

Tooling by **DIJET**[®]

Drills

TA-EZ Drill TEZD-MS/ML^{TYPE}

Easy assembly and high cutting performances



Ecology EZ cutting edge geometry reduce power consumption by 30%.

Economy High rigid **G-Body** achieves longer tool life of holder and insert.

High performance Unique cooling system achieve surely coolant supply to cutting edge.

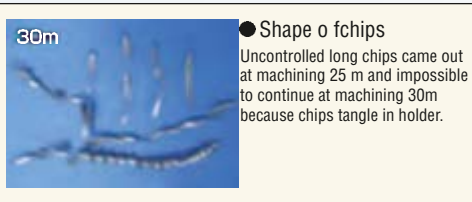


CUTTING PERFORMANCES

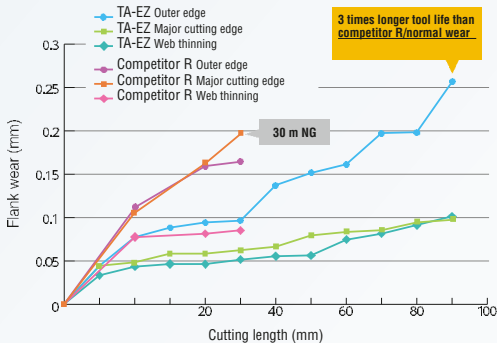
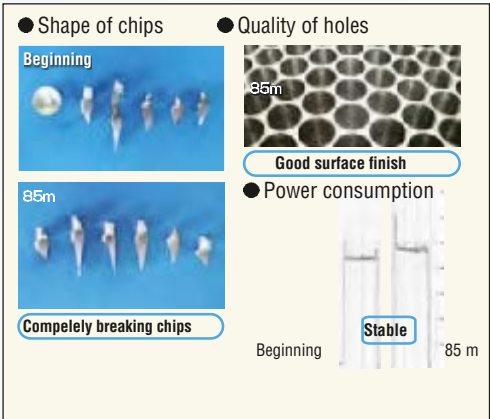
Tool life comparison

Toolno.: TEZD1900S25-ML (5XDc), TEZ 1930 ($\varnothing 19.3$ mm)
 Competitor R: $\varnothing 19$ mm
 Material: S25C (C25)
 Machine: Vertical MC (BT50)
 Coolant: Water soluble (Internal)
 Cuttingcondition: $V_c=75$ m/min, $f=0.35$ mm/rev, $H=95$ mm (Through hole)

Competitor R



TEZD type



TA-EZ Drill

TEZD_{TYPE}

Instructions for mounting insert

1. Clean

Clean the insert pocket (Slit part) by air blow or brush.



2. Mounting insert

Tighten two clamp screws temporary with pressing the top of insert (refer below photo). After conforming there is no gap between insert and insert pocket, tighten the clamp screws completely. (refer page E019-E022 for the recommended torque for the clamp screw). Recommend to apply "MOLY" to the clamp screw in advance.



Anti-seizure paste
"MOLY"

 Attention

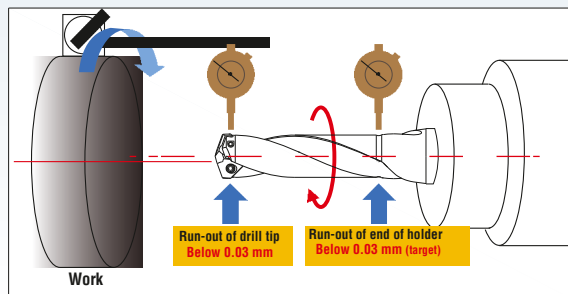
Clamp screw is expendable, so please change the clamp screw when ever you change the insert 10 times. But in case, there is the deformation of clamp screw, change it immediately.



Clamp screw

Instructions for using at NC lathe

1. Adjust run-out of drill tip below 0.03 mm (off set of center below 0.015 mm) and run-out of end of holder below 0.03 mm (target)
2. Due to large thrust cutting force, set a backup plate at bottom end of holder.
3. Reduce spindle speed and feed speed by 20% on recommended cutting conditions. (Page E024). In case of long chips come out, recommend to increase feed rate only.



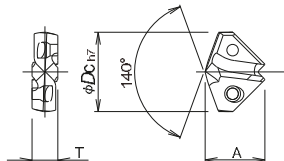
TA-EZ Drill

TEZD-MS/MLTYPE

G-Body

Through Coolant Hole

- Drilling depth: 3 x Dc/5 x Dc



- MS type: 3 x Dc



- ML type: 5 x Dc



■ Insert

■ Body

Drill dia. (mm)	Insert				Body									
	Insert No.	PVD coated	Dimensions (mm)		Applicable dia.		Tool no.	Stock	MS type (3D)					
			JC8050	A	T	Over			Under	Dimensions (mm)				
ϕDc									ℓ	ℓ_2	ℓ_s	L	ϕD_s	
14	TEZ1400	●												
14.1	TEZ1410	●												
14.2	TEZ1420	●												
14.3	TEZ1430	□	11.4	4.5	13.5	14.5	TEZD1400S16-MS	●	51	65	48	113	16	
14.4	TEZ1440	□												
14.5	TEZ1450	●												
14.6	TEZ1460	□												
14.7	TEZ1470	□												
14.8	TEZ1480	□												
14.9	TEZ1490	□												
15	TEZ1500	●	11.5	4.8	14.5	15.5	TEZD1500S20-MS	●	54	69	50	119	20	
15.1	TEZ1510	●												
15.2	TEZ1520	●												
15.3	TEZ1530	□												
15.4	TEZ1540	□												
15.5	TEZ1550	●												
15.6	TEZ1560	□												
15.7	TEZ1570	□												
15.8	TEZ1580	●												
15.9	TEZ1590	□												
16	TEZ1600	●	12.4	5.0	15.5	16.5	TEZD1600S20-MS	●	58	74	50	124	20	
16.1	TEZ1610	□												
16.2	TEZ1620	●												
16.3	TEZ1630	●												
16.4	TEZ1640	□												
16.5	TEZ1650	●												
16.6	TEZ1660	□												
16.7	TEZ1670	□												
16.8	TEZ1680	□												
16.9	TEZ1690	□												
17	TEZ1700	●	13.2	5.5	16.5	17.5	TEZD1700S20-MS	●	61	78	50	128	20	
17.1	TEZ1710	□												
17.2	TEZ1720	□												
17.3	TEZ1730	□												
17.4	TEZ1740	□												
17.5	TEZ1750	●												
17.6	TEZ1760	□												
17.7	TEZ1770	□												
17.8	TEZ1780	●												
17.9	TEZ1790	□												
18	TEZ1800	●	13.5	5.8	17.5	18.5	TEZD1800S20-MS	●	65	83	50	133	20	
18.1	TEZ1810	●												
18.2	TEZ1820	□												
18.3	TEZ1830	□												
18.4	TEZ1840	□												
18.5	TEZ1850	●												

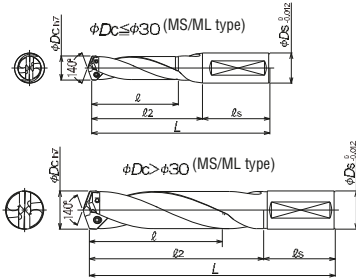
1 insert per case

■ NOTE

- 1) All bodies are supplied without insert.
- 2) Please contact with our salesdepartment for make to order items.
- 3) Please refer page E008 for recommended cutting conditions.
- 4) Please refer page E003 for "Instructions for mounting insert".

TA-EZ Drill

TEZD-MS/MLTYPE



Clamp screw	Recommended torque (Nm)
DSW-2045H	0.9
TSW-2556H	1.2
TSW-2556H	1.2
DSW-307H	2.0
DSW-309H	2.0
TSW-3510H	3.0
TSW-3512H	3.0

Insert

Parts

Body							Parts	
ML type (5D)							Clamp screw	Wrench
Toolno.	Stock	Dimensions (mm)						
		ℓ	ℓ_2	ℓ_s	L	ϕD_s		
TEZD1400S16-ML	●	80	97	48	145	16	DSW-2045H	A-07
TEZD1500S20-ML	●	85	103	50	153	20	DSW-2045H	A-07
TEZD1600S20-ML	●	91	110	50	160	20	TSW-2556H	A-08
TEZD1700S20-ML	●	96	117	50	167	20	TSW-2556H	A-08
TEZD1800S20-ML	●	102	123	50	173	20	TSW-2556H	A-08

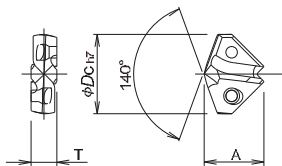
TA-EZ Drill

TEZD-MS/MLTYPE

G-Body

Through Coolant Hole

● Drilling depth: 3 x Dc/5 x Dc



● MS type: 3 x Dc



● ML type: 5 x Dc



■ Insert

■ Body

Drill dia. (mm)	Insert			Dimensions (mm)		Applicable dia.		Body							
	Insert No.	PVD coated JC8050		A	T	Over	Under	Toolno.	Stock	MS type (3D)					
										Dimensions (mm)					
φDc										ℓ	ℓ2	ℓs	L	φDs	
18.6	TEZ1860	□													
18.7	TEZ1870	□													
18.8	TEZ1880	□													
18.9	TEZ1890	□													
19	TEZ1900	●	14.2	6.0	18.5	19.5	TEZD1900S25-MS	●	68	87	56	143	25		
19.1	TEZ1910	□													
19.2	TEZ1920	□													
19.3	TEZ1930	●													
19.	TEZ1940	□													
19.5	TEZ1950	●													
19.6	TEZ1960	□													
19.7	TEZ1970	□													
19.8	TEZ1980	●	15.1	6.5	19.5	20.5	TEZD2000S25-MS	●	72	92	56	148	25		
19.9	TEZ1990	□													
20	TEZ2000	●													
20.5	TEZ2050	●													
21	TEZ2100	●	15.7	6.7	20.5	21.5	TEZD2100S25-MS	●	75	96	56	152	25		
21.5	TEZ2150	●													
22	TEZ2200	●	16.6	7.5	21.5	22.5	TEZD2200S25-MS	●	79	101	6	157	25		
22.5	TEZ2250	●													
23	TEZ2300	●	17.4	7.5	22.5	23.5	TEZD2300S25-MS	●	82	105	56	161	25		
23.5	TEZ2350	●													
24	TEZ2400	●	18.2	8.0	23.5	24.5	TEZD2400S32-MS	●	86	110	60	170	32		
24.5	TEZ2450	●													
25	TEZ2500	●	19.1	8.0	24.5	25.5	TEZD2500S32-MS	●	89	114	60	174	32		
25.5	TEZ2550	●													
26	TEZ2600	●	19.7	8.5	25.5	26.5	TEZD2600S32-MS	●	93	119	60	179	32		
26.5	TEZ2650	●													
27	TEZ2700	●													
27.5	TEZ2750	●	20.4	8.5	26.5	27.5	TEZD2700S32-MS	●	96	123	60	183	32		
28	TEZ2800	●	21.2	9.0	27.5	28.5	TEZD2800S32-MS	●	100	128	60	188	32		
28.5	TEZ2850	●													
29	TEZ2900	●	22.1	9.0	28.5	29.5	TEZD2900S32-MS	●	103	132	60	192	32		
29.5	TEZ2950	●													
30	TEZ3000	●	22.5	9.5	29.5	30.5	TEZD3000S32-MS	●	107	137	60	197	32		
30.5	TEZ3050	●													
31	TEZ3100	●	23.4	10.0	30.5	31.5	TEZD3100S32-MS	●	110	141	60	201	32		
31.5	TEZ3150	●													
32	TEZ3200	●	24.3	10.0	31.5	32.5	TEZD3200S32-MS	●	114	146	60	206	32		

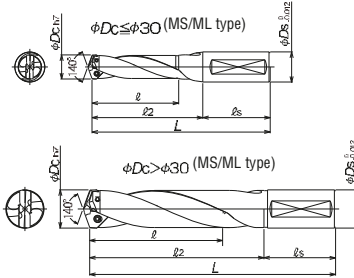
1 insert per case

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- 4) Please refer page E003 "Instructions for mounting insert".

TA-EZ Drill

TEZD-MS/ML_{TYPE}



Clamp screw	Recommended torque (Nm)
DSW-2045H	0.9
TSW-2556H	1.2
TSW-2567H	1.2
DSW-307H	2.0
DSW-309H	2.0
TSW-3510H	3.0
TSW-3512H	3.0

Insert

Parts

Body							Parts	
ML type (5D)							Clamp screw	Wrench
Toolno.	Stock	Dimensions (mm)						
		ℓ	ℓ_2	ℓ_s	L	ϕD_s		
TEZD1900S25-ML	●	107	130	56	186	25	TSW-2567H	A-08
TEZD2000S25-ML	●	113	137	56	193	25	TSW-2567H	A-08
TEZD2100S25-ML	●	118	143	56	199	25	TSW-2567H	A-08
TEZD2200S25-ML	●	124	150	56	206	25	DSW-307H	A-10
TEZD2300S25-ML	●	129	157	56	213	25	DSW-307H	A-10
TEZD2400S32-ML	●	135	164	60	224	32	DSW-307H	A-10
TEZD2500S32-ML	●	140	170	60	230	32	DSW-309H	A-10
TEZD2600S32-ML	●	146	177	60	237	32	DSW-309H	A-10
TEZD2700S32-ML	●	151	184	60	244	32	DSW-309H	A-10
TEZD2800S32-ML	●	157	190	60	250	32	TSW-3510H	A-15
TEZD2900S32-ML	●	162	197	60	257	32	TSW-3510H	A-15
TEZD3000S32-ML	●	168	204	60	264	32	TSW-3510H	A-15
TEZD3100S32-ML	●	173	210	60	270	32	TSW-3512H	A-15
TEZD3200S32-ML	●	179	217	60	277	32	TSW-3512H	A-15

TA-EZ Drill

TEZD_{TYPE}

RECOMMENDED CUTTING CONDITIONS

TEZD-MS/ML type

Work Materials	Structural steel Carbon steel SS400, S50C (C50) Below 280HB		Alloy steel SCM440 (1.7223) 280 350HB		Stainless steel SUS304 Below 280HB		Grey cast iron FC250 (GG25) Tensile strength Below 350MPa		Nodular cast iron FCD400 (GGG40) Tensile strength Below 450MPa	
	Drill dia.	Spindle speed	Feed speed	Spindle speed	Feed speed	Spindle speed	Feed speed	Spindle speed	Feed speed	Spindle speed
φD_c (mm)	n (min ⁻¹)	V _f (mm/min)	n (min ⁻¹)	V _f (mm/min)	n (min ⁻¹)	V _f (mm/min)	n (min ⁻¹)	V _f (mm/min)	n (min ⁻¹)	V _f (mm/min)
14	1,700	510	1,600	350	1,000	250	1,900	570	1,500	450
15	1,600	480	1,500	350	950	240	1,900	570	1,400	420
16	1,500	450	1,400	340	890	220	1,900	570	1,350	400
17	1,400	450	1,300	330	840	210	1,800	570	1,250	400
18	1,300	450	1,250	310	790	200	1,700	570	1,000	350
19	1,250	440	1,200	300	750	190	1,600	560	1,000	350
20	1,200	420	1,100	280	710	180	1,600	560	1,000	350
21	1,200	420	1,100	280	680	170	1,550	540	1,000	350
22	1,200	420	1,050	260	650	160	1,500	530	1,000	350
23	1,200	420	1,050	260	620	155	1,450	510	1,000	350
24	1,200	420	1,050	260	600	150	1,400	490	1,000	350
25	1,150	400	1,050	260	570	140	1,350	470	1,000	350
26	1,110	390	1,050	260	550	140	1,300	460	1,000	330
27	1,070	370	1,000	250	530	135	1,250	460	950	330
28	1,030	360	1,000	250	510	130	1,200	460	950	330
29	990	350	950	240	495	125	1,150	460	950	330
30	960	340	950	240	480	120	1,150	460	950	330
31	930	330	900	225	460	115	1,100	440	850	300
32	900	315	900	225	445	110	1,100	440	850	300

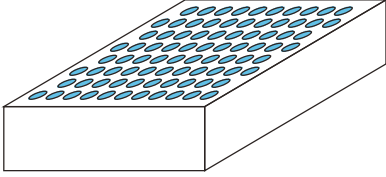
NOTE

- 1) The cutting parameters to be adjusted according to the machine rigidity or work rigidity.
- 2) Recommend to make 0.5 x D_c depth pilot hole by same dia. TEZD-MS (3 x D_c) type.

■ CASE STUDIES

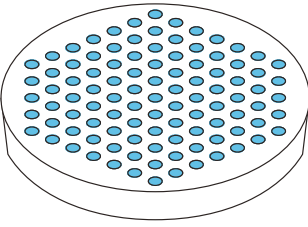
1. Drilling of tube plate for air conditioner.

Long tool life

	Work	Part name	Tube plate for air conditioner
		Material	Structural steel (Low carbon steel)
	Tool	Tool no.	TEZD1600S20-MS
		Grade	TEZ1630(JC8050)
Result	Cutting conditions	Spindle speed	$n=1,450\text{min}^{-1}$,
		Cutting speed	$V_c=73.76\text{m/min}$
Feed speed		$V_f=362.5\text{mm/min}$,	
Feed rate		$f=0.25\text{mm/rev}$	
Drilling depth		28mm (Through hole)	
Clamp		Good	
Coolant		Water soluble	
Machine		Vertical MC	
Double spindle machine: No. 1: 4,040 holes (113 m) No. 2: 3,922 holes (110 m)			

2. Drilling of heat exchanger.

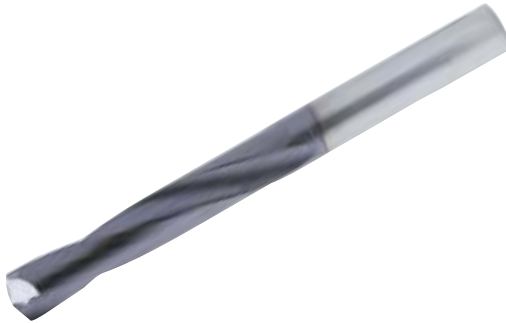
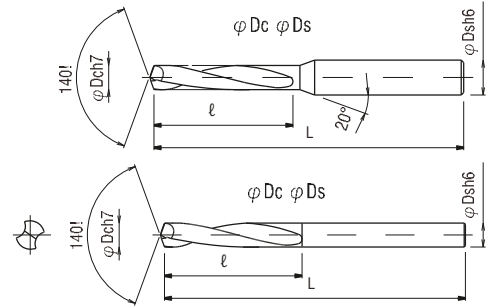
High efficiency

	Work	Part name	Heat exchanger
		Material	Stainless steel
	Tool	Hardness	250HB
		Tool no.	TEZD1900S25-MS
Result	Cutting conditions	Grade	TEZ1930 (JC8050)
		Spindle speed	$n = 1,000\text{min}^{-1}$,
Cutting speed		$V_c = 60.3\text{m/min}$	
Feed speed		$V_f = 300\text{mm/min}$,	
Feed rate		$f = 0.3\text{mm/rev}$	
Drilling depth		45mm (Through hole) Good	
Clamp		Water soluble	
Coolant		Double column MC	
TEZD increased feed speed by 2 times and chip removal rate compared with competitors.		Machine	

Sigma Drill Hard

DZ-DHS_{TYPE}

- Drilling depth: 5 x Dc
- For high hardened material up to 70HRC


 $\varphi D_c \varphi 12$


Cat. No.	Stock	Dimensions (mm)			
		φD_c	ℓ	L	φD_s
DZ-DHS0200-12	●	2.0	12	55	3
DZ-DHS0200	●	2.0	16	55	3
DZ-DHS0200-21	●	2.0	21	55	3
DZ-DHS0210	●	2.1	16	55	3
DZ-DHS0220	●	2.2	16	55	3
DZ-DHS0230	●	2.3	16	55	3
DZ-DHS0240	●	2.4	16	55	3
DZ-DHS0250	●	2.5	16	55	3
DZ-DHS0250-21	●	2.5	21	55	3
DZ-DHS0260	●	2.6	16	55	3
DZ-DHS0270	●	2.7	16	55	3
DZ-DHS0280	●	2.8	16	55	3
DZ-DHS0290	●	2.9	16	55	3
DZ-DHS0300	●	3	21	55	4
DZ-DHS0330	●	3.3	24	60	4
DZ-DHS0340	●	3.4	24	60	4
DZ-DHS0350	●	3.5	24	60	4
DZ-DHS0380	●	3.8	27	60	4
DZ-DHS0390	●	3.9	27	60	4
DZ-DHS0400	●	4	27	60	4
DZ-DHS0420	●	4.2	29	63	6
DZ-DHS0430	●	4.3	29	63	6
DZ-DHS0440	●	4.4	29	63	6
DZ-DHS0450	●	4.5	29	63	6
DZ-DHS0490	●	4.9	32	68	6
DZ-DHS0500	●	5	32	68	6

Cat. No.	Stock	Dimensions (mm)			
		φD_c	ℓ	L	φD_s
DZ-DHS0510	●	5.1	34	72	6
DZ-DHS0520	●	5.2	34	72	6
DZ-DHS0550	●	5.5	34	72	6
DZ-DHS0590	●	5.9	36	74	6
DZ-DHS0600	●	6	41	81	6
DZ-DHS0680	●	6.8	43	83	8
DZ-DHS0690	●	6.9	43	83	8
DZ-DHS0700	●	7	43	83	8
DZ-DHS0790	●	7.9	48	90	8
DZ-DHS0800	●	8	48	90	8
DZ-DHS0840	●	8.4	53	96	10
DZ-DHS0850	●	8.5	53	96	10
DZ-DHS0860	●	8.6	55	98	10
DZ-DHS0900	●	9	55	98	10
DZ-DHS0990	●	9.9	60	105	10
DZ-DHS1000	●	10	60	105	10
DZ-DHS1030	●	10.3	66	112	12
DZ-DHS1040	●	10.4	66	112	12
DZ-DHS1060	●	10.6	68	114	12
DZ-DHS1100	●	11	68	114	12
DZ-DHS1180	●	11.8	73	121	12
DZ-DHS1190	□	11.9	73	121	12
DZ-DHS1200	●	12	73	121	12


Note) Please refer page E012 – E013 for recommended cutting conditions.

Sigma Drill Hard

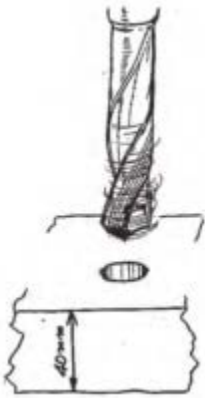
DZ-DHS_{TYPE}

■ CASE STUDIES

1. SKD11 (62HRC)

Machined hole dia.: 9.98 -10.00 mm		Work	Part name	Plate
			Material	SKD11
			Hardness	62HRC
		Tool	Tool No.	DZ-DHS1000
Grade	DZ coating			
Result	After machining 84 holes, Sigma drill hard showed normal wear. Tool life of competitor's was only 11 holes.	Cutting conditions	Cutting speed	12.6 (m/min)
			Spindle speed	400 (min ⁻¹)
			Feed speed	20 (mm/min)
			Feed rate	0.05 (mm/rev)
			Drilling depth	26 mm (Through hole)
			Clamp	Good
			Coolant	Water soluble (External)
			Machine	Vertical MC

2. SKD11 (60HRC)

<ul style="list-style-type: none"> ● Drilling depth: L/D = 6.7 ● Step feed every 5 mm 		Work	Part name	Mould
			Material	SKD11
			Hardness	60HRC
		Tool	Tool No.	DZ-DHS0600
Grade	DZ coating 18.3			
Result	Existing tool was damaged every 5 mm machining and max. drilling depth was 20 mm. Sigma drill hard could machine 40 mm and still able to continue.	Cutting conditions	Cutting speed	(m/min) 970
			Spindle speed	(min ⁻¹)
			Feed speed	97 (mm/min) 0.1
			Feed rate	(mm/rev)
			Drilling depth	40 mm (Throughhole)
			Clamp	Good
			Coolant	Water soluble (External)
			Machine	Vertical MC

Sigma Drill Hard

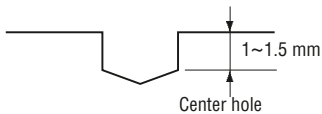
DZ-DHS_{TYPE}

■ RECOMMENDED CUTTING CONDITIONS

Work Materials	SKT, SKD61 (48~56HRC)		SKD11, SKH (57~62HRC)		SKD11, SKH (63~70HRC)	
	Spindle speed n (min ⁻¹)	Feed speed Vf (mm/min)	Spindle speed n (min ⁻¹)	Feed speed Vf (mm/min)	Spindle speed n (min ⁻¹)	Feed speed Vf (mm/min)
Drill dia. (mm)	Cutting speed Vc (m/min)	Feed rate f (mm/rev)	Cutting speed Vc (m/min)	Feed rate f (mm/rev)	Cutting speed Vc (m/min)	Feed rate f (mm/rev)
2	2,860	115	2,070	83	1,270	38
	15~20	0.03~0.05	10~15	0.03~0.05	5~10	0.02~0.04
2.5	2,550	102	1,660	66	1,270	38
	15~25	0.03~0.05	10~15	0.03~0.05	7~12	0.02~0.04
3	2,100	84	1,380	55	1,060	31
	15~25	0.03~0.05	10~15	0.03~0.05	7~12	0.02~0.04
4	1,590	63	1,035	41	795	23
	15~25	0.03~0.05	10~15	0.03~0.05	7~12	0.02~0.04
5	1,270	62	830	41	635	25
	15~25	0.04~0.06	10~15	0.04~0.06	7~12	0.03~0.05
6	1,060	74	690	41	530	26
	15~25	0.06~0.08	10~15	0.05~0.07	7~12	0.04~0.06
7	910	63	590	35	455	22
	15~25	0.06~0.08	10~15	0.05~0.07	7~12	0.04~0.06
8	795	60	520	34	400	20
	15~25	0.06~0.09	10~15	0.05~0.08	7~12	0.04~0.06

■ NOTE

- 1) Use water soluble coolant.
- 2) Not recommended to drilling for general steel.
- 3) Recommend to use under the conditions of high accurate and rigid machine and rigid work.
- 4) The cutting parameters is for drilling depth 3 x Dc. In case of drilling depth over 3 x Dc, step feed is recommended.
- 5) To prevent breakage of drill, not recommend to making through hole. Please see planking.
- 6) Recommend to making center hole.



Sigma Drill Hard

DZ-DHS_{TYPE}

■ RECOMMENDED CUTTING CONDITIONS

Work Materials	SKT, SKD61 (48~56HRC)		SKD11, SKH (57~62HRC)		SKD11, SKH (63~70HRC)	
	Spindle speed n (min ⁻¹)	Feed speed Vf (mm/min)	Spindle speed n (min ⁻¹)	Feed speed Vf (mm/min)	Spindle speed n (min ⁻¹)	Feed speed Vf (mm/min)
Drill dia. (mm)	Cutting speed Vc (m/min)	Feed rate f (mm/rev)	Cutting speed Vc (m/min)	Feed rate f (mm/rev)	Cutting speed Vc (m/min)	Feed rate f (mm/rev)
9	710	53	460	30	355	18
	15~25	0.06~0.09	10~15	0.05~0.08	7~12	0.04~0.06
10	640	51	415	29	320	17
	15~25	0.06~0.1	10~15	0.05~0.09	7~12	0.04~0.07
11	580	46	375	26	290	15
	15~25	0.06~0.1	10~15	0.05~0.09	7~12	0.04~0.07
12	530	47	345	25	265	15
	15~25	0.06~0.12	10~15	0.05~0.1	7~12	0.04~0.08

■ NOTE

- 1) Use water soluble coolant.
- 2) Not recommended to drilling for general steel.
- 3) Recommend to use under the conditions of high accurate and rigid machine and rigid work.
- 4) The cutting parameters is for drilling depth 3 x Dc. In case of drilling depth over 3 x Dc, step feed is recommended.
- 5) To prevent breakage of drill, not recommend to making through hole. Please see planing.
- 6) Recommend to making center hole.

