

Insert Type Indexable Drills

SumiDrill WDX Series

New Grade For Machining Non-Ferrous Metals

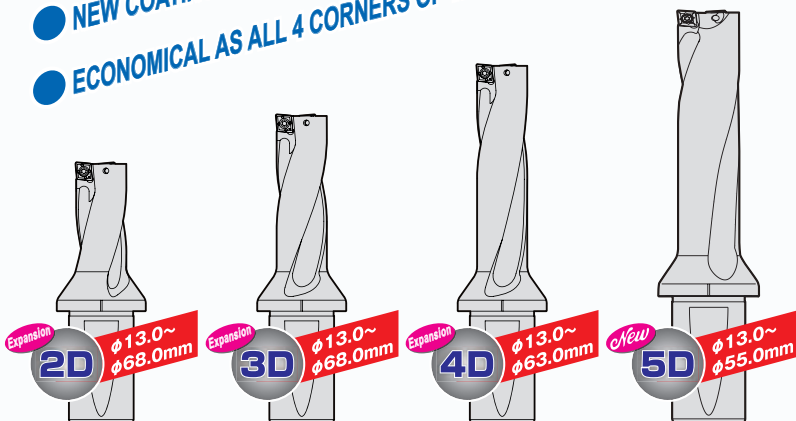
New

DL1500

AURORA Coat

EXCELLENT STABILITY!

- BALANCED DESIGN FOR STABILITY AND HIGH QUALITY DRILLING!
- 3 TYPES OF CHIPBREAKERS TO SOLVE VARIOUS CHIP CONTROL PROBLEMS!
- NEW INSERT GRADES FOR DRILLING STEEL, STAINLESS STEEL, CAST IRON AND NON-FERROUS METAL!
- NEW COATING TECHNOLOGY WITH IMPROVED FRACTURE AND WEAR RESISTANCE FOR LONGER TOOL LIFE!
- ECONOMICAL AS ALL 4 CORNERS OF THE INSERTS ARE UTILIZED FOR THE CENTRAL AND PERIPHERAL EDGES!



Indexable Drill **SumiDrill WDX Series**

■ General Features

SumiDrill WDX series with its excellent balanced design, achieves stable drilling for a wide variety of work materials from General Steel, Stainless Steel, Cast Iron to Non-Ferrous Metals.

In addition, there are 3 original chipbreaker designs available that enhance chip control and lower cutting forces for low rigidity set-ups.

● Series Range

(units : mm)

Drilling Depth	Stocked Sizes	Planned Expansion
2D	ø13.0~ø65.0	ø66.0~ø68.0
3D	ø13.0~ø65.0	ø66.0~ø68.0
4D	ø13.0~ø60.0	ø61.0~ø63.0
5D	ø13.0~ø36.0	ø37.0~ø55.0



Balanced design for high quality drilling



Utilizing new grades ACP300, ACK300 and DL1500



3 types of unique chipbreakers for various applications



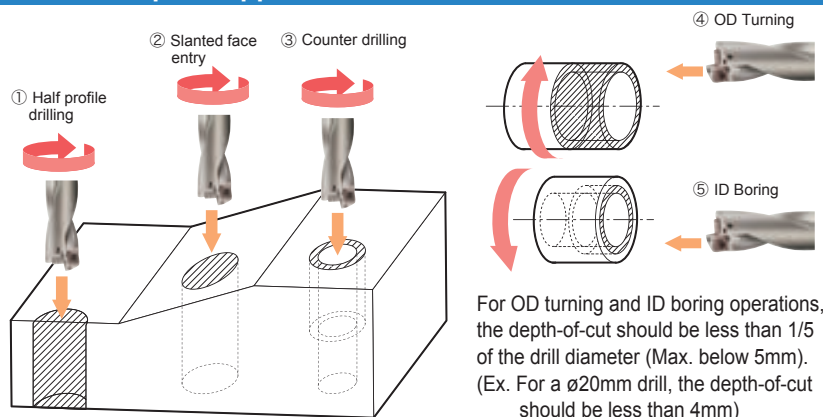
Applicable on lathe machines



Multi-purpose tool for a variety of applications

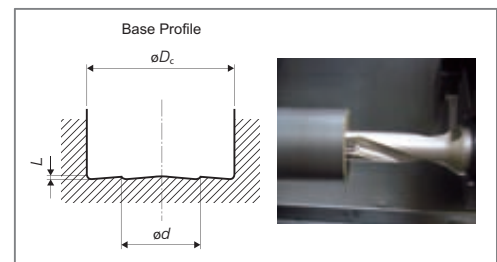
Highly durable body with a special surface treatment for stable and extended usage on a variety of applications such as general drilling, counter boring, spot drilling etc.

■ Multi-Purpose Applications



■ Nearly Flat Hole Base

Nearly flat hole base makes it easy for finishing on the next process!



● Base Profile Dimensions

(units : mm)

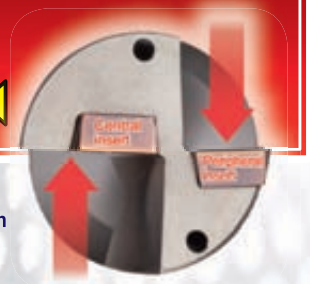
Drill Dia. øD _c	ød	L (Highest Step)
ø13.0~ø18.0	ød _c / 2	0.4
ø18.5~ø28.5	ød _c / 2	0.6
ø29.0~ø36.0	ød _c / 2	0.8
ø37.0~ø55.0	ød _c / 2	1.2
ø56.0~ø68.0	ød _c / 2	1.2

Unmatched

Balanced Design !



▶▶ Cutting force of central insert $\approx$ Cutting force of peripheral insert ◀◀



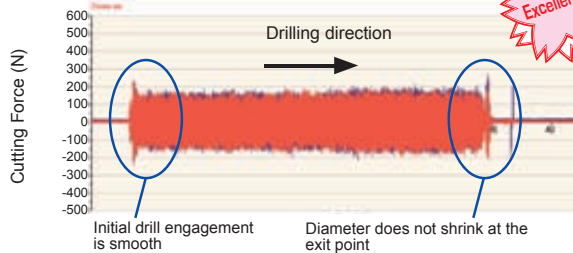
■ With a Balanced Design...

Balancing the cutting forces during drilling through optimizing the relative position between the peripheral and central insert thus resulting in a more stable drilling.

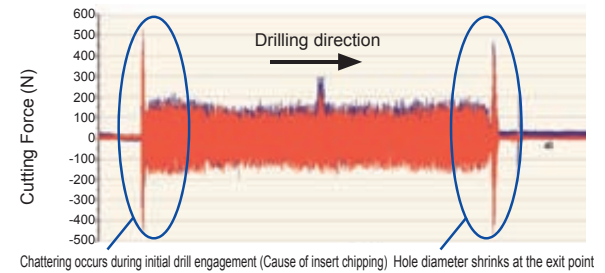
Horizontal Force Comparison

Maintaining balance at both the drill entry point and exit point for better stability

SumiDrill WDX type



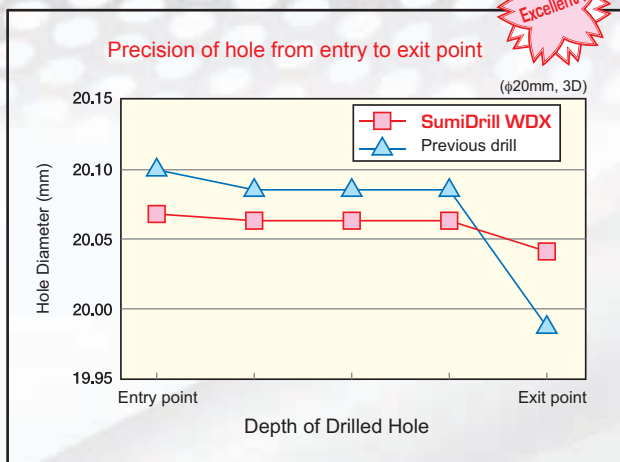
Conventional and Competitor's drill



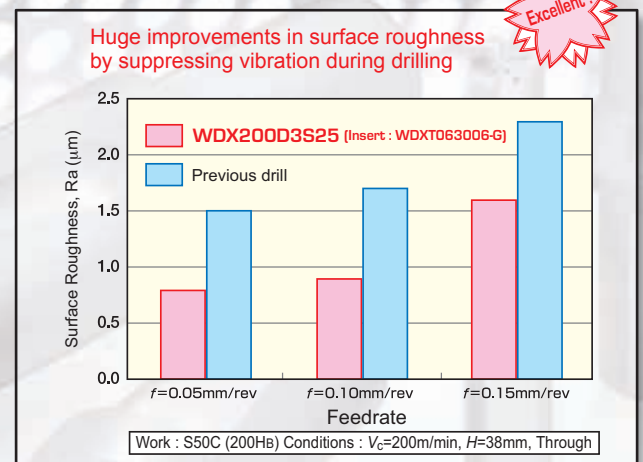
High Quality Holes

Achieving high precision, stable drilling and good surface finish with a balanced design

■ Hole Precision Comparison



■ Surface Roughness Comparison



New 5D series for deep hole drilling! (Range: $\phi 13.0\text{mm}$ ~ $\phi 55.0\text{mm}$)

New

■ Characteristic

SumiDrill WDX series for 5D drilling features a specially designed flute shape + enlarged coolant holes, allowing excellent chip evacuation during deep hole drilling.

Large coolant hole

Guide groove for coolant supply



■ Performance

Characteristics	Figure	Cutting Resistance	Machined Surface (Exit)
WDX260D5S32 Special Flute Shape for L/D=5 ※ Emphasis on chip evacuation Large capacity flute design for improved chip evacuation, resulting in stable drilling of deep 5 L/D holes.		Although the thrust amplitude is larger than using flutes designed for up to 4 L/D drills, the drilling performance of 5 L/D flutes are more stable in drilling deep holes. Thrust horizontal component force Drilling depth L/D=4 Drilling depth L/D=5	Good machined surface throughout the length of the hole.
WDX260D4S32 Flute Shape for L/D≤4 ※ Emphasis on drill rigidity Flutes designed for greater drill rigidity provides stable drilling of shallow holes of up to L/D=4.		Chip blockage at the bottom of hole however, exhibits stable drilling up to 4 L/D depth High drill rigidity only allow reduce thrust amplitude Drilling depth L/D=4 Drilling depth L/D=5	Poor machined surface due to chip blockage near the bottom of the hole (near 5 L/D)

Work : SUS304 Insert : WDX073506-G
 Conditions : $V_c=150\text{m/min}$, $f=0.05\text{mm/rev}$, $H=130\text{mm}$, Through, WET

Inserts for SumiDrill WDX type

WDXT Series

(L type / G type / H type)



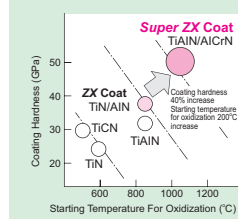
Achieving Longer Tool Life With New Grades ^{ACP300} ^{ACK300} For Excellent Chipping And Wear Resistance !

Utilizing the new "Super ZX Coat" for longer tool life -
ACP300 for General Steel and ACK300 for Cast Iron or high speed drilling of Steel.

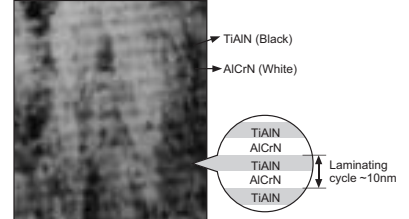
■ Characteristics of "Super ZX Coat"

- Super multi-layered structure (up to 1,000 layers) of alternately stacked nanometer-thick layers of TiAlN and AlCrN coatings.
- Increased wear resistance with 40% higher coating hardness and 200°C increase in oxidation resistance as compared with conventional coatings.

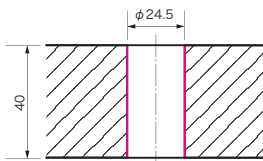
Characteristics of new coating layer



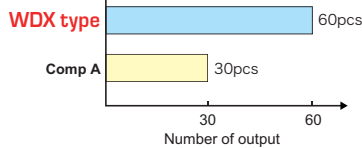
TEM image of the coating structure



■ Application Example

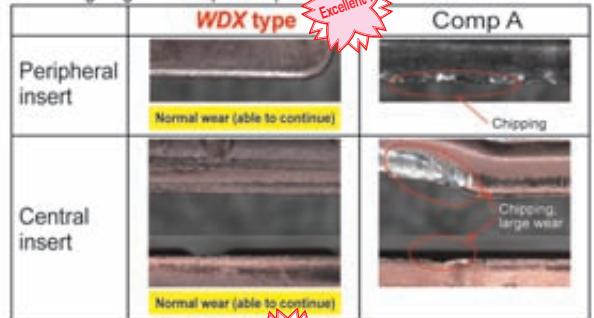


Double the tool life !



Work : Machine Component (Carbon Steel)
Tool : WDX245D2S25 (ACP300, G type breaker)
Conditions : $V_c = 185\text{m/min}$ ($n = 2,400\text{min}^{-1}$)
 $f = 0.1\text{mm/rev}$
 $H = 32\text{mm}$, water soluble cutting oil

■ Cutting Edge After 30pcs Output

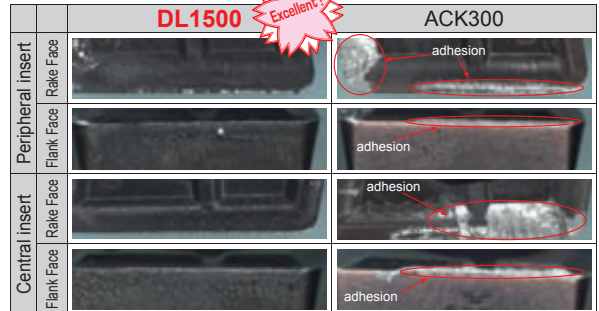


New AURORA Coat Grade ^{DL1500} For Drilling Of Non-Ferrous Metals !



New insert grade for drilling of non-ferrous metals - DL1500, offering greatly improved adhesion resistance as compared to conventional grades. This grade is excellent for drilling Aluminum and Copper Alloys.

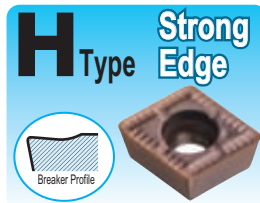
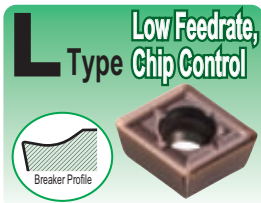
Work : ADC52
Drill : WDX250D3S25 (DL1500, G type)
Conditions : $V_c = 150\text{m/min}$ ($n = 1,911\text{min}^{-1}$)
 $f = 0.1\text{mm/rev}$
 $H = 50\text{mm}$ (Through), WET



3 Types Of Chipbreakers For A Variety Of Work Materials And Conditions

"Chip Control Grooves" located at the center of the chipbreakers effectively control the direction of chip flow on 3 types of chipbreakers that reduce chip control problems and cover a wide variety of work and conditions.

■ Chipbreaker Selection



● Rake Angle

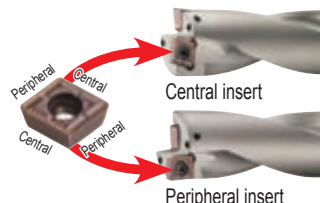


● Breaker Width



■ Effective Use of All 4 Insert Corners

Using 2 corners for the peripheral insert position and the other 2 corners for the central insert position, all 4 corners of the insert are effectively utilized.



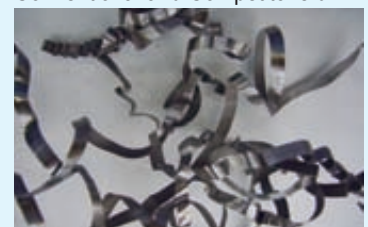
● Chip Control Improvements

Work : SS400
Drill : WDX210D3S25 ($\phi 21.0$)
Conditions : $V_c = 100\text{m/min}$ ($n = 1,517\text{min}^{-1}$)
 $f = 0.08\text{mm/rev}$, WET

SumiDrill WDX type



Conventional and Competitor's drill



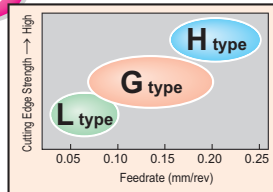
Insert Selection Guides — Choosing The Various WDX Insert Series



3 types of Grades

Work	Grade	ACP300	ACK300	DL1500 ^{New}
P Steel (General purpose)		○		
P Steel (High-speed drilling)			○	
M Stainless Steel		○		
K Cast Iron			○	
N Non-ferrous Metal				○

3 types of Chipbreakers



7 possible Combinations!

ACP300		ACK300		DL1500 ^{New}	
P M	P K	P K	P K		
L type	L type	L type	L type		
P M	P K	P K	P K	N	
G type	G type	G type	G type	G type	
P	K	P	K		
H type	H type	H type	H type		

2nd Recommendation

P Steel

Low Feedrate, Chip Control Type

L Type ACP300

- For drilling materials such as SS400, SCM415 and SCM440 etc.
- To counter chip control problems, increase cutting and reduce feedrate.
- To counter chattering, reduce the feedrate.

P Steel

Strong Edge Type

H Type ACP300

- For drilling slanted surfaces (at entry or exit points) where interrupted drilling happens, reduce feedrate when engaging these positions (~ F=0.05mm/rev).
- For Hardened Steel (heat treated) drilling where a stronger cutting edge is required.

P Steel

General Purpose

G Type ACK300

- To counter problems of large flank wear during the drilling of General Steel and Alloy Steel

P Steel

Low Feedrate, Chip Control Type

L Type ACK300

- When feedrate is low.

P Steel

Improve Chip Control
(Low Carbon Steel etc.)

P Steel

Prevent Early Stage Chipping
(Interrupted drilling, Hardened Steel etc.)

P Steel

Better Wear Resistance Required

1st Recommendation

Chipbreaker

General Purpose

G Type

Grade

For General Steel, Alloy Steel / Stainless Steel

ACP300

For Cast Iron

ACK300

M Stainless Steel

Improve Chip Control

K Cast Iron

Prevent Early Stage Chipping
(Interrupted drilling, High feed drilling)

2nd Recommendation

M Stainless Steel

Low Feedrate, Chip Control Type

L Type ACP300

- To counter chip control problems arising from using low rigidity machines where cutting speeds and feedrates cannot be increased.

K Cast Iron

Strong Edge Type

H Type ACK300

- Similar to drilling of Steel with slanted surfaces where interruption drilling happens.
- For high feed drilling which requires a stronger cutting edge.

SumiDrill WDX Series (2D)

Expansion

Drilling Depth 2D

Recommended Cutting Conditions P.10

Drilling tolerance guide: -0.05 ~ +0.15
Drilling depth ℓ : $2 \times \phi D_c$

DLC
Coat

Coated
Carbide

with Oil Hole

Indexable

2D

Fig 1

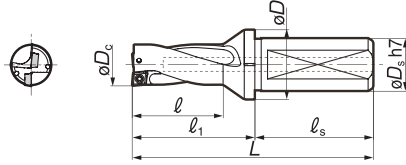


Fig 2

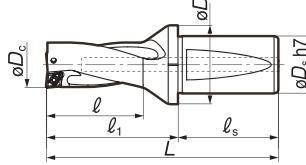
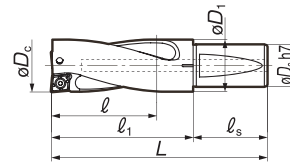


Fig 3



Holder $\phi 13.0 \sim \phi 45.0\text{mm}$

(Refer to P.13)

(Units : mm)

Diameter ϕD_c	Shank ϕD_s	Cat. No.	Stock	L	ℓ	ℓ_1	ℓ_s	ϕD_1	Radial Offset (Max.)	Applicable Insert	Fig
13.0	20	WDX 130D2S20	●	88	29	44			0.35		
13.5	20	WDX 135D2S20	●	89	30	45			0.30		
14.0	20	WDX 140D2S20	●	90	31	46	44	28.0	0.25	WDXT 042004	
14.5	20	WDX 145D2S20	●	91	32	47			0.20		
15.0	20	WDX 150D2S20	●	92	33	48			0.15		
15.5	20	WDX 155D2S20	●	93	34	49			0.40		
16.0	20	WDX 160D2S20	●	94	35	50			0.40		
16.5	20	WDX 165D2S20	●	95	36	51	44	30.0	0.35	WDXT 052504	
17.0	20	WDX 170D2S20	●	96	37	52			0.30		
17.5	25	WDX 175D2S25	●	109	38	53			0.25		
18.0	25	WDX 180D2S25	●	110	39	54	56	32.0	0.20		
18.5	25	WDX 185D2S25	●	111	40	55			0.50		
19.0	25	WDX 190D2S25	●	112	41	56			0.45		
19.5	25	WDX 195D2S25	●	113	42	57			0.40		
20.0	25	WDX 200D2S25	●	114	43	58			0.30		
20.5	25	WDX 205D2S25	●	115	44	59	56	33.0	0.30	WDXT 063006	
21.0	25	WDX 210D2S25	●	116	45	60			0.20		
21.5	25	WDX 215D2S25	●	117	46	61			0.15		
22.0	25	WDX 220D2S25	●	118	47	62			0.10		
22.5	25	WDX 225D2S25	●	119	48	63			0.05		
23.0	25	WDX 230D2S25	●	123	49	67			0.70		
23.5	25	WDX 235D2S25	●	124	50	68			0.70		
24.0	25	WDX 240D2S25	●	125	51	69	56	37.0	0.60		
24.5	25	WDX 245D2S25	●	126	52	70			0.50		
25.0	25	WDX 250D2S25	●	127	53	71			0.50		
25.5	32	WDX 255D2S32	●	134	54	74			0.45	WDXT 073506	
26.0	32	WDX 260D2S32	●	135	55	75			0.40		
26.5	32	WDX 265D2S32	●	136	56	76			0.35		
27.0	32	WDX 270D2S32	●	137	57	77	60	41.0	0.25		
27.5	32	WDX 275D2S32	●	138	58	78			0.20		
28.0	32	WDX 280D2S32	●	139	59	79			0.15		
28.5	32	WDX 285D2S32	●	140	60	80			0.10		
29.0	32	WDX 290D2S32	●	143	62	83			1.00		
29.5	32	WDX 295D2S32	●	144	63	84	60		0.95		
30.0	32	WDX 300D2S32	●	148	64	88			0.90		
31.0	32	WDX 310D2S32	●	150	66	90			0.80		
32.0	32	WDX 320D2S32	●	152	68	92			0.70		
30.0	40	WDX 300D2S40	●	158	64	88			0.90	WDXT 094008	
31.0	40	WDX 310D2S40	●	160	66	90			0.80		
32.0	40	WDX 320D2S40	●	162	68	92			0.70		
33.0	40	WDX 330D2S40	●	164	70	94	70		0.55		
34.0	40	WDX 340D2S40	●	166	72	96			0.45		
35.0	40	WDX 350D2S40	●	168	74	98			0.35		
36.0	40	WDX 360D2S40	●	170	76	100			0.20		
37.0	40	WDX 370D2S40	●	179	79	109			1.00		
38.0	40	WDX 380D2S40	●	181	81	111			1.00		
39.0	40	WDX 390D2S40	●	183	83	113			0.90		
40.0	40	WDX 400D2S40	●	185	85	115			0.80		
41.0	40	WDX 410D2S40	●	187	87	117	70	49.5	0.70	WDXT 125012	
42.0	40	WDX 420D2S40	●	189	89	119			0.60		
43.0	40	WDX 430D2S40	●	191	91	121			0.50		
44.0	40	WDX 440D2S40	●	193	93	123			0.50		
45.0	40	WDX 450D2S40	●	195	95	125			0.40		

$\phi 30$, $\phi 31$ and $\phi 32$ drill holders in $\phi 32$ or $\phi 40$ shanks are available in stock.

Parts

Screw	Wrench	Wrench	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX01604N	TRX06		0.5	WDX130D2S20 ~ WDX150D2S20
BFTX0204N	TRX06		0.5	WDX155D2S20 ~ WDX180D2S25
BFTY02206		TRD07	1.0	WDX185D2S25 ~ WDX225D2S25
BFTX02506N		TRD08	1.5	WDX230D2S25 ~ WDX285D2S32
BFTX03584		TRD15	3.5	WDX290D2S32 ~ WDX360D2S40
BFTX0511N		TRD20	5.0	WDX370D2S40 ~ WDX450D2S40
BFTX0615N		TRD25	5.0	WDX460D2S40 ~ WDX680D2S40

Holder $\phi 46.0 \sim \phi 68.0\text{mm}$

(Refer to P.13)

(Units : mm)

Diameter ϕD_c	Shank ϕD_s	Cat. No.	Stock	L	ℓ	ℓ_1	ℓ_s	ϕD_1	Radial Offset (Max.)	Applicable Insert	Fig
46.0	40	WDX 460D2S40	●	197	97	127			1.50		
47.0	40	WDX 470D2S40	●	199	99	129			1.40		
48.0	40	WDX 480D2S40	●	201	101	131			1.30		
49.0	40	WDX 490D2S40	●	203	103	133			1.20		
50.0	40	WDX 500D2S40	●	205	105	135			1.10	WDXT 156012	2
51.0	40	WDX 510D2S40	●	207	107	137			1.00		
52.0	40	WDX 520D2S40	●	209	109	139			50.5	0.90	
53.0	40	WDX 530D2S40	●	211	111	141			51.5	0.80	
54.0	40	WDX 540D2S40	●	213	113	143			52.5	0.60	
55.0	40	WDX 550D2S40	●	215	115	145			53.5	0.50	
56.0	40	WDX 560D2S40	●	222	120	152			54.0	2.00	
57.0	40	WDX 570D2S40	●	224	122	154			55.0	1.80	
58.0	40	WDX 580D2S40	●	226	124	156			56.0	1.70	
59.0	40	WDX 590D2S40	●	228	126	158			57.0	1.60	
60.0	40	WDX 600D2S40	●	230	128	160			58.0	1.50	
61.0	40	WDX 610D2S40	●	232	130	162			59.0	1.40	
62.0	40	WDX 620D2S40	●	234	132	164			60.0	1.30	
63.0	40	WDX 630D2S40	●	236	134	166			61.0	1.20	
64.0	40	WDX 640D2S40	●	238	136	168			62.0	1.00	
65.0	40	WDX 650D2S40	●	240	138	170			63.0	0.90	
66.0	40	WDX 660D2S40	●	242	140	172			64.0	0.70	
67.0	40	WDX 670D2S40	●	244	142	174			65.0	0.60	
68.0	40	WDX 680D2S40	●	246	144	176			66.0	0.50	

Inserts Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

Fig 4

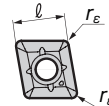


Fig 5

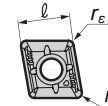
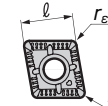


Fig 6



Grade	Coated Carbide	Application	Cat. No.	Fig	Dimensions (mm)	Applicable Holders
High Speed / Light Cut	N	General Purpose	WDXT 042004-L	4	ℓ Thickness r_e	WDX130D2S20 ~ WDX150D2S20
General Purpose	M	Roughing	WDXT 042004-G	5		
	K		WDXT 042004-H	6		
	N		WDXT 052504-L	4		WDX155D2S20 ~ WDX180D2S25
	M		WDXT 052504-G	5		
	K		WDXT 052504-H	6		
	N		WDXT 063006-L	4		WDX185D2S25 ~ WDX225D2S25
	M		WDXT 063006-G	5		
	K		WDXT 063006-H	6		
	N		WDXT 073506-L	4		WDX230D2S25 ~ WDX285D2S32
	M		WDXT 073506-G	5		
	K		WDXT 073506-H	6		
	N		WDXT 094008-L	4		WDX290D2S32 ~ WDX360D2S40
	M		WDXT 094008-G	5		
	K		WDXT 094008-H	6		
	N		WDXT 125012-L	4		WDX370D2S40 ~ WDX450D2S40
	M		WDXT 125012-G	5		
	K		WDXT 125012-H	6		
	N		WDXT 156012-L	4		WDX460D2S40 ~ WDX550D2S40
	M		WDXT 156012-G	5		
	K		WDXT 156012-H	6		
	N		WDXT 186012-L	4		WDX560D2S40 ~ WDX680D2S40
	M		WDXT 186012-G	5		
	K		WDXT 186012-H	6		

Drilling Depth 3D

Recommended Cutting Conditions P.10

Drilling tolerance guide : 0 ~ +0.20
Drilling depth ℓ : $3 \times \phi D_c$

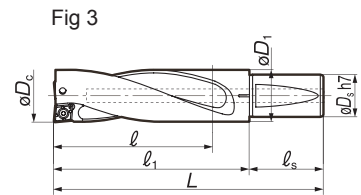
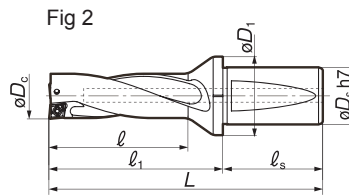
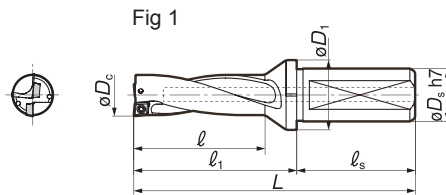
DLC
Coat

Coated
Carbide

with Oil Hole

Indexable

3D



Holder $\phi 13.0 \sim \phi 45.0\text{mm}$

(Refer to P.13)

(Units : mm)

Diameter ϕD_c	Shank ϕD_s	Cat. No.	Stock	L	ℓ	ℓ_1	ℓ_s	ϕD_1	Radial Offset (Max.)	Applicable Insert	Fig
13.0	20	WDX 130D3S20	●	101.0	42.0	57.0			0.35	WDXT 042004	
13.5		WDX 135D3S20	●	102.5	43.5	58.5			0.30		
14.0		WDX 140D3S20	●	104.0	45.0	60.0	44	28.0	0.25		
14.5		WDX 145D3S20	●	105.5	46.5	61.5			0.20		
15.0		WDX 150D3S20	●	107.0	48.0	63.0			0.15		
15.5	20	WDX 155D3S20	●	108.5	49.5	64.5			0.40	WDXT 052504	
16.0		WDX 160D3S20	●	110.0	51.0	66.0			0.40		
16.5		WDX 165D3S20	●	111.5	52.5	67.5	44	30.0	0.35		
17.0		WDX 170D3S20	●	113.0	54.0	69.0			0.30		
17.5		WDX 175D3S25	●	126.5	55.5	70.5			0.25		
18.0	25	WDX 180D3S25	●	128.0	57.0	72.0	56	32.0	0.20	WDXT 063006	1
18.5		WDX 185D3S25	●	129.5	58.5	73.5			0.50		
19.0		WDX 190D3S25	●	131.0	60.0	75.0			0.45		
19.5		WDX 195D3S25	●	132.5	61.5	76.5			0.40		
20.0		WDX 200D3S25	●	134.0	63.0	78.0			0.30		
20.5	25	WDX 205D3S25	●	135.5	64.5	79.5	56	33.0	0.30	WDXT 063006	
21.0		WDX 210D3S25	●	137.0	66.0	81.0			0.20		
21.5		WDX 215D3S25	●	138.5	67.5	82.5			0.15		
22.0		WDX 220D3S25	●	140.0	69.0	84.0			0.10		
22.5		WDX 225D3S25	●	141.5	70.5	85.5			0.05		
23.0	25	WDX 230D3S25	●	146.0	72.0	90.0			0.70	WDXT 073506	
23.5		WDX 235D3S25	●	147.5	73.5	91.5			0.70		
24.0		WDX 240D3S25	●	149.0	75.0	93.0	56	37.0	0.60		
24.5		WDX 245D3S25	●	150.5	76.5	94.5			0.50		
25.0		WDX 250D3S25	●	152.0	78.0	96.0			0.50		
25.5	32	WDX 255D3S32	●	159.5	79.5	99.5			0.45	WDXT 073506	
26.0		WDX 260D3S32	●	161.0	81.0	101.0			0.40		
26.5		WDX 265D3S32	●	162.5	82.5	102.5			0.35		
27.0		WDX 270D3S32	●	164.0	84.0	104.0	60	41.0	0.25		
27.5		WDX 275D3S32	●	165.5	85.5	105.5			0.20		
28.0	32	WDX 280D3S32	●	167.0	87.0	107.0			0.15	WDXT 094008	2
28.5		WDX 285D3S32	●	168.5	88.5	108.5			0.10		
29.0		WDX 290D3S32	●	172.0	91.0	112.0			1.00		
29.5		WDX 295D3S32	●	173.5	92.5	113.5	60		0.95		
30.0		WDX 300D3S32	●	178.0	94.0	118.0			0.90		
31.0	40	WDX 310D3S32	●	181.0	97.0	121.0			0.80	WDXT 094008	
32.0		WDX 320D3S32	●	184.0	100.0	124.0			0.70		
33.0		WDX 330D3S40	●	197.0	103.0	127.0			0.55		
34.0		WDX 340D3S40	●	200.0	106.0	130.0	70		0.45		
35.0		WDX 350D3S40	●	203.0	109.0	133.0			0.35		
36.0	40	WDX 360D3S40	●	206.0	112.0	136.0			0.20	WDXT 125012	
37.0		WDX 370D3S40	●	216.0	116.0	146.0			1.00		
38.0		WDX 380D3S40	●	219.0	119.0	149.0			1.00		
39.0		WDX 390D3S40	●	222.0	122.0	152.0			0.90		
40.0		WDX 400D3S40	●	225.0	125.0	155.0	70	49.5	0.80		
41.0	40	WDX 410D3S40	●	228.0	128.0	158.0			0.70	WDXT 125012	
42.0		WDX 420D3S40	●	231.0	131.0	161.0			0.60		
43.0		WDX 430D3S40	●	234.0	134.0	164.0			0.50		
44.0		WDX 440D3S40	●	237.0	137.0	167.0			0.50		
45.0		WDX 450D3S40	●	240.0	140.0	170.0			0.40		

$\phi 30$, $\phi 31$ and $\phi 32$ drill holders in $\phi 32$ or $\phi 40$ shanks are available in stock.

Parts

Screw	Wrench	Wrench	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX01604N	TRX06		0.5	WDX130D3S20 ~ WDX150D3S20
BFTX0204N	TRX06		0.5	WDX155D3S20 ~ WDX180D3S25
BFTY02206		TRD07	1.0	WDX185D3S25 ~ WDX225D3S25
BFTX02506N		TRD08	1.5	WDX230D3S25 ~ WDX285D3S32
BFTX03584		TRD15	3.5	WDX290D3S32 ~ WDX360D3S40
BFTX0511N		TRD20	5.0	WDX370D3S40 ~ WDX450D3S40
BFTX0615N		TRD25	5.0	WDX460D3S40 ~ WDX680D3S40

Holder $\phi 46.0 \sim \phi 68.0\text{mm}$

(Refer to P.13)

(Units : mm)

Diameter ϕD_c	Shank ϕD_s	Cat. No.	Stock	L	ℓ	ℓ_1	ℓ_s	ϕD_1	Radial Offset (Max.)	Applicable Insert	Fig
46.0	40	WDX 460D3S40	●	243.0	143.0	173.0			1.50	WDXT 156012	2
47.0		WDX 470D3S40	●	246.0	146.0	176.0			1.40		
48.0		WDX 480D3S40	●	249.0	149.0	179.0			1.30		
49.0		WDX 490D3S40	●	252.0	152.0	182.0			1.20		
50.0		WDX 500D3S40	●	255.0	155.0	185.0			1.10		
51.0	40	WDX 510D3S40	●	258.0	158.0	188.0			1.00	WDXT 156012	
52.0		WDX 520D3S40	●	261.0	161.0	191.0			0.90		
53.0		WDX 530D3S40	●	264.0	164.0	194.0			0.80		
54.0		WDX 540D3S40	●	267.0	167.0	197.0			0.70		
55.0		WDX 550D3S40	●	270.0	170.0	200.0			0.60		
56.0	40	WDX 560D3S40	●	278.0	176.0	208.0			2.00	WDXT 186012	3
57.0		WDX 570D3S40	●	281.0	179.0	211.0			1.80		
58.0		WDX 580D3S40	●	284.0	182.0	214.0			1.70		
59.0		WDX 590D3S40	●	287.0	185.0	217.0			1.60		
60.0		WDX 600D3S40	●	290.0	188.0	220.0			1.50		
61.0	40	WDX 610D3S40	●	293.0	191.0	223.0			1.40	WDXT 186012	
62.0		WDX 620D3S40	●	296.0	194.0	226.0			1.30		
63.0		WDX 630D3S40	●	299.0	197.0	229.0			1.20		
64.0		WDX 640D3S40	●	302.0	200.0	232.0			1.00		
65.0		WDX 650D3S40	●	305.0	203.0	235.0			0.90		
66.0	40	WDX 660D3S40	●	308.0	206.0	238.0			0.70	WDXT 186012	
67.0		WDX 670D3S40	●	311.0	209.0	241.0			0.60		
68.0		WDX 680D3S40	●	314.0	212.0	244.0			0.50		

Inserts

Fig 4

L type Chipbreaker
(Low feed, chip control type)

Fig 5

G type Chipbreaker
(General purpose type)

Fig 6

H type Chipbreaker
(Strong edged type)

Grade		Coated Carbide							
Application	High Speed / Light Cut		N						
	General Purpose	M							
	Roughing	K							
Cat. No.		ACP300	ACK300	DL1500	Fig	Dimensions (mm)			Applicable Holders
						ℓ	Thickness	r _e	
WDXT 042004-L		●	●		4				WDX130D3S20
WDXT 042004-G		●	●	●	5	4.2	2.0	0.4	~ WDX150D3S20
WDXT 042004-H		●	●		6				
WDXT 052504-L		●	●		4				WDX155D3S20
WDXT 052504-G		●	●	●	5	5.0	2.5	0.4	~ WDX180D3S25
WDXT 052504-H		●	●		6				
WDXT 063006-L		●	●		4				WDX185D3S25
WDXT 063006-G		●	●	●	5	6.0	3.0	0.6	~ WDX225D3S25
WDXT 063006-H		●	●		6				
WDXT 073506-L		●	●		4				WDX230D3S25
WDXT 073506-G		●	●	●	5	7.5	3.5	0.6	~ WDX285D3S32
WDXT 073506-H		●	●		6				
WDXT 094008-L		●	●		4				WDX290D3S32
WDXT 094008-G		●	●	●	5	9.6	4.0	0.8	~ WDX360D3S40
WDXT 094008-H		●	●		6				
WDXT 125012-L		●	●		4				WDX370D3S40
WDXT 125012-G		●	●	●	5	12.4	5.0	1.2	~ WDX450D3S40
WDXT 125012-H		●	●		6				
WDXT 156012-L		●	●		4				WDX460D3S40
WDXT 156012-G		●	●	●	5	15.2	6.0	1.2	~ WDX550D3S40
WDXT 156012-H		●	●		6				
WDXT 186012-L					4				WDX560D3S40
WDXT 186012-G		●	●		5	18.0	6.0	1.2	~ WDX680D3S40
WDXT 186012-H					6				

SumiDrill WDX Series (4D)

Expansion

Drilling Depth 4D

Recommended Cutting Conditions P.11

Drilling tolerance guide : 0 ~ +0.25
Drilling depth ℓ : 4 x ϕD_c

DLC
Coat

Coated
Carbide

with Oil Hole

Indexable

4D

Fig 1

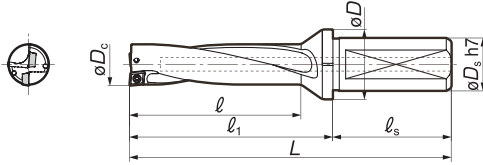


Fig 2

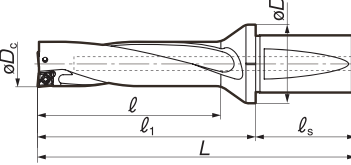
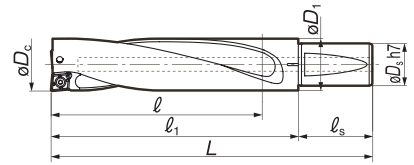


Fig 3



Holder $\phi 13.0 \sim \phi 45.0\text{mm}$

(Refer to P.13)

(Units : mm)

Diameter ϕD_c	Shank ϕD_s	Cat. No.	Stock	L	ℓ	ℓ_1	ℓ_s	ϕD_1	Radial Offset (Max.)	Applicable Insert	Fig
13.0		WDX 130D4S20	●	114	55	70			0.35		
13.5		WDX 135D4S20	●	116	57	72			0.30		
14.0	20	WDX 140D4S20	●	118	59	74	44	28.0	0.25	WDX 042004	
14.5		WDX 145D4S20	●	120	61	76			0.20		
15.0		WDX 150D4S20	●	122	63	78			0.15		
15.5		WDX 155D4S20	●	124	65	80			0.40		
16.0	20	WDX 160D4S20	●	126	67	82			0.40		
16.5		WDX 165D4S20	●	128	69	84	44	30.0	0.35	WDX 052504	
17.0		WDX 170D4S20	●	130	71	86			0.30		
17.5		WDX 175D4S25	●	144	73	88			0.25		
18.0	25	WDX 180D4S25	●	146	75	90	56	32.0	0.20		
18.5		WDX 185D4S25	●	148	77	92			0.50		
19.0		WDX 190D4S25	●	150	79	94			0.45		
19.5		WDX 195D4S25	●	152	81	96			0.40		
20.0	25	WDX 200D4S25	●	154	83	98			0.30	WDX 063006	1
20.5		WDX 205D4S25	●	156	85	100	56	33.0	0.30		
21.0		WDX 210D4S25	●	158	87	102			0.20		
21.5		WDX 215D4S25	●	160	89	104			0.15		
22.0		WDX 220D4S25	●	162	91	106			0.10		
22.5		WDX 225D4S25	●	164	93	108			0.05		
23.0		WDX 230D4S25	●	169	95	113			0.70		
23.5	25	WDX 235D4S25	●	171	97	115	56	37.0	0.70		
24.0		WDX 240D4S25	●	173	99	117			0.60		
24.5		WDX 245D4S25	●	175	101	119			0.50		
25.0		WDX 250D4S25	●	177	103	121			0.50		
25.5		WDX 255D4S32	●	185	105	125			0.45	WDX 073506	
26.0		WDX 260D4S32	●	187	107	127			0.40		
26.5	32	WDX 265D4S32	●	189	109	129	60	41.0	0.35		
27.0		WDX 270D4S32	●	191	111	131			0.25		
27.5		WDX 275D4S32	●	193	113	133			0.20		
28.0		WDX 280D4S32	●	195	115	135			0.15		
28.5		WDX 285D4S32	●	197	117	137			0.10		
29.0		WDX 290D4S32	●	201	120	141			1.00		
29.5	32	WDX 295D4S32	●	203	122	143	60		0.95		
30.0		WDX 300D4S32	●	208	124	148			0.90		
31.0		WDX 310D4S32	●	212	128	152			0.80		
32.0		WDX 320D4S32	●	216	132	156			0.70		
30.0	40	WDX 300D4S40	●	218	124	148			0.90	WDX 094008	2
31.0		WDX 310D4S40	●	222	128	152			0.80		
32.0		WDX 320D4S40	●	226	132	156			0.70		
33.0		WDX 330D4S40	●	230	136	160	70	54.0	0.55		
34.0		WDX 340D4S40	●	234	140	164			0.45		
35.0		WDX 350D4S40	●	238	144	168			0.35		
36.0		WDX 360D4S40	●	242	148	172			0.20		
37.0	40	WDX 370D4S40	●	253	153	183			1.00	WDX 125012	
38.0		WDX 380D4S40	●	257	157	187			1.00		
39.0		WDX 390D4S40	●	261	161	191			0.90		
40.0		WDX 400D4S40	●	265	165	195			0.80		
41.0		WDX 410D4S40	●	269	169	199	70	49.5	0.70		
42.0		WDX 420D4S40	●	273	173	203			0.60		
43.0		WDX 430D4S40	●	277	177	207			0.50		
44.0		WDX 440D4S40	●	281	181	211			0.50		
45.0		WDX 450D4S40	●	285	185	215			0.40		

$\phi 30$, $\phi 31$ and $\phi 32$ drill holders in $\phi 32$ or $\phi 40$ shanks are available in stock.

Parts

Screw	Wrench	Wrench	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX01604N	TRX06		0.5	WDX130D4S20 ~ WDX150D4S20
BFTX0204N	TRX06		0.5	WDX155D4S20 ~ WDX180D4S25
BFTY02206		TRD07	1.0	WDX185D4S25 ~ WDX225D4S25
BFTX02506N		TRD08	1.5	WDX230D4S25 ~ WDX285D4S32
BFTX03584		TRD15	3.5	WDX290D4S32 ~ WDX360D4S40
BFTX0511N		TRD20	5.0	WDX370D4S40 ~ WDX450D4S40
BFTX0615N		TRD25	5.0	WDX460D4S40 ~ WDX630D4S40

Holder $\phi 46.0 \sim \phi 63.0\text{mm}$

(Refer to P.13)

(Units : mm)

Diameter ϕD_c	Shank ϕD_s	Cat. No.	Stock	L	ℓ	ℓ_1	ℓ_s	ϕD_1	Radial Offset (Max.)	Applicable Insert	Fig
46.0		WDX 460D4S40	●	289	189	219			1.50		
47.0		WDX 470D4S40	●	293	193	223			1.40		
48.0		WDX 480D4S40	●	297	197	227			1.30		
49.0		WDX 490D4S40	●	301	201	231			1.20		
50.0	40	WDX 500D4S40	●	305	205	235			1.10	WDX 156012	2
51.0		WDX 510D4S40	●	309	209	239			1.00		
52.0		WDX 520D4S40	●	313	213	243			50.5		
53.0		WDX 530D4S40	●	317	217	247			51.5		
54.0		WDX 540D4S40	●	321	221	251			52.5		
55.0		WDX 550D4S40	●	325	225	255			53.5		
56.0		WDX 560D4S40	●	334	232	264			54.0		
57.0		WDX 570D4S40	●	338	236	268			55.0		
58.0		WDX 580D4S40	●	342	240	272			56.0		
59.0	40	WDX 590D4S40	●	346	244	276			57.0		
60.0		WDX 600D4S40	●	350	248	280			58.0		
61.0		WDX 610D4S40	●	354	252	284			59.0		
62.0		WDX 620D4S40	●	358	256	288			60.0		
63.0		WDX 630D4S40	●	362	260	292			61.0		

Inserts P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

Fig 4	Fig 5	Fig 6
L type Chipbreaker (Low feed, chip control type)	G type Chipbreaker (General purpose type)	H type Chipbreaker (Strong edged type)
Grade	Coated Carbide	
High Speed / Light Cut		N
General Purpose	M	
Roughing	P	K
Cat. No.	ACP300	ACK300
WDX 042004-L	●	●
WDX 042004-G	●	●
WDX 042004-H	●	●
WDX 052504-L	●	●
WDX 052504-G	●	●
WDX 052504-H	●	●
WDX 063006-L	●	●
WDX 063006-G	●	●
WDX 063006-H	●	●
WDX 073506-L	●	●
WDX 073506-G	●	●
WDX 073506-H	●	●
WDX 094008-L	●	●
WDX 094008-G	●	●
WDX 094008-H	●	●
WDX 125012-L	●	●
WDX 125012-G	●	●
WDX 125012-H	●	●
WDX 156012-L	●	●
WDX 156012-G	●	●
WDX 156012-H	●	●
WDX 186012-L	●	●
WDX 186012-G	●	●
WDX 186012-H	●	●

● mark : Stocked item ● mark : Stocked item (expansion item) unmarked : Available by order

Refer to Pg11 for Holder and Insert Identification

Drilling Depth 5D

Recommended Cutting Conditions P.11

Drilling tolerance guide : 0 ~ +0.25
Drilling depth ℓ : $5 \times \phi D_c$

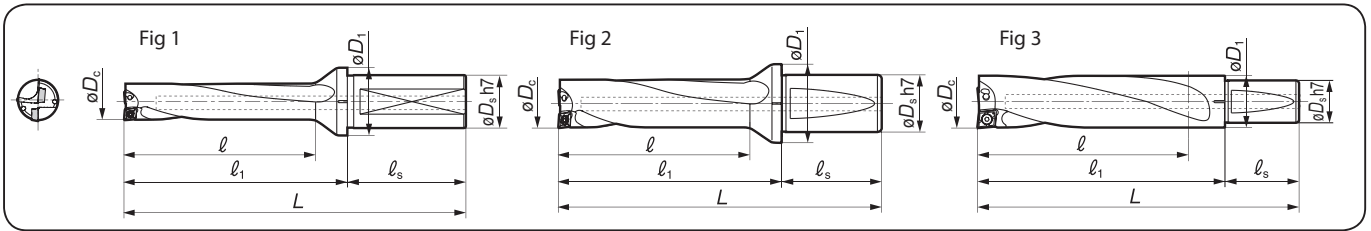
DLC
Coat

Coated
Carbide

with Oil Hole

Indexable

5D



Holder $\phi 13.0 \sim \phi 45.0\text{mm}$

(Refer to P.13)

(Units : mm)

Diameter ϕD_c	Shank ϕD_s	Cat. No.	Stock	L	ℓ	ℓ_1	ℓ_s	ϕD_1	Radial Offset (Max.)	Applicable Insert	Fig
13.0		WDX 130D5S20	●	127.0	68.0	83.0			0.35		
13.5		WDX 135D5S20	●	129.5	70.5	85.5			0.30		
14.0	20.0	WDX 140D5S20	●	132.0	73.0	88.0	44.0	28.0	0.25	WDX T 042004	
14.5		WDX 145D5S20	●	134.5	75.5	90.5			0.20		
15.0		WDX 150D5S20	●	137.0	78.0	93.0			0.15		
15.5		WDX 155D5S20	●	139.5	80.5	95.5			0.40		
16.0	20.0	WDX 160D5S20	●	142.0	83.0	98.0			0.40		
16.5		WDX 165D5S20	●	144.5	85.5	100.5	44.0	30.0	0.35	WDX T 052504	
17.0		WDX 170D5S20	●	147.0	88.0	103.0			0.30		
17.5		WDX 175D5S25	●	161.5	90.5	105.5			0.25		
18.0	25.0	WDX 180D5S25	●	164.0	93.0	108.0	56.0	32.0	0.20		
18.5		WDX 185D5S25	●	166.5	95.5	110.5			0.50		
19.0		WDX 190D5S25	●	169.0	98.0	113.0			0.45		
19.5		WDX 195D5S25	●	171.5	100.5	115.5			0.40		
20.0	25.0	WDX 200D5S25	●	174.0	103.0	118.0			0.30	WDX T 063006	
20.5		WDX 205D5S25	●	176.5	105.5	120.5	56.0	33.0	0.30		
21.0		WDX 210D5S25	●	179.0	108.0	123.0			0.20		
21.5		WDX 215D5S25	●	181.5	110.5	125.5			0.15		
22.0		WDX 220D5S25	●	184.0	113.0	128.0			0.10		
22.5		WDX 225D5S25	●	186.5	115.5	130.5			0.05		
23.0		WDX 230D5S25	●	192.0	118.0	136.0			0.70		
23.5	25.0	WDX 235D5S25	●	194.5	120.5	138.5			0.70		
24.0		WDX 240D5S25	●	197.0	123.0	141.0	56.0	37.0	0.60	WDX T 073506	
24.5		WDX 245D5S25	●	199.5	125.5	143.5			0.50		
25.0		WDX 250D5S25	●	202.0	128.0	146.0			0.50		
26.0		WDX 260D5S32	●	213.0	133.0	153.0			0.40		
27.0		WDX 270D5S32	●	218.0	138.0	158.0	60.0	41.0	0.25		
28.0		WDX 280D5S32	●	223.0	143.0	163.0			0.15		
29.0	32.0	WDX 290D5S32	●	230.0	149.0	170.0		50.0	1.00		
30.0		WDX 300D5S32	●	238.0	154.0	178.0	60.0		0.90		
31.0		WDX 310D5S32	●	243.0	159.0	183.0			0.80		
32.0		WDX 320D5S32	●	248.0	164.0	188.0			0.70		
30.0		WDX 300D5S40	●	248.0	154.0	178.0			0.90	WDX T 094008	
31.0		WDX 310D5S40	●	253.0	159.0	183.0			0.80		
32.0		WDX 320D5S40	●	258.0	164.0	188.0			0.70		
33.0	40.0	WDX 330D5S40	●	263.0	169.0	193.0	70.0		0.55		
34.0		WDX 340D5S40	●	268.0	174.0	198.0			0.45		
35.0		WDX 350D5S40	●	273.0	179.0	203.0			0.35		
36.0		WDX 360D5S40	●	278.0	184.0	208.0			0.20		
37.0		WDX 370D5S40	●	290.0	190.0	220.0			1.00		
38.0		WDX 380D5S40	●	295.0	195.0	225.0			1.00		
39.0		WDX 390D5S40	●	300.0	200.0	230.0			0.90		
40.0	40.0	WDX 400D5S40	●	305.0	205.0	235.0			0.80	WDX T 125012	
41.0		WDX 410D5S40	●	310.0	210.0	240.0	70.0	49.5	0.70		
42.0		WDX 420D5S40	●	315.0	215.0	245.0			0.60		
43.0		WDX 430D5S40	●	320.0	220.0	250.0			0.50		
44.0		WDX 440D5S40	●	325.0	225.0	255.0			0.50		
45.0		WDX 450D5S40	●	330.0	230.0	260.0			0.40		

$\phi 30$, $\phi 31$ and $\phi 32$ drill holders in $\phi 32$ or $\phi 40$ shanks are available in stock.

Parts

Screw	Wrench	Wrench	Recommended Tightening Torque (N·m)	Applicable Holders
BFTX01604N	TRX06		0.5	WDX130D5S20 ~ WDX150D5S20
BFTX0204N	TRX06		0.5	WDX155D5S20 ~ WDX180D5S25
BFTY02206		TRD07	1.0	WDX185D5S25 ~ WDX225D5S25
BFTX02506N		TRD08	1.5	WDX230D5S25 ~ WDX285D5S32
BFTX03584		TRD15	3.5	WDX290D5S32 ~ WDX360D5S40
BFTX0511N		TRD20	5.0	WDX370D5S40 ~ WDX450D5S40
BFTX0615N		TRD25	5.0	WDX460D5S40 ~ WDX550D5S40

Holder $\phi 46.0 \sim \phi 55.0\text{mm}$

(Refer to P.13)

(Units : mm)

Diameter ϕD_c	Shank ϕD_s	Cat. No.	Stock	L	ℓ	ℓ_1	ℓ_s	ϕD_1	Radial Offset (Max.)	Applicable Insert	Fig
46.0		WDX 460D5S40	●	335.0	235.0	265.0			1.50		
47.0		WDX 470D5S40	●	340.0	240.0	270.0			1.40		
48.0		WDX 480D5S40	●	345.0	245.0	275.0			1.30		
49.0		WDX 490D5S40	●	350.0	250.0	280.0			1.20		
50.0	40.0	WDX 500D5S40	●	355.0	255.0	285.0			1.10	WDX T 156012	2
51.0		WDX 510D5S40	●	360.0	260.0	290.0			1.00		
52.0		WDX 520D5S40	●	365.0	265.0	295.0			0.90		
53.0		WDX 530D5S40	●	370.0	270.0	300.0	70.0		0.80		3
54.0		WDX 540D5S40	●	375.0	275.0	305.0			0.60		
55.0		WDX 550D5S40	●	380.0	280.0	310.0			0.50		

Inserts P Steel M Stainless Steel K Cast Iron N Non-Ferrous Metal S Exotic Alloy H Hardened Steel

Fig 4

L type Chipbreaker
(Low feed, chip control type)

Fig 5

G type Chipbreaker
(General purpose type)

Fig 6

H type Chipbreaker
(Strong edged type)

Grade		Coated Carbide		Fig	Dimensions (mm)			Applicable Holders	
Application	High Speed / Light Cut		N						
	General Purpose	M							
	Roughing	P	K						
Cat. No.		ACP300	ACK300	DL1500	Fig	ℓ	Thickness	r _e	Applicable Holders
WDX T 042004-L		●	●	●	4	4.2	2.0	0.4	WDX130D5S20 ~ WDX150D5S20
WDX T 042004-G		●	●	●	5				
WDX T 042004-H		●	●	●	6				
WDX T 052504-L		●	●	●	4	5.0	2.5	0.4	WDX155D5S20 ~ WDX180D5S25
WDX T 052504-G		●	●	●	5				
WDX T 052504-H		●	●	●	6				
WDX T 063006-L		●	●	●	4	6.0	3.0	0.6	WDX185D5S25 ~ WDX225D5S25
WDX T 063006-G		●	●	●	5				
WDX T 063006-H		●	●	●	6				
WDX T 073506-L		●	●	●	4	7.5	3.5	0.6	WDX230D5S25 ~ WDX285D5S32
WDX T 073506-G		●	●	●	5				
WDX T 073506-H		●	●	●	6				
WDX T 094008-L		●	●	●	4	9.6	4.0	0.8	WDX290D5S32 ~ WDX360D5S40
WDX T 094008-G		●	●	●	5				
WDX T 094008-H		●	●	●	6				
WDX T 125012-L		●	●	●	4	12.4	5.0	1.2	WDX370D5S40 ~ WDX450D5S40
WDX T 125012-G		●	●	●	5				
WDX T 125012-H		●	●	●	6				
WDX T 156012-L		●	●	●	4	15.2	6.0	1.2	WDX460D5S40 ~ WDX550D5S40
WDX T 156012-G		●	●	●	5				
WDX T 156012-H		●	●	●	6				

WDX Drill Identification

WDX 200 D5 S25

Drill Diameter ϕD_c
($\phi 20.0$)

Drill Length L/D
(5D)

Shank Diameter ϕD_s
($\phi 25.0$)

WDX Drill Insert Identification

WDX 06 30 06 -G

Width Across
Flats x10
(20.0)

Thickness x10
(3.0)

Nose Radius x10
(0.6)

Chipbreaker
Type

SumiDrill WDX Series

Recommended Cutting Conditions (2D)

[min. - optimum - max.]

		Work Material		Workpiece Hardness	Recommended Chipbreaker	Recommended Grade	Cutting Speed V _c (m/min)	Feedrate, f (mm/rev)				
				H _B				ø13.0~ø18.0	ø18.5~ø29.0	ø29.5~ø36.0	ø37.0~ø55.0	ø56.0~ø68.0
2D	P	Steel, Carbon Steel	SS400	125	G	ACP300	120-180-240	0.05-0.08-0.10	0.05-0.08-0.10	0.05-0.08-0.11	0.05-0.08-0.12	0.06-0.09-0.13
		"	S15C	125	L	ACP300	130-170-220	0.04-0.08-0.12	0.04-0.08-0.12	0.04-0.08-0.13	0.05-0.10-0.15	0.06-0.11-0.17
		"	S45C	190	G	ACP300	100-150-200	0.08-0.13-0.24	0.08-0.13-0.24	0.08-0.14-0.26	0.09-0.16-0.29	0.10-0.17-0.32
		"	S45C Hardened	250	G	ACP300	80-120-160	0.06-0.11-0.18	0.06-0.11-0.18	0.06-0.12-0.19	0.07-0.13-0.22	0.08-0.14-0.24
		"	S75C	270	G	ACP300	100-130-160	0.08-0.13-0.22	0.08-0.13-0.22	0.08-0.14-0.23	0.09-0.16-0.26	0.10-0.17-0.29
		"	S75C Hardened	300	G	ACP300	70-100-140	0.06-0.11-0.17	0.06-0.11-0.17	0.06-0.12-0.18	0.07-0.13-0.20	0.08-0.14-0.22
		Low Alloy Steel	SCM, SNCM	180	L	ACP300	100-140-180	0.05-0.08-0.14	0.05-0.08-0.14	0.05-0.08-0.16	0.06-0.09-0.17	0.07-0.10-0.19
		"	SCM, SNCM Hardened	275	G	ACP300	80-120-160	0.06-0.11-0.17	0.06-0.11-0.17	0.06-0.12-0.18	0.07-0.13-0.20	0.08-0.14-0.22
		"	SCM, SNCM Hardened	300	G	ACP300	75-110-140	0.06-0.11-0.17	0.06-0.11-0.17	0.06-0.12-0.18	0.07-0.13-0.20	0.08-0.14-0.22
		"	SCM, SNCM Hardened	350	G	ACP300	60-85-110	0.06-0.11-0.17	0.06-0.11-0.17	0.06-0.12-0.18	0.07-0.13-0.20	0.08-0.14-0.22
		High Alloy Steel	SKD, SKT, SKH	200	G	ACP300	100-130-160	0.08-0.13-0.24	0.08-0.13-0.24	0.08-0.14-0.26	0.09-0.16-0.29	0.10-0.17-0.32
		"	SKD, SKT, SKH Hardened	325	G	ACP300	80-100-120	0.06-0.11-0.18	0.06-0.11-0.18	0.06-0.12-0.19	0.07-0.13-0.22	0.08-0.14-0.24
	M	Stainless Steel	SUS403 and others (Martensitic/Ferritic)	200	G	ACP300	100-140-180	0.06-0.11-0.18	0.06-0.11-0.18	0.06-0.12-0.19	0.07-0.13-0.22	0.08-0.14-0.24
		"	SUS403 and others Martensitic (Hardened)	240	G	ACP300	90-120-150	0.06-0.11-0.18	0.06-0.11-0.18	0.06-0.12-0.19	0.07-0.13-0.22	0.08-0.14-0.24
		"	SUS304, SUS316 (Austenitic)	180	G	ACP300	100-140-180	0.06-0.11-0.18	0.06-0.11-0.18	0.06-0.12-0.19	0.07-0.13-0.22	0.08-0.14-0.24
	K	Cast Iron			H	ACK300	120-160-200	0.09-0.20-0.32	0.10-0.22-0.36	0.11-0.24-0.39	0.12-0.26-0.44	0.13-0.29-0.48
		Ductile Cast Iron			H	ACK300	90-120-150	0.09-0.20-0.32	0.10-0.22-0.36	0.11-0.24-0.39	0.12-0.26-0.44	0.13-0.29-0.48
	S	Exotic Alloys (Heat Resistant Alloy, Super Alloy, Ti Alloy etc.)	200	G	ACP300	25-50-70	0.06-0.11-0.18	0.06-0.11-0.18	0.06-0.12-0.19	0.07-0.13-0.22	0.08-0.14-0.24	
	N	Aluminum Alloy		G	DL1500	200-260-320	0.06-0.11-0.17	0.06-0.11-0.17	0.06-0.12-0.18	0.07-0.13-0.20	0.08-0.14-0.22	
		Copper Alloy		G	DL1500	180-230-280	0.06-0.11-0.17	0.06-0.11-0.17	0.06-0.12-0.18	0.07-0.13-0.20	0.08-0.14-0.22	

Recommended Cutting Conditions (3D)

[min. - optimum - max.]

		Work Material		Workpiece Hardness	Recommended Chipbreaker	Recommended Grade	Cutting Speed V _c (m/min)	Feedrate, <i>f</i> (mm/rev)				
				Hb				ø13.0~ø18.0	ø18.5~ø29.0	ø29.5~ø36.0	ø37.0~ø55.0	ø56.0~ø68.0
3D	P	Steel, Carbon Steel	SS400	125	G	ACP300	120-180-240	0.05-0.07-0.10	0.05-0.07-0.10	0.05-0.08-0.11	0.05-0.08-0.12	0.06-0.09-0.13
		"	S15C	125	L	ACP300	130-170-220	0.04-0.07-0.10	0.04-0.07-0.10	0.04-0.08-0.11	0.05-0.09-0.12	0.06-0.10-0.13
		"	S45C	190	G	ACP300	100-150-200	0.08-0.12-0.20	0.08-0.12-0.20	0.08-0.13-0.22	0.09-0.14-0.24	0.10-0.16-0.27
		"	S45C Hardened	250	G	ACP300	80-120-160	0.06-0.10-0.15	0.06-0.10-0.15	0.06-0.11-0.16	0.07-0.12-0.18	0.08-0.13-0.20
		"	S75C	270	G	ACP300	100-130-160	0.08-0.12-0.18	0.08-0.12-0.18	0.08-0.13-0.19	0.09-0.14-0.22	0.10-0.16-0.24
		"	S75C Hardened	300	G	ACP300	70-100-140	0.06-0.10-0.14	0.06-0.10-0.14	0.06-0.11-0.15	0.07-0.12-0.17	0.08-0.13-0.19
		Low Alloy Steel	SCM, SNCM	180	L	ACP300	100-140-180	0.05-0.07-0.12	0.05-0.07-0.12	0.05-0.08-0.13	0.06-0.08-0.15	0.07-0.09-0.16
		"	SCM, SNCM Hardened	275	G	ACP300	80-120-160	0.06-0.10-0.14	0.06-0.10-0.14	0.06-0.11-0.15	0.07-0.12-0.17	0.08-0.13-0.19
		"	SCM, SNCM Hardened	300	G	ACP300	75-110-140	0.06-0.10-0.14	0.06-0.10-0.14	0.06-0.11-0.15	0.07-0.12-0.17	0.08-0.13-0.19
		"	SCM, SNCM Hardened	350	G	ACP300	60-85-110	0.06-0.10-0.14	0.06-0.10-0.14	0.06-0.11-0.15	0.07-0.12-0.17	0.08-0.13-0.19
		High Alloy Steel	SKD, SKT, SKH	200	G	ACP300	100-130-160	0.08-0.12-0.20	0.08-0.12-0.20	0.08-0.13-0.22	0.09-0.14-0.24	0.10-0.16-0.27
		"	SKD, SKT, SKH Hardened	325	G	ACP300	80-100-120	0.06-0.10-0.15	0.06-0.10-0.15	0.06-0.11-0.16	0.07-0.12-0.18	0.08-0.13-0.20
M	Stainless Steel	SUS403 and others (Martensitic/Ferritic)	200	G	ACP300	100-140-180	0.06-0.10-0.15	0.06-0.10-0.15	0.06-0.11-0.16	0.07-0.12-0.18	0.08-0.13-0.20	
	"	SUS403 and others Martensitic (Hardened)	240	G	ACP300	90-120-150	0.06-0.10-0.15	0.06-0.10-0.15	0.06-0.11-0.16	0.07-0.12-0.18	0.08-0.13-0.20	
	"	SUS304, SUS316 (Austenitic)	180	G	ACP300	100-140-180	0.06-0.10-0.15	0.06-0.10-0.15	0.06-0.11-0.16	0.07-0.12-0.18	0.08-0.13-0.20	
K	Cast Iron			H	ACK300	120-160-200	0.09-0.18-0.27	0.10-0.20-0.30	0.11-0.22-0.32	0.12-0.24-0.36	0.13-0.26-0.40	
	Ductile Cast Iron			H	ACK300	90-120-150	0.09-0.18-0.27	0.10-0.20-0.30	0.11-0.22-0.32	0.12-0.24-0.36	0.13-0.26-0.40	
S	Exotic Alloys (Heat Resistant Alloy, Super Alloy, Ti Alloy etc.)	200	G	ACP300	25-50-70	0.06-0.10-0.15	0.06-0.10-0.15	0.06-0.11-0.16	0.07-0.12-0.18	0.08-0.13-0.20		
N	Aluminum Alloy		G	DL1500	200-260-320	0.06-0.11-0.17	0.06-0.11-0.17	0.06-0.12-0.18	0.07-0.13-0.20	0.08-0.14-0.22		
	Copper Alloy		G	DL1500	180-230-280	0.06-0.11-0.17	0.06-0.11-0.17	0.06-0.12-0.18	0.07-0.13-0.20	0.08-0.14-0.22		

Application	Slanted Face Entry	Half Profile Drilling	Counter Drilling	Intersecting Holes	ID Boring	OD Turning	Drilling Stacked Plates	Back Boring
								
Feedrate, f (mm/rev)	0.05	0.05	0.08	0.05	0.1	0.1	Unsuitable	Unsuitable

SumiDrill WDX Series

Recommended Cutting Conditions (4D)

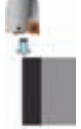
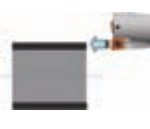
[min. - optimum - max.]

	Work Material	Workpiece Hardness	Recommended Chipbreaker	Recommended Grade	Cutting Speed V_c (m/min)	Feedrate, f (mm/rev)				
		Hb				Ø13.0~Ø18.0	Ø18.5~Ø29.0	Ø29.5~Ø36.0	Ø37.0~Ø55.0	Ø56.0~Ø68.0
4D	P	Steel, Carbon Steel SS400	125	G	ACP300	120-180-240	0.05-0.07-0.10	0.05-0.07-0.10	0.05-0.07-0.10	0.05-0.08-0.10
		" S15C	125	L	ACP300	130-170-220	0.04-0.07-0.09	0.04-0.07-0.09	0.04-0.07-0.09	0.05-0.08-0.10
		" S45C	190	G	ACP300	100-150-200	0.08-0.11-0.17	0.08-0.11-0.17	0.08-0.12-0.18	0.09-0.14-0.21
		" S45C Hardened	250	G	ACP300	80-120-160	0.06-0.10-0.13	0.06-0.10-0.13	0.06-0.10-0.14	0.07-0.11-0.15
		" S75C	270	G	ACP300	100-130-160	0.08-0.11-0.15	0.08-0.11-0.15	0.08-0.12-0.17	0.09-0.14-0.19
		" S75C Hardened	300	G	ACP300	70-100-140	0.06-0.10-0.12	0.06-0.10-0.12	0.06-0.10-0.13	0.07-0.11-0.14
		Low Alloy Steel SCM, SNCM	180	L	ACP300	100-140-180	0.05-0.07-0.10	0.05-0.07-0.10	0.05-0.07-0.11	0.06-0.08-0.12
		" SCM, SNCM Hardened	275	G	ACP300	80-120-160	0.06-0.10-0.12	0.06-0.10-0.12	0.06-0.10-0.13	0.07-0.11-0.14
		" SCM, SNCM Hardened	300	G	ACP300	75-110-140	0.06-0.10-0.12	0.06-0.10-0.12	0.06-0.10-0.13	0.07-0.11-0.14
		" SCM, SNCM Hardened	350	G	ACP300	60-85-110	0.06-0.10-0.12	0.06-0.10-0.12	0.06-0.10-0.13	0.07-0.11-0.14
	M	High Alloy Steel SKD, SKT, SKH	200	G	ACP300	100-130-160	0.08-0.11-0.17	0.08-0.11-0.17	0.08-0.12-0.18	0.09-0.14-0.21
		" SKD, SKT, SKH Hardened	325	G	ACP300	80-100-120	0.06-0.10-0.13	0.06-0.10-0.13	0.06-0.10-0.14	0.07-0.11-0.15
		Stainless Steel SUS403 and others (Martensitic/Ferritic)	200	G	ACP300	100-140-180	0.06-0.10-0.13	0.06-0.10-0.13	0.06-0.10-0.14	0.07-0.11-0.15
		" SUS403 and others Martensitic (Hardened)	240	G	ACP300	90-120-150	0.06-0.10-0.13	0.06-0.10-0.13	0.06-0.10-0.14	0.07-0.11-0.15
	K	" SUS304, SUS316 (Austenitic)	180	G	ACP300	100-140-180	0.06-0.10-0.13	0.06-0.10-0.13	0.06-0.10-0.14	0.07-0.11-0.15
		Cast Iron		H	ACK300	120-160-200	0.09-0.17-0.23	0.10-0.19-0.26	0.11-0.21-0.28	0.12-0.23-0.31
	S	Ductile Cast Iron		H	ACK300	90-120-150	0.09-0.17-0.23	0.10-0.19-0.26	0.11-0.21-0.28	0.12-0.23-0.31
		Exotic Alloys (Heat Resistant Alloy, Super Alloy, Ti Alloy etc.)	200	G	ACP300	25-50-70	0.06-0.10-0.13	0.06-0.10-0.13	0.06-0.10-0.14	0.07-0.11-0.15
	N	Aluminum Alloy		G	DL1500	200-260-320	0.05-0.10-0.15	0.05-0.10-0.15	0.06-0.11-0.16	0.06-0.12-0.18
		Copper Alloy		G	DL1500	180-230-280	0.05-0.10-0.15	0.05-0.10-0.15	0.06-0.11-0.16	0.06-0.12-0.18

Recommended Cutting Conditions (5D)

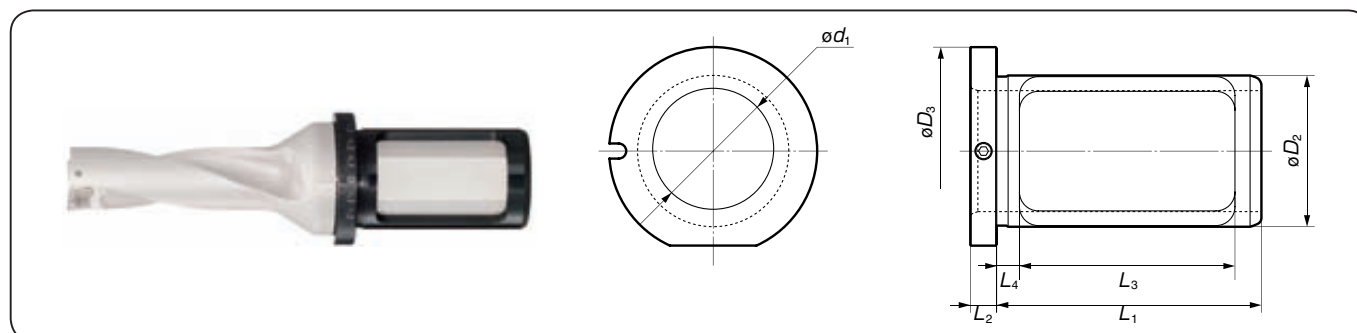
[min. - optimum - max.]

	Work Material	Workpiece Hardness	Recommended Chipbreaker	Recommended Grade	Cutting Speed V_c (m/min)	Feedrate, f (mm/rev)				
		Hb				Ø13.0~Ø18.0	Ø18.5~Ø29.0	Ø29.5~Ø36.0	Ø37.0~Ø55.0	Ø56.0~Ø68.0
5D	P	Steel, Carbon Steel SS400	125	G	ACP300	120-180-240	0.05-0.06-0.09	0.05-0.06-0.09	0.05-0.06-0.09	0.05-0.07-0.09
		" S15C	125	L	ACP300	130-170-220	0.04-0.06-0.08	0.04-0.06-0.08	0.04-0.06-0.08	0.05-0.07-0.09
		" S45C	190	G	ACP300	100-150-200	0.07-0.10-0.15	0.07-0.10-0.15	0.08-0.11-0.17	0.09-0.12-0.19
		" S45C Hardened	250	G	ACP300	80-120-160	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.14
		" S75C	270	G	ACP300	100-130-160	0.07-0.10-0.14	0.07-0.10-0.14	0.08-0.11-0.15	0.09-0.12-0.17
		" S75C Hardened	300	G	ACP300	70-100-140	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.13
		Low Alloy Steel SCM, SNCM	180	L	ACP300	100-140-180	0.05-0.06-0.09	0.05-0.06-0.09	0.05-0.06-0.10	0.05-0.07-0.11
		" SCM, SNCM Hardened	275	G	ACP300	80-120-160	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.13
		" SCM, SNCM Hardened	300	G	ACP300	75-110-140	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.13
		" SCM, SNCM Hardened	350	G	ACP300	60-85-110	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.13
	M	High Alloy Steel SKD, SKT, SKH	200	G	ACP300	100-130-160	0.07-0.10-0.15	0.07-0.10-0.15	0.08-0.11-0.17	0.09-0.12-0.19
		" SKD, SKT, SKH Hardened	325	G	ACP300	80-100-120	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.14
		Stainless Steel SUS403 and others (Martensitic/Ferritic)	200	G	ACP300	100-140-180	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.14
		" SUS403 and others Martensitic (Hardened)	240	G	ACP300	90-120-150	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.14
	K	" SUS304, SUS316 (Austenitic)	180	G	ACP300	100-140-180	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.14
		Cast Iron		H	ACK300	120-160-200	0.08-0.15-0.21	0.09-0.17-0.23	0.09-0.18-0.25	0.11-0.20-0.28
	S	Ductile Cast Iron		H	ACK300	90-120-150	0.08-0.15-0.21	0.09-0.17-0.23	0.09-0.18-0.25	0.11-0.20-0.28
		Exotic Alloys (Heat Resistant Alloy, Super Alloy, Ti Alloy etc.)	200	G	ACP300	25-50-70	0.05-0.09-0.11	0.05-0.09-0.11	0.06-0.09-0.12	0.06-0.10-0.14
	N	Aluminum Alloy		G	DL1500	200-260-320	0.05-0.10-0.15	0.05-0.10-0.15	0.06-0.11-0.16	0.06-0.12-0.18
		Copper Alloy		G	DL1500	180-230-280	0.05-0.10-0.15	0.05-0.10-0.15	0.06-0.11-0.16	0.06-0.12-0.18

Application	Slanted Face Entry	Half Profile Drilling	Counter Drilling	Intersecting Holes	ID Boring	OD Turning	Drilling Stacked Plates	Back Boring
								
Feedrate, f (mm/rev)	0.05	0.05	0.08	0.05	0.1	0.1	Unsuitable	Unsuitable

Eccentric Sleeve WAS type

Eccentric Sleeve WAS type was designed exclusively for use with the SumiDrill WDX series, providing a hole size adjustment range of $\pm 0.3\text{mm}$.



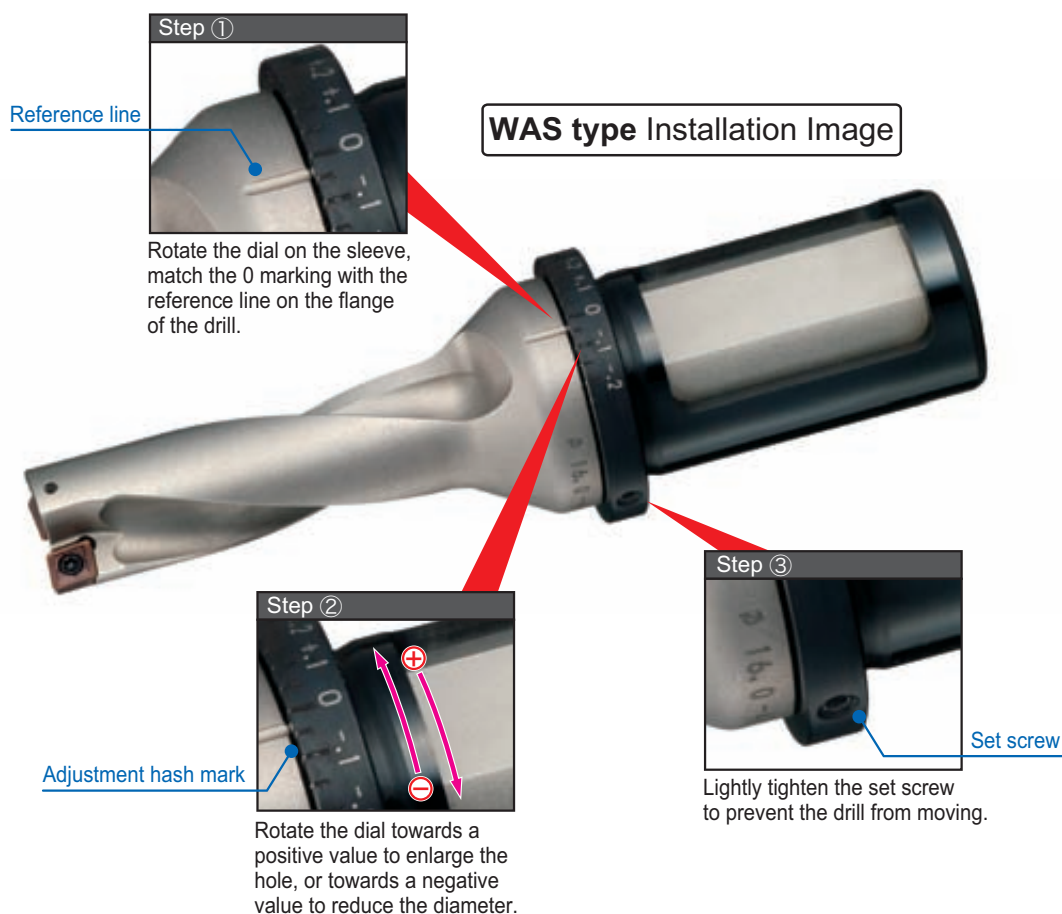
■ Body (WAS type)

(Units : mm)

Cat No.	Stock	ϕd_1	ϕD_2	ϕD_3	L_1	L_2	L_3	L_4	Diameter Adjustment Range
WAS 2025-48	●	20	25	33	43	5	32	5	+0.3 ~ -0.2
WAS 2532-60	●	25	32	42	60	7	46	6	+0.3 ~ -0.3
WAS 3240-70	●	32	40	55	70	7	57	6	+0.3 ~ -0.3
WAS 4050-85	●	40	50	60	80	7	64	6	+0.3 ~ -0.3

※ Diameter Adjustment Range refers to the adjustment value in terms of hole diameter.

■ How to adjust drilling diameter



Note 1: Adjustment marks shown on the dial are target values only. Always measure the actual drilled diameter and adjust accordingly.

Note 2: Not usable with collet chuck type holders. This unit is only applicable with side-lock holders.

SumiDrill WDX Series

■ Points to note when using SumiDrill WDX series on a lathe

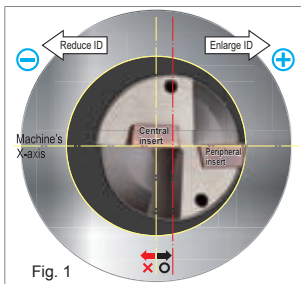


Fig. 1



Fig. 2

■ Drill mounting

- The cutting edge of the peripheral insert should be set parallel to the x-axis of the lathe. (Fig. 1)
- The drill flange face should be pushed back to contact the sleeve face before tightening the screws.

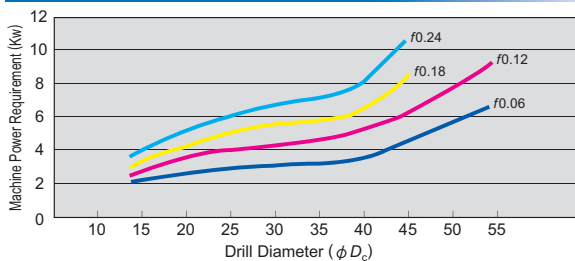
■ Adjustment of drilling diameter

- Diameter adjustment is possible by moving the drill along the x-axis of the lathe.
- Direction of adjustment should be made towards the positive (+) side of the x-axis (enlarge ID), adjustments towards the negative (-) side is not possible as the holder will hit the workpiece. (Fig. 1)
- Maximum drilling diameter offset amount depends on the drill diameter, please refer to the values listed in the "Holder" table on Pg 6~9 under "Radial Offset (Max.)".

■ Additional Information

- The tool height of the central insert, when mounted on the lathe, has been designed to be 0.15~0.20mm lower than the center of the machine spindle.
- The central insert will break easily if its cutting edge is located higher than the center of the spindle.
- When using the WDX for OD turning or ID boring applications, the depth-of-cut should be less than 1/5 of the drill diameter (max. below 5mm). (Ex. For a $\phi 20$ drill, depth-of-cut should be below 4mm)
- During through hole drilling on the lathe, a disc or slug (Fig. 2) will fly out as the drill breaks through the work. Please ensure that adequate safety covers or protection are in place.

■ Machine power requirement guidelines

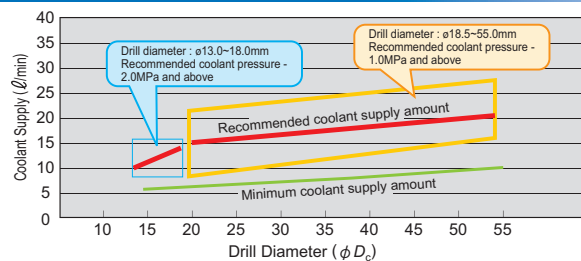


< Note >

- With reference to the above graph, machine power requirements may also change depending on the work material and cutting speeds.

■ Conditions (Reference)
Work : S50C (230HB)
Condition : $V_c=150\text{m/min}$

■ Coolant supply requirement guidelines



< Note >

- Coolant supply is one of the factors affecting drill performance especially in terms of chip evacuation capabilities and lubricity.
- High coolant pressure is recommended for small diameter drills. ($\phi 18.0$ and below)
- Generally, CNC machines are equipped with the function of adjusting coolant supply and pressure.
- The above graph is just for reference, actual requirements will depend on the machine, type of coolant and work material.



■ Points to note when mounting the inserts

- Remove all foreign particles and clean the insert pockets with air blow before mounting the inserts.
- Ensure that the wrench is positioned squarely and its head sitting properly in the screw head pattern (Fig. 3) before turning. If the wrench is slanted, less torque is created and it will also cause the screw head pattern to wear out faster.
- When the insert is mounted, please note that there should not be any gap at the insert sitting face. (Fig. 4, position A)
- Fig. 4 shows the correct insert mounting positions.
- When the inner insert is mounted, only the 2 inner faces of the insert pocket will act as clamping guides. As such, it is natural to have a small gap at the outer portion of the insert pocket and it does not affect the drill's performance.

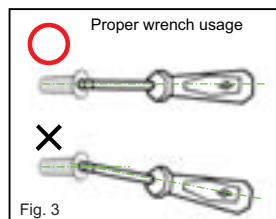


Fig. 3

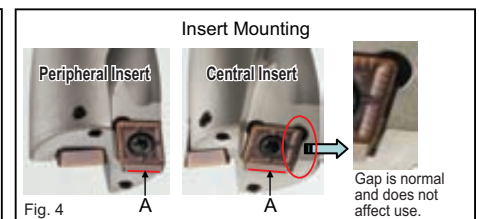


Fig. 4

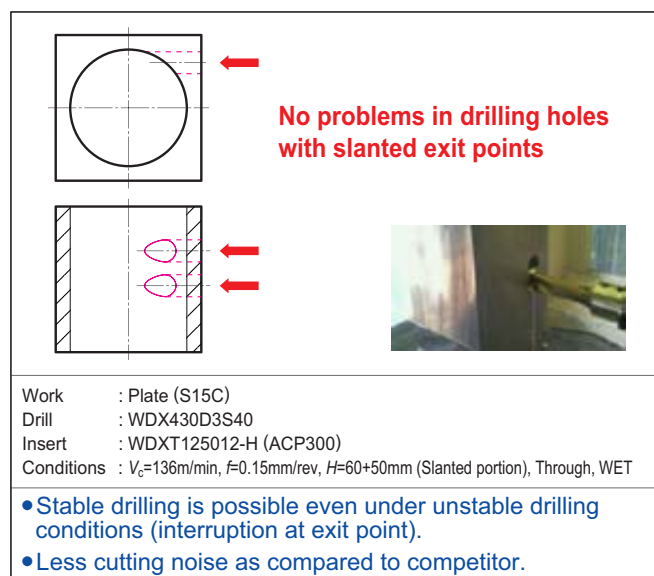
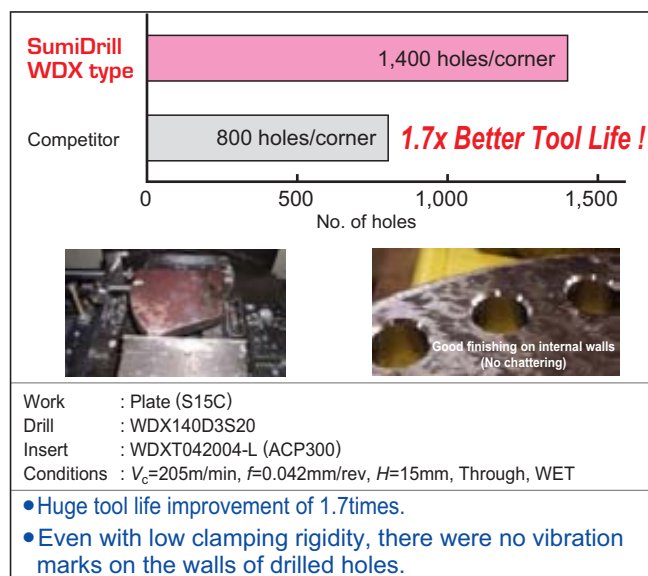
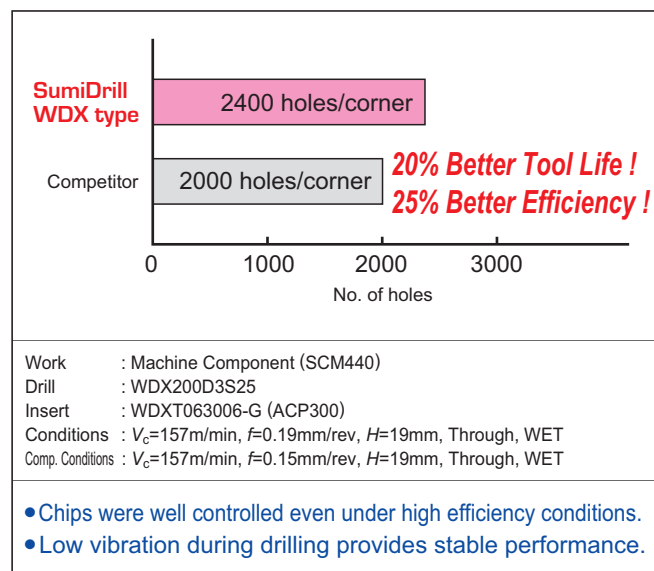
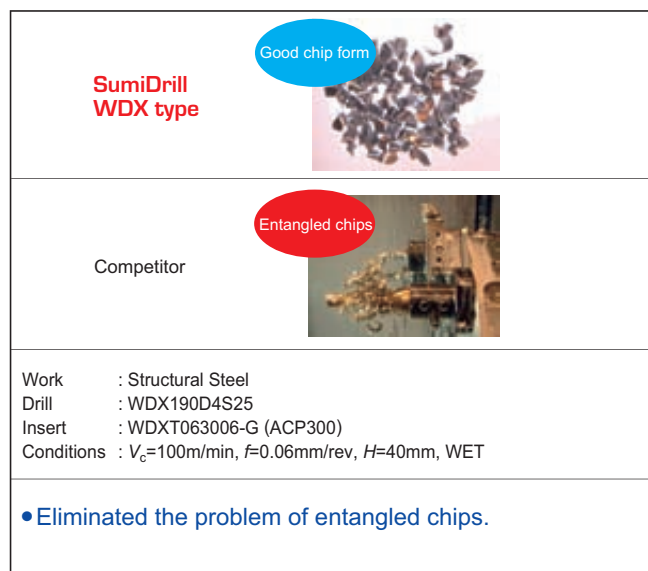
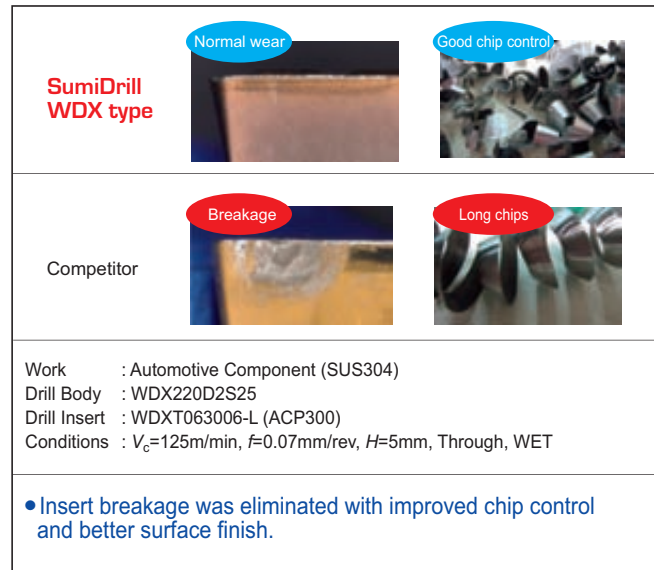
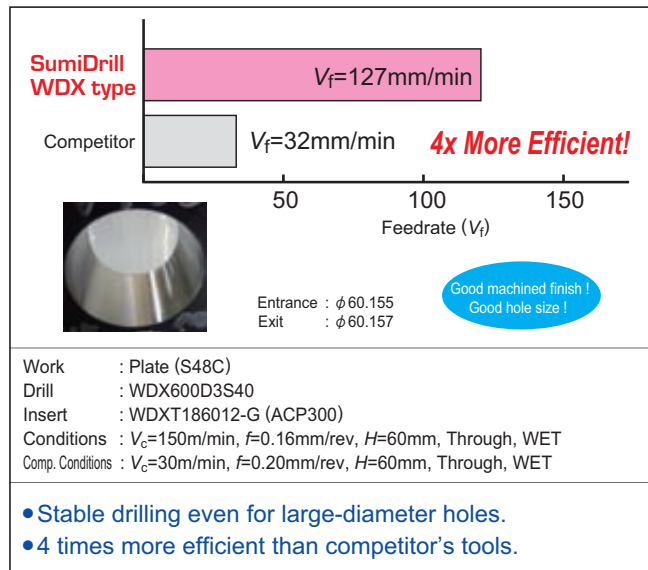
Gap is normal and does not affect use.

■ Troubleshooting Guide

Problem	Effects	Causes	Remedies
Diameter of drilled hole is very different from actual requirement.	Size of drilled hole is larger than the target diameter.	• Hole expansion caused by high cutting resistance. • Improper hole size adjustment setting.	• Reduce the feedrate to lower the cutting resistance. • On the lathe, adjustments should only be made along the X-axis.
	Size of drilled hole is smaller than the target diameter.	• Hole reduction due to insufficient cutting resistance. • Improper hole size adjustment setting	• Increase the feedrate to increase the cutting resistance, this will cause the hole size to enlarge. • On the lathe, adjustments should only be made along the X-axis.
	Huge difference in hole diameter between the drill entry and exit points.	• Packing of chips.	• Increase the feedrate to improve chip control. • Change to L-type chipbreaker for chip control purposes. (Refer Pg. 5)
Poor surface finish	Poor surface finish throughout the whole depth of the drilled hole.	• Poor surface finish as a result of high cutting resistance.	• Reduce the feedrate to lower the cutting resistance.
	Poor surface finish at the bottom end of the drilled hole.	• Poor surface finish caused by packing of chips.	• Increase the feedrate to improve chip control. • Change to L-type chipbreaker for chip control purposes. (Refer Pg. 5)
Drill insert breakage	Breakage of the central insert (center portion).	• Cutting edge height is not correct. • Insert edge toughness is not enough.	• Readjust the cutting edge height. • On the lathe, rotate the drill 180°. • Change to H-type chipbreaker for stronger cutting edge (Refer Pg. 5)
	Breakage of the peripheral insert.	• Insert edge toughness is not enough.	• Reduce the feedrate to lower the cutting resistance. • Change to H-type chipbreaker for stronger cutting edge. (Refer Pg. 5)

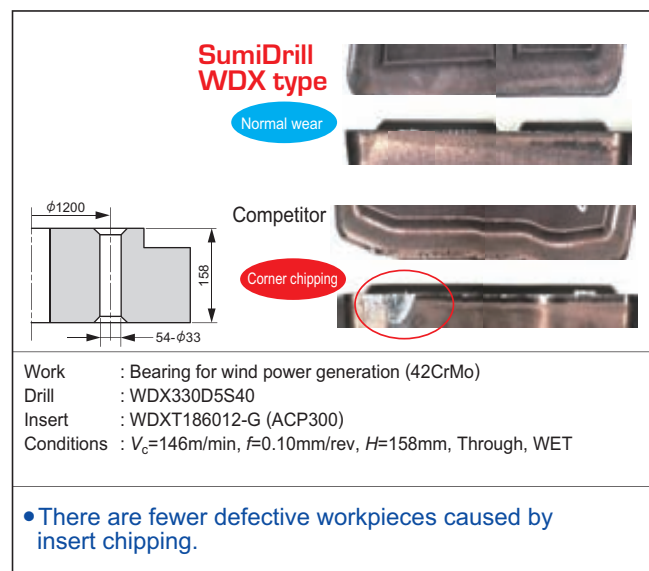
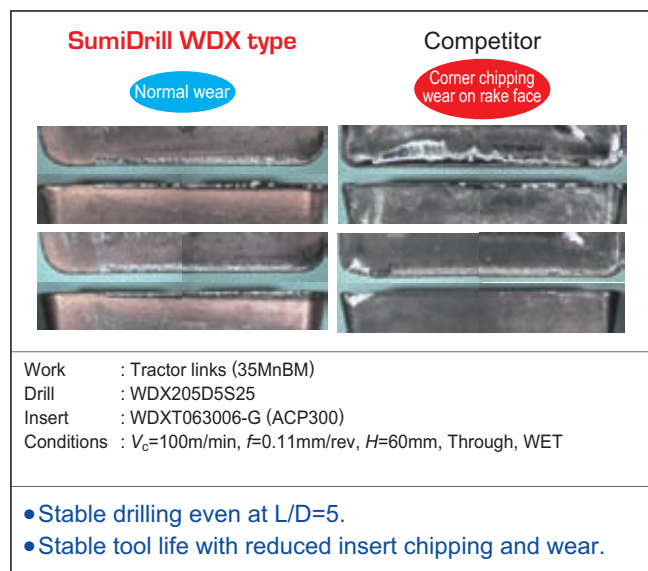
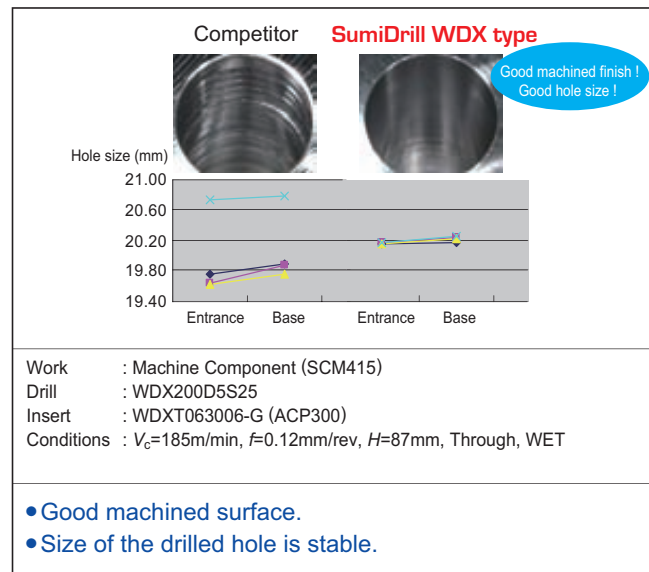
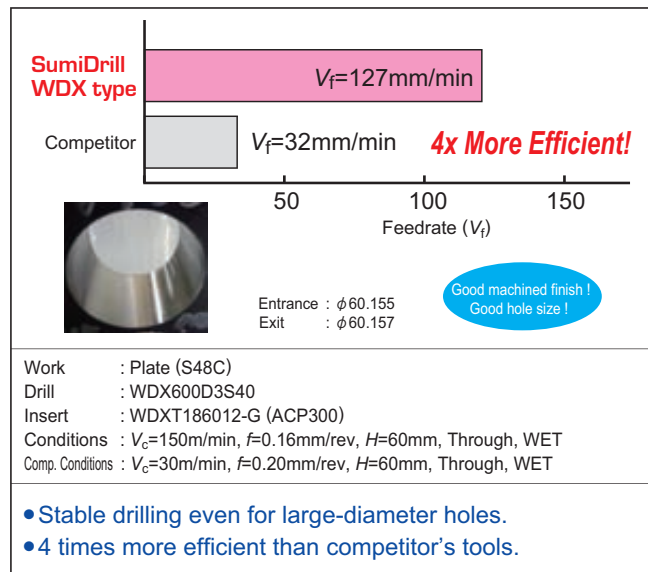
SumiDrill WDX Series

Application Examples



SumiDrill WDX Series

Application Examples



SumiDrill WDX Series Inquiry For Special Drill Design

Please fill in the required specifications below.

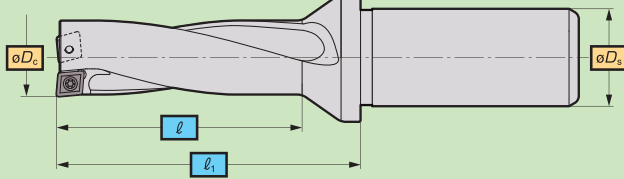
Please send the completed form to either our sales office or distributor

For other special drill requirements not stated below, please feel free to consult our sales staff.

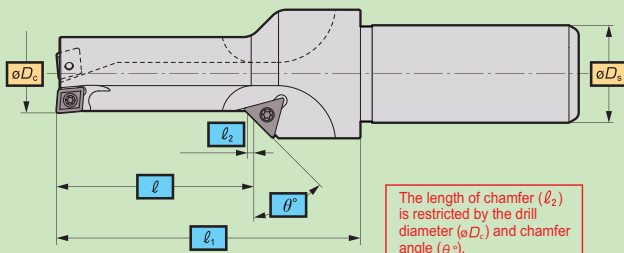
Company / Contact Person

■ Drill Type

SumiDrill WDX type

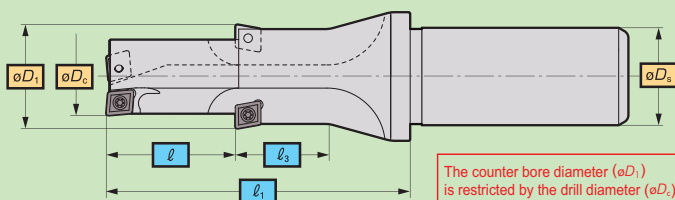

☐

SumiDrill WDX type with Chamfering Insert


☐

The length of chamfer (ℓ_2) is restricted by the drill diameter (ϕD_c) and chamfer angle (θ°).

SumiDrill WDX type with Counter Boring Insert


☐

The counter bore diameter (ϕD_1) is restricted by the drill diameter (ϕD_c).

■ Shank Type

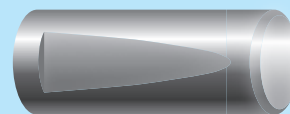
Cylindrical type


☐

Rectangular Flat type


☐

Whistle Notch type


☐

■ Applicable Insert

Drilling / Counter Bore (WDX-□□□□□□-□)



(L type)



(G type)



(H type)

Chamfering (TP□□□□□□□□-□□)



ϕD_c (Drill diameter)	$\phi 13 \sim \phi 55\text{mm}$		mm
ϕD_s (※) (Shank diameter)	$\phi 20 \sim \phi 40\text{mm}$		mm
ϕD_1 (Counter bore diameter)	$\phi D_c + 2 \sim 20\text{mm}$		mm
ℓ (Drilling depth)	$\phi D_c \times 4$ and below		mm
ℓ_1 (※) (Length from flange)	200mm and below		mm

ℓ_2 (Chamfer Width)	3mm and below		mm
$\ell + \ell_3$ (Drilling depth + Counter bore depth)	$\phi D_c \times 4$ and below		mm
θ° (※) (Chamfer angle)	15 ~ 60°		°

(※) Please note that some restrictions apply

Additional Requests



SAFETY NOTES

● Very hot or lengthy chips may be discharged while the machine is in operation. Therefore, machine guards, safety goggles or other protective covers must be used. Fire safety precautions must also be considered.

● Please handle with care as this product has sharp edges.
● Improper cutting conditions or mis-handling of the tool may result in breakages or projectiles. Therefore, please use the tool within its recommended conditions.

● When using non-water soluble cutting oil, precautions against fire must be taken and please ensure that a fire extinguisher is placed near the machine.



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