

Tooling by **DIJET®**

Drills

TA-EZ Drill

TEZD-MS/ML^{TYPE}

Easy assembly and high cutting performances



G-Body

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.



Indexable

G-Body

Highrigid
G-body

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)

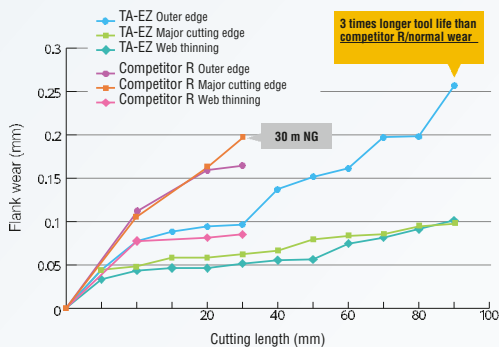
Cuttingcondition: $V_c=75$ m/min, $f=0.35$ mm/rev, $H=95$ mm (Through hole)

Competitor R



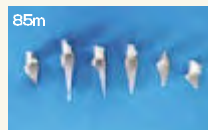
● Shape of chips

Uncontrolled long chips came out at machining 25 m and impossible to continue at machining 30m because chips tangle in holder.



TEZD type

● Shape of chips



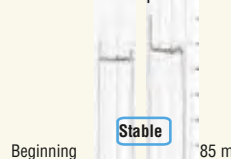
Completely breaking chips

● Quality of holes



Good surface finish

● Power consumption



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

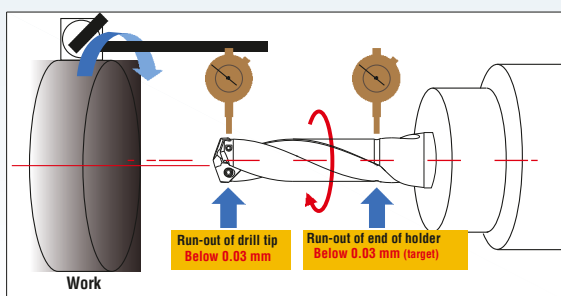
Clamp screw is expendable, so please change the clamp screw when ever you change the insert 10 times. But in case, there is the deformation of clamp screw, change it immediately.



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.

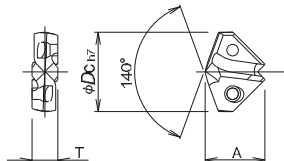


TA-EZ Drill

TEZD-MS/ML^{TYPE}**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.		MS type (3D)							
		JC8050	A	T	Over	Under	Tool no.	Stock	Dimensions (mm)					
ϕD_c										ℓ	ℓ_2	ℓ_s	L	ϕD_s
14	TEZ1400	●	11.4	4.5	13.5	14.5	TEZD1400S16-MS	●	51	65	48	113	16	
14.1	TEZ1410	●												
14.2	TEZ1420	●												
14.3	TEZ1430	□												
14.4	TEZ1440	□												
14.5	TEZ1450	●	11.5	4.8	14.5	15.5	TEZD1500S20-MS	●	54	69	50	119	20	
14.6	TEZ1460	□												
14.7	TEZ1470	□												
14.8	TEZ1480	□												
14.9	TEZ1490	□												
15	TEZ1500	●	12.4	5.0	15.5	16.5	TEZD1600S20-MS	●	58	74	50	124	20	
15.1	TEZ1510	●												
15.2	TEZ1520	●												
15.3	TEZ1530	□												
15.4	TEZ1540	□												
15.5	TEZ1550	●	12.4	5.0	15.5	16.5	TEZD1600S20-MS	●	58	74	50	124	20	
15.6	TEZ1560	□												
15.7	TEZ1570	□												
15.8	TEZ1580	●												
15.9	TEZ1590	□												
16	TEZ1600	●	13.2	5.5	16.5	17.5	TEZD1700S20-MS	●	61	78	50	128	20	
16.1	TEZ1610	□												
16.2	TEZ1620	●												
16.3	TEZ1630	●												
16.4	TEZ1640	□												
16.5	TEZ1650	●	13.2	5.5	16.5	17.5	TEZD1700S20-MS	●	61	78	50	128	20	
16.6	TEZ1660	□												
16.7	TEZ1670	□												
16.8	TEZ1680	□												
16.9	TEZ1690	□												
17	TEZ1700	●	13.5	5.8	17.5	18.5	TEZD1800S20-MS	●	65	83	50	133	20	
17.1	TEZ1710	□												
17.2	TEZ1720	□												
17.3	TEZ1730	□												
17.4	TEZ1740	□												
17.5	TEZ1750	●	13.5	5.8	17.5	18.5	TEZD1800S20-MS	●	65	83	50	133	20	
17.6	TEZ1760	□												
17.7	TEZ1770	□												
17.8	TEZ1780	●												
17.9	TEZ1790	□												
18	TEZ1800	●	18.1	8.1	19.5	20.5	TEZD1900S20-MS	●	71	89	50	141	20	
18.1	TEZ1810	●												
18.2	TEZ1820	□												
18.3	TEZ1830	□												
18.4	TEZ1840	□												
18.5	TEZ1850	●	18.5	8.5	20.0	21.0	TEZD2000S20-MS	●	75	93	50	145	20	
18.6	TEZ1860	□												
18.7	TEZ1870	□												
18.8	TEZ1880	□												
18.9	TEZ1890	□												

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".

TEZD-MS/ML_{TYPE}

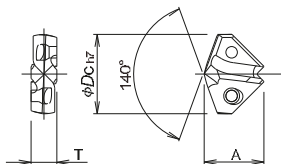


Clamp screw	Recommended torque (Nm)
DSW-2045H	0.9
TSW-2556H	1.2
TSW-2567H	1.2
DSW-307H	2.0
DSW-309H	2.0
TSW-3510H	3.0
TSW-3512H	3.0

■ Parts

● Standard stock items □ Stock in Japan ○ Soon to be deleted

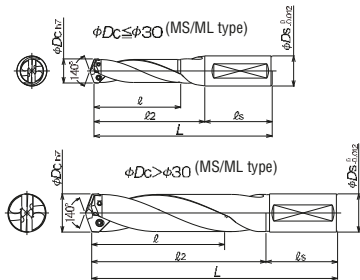
TEZD-MS/ML_{TYPE}



● Standard stock items □ Stock in Japan ○ Soon to be deleted



TA-EZ Drill

TEZD-MS/MLTYPE





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

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

■ Parts

Parts	
Clamp screw	Wrench
	

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	
	Spindle speed	Feed speed	Spindle speed	Feed speed	Spindle speed	Feed speed	Spindle speed	Feed speed	Spindle speed	Feed 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.

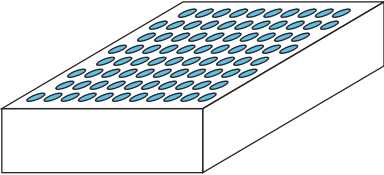
TA-EZ Drill

TEZD_{TYPE}

CASE STUDIES

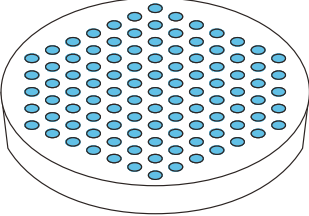
1.Drilling of tube plate for air conditioner.

Long tool life

	Work	Part name	Tube plate for air conditioner
		Material	Structural steel (Low carbon steel)
		Hardness	-
<div>Result</div> <div>Double spindle machine: No. 1: 4,040 holes (113 m) No. 2: 3,922 holes (110 m)</div>	Tool	Tool no.	TEZD1600S20-MS
		Grade	TEZ1630(JC8050)
	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

2.Drilling of heat exchanger.

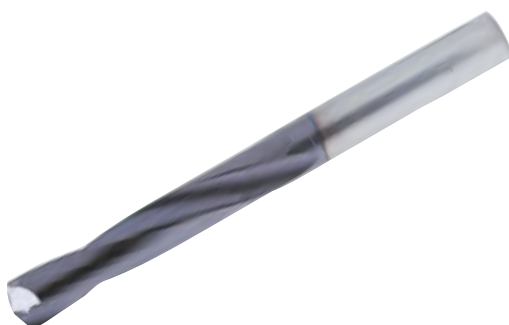
High efficiency

	Work	Part name	Heat exchanger
		Material	Stainless steel
		Hardness	250HB
<div>Result</div> <div>TEZD increased feed speed by 2 times and chip removal rate compared with competitors.</div>	Tool	Tool no.	TEZD1900S25-MS
		Grade	TEZ1930 (JC8050)
	Cutting conditions	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
		Machine	

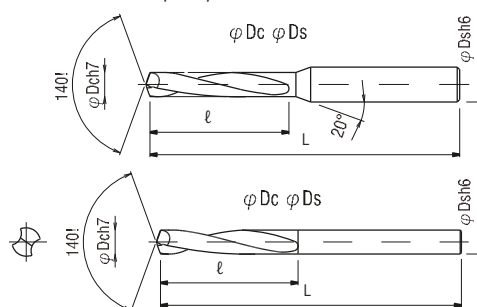
Sigma Drill Hard

DZ-DHS_{TYPE}

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



φ Dc φ 12



Cat. No.	Stock	Dimensions (mm)			
		φ Dc	ℓ	L	φ Ds
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)			
		φ Dc	ℓ	L	φ Ds
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
		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
Result	After machining 84 holes, Sigma drill hard showed normal wear. Tool life of competitor's was only 11 holes.			

2. SKD11 (60HRC)

<div><ul style="list-style-type: none">● Drilling depth: $L/D = 6.7$● Step feed every 5 mm</div> <div></div>		Work	Part name	Mould
			Material	SKD11
			Hardness	60HRC
		Tool	Tool No.	DZ-DHS0600
			Grade	DZ coating 18.3
		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			
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.			

Sigma Drill Hard

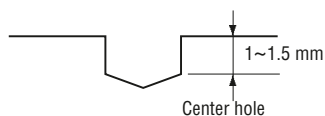
DZ-DHS_{TYPE}

■ 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 planing.
- 6) Recommend to making center hole.



Sigma Drill Hard

DZ-DHSTYPE

RECOMMENDED CUTTING CONDITIONS

Work Materials	SKT, SKD61 (48~56HRC)		SKD11, SKH (57~62HRC)		SKD11, SKH (63~70HRC)	
Drill dia. (mm)	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)
	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 todrilling 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. Incase of drilling dept hover 3 x Dc, step feed is recommended.
- 5) To prevent breakage of drill, not recommend to making through hole. Please se tplaning.
- 6) Recommend to making center hole.

