameter- Length Ratio : 2D
2D holder



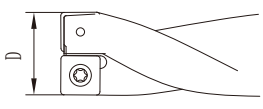
Designation	Dimensions(mm)					Insert
	D	L1	L	Ds	LS	
HP-2D280-S32-S09	28.0	59	149	32	60	SPMT 090408E-DP
HP-2D285-S32-S09	28.5	60	150	32	60	
HP-2D290-S32-S09	29.0	61	151	32	60	
HP-2D295-S32-S09	29.5	63	153	32	60	
HP-2D300-S32-S09	30.0	65	155	32	60	
HP-2D310-S32-S09	31.0	67	157	32	60	
HP-2D320-S32-S09	32.0	69	159	32	60	
HP-2D330-S32-S09	33.0	71	161	32	60	
HP-2D340-S40-S11	34.0	73	178	40	70	SPMT 110408E-DP
HP-2D350-S40-S11	35.0	75	180	40	70	
HP-2D360-S40-S11	36.0	77	182	40	70	
HP-2D370-S40-S11	37.0	79	184	40	70	
HP-2D380-S40-S11	38.0	81	186	40	70	
HP-2D390-S40-S11	39.0	83	188	40	70	
HP-2D400-S40-S11	40.0	85	190	40	70	
HP-2D410-S40-S11	41.0	87	192	40	70	
HP-2D420-S40-S14	42.0	89	194	40	70	SPMT 140512E-DP
HP-2D430-S40-S14	43.0	91	196	40	70	
HP-2D440-S40-S14	44.0	93	198	40	70	
HP-2D450-S40-S14	45.0	95	200	40	70	
HP-2D460-S40-S14	46.0	97	202	40	70	
HP-2D470-S40-S14	47.0	99	204	40	70	
HP-2D480-S40-S14	48.0	101	206	40	70	
HP-2D490-S40-S14	49.0	103	208	40	70	
HP-2D500-S40-S14	50.0	105	210	40	70	

Dimensions (mm)	Spare parts	
Body diameter	Screw	Wrench
28-33	AST35084-60H	AWF-T15
34-41	AST410-60H	AWF-T15
42-50	AST5126-60	AWF-T20

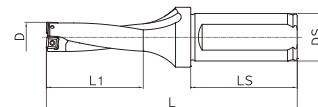
Diameter- Length Ratio : 3D
3D holder



Designation	Dimensions(mm)					Insert
	D	L1	L	DS	LS	
HP-3D130-S20-S05	13.0	42	112	20	50	SPMT 050204E-DP
HP-3D135-S20-S05	13.5	44	114	20	50	
HP-3D140-S20-S05	14.0	45	115	20	50	
HP-3D145-S20-S05	14.5	47	117	20	50	
HP-3D150-S20-S05	15.0	48	118	20	50	
HP-3D155-S25-S06	15.5	50	131	25	56	SPMT 060204E-DP
HP-3D160-S25-S06	16.0	51	132	25	56	
HP-3D165-S25-S06	16.5	53	134	25	56	
HP-3D170-S25-S06	17.0	54	135	25	56	
HP-3D175-S25-S06	17.5	56	137	25	56	
HP-3D180-S25-S06	18.0	57	138	25	56	
HP-3D185-S25-S06	18.5	59	140	25	56	
HP-3D190-S25-S06	19.0	60	141	25	56	
HP-3D195-S25-S06	19.5	62	143	25	56	
HP-3D200-S25-S06	20.0	63	144	25	56	
HP-3D205-S25-S06	20.5	65	146	25	56	
HP-3D210-S25-S06	21.0	66	147	25	56	
HP-3D215-S25-S06	21.5	68	149	25	56	
HP-3D220-S32-S07	22.0	69	159	32	60	SPMT 07T308E-DP
HP-3D225-S32-S07	22.5	71	161	32	60	
HP-3D230-S32-S07	23.0	72	162	32	60	
HP-3D235-S32-S07	23.5	74	164	32	60	
HP-3D240-S32-S07	24.0	75	165	32	60	
HP-3D245-S32-S07	24.5	77	167	32	60	
HP-3D250-S32-S07	25.0	78	168	32	60	
HP-3D255-S32-S07	25.5	80	170	32	60	
HP-3D260-S32-S07	26.0	81	171	32	60	
HP-3D265-S32-S07	26.5	83	173	32	60	
HP-3D270-S32-S07	27.0	84	174	32	60	
HP-3D275-S32-S07	27.5	86	176	32	60	

Dimensions (mm)	Spare parts	
Body diameter	Screw	Wrench
		
13-15	AST2043-60	AWF-T06
15.5-21.5	AST2255-60	AWF-T06
22-27.5	AST25065-60S	AWF-T08

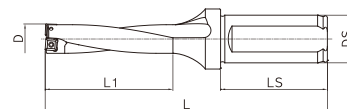
Diameter- Length Ratio : 3D
3D holder



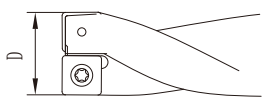
Designation	Dimensions(mm)					Insert
	D	L1	L	Ds	Ls	
HP-3D280-S32-S09	28.0	87	177	32	60	SPMT 090408E-DP
HP-3D285-S32-S09	28.5	89	179	32	60	
HP-3D290-S32-S09	29.0	90	180	32	60	
HP-3D295-S32-S09	29.5	93	183	32	60	
HP-3D300-S32-S09	30.0	95	185	32	60	
HP-3D310-S32-S09	31.0	98	188	32	60	
HP-3D320-S32-S09	32.0	101	191	32	60	
HP-3D330-S32-S09	33.0	104	194	32	60	
HP-3D340-S40-S11	34.0	107	212	40	70	SPMT 110408E-DP
HP-3D350-S40-S11	35.0	110	215	40	70	
HP-3D360-S40-S11	36.0	113	218	40	70	
HP-3D370-S40-S11	37.0	116	221	40	70	
HP-3D380-S40-S11	38.0	119	224	40	70	
HP-3D390-S40-S11	39.0	122	227	40	70	
HP-3D400-S40-S11	40.0	125	230	40	70	
HP-3D410-S40-S11	41.0	128	233	40	70	
HP-3D420-S40-S14	42.0	131	236	40	70	SPMT 140512E-DP
HP-3D430-S40-S14	43.0	134	239	40	70	
HP-3D440-S40-S14	44.0	137	242	40	70	
HP-3D450-S40-S14	45.0	140	245	40	70	
HP-3D460-S40-S14	46.0	143	248	40	70	
HP-3D470-S40-S14	47.0	146	251	40	70	
HP-3D480-S40-S14	48.0	149	254	40	70	
HP-3D490-S40-S14	49.0	152	257	40	70	
HP-3D500-S40-S14	50.0	155	260	40	70	

Dimensions (mm)	Spare parts	
Body diameter	Screw	Wrench
28-33	AST35084-60H	AWF-T15
34-41	AST410-60H	AWF-T15
42-50	AST5126-60	AWF-T20

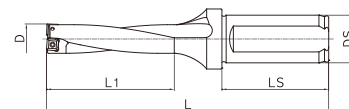
Diameter- Length Ratio : 4D
4D holder



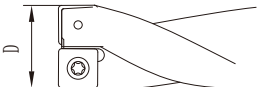
Designation	Dimensions(mm)					Insert
	D	L1	L	Ds	Ls	
HP-4D130-S20-S05	13.0	55	125	20	50	SPMT 050204E-DP
HP-4D135-S20-S05	13.5	57	127	20	50	
HP-4D140-S20-S05	14.0	59	129	20	50	
HP-4D145-S20-S05	14.5	61	131	20	50	
HP-4D150-S20-S05	15.0	63	133	20	50	
HP-4D155-S25-S06	15.5	65	146	25	56	SPMT 060204E-DP
HP-4D160-S25-S06	16.0	67	148	25	56	
HP-4D165-S25-S06	16.5	69	150	25	56	
HP-4D170-S25-S06	17.0	71	152	25	56	
HP-4D175-S25-S06	17.5	73	154	25	56	
HP-4D180-S25-S06	18.0	75	156	25	56	
HP-4D185-S25-S06	18.5	77	158	25	56	
HP-4D190-S25-S06	19.0	79	160	25	56	
HP-4D195-S25-S06	19.5	81	162	25	56	
HP-4D200-S25-S06	20.0	83	164	25	56	
HP-4D205-S25-S06	20.5	85	166	25	56	
HP-4D210-S25-S06	21.0	87	168	25	56	
HP-4D215-S25-S06	21.5	89	170	25	56	
HP-4D220-S32-S07	22.0	91	181	32	60	SPMT 07T308E-DP
HP-4D225-S32-S07	22.5	93	183	32	60	
HP-4D230-S32-S07	23.0	95	185	32	60	
HP-4D235-S32-S07	23.5	97	187	32	60	
HP-4D240-S32-S07	24.0	99	189	32	60	
HP-4D245-S32-S07	24.5	101	191	32	60	
HP-4D250-S32-S07	25.0	103	193	32	60	
HP-4D255-S32-S07	25.5	105	195	32	60	
HP-4D260-S32-S07	26.0	107	197	32	60	
HP-4D265-S32-S07	26.5	109	199	32	60	
HP-4D270-S32-S07	27.0	111	201	32	60	
HP-4D275-S32-S07	27.5	113	203	32	60	

Dimensions (mm)	Spare parts	
Body diameter	Screw	Wrench
		
13-15	AST2043-60	AWF-T06
15.5-21.5	AST2255-60	AWF-T06
22-27.5	AST25065-60S	AWF-T08

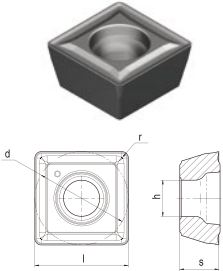
Diameter- Length Ratio : 4D
4D holder



Designation	Dimensions(mm)					Insert
	D	L1	L	Ds	Ls	
HP-4D280-S32-S09	28.0	115	205	32	60	SPMT 090408E-DP
HP-4D285-S32-S09	28.5	117	207	32	60	
HP-4D290-S32-S09	29.0	120	210	32	60	
HP-4D295-S32-S09	29.5	123	213	32	60	
HP-4D300-S32-S09	30.0	125	215	32	60	
HP-4D310-S32-S09	31.0	129	219	32	60	
HP-4D320-S32-S09	32.0	133	223	32	60	
HP-4D330-S32-S09	33.0	137	227	32	60	
HP-4D340-S40-S11	34.0	141	246	40	70	SPMT 110408E-DP
HP-4D350-S40-S11	35.0	145	250	40	70	
HP-4D360-S40-S11	36.0	149	254	40	70	
HP-4D370-S40-S11	37.0	153	258	40	70	
HP-4D380-S40-S11	38.0	157	262	40	70	
HP-4D390-S40-S11	39.0	161	266	40	70	
HP-4D400-S40-S11	40.0	165	270	40	70	
HP-4D410-S40-S11	41.0	169	274	40	70	
HP-4D420-S40-S14	42.0	173	278	40	70	SPMT 140512E-DP
HP-4D430-S40-S14	43.0	177	282	40	70	
HP-4D440-S40-S14	44.0	181	286	40	70	
HP-4D450-S40-S14	45.0	185	290	40	70	
HP-4D460-S40-S14	46.0	189	294	40	70	
HP-4D470-S40-S14	47.0	193	298	40	70	
HP-4D480-S40-S14	48.0	197	302	40	70	
HP-4D490-S40-S14	49.0	201	306	40	70	
HP-4D500-S40-S14	50.0	205	310	40	70	

Dimensions (mm)	Spare parts	
Body diameter	Screw	Wrench
		
28-33	AST35084-60H	AWF-T15
34-41	AST410-60H	AWF-T15
42-50	AST5126-60	AWF-T20

Insert Stock

Insert	Designation	Recommended parameter		Grade		
		Feed (mm/r)	Cutting speed (m/min)	CVD coated	PVD coated	
				AC301P	AP301U	AP351U
	SPMT 050204E-DP	0.06-0.12	130-250	●	●	●
	SPMT 060204E-DP	0.08-0.15	130-250	●	●	●
	SPMT 07T308E-DP	0.10-0.20	130-250	●	●	●
	SPMT 090408E-DP	0.12-0.25	130-250	●	●	●
	SPMT 110408E-DP	0.14-0.28	130-250	●	●	●
	SPMT 140512E-DP	0.15-0.30	130-250	●	●	●

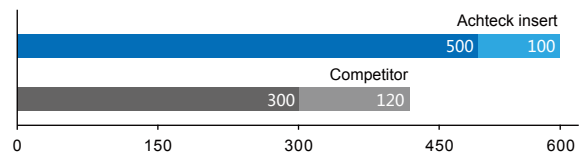
Remark: ● Represent for standard stock

Machining case

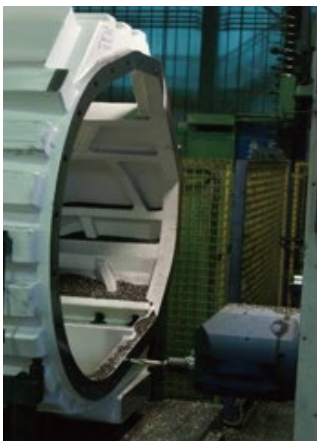
Material: Alloy steel Hardness: HB280-320
 Work piece: Steels plate Cutting depth: 65mm
 Cutting diameter: $\varnothing 25$ Coolant type: Inner coolant
 Tool designation: HP-3D250-S32-S07
 Insert designation: SPMT 07T308E-DP AP301U
 (center&peripheral insert)
 Cutting parameter: $V_c=160\text{m/min}$ $f_n=0.12\text{mm/r}$



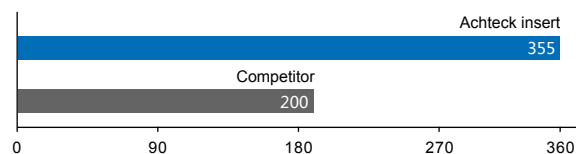
Tool life comparison				
Hole number/length	SPMT 07T308E-DP		Competitor maker	
	Periphery	Center	Periphery	Center
300PCS/19.5m				
420PCS/27.3m				
500PCS/32.5m				
600PCS/39m				



After drilled 600 holes, Achteck changed the edge cause of wear; however, competitor appeared wear when drilled 300 holes and chipped when drilled 420 holes. Achteck's tool life is 43% higher than competitor maker.



Material: Gray cast iron Hardness: HB180-240
 Work piece: Gear box casing Cutting depth: 100mm
 Cutting diameter: $\varnothing 26.5$ Coolant type: Inner coolant
 Tool designation: HP-4D265-S32-S07
 Insert designation: SPMT 07T308E-DP AP301U (center&peripheral insert)
 Cutting parameter: $V_c=170\text{m/min}$ $f_n=0.22\text{mm/r}$



Test result: Achteck's tool life is 78% higher than competitor maker.

Application Chart

Machined Materials				AP301U	AP351U	AC301P
ISO	Material classification	Tensile strength (N/mm ²)	Hardness (HB)	PVD coated	PVD coated	CVD coated
P	Non-alloyed steel	<600	<180	●	●	●
		<950	<280	●	●	●
		700-950	200-280	●	●	●
	Alloyed steel	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	-	-	-
S	Fe based alloy	943	280	-	◐	-
	Co based alloy	1076	320	-	◐	-
	Ni based alloy	1177	350	-	◐	-
	Ti-alloy	1262	370	-	◐	-
N	Aluminum	260	75	-	-	-
	Aluminum alloy	447	130	-	-	-
H	Hardened steel	-	50-60HRC	-	-	-
	Chilled cast iron	-	55HRC	-	-	-

- : Best choice
- ◐ : 2nd choice
- : Inapplicable

Achteck Drilling DP Series- Recommended Cutting Parameter

Machined Materials										Achteck Drilling Grades Application Ranges									
ISO	Material classification	Tensile strength (N/mm ²)	Hardness (HB)	Feed (mm/r)										Feed (mm/r)					
				Cutting speed (m/min)										Cutting speed (m/min)					
				Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min
				260	240	224	220	185	150	200	175	150	SPMT 060204E-DP	SPMT 060204E-DP	SPMT 060204E-DP	SPMT 070208E-DP	SPMT 090308E-DP	SPMT 110408E-DP	SPMT 140512E-DP
P	Non-alloyed steel	<600	<180	260	240	224	220	185	150	200	175	150	0.05-0.08	0.06-0.10	0.06-0.12	0.06-0.12	0.07-0.13	0.08-0.15	0.08-0.16
			<280	250	210	170	200	170	140	190	162.5	135	0.06-0.12	0.08-0.15	0.10-0.18	0.10-0.18	0.12-0.22	0.12-0.24	0.13-0.25
	Alloyed steel	700-950	200-280	240	200	160	190	160	130	180	150	120	0.06-0.10	0.08-0.14	0.10-0.18	0.10-0.18	0.12-0.22	0.12-0.23	0.13-0.24
			280-355	210	170	130	170	130	90	160	130	100	0.06-0.12	0.08-0.15	0.10-0.18	0.10-0.18	0.12-0.22	0.12-0.24	0.13-0.25
			1200-1400	170	140	110	160	120	80	140	110	80	0.06-0.10	0.08-0.14	0.10-0.18	0.10-0.18	0.12-0.22	0.12-0.23	0.13-0.24
M	Duplex stainless steel	778	230	260	200	140	180	135	90				0.05-0.10	0.06-0.12	0.08-0.15	0.09-0.16	0.10-0.17	0.11-0.18	
	Austenitic stainless steel	675	200	220	170	120	120	65	60				0.05-0.10	0.06-0.12	0.08-0.15	0.09-0.16	0.10-0.17	0.11-0.18	
	Precipitation-hardening stainless steel	1013	300	180	140	100	90	65	40										
K	Grey cast iron	700	220																
	Nodular Cast iron	880	260																
	Malleable cast iron	800	250																
S	Fe based alloy	943	280				40	30	20										
	Co based alloy	1076	320				35	25	15										
	Ni based alloy	1177	350				35	25	15										
	Ti-alloy	1262	370				40	30	20				0.05-0.10	0.06-0.14	0.08-0.18	0.10-0.22	0.14-0.23	0.15-0.24	
	Aluminum	260	75																
N	Aluminum alloy	447	130																
H	Hardened steel	-	50-60HRC																
	Chilled cast iron	-	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 coolants.

Technical Requirements

Hole accuracy range

Diameter (mm)	2D	3D	4D
φ13~φ21.5	-0.1mm~+0.15mm	-0.1mm~+0.15mm	-0.15mm~+0.2mm
φ22~φ50	-0.1mm~+0.15mm	-0.12mm~+0.2mm	-0.15mm~+0.25mm

Coolant supply

1. Make sure at least 5kg/cm² coolant pressure for 2D and 3D drill.
2. Suggest at least 8kg/cm² coolant pressure for 4D drill.

Low pressure leads to vibration, bad chip removal and short tool life.

Questions and Answers

Failure phenomenon			Cause	Solution
Insert abnormal wear	Central edge	Bottom	Unsuitable cutting conditions	Increase standard cutting speed 10% Reduce feed rate 10%
	Peripheral edge	Bottom	Unsuitable cutting conditions	Increase standard cutting speed 10% Excessive higher or less feed rate; adjust to standard conditions
	General	Bottom	Cutting fluid type and supply	Ensure fluid above 7L Cutting fluid concentration above 5% Using fine lubricating cutting fluid Outer coolant condition change to inner coolant type
			Vibration during drilling	Use higher rigidity machine Change to higher rigidity chuck Change installing method of the drill
			Unsuitable grade	Change to higher wear-resistance grade
			Insert locking screw loose	Locked the screws well
		Crater wear	High cutting heat	Outer coolant condition change to inner coolant type Increase cutting fluid supply (recommended 10L above) Reduce standard feed rate 20% Reduce standard cutting speed 20%
			Serious cutting scratch	Reduce standard feed rate 20% Reduce standard cutting speed 20%
		Chip breaking	Bad chip control and blocked	Increase standard cutting speed 20%, reduce feed rate 20% Improve coolant pressure(recommend above 1.5MPa)

Attention

For through-hole drilling, it would produce disc during tool pass through the work piece.

If the drill is fixed and the work piece is rotating, the disc would be threw away by centrifugal force.

Please DO PRECAUTION for the person on the spot.

Drilling General Formula

Vc: Cutting speed (m/min)

fz: Feed per tooth (mm/z)

Z: Number of teeth

f: Feed rate per rev. (mm/rev)

Kc: Unit cutting force(N/mm²)

Mc: Torque

Vf: Feed (mm/min)

n: Spindle speed (rev/min)

Q: Metal removal rate(cm³/min)

hm: Chip thickness

η: Machine efficiency coefficient (0.7-0.95)

mc: Kc Clinographic curve

Dc: Diameter of Drill(mm)

A: Chip sectional area

Ff: Feed force

Pmot: Cutting power(KW)

kr: Approaching angle (°)

Hp: Horse power

Cutting speed

$$V_c = \frac{\pi * D_c * n}{1000} \text{ (m/min)}$$

Spindle speed

$$n = \frac{1000 * V_c}{\pi * D_c} \text{ (rev/min)}$$

Feed speed

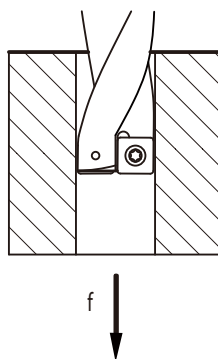
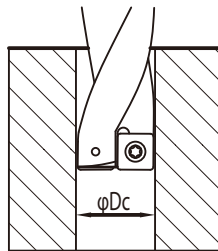
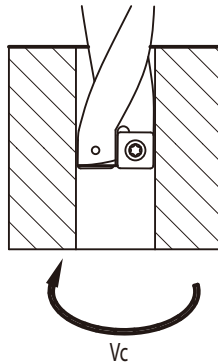
$$V_f = f_z * n * Z \text{ (mm/min)}$$

Feed per tooth

$$f_z = \frac{V_f}{n * Z} \text{ (mm/z)}$$

Feed rate per rev.

$$f = \frac{V_f}{n} \text{ (mm/rev)}$$



Power demand

$$P_{mot} = \frac{Q * K_c}{60000 * \eta} \text{ (KW)}$$

Torque

$$M_c = \frac{D_c^2 * K_c * f}{8000} \text{ (N*m)}$$

Feed force

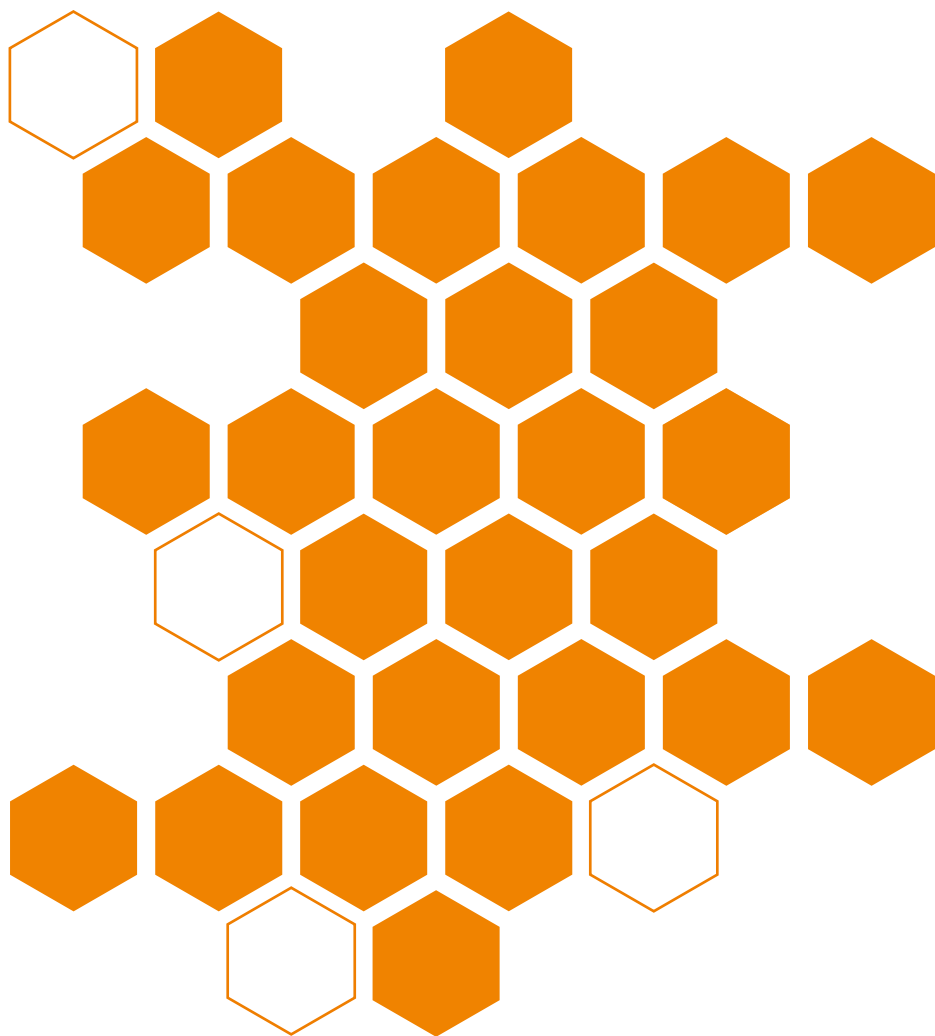
$$F_f = 0.63 * \frac{f * D_c * K_c}{2} \text{ (N)}$$

Chip thickness

$$h = f_z * \sin \kappa \text{ (mm)}$$

Metal removal rate

$$Q = \frac{V_f * \pi * D_c^2}{4 * 1000} \text{ (cm}^3\text{/min)}$$



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