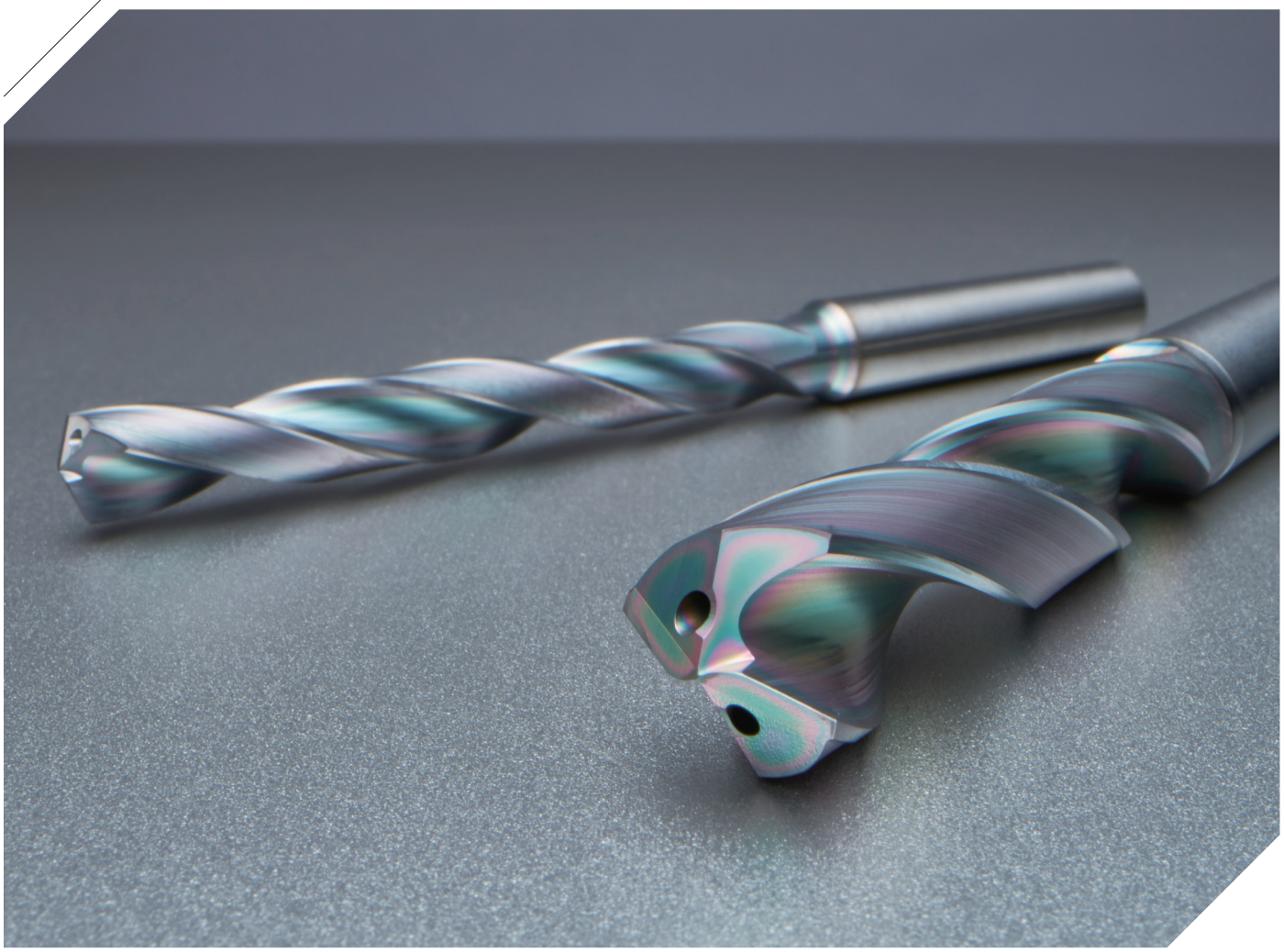
KORLOY
TECH-NEWS

W-Star Drill series

WSDP, WSDPH (Oil hole type)

Economical carbide coated Solid Drill

- New tip groove geometry prevents chip clogging and maximizes cooling efficiency
- Improved XR thinning structure disperses cutting force, resulting in excellent tool life



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Economical carbide coated Solid Drill

W-Star Drill series

Drilling is used in numerous ways in various industries seeking better efficiency. Industries require improved cutting performance and reduced machining time for various workpieces, including Carbon steel, Cast iron, Alloy steel, Stainless steel, etc.

W-Star Drill (WSDP) is designed for general use with enhanced stability and efficiency, and it is designed with reduced flute radius for a good chip control. Also, the drill has been improved to produce an optimal surface finish, resulting in better chip evacuation.

W-Star Drill (WSDPH) minimizes chip clogging with its pocket design optimized for drilling depth. A newly designed tip groove geometry increases coolant flow rate and velocity, effectively controlling cutting heat. The improved XR thinning structure ensures smooth chip evacuation and evenly distributes cutting forces to prevent localized stress, which extends tool life. The drill also complies with DIN standard specifications.

The exclusive AlCrN based coating PC320W increases tool life by higher wear resistance and lubrication with higher welding resistance. W-Star Drill is used for various types of cutting due to stable and excellent performance in wide cutting range, from low to high conditions.

» Minimized Chip Packing

- Prevents chip blocking in deep drilling and reduces internal hole damage

» Smooth Chip Evacuation & Reduced Cutting Load

- Excellent chip evacuation efficiency and tool life achieved with XR thinning

» Enhanced Cooling Efficiency

- Improved coolant flow and reduced cutting edge temperature through a new tip groove

» Versatile Workpiece Compatibility

- Stable machining across a wide range of materials and conditions thanks to its universal design

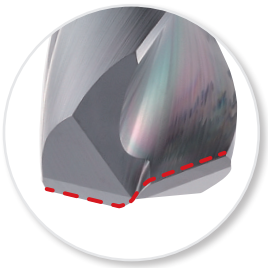
WSDP

Code system

Special type

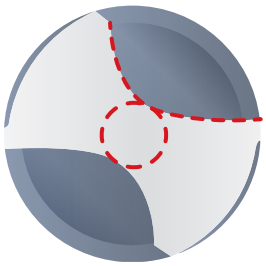
WSDP	040	-	5D	-	100L	-	5S
W-Star Drill Plus	Drill diameter 040 : Ø4 mm		Aspect ratio (L/D) 3D, 5D, 7D Special type Flute length 100 : 100 mm		Overall length 100L : 100 mm		Shank diameter 5S : Ø5 mm

Features



XR Thinning shape

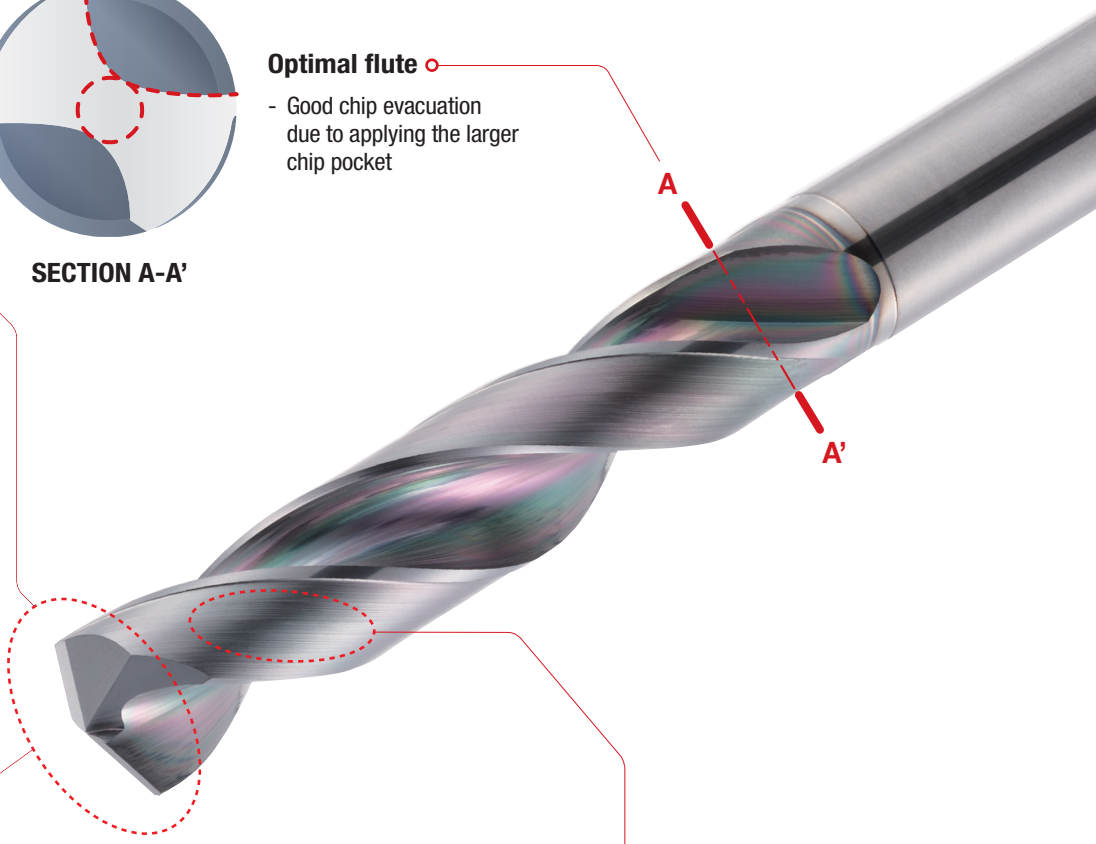
- Reduced cutting load on the cutting edge with a streamlined thinning
- Improved chip breaking

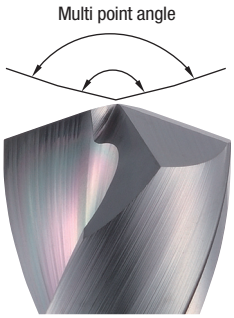


SECTION A-A'

Optimal flute

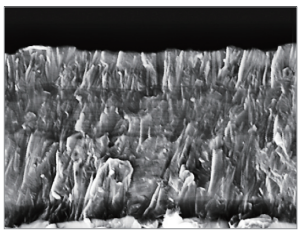
- Good chip evacuation due to applying the larger chip pocket





Multi point angle

- Separated cutting load by optimal point angle
- Streamlined 1st point angle



New AlCrN coating (PC320W)

- Improved chip evacuation with enhanced flute lubrication
- Enhanced wear resistance and oxidation resistance by multi-layer coating

Application range

◎: 1st recommendation ○: 2nd recommendation

P					M	K
Carbon steel	Alloy steel	Pre-hardened steel	Heat-treated steel		Stainless steel	Cast iron
			STD61(~HRC55)	STD11(HRC55~63)		
◎	◎	○	-	-	◎	○

Recommended cutting conditions

Workpiece	P						M		K			
Cutting condition	Carbon Steels, Alloy Steels SS400, SM50C, SCM, SCr ~900N/mm² / ~HRC 28		Alloy Steels SCM, SCr ~1,100N/mm² HRC 28~35		Alloy Steels, Hardened Steels ~HRC40		Stainless Steels SUS300, SUS400		Cast Iron ~350N/mm²		Ductile Iron 400~600N/mm²	
	70~120 m/min		50~90 m/min		25~60 m/min		35~70 m/min		70~120 m/min		55~100 m/min	
DC(∅)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)
2	11,100	0.06	8,000	0.06	4,000	0.06	8,400	0.06	11,100	0.06	10,400	0.06
4	7,600	0.14	5,600	0.14	3,400	0.1	4,200	0.14	7,600	0.14	6,200	0.14
6	5,000	0.17	3,700	0.17	2,300	0.14	2,800	0.17	5,000	0.17	4,100	0.21
8	3,800	0.21	2,800	0.21	1,700	0.18	2,100	0.21	3,800	0.21	3,100	0.24
10	3,000	0.25	2,200	0.25	1,400	0.22	1,700	0.25	3,000	0.25	2,500	0.26
12	2,500	0.27	1,900	0.27	1,100	0.24	1,400	0.27	2,500	0.27	2,100	0.28
14	2,200	0.29	1,600	0.29	1,000	0.26	1,200	0.29	2,200	0.29	1,800	0.31
16	1,900	0.31	1,400	0.31	800	0.29	1,000	0.31	1,900	0.31	1,500	0.33
18	1,700	0.33	1,200	0.33	800	0.32	900	0.33	1,700	0.33	1,400	0.35
20	1,500	0.35	1,100	0.35	700	0.34	800	0.35	1,500	0.35	1,200	0.37

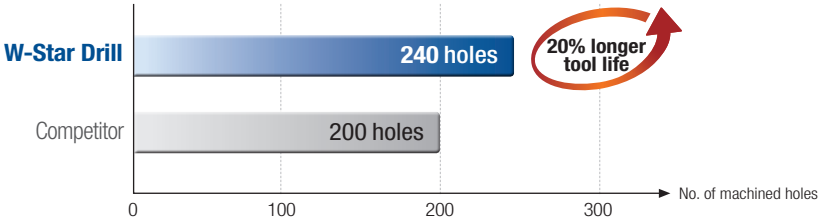
※ In actual machinning, the condition should be adjusted according to the machining shape, purpose and machine type.

* **7D** : apply 75 % of above cutting condition

Application examples

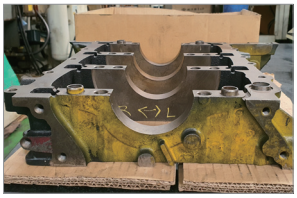
Automotive engine components

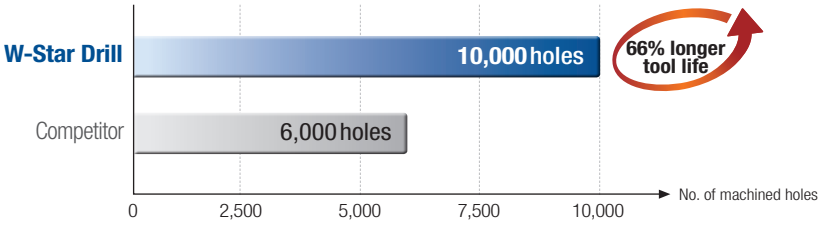
Workpiece	Heat-resisting stainless steel [1.4848(DIN)]
Cutting condition	vc (m/min) = 27.3, fn (mm/rev) = 0.13, ap (mm) = 15, wet
Tool	WSDP130-5D (PC320W)



Bed plate

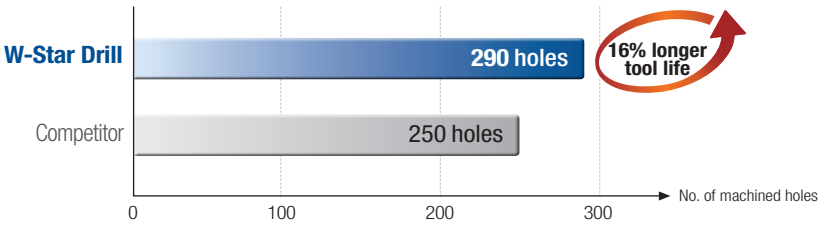
Workpiece	Ductile cast iron (400-18)
Cutting condition	vc (m/min) = 84, fn (mm/rev) = 0.15, ap (mm) = 26, wet
Tool	WSDP121-7D (PC320W)



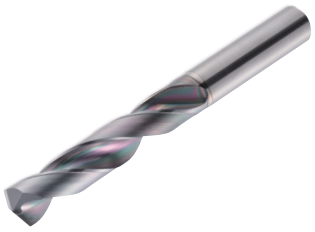


Automotive engine components

Workpiece	Ductile cast iron (HiSiMo)
Cutting condition	vc (m/min) = 57, fn (mm/rev) = 0.12, ap (mm) = 15, wet
Tool	WSDP114-5D (PC320W)



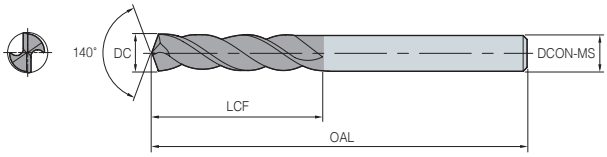
WSDP-□D



• **Tolerance** (Drill dia.)

DC		DCON-MS
D1 ~ D3	0 ~ -0.010 mm	h6
D3.1 ~ D6	0 ~ -0.012 mm	
D6.1 ~ D10	0 ~ -0.015 mm	
D10.1 ~ D18	0 ~ -0.018 mm	
D18.1 ~	0 ~ -0.021 mm	

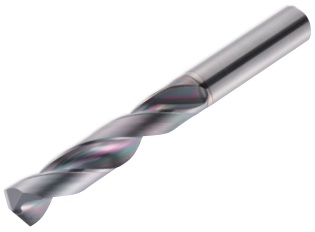
Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	External		



(mm)

Designation		DC		DCON-MS	3D		5D		7D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDP	010-□D	1		3	5	38	8	38	12	60		
	011-□D	1.1		3	6	42	9	42	12	60		
	012-□D	1.2		3	6	42	10	42	12	60		
	013-□D	1.3		3	6	42	10	42	15	60		
	014-□D	1.4		3	7	42	11	42	15	60		
	015-□D	1.5		3	7	42	11	42	15	60		
	016-□D	1.6		3	8	42	12	42	20	60		
	017-□D	1.7		3	8	42	12	42	20	60		
	018-□D	1.8		3	9	42	13	42	20	60		
	019-□D	1.9		3	9	42	13	42	20	60		
	020-□D	2		3	10	50	18	50	25	66		
	021-□D	2.1		3	10	50	18	50	25	66		
	022-□D	2.2		3	11	50	18	50	25	66		
	023-□D	2.3		3	11	50	18	50	25	66		
	024-□D	2.4		3	12	50	18	50	30	66		
	025-□D	2.5		3	12	50	18	50	30	66	M3x0.5	H1~4
	026-□D	2.6		3	12	50	18	50	30	66	M3x0.5	H5~6
	027-□D	2.7		3	14	50	18	50	30	66		
	028-□D	2.8		3	14	50	18	50	30	66		
	029-□D	2.9		3	14	50	18	50	30	66		
	030-□D	3		3	14	55	20	55	45	80		
	031-□D	3.1		4	16	55	20	55	45	80		
	03175-□D	3.175	1/8	4	16	55	20	55	45	80		
	032-□D	3.2		4	16	55	20	55	45	80		
	03264-□D	3.264		4	16	55	20	55	45	80		
	033-□D	3.3		4	16	55	20	55	45	80	M4x0.7	H1~4
	034-□D	3.4		4	16	55	20	55	45	80	M4x0.7	H5~6
	035-□D	3.5		4	16	55	25	55	45	80		
	03572-□D	3.572	9/64	4	18	55	25	55	45	80		
	036-□D	3.6		4	18	55	25	55	45	80		
	037-□D	3.7		4	18	55	25	55	45	80		
	038-□D	3.8		4	20	55	25	55	45	80		
	039-□D	3.9		4	20	55	25	55	45	80		
	040-□D	4		4	20	55	25	55	45	80		
	04039-□D	4.039		5	20	55	25	55	-	-		
	041-□D	4.1		5	20	55	25	55	45	80		
	042-□D	4.2		5	20	62	33	63	45	80	M5x0.8	H1~4
	043-□D	4.3		5	22	62	33	63	45	80	M5x0.8	H5~6
	044-□D	4.4		5	22	62	33	63	45	80		
	045-□D	4.5		5	22	62	33	63	45	80		
	046-□D	4.6		5	22	62	33	63	45	80		
	047-□D	4.7		5	22	62	33	63	45	80		

WSDP-□D



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D1 ~ D3	0 ~ -0.010 mm	h6
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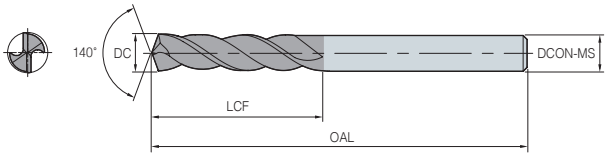
D18.1 ~	0 ~ -0.021 mm	

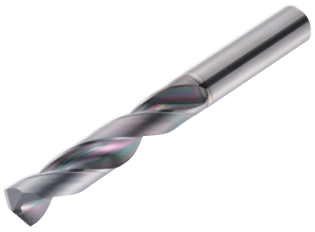
Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	External		



(mm)

Designation		DC		DCON-MS	3D		5D		7D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDP	04763-□D	4.763	3/16	5	24	62	33	63	45	80		
	048-□D	4.8		5	24	62	33	63	45	80		
	049-□D	4.9		5	24	62	33	63	45	80		
	050-□D	5		5	24	62	33	63	45	80	M6x1.0	H1~4
	051-□D	5.1		6	24	62	33	63	45	80	M6x1.0	H5~6
	05159-□D	5.159	13/64	6	28	66	33	63	50	83		
	052-□D	5.2		6	28	66	36	66	50	83		
	053-□D	5.3		6	28	66	36	66	50	83		
	054-□D	5.4		6	28	66	36	66	50	83		
	055-□D	5.5		6	28	66	36	66	50	83		
	05556-□D	5.556	7/32	6	28	66	36	66	50	83		
	056-□D	5.6		6	28	66	36	66	50	83		
	057-□D	5.7		6	28	66	36	66	50	83		
	058-□D	5.8		6	28	66	36	66	50	83		
	059-□D	5.9		6	28	66	36	66	50	83		
	05953-□D	5.953	15/64	6	28	66	36	66	-	-		
	060-□D	6		6	28	66	36	66	50	83		
	061-□D	6.1		7	30	66	36	66	50	83		
	062-□D	6.2		7	34	74	42	75	53	85		
	063-□D	6.3		7	34	74	42	75	53	85		
	0635-□D	6.35	1/4	7	34	74	42	75	53	85		
	064-□D	6.4		7	34	74	42	75	53	85		
	065-□D	6.5		7	34	74	42	75	53	85		
	066-□D	6.6		7	34	74	42	75	53	85		
	067-□D	6.7		7	37	74	42	75	53	85		
	06747-□D	6.747	17/64	7	37	74	42	75	53	85		
	068-□D	6.8		7	37	74	42	75	53	85	M8x1.25	H1~4
	069-□D	6.9		7	37	74	42	75	53	85	M8x1.25	H5~6
	070-□D	7		7	37	74	42	75	53	85	M8x1.0	H1~4
	071-□D	7.1		8	37	74	42	75	53	85	M8x1.0	H5~6
	07144-□D	7.144	9/32	8	40	79	46	80	58	90		
	072-□D	7.2		8	40	79	46	80	58	90		
	073-□D	7.3		8	40	79	46	80	58	90		
	074-□D	7.4		8	40	79	46	80	58	90		
	075-□D	7.5		8	40	79	46	80	58	90		
	07541-□D	7.541	19/64	8	40	79	46	80	-	-		
	076-□D	7.6		8	40	79	46	80	58	90		
	077-□D	7.7		8	40	79	46	80	58	90		
	078-□D	7.8		8	40	79	46	80	58	90		
	079-□D	7.9		8	40	79	46	80	58	90		
	07938-□D	7.938	5/16	8	40	79	46	80	58	90		
	080-□D	8		8	40	79	46	80	58	90		

WSDP-□D



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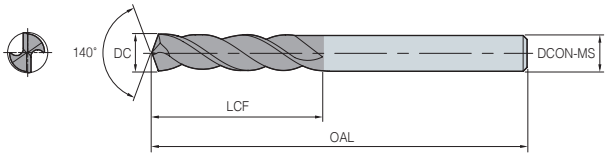
D18.1 ~	0 ~ -0.021 mm	

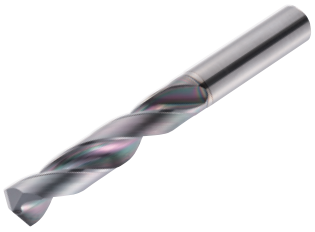
Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	External		



(mm)

Designation		DC		DCON-MS	3D		5D		7D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDP	081-□D	8.1		9	40	79	46	80	58	90		
	082-□D	8.2		9	43	84	50	85	64	98		
	083-□D	8.3		9	43	84	50	85	64	98		
	084-□D	8.4		9	43	84	50	85	64	98		
	085-□D	8.5		9	43	84	50	85	64	98	M10x1.5	H1~4
	086-□D	8.6		9	43	84	50	85	64	98	M10x1.5	H5~6
	087-□D	8.7		9	43	84	50	85	64	98		
	08731-□D	8.731	11/32	9	43	84	50	85	64	98		
	088-□D	8.8		9	43	84	50	85	64	98	M10x1.25	H1~4
	089-□D	8.9		9	43	84	50	85	64	98	M10x1.25	H5~6
	090-□D	9		9	43	84	50	85	64	98	M10x1.0	H1~4
	091-□D	9.1		10	43	84	50	85	64	98	M10x1.0	H5~6
	092-□D	9.2		10	47	89	55	90	68	105		
	093-□D	9.3		10	47	89	55	90	68	105		
	094-□D	9.4		10	47	89	55	90	68	105		
	095-□D	9.5		10	47	89	55	90	68	105		
	09525-□D	9.525	3/8	10	47	89	55	90	68	105		
	096-□D	9.6		10	47	89	55	90	68	105		
	097-□D	9.7		10	47	89	55	90	68	105		
	098-□D	9.8		10	47	89	55	90	68	105		
	099-□D	9.9		10	47	89	55	90	68	105		
	100-□D	10		10	47	89	55	90	68	105		
	101-□D	10.1		11	47	89	55	90	68	105		
	102-□D	10.2		11	51	95	57	95	73	110		
	103-□D	10.3		11	51	95	57	95	73	110	M12x1.75	H1~2
	10319-□D	10.319	13/32	11	51	95	57	95	73	110	M12x1.75	H3~4
	104-□D	10.4		11	51	95	57	95	73	110	M12x1.75	H5~6
	105-□D	10.5		11	51	95	57	95	73	110	M12x1.5	H1~4
	106-□D	10.6		11	51	95	57	95	73	110	M12x1.5	H5~6
	107-□D	10.7		11	51	95	57	95	73	110		
	10716-□D	10.716	27/64	11	51	95	57	95	73	110		
	108-□D	10.8		11	51	95	57	95	73	110	M12x1.25	H1~4
	109-□D	10.9		11	51	95	57	95	73	110	M12x1.25	H5~6
	110-□D	11		11	51	95	57	95	73	110	M12x1.0	H1~4
	111-□D	11.1		12	51	95	57	95	73	110	M12x1.0	H5~6
	11113-□D	11.113	7/16	12	54	102	63	102	80	120		
	112-□D	11.2		12	54	102	63	102	80	120		
	113-□D	11.3		12	54	102	63	102	80	120		
	114-□D	11.4		12	54	102	63	102	80	120		
	115-□D	11.5		12	54	102	63	102	80	120		
	116-□D	11.6		12	54	102	63	102	80	120		
	117-□D	11.7		12	54	102	63	102	80	120		

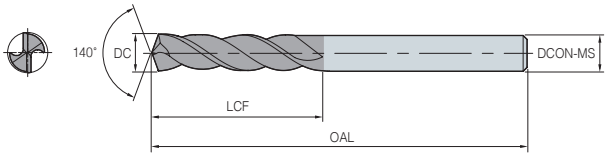
WSDP-□D



• **Tolerance** (Drill dia.)

DC		DCON-MS
D1 ~ D3	0 ~ -0.010 mm	h6
D3.1 ~ D6	0 ~ -0.012 mm	
D6.1 ~ D10	0 ~ -0.015 mm	
D10.1 ~ D18	0 ~ -0.018 mm	
D18.1 ~	0 ~ -0.021 mm	

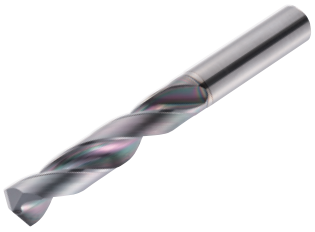
Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	External		



(mm)

Designation		DC		DCON-MS	3D		5D		7D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDP	118-□D	11.8		12	54	102	63	102	80	120		
	119-□D	11.9		12	54	102	63	102	80	120		
	120-□D	12		12	54	102	63	102	80	120	M14x2	H1~4
	121-□D	12.1		13	54	102	63	102	80	120	M14x2	H5~6
	122-□D	12.2		13	57	102	63	102	90	137		
	123-□D	12.3		13	57	102	63	102	90	137		
	124-□D	12.4		13	57	102	63	102	90	137		
	125-□D	12.5		13	57	102	63	102	90	137	M14x1.5	H1~4
	126-□D	12.6		13	57	102	63	102	90	137	M14x1.5	H5~6
	127-□D	12.7	1/2	13	57	102	63	102	90	137		
	128-□D	12.8		13	57	102	63	102	90	137		
	129-□D	12.9		13	57	102	63	102	90	137		
	130-□D	13		13	57	102	63	102	90	137		
	131-□D	13.1		14	-	-	63	102	90	137		
	132-□D	13.2		14	-	-	65	107	96	147		
	133-□D	13.3		14	-	-	65	107	96	147		
	134-□D	13.4		14	-	-	65	107	96	147		
	13494-□D	13.494	17/32	14	-	-	65	107	96	147		
	135-□D	13.5		14	-	-	65	107	96	147		
	136-□D	13.6		14	-	-	65	107	96	147		
	137-□D	13.7		14	-	-	65	107	96	147		
	138-□D	13.8		14	-	-	65	107	96	147		
	13891-□D	13.891	35/64	14	-	-	-	-	96	147		
	139-□D	13.9		14	-	-	65	107	96	147		
	140-□D	14		14	-	-	65	107	96	147	M16x2.0	H1~4
	141-□D	14.1		15	-	-	65	107	96	147	M16x2.0	H5~6
	142-□D	14.2		15	-	-	67	111	100	153		
	14288-□D	14.288	9/16	15	-	-	-	-	100	153		
	143-□D	14.3		15	-	-	67	111	100	153		
	144-□D	14.4		15	-	-	67	111	100	153		
	145-□D	14.5		15	-	-	67	111	100	153	M16x1.5	H1~4
	146-□D	14.6		15	-	-	67	111	100	153	M16x1.5	H5~6
	147-□D	14.7		15	-	-	67	111	100	153		
	148-□D	14.8		15	-	-	67	111	100	153		
	149-□D	14.9		15	-	-	67	111	100	153		
	150-□D	15		15	-	-	67	111	100	153		
	151-□D	15.1		16	-	-	67	111	100	153		
	152-□D	15.2		16	-	-	69	115	112	160		
	154-□D	15.4		16	-	-	69	115	112	160		
	155-□D	15.5		16	-	-	69	115	112	160	M18x2.5	H1~4
	156-□D	15.6		16	-	-	69	115	112	160	M18x2.5	H5~6
	157-□D	15.7		16	-	-	69	115	112	160		

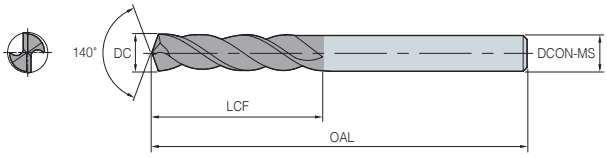
WSDP-□D



• **Tolerance** (Drill dia.)

DC		DCON-MS
D1 ~ D3	0 ~ -0.010 mm	h6
D3.1 ~ D6	0 ~ -0.012 mm	
D6.1 ~ D10	0 ~ -0.015 mm	
D10.1 ~ D18	0 ~ -0.018 mm	
D18.1 ~	0 ~ -0.021 mm	

Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	External		



(mm)

Designation		DC		DCON-MS	3D		5D		7D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDP	**158-□D**	15.8		16	-	-	69	115	112	160		
	15875-□D	15.875	5/8	16	-	-	69	115	112	160		
	160-□D	16		16	-	-	69	115	112	160		
	161-□D	16.1		17	-	-	69	115	112	160		
	163-□D	16.3		17	-	-	71	119	112	160		
	165-□D	16.5		17	-	-	71	119	112	160	M18x1.5	H1~6
	16669-□D	16.669	21/32	17	-	-	71	119	112	160		
	170-□D	17		17	-	-	71	119	112	160		
	171-□D	17.1		18	-	-	71	119	112	160		
	172-□D	17.2		18	-	-	74	123	112	160		
	17463-□D	17.463	11/16	18	-	-	-	-	112	160		
	175-□D	17.5		18	-	-	74	123	112	160	M20x2.5	H1~6
	177-□D	17.7		18	-	-	74	123	112	160		
	178-□D	17.8		18	-	-	74	123	112	160		
	180-□D	18		18	-	-	74	123	112	160		
	181-□D	18.1		19	-	-	74	123	112	160		
	182-□D	18.2		19	-	-	76	127	112	160		
	185-□D	18.5		19	-	-	76	127	112	160	M20x1.5	H1~6
	190-□D	19		19	-	-	76	127	112	160		
	191-□D	19.1		20	-	-	76	127	112	160		
	195-□D	19.5		20	-	-	80	131	112	160	M22x2.5	H1~6
	197-□D	19.7		20	-	-	80	131	112	160		
	200-□D	20		20	-	-	80	131	112	160		

WSDPH

Code system

Special type

WSDP	H	040	-	5D	-	100L	-	5S

- **WSDP** — W-Star Drill Plus
- **H** — Oil hole
  H : Oil hole
- **040** — Drill diameter
  040 : Ø4 mm
- **5D** — Aspect ratio (L/D)
  3D, 5D, 8D
- **100L** — Overall length
  100L : 100 mm
- **5S** — Shank diameter
  5S : Ø5 mm
- **100** — Special type
  Flute length
  100 : 100 mm

Features

Minimized chip packing

- Deep chip pockets with 3D to 8D machining depth
- Minimized chip packing reduces scratches inside the hole, thereby enhancing machining quality

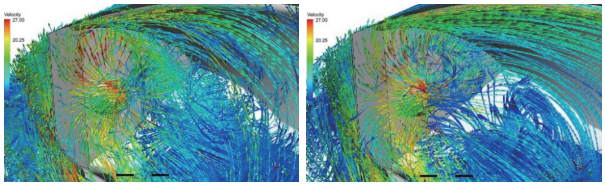
Detailed line up

- **3D** : DIN 6537, HB/HE Shank
- **5D** : DIN 6537, HB/HE Shank
- **8D** : KORLOY Standard

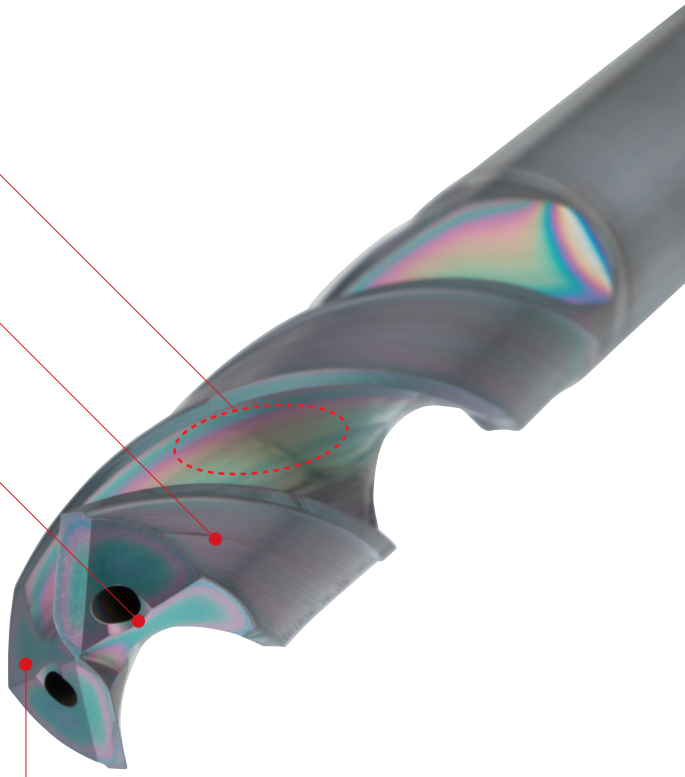
New tip groove geometry

- Enhanced cooling effect due to increased coolant flow rate and volume at the cutting edge and periphery
- Enhanced chip evacuation capability due to increased coolant flow rate in the flute

Improved Cooling



[WSDPH] [Competitor]



Improved XR thinning

- Enhanced chip evacuation capability through thinning surface finishing
- Improved surface integrity of the cutting edge enhances resistance to catastrophic failure and chipping
- Applying streamlined thinning disperses the cutting force at the machining tip, which reduces the cutting load

Application range

◎: 1st recommendation ○: 2nd recommendation

P			M	K	N	H	
Carbon steel ~HB225	Alloy steel HB225~325	Pre-hardened steel HRC30~50	Stainless steel	Cast iron	Non-ferrous & Aluminum	Hardened steel	
						SKD61 ~HRC55	SKD11 HRC55~
◎	◎	◎	◎	○	○	○	-

Recommended cutting conditions

Workpiece	P						M		K			
	Carbon Steels, Alloy Steels SS400, SM50C, SCM, SCr ~900N/mm² / ~HRC 28		Alloy Steels SCM, SCr ~1,100N/mm² HRC 28~35		Alloy Steels, Hardened Steels ~HRC40		Stainless Steels SUS300, SUS400		Cast Iron ~350N/mm²		Ductile Iron 400~600N/mm²	
Cutting condition	80~120 m/min		60~90 m/min		30~60 m/min		40~70 m/min		80~120 m/min		60~100 m/min	
DC(∅)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)	RPM n (min⁻¹)	fn (mm/rev)
3	10,600	0.09	8,000	0.09	4,800	0.08	5,800	0.09	10,600	0.09	8,500	0.09
4	8,000	0.14	6,000	0.14	3,600	0.1	4,400	0.14	8,000	0.14	6,400	0.14
6	5,300	0.17	4,000	0.17	2,400	0.14	2,900	0.17	5,300	0.17	4,200	0.21
8	4,000	0.21	3,000	0.21	1,800	0.18	2,200	0.21	4,000	0.21	3,200	0.24
10	3,200	0.25	2,400	0.25	1,400	0.22	1,800	0.25	3,200	0.25	2,500	0.26
12	2,700	0.27	2,000	0.27	1,200	0.24	1,500	0.27	2,700	0.27	2,100	0.28
14	2,300	0.29	1,700	0.29	1,000	0.26	1,300	0.29	2,300	0.29	1,800	0.31
16	2,000	0.31	1,500	0.31	900	0.29	1,100	0.31	2,000	0.31	1,600	0.33
18	1,800	0.33	1,300	0.33	800	0.32	1,000	0.33	1,800	0.33	1,400	0.35
20	1,600	0.35	1,200	0.35	700	0.34	900	0.35	1,600	0.35	1,300	0.37

※ In actual machinning, the condition should be adjusted according to the machining shape, purpose and machine type.

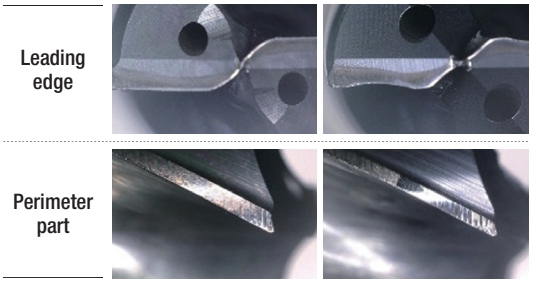
* **7D** : apply 75 % of above cutting condition

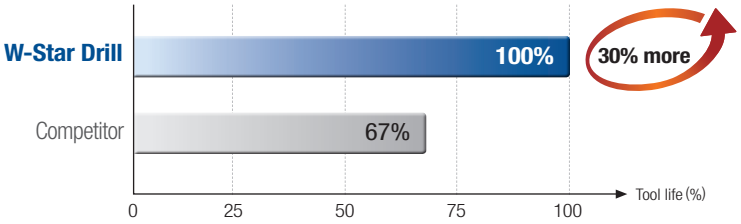
Application examples

Carbon steel (C45)

Cutting condition vc (m/min) = 100, fn (mm/rev) = 0.24, ap (mm) = 30, wet

Tool WSDPH060-5D (Tool diameter = Ø6 mm)



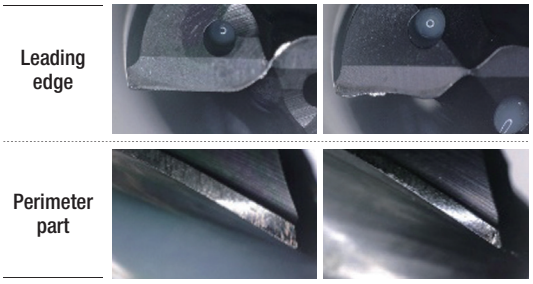


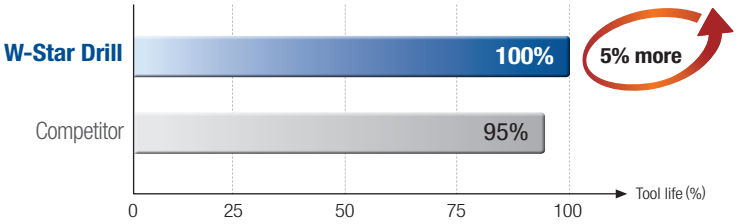
» 30% longer tool life compared to the competitor

Alloy steel (42CrMo4)

Cutting condition vc (m/min) = 80, fn (mm/rev) = 0.2, ap (mm) = 30, wet

Tool WSDPH060-5D (Tool diameter = Ø6 mm)



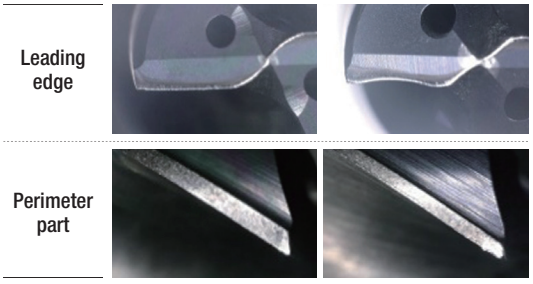


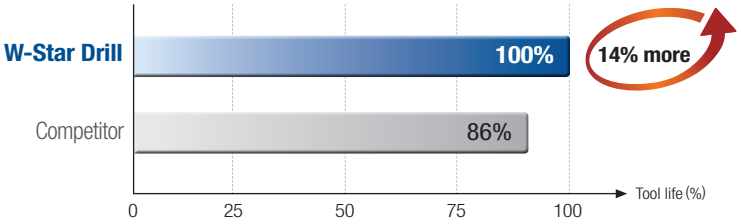
» 5% longer tool life compared to the competitor

Stainless steel (X5CrNi18-9)

Cutting condition vc (m/min) = 60, fn (mm/rev) = 0.14, ap (mm) = 19, wet

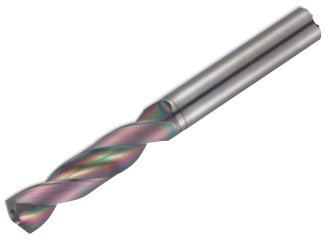
Tool WSDPH060-5D (Tool diameter = Ø6 mm)





» 14% longer tool life compared to the competitor

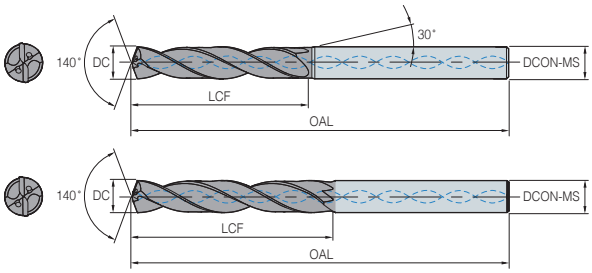
WSDPH-□D



• **Tolerance** (Drill dia.)

DC		DCON-MS
~ D3	+0.002 ~ - 0.012 mm	h6
D3.1 ~ D6	+0.004 ~ - 0.016 mm	
D6.1 ~ D10	+0.006 ~ - 0.021 mm	
D10.1 ~ D13	+0.007 ~ - 0.025 mm	
D18.1 ~ D20	+0.008 ~ - 0.029 mm	

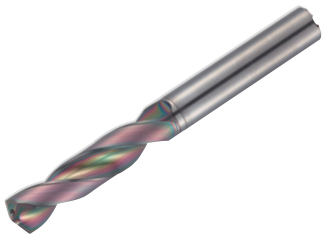
Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	Internal		



(mm)

Designation		DC		DCON-MS	3D		5D		8D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDPH	030-□D	3		6	20	62	28	66	31	74		
	031-□D	3.1		6	20	62	28	66	36	81		
	03175-□D	3.175	1/8	6	20	62	28	66	36	81		
	032-□D	3.2		6	20	62	28	66	36	81		
	033-□D	3.3		6	20	62	28	66	36	81	M4x0.7	H1~4
	034-□D	3.4		6	20	62	28	66	36	81	M4x0.7	H5~6
	035-□D	3.5		6	20	62	28	66	36	81		
	03572-□D	3.572	9/64	6	20	62	28	66	41	86		
	036-□D	3.6		6	20	62	28	66	41	86		
	037-□D	3.7		6	20	62	28	66	41	86		
	038-□D	3.8		6	24	66	36	74	41	86		
	039-□D	3.9		6	24	66	36	74	41	86		
	03969-□D	3.969	5/32	6	24	66	36	74	41	86		
	040-□D	4		6	24	66	36	74	41	86		
	04039-□D	4.039	7/44	6	24	66	36	74	46	91		
	041-□D	4.1		6	24	66	36	74	46	91		
	042-□D	4.2		6	24	66	36	74	46	91	M5x0.8	H1~4
	043-□D	4.3		6	24	66	36	74	46	91	M5x0.8	H5~6
	04366-□D	4.366	11/64	6	24	66	36	74	46	91		
	044-□D	4.4		6	24	66	36	74	46	91		
	045-□D	4.5		6	24	66	36	74	46	91		
	046-□D	4.6		6	24	66	36	74	51	96		
	047-□D	4.7		6	24	66	36	74	51	96		
	04763-□D	4.763	3/16	6	28	66	36	74	51	96		
	048-□D	4.8		6	28	66	44	82	51	96		
	049-□D	4.9		6	28	66	44	82	51	96		
	050-□D	5		6	28	66	44	82	51	96	M6x1.0	H1~4
	051-□D	5.1		6	28	66	44	82	57	102	M6x1.0	H5~6
	05159-□D	5.159	13/64	6	28	66	44	82	57	102		
	052-□D	5.2		6	28	66	44	82	57	102		
	053-□D	5.3		6	28	66	44	82	57	102		
	054-□D	5.4		6	28	66	44	82	57	102		
	055-□D	5.5		6	28	66	44	82	57	102		
	05556-□D	5.556	7/32	6	28	66	44	82	62	107		
	056-□D	5.6		6	28	66	44	82	62	107		
	057-□D	5.7		6	28	66	44	82	62	107		
	058-□D	5.8		6	28	66	44	82	62	107		
	059-□D	5.9		6	28	66	44	82	62	107		
	05953-□D	5.953	15/64	6	28	66	44	82	62	107		
	060-□D	6		6	28	66	44	82	62	107		

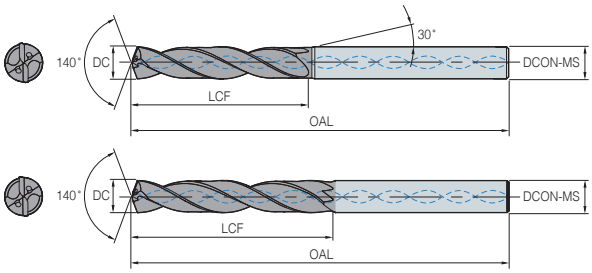
WSDPH-□D



• **Tolerance** (Drill dia.)

DC		DCON-MS
~ D3	+0.002 ~ - 0.012 mm	h6
D3.1 ~ D6	+0.004 ~ - 0.016 mm	
D6.1 ~ D10	+0.006 ~ - 0.021 mm	
D10.1 ~ D13	+0.007 ~ - 0.025 mm	
D18.1 ~ D20	+0.008 ~ - 0.029 mm	

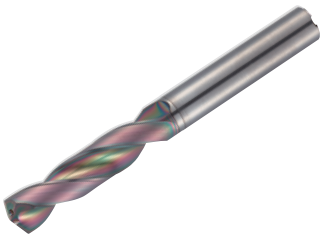
Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	Internal		



(mm)

Designation		DC		DCON-MS	3D		5D		8D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDPH	**061-□D**	6.1		8	34	79	53	91	71	116		
	062-□D	6.2		8	34	79	53	91	71	116		
	063-□D	6.3		8	34	79	53	91	71	116		
	0635-□D	6.35	1/4	8	34	79	53	91	71	116		
	064-□D	6.4		8	34	79	53	91	71	116		
	065-□D	6.5		8	34	79	53	91	71	116		
	06528-□D	6.528	9/35	8	34	79	53	91	71	116		
	066-□D	6.6		8	34	79	53	91	71	116		
	067-□D	6.7		8	34	79	53	91	71	116		
	06747-□D	6.747	17/64	8	34	79	53	91	71	116		
	068-□D	6.8		8	34	79	53	91	71	116	M8x1.25	H1~4
	069-□D	6.9		8	34	79	53	91	71	116	M8x1.25	H5~6
	070-□D	7		8	34	79	53	91	71	116	M8x1.0	H1~4
	071-□D	7.1		8	41	79	53	91	81	126	M8x1.0	H5~6
	07144-□D	7.144	9/32	8	41	79	53	91	81	126		
	072-□D	7.2		8	41	79	53	91	81	126		
	073-□D	7.3		8	41	79	53	91	81	126		
	074-□D	7.4		8	41	79	53	91	81	126		
	075-□D	7.5		8	41	79	53	91	81	126		
	07541-□D	7.541	19/64	8	41	79	53	91	81	126		
	076-□D	7.6		8	41	79	53	91	81	126		
	077-□D	7.7		8	41	79	53	91	81	126		
	078-□D	7.8		8	41	79	53	91	81	126		
	079-□D	7.9		8	41	79	53	91	81	126		
	07938-□D	7.938	5/16	8	41	79	53	91	81	126		
	080-□D	8		8	41	79	53	91	81	126		
	081-□D	8.1		10	47	89	61	103	92	137		
	082-□D	8.2		10	47	89	61	103	92	137		
	083-□D	8.3		10	47	89	61	103	92	137		
	08334-□D	8.334	21/64	10	47	89	61	103	92	137		
	084-□D	8.4		10	47	89	61	103	92	137		
	08433-□D	8.433		10	47	89	61	103	92	137		
	085-□D	8.5		10	47	89	61	103	92	137	M10x1.5	H1~4
	086-□D	8.6		10	47	89	61	103	92	137	M10x1.5	H5~6
	087-□D	8.7		10	47	89	61	103	92	137		
	08731-□D	8.731	11/32	10	47	89	61	103	92	137		
	088-□D	8.8		10	47	89	61	103	92	137	M10x1.25	H1~4
	089-□D	8.9		10	47	89	61	103	92	137	M10x1.25	H5~6
	090-□D	9		10	47	89	61	103	92	137	M10x1.0	H1~4
	091-□D	9.1		10	47	89	61	103	102	147	M10x1.0	H5~6

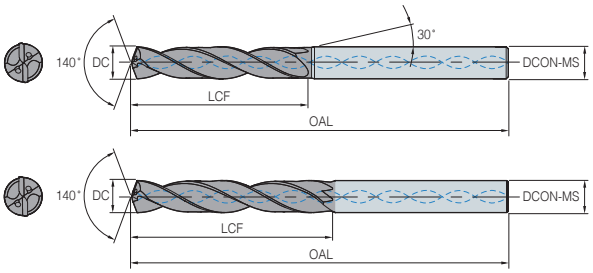
WSDPH-□D



• **Tolerance** (Drill dia.)

DC		DCON-MS
~ D3	+0.002 ~ - 0.012 mm	h6
D3.1 ~ D6	+0.004 ~ - 0.016 mm	
D6.1 ~ D10	+0.006 ~ - 0.021 mm	
D10.1 ~ D13	+0.007 ~ - 0.025 mm	
D18.1 ~ D20	+0.008 ~ - 0.029 mm	

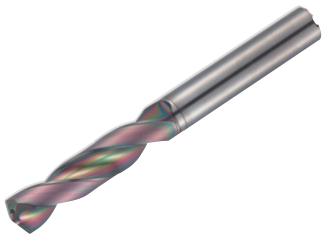
Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	Internal		



(mm)

Designation		DC		DCON-MS	3D		5D		8D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDPH	**09128-□D**	9.128	23/64	10	47	89	61	103	102	147		
	092-□D	9.2		10	47	89	61	103	102	147		
	093-□D	9.3		10	47	89	61	103	102	147		
	09347-□D	9.347		10	47	89	61	103	102	147		
	094-□D	9.4		10	47	89	61	103	102	147		
	095-□D	9.5		10	47	89	61	103	102	147		
	09525-□D	9.525	3/8	10	47	89	61	103	102	147		
	096-□D	9.6		10	47	89	61	103	102	147		
	097-□D	9.7		10	47	89	61	103	102	147		
	098-□D	9.8		10	47	89	61	103	102	147		
	099-□D	9.9		10	47	89	61	103	102	147		
	09922-□D	9.922	25/64	10	47	89	61	103	102	147		
	100-□D	10		10	47	89	61	103	102	147		
	101-□D	10.1		12	55	102	71	118	113	158		
	102-□D	10.2		12	55	102	71	118	113	158		
	103-□D	10.3		12	55	102	71	118	113	158	M12x1.75	H1~2
	10319-□D	10.319	13/32	12	55	102	71	118	113	158	M12x1.75	H3~4
	104-□D	10.4		12	55	102	71	118	113	158	M12x1.75	H5~6
	105-□D	10.5		12	55	102	71	118	113	158	M12x1.5	H1~4
	106-□D	10.6		12	55	102	71	118	113	158	M12x1.5	H5~6
	107-□D	10.7		12	55	102	71	118	113	158		
	10716-□D	10.716	27/64	12	55	102	71	118	113	158		
	108-□D	10.8		12	55	102	71	118	113	158	M12x1.25	H1~4
	109-□D	10.9		12	55	102	71	118	113	158	M12x1.25	H5~6
	110-□D	11		12	55	102	71	118	113	158	M12x1.0	H1~4
	111-□D	11.1		12	55	102	71	118	123	168	M12x1.0	H5~6
	11113-□D	11.113	7/16	12	55	102	71	118	123	168		
	112-□D	11.2		12	55	102	71	118	123	168		
	113-□D	11.3		12	55	102	71	118	123	168		
	114-□D	11.4		12	55	102	71	118	123	168		
	115-□D	11.5		12	55	102	71	118	123	168		
	11509-□D	11.509	29/64	12	55	102	71	118	123	168		
	116-□D	11.6		12	55	102	71	118	123	168		
	117-□D	11.7		12	55	102	71	118	123	168		
	118-□D	11.8		12	55	102	71	118	123	168		
	119-□D	11.9		12	55	102	71	118	123	168		
	11906-□D	11.906	15/32	12	55	102	71	118	123	168		
	120-□D	12		12	55	102	71	118	123	168	M14x2.0	H1~4
	121-□D	12.1		14	60	107	77	124	134	179	M14x2.0	H5~6
	122-□D	12.2		14	60	107	77	124	134	179		

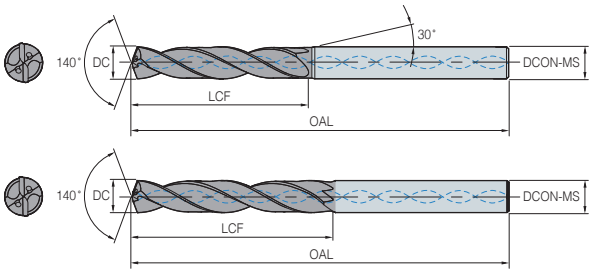
WSDPH-□D



• **Tolerance** (Drill dia.)

DC		DCON-MS
~ D3	+0.002 ~ - 0.012 mm	h6
D3.1 ~ D6	+0.004 ~ - 0.016 mm	
D6.1 ~ D10	+0.006 ~ - 0.021 mm	
D10.1 ~ D13	+0.007 ~ - 0.025 mm	
D18.1 ~ D20	+0.008 ~ - 0.029 mm	

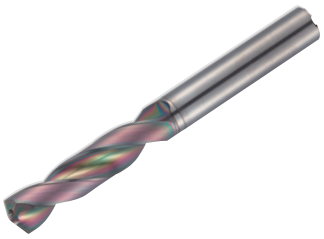
Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	Internal		



(mm)

Designation		DC		DCON-MS	3D		5D		8D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDPH	**123-□D**	12.3		14	60	107	77	124	134	179		
	12303-□D	12.303	31/64	14	60	107	77	124	134	179		
	124-□D	12.4		14	60	107	77	124	134	179		
	125-□D	12.5		14	60	107	77	124	134	179	M14x1.5	H1~4
	126-□D	12.6		14	60	107	77	124	134	179	M14x1.5	H5~6
	127-□D	12.7		14	60	107	77	124	134	179		
	128-□D	12.8		14	60	107	77	124	134	179		
	129-□D	12.9		14	60	107	77	124	134	179		
	130-□D	13		14	60	107	77	124	134	179		
	131-□D	13.1		14	60	107	77	124	144	189		
	132-□D	13.2		14	60	107	77	124	144	189		
	133-□D	13.3		14	60	107	77	124	144	189		
	134-□D	13.4		14	60	107	77	124	144	189		
	135-□D	13.5		14	60	107	77	124	144	189		
	136-□D	13.6		14	60	107	77	124	144	189		
	137-□D	13.7		14	60	107	77	124	144	189		
	138-□D	13.8		14	60	107	77	124	144	189		
	13891-□D	13.891	35/64	14	60	107	77	124	144	189		
	139-□D	13.9		14	60	107	77	124	144	189		
	140-□D	14		14	60	107	77	124	144	189	M16x2.0	H1~4
	141-□D	14.1		16	65	115	83	133	155	200	M16x2.0	H5~6
	142-□D	14.2		16	65	115	83	133	155	200		
	14288-□D	14.288	9/16	16	65	115	83	133	155	200		
	143-□D	14.3		16	65	115	83	133	155	200		
	144-□D	14.4		16	65	115	83	133	155	200		
	145-□D	14.5		16	65	115	83	133	155	200	M16x1.5	H1~4
	146-□D	14.6		16	65	115	83	133	155	200	M16x1.5	H5~6
	14684-□D	14.684	37/64	16	65	115	83	133	155	200		
	147-□D	14.7		16	65	115	83	133	155	200		
	148-□D	14.8		16	65	115	83	133	155	200		
	149-□D	14.9		16	65	115	83	133	155	200		
	150-□D	15		16	65	115	83	133	155	200		
	15081-□D	15.081	19/32	16	65	115	83	133	165	210		
	151-□D	15.1		16	65	115	83	133	165	210		
	152-□D	15.2		16	65	115	83	133	165	210		
	153-□D	15.3		16	65	115	83	133	165	210		
	154-□D	15.4		16	65	115	83	133	165	210		
	15478-□D	15.478	39/64	16	65	115	83	133	165	210		
	155-□D	15.5		16	65	115	83	133	165	210	M18x2.5	H1~4
	156-□D	15.6		16	65	115	83	133	165	210	M18x2.5	H5~6

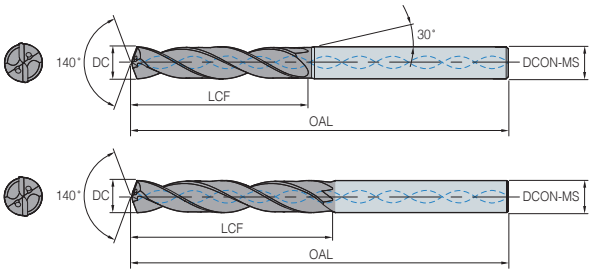
WSDPH-□D



• **Tolerance** (Drill dia.)

DC		DCON-MS
~ D3	+0.002 ~ - 0.012 mm	h6
D3.1 ~ D6	+0.004 ~ - 0.016 mm	
D6.1 ~ D10	+0.006 ~ - 0.021 mm	
D10.1 ~ D13	+0.007 ~ - 0.025 mm	
D18.1 ~ D20	+0.008 ~ - 0.029 mm	

Specification	P	M	K
Twist angle	Streamlined		
Thinning	XR type		
Coolant	Internal		

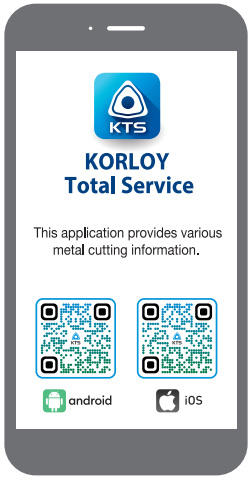


(mm)

Designation		DC		DCON-MS	3D		5D		8D		Applicable Tap	
		Metric	Fraction (inch)		LCF	OAL	LCF	OAL	LCF	OAL	TDZ × TP	TCTR
WSDPH	**157-□D**	15.7		16	65	115	83	133	165	210		
	158-□D	15.8		16	65	115	83	133	165	210		
	15875-□D	15.875	5/8	16	65	115	83	133	165	210		
	159-□D	15.9		16	65	115	83	133	165	210		
	160-□D	16		16	65	115	83	133	165	210		
	16272-□D	16.272	41/64	18	73	123	93	143	-	-		
	165-□D	16.5		18	73	123	93	143	-	-	M18x1.5	H1~6
	16669-□D	16.669	21/32	18	73	123	93	143	-	-		
	170-□D	17		18	73	123	93	143	-	-		
	17066-□D	17.066	43/64	18	73	123	93	143	-	-		
	17463-□D	17.463	11/16	18	73	123	93	143	-	-		
	175-□D	17.5		18	73	123	93	143	-	-	M20x2.5	H1~6
	17859-□D	17.859	45/64	18	73	123	93	143	-	-		
	180-□D	18		18	73	123	93	143	-	-		
	18256-□D	18.256	23/32	20	79	131	101	153	-	-		
	185-□D	18.5		20	79	131	101	153	-	-	M20x1.5	H1~6
	18654-□D	18.654	47/64	20	79	131	101	153	-	-		
	190-□D	19		20	79	131	101	153	-	-		
	1905-□D	19.05	3/4	20	79	131	101	153	-	-		
	1925-□D	19.25	72/95	20	79	131	101	153	-	-		
	19447-□D	19.447	49/64	20	79	131	101	153	-	-		
	195-□D	19.5		20	79	131	101	153	-	-	M22x2.5	H1~6
	19844-□D	19.844	25/32	20	79	131	101	153	-	-		
	200-□D	20		20	79	131	101	153	-	-		

⚠ For the safe metalcutting

- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threat the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the tools can be pulled out due to centrifugal force while high speed machining.



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