PRODUCT NEWS

PN-E-013

NEW PRODUCT

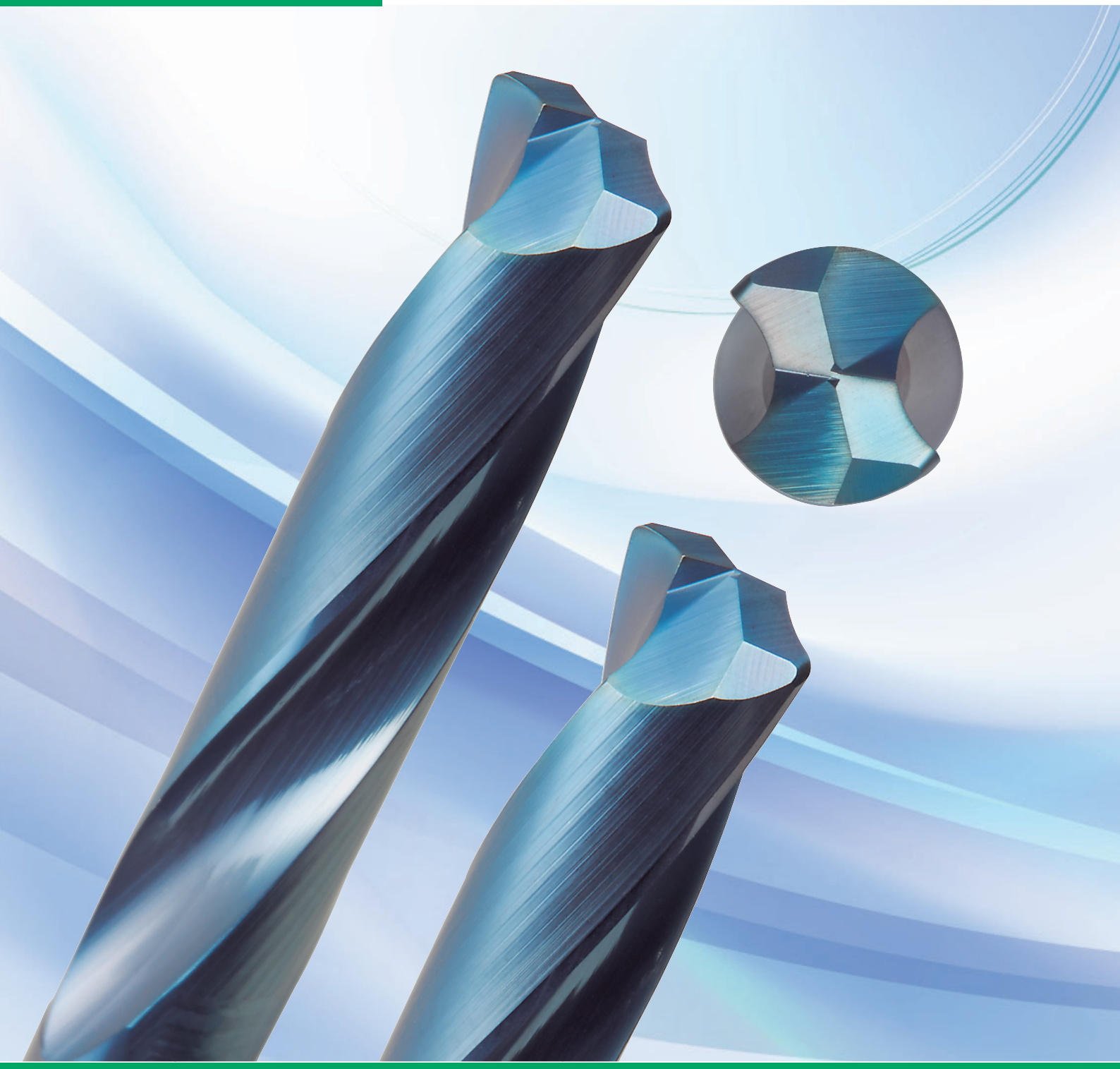
NEW

EZ HARD DRILL

for high hardened material up to 70 HRC

EZH Type

70 HRC | DH Coat | Drilling



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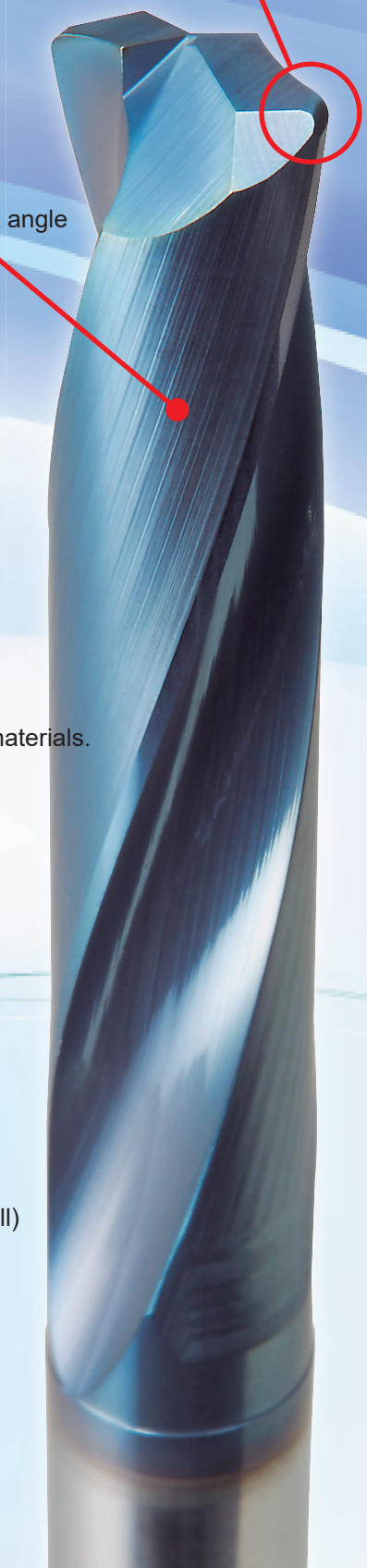
Features

Features 1

Stable drilling high hardened materials up to 70HRC.

By adopting “DH1” coating which provides high hardness & oxidization resistance, improved wear resistance and gives longer tool life.
Adopting micro grain carbide with high toughness, improved chipping resistance.



Features 2

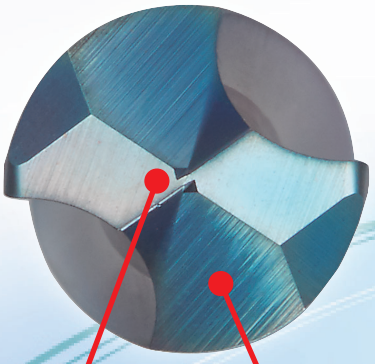
High drill rigidity

The web thickness is 1.6 times or more than that of previous carbide drills

Features 3

Incredibly strong against chipping

The chipping resistance has been improved
with 15° helix angle and a corner radius on the outer corner.
The chipping resistance on the center edge
and chip evacuation has been improved with a thinning shape suitable for hard materials.



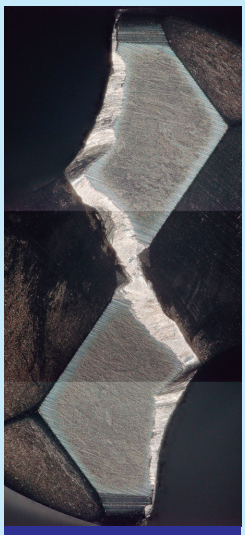
Newly developed "DH1 COATING"

DH1 COATING gives stable and high-performance machining on high hardened materials even with high speed dry condition, due to higher hardness and higher oxidation resistance than the existing PVD coating.

Characteristic value of various PVD coatings

	DH1 coating	DV coating	DZ coating
Hardness	3,500~3,700	3,300~3,500	2,800~2,900
Oxidization temperature	1,100~1,200	1,000~1,100	700~800
Coefficient of friction	0.5	0.65	0.6

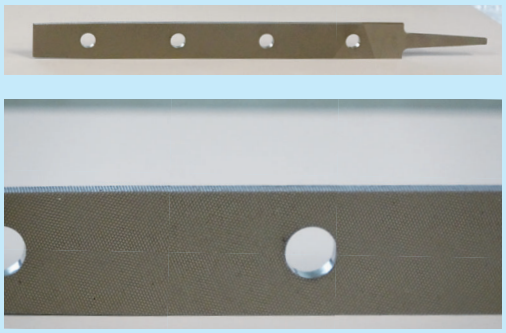
Cutting performance



EZH5D0700S08
After 180 holes

Conventional
After 110 holes

Material: Hardened die steel 1.2344 (60HRC)
Cutting conditions : Vertical MC
●Drill dia. : ϕ7 (EZH5D0700S08)
●Cutting conditions : n=455min^{-1}, Vc=10m/min, Vf=23mm/min, f=0.05mm/rev
● Drilling depth : 23mm （Thru）
●Coolant : Water soluble



Material: File (68HRC)
Cutting conditions : Vertical MC
●Drill dia. : ϕ10 (EZH5D1000S010)
●Cutting conditions : n=382min^{-1}, Vc=12m/min, f=0.04mm/rev
● Drilling depth : 6mm （Thru）
●Coolant : Mist

Video→

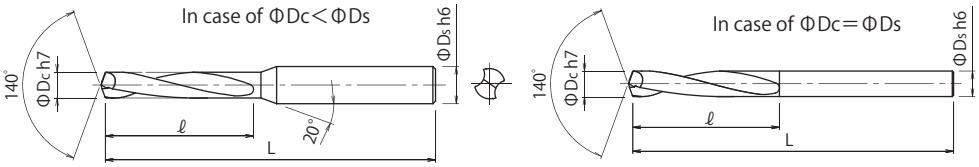
Line up

EZ Hard drill EZH type

- For high hardened steel up to 70 HRC
- Drilling depth 5×ΦDc
- Helix angle15°

- Tolerance for ΦDc (mm)

Tool dia. ΦDc (mm)	Tolerance
Up to 3	0
	−0.01
Over 3 , Up to 6	0
	−0.012
Over 6, Up to 10	0
	−0.015
Over 10, Up to12	0
	−0.018



Item code	Grade	Dimensions (mm)			
		ΦDc	ℓ	L	ΦDs
EZH5D0200S03	●	2	16	55	3
EZH5D0200S03-12	●	2	12	55	3
EZH5D0200S03-21	●	2	21	55	3
EZH5D0210S03	●	2.1	16	55	3
EZH5D0220S03	●	2.2	16	55	3
EZH5D0230S03	●	2.3	16	55	3
EZH5D0240S03	●	2.4	16	55	3
EZH5D0250S03	●	2.5	16	55	3
EZH5D0250S03-21	●	2.5	21	55	3
EZH5D0260S03	●	2.6	16	55	3
EZH5D0270S03	●	2.7	16	55	3
EZH5D0280S03	●	2.8	16	55	3
EZH5D0290S03	●	2.9	16	55	3
EZH5D0300S04	●	3	21	59	4
EZH5D0330S04	●	3.3	24	59	4
EZH5D0340S04	●	3.4	24	59	4
EZH5D0350S04	●	3.5	24	59	4
EZH5D0380S04	●	3.8	27	59	4
EZH5D0390S04	●	3.9	27	59	4
EZH5D0400S04	●	4	27	59	4
EZH5D0420S06	●	4.2	29	74	6
EZH5D0430S06	●	4.3	29	74	6
EZH5D0440S06	●	4.4	29	74	6
EZH5D0450S06	●	4.5	29	74	6
EZH5D0490S06	●	4.9	32	74	6
EZH5D0500S06	●	5.0	32	74	6
EZH5D0510S06	●	5.1	34	79	6

Item code	Grade	Dimensions (mm)			
		ΦDc	ℓ	L	ΦDs
EZH5D0520S06	●	5.2	34	79	6
EZH5D0590S06	●	5.9	36	79	6
EZH5D0600S06	●	6	41	79	6
EZH5D0680S08	●	6.8	43	88	8
EZH5D0690S08	●	6.9	43	88	8
EZH5D0700S08	●	7	43	88	8
EZH5D0790S08	●	7.9	48	93	8
EZH5D0800S08	●	8	48	93	8
EZH5D0850S10	●	8.5	53	98	10
EZH5D0860S10	●	8.6	55	98	10
EZH5D0900S10	●	9	55	98	10
EZH5D0990S10	●	9.9	60	108	10
EZH5D1000S10	●	10	60	108	10
EZH5D1030S12	●	10.3	66	117	12
EZH5D1040S12	●	10.4	66	117	12
EZH5D1100S12	●	11	68	117	12
EZH5D1190S12	□	11.9	73	117	12
EZH5D1200S12	●	12	73	117	12

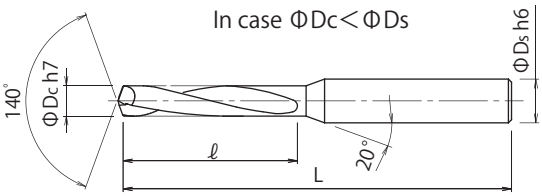
● : Standard stock item □ : Stock in Japan

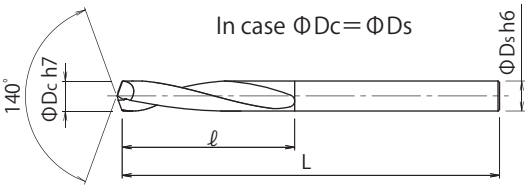
EZ Hard drill long shank type

- For high hardened steel up to 70 HRC
- Drilling depth 5×ΦDc
- Helix angle15°
- Long shank type

●Tolerance of ΦDc (mm)

Tool dia. ΦDc (mm)	Tolerance
Up to 3	0
	−0.01
Over 3 , Up to 6	0
	−0.012
Over 6, Up to 10	0
	−0.015
Over 10, Up to12	0
	−0.018



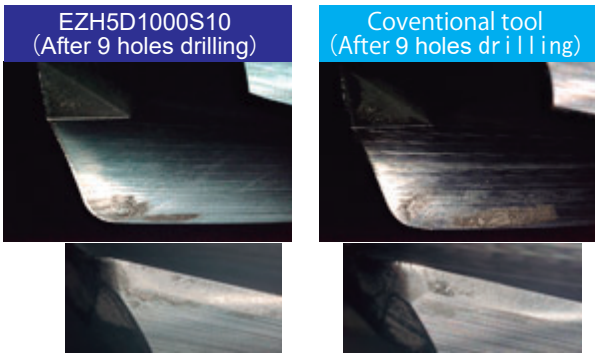


Item code	Grade	Dimensions (mm)				
		ΦDc	ℓ	L	ΦDs	
EZH5D0300S04-LS	□	3	25	69	4	
EZH5D0330S04-LS	□	3.3	25	79	4	
EZH5D0380S04-LS	□	3.8	30	79	4	
EZH5D0400S04-LS	□	4	30	79	4	

□:Stock in Japan

Cutting Data

Drilling of Die steel (After heat treatment)

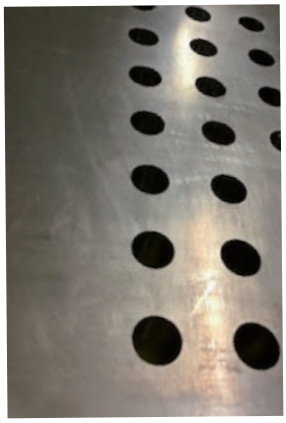


Result

EZH could drill without burr after 9 holes drilling.
Stable drilling is possible even after 100 holes drilling.

Work	Parts name		Test piece
	Material		1.2379 (After heat treated)
	Hardness		59.5HRC
Tool	Item code		EZH5D1000S10 (φ10)
	Grade		DH coating
Cutting conditions	Spindle speed	*n*	*n*=299min^{-1}
	Cutting speed	*Vc*	*Vc*=9.4m/min
	Feed speed	*Vf*	*Vf*=15mm/min
	Feed	*f*	*f*=0.05mm/rev
	Drilling depth		30mm (Blind)
	Coolant		Water soluble (external)
	Machine		Vertical MC

Drilling of high hardened steel



Result

Machining time has been reduced 2.5 hours by changing from helical interpolation by end mill to drilling.
EZH could continuously drilled 82 holes.
The tool life of EZH is more than 4 times longer compare with the competitor's drill.

Work	Part name		Test piece
	Material		1.2379
	Hardness		60HRC
Tool	Item code		EZH5D1200S12 (Φ12)
	Grade		DH coating
Cutting conditions	Spindle speed	*n*	*n*=345min^{-1}
	Cutting speed	*Vc*	*Vc*=13m/min
	Feed speed	*Vf*	*Vf*=26mm/min
	Feed	*f*	*f*=0.075mm/rev
	Drilling depth		40mm (Through)
	Clamp		Good
	Coolant		Water soluble (external)
	Machine		Vertical MC

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Recommended cutting condition

Material	Hardened die steel (1.2344, 1.2379) 48～56HRC		Hardened die steel (1.2344, 1.2379) 57～62HRC		High speed tool steel (1.3343) 63～70HRC	
Cutting speed *Vc* (m/min)	15～20 (φ 2) 15～25 (φ 2.5～φ12) 10～20 (φ13 ～φ16)		10～15 (φ 2～φ12) 7～13 (φ13～φ16)		5～10 (φ 2) 7～12 (φ 2.5～φ12) 6～10 (φ13 ～φ16)	
Feed *f* (mm/rev)	0.03～0.05 (φ 3～φ 4) 0.04～0.06 (φ 5) 0.06～0.08 (φ 6～φ 7) 0.06～0.09 (φ 8～φ 9) 0.06～0.10 (φ10～φ11) 0.07～0.12 (φ12～φ16)		0.03～0.05 (φ 2～φ 4) 0.04～0.06 (φ 5) 0.05～0.07 (φ 6～φ 7) 0.05～0.08 (φ 8～φ 9) 0.05～0.09 (φ10～φ11) 0.05～0.10 (φ12～φ13) 0.07～0.12 (φ14～φ16)		0.02～0.04 (φ 2～φ 4) 0.03～0.05 (φ 5) 0.04～0.06 (φ 6～φ 9) 0.04～0.07 (φ10～φ11) 0.05～0.08 (φ12～φ13) 0.06～0.09 (φ14～φ16)	
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)
2	2,860	115	2,070	86	1,270	38
2.5	2,550	102	1,660	66	1,270	38
3	2,100	84	1,380	55	1,060	31
4	1,590	63	1,035	41	795	23
5	1,270	62	830	41	635	25
6	1,060	74	690	41	530	26
7	910	63	590	35	455	22
8	795	60	520	34	400	20
9	710	54	460	30	355	18
10	640	51	415	29	320	17
11	580	46	375	26	290	16
12	530	47	345	26	265	16
13	370	33	250	20	200	13
14	330	30	220	20	180	13
15	320	30	210	20	170	13
16	320	30	200	19	160	12

■Attention for use:
1) Use water soluble oil.
2) Recommend to use for over 50HRC up to 70HRC.
3) Use a rigid machine and precise holder.
4) This data is relevant for drilling depth at 3Dc. In case of drilling depth over 3Dc, use step feed.
5) Recommend to use for blind hole. In case of through hole, use back up under the work.
6) Above data is relevant to EZH type. In case of use for EZH5D-LS type, recommend applying lower cutting conditions.

ISO9001 JQA-2089 ISO14001 JQA-EM1580

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