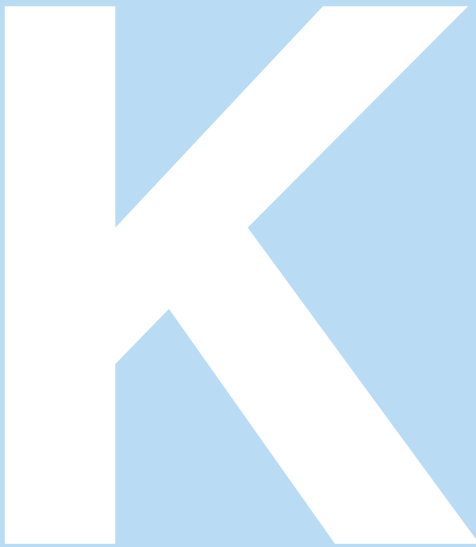


# Multi-Drills

K1 ~ K42



Selection Guide	<b>MULTI-DRILLS</b> .....	K2 - 5
<b>Solid Type Drills</b>	<b>m7, (DIN) MULTI-DRILLS</b> .....	K6
	<b>SUPER MULTI-DRILLS</b> .....	K7
Series	<b>MDS ... SK-HAK</b> .....	K8
	<b>MDS ... MK-HAK</b> .....	K9
	<b>MDS ... SK/SG</b> .....	K10-11
	<b>MDS ... MK/MG</b> .....	K12-13
Deep Hole Drills	<b>MDW</b> .....	K14-15
for Steels	<b>MDW ... XHT S</b> .....	K16
for Aluminium	<b>MDW ... XHT A</b> .....	K17
Pilot Hole Drills	<b>MDW ... PHT</b> .....	K18
AURORA COAT Drills	<b>MDW ... DLH</b> .....	K19
MINI-Drills	<b>MDSS</b> .....	K20
<b>Brazed Type Drills</b>	<b>KDS</b> .....	K21
Series	<b>KDS ... MAK</b> .....	K22-23
	<b>KDS ... LAK</b> .....	K24-25
	<b>KDS ... DAK</b> .....	K26-27
	<b>KDS ... FA</b> .....	K28
<b>Replaceable Head Type Drills</b>	<b>SMD</b> .....	K29
Drill Holder	<b>SMDH</b> .....	K30
Drill Head for Steels	<b>SMDT ...D MTL</b> .....	K31
for Stainless Steels	<b>SMDT ...D MEL</b> .....	K32-33
<b>Insert Type Drills</b>	<b>WDX</b> .....	K34-40
	<i>New</i>	
Straight Flute Type <b>SUMIDIA Drills</b>	<b>DAL / DDL / DML</b> .....	K41-42

# Multi-Drill Series



## ■ General Features

MultiDrill series is Sumitomo's original brand of high performance drills that have a special cutting edge design coupled with an advance carbide substrate.

The series has a comprehensive selection of diameters and drill lengths to cover a wide range of work materials and requirements, providing high efficiency, high precision and cost effectiveness.

## ■ Solid Carbide Type Multi-Drills Selection

Series	MDS ... ○○ ⇒ K6~7						MDW ... ○○○ ⇒ K14~15			MDSS	
Type	SK-HAK (DIN)	MK-HAK (DIN)	... SK	... MK	... SG	... MG	MDW ... XHT	MDW ... PHT	MDW... DLH	—	
Page	⇒ K8	⇒ K9	⇒ K10~11	⇒ K12~13	⇒ K10~11	⇒ K12~13	⇒ K16~17	⇒ K17	⇒ K17	⇒ K20	
Application	P M K S		P M K S		K N		P M K N	P M K N	N	P M K H	
Form	m7 drill, DIN type		h8 drill, straight		h8 drill, straight		Extra long	Pilot drill	Super Multi-Drill	Mini Multi-Drill	
Length (The ratio to øD)	3D ~ 3,5D	~ 5D	2,5D ~ 3D	~ 4D	2,5D ~ 3D	4D	10D ~ 30D	3D	3D / 5D	10D	
Coolant holes	Yes		No		No		Yes	Yes	Yes	No	
Coating	TiAlN	TiAlN	TiAlN	TiAlN	—	—	TiAlN	—	TiAlN	DLC	ZX
Diameter range	ø 4,0 ~ ø12,0	ø 4,0 ~ ø12,0	ø 2,0 ~ ø14,0	ø 2,0 ~ ø14,0	ø 2,0 ~ ø14,0	ø 2,0 ~ ø14,0	ø 3,0 ~ ø 12,0	ø 4,0 ~ ø 8,0	ø 3,0 ~ ø 16,0	ø 0,2 ~ ø 1,0	

# Multi-Drill Series

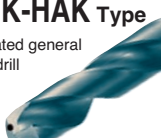
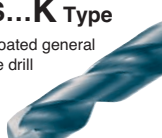

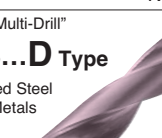

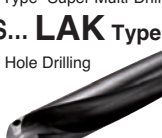
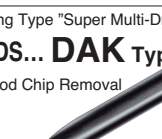
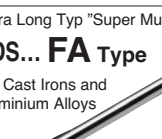
- Advantages**
  - Unique curved flute design has proven to enhance chip formation and removal, resulting in better hole accuracy.
  - High speed and high efficient drilling is made possible with the combination of a special substrate with an advance PVD coating. (10x tool life of HSS drills, 5x the efficiency)
  - Wide selection range (Diameter: 1,0 ~ 40,5mm , Drilling depths L/D: 2 ~ 30)

## Brazed Carbide Type and Insert Type Multi-Drills Selection

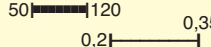
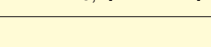
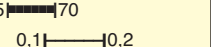
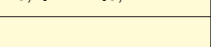
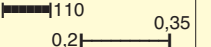
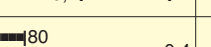
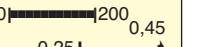
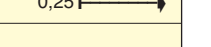
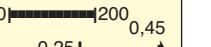
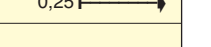
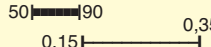
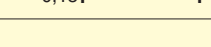
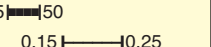
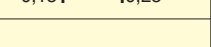
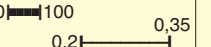
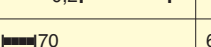
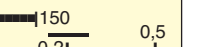
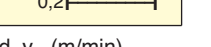
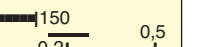
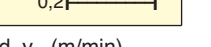
Series	KDS ... 000 ⇒ K21				SMD ... ⇒ K29		 WDX ...	SUMIDIA (PCD)
	KDS... MAK	KDS... LAK	KDS... DAK	KDS... FA	 SMDH ...3/5/8 M ⇒ K30	⇒ K34~40		DAL/DDL/DML
Type								
Page	⇒ K22~23	⇒ K24~25	⇒ K26~27	⇒ K28	 SMDT ...D MTL ⇒ K31	 SMDT ...D MEL ⇒ K32~33		⇒ K41~41
Application	<b>P M K S</b>				<b>K N</b>		<b>P M K N</b>	<b>N</b>
Form	h7 drill				h8 drill		WDX type insert	Straight type, Step type
Length (The ratio to øD)	3D	5D	7D	10D	SMDT type carbide head 3D / 5D / 8D		2D / 3D / 4D	3D / 5D
Coolant holes	Yes				Yes		Yes	No
Coating	TiAlN	TiAlN	TiAlN	–	TiAlN		"Super ZX"	–
Diameter range	ø 9,5 ~ ø40,5	ø 9,5 ~ ø40,5	ø 9,5 ~ ø40,5	ø 8,0 ~ ø30,5	ø 12,0 ~ ø30,0		ø 13,0 ~ ø55,0	ø 5,0 ~ ø12,0



# Multi-Drill Series Selection Guide

● According to Drill Types / Applications

Application		General ↔ Special		
Solid Type	"Super Multi-Drill" MDS Type	m7 DIN Type "Super Multi-Drill" <b>MDS...K-HAK Type</b> TiAlN coated general purpose drill  øD : 2,0 ~ 12mm L/D : ~ 2, ~ 4 ⇒ K8 ~ 9	"Super Multi-Drill" <b>MDS...K Type</b> TiAlN coated general purpose drill  øD : 1,0 ~ 20mm L/D : ~ 2, ~ 3 ⇒ K10 ~ 13	"Super Multi-Drill" <b>MDS...G Type</b> For Cast Iron & Aluminum  øD : 2,8 ~ 20mm L/D : ~ 3 ⇒ K10 ~ 13
		—	—	"Super Multi-Drill" <b>MDS...D Type</b> Hardened Steel Exotic Metals  øD : 1,0 ~ 16,1mm L/D : ~ 3 (Stock in Japan)
Brazed Type	"Super Multi-Drill" KDS Type	"Super Multi-Drill" <b>KDS...MAK Type</b> General Purpose Drill  øD : 12 ~ 26mm L/D : ~ 3 ⇒ K22 ~ 23	Long Type "Super Multi-Drill" <b>KDS...LAK Type</b> Deep Hole Drilling  øD : 12 ~ 26mm L/D : ~ 5 ⇒ K24 ~ 25	—
		—	Long Type "Super Multi-Drill" <b>KDS...DAK Type</b> Good Chip Removal  øD : 9 ~ 22mm L/D : ~ 7 ⇒ K26 ~ 27	Extra Long Typ "Super Multi-Drill" <b>KDS...FA Type</b> For Cast Irons and Aluminium Alloys  øD : 9 ~ 22mm L/D : ~ 7 ⇒ K28 Delivery on request

## ■ Recommended Cutting Conditions by Work Materials



Drill		Work			
		Steel	Stainless Steel	Cast Iron	Non-ferrous Metals
Solid Type	K Type	50  120 0,21  0,35	15  70 0,11  0,2	50  110 0,21  0,35	—
	G Type	—	—	25  80 0,25  0,4	80  200 0,25  0,45
Brazed Type	AK Type (MAK/LAK/DAK)	50  90 0,15  0,35	35  50 0,15  0,25	60  100 0,21  0,35	—
	FA Type	—	—	30  70 0,21  0,5	60  150 0,21  0,5

 Cutting speed  $v_c$  (m/min)  
 Feed  $f$  (mm/rev)




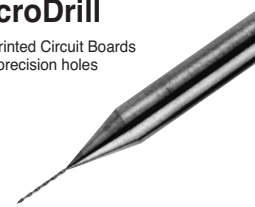

# Multi-Drill Series Selection Guide

## ● According to Drill Types / Applications

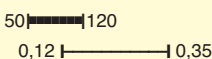

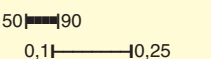
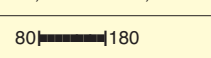
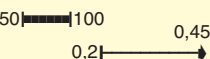
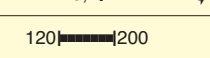
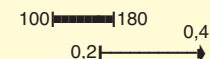
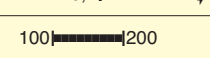
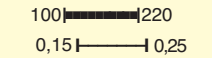
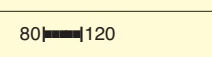
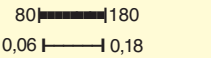
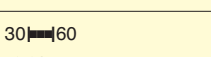
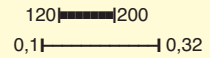
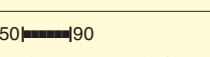
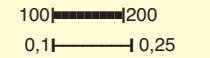
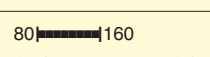
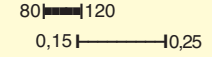
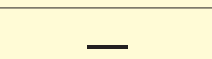
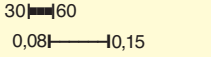

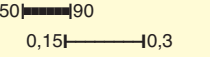
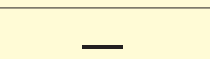
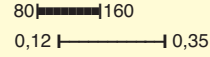
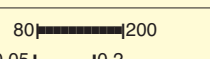
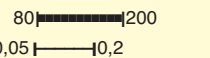
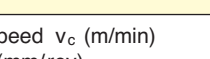
Application	General	Special
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Indexable Drills	Insert Type Drills <b>WDX Type</b> High Efficiency and Deep Holes  <p>∅D : 13,0 ~ 55,0mm L/D : 2, 3, 4</p> <p>⇒ K34 ~ 40</p>	Replaceable Head Type Drills <b>SMD Type</b>  <p>∅D : 13,5 ~ 30,5mm L/D : 3, 5, 8</p> <p>⇒ K29 ~ 33</p>	—
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Application	Deep Hole	Very Small Hole	Precision Hole
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Special Purpose Drills	"Super Long Multi-Drill" <b>XHT Type</b> New General Purpose Deep Hole Drill  <p>∅D : 4,0 ~ 8,0mm L/D : 10/15/20/25/30</p> <p>⇒ K16 ~ 17</p>	"Mini-MultiDrill" <b>MDSS Type</b>  <p>∅D : 0,20 ~ 1,00mm L/D : 10</p> <p>⇒ K20 (Stock in Japan)</p>	AURORA-Coat Drill <b>DLH Type</b> (For Aluminium)  <p>∅D : 3,0 ~ 16,0mm L/D : 3' 5</p> <p>⇒ K19 (Stock in Japan)</p>
	—	MicroDrill For Printed Circuit Boards High precision holes  <p>∅D : 0,05 ~ 3,20mm L/D : ~ 5</p> <p>(Stock in Japan)</p>	PCD Brazed Drill <b>SumiDia Drill</b>  <p>∅D : 5 ~ 12mm L/D : ~ 3</p> <p>⇒ K41 ~ 42 (Stock in Japan)</p>

## ■ Recommended Cutting Conditions by Work Materials

Drill \ Work	Steel	Stainless Steel	Cast Iron	Non-ferrous Metals
<b>SMD Type (∅20)</b>	50  120 0,12  0,35	50  90 0,1  0,25	50  100 0,2  0,45	100  180 0,2  0,4
<b>WDX Type (∅18)</b>	100  220 0,15  0,25	80  180 0,06  0,18	120  200 0,1  0,32	100  200 0,1  0,25
<b>XHT Type (∅5)</b>	80  120 0,15  0,25	30  60 0,08  0,15	50  90 0,15  0,3	80  160 0,12  0,35
<b>SumiDia Drill</b>	—	—	—	80  200 0,05  0,2

 Cutting speed  $v_c$  (m/min)  
 Feed  $f$  (mm/rev)

# K Type SUPER MULTI-DRILLS (DIN) MDS ... s/M-HAK Type

TiAlN Coated Solid Carbide Drills with Coolant Holes

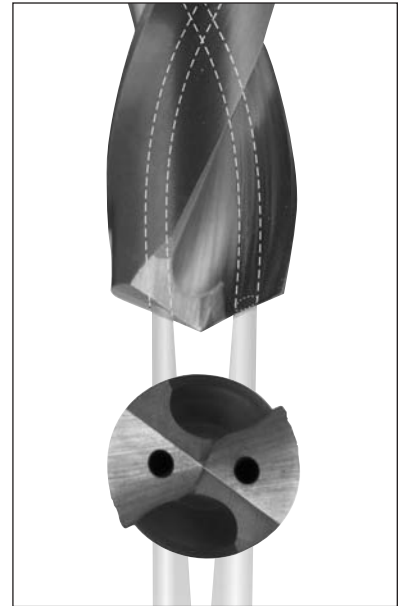
to DIN6535 Form HAK and DIN6537 (  $\phi$ -Tolerance: m7 )



## Description

The new K type Multi-Drill features an extra tough carbide substrate, new cutting geometry, spiral coolant holes, ultra hard TiAlN coating and significantly reduces hole making costs.

- Advantages
  - High productivity drilling even on deep holes up to 5 x D
  - Twice the tool life of conventionally coated drills
  - Self centering
  - Surface finish and tolerances comparable to reaming
  - Regrindable



## Series

Type	Diameter range (mm)	Hole depth (L/D)	Remark
Short type (MDS...SKHAK)	$\phi$ 4,0~ $\phi$ 12,0	3 ~ 3,5	"Multi-Drill" Type m7 (DIN6537)
Long type (MDS...MKHAK)	$\phi$ 4,0~ $\phi$ 12,0	~ 5	

## Performance

Comparison of substrate strength	Comparison of wear resistance	Comparison of cutting power (Cutting resistance)
<p>Feed (mm/rev)</p> <p>MDS ... MK-HAK ①</p> <p>MDS ... MK-HAK ②</p> <p>P type ①</p> <p>Conventional substrate ②</p>	<p>MDS...MK-HAK</p> <p>Competitor's drill</p> <p>Spalling</p> <p>After 40 min. cut length</p>	<p>MDS...MK-HAK</p> <p>Competitor's drill</p> <p>Cutting power (N)</p>
Drill: MDS 080 MK-HAK, $v_c = 70$ m/min Work material: C50 (HB230) $d_{oc} = 40$ mm	Drill dia.: 8 mm Work material: C50 $v_c = 70$ m/min $d_{oc} = 40$ mm $f = 0,25$ mm/rev	Drill: MDS 120 MK-HAK $v_c = 80$ m/min Work material: C50 (HB230) $d_{oc} = 50$ mm $f = 0,3$ mm/rev

## Tool Life Examples

Parts for heat exchanger X5CrNi810 - stainless steel	Automotive parts Ck45 (HB220)	Parts for construction machinery C50 (HB230)
<p>MDS ... MK-HAK 925 holes</p> <p>Competitor A 815 holes</p> <p>Competitor B 667 holes</p>	<p>MDS ... MK-HAK 800 holes</p> <p>Competitor A 360 holes</p> <p>Competitor B 300 holes</p>	<p>MDS ... MK-HAK 348 holes</p> <p>Brazed carbide KDS...LPFX 252 holes</p> <p>Brazed carbide KDS...LA 180 holes</p>
Drill: MDS 068 MK-HAK ( $\phi$ 6,8mm) Work material: X5CrNi810 Cutting data: $v_c = 75$ m/min (N=3510rpm) $f = 0,2$ mm/rev (F=702mm/min) $d_{oc} = 13,5$ mm	Drill: MDS 105 MK-HAK ( $\phi$ 10,5mm) Work material: Ck45 (HB230) Cutting data: $v_c = 80$ m/min (N=2426rpm) $f = 0,2$ mm/rev (F=495mm/min) $d_{oc} = 50$ mm	Drill: MDS 102 MK-HAK ( $\phi$ 10,2mm) Work material: C50 (HB230) Cutting data: $v_c = 90$ m/min (N=2810rpm) $f = 0,2$ mm/rev (F=562mm/min) $d_{oc} = 50$ mm



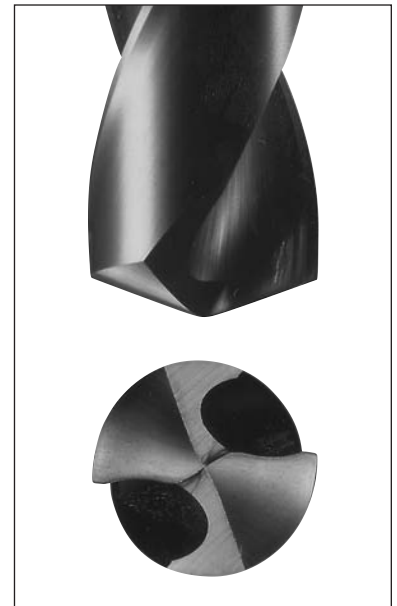
Cylindrical Type (  $\phi$ -Tolerance: h8 )



### Description

The new K type Multi-Drill features an extra tough carbide substrate, new cutting geometry, ultra hard TiAlN coating and significantly reduces hole making costs.

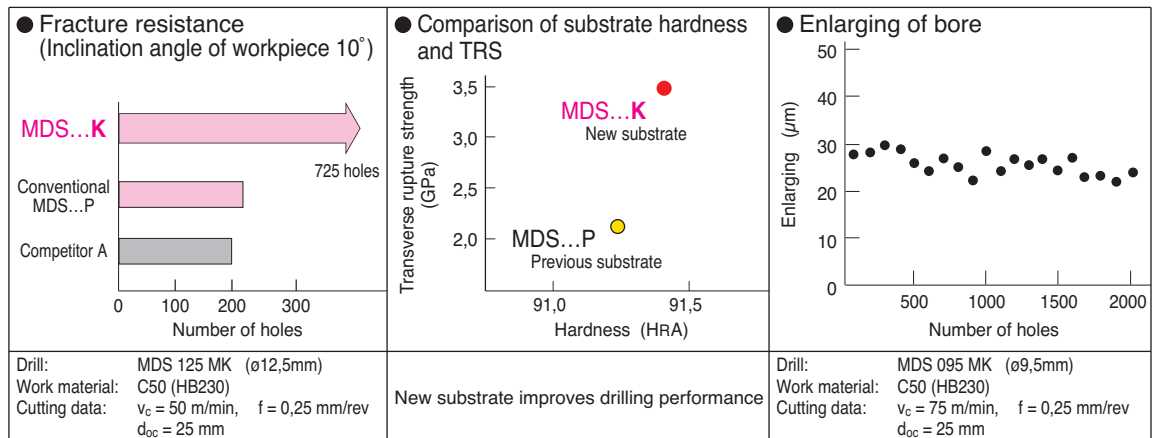
- Advantages
- General purpose drill for steels, stainless steels and cast irons
  - High productivity drilling even on deep holes up to 4 x D
  - Twice the tool life of conventionally coated drills
  - Self centering
  - Surface finish and tolerances comparable to reaming
  - Regrindable



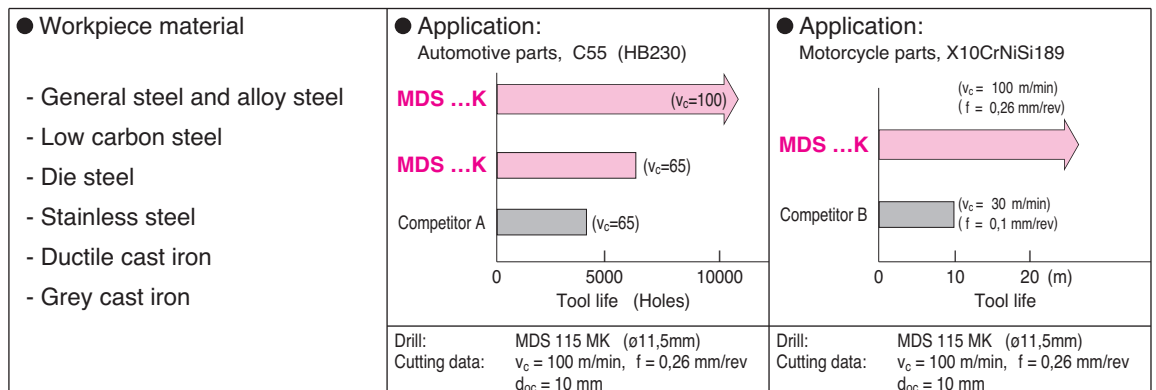
### Series

Type	Diameter range (mm)	Hole depth (L/D)	Remark
Short type (SK Type)	$\phi$ 2,0~ $\phi$ 14,0	2,5 ~ 3	First choice general purpose drill
Long type (MK Type)	$\phi$ 5,0~ $\phi$ 14,0	~ 4	

### Performance



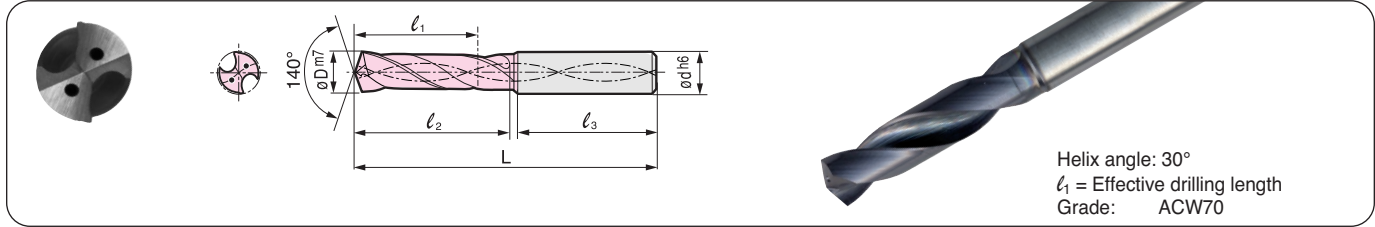
### Application Examples



# K Type SUPER MULTI-DRILLS (DIN) MDS ... SK-HAK Type

## Short Type

TiAlN Coated Solid Carbide Drills to DIN6537 (  $\phi$ -Tolerance: m7 )



### ● Diameter $\phi 4,0 \sim 8,0$ mm

Dimensions (mm)			Cat. No.	DIN 6537 K (Short Type)			
$\phi D$ (mm)	Shank			Stock SK-HAK	Dimensions (mm)		
	$\phi d$	$l_3$			L	$l_1$	$l_2$
4,0	6	36	MDS 040 SKHAK	●	66	17	24
4,1			MDS 041 SKHAK	●			
4,2			MDS 042 SKHAK	●			
4,3			MDS 043 SKHAK				
4,4			MDS 044 SKHAK				
4,5			MDS 045 SKHAK	●			
4,6			MDS 046 SKHAK				
4,7			MDS 047 SKHAK				
4,8			MDS 048 SKHAK				
4,9			MDS 049 SKHAK				
5,0	6	36	MDS 050 SKHAK	●	66	20	28
5,1			MDS 051 SKHAK	●			
5,2			MDS 052 SKHAK				
5,3			MDS 053 SKHAK				
5,4			MDS 054 SKHAK				
5,5			MDS 055 SKHAK	●			
5,6			MDS 056 SKHAK				
5,7			MDS 057 SKHAK				
5,8			MDS 058 SKHAK				
5,9			MDS 059 SKHAK				
6,0	8	36	MDS 060 SKHAK	●	79	24	34
6,1			MDS 061 SKHAK				
6,2			MDS 062 SKHAK				
6,3			MDS 063 SKHAK				
6,4			MDS 064 SKHAK				
6,5			MDS 065 SKHAK	●			
6,6			MDS 066 SKHAK				
6,7			MDS 067 SKHAK				
6,8			MDS 068 SKHAK	●			
6,9			MDS 069 SKHAK				
7,0	8	36	MDS 070 SKHAK	●	79	29	41
7,1			MDS 071 SKHAK				
7,2			MDS 072 SKHAK				
7,3			MDS 073 SKHAK				
7,4			MDS 074 SKHAK				
7,5			MDS 075 SKHAK	●			
7,6			MDS 076 SKHAK				
7,7			MDS 077 SKHAK				
7,8			MDS 078 SKHAK				
7,9			MDS 079 SKHAK				
8,0			MDS 080 SKHAK	●			

### ● Diameter $\phi 8,1 \sim 12,0$ mm

Dimensions (mm)			Cat. No.	DIN 6537 K (Short Type)			
$\phi D$ (mm)	Shank			Stock SK-HAK	Dimensions (mm)		
	$\phi d$	$l_3$			L	$l_1$	$l_2$
8,1	10	40	MDS 081 SKHAK		89	35	47
8,2			MDS 082 SKHAK				
8,3			MDS 083 SKHAK				
8,4			MDS 084 SKHAK				
8,5			MDS 085 SKHAK	●			
8,6			MDS 086 SKHAK				
8,7			MDS 087 SKHAK				
8,8			MDS 088 SKHAK				
8,9			MDS 089 SKHAK				
9,0			MDS 090 SKHAK	●			
9,1	10	40	MDS 091 SKHAK		89	35	47
9,2			MDS 092 SKHAK				
9,3			MDS 093 SKHAK				
9,4			MDS 094 SKHAK				
9,5			MDS 095 SKHAK	●			
9,6			MDS 096 SKHAK				
9,7			MDS 097 SKHAK				
9,8			MDS 098 SKHAK				
9,9			MDS 099 SKHAK				
10,0			MDS 100 SKHAK	●			
10,1	12	45	MDS 101 SKHAK		102	40	55
10,2			MDS 102 SKHAK	●			
10,3			MDS 103 SKHAK				
10,4			MDS 104 SKHAK				
10,5			MDS 105 SKHAK	●			
10,6			MDS 106 SKHAK				
10,7			MDS 107 SKHAK				
10,8			MDS 108 SKHAK				
10,9			MDS 109 SKHAK				
11,0			MDS 110 SKHAK	●			
11,1	12	45	MDS 111 SKHAK		102	40	55
11,2			MDS 112 SKHAK				
11,3			MDS 113 SKHAK				
11,4			MDS 114 SKHAK				
11,5			MDS 115 SKHAK	●			
11,6			MDS 116 SKHAK				
11,7			MDS 117 SKHAK				
11,8			MDS 118 SKHAK				
11,9			MDS 119 SKHAK				
12,0			MDS 120 SKHAK	●			

### ■ Recommended Cutting Conditions for K-HAK Type Multi-Drills

Diameter (mm)		Steels	Steels	Alloy Steels	Hardened Steels	Stainless Steels	Ductile	Grey	Titanium Alloys	Inconel
		(under HB200)	(HB200~300)	(over HB300)	(HRC45)	(except 316-bar)	Cast Irons	Cast Irons	(Ti-6Al-4V)	(Inconel 718)
~ $\phi 5$	$v_c$	50 - 80 - 120	50 - 75 - 100	40 - 65 - 80	20 - 35 - 50	30 - 45 - 60	40 - 60 - 100	80 - 100 - 120	20 - 30 - 40	10 - 20 - 30
	f	0.15 - 0.25	0.15 - 0.25	0.10 - 0.20	0.08 - 0.10	0.10 - 0.20	0.15 - 0.25	0.15 - 0.30	0.08 - 0.10	0.05 - 0.08
~ $\phi 10$	$v_c$	50 - 120 - 140	70 - 110 - 140	40 - 70 - 80	30 - 40 - 60	50 - 70 - 90	70 - 90 - 120	100 - 130 - 140	25 - 30 - 40	15 - 25 - 30
	f	0.20 - 0.35	0.20 - 0.35	0.10 - 0.25	0.10 - 0.15	0.10 - 0.25	0.20 - 0.35	0.20 - 0.35	0.08 - 0.12	0.08 - 0.10
~ $\phi 16$	$v_c$	90 - 140 - 170	80 - 120 - 150	40 - 80 - 100	30 - 45 - 60	50 - 80 - 110	80 - 100 - 130	100 - 150 - 160	25 - 35 - 40	20 - 30 - 35
	f	0.25 - 0.35	0.25 - 0.35	0.15 - 0.30	0.12 - 0.20	0.15 - 0.30	0.25 - 0.35	0.25 - 0.40	0.10 - 0.15	0.08 - 0.10
~ $\phi 20$	$v_c$	100 - 150 - 180	80 - 130 - 160	50 - 90 - 120	30 - 45 - 60	50 - 80 - 110	80 - 110 - 140	100 - 150 - 160	25 - 35 - 40	20 - 30 - 35
	f	0.30 - 0.40	0.25 - 0.40	0.15 - 0.30	0.15 - 0.25	0.15 - 0.30	0.25 - 0.40	0.25 - 0.40	0.10 - 0.15	0.08 - 0.10

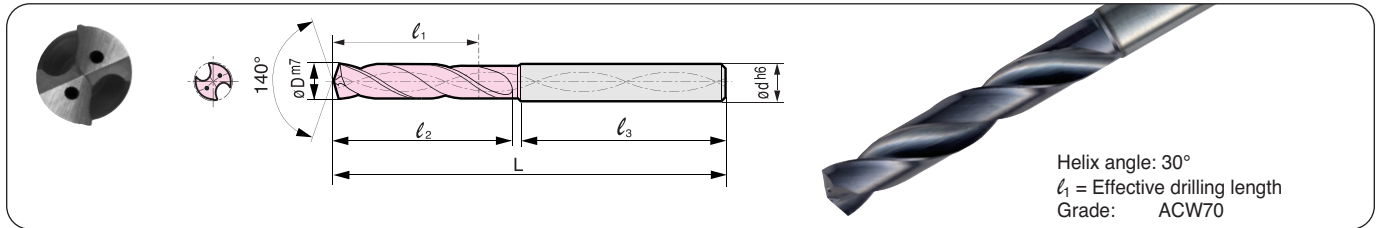
(  $v_c$  : Cutting Speed (m/min), f : Feed rate (mm/rev) ) (Min - Standard - Max)



# K Type SUPER MULTI-DRILLS (DIN) MDS ... MK-HAK Type

## Long Type

TiAlN Coated Solid Carbide Drills to DIN6537 (  $\phi$ -Tolerance: m7 )



### ● Diameter $\phi 4,0 \sim 8,0$ mm

Dimensions (mm)			Cat. No.	DIN 6537 K (Long Type)			
$\phi D$ (mm)	Shank			Stock	Dimensions (mm)		
	$\phi d$	$\ell_3$			MK-HAK	L	$\ell_1$
4,0	6	36	MDS 040 MKHAK	●	74	29	36
4,1			MDS 041 MKHAK				
4,2			MDS 042 MKHAK	●			
4,3			MDS 043 MKHAK				
4,4			MDS 044 MKHAK				
4,5			MDS 045 MKHAK	●			
4,6			MDS 046 MKHAK				
4,7			MDS 047 MKHAK				
4,8	6	36	MDS 048 MKHAK		82	35	44
4,9			MDS 049 MKHAK				
5,0			MDS 050 MKHAK	●			
5,1			MDS 051 MKHAK				
5,2			MDS 052 MKHAK				
5,3			MDS 053 MKHAK				
5,4			MDS 054 MKHAK				
5,5			MDS 055 MKHAK	●			
5,6	8	36	MDS 056 MKHAK		91	43	53
5,7			MDS 057 MKHAK				
5,8			MDS 058 MKHAK				
5,9			MDS 059 MKHAK				
6,0			MDS 060 MKHAK	●			
6,1			MDS 061 MKHAK				
6,2			MDS 062 MKHAK				
6,3			MDS 063 MKHAK				
6,4	8	36	MDS 064 MKHAK		91	43	53
6,5			MDS 065 MKHAK	●			
6,6			MDS 066 MKHAK				
6,7			MDS 067 MKHAK				
6,8			MDS 068 MKHAK	●			
6,9			MDS 069 MKHAK				
7,0			MDS 070 MKHAK	●			
7,1			MDS 071 MKHAK				
7,2	8	36	MDS 072 MKHAK		91	43	53
7,3			MDS 073 MKHAK				
7,4			MDS 074 MKHAK				
7,5			MDS 075 MKHAK				
7,6			MDS 076 MKHAK				
7,7			MDS 077 MKHAK				
7,8			MDS 078 MKHAK				
7,9			MDS 079 MKHAK				
8,0			MDS 080 MKHAK	●			

### ● Diameter $\phi 8,1 \sim 12,0$ mm

Dimensions (mm)			Cat. No.	DIN 6537 K (Long Type)			
$\phi D$ (mm)	Shank			Stock	Dimensions (mm)		
	$\phi d$	$\ell_3$			MK-HAK	L	$\ell_1$
8,1	10	40	MDS 081 MKHAK		103	49	61
8,2			MDS 082 MKHAK				
8,3			MDS 083 MKHAK				
8,4			MDS 084 MKHAK				
8,5			MDS 085 MKHAK	●			
8,6			MDS 086 MKHAK				
8,7			MDS 087 MKHAK				
8,8			MDS 088 MKHAK				
8,9			MDS 089 MKHAK				
9,0			MDS 090 MKHAK	●			
9,1	12	45	MDS 091 MKHAK		118	56	71
9,2			MDS 092 MKHAK				
9,3			MDS 093 MKHAK				
9,4			MDS 094 MKHAK				
9,5			MDS 095 MKHAK	●			
9,6			MDS 096 MKHAK				
9,7			MDS 097 MKHAK				
9,8			MDS 098 MKHAK				
9,9			MDS 099 MKHAK				
10,0			MDS 100 MKHAK	●			
10,1	12	45	MDS 101 MKHAK		118	56	71
10,2			MDS 102 MKHAK	●			
10,3			MDS 103 MKHAK				
10,4			MDS 104 MKHAK				
10,5			MDS 105 MKHAK	●			
10,6			MDS 106 MKHAK				
10,7			MDS 107 MKHAK				
10,8			MDS 108 MKHAK				
10,9			MDS 109 MKHAK				
11,0			MDS 110 MKHAK	●			
11,1	12	45	MDS 111 MKHAK		118	56	71
11,2			MDS 112 MKHAK				
11,3			MDS 113 MKHAK				
11,4			MDS 114 MKHAK				
11,5			MDS 115 MKHAK	●			
11,6			MDS 116 MKHAK				
11,7			MDS 117 MKHAK				
11,8			MDS 118 MKHAK				
11,9			MDS 119 MKHAK				
12,0			MDS 120 MKHAK	●			

### ■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **MDS 102 MK-HAK**, (Grade) **ACW70**

Multi-Drill  
Solid type  
Drill diameter  
10,2 mm

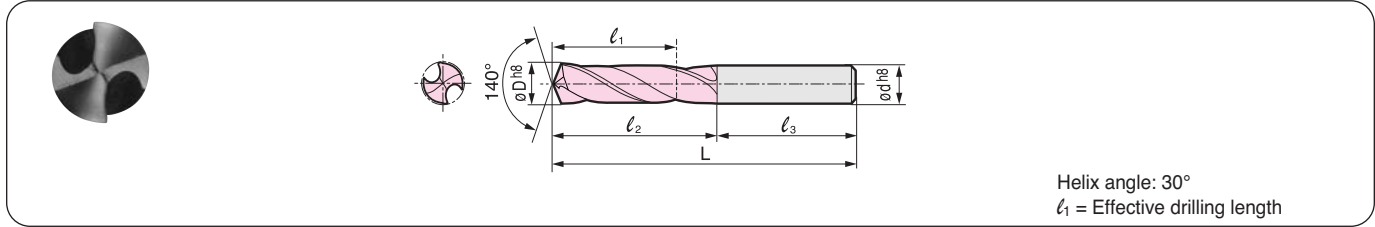
Cylindrical shank and spiral coolant holes to: DIN6535 Form HAK  
S : 3 ~ 3,5 D  
M : ~ 5 D



# SUPER MULTI-DRILLS MDS ... SK/SG Type

## Short Type

Cylindrical Solid Carbide Drills without Coolant Holes



### ● Diameter ø2,0~6,0mm

Dimensions (mm)		Cat. No.	Short Type					
øD	Shank		Stock		Dimensions (mm)			
	ød		ℓ3	SK	SG	L	ℓ1	ℓ2
2,0	2,0	30	MDS 020			42	9,5	12
2,1	2,1	30	MDS 021					
2,2	2,2	30	MDS 022			43	10,2	13
2,3	2,3	30	MDS 023					
2,4	2,4	30	MDS 024					
2,5	2,5	30	MDS 025	●		44	10,9	14
2,6	2,6	30	MDS 026	●				
2,7	2,7	30	MDS 027					
2,8	2,8	30	MDS 028	●		46	12,4	16
2,9	2,9	30	MDS 029					
3,0	3,0	30	MDS 030	●	●			
3,1	3,1	31	MDS 031					
3,2	3,2	31	MDS 032			49	14,0	18
3,3	3,3	31	MDS 033					
3,4	3,4	32	MDS 034	●				
3,5	3,5	32	MDS 035	●	●	52	15,6	20
3,6	3,6	32	MDS 036					
3,7	3,7	32	MDS 037					
3,8	3,8	33	MDS 038					
3,9	3,9	33	MDS 039					
4,0	4,0	33	MDS 040	●	●	55	17,0	22
4,1	4,1	33	MDS 041					
4,2	4,2	33	MDS 042	●				
4,3	4,3	34	MDS 043					
4,4	4,4	34	MDS 044					
4,5	4,5	34	MDS 045	●	●	58	18,4	24
4,6	4,6	34	MDS 046					
4,7	4,7	34	MDS 047					
4,8	4,8	36	MDS 048					
4,9	4,9	36	MDS 049					
5,0	5,0	36	MDS 050	●	●	62	19,6	26
5,1	5,1	36	MDS 051	●				
5,2	5,2	36	MDS 052	●	●			
5,3	5,3	36	MDS 053					
5,4	5,4	36	MDS 054					
5,5	5,5	36	MDS 055	●	●			
5,6	5,6	36	MDS 056					
5,7	5,7	36	MDS 057			66	22,8	30
5,8	5,8	36	MDS 058					
5,9	5,9	36	MDS 059					
6,0	6,0	36	MDS 060	●	●			

### ● Diameter ø6,1~10,0mm

Dimensions (mm)		Cat. No.	Short Type					
øD	Shank		Stock		Dimensions (mm)			
	ød		ℓ3	SK	SG	L	ℓ1	ℓ2
6,1	6,1	39	MDS 061					
6,2	6,2	39	MDS 062					
6,3	6,3	39	MDS 063			70	23,0	31
6,4	6,4	39	MDS 064					
6,5	6,5	39	MDS 065	●	●			
6,6	6,6	39	MDS 066					
6,7	6,7	39	MDS 067					
6,8	6,8	40	MDS 068	●	●			
6,9	6,9	40	MDS 069					
7,0	7,0	40	MDS 070	●	●	74	25,0	34
7,1	7,1	40	MDS 071					
7,2	7,2	40	MDS 072					
7,3	7,3	40	MDS 073					
7,4	7,4	40	MDS 074					
7,5	7,5	40	MDS 075	●	●			
7,6	7,6	42	MDS 076					
7,7	7,7	42	MDS 077					
7,8	7,8	42	MDS 078					
7,9	7,9	42	MDS 079					
8,0	8,0	42	MDS 080	●	●	79	26,8	37
8,1	8,1	42	MDS 081					
8,2	8,2	42	MDS 082					
8,3	8,3	42	MDS 083					
8,4	8,4	42	MDS 084					
8,5	8,5	42	MDS 085	●	●			
8,6	8,6	44	MDS 086					
8,7	8,7	44	MDS 087					
8,8	8,8	44	MDS 088					
8,9	8,9	44	MDS 089					
9,0	9,0	44	MDS 090	●	●	84	28,6	40
9,1	9,1	44	MDS 091					
9,2	9,2	44	MDS 092					
9,3	9,3	44	MDS 093					
9,4	9,4	44	MDS 094					
9,5	9,5	44	MDS 095	●	●			
9,6	9,6	46	MDS 096					
9,7	9,7	46	MDS 097					
9,8	9,8	46	MDS 098			89	30,3	43
9,9	9,9	46	MDS 099					
10,0	10,0	46	MDS 100	●	●			

### ■ Recommended Cutting Conditions for K Type Multi-Drills

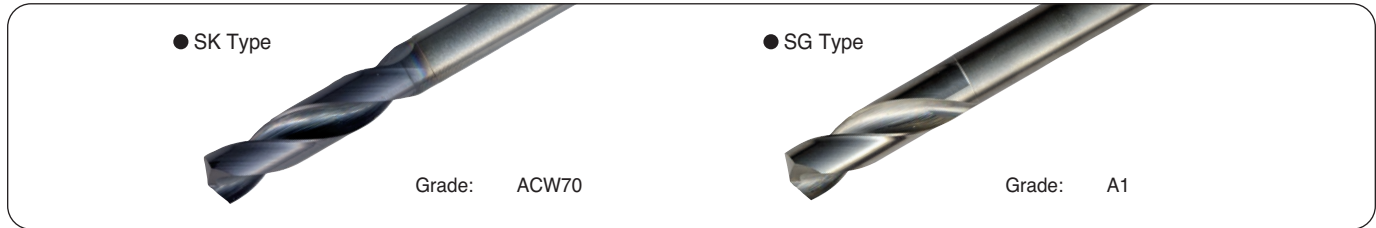
Diameter (mm)	Recommended Cutting Conditions						
		Soft Steels (under HB250)	General Steels, Alloy Steels	Die Steels (about HB250)	Stainless Steels (except 316)	Ductile Cast Irons	Grey Cast Irons
~ ø5	v <sub>c</sub>	40 - 60 - 80	40 - 60 - 80	15 - 30 - 45	15 - 40 - 55	40 - 60 - 80	40 - 70 - 90
	f	0.15 - 0.25	0.15 - 0.25	0.10 - 0.20	0.08 - 0.15	0.15 - 0.25	0.15 - 0.30
~ ø10	v <sub>c</sub>	50 - 70 - 120	50 - 70 - 110	20 - 40 - 50	15 - 45 - 60	50 - 70 - 100	50 - 80 - 120
	f	0.20 - 0.35	0.20 - 0.35	0.10 - 0.20	0.10 - 0.20	0.20 - 0.35	0.20 - 0.35
~ ø15	v <sub>c</sub>	60 - 80 - 120	50 - 70 - 120	20 - 40 - 60	20 - 50 - 70	50 - 70 - 100	60 - 90 - 120
	f	0.25 - 0.35	0.25 - 0.35	0.15 - 0.25	0.10 - 0.20	0.25 - 0.35	0.25 - 0.35
~ ø20	v <sub>c</sub>	60 - 90 - 120	60 - 80 - 120	30 - 40 - 60	20 - 50 - 70	60 - 80 - 100	60 - 90 - 120
	f	0.30 - 0.40	0.25 - 0.40	0.15 - 0.25	0.10 - 0.20	0.25 - 0.40	0.25 - 0.45

(v<sub>c</sub> : Cutting Speed (m/min), f : Feed rate (mm/rev)) (Min - Standard - Max)



# SUPER MULTI-DRILLS MDS ... SK/SG Type

K Type: Coated Multi-Drill for General Purpose Drilling of Steels  
G Type: Uncoated Multi-Drill for Cast Irons and Aluminium Alloys



## ● Diameter $\phi 10,1 \sim 12,0$ mm

Dimensions (mm)			Cat. No.	Short Type				
$\phi D$	Shank			Stock		Dimensions (mm)		
	$\phi d$	$\ell_3$		SK	SG	L	$\ell_1$	$\ell_2$
10,1	10,1	46	MDS 101 □□	●		89	30,3	43
10,2	10,2		MDS 102 □□					
10,3	10,3		MDS 103 □□					
10,4	10,4		MDS 104 □□					
10,5	10,5		MDS 105 □□	●	●			
10,6	10,6		MDS 106 □□					
10,7	10,7	48	MDS 107 □□			95	32,8	47
10,8	10,8		MDS 108 □□					
10,9	10,9		MDS 109 □□					
11,0	11,0		MDS 110 □□	●	●			
11,1	11,1		MDS 111 □□					
11,2	11,2		MDS 112 □□					
11,3	11,3	51	MDS 113 □□			102	35,2	51
11,4	11,4		MDS 114 □□					
11,5	11,5		MDS 115 □□	●	●			
11,6	11,6		MDS 116 □□					
11,7	11,7		MDS 117 □□					
11,8	11,8		MDS 118 □□					
11,9	11,9	51	MDS 119 □□			102	35,2	51
12,0	12,0		MDS 120 □□	●	●			

## ● Diameter $\phi 12,1 \sim 14,0$ mm

Dimensions (mm)			Cat. No.	Short Type				
$\phi D$	Shank			Stock		Dimensions (mm)		
	$\phi d$	$\ell_3$		SK	SG	L	$\ell_1$	$\ell_2$
12,1	12,1	51	MDS 121 □□			102	35,2	51
12,2	12,2		MDS 122 □□					
12,3	12,3		MDS 123 □□					
12,4	12,4		MDS 124 □□					
12,5	12,5		MDS 125 □□					
12,6	12,6		MDS 126 □□					
12,7	12,7	53	MDS 127 □□			107	37,2	54
12,8	12,8		MDS 128 □□					
12,9	12,9		MDS 129 □□					
13,0	13,0		MDS 130 □□					
13,1	13,1		MDS 131 □□					
13,2	13,2		MDS 132 □□					
13,3	13,3	53	MDS 133 □□			107	37,2	54
13,4	13,4		MDS 134 □□					
13,5	13,5		MDS 135 □□					
13,6	13,6		MDS 136 □□					
13,7	13,7		MDS 137 □□					
13,8	13,8		MDS 138 □□					
13,9	13,9		MDS 139 □□					
14,0	14,0		MDS 140 □□					

## ■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs.  
Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **MDS 102 S K** , **ACW70**  
(Grade)

Multi-Drill  
Solid type

Drill diameter  
10,2 mm

K : K-Type drill  
G : G-Type drill

S : 2,5 ~ 3D

## ■ Recommended Cutting Conditions for G Type Multi-Drills

( $v_c$  : Cutting Speed (m/min),  $f$  : Feed rate (mm/rev)) (Min - Standard - Max)

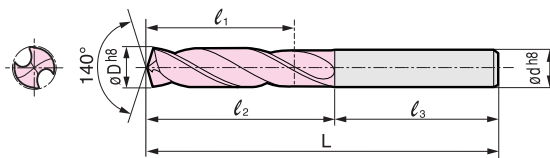
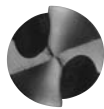
Diameter (mm)		Ductile Cast Irons	Grey Cast Irons	Aluminium Alloys
~ $\phi 6$	$v_c$	25 - 50 - 70	25 - 55 - 80	80 - 120 - 200
	$f$	0,15 - 0,2 - 0,25	0,2 - 0,25 - 0,3	0,2 - 0,3 - 0,4
~ $\phi 10$	$v_c$	25 - 50 - 70	25 - 55 - 80	80 - 120 - 200
	$f$	0,2 - 0,3 - 0,35	0,25 - 0,35 - 0,4	0,25 - 0,35 - 0,45
~ $\phi 14$	$v_c$	25 - 50 - 70	25 - 55 - 80	80 - 120 - 200
	$f$	0,2 - 0,35 - 0,4	0,25 - 0,4 - 0,5	0,25 - 0,45 - 0,6
~ $\phi 20$	$v_c$	25 - 50 - 70	25 - 55 - 80	80 - 120 - 200
	$f$	0,2 - 0,4 - 0,5	0,25 - 0,4 - 0,6	0,25 - 0,45 - 0,7



# SUPER MULTI-DRILLS MDS ... MK/MG Type

## Long Type

Cylindrical Solid Carbide Drills without Coolant Holes



Helix angle: 30°  
l<sub>1</sub> = Effective drilling length

### ● Diameter ø2,0~6,0mm

Dimensions (mm)			Cat. No.	Long Type				
øD	Shank			Stock		Dimensions (mm)		
	ød	l <sub>3</sub>		MK	MG	L	l <sub>1</sub>	l <sub>2</sub>
2,0	2,0	30	MDS 020 □□			45,4	12,9	15,4
2,1	2,1		MDS 021 □□					
2,2	2,2	30	MDS 022 □□			46,4	13,6	16,4
2,3	2,3		MDS 023 □□					
2,4	2,4	30	MDS 024 □□			47,5	14,4	17,5
2,5	2,5		MDS 025 □□					
2,6	2,6	30	MDS 026 □□			49,5	15,9	19,5
2,7	2,7		MDS 027 □□					
2,8	2,8	30	MDS 028 □□			52,6	17,6	21,6
2,9	2,9		MDS 029 □□					
3,0	3,0	30	MDS 030 □□			56,7	20,3	24,7
3,1	3,1		MDS 031 □□					
3,2	3,2	31	MDS 032 □□			60,8	22,8	27,8
3,3	3,3		MDS 033 □□					
3,4	3,4	32	MDS 034 □□			65,9	26,3	31,9
3,5	3,5		MDS 035 □□					
3,6	3,6	32	MDS 036 □□			69,9	28,0	33,9
3,7	3,7		MDS 037 □□					
3,8	3,8	33	MDS 038 □□			77,0	32,4	39,0
3,9	3,9		MDS 039 □□					
4,0	4,0	33	MDS 040 □□			82,1	34,9	42,1
4,1	4,1		MDS 041 □□					
4,2	4,2	34	MDS 042 □□			88,3	37,3	46,3
4,3	4,3		MDS 043 □□					
4,4	4,4	34	MDS 044 □□			91,4	39,8	49,4
4,5	4,5		MDS 045 □□					
4,6	4,6	34	MDS 046 □□			97,5	44,3	54,5
4,7	4,7		MDS 047 □□					
4,8	4,8	36	MDS 048 □□			99,6	45,8	56,6
4,9	4,9		MDS 049 □□					
5,0	5,0	38	MDS 050 □□	●	●	103,7	48,3	59,7
5,1	5,1		MDS 051 □□	●				
5,2	5,2	38	MDS 052 □□			106,8	49,8	61,8
5,3	5,3		MDS 053 □□					
5,4	5,4	38	MDS 054 □□					
5,5	5,5		MDS 055 □□	●	●			
5,6	5,6	40	MDS 056 □□					
5,7	5,7		MDS 057 □□					
5,8	5,8	40	MDS 058 □□					
5,9	5,9		MDS 059 □□					
6,0	6,0	40	MDS 060 □□	●	●			

### ● Diameter ø6,1~10,0mm

Dimensions (mm)			Cat. No.	Long Type				
øD	Shank			Stock		Dimensions (mm)		
	ød	l <sub>3</sub>		MK	MG	L	l <sub>1</sub>	l <sub>2</sub>
6,1	6,1		MDS 061 □□					
6,2	6,2	40	MDS 062 □□			82,1	34,9	42,1
6,3	6,3		MDS 063 □□					
6,4	6,4	40	MDS 064 □□			84,2	35,8	44,2
6,5	6,5		MDS 065 □□	●	●			
6,6	6,6	40	MDS 066 □□			88,3	37,3	46,3
6,7	6,7		MDS 067 □□					
6,8	6,8	40	MDS 068 □□	●	●	91,4	39,8	49,4
6,9	6,9		MDS 069 □□					
7,0	7,0	41	MDS 070 □□	●	●	97,5	44,3	54,5
7,1	7,1		MDS 071 □□					
7,2	7,2	41	MDS 072 □□			99,6	45,8	56,6
7,3	7,3		MDS 073 □□					
7,4	7,4	41	MDS 074 □□			103,7	48,3	59,7
7,5	7,5		MDS 075 □□	●	●			
7,6	7,6	42	MDS 076 □□			106,8	49,8	61,8
7,7	7,7		MDS 077 □□					
7,8	7,8	42	MDS 078 □□					
7,9	7,9		MDS 079 □□					
8,0	8,0	43	MDS 080 □□	●	●			
8,1	8,1		MDS 081 □□					
8,2	8,2	43	MDS 082 □□			103,7	48,3	59,7
8,3	8,3		MDS 083 □□					
8,4	8,4	43	MDS 084 □□			99,6	45,8	56,6
8,5	8,5		MDS 085 □□	●	●			
8,6	8,6	43	MDS 086 □□			99,6	45,8	56,6
8,7	8,7		MDS 087 □□					
8,8	8,8	43	MDS 088 □□			103,7	48,3	59,7
8,9	8,9		MDS 089 □□					
9,0	9,0	44	MDS 090 □□	●	●	106,8	49,8	61,8
9,1	9,1		MDS 091 □□					
9,2	9,2	44	MDS 092 □□					
9,3	9,3		MDS 093 □□					
9,4	9,4	44	MDS 094 □□					
9,5	9,5		MDS 095 □□	●	●			
9,6	9,6	45	MDS 096 □□					
9,7	9,7		MDS 097 □□					
9,8	9,8	45	MDS 098 □□					
9,9	9,9		MDS 099 □□					
10,0	10,0	45	MDS 100 □□	●	●			

Multi-Drills

### ■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs.  
Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **MDS 102 MK** , **ACW70**  
(Grade)

Multi-Drill  
Solid type

Drill diameter  
10,2 mm

**K** : K-Type drill  
**G** : G-Type drill

**M** : ~ 4D

# SUPER MULTI-DRILLS MDS ... MK/MG Type

K Type: Coated Multi-Drill for General Purpose Drilling of Steels  
G Type: Uncoated Multi-Drill for Cast Irons and Aluminium Alloys



## ● Diameter $\phi 10,1 \sim 12,0$ mm

Dimensions (mm)			Cat. No.	Long Type				
$\phi D$	Schaft			Stock		Dimensions (mm)		
	$\phi d$	$\ell_3$		MK	MG	L	$\ell_1$	$\ell_2$
10,1	10,1	46	MDS 101 □□			113,9	55,3	67,9
10,2	10,2		MDS 102 □□					
10,3	10,3		MDS 103 □□					
10,4	10,4		MDS 104 □□					
10,5	10,5		MDS 105 □□	●	●			
10,6	10,6	46	MDS 106 □□			116,0	56,8	70,0
10,7	10,7		MDS 107 □□					
10,8	10,8		MDS 108 □□					
10,9	10,9		MDS 109 □□					
11,0	11,0		MDS 110 □□	●	●			
11,1	11,1	47	MDS 111 □□			120,2	59,4	73,2
11,2	11,2		MDS 112 □□					
11,3	11,3		MDS 113 □□					
11,4	11,4		MDS 114 □□					
11,5	11,5		MDS 115 □□	●	●			
11,6	11,6	48	MDS 116 □□			123,2	60,8	75,2
11,7	11,7		MDS 117 □□					
11,8	11,8		MDS 118 □□					
11,9	11,9		MDS 119 □□					
12,0	12,0		MDS 120 □□	●	●			

## ● Diameter $\phi 12,1 \sim 14,0$ mm

Dimensions (mm)			Cat. No.	Long Type				
$\phi D$	Schaft			Stock		Dimensions (mm)		
	$\phi d$	$\ell_3$		MK	MG	L	$\ell_1$	$\ell_2$
12,1	12,1	59	MDS 121 □□			137,3	73,3	78,3
12,2	12,2		MDS 122 □□					
12,3	12,3		MDS 123 □□					
12,4	12,4		MDS 124 □□					
12,5	12,5		MDS 125 □□					
12,6	12,6	59	MDS 126 □□			139,4	84,8	80,4
12,7	12,7		MDS 127 □□					
12,8	12,8		MDS 128 □□					
12,9	12,9		MDS 129 □□					
13,0	13,0		MDS 130 □□					
13,1	13,1	60	MDS 131 □□			146,5	70,3	86,5
13,2	13,2		MDS 132 □□					
13,3	13,3		MDS 133 □□					
13,4	13,4		MDS 134 □□					
13,5	13,5		MDS 135 □□					
13,6	13,6	61	MDS 136 □□			149,6	71,8	88,6
13,7	13,7		MDS 137 □□					
13,8	13,8		MDS 138 □□					
13,9	13,9		MDS 139 □□					
14,0	14,0		MDS 140 □□					

## ■ Recommended Cutting Conditions for K Type Multi-Drills

( $v_c$  : Cutting Speed (m/min),  $f$  : Feed rate (mm/rev)) (Min - Standard - Max)

Diameter (mm)		Soft Steels (under HB250)	General Steels, Alloy Steels	Die Steels (about HB250)	Stainless Steels (except 316-bar)	Ductile Cast Irons	Grey Cast Irons
		$\sim \phi 5$	$v_c$	40 - 60 - 80	40 - 60 - 80	15 - 30 - 45	15 - 40 - 55
	$f$	0.15 - 0.25	0.15 - 0.25	0.10 - 0.20	0.08 - 0.15	0.15 - 0.25	0.15 - 0.30
$\sim \phi 10$	$v_c$	50 - 70 - 120	50 - 70 - 110	20 - 40 - 50	15 - 45 - 60	50 - 70 - 100	50 - 80 - 120
	$f$	0.20 - 0.35	0.20 - 0.35	0.10 - 0.20	0.10 - 0.20	0.20 - 0.35	0.20 - 0.35
$\sim \phi 15$	$v_c$	60 - 80 - 120	50 - 70 - 120	20 - 40 - 60	20 - 50 - 70	50 - 70 - 100	60 - 90 - 120
	$f$	0.25 - 0.35	0.25 - 0.35	0.15 - 0.25	0.10 - 0.20	0.25 - 0.35	0.25 - 0.35
$\sim \phi 20$	$v_c$	60 - 90 - 120	60 - 80 - 120	30 - 40 - 60	20 - 50 - 70	60 - 80 - 100	60 - 90 - 120
	$f$	0.30 - 0.40	0.25 - 0.40	0.15 - 0.25	0.10 - 0.20	0.25 - 0.40	0.25 - 0.45



Multi-Drills

## ■ Recommended Cutting Conditions for G Type Multi-Drills

( $v_c$  : Cutting Speed (m/min),  $f$  : Feed rate (mm/rev)) (Min - Standard - Max)

Diameter (mm)		Ductile Cast Irons	Grey Cast Irons	Aluminium Alloys
		$\sim \phi 6$	$v_c$	25 - 50 - 70
	$f$	0.15 - 0.2 - 0.25	0.2 - 0.25 - 0.3	0.2 - 0.3 - 0.4
$\sim \phi 10$	$v_c$	25 - 50 - 70	25 - 55 - 80	80 - 120 - 200
	$f$	0.2 - 0.3 - 0.35	0.25 - 0.35 - 0.4	0.25 - 0.35 - 0.45
$\sim \phi 14$	$v_c$	25 - 50 - 70	25 - 55 - 80	80 - 120 - 200
	$f$	0.2 - 0.35 - 0.4	0.25 - 0.4 - 0.5	0.25 - 0.45 - 0.6
$\sim \phi 20$	$v_c$	25 - 50 - 70	25 - 55 - 80	80 - 120 - 200
	$f$	0.2 - 0.4 - 0.5	0.25 - 0.4 - 0.6	0.25 - 0.45 - 0.7





# Extra Long SUPER MULTI-DRILLS MDW ... XHT/PHT Type

A Revolution in Deep Hole Drilling



## ■ Features

- Drills faster than conventional high speed drills and gun drills
- Drilling depths up to 30xD
- Unique flute design efficiently removes chips
- Solid carbide construction provides excellent finished hole geometry
- Low cutting forces - suitable for low powered machine spindles
- Eco-friendly - uses MQL (minimum quantity lubrication) systems

## ■ Chip Form Examples Using Alternative Coolant Methods

MQL chips well across a wider range of cutting conditions  
MQL works well even when drilling soft steels



**MQL - optimised  
chip evacuation**

## Coolant supply

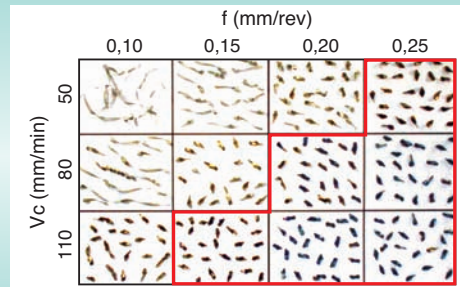
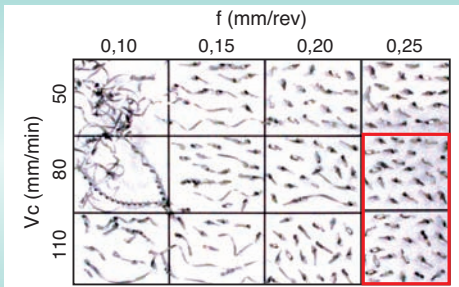
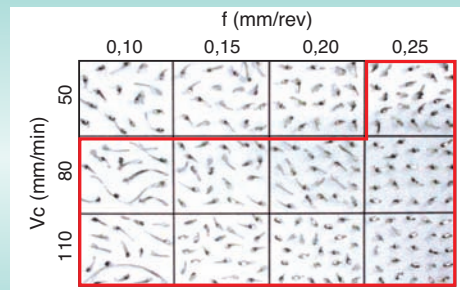
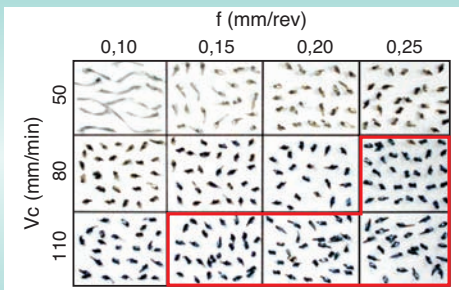
**Internal coolant (Emulsion 3MPa)**

**Internal MQL (Natural oil 0,6MPa)**

Work material

C50 (230HB)

15CrMo5 (<230HB)



Applicable range

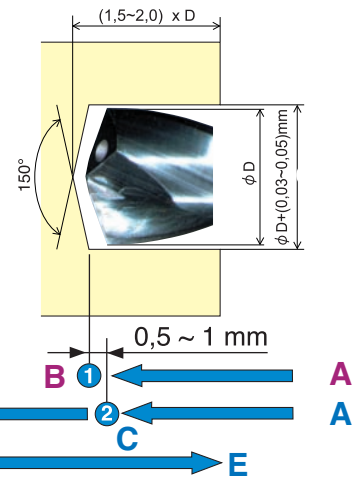
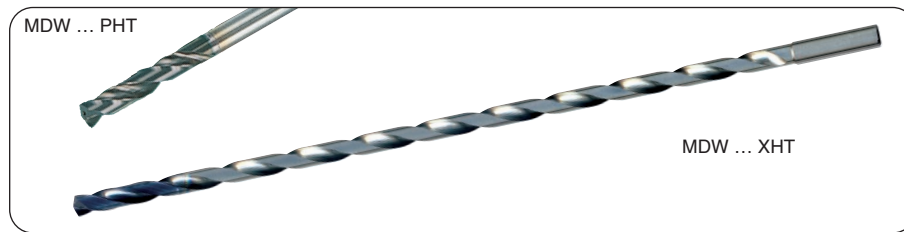
## ■ Applications

- Oil hole drilling on crankshafts
- Camshaft drilling
- Die mould drilling
- Oil hole drilling on connecting rods
- Machine parts drilling



# Extra Long SUPER MULTI-DRILLS MDW ... XHT/PHT Type

## Recommended Tooling Strategy



### 1. A → B: Preperation of pilot hole with MDW ...PHT type

$v_c = 50-80 \text{ m/min}$ ,  $f = 0,15-0,25 \text{ mm/rev}$ ,  $d_{oc}: 1-2 \times D$

### 2. A → C: Entering into pilot hole with long Multi-Drill (MDW ....XHT type)

$N = 500 \text{ rpm}$ ,  $v_f = 2000 \text{ mm/min}$

At C the drill should stay (about. 3 sec.) and increase speed to set recommended cutting conditions.

### 3. C → D: Deep hole drilling

After reaching required number of revolution operation can be started taking into consideration mentioned recommendation for the feed rates. At cross holes and irregular or angled surfaces feed should be reduced.

### 4. D → E: After hole drilling

Decrease spindle rotation to  $N = 500 \sim 700 \text{ rpm}$  and pull back with high feed rate  $F = 2000 \text{ mm/min}$ .

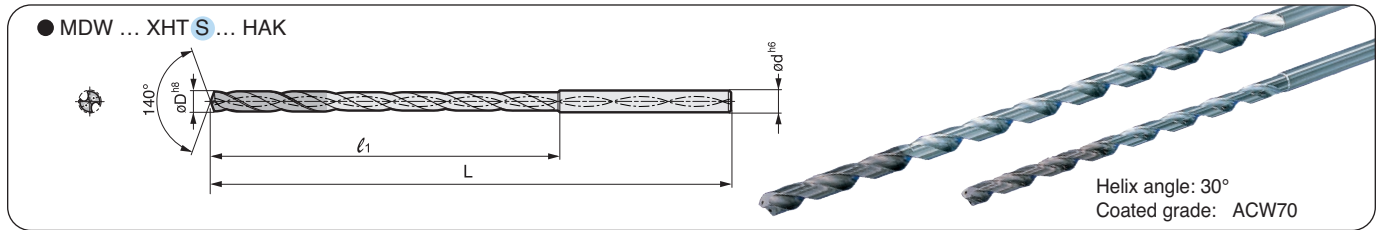
## Recommended Cutting Conditions

$V_c$ : Cutting speed (m/min),  $f$ : Feed rate (mm/rev)

Diameter (mm)		General Steel	Alloy Steel	Stainless Steel	Grey Cast Iron	Ductile Cast Iron	Aluminium Alloy
		( ~ HB300)	( ~ HRC45)	( ~ HB200)	(GG25)	(GGG45)	—
~ 5	$V_c$	70 ~ 90	50 ~ 70	30 ~ 50	50 ~ 90	50 ~ 90	80 ~ 160
	$f$	0,08 ~ 0,12	0,06 ~ 0,15	0,06 ~ 0,12	0,15 ~ 0,25	0,15 ~ 0,2	0,08 ~ 0,3
~ 6	$V_c$	80 ~ 120	60 ~ 80	30 ~ 60	50 ~ 90	50 ~ 90	80 ~ 160
	$f$	0,1 ~ 0,17	0,12 ~ 0,25	0,08 ~ 0,15	0,15 ~ 0,3	0,15 ~ 0,25	0,12 ~ 0,35
~ 8	$V_c$	80 ~ 120	70 ~ 90	40 ~ 80	60 ~ 100	50 ~ 90	80 ~ 180
	$f$	0,12 ~ 0,25	0,12 ~ 0,25	0,1 ~ 0,2	0,2 ~ 0,35	0,15 ~ 0,25	0,15 ~ 0,4
~ 10	$V_c$	80 ~ 120	70 ~ 90	40 ~ 80	60 ~ 100	80 ~ 120	80 ~ 180
	$f$	0,15 ~ 0,3	0,12 ~ 0,25	0,1 ~ 0,2	0,2 ~ 0,35	0,15 ~ 0,3	0,2 ~ 0,5
~ 12	$V_c$	80 ~ 120	70 ~ 90	40 ~ 80	60 ~ 100	80 ~ 120	80 ~ 180
	$f$	0,15 ~ 0,3	0,12 ~ 0,25	0,1 ~ 0,2	0,2 ~ 0,35	0,15 ~ 0,3	0,2 ~ 0,45

# Extra Long SUPER MULTI-DRILLS MDW ... XHT/PHT Type

A Revolution in Deep Hole Drilling



## ● MDW...XHT S Type for Deep Hole Drilling Steels

Dimensions		Cat. No.	For 10 x D			For 15 x D			For 20 x D			For 25 x D			For 30 x D		
øD (mm)	ød (mm)		Stock	Dimensions		Stock	Dimensions		Stock	Dimensions		Stock	Dimensions		Stock	Dimensions	
			10	L	l <sub>1</sub>	15	L	l <sub>1</sub>	20	L	l <sub>1</sub>	25	L	l <sub>1</sub>	30	L	l <sub>1</sub>
3,0	4,0	MDW 030 XHT S□□HAK	●	79	48	●	94	66	●	109	81	●	124	96	●	139	111
3,5		MDW 035 XHT S□□HAK	●	82	53	●	100	72	●	117	89	●	135	107	●	152	124
4,0		MDW 040 XHT S□□HAK	●	87	58	●	107	78	●	127	97	●	147	117	●	167	137
4,5	5,0	MDW 045 XHT S□□HAK	●	95	63	●	118	86	●	140	108	●	163	130,5	●	184	153
5,0		MDW 050 XHT S□□HAK <sup>(*)</sup>	●	98	68	●	123	93	●	148	118	●	173	133	●	198	168
5,0	6,0	MDW 050 XHT S□□HAK	●	106	68	●	131	93	●	156	118	●	181	133	●	206	168
5,5		MDW 055 XHT S□□HAK	●	113	73	●	141	101	●	168	128	●	196	155,5	●	223	183
6,0		MDW 060 XHT S□□HAK	●	118	78	●	148	108	●	178	138	●	208	168	●	238	198
6,5	8,0	MDW 065 XHT S□□HAK	●	125	87	●	158	120	●	190	148	●	223	180,5	●	255	213
6,8		MDW 068 XHT S□□HAK	●	130	90	●	164	124	●	198	158	●	236	192	●	266	226
7,0		MDW 070 XHT S□□HAK	●	131	92	●	166	127	●	201	162	●	236	197	●	271	232
7,5		MDW 075 XHT S□□HAK	●	136	97	●	174	135	●	211	172	●	249	209,5	●	286	247
8,0		MDW 080 XHT S□□HAK	●	141	102	●	181	142	●	221	182	●	261	222	●	301	262
8,5	10,0	MDW 085 XHT S□□HAK	●	154	110	●	197	153	●	239	195	●	282	238	●	324	280
9,0		MDW 090 XHT S□□HAK	●	159	115	●	204	160	●	249	205	●	294	250	●	339	295
9,5		MDW 095 XHT S□□HAK	●	164	120	●	212	168	●	259	215	●	305	263	●	354	310
10,0	MDW 100 XHT S□□HAK	●	167	125	●	217	175	●	267	225	●	317	275	●	367	325	
10,5	12,0	MDW 105 XHT S□□HAK	●	181	131	●	234	184	●	286	236	●	339	289	×	—	—
11,0		MDW 110 XHT S□□HAK	●	186	136	●	241	191	●	296	246	●	351	301	×	—	—
11,5		MDW 115 XHT S□□HAK	●	190	141	●	248	199	●	305	256	●	363	314	×	—	—
12,0	MDW 120 XHT S□□HAK	●	195	146	●	255	206	●	315	266	●	375	326	×	—	—	

● All Long Drill series include an allowance to accommodate regrinding!

● TiAlN coated carbide grade: ACW70

(\*) Cat. No. description: Drill-ø: 5mm, shank-ø: 5 mm, (Eg. for 20xD: MDW 050 XHT S20 HAK5 )

● Euro stock

× Not possible to produce

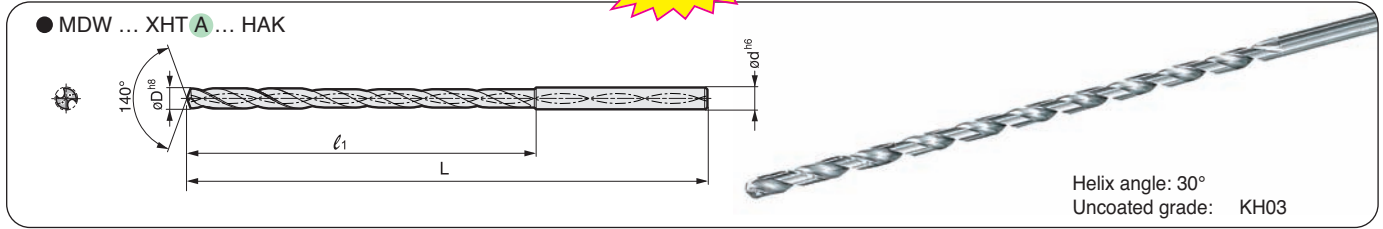
### ■ How to Order

Non stock items – minimum order 6 pieces

Always specify the catalogue number and drill diameter as shown - eg drill diameter 5,0mm = MDW 050

E.g.,

**MDW 050 XHT S 30 HAK , ACW70** (Grade)  
 Super MULTI-DRILL  
 øD=5,0 mm  
 Extra long type with spiral coolant holes  
 Shank type to DIN6535  
 Drilling depth (L/D ratio)  
 Cutting edges for steel with double margin  
 Special shape of clearance face



Helix angle: 30°  
Uncoated grade: KH03

## MDW...XHT A Type for Aluminium and Copper Alloys

Dimensions		Cat. No.	For 20 x D			For 30 x D		
$\phi D$ (mm)	$\phi d$ (mm)		Stock	Dimensions		Stock	Dimensions	
			20	L	$l_1$	30	L	$l_1$
4,0	4,0	MDW 040 XHT A□□ HAK	●	127	97	●	167	137
5,0	6,0	MDW 050 XHT A□□ HAK	●	156	118	●	206	168
6,0		MDW 060 XHT A□□ HAK	●	178	138	●	238	198
7,0	8,0	MDW 070 XHT A□□ HAK	●	201	162	●	271	232
8,0		MDW 080 XHT A□□ HAK	●	221	182	●	301	262
9,0	10,0	MDW 090 XHT A□□ HAK	●	249	205	●	339	295
10,0		MDW 100 XHT A□□ HAK	●	267	225	●	367	325

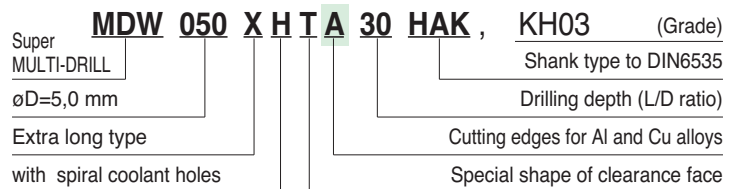
All Long Drill series include an allowance to accommodate regrinding!  
Uncoated carbide grade: KH03

● Euro stock

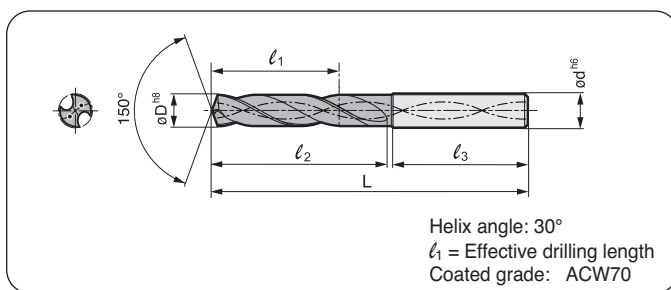
### How to Order

Non stock items – minimum order 6 pieces  
Always specify the catalogue number and drill diameter as shown -  
eg. drill diameter 5,0mm = MDW 050

E.g.,



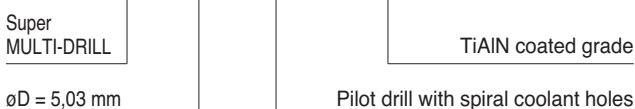
## MDW...PHT Type for Pilot Hole



### How to Order

Non stock items – minimum order 6 pieces  
Always specify the catalogue number and drill diameter as shown -  
eg. drill diameter 5,03mm = MDW 0503

E.g., **MDW 0503 PHT**, ACW70



Dimensions		Cat. No.	Stock	For Pilot Hole			
$\phi D$ (mm)	$\phi d$ (mm)			Dimensions (mm)			
				L	$l_1$	$l_2$	$l_3$
3,03	4,0	MDW 0303 PHT	●	52	9	22	28
3,53		MDW 0353 PHT	●	52	9	22	28
4,03	5,0	MDW 0403 PHT	●	59	12	29	28
4,53		MDW 0453 PHT	●	59	12	29	28
5,03	6,0	MDW 0503 PHT	●	71	15	33	36
5,53		MDW 0553 PHT	●	71	15	33	36
6,03	8,0	MDW 0603 PHT	●	76	18	38	36
6,50		MDW 0653 PHT	●	76	18	38	36
6,83	8,0	MDW 0683 PHT	●	76	18	38	36
7,03		MDW 0703 PHT	●	82	21	43	36
7,53	MDW 0753 PHT	●	82	21	43	36	
8,03	10,0	MDW 0803 PHT	●	88	24	46	40
8,53		MDW 0853 PHT	●	88	24	46	40
9,03	10,0	MDW 0903 PHT	●	88	24	46	40
9,53		MDW 0953 PHT	●	88	24	46	40
10,03	12,0	MDW 1003 PHT	●	104	30	55	45
10,53		MDW 1053 PHT	●	104	30	55	45
11,03	12,0	MDW 1103 PHT	●	104	30	55	45
11,53		MDW 1153 PHT	●	104	30	55	45
12,03	14,0	MDW 1203 PHT	●	117	42	68	45

● Euro stock

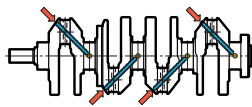
# Extra Long SUPER MULTI-DRILLS MDW ... XHT/PHT Type

## Application Examples

### Work piece: Crank shaft (C45E, 1.1191)

#### Machine

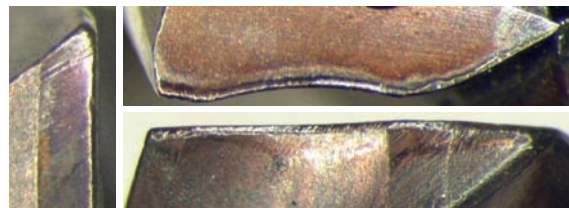
Machine: Horizontal M/C  
Coolant: MQL (Synthesized ester)  
Air pressure 0,9MPa  
Supplying rate 20cc/h



#### Process and cutting condition

- 1) Pilot hole ( $\phi 5,75 \times 12\text{mm}$ , Top angle of drill:  $150^\circ$ )  
 $V_c=80\text{m/min}$   $f=0,2\text{mm/rev.}$
- 2) Deep hole ( $\phi 5,70 \times 83\text{mm} \times 4$  holes, XHT type)  
 $V_c=100\text{m/min}$   $f=0,15\text{mm/rev.}$   $F=873\text{mm/min}$

### Tool life 200pcs

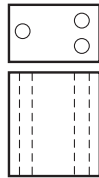


Cutting edge after 66,4m drilling

### Work piece: Cutting tool body (42CrMo4, 1.7225: 35~38HRC)

#### Machine

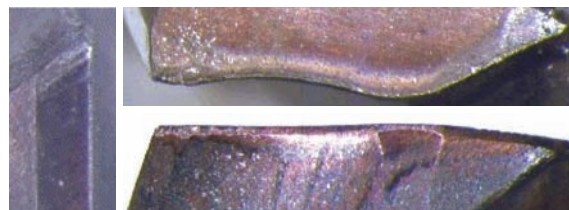
Machine: Vertical M/C (BT40)  
Coolant: Internal cooling (Emulsion)  
Pump pressure 3,0MPa



#### Process and cutting condition

- 1) Pilot hole ( $\phi 7,03 \times 14\text{mm}$ , Top angle of drill:  $150^\circ$ )  
 $V_c=50\text{m/min}$   $f=0,08\text{mm/rev.}$
- 2) Deep hole ( $\phi 7,0 \times 90\text{mm} \times 3$  holes, XHT type)  
 $V_c=50\text{m/min}$   $f=0,10\text{mm/rev.}$   $F=227\text{mm/min}$

### Tool life 60pcs



Cutting edge after 16,2m drilling

\* Current tooling (center drill + HSS drill)  
 $V_c=15\text{m/min}$   $f=0,03\text{mm/rev.}$   $F=20\text{mm/min.}$   
→ Tool life 30pcs

### Work piece: Connecting rod (C53,1.1213)

#### Machine

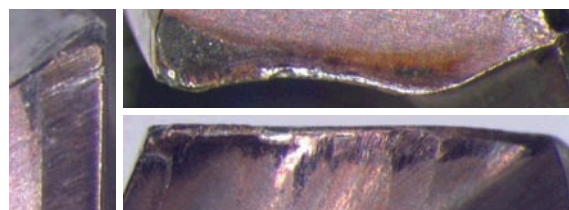
Machine: Vertical M/C (BT40)  
Coolant: Internal cooling (Emulsion)  
Pump pressure 2,0MPa



#### Process and cutting condition

- 1) Pilot hole ( $\phi 5,85 \times 10\text{mm}$ , Top angle of drill:  $175^\circ$ )  
 $V_c=80\text{m/min}$   $f=0,05 \rightarrow 0,15\text{mm/rev.}$
- 2) Deep hole ( $\phi 5,80 \times 130\text{mm}$ , XHT type)  
 $V_c=90\text{m/min}$   $f=0,20\text{mm/rev.}$   $F=988\text{mm/min}$

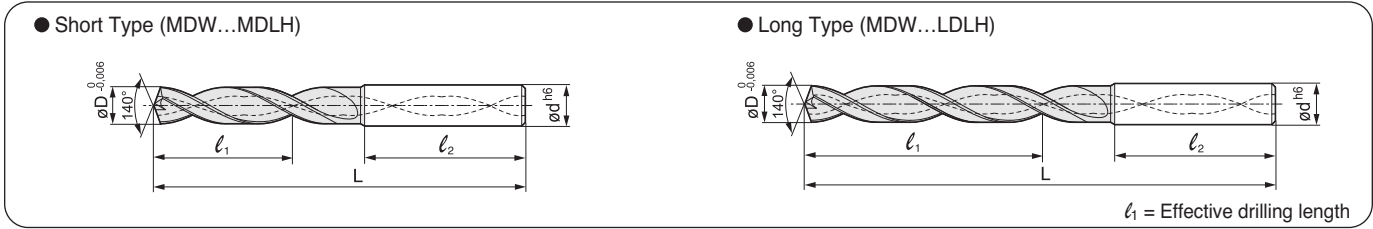
### Tool life 300pcs



Cutting edge after 39,0m drilling

\* Current tooling (with  $\phi 5,8 \times 130\text{mm}$  gun drill)  
 $V_c=100\text{m/min}$   $f=0,03\text{mm/rev.}$   $F=164\text{mm/min.}$   
==> Tool life 120pcs





### ● Diameter ø3,00~8,00mm (mm)

Dimensions			Cat. No.	Short Type (3D)		Long Type (5D)		
øD	Shank			Stock	Dimensions	Stock	Dimensions	
	ød	ℓ <sub>2</sub>		MDLH	L ℓ <sub>1</sub>	LDLH	L ℓ <sub>1</sub>	
3,00	3	48	MDW 0300 □□□□	68,5	14,4		78,5	24,4
3,10	4	48	MDW 0310 □□□□	72,7	17,2		86,7	31,2
3,20			MDW 0320 □□□□					
3,30			MDW 0330 □□□□					
3,50			MDW 0350 □□□□					
3,65			MDW 0365 □□□□					
4,00	MDW 0400 □□□□	5	50	80,9	22,0		98,9	40,0
4,20	MDW 0420 □□□□							
4,50	MDW 0450 □□□□							
4,60	MDW 0460 □□□□							
5,00	MDW 0500 □□□□							
5,10	MDW 0510 □□□□	6	52	83,1	20,8		101,1	38,8
5,50	MDW 0550 □□□□							
6,00	MDW 0600 □□□□							
6,50	MDW 0650 □□□□							
6,80	MDW 0680 □□□□							
7,00	MDW 0700 □□□□	7	53	89,3	24,6		110,3	45,6
7,36	MDW 0736 □□□□							
7,50	MDW 0750 □□□□							
7,50	MDW 0750 □□□□							
8,00	MDW 0800 □□□□							

### ● Diameter ø8,50~16,00mm (mm)

Dimensions			Cat. No.	Short Type (3D)		Long Type (5D)		
øD	Shank			Stock	Dimensions	Stock	Dimensions	
	ød	ℓ <sub>2</sub>		MDLH	L ℓ <sub>1</sub>	LDLH	L ℓ <sub>1</sub>	
8,50	9	55	MDW 0850 □□□□	101,6	32,2		128,6	59,2
8,80			MDW 0880 □□□□					
9,00			MDW 0900 □□□□					
9,20			MDW 0920 □□□□					
9,50			MDW 0950 □□□□					
10,00	MDW 1000 □□□□	10	56	107,8	36,0		137,8	66,0
10,30	MDW 1030 □□□□							
10,50	MDW 1050 □□□□							
10,80	MDW 1080 □□□□							
11,00	MDW 1100 □□□□							
11,10	MDW 1110 □□□□	11	61	118,0	39,8		151,0	72,8
11,50	MDW 1150 □□□□							
12,00	MDW 1200 □□□□							
12,50	MDW 1250 □□□□							
12,96	MDW 1296 □□□□							
13,00	MDW 1300 □□□□	12	62	124,2	43,6		160,2	79,6
13,50	MDW 1350 □□□□							
14,00	MDW 1400 □□□□							
14,50	MDW 1450 □□□□							
14,96	MDW 1496 □□□□							
15,00	MDW 1500 □□□□	13	63	130,4	47,4		169,4	86,4
15,50	MDW 1550 □□□□							
16,00	MDW 1600 □□□□							
16,00	MDW 1600 □□□□							
16,00	MDW 1600 □□□□							

AURORA Coated DLH Type, Grade: DL1300

## ■ Characteristics

- **High efficiency drilling**  
AURORA COAT and strong helix design reduces cutting forces and improves edge sharpness.
- **Precision drilling**  
Special cutting edge design improves hole precision and quality.
- **Longer tool life**  
With AURORA COAT coupled with the cutting edge design, long and stable tool life can be achieved.
- **Deep hole (L/D=20) drilling**  
Drills for deep hole drilling can be custom-made.  
Production range: ø3~ø12mm  
total length: 50 times drill diameter (max. 290mm)



Multi-Drills

## ■ Applicable Work Materials

- Aluminium Die Casting
- Aluminium Alloy
- Aluminium Alloy Casting
- Brass Casting
- Bronze Casting

## ■ Ordering

Non-Stock Items will be required minimum order quantity for 6 pcs.

## ■ Recommended Cutting Conditions

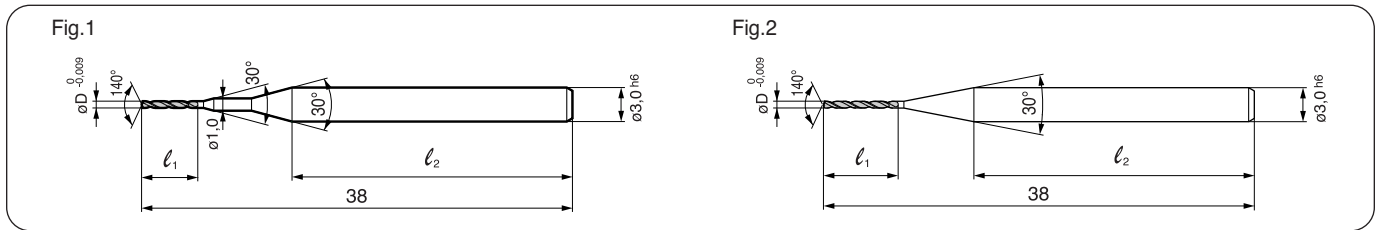
ø D (mm)		Aluminium Alloy		Aluminium Die Casting	Copper Alloy
		v <sub>c</sub>	f	v <sub>c</sub>	f
~ ø 5	v <sub>c</sub>	80 ~ 160		80 ~ 180	80 ~ 160
	f	0,08 ~ 0,3		0,1 ~ 0,3	0,08 ~ 0,15
~ ø 10	v <sub>c</sub>	80 ~ 180		80 ~ 200	60 ~ 180
	f	0,1 ~ 0,3		0,1 ~ 0,35	0,1 ~ 0,2
~ ø 16	v <sub>c</sub>	80 ~ 200		80 ~ 200	80 ~ 200
	f	0,15 ~ 0,4		0,1 ~ 0,4	0,1 ~ 0,25

(v<sub>c</sub> : Cutting Speed (m/min), f : Feed rate (mm/rev), Min ~ Max )



# Solid Carbide MINI MULTI-DRILLS

## MDSS Type



### ● Diameter $\phi 0,20 \sim 0,49 \text{mm}$

$\phi D$ (mm)	Cat. No.	Stock	Dimensions		Fig.
			$l_1$	$l_2$	
0,20	MDSS 0020		2,5	28	1
0,21	MDSS 0021				
0,22	MDSS 0022				
0,23	MDSS 0023				
0,24	MDSS 0024				
0,25	MDSS 0025				
0,26	MDSS 0026				
0,27	MDSS 0027				
0,28	MDSS 0028				
0,29	MDSS 0029				
0,30	MDSS 0030		3	28	2
0,31	MDSS 0031				
0,32	MDSS 0032				
0,33	MDSS 0033				
0,34	MDSS 0034				
0,35	MDSS 0035		4	28	
0,36	MDSS 0036				
0,37	MDSS 0037				
0,38	MDSS 0038				
0,39	MDSS 0039				
0,40	MDSS 0040		5	28	
0,41	MDSS 0041				
0,42	MDSS 0042				
0,43	MDSS 0043				
0,44	MDSS 0044				
0,45	MDSS 0045				
0,46	MDSS 0046				
0,47	MDSS 0047				
0,48	MDSS 0048				
0,49	MDSS 0049				

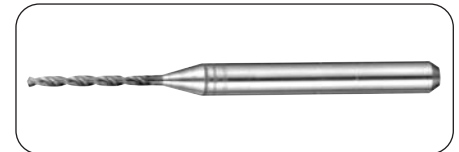
### ● Diameter $\phi 0,50 \sim 0,79 \text{mm}$

$\phi D$ (mm)	Cat. No.	Stock	Dimensions		Fig.
			$l_1$	$l_2$	
0,50	MDSS 0050		6	27	1
0,51	MDSS 0051				
0,52	MDSS 0052				
0,53	MDSS 0053				
0,54	MDSS 0054				
0,55	MDSS 0055				
0,56	MDSS 0056				
0,57	MDSS 0057				
0,58	MDSS 0058				
0,59	MDSS 0059				
0,60	MDSS 0060		7	26	2
0,61	MDSS 0061				
0,62	MDSS 0062				
0,63	MDSS 0063				
0,64	MDSS 0064				
0,65	MDSS 0065				
0,66	MDSS 0066				
0,67	MDSS 0067				
0,68	MDSS 0068				
0,69	MDSS 0069				
0,70	MDSS 0070		9	24	1
0,71	MDSS 0071				
0,72	MDSS 0072				
0,73	MDSS 0073				
0,74	MDSS 0074				
0,75	MDSS 0075				
0,76	MDSS 0076				
0,77	MDSS 0077				
0,78	MDSS 0078				
0,79	MDSS 0079				

### ● Diameter $\phi 0,80 \sim 1,00 \text{mm}$

$\phi D$ (mm)	Cat. No.	Stock	Dimensions		Fig.
			$l_1$	$l_2$	
0,80	MDSS 0080		10	23	1
0,81	MDSS 0081				
0,82	MDSS 0082				
0,83	MDSS 0083				
0,84	MDSS 0084				
0,85	MDSS 0085				
0,86	MDSS 0086				
0,87	MDSS 0087				
0,88	MDSS 0088				
0,89	MDSS 0089				
0,90	MDSS 0090		11	22	2
0,91	MDSS 0091				
0,92	MDSS 0092				
0,93	MDSS 0093				
0,94	MDSS 0094				
0,95	MDSS 0095				
0,96	MDSS 0096				
0,97	MDSS 0097				
0,98	MDSS 0098				
0,99	MDSS 0099				
1,00	MDSS 0100		12	21	

Grade: ACF40B



### ■ Recommended Cutting Conditions (Wet)

Work Cond. Drill- $\phi$ (mm)	Structural Steel, Carbon Steel, Cast Iron			Alloy Steel, Pre-hardened Steel			Tempered Steel, Hardened Steel			Hardened Steel (H <sub>R</sub> C40~50)			Hardened Steel (H <sub>R</sub> C50~55)		
	Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)	Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)	Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)	Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)	Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)
0,2	31800	60	0,1D	26500	50	0,1D	21200	40	0,1D	12700	30	0,1D	10600	20	0,1D
0,3	31800	100		26500	80		21200	60		12700	40		10600	30	
0,4	31800	130		25900	100		19900	80		12700	50		9900	40	
0,5	31800	190		25500	150		19100	110		12700	60		9500	50	
1,0	23900	360		0,2D~0,5D*	15900		240	0,2D~0,5D*		12700	190		0,2D~0,5D*	8000	

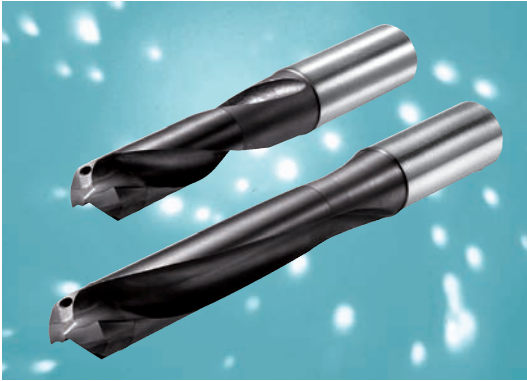
Work Cond. Drill- $\phi$ (mm)	Gray Cast Iron (GG45)			Stainless Steel		
	Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)	Spindle (rpm)	Feed rate (mm/min)	Step-feed (mm)
0,2	31800	60	0,1D	10600	20	0,1D
0,3	31800	100		10600	30	
0,4	31800	130		9500	40	
0,5	31800	190		9500	50	
1,0	19100	290		0,2D~0,5D*	5600	

1. The above conditions are recommended under wet conditions, using water-soluble coolant.
2. If machine noises and vibrations are present, please adjust the cutting conditions accordingly.
3. If the machine cannot achieve the recommended spindle speed, please use the max. spindle speed available.

\* Step feed is recommended for drilling of holes deeper than 3xD.



# Brazed Carbide MULTI-DRILLS KDS Type



## ■ Description

The new AK type drill features an extra long carbide drill head, new cutting geometry, coolant holes and ultra hard TiAlN coating for reliable high productivity drilling.

## ■ Advantages

- General purpose drill for steels, stainless steels, cast irons
- High productivity drilling even on deep holes up to 7 x D
- Twice the tool life of conventionally coated drills
- Self centering
- Surface finish and tolerances comparable to solid carbide
- Regrindable extra long carbide head halves drill replacement costs



## ■ Series

Type	Diameter range (mm)	Hole depth (L/D)	Remark
Short type (MAK Type)	ø9,5~ø40,5	~ 3	First choice general purpose drill
Long type (LAK Type)	ø9,5~ø40,5	~ 5	
Extra long type (DAK Type)	ø9,5~ø40,5	~ 7	

## ■ Performance

● High efficiency drilling	● Optimized drill geometry	● Comparison of cutting power (chip removal capability)
<p>Comparison of coating damage when high speed drilling</p> <p>TiAlN coated <b>KDS...AK</b>      TiN coated type</p> <p><math>v_c = 120</math> m/min      <math>v_c = 60</math> m/min After 30 m cut length (600 holes)</p> <p>Drill dia.: 18,0 mm Work material: C50 (HB230)      <math>f = 0,3</math> mm/rev <math>d_{oc} = 50</math> mm</p>	<p>Comparison of damage to drill margin After 40 min. cut length</p> <p><b>KDS...AK</b>      Competitor's drill</p> <p>Drill dia.: 18,0 mm      <math>v_c = 50</math> m/min Work material: C50 (HB230)      <math>f = 0,25</math> mm/rev <math>d_{oc} = 38</math> mm</p>	<p>Cutting power (N)</p> <p>Drill dia.: 18,0 mm      <math>v_c = 50</math> m/min Work material: C50 (HB230)      <math>f = 0,3</math> mm/rev <math>d_{oc} = 90</math> mm (L/D=5)</p>

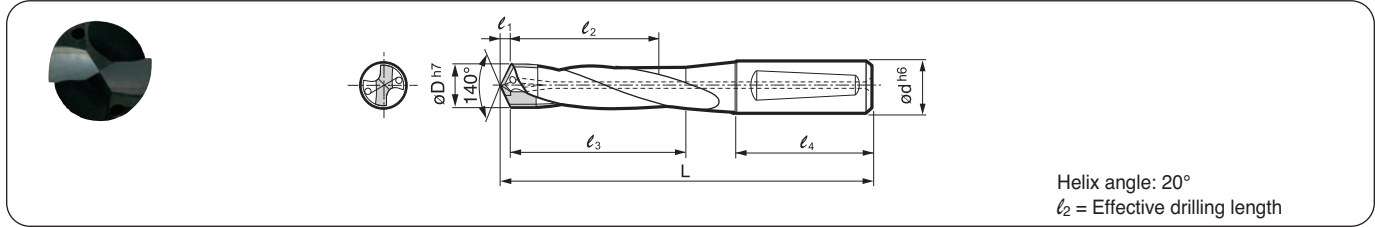
## ■ Application examples

● Workpiece material	● Automotive parts	● Automotive parts
<ul style="list-style-type: none"> <li>- General steel and alloy steel</li> <li>- Low carbon steel</li> <li>- Die steel</li> <li>- Stainless steel</li> <li>- Ductile cast iron</li> <li>- Grey cast iron</li> </ul>	<p>Work material: C50 (HB250)</p> <p><b>KDS ...AK</b></p> <p>Competitor A</p> <p>0      100      200      300 Tool life (Holes)</p> <p>Drill: KDS 180 LAK (ø18,0mm) Cutting data: <math>v_c = 55</math> m/min, <math>f = 0,25</math> mm/rev <math>d_{oc} = 70</math> mm</p>	<p>Work material: 42CrMo4 (HB250)</p> <p><b>MDS ...K</b></p> <p>Competitor B</p> <p>0      100      200      300 Tool life (Holes)</p> <p>Drill: KDS 250 MAK (ø25,0mm) Cutting data: <math>v_c = 60</math> m/min, <math>f = 0,25</math> mm/rev <math>d_{oc} = 65</math> mm</p>

# Brazed Carbide MULTI-DRILLS KDS ... MAK Type

## Short Type (3 x D)

Brazed Carbide Drills with Coolant Holes



### ● Diameter ø9,5~15,5mm

Dimensions (mm)			Cat. No.	Short Series (3D)				
øD (mm)	Shank			Drill Head	Stock	Dimensions (mm)		
	ød	l <sub>4</sub>				l <sub>1</sub>	MAK	L
9,5~10,0	16	48	1,8	KDS 095 MAK	96,8	32	37	
10,0~10,5				KDS 100 MAK				
~10,5				KDS 105 MAK				
10,6~11,0	16	48	2	KDS 106 MAK	102,0	35	40	
11,0~11,5				KDS 110 MAK				
~11,5				KDS 115 MAK				
11,6~11,7	16	48	2,2	KDS 116 MAK	107,2	38	44	
11,7~11,8				KDS 117 MAK				
11,8~11,9				KDS 118 MAK				
11,9~12,0	16	48	2,2	KDS 119 MAK	107,2	38	44	
12,0~12,1				KDS 120 MAK				
12,1~12,2				KDS 121 MAK				
12,2~12,3	16	48	2,2	KDS 122 MAK	107,2	38	44	
12,3~12,4				KDS 123 MAK				
12,4~12,5				KDS 124 MAK				
12,5~12,6	16	48	2,2	KDS 125 MAK	107,2	38	44	
12,6~12,7				KDS 126 MAK				
12,7~12,8				KDS 127 MAK				
12,8~12,9	16	48	2,2	KDS 128 MAK	107,2	38	44	
12,9~13,0				KDS 129 MAK				
13,0~13,1				KDS 130 MAK				
13,1~13,2	16	48	2,2	KDS 131 MAK	107,2	38	44	
13,2~13,3				KDS 132 MAK				
13,3~13,4				KDS 133 MAK				
13,4~13,5	16	48	2,2	KDS 134 MAK	107,2	38	44	
13,5~13,6				KDS 135 MAK				
13,6~13,7				KDS 136 MAK				
13,7~13,8	16	48	2,2	KDS 137 MAK	107,2	38	44	
13,8~13,9				KDS 138 MAK				
13,9~14,0				KDS 139 MAK				
14,0~14,1	16	48	2,5	KDS 140 MAK	117,5	44	51	
14,1~14,2				KDS 141 MAK				
14,2~14,3				KDS 142 MAK				
14,3~14,4	16	48	2,5	KDS 143 MAK	117,5	44	51	
14,4~14,5				KDS 144 MAK				
14,5~14,6				KDS 145 MAK				
14,6~14,7	16	48	2,5	KDS 146 MAK	117,5	44	51	
14,7~14,8				KDS 147 MAK				
14,8~14,9				KDS 148 MAK				
14,9~15,0	16	48	2,5	KDS 149 MAK	117,5	44	51	
15,0~15,1				KDS 150 MAK				
15,1~15,2				KDS 151 MAK				
15,2~15,3	20	50	2,7	KDS 152 MAK	127,7	47	54	
15,3~15,4				KDS 153 MAK				
15,4~15,5				KDS 154 MAK				
15,5~15,6	20	50	2,7	KDS 155 MAK	127,7	47	54	
15,6~15,7				KDS 156 MAK				
15,7~15,8				KDS 157 MAK				

### ● Diameter ø15,6~20,0mm

Dimensions (mm)			Cat. No.	Short Series (3D)				
øD (mm)	Shank			Drill Head	Stock	Dimensions (mm)		
	ød	l <sub>4</sub>				l <sub>1</sub>	MAK	L
15,6~15,7				KDS 156 MAK	132,9	50	58	
15,7~15,8				KDS 157 MAK				
15,8~15,9				KDS 158 MAK				
15,9~16,0	20	50	2,9	KDS 159 MAK	132,9	50	58	
16,0~16,1				KDS 160 MAK				
16,1~16,2				KDS 161 MAK				
16,2~16,3	20	50	2,9	KDS 162 MAK	132,9	50	58	
16,3~16,4				KDS 163 MAK				
16,4~16,5				KDS 164 MAK				
16,5~16,6	20	50	2,9	KDS 165 MAK	132,9	50	58	
16,6~16,7				KDS 166 MAK				
16,7~16,8				KDS 167 MAK				
16,8~16,9	20	50	3,1	KDS 168 MAK	138,1	53	61	
16,9~17,0				KDS 169 MAK				
17,0~17,1				KDS 170 MAK				
17,1~17,2	20	50	3,1	KDS 171 MAK	138,1	53	61	
17,2~17,3				KDS 172 MAK				
17,3~17,4				KDS 173 MAK				
17,4~17,5	20	50	3,1	KDS 174 MAK	138,1	53	61	
17,5~17,6				KDS 175 MAK				
17,6~17,7				KDS 176 MAK				
17,7~17,8	20	50	3,3	KDS 177 MAK	143,3	56	65	
17,8~17,9				KDS 178 MAK				
17,9~18,0				KDS 179 MAK				
18,0~18,1	20	50	3,3	KDS 180 MAK	143,3	56	65	
18,1~18,2				KDS 181 MAK				
18,2~18,3				KDS 182 MAK				
18,3~18,4	20	50	3,3	KDS 183 MAK	143,3	56	65	
18,4~18,5				KDS 184 MAK				
18,5~18,6				KDS 185 MAK				
18,6~18,7	25	56	3,5	KDS 186 MAK	158,5	59	68	
18,7~18,8				KDS 187 MAK				
18,8~18,9				KDS 188 MAK				
18,9~19,0	25	56	3,5	KDS 189 MAK	158,5	59	68	
19,0~19,1				KDS 190 MAK				
19,1~19,2				KDS 191 MAK				
19,2~19,3	25	56	3,5	KDS 192 MAK	158,5	59	68	
19,3~19,4				KDS 193 MAK				
19,4~19,5				KDS 194 MAK				
19,5~19,6	25	56	3,6	KDS 195 MAK	158,6	62	72	
19,6~19,7				KDS 196 MAK				
19,7~19,8				KDS 197 MAK				
19,8~19,9	25	56	3,6	KDS 198 MAK	158,6	62	72	
19,9~20,0				KDS 199 MAK				
20,0~20,1				KDS 200 MAK				

### ■ Recommended Cutting Conditions

(v<sub>c</sub> : Cutting Speed (m/min), f : Feed rate (mm/rev)) (Min - Standard - Max)

Diameter (mm)		Steels (under HB250)	Steels (HB250~320)	Hardened Steels (HRC45)	Stainless Steels (except 316 - bar)	Ductile Cast Irons	Cast Irons	Aluminium Alloys	Titanium Alloys (Ti-6Al-4V)	Inconel (Inconel 718)
~ ø15	v <sub>c</sub>	50 - 65 - 75	50 - 60 - 70	30 - 35 - 45	35 - 45 - 50	55 - 65 - 75	60 - 80 - 100	70 - 85 - 100	20 - 25 - 35	10 - 20 - 30
	f	0,15 - 0,3	0,15 - 0,3	0,1 - 0,2	0,1 - 0,2	0,15 - 0,3	0,2 - 0,3	0,25 - 0,35	0,1 - 0,15	0,08 - 0,1
~ ø20	v <sub>c</sub>	50 - 65 - 75	50 - 60 - 70	35 - 40 - 50	35 - 45 - 50	60 - 70 - 80	60 - 80 - 100	70 - 90 - 110	20 - 30 - 40	10 - 20 - 30
	f	0,15 - 0,35	0,15 - 0,35	0,15 - 0,25	0,15 - 0,25	0,15 - 0,35	0,2 - 0,35	0,25 - 0,4	0,1 - 0,15	0,08 - 0,1
~ ø30,5	v <sub>c</sub>	55 - 70 - 90	55 - 65 - 90	35 - 40 - 50	35 - 45 - 50	60 - 70 - 90	60 - 90 - 110	75 - 100 - 120	25 - 35 - 40	15 - 25 - 35
	f	0,2 - 0,4	0,2 - 0,4	0,15 - 0,25	0,15 - 0,25	0,2 - 0,4	0,25 - 0,4	0,3 - 0,4	0,1 - 0,2	0,08 - 0,12

If the drilling operation is completely satisfactory with the above condition and the rigidity of the machine is sufficient, the cutting data can be raised. For more guidance, please contact our technical representative.

# Brazed Carbide MULTI-DRILLS KDS ... MAK Type

TiAlN Coated Brazed Carbide Multi-Drills for General Steels, Cast Iron & Ductile Cast Iron



### Specification:

- Brazed carbide drill TiAlN coated (Grade: ACW30) with coolant holes
- Shank with whistle notch

### ● Diameter $\varnothing 20,1 \sim 24,5$ mm

Dimensions (mm)				Cat. No.	Short Series (3D)			
$\varnothing D$ (mm)	Shank		Drill Head $\ell_1$		Stock MAK	Dimensions (mm)		
	$\varnothing d$	$\ell_4$				L	$\ell_2$	$\ell_3$
20,1	25	56	3,6	KDS 201 MAK		158,6	62	72
20,2				KDS 202 MAK				
20,3				KDS 203 MAK				
20,4				KDS 204 MAK				
20,5				KDS 205 MAK	●			
20,6	25	56	3,8	KDS 206 MAK		158,8	65	75
20,7				KDS 207 MAK				
20,8				KDS 208 MAK				
20,9				KDS 209 MAK				
21,0				KDS 210 MAK	●			
21,1				KDS 211 MAK				
21,2				KDS 212 MAK				
21,3				KDS 213 MAK				
21,4				KDS 214 MAK				
21,5				KDS 215 MAK	●			
21,6	25	56	4,0	KDS 216 MAK		164,0	68	79
21,7				KDS 217 MAK				
21,8				KDS 218 MAK				
21,9				KDS 219 MAK				
22,0				KDS 220 MAK	●			
22,1				KDS 221 MAK				
22,2				KDS 222 MAK				
22,3				KDS 223 MAK				
22,4				KDS 224 MAK				
22,5				KDS 225 MAK	●			
22,6	25	56	4,2	KDS 226 MAK		164,2	71	82
22,7				KDS 227 MAK				
22,8				KDS 228 MAK				
22,9				KDS 229 MAK				
23,0				KDS 230 MAK	●			
23,1				KDS 231 MAK				
23,2				KDS 232 MAK				
23,3				KDS 233 MAK				
23,4				KDS 234 MAK				
23,5				KDS 235 MAK				
23,6	32	60	4,4	KDS 236 MAK		174,4	74	86
23,7				KDS 237 MAK				
23,8				KDS 238 MAK				
23,9				KDS 239 MAK				
24,0				KDS 240 MAK	●			
24,1				KDS 241 MAK				
24,2				KDS 242 MAK				
24,3				KDS 243 MAK				
24,4				KDS 244 MAK				
24,5				KDS 245 MAK	●			

### ● Diameter $\varnothing 24,6 \sim 40,5$ mm

Dimensions (mm)				Cat. No.	Short Series (3D)						
$\varnothing D$ (mm)	Shank		Drill Head $\ell_1$		Stock MAK	Dimensions (mm)					
	$\varnothing d$	$\ell_4$				L	$\ell_2$	$\ell_3$			
24,6	32	60	4,5	KDS 246 MAK		174,5	76	88			
24,7				KDS 247 MAK							
24,8				KDS 248 MAK							
24,9				KDS 249 MAK							
25,0				KDS 250 MAK	●						
25,1				KDS 251 MAK							
25,2				KDS 252 MAK							
25,3				KDS 253 MAK							
25,4				KDS 254 MAK							
25,5				KDS 255 MAK							
25,6	32	60	4,7	KDS 256 MAK		179,7	79	92			
25,7				KDS 257 MAK							
25,8				KDS 258 MAK							
25,9				KDS 259 MAK							
26,0				KDS 260 MAK	●						
26,1				KDS 261 MAK							
~26,5				~265 MAK							
26,6				KDS 266 MAK					179,9	81	94
~27,5				~275 MAK							
27,6				32	60				5,1	KDS 276 MAK	
~28,5	~285 MAK										
28,6	32	60	5,3	KDS 285 MAK		190,3	86	100			
~29,5				~295 MAK							
29,6	32	60	5,5	KDS 296 MAK		190,5	89	104			
~30,5				~305 MAK							
30,6	40	70	5,6	KDS 306 MAK		210,6	95	112			
~31,5				~315 MAK							
31,6	40	70	5,8	KDS 316 MAK		215,8	98	115			
~32,5				~325 MAK							
32,6	40	70	6,0	KDS 326 MAK		221,0	101	119			
~33,5				~335 MAK							
33,6	40	70	6,2	KDS 336 MAK		226,2	104	122			
~34,5				~345 MAK							
34,6	40	70	6,4	KDS 346 MAK		231,4	107	125			
~35,5				~355 MAK							
35,6	40	70	6,6	KDS 356 MAK		231,6	110	128			
~36,5				~365 MAK							
36,6	40	70	6,7	KDS 366 MAK		236,7	113	132			
~37,5				~375 MAK							
37,6	40	70	6,9	KDS 376 MAK		241,9	116	163			
~38,5				~385 MAK							
38,6	40	70	7,1	KDS 386 MAK		247,1	119	168			
~39,5				~395 MAK							
39,6	40	70	7,3	KDS 396 MAK		252,3	122	173			
~40,5				~405 MAK							

### ■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **KDS 102 MAK**, **ACW30** (Grade)

**KDS series:** Brazed carbide drill with coolant holes

Drill diameter  
10,2 mm

**AK:** Brazed carbide and TiAlN coated drill

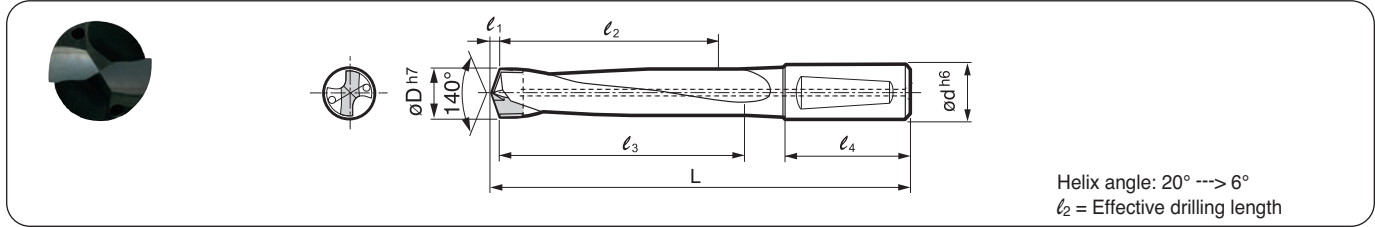
**M :** 3 x D



# Brazed Carbide MULTI-DRILLS KDS ... LAK Type

## Long Type (5 x D)

Brazed Carbide Drills with Coolant Holes



### ● Diameter ø9,5~15,5mm

Dimensions (mm)			Cat. No.	Long Series (5D)			
øD (mm)	Shank			LAK	Dimensions (mm)		
	ød	l <sub>4</sub>			L	l <sub>2</sub>	l <sub>3</sub>
9,5~10,0	16	48	1,8	KDS 095 LAK	116,8	52	57
10,0~10,5				KDS 100 LAK			
10,5~11,0				KDS 105 LAK			
10,6~11,0	16	48	2	KDS 106 LAK	127,0	57	63
11,0~11,5				KDS 110 LAK			
11,5~11,6				KDS 115 LAK			
11,6~11,7				KDS 116 LAK			
11,7~11,8				KDS 117 LAK			
11,8~11,9	16	48	2,2	KDS 118 LAK	132,2	63	69
11,9~12,0				KDS 119 LAK			
12,0~12,1				KDS 120 LAK			
12,1~12,2				KDS 121 LAK			
12,2~12,3				KDS 122 LAK			
12,3~12,4				KDS 123 LAK			
12,4~12,5				KDS 124 LAK			
12,5~12,6				KDS 125 LAK			
12,6~12,7				KDS 126 LAK			
12,7~12,8				KDS 127 LAK			
12,8~12,9	16	48	2,4	KDS 128 LAK	142,4	67	74
12,9~13,0				KDS 129 LAK			
13,0~13,1				KDS 130 LAK			
13,1~13,2				KDS 131 LAK			
13,2~13,3				KDS 132 LAK			
13,3~13,4				KDS 133 LAK			
13,4~13,5				KDS 134 LAK			
13,5~13,6				KDS 135 LAK			
13,6~13,7				KDS 136 LAK			
13,7~13,8				KDS 137 LAK			
13,8~13,9	16	48	2,5	KDS 138 LAK	147,5	73	80
13,9~14,0				KDS 139 LAK			
14,0~14,1				KDS 140 LAK			
14,1~14,2				KDS 141 LAK			
14,2~14,3				KDS 142 LAK			
14,3~14,4				KDS 143 LAK			
14,4~14,5				KDS 144 LAK			
14,5~14,6				KDS 145 LAK			
14,6~14,7				KDS 146 LAK			
14,7~14,8				KDS 147 LAK			
14,8~14,9	20	50	2,7	KDS 148 LAK	157,7	77	85
14,9~15,0				KDS 149 LAK			
15,0~15,1				KDS 150 LAK			
15,1~15,2				KDS 151 LAK			
15,2~15,3				KDS 152 LAK			
15,3~15,4				KDS 153 LAK			
15,4~15,5				KDS 154 LAK			
15,5~15,6				KDS 155 LAK			

### ● Diameter ø15,6~20,0mm

Dimensions (mm)				Cat. No.	Long Series (5D)			
øD (mm)	Shank		Drill Head		LAK	Dimensions (mm)		
	ød	l <sub>4</sub>				L	l <sub>2</sub>	l <sub>3</sub>
15,6				KDS 156 LAK	167,9	83	91	
15,7				KDS 157 LAK				
15,8				KDS 158 LAK				
15,9				KDS 159 LAK				
16,0				KDS 160 LAK				
16,1				KDS 161 LAK				
16,2				KDS 162 LAK				
16,3				KDS 163 LAK				
16,4				KDS 164 LAK				
16,5				KDS 165 LAK				
16,6	20	50	2,9	KDS 166 LAK	173,1	87	96	
16,7				KDS 167 LAK				
16,8				KDS 168 LAK				
16,9				KDS 169 LAK				
17,0				KDS 170 LAK				
17,1				KDS 171 LAK				
17,2				KDS 172 LAK				
17,3				KDS 173 LAK				
17,4				KDS 174 LAK				
17,5				KDS 175 LAK				
17,6	20	50	3,3	KDS 176 LAK	178,3	93	102	
17,7				KDS 177 LAK				
17,8				KDS 178 LAK				
17,9				KDS 179 LAK				
18,0				KDS 180 LAK				
18,1				KDS 181 LAK				
18,2				KDS 182 LAK				
18,3				KDS 183 LAK				
18,4				KDS 184 LAK				
18,5				KDS 185 LAK				
18,6	25	56	3,5	KDS 186 LAK	193,5	97	107	
18,7				KDS 187 LAK				
18,8				KDS 188 LAK				
18,9				KDS 189 LAK				
19,0				KDS 190 LAK				
19,1				KDS 191 LAK				
19,2				KDS 192 LAK				
19,3				KDS 193 LAK				
19,4				KDS 194 LAK				
19,5				KDS 195 LAK				
19,6	25	56	3,6	KDS 196 LAK	198,6	103	113	
19,7				KDS 197 LAK				
19,8				KDS 198 LAK				
19,9				KDS 199 LAK				
20,0				KDS 200 LAK				

### ■ Recommended Cutting Conditions

(v<sub>c</sub> : Cutting Speed (m/min), f : Feed rate (mm/rev)) (Min - Standard - Max)

Diameter (mm)		Steels (under HB250)	Steels (HB250~320)	Hardened Steels (HRC45)	Stainless Steels (except 316 - bar)	Ductile Cast Irons	Cast Irons	Aluminium Alloys	Titanium Alloys (Ti-6Al-4V)	Inconel (Inconel 718)
		~ ø15	v <sub>c</sub>	50 - 65 - 75	50 - 60 - 70	30 - 35 - 45	35 - 45 - 50	55 - 65 - 75	60 - 80 - 100	70 - 85 - 100
	f	0,15 - 0,3	0,15 - 0,3	0,1 - 0,2	0,1 - 0,2	0,15 - 0,3	0,2 - 0,3	0,25 - 0,35	0,1 - 0,15	0,08 - 0,1
~ ø20	v <sub>c</sub>	50 - 65 - 75	50 - 60 - 70	35 - 40 - 50	35 - 45 - 50	60 - 70 - 80	60 - 80 - 100	70 - 90 - 110	20 - 30 - 40	10 - 20 - 30
	f	0,15 - 0,35	0,15 - 0,35	0,15 - 0,25	0,15 - 0,25	0,15 - 0,35	0,2 - 0,35	0,25 - 0,4	0,1 - 0,15	0,08 - 0,1
~ ø30,5	v <sub>c</sub>	55 - 70 - 90	55 - 65 - 90	35 - 40 - 50	35 - 45 - 50	60 - 70 - 90	60 - 90 - 110	75 - 100 - 120	25 - 35 - 40	15 - 25 - 35
	f	0,2 - 0,4	0,2 - 0,4	0,15 - 0,25	0,15 - 0,25	0,2 - 0,4	0,25 - 0,4	0,3 - 0,4	0,1 - 0,2	0,08 - 0,12

If the drilling operation is completely satisfactory with the above condition and the rigidity of the machine is sufficient, the cutting data can be raised. For more guidance, please contact our technical representative.

# Brazed Carbide MULTI-DRILLS KDS ... LAK Type

TiAlN Coated Brazed Carbide Multi-Drills for General Steels, Cast Iron & Ductile Cast Iron



### Specification:

- Brazed carbide drill TiAlN coated (Grade: ACW30) with coolant holes
- Shank with whistle notch

### ● Diameter $\varnothing 20,1 \sim 24,5$ mm

Dimensions (mm)				Cat. No.	Long Series (5D)			
$\varnothing D$ (mm)	Shank		Drill Head $\ell_1$		Stock LAK	Dimensions (mm)		
	$\varnothing d$	$\ell_4$				L	$\ell_2$	$\ell_3$
20,1	25	56	3,6	KDS 201 LAK		198,6	103	113
20,2				KDS 202 LAK				
20,3				KDS 203 LAK				
20,4				KDS 204 LAK				
20,5				KDS 205 LAK	●			
20,6	25	56	3,8	KDS 206 LAK		198,8	107	118
20,7				KDS 207 LAK				
20,8				KDS 208 LAK				
20,9				KDS 209 LAK				
21,0				KDS 210 LAK	●			
21,1				KDS 211 LAK				
21,2				KDS 212 LAK				
21,3				KDS 213 LAK				
21,4				KDS 214 LAK				
21,5				KDS 215 LAK	●			
21,6	25	56	4,0	KDS 216 LAK		204,0	113	124
21,7				KDS 217 LAK				
21,8				KDS 218 LAK				
21,9				KDS 219 LAK				
22,0				KDS 220 LAK	●			
22,1				KDS 221 LAK				
22,2				KDS 222 LAK				
22,3				KDS 223 LAK				
22,4				KDS 224 LAK				
22,5				KDS 225 LAK				
22,6	25	56	4,2	KDS 226 LAK		214,2	117	129
22,7				KDS 227 LAK				
22,8				KDS 228 LAK				
22,9				KDS 229 LAK				
23,0				KDS 230 LAK	●			
23,1				KDS 231 LAK				
23,2				KDS 232 LAK				
23,3				KDS 233 LAK				
23,4				KDS 234 LAK				
23,5				KDS 235 LAK				
23,6	32	60	4,4	KDS 236 LAK		224,4	123	135
23,7				KDS 237 LAK				
23,8				KDS 238 LAK				
23,9				KDS 239 LAK				
24,0				KDS 240 LAK	●			
24,1				KDS 241 LAK				
24,2				KDS 242 LAK				
24,3				KDS 243 LAK				
24,4				KDS 244 LAK				
24,5				KDS 245 LAK				

### ● Diameter $\varnothing 24,6 \sim 40,5$ mm

Dimensions (mm)				Cat. No.	Long Series (5D)						
$\varnothing D$ (mm)	Shank		Drill Head $\ell_1$		Stock LAK	Dimensions (mm)					
	$\varnothing d$	$\ell_4$				L	$\ell_2$	$\ell_3$			
24,6	32	60	4,5	KDS 246 LAK		229,5	127	140			
24,7				KDS 247 LAK							
24,8				KDS 248 LAK							
24,9				KDS 249 LAK							
25,0				KDS 250 LAK	●						
25,1				KDS 251 LAK							
25,2				KDS 252 LAK							
25,3				KDS 253 LAK							
25,4				KDS 254 LAK							
25,5				KDS 255 LAK							
25,6	32	60	4,7	KDS 256 LAK		234,7	133	146			
25,7				KDS 257 LAK							
25,8				KDS 258 LAK							
25,9				KDS 259 LAK							
26,0				KDS 260 LAK	●						
26,1				KDS 261 LAK							
~26,5				~265 LAK							
26,6				KDS 266 LAK					239,9	137	151
~27,5				~275 LAK							
27,6				32	60				5,1	KDS 276 LAK	
~28,5	~285 LAK										
28,6	32	60	5,3	KDS 285 LAK		250,3	147	162			
~29,5				~295 LAK							
29,6	32	60	5,5	KDS 296 LAK		260,5	152	167			
~30,5				~305 LAK							
30,6	40	70	5,6	KDS 306 LAK		280,6	166	187			
~31,5				~315 LAK							
31,6	40	70	5,8	KDS 316 LAK		285,8	172	190			
~32,5				~325 LAK							
32,6	40	70	6,0	KDS 326 LAK		291,0	175	194			
~33,5				~335 LAK							
33,6	40	70	6,2	KDS 336 LAK		296,2	177	197			
~34,5				~345 LAK							
34,6	40	70	6,4	KDS 346 LAK		301,4	180	200			
~35,5				~355 LAK							
35,6	40	70	6,6	KDS 356 LAK		306,6	183	203			
~36,5				~365 LAK							
36,6	40	70	6,7	KDS 366 LAK		311,7	188	207			
~37,5				~375 LAK							
37,6	40	70	6,9	KDS 376 LAK		321,9	193	243			
~38,5				~385 LAK							
38,6	40	70	7,1	KDS 386 LAK		327,1	198	248			
~39,5				~395 LAK							
39,6	40	70	7,3	KDS 396 LAK		332,3	203	253			
~40,5				~405 LAK							

### ■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **KDS 102 LAK**, **ACW30** (Grade)

**KDS series:** Brazed carbide drill with coolant holes

Drill diameter  
10,2 mm

**AK:** Brazed carbide and TiAlN coated drill

**L :** 5 x D

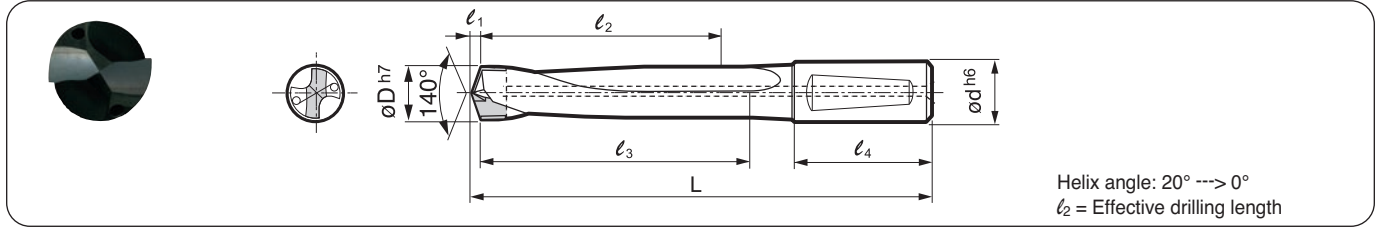




# Brazed Carbide MULTI-DRILLS KDS ... DAK Type

## Extra Long Type ( 7 x D )

Brazed Carbide Drills with Coolant Holes



### ● Diameter ø9,5~15,5mm

Dimensions (mm)			Cat. No.	Extra Long Series (7D)			
øD (mm)	Shank			Stock	Dimensions (mm)		
	ød	l <sub>4</sub>			DAK	L	l <sub>2</sub>
9,5~10,0	16	48	1,8	KDS 095 DAK	141,8	75	80
10,0~10,5				KDS 100 DAK			
10,5~11,0				KDS 105 DAK			
10,6~11,0	16	48	2	KDS 106 DAK	152,0	81	87
11,0~11,5				KDS 110 DAK			
11,5~11,6				KDS 115 DAK			
11,6~11,7	16	48	2,2	KDS 116 DAK	162,2	91	97
11,7~11,8				KDS 117 DAK			
11,8~11,9				KDS 118 DAK			
11,9~12,0	16	48	2,2	KDS 119 DAK	162,2	91	97
12,0~12,1				KDS 120 DAK			
12,1~12,2				KDS 121 DAK			
12,2~12,3	16	48	2,4	KDS 122 DAK	177,4	99	106
12,3~12,4				KDS 123 DAK			
12,4~12,5				KDS 124 DAK			
12,5~12,6	16	48	2,4	KDS 125 DAK	177,4	99	106
12,6~12,7				KDS 126 DAK			
12,7~12,8				KDS 127 DAK			
12,8~12,9	16	48	2,5	KDS 128 DAK	182,5	106	113
12,9~13,0				KDS 129 DAK			
13,0~13,1				KDS 130 DAK			
13,1~13,2	16	48	2,5	KDS 131 DAK	182,5	106	113
13,2~13,3				KDS 132 DAK			
13,3~13,4				KDS 133 DAK			
13,4~13,5	16	48	2,7	KDS 134 DAK	197,7	114	122
13,5~13,6				KDS 135 DAK			
13,6~13,7				KDS 136 DAK			
13,7~13,8	16	48	2,7	KDS 137 DAK	197,7	114	122
13,8~13,9				KDS 138 DAK			
13,9~14,0				KDS 139 DAK			
14,0~14,1	16	48	2,7	KDS 140 DAK	197,7	114	122
14,1~14,2				KDS 141 DAK			
14,2~14,3				KDS 142 DAK			
14,3~14,4	16	48	2,7	KDS 143 DAK	197,7	114	122
14,4~14,5				KDS 144 DAK			
14,5~14,6				KDS 145 DAK			
14,6~14,7	20	50	2,7	KDS 146 DAK	197,7	114	122
14,7~14,8				KDS 147 DAK			
14,8~14,9				KDS 148 DAK			
14,9~15,0	20	50	2,7	KDS 149 DAK	197,7	114	122
15,0~15,1				KDS 150 DAK			
15,1~15,2				KDS 151 DAK			
15,2~15,3	20	50	2,7	KDS 152 DAK	197,7	114	122
15,3~15,4				KDS 153 DAK			
15,4~15,5				KDS 154 DAK			
15,5~15,6	20	50	2,9	KDS 155 DAK	207,9	121	129
15,6~15,7				KDS 156 DAK			
15,7~15,8				KDS 157 DAK			
15,8~15,9	20	50	2,9	KDS 158 DAK	207,9	121	129
15,9~16,0				KDS 159 DAK			
16,0~16,1				KDS 160 DAK			
16,1~16,2	20	50	3,1	KDS 161 DAK	218,1	129	138
16,2~16,3				KDS 162 DAK			
16,3~16,4				KDS 163 DAK			
16,4~16,5	20	50	3,1	KDS 164 DAK	218,1	129	138
16,5~16,6				KDS 165 DAK			
16,6~16,7				KDS 166 DAK			
16,7~16,8	20	50	3,3	KDS 167 DAK	223,3	136	145
16,8~16,9				KDS 168 DAK			
16,9~17,0				KDS 169 DAK			
17,0~17,1	20	50	3,3	KDS 170 DAK	223,3	136	145
17,1~17,2				KDS 171 DAK			
17,2~17,3				KDS 172 DAK			
17,3~17,4	20	50	3,3	KDS 173 DAK	223,3	136	145
17,4~17,5				KDS 174 DAK			
17,5~17,6				KDS 175 DAK			
17,6~17,7	20	50	3,5	KDS 176 DAK	243,5	144	154
17,7~17,8				KDS 177 DAK			
17,8~17,9				KDS 178 DAK			
17,9~18,0	20	50	3,5	KDS 179 DAK	243,5	144	154
18,0~18,1				KDS 180 DAK			
18,1~18,2				KDS 181 DAK			
18,2~18,3	25	56	3,5	KDS 182 DAK	248,6	151	161
18,3~18,4				KDS 183 DAK			
18,4~18,5				KDS 184 DAK			
18,5~18,6	25	56	3,6	KDS 185 DAK	248,6	151	161
18,6~18,7				KDS 186 DAK			
18,7~18,8				KDS 187 DAK			
18,8~18,9	25	56	3,6	KDS 188 DAK	248,6	151	161
18,9~19,0				KDS 189 DAK			
19,0~19,1				KDS 190 DAK			
19,1~19,2	25	56	3,6	KDS 191 DAK	248,6	151	161
19,2~19,3				KDS 192 DAK			
19,3~19,4				KDS 193 DAK			
19,4~19,5	25	56	3,6	KDS 194 DAK	248,6	151	161
19,5~19,6				KDS 195 DAK			
19,6~19,7				KDS 196 DAK			
19,7~19,8	25	56	3,6	KDS 197 DAK	248,6	151	161
19,8~19,9				KDS 198 DAK			
19,9~20,0				KDS 199 DAK			
20,0~20,1	25	56	3,6	KDS 200 DAK	248,6	151	161
20,1~20,2							
20,2~20,3							

### ● Diameter ø15,6~20,0mm

Dimensions (mm)			Cat. No.	Extra Long Series (7D)			
øD (mm)	Shank			Stock	Dimensions (mm)		
	ød	l <sub>4</sub>			DAK	L	l <sub>2</sub>
15,6~15,7	20	50	2,9	KDS 156 DAK	207,9	121	129
15,7~15,8				KDS 157 DAK			
15,8~15,9				KDS 158 DAK			
15,9~16,0	20	50	2,9	KDS 159 DAK	207,9	121	129
16,0~16,1				KDS 160 DAK			
16,1~16,2				KDS 161 DAK			
16,2~16,3	20	50	3,1	KDS 162 DAK	218,1	129	138
16,3~16,4				KDS 163 DAK			
16,4~16,5				KDS 164 DAK			
16,5~16,6	20	50	3,1	KDS 165 DAK	218,1	129	138
16,6~16,7				KDS 166 DAK			
16,7~16,8				KDS 167 DAK			
16,8~16,9	20	50	3,1	KDS 168 DAK	218,1	129	138
16,9~17,0				KDS 169 DAK			
17,0~17,1				KDS 170 DAK			
17,1~17,2	20	50	3,3	KDS 171 DAK	223,3	136	145
17,2~17,3				KDS 172 DAK			
17,3~17,4				KDS 173 DAK			
17,4~17,5	20	50	3,3	KDS 174 DAK	223,3	136	145
17,5~17,6				KDS 175 DAK			
17,6~17,7				KDS 176 DAK			
17,7~17,8	20	50	3,3	KDS 177 DAK	223,3	136	145
17,8~17,9				KDS 178 DAK			
17,9~18,0				KDS 179 DAK			
18,0~18,1	20	50	3,3	KDS 180 DAK	223,3	136	145
18,1~18,2				KDS 181 DAK			
18,2~18,3				KDS 182 DAK			
18,3~18,4	20	50	3,5	KDS 183 DAK	243,5	144	154
18,4~18,5				KDS 184 DAK			
18,5~18,6				KDS 185 DAK			
18,6~18,7	25	56	3,5	KDS 186 DAK	243,5	144	154
18,7~18,8				KDS 187 DAK			
18,8~18,9				KDS 188 DAK			
18,9~19,0	25	56	3,5	KDS 189 DAK	243,5	144	154
19,0~19,1				KDS 190 DAK			
19,1~19,2				KDS 191 DAK			
19,2~19,3	25	56	3,6	KDS 192 DAK	248,6	151	161
19,3~19,4				KDS 193 DAK			
19,4~19,5				KDS 194 DAK			
19,5~19,6	25	56	3,6	KDS 195 DAK	248,6	151	161
19,6~19,7				KDS 196 DAK			
19,7~19,8				KDS 197 DAK			
19,8~19,9	25	56	3,6	KDS 198 DAK	248,6	151	161
19,9~20,0				KDS 199 DAK			
20,0~20,1				KDS 200 DAK			

### ■ Recommended Cutting Conditions

(v<sub>c</sub> : Cutting Speed (m/min), f : Feed rate (mm/rev)) (Min - Standard - Max)

Diameter (mm)		Steels (under HB250)	Steels (HB250~320)	Die Steels (about HB250)	Ductile Cast Irons	Remarks
~ ø15	v <sub>c</sub>	40 - 65 - 90	40 - 60 - 90	40 - 50 - 70	50 - 70 - 100	To avoid the drill bending, which can cause breakage, please pre-drill or reduce the cutting conditions at the entrance of hole:  RPM: 100~300 f: 0,05~0,08 mm/rev.
	f	0,15 - 0,2 - 0,3	0,1 - 0,2 - 0,25	0,1 - 0,2 - 0,25	0,2 - 0,3 - 0,35	
~ ø20	v <sub>c</sub>	40 - 65 - 90	40 - 60 - 90	40 - 50 - 70	50 - 70 - 100	
	f	0,2 - 0,3 - 0,4	0,15 - 0,25 - 0,35	0,15 - 0,25 - 0,3	0,2 - 0,35 - 0,4	
~ ø40,5	v <sub>c</sub>	40 - 70 - 90	40 - 65 - 90	40 - 55 - 70	50 - 70 - 100	
	f	0,2 - 0,35 - 0,45	0,2 - 0,3 - 0,4	0,2 - 0,3 - 0,35	0,25 - 0,4 - 0,5	



# Brazed Carbide MULTI-DRILLS KDS ... DAK Type

TiAlN Coated Brazed Carbide Multi-Drills for General Steels & Ductile Cast Iron



### Specification:

- Brazed carbide drill TiAlN coated (Grade: ACW30) with coolant holes
- Shank with whistle notch

### ● Diameter $\varnothing 20,1 \sim 24,5$ mm

Dimensions (mm)				Cat. No.	Extra Long Series (7D)			
$\varnothing D$ (mm)	Shank		Drill Head $\ell_1$		Stock DAK	Dimensions (mm)		
	$\varnothing d$	$\ell_4$				L	$\ell_2$	$\ell_3$
20,1	25	56	3,6	KDS 201 DAK		248,6	151	161
20,2				KDS 202 DAK				
20,3				KDS 203 DAK				
20,4				KDS 204 DAK				
20,5				KDS 205 DAK				
20,6	25	56	3,8	KDS 206 DAK		248,8	155	166
20,7				KDS 207 DAK				
20,8				KDS 208 DAK				
20,9				KDS 209 DAK				
21,0				KDS 210 DAK	●			
21,1				KDS 211 DAK				
21,2				KDS 212 DAK				
21,3				KDS 213 DAK				
21,4				KDS 214 DAK				
21,5				KDS 215 DAK				
21,6	25	56	4,0	KDS 216 DAK		259,0	166	177
21,7				KDS 217 DAK				
21,8				KDS 218 DAK				
21,9				KDS 219 DAK				
22,0				KDS 220 DAK	●			
22,1				KDS 221 DAK				
22,2				KDS 222 DAK				
22,3				KDS 223 DAK				
22,4				KDS 224 DAK				
22,5				KDS 225 DAK				
22,6	25	56	4,2	KDS 226 DAK		274,2	174	186
22,7				KDS 227 DAK				
22,8				KDS 228 DAK				
22,9				KDS 229 DAK				
23,0				KDS 230 DAK				
23,1				KDS 231 DAK				
23,2				KDS 232 DAK				
23,3				KDS 233 DAK				
23,4				KDS 234 DAK				
23,5				KDS 235 DAK				
23,6	32	60	4,4	KDS 236 DAK		284,4	178	190
23,7				KDS 237 DAK				
23,8				KDS 238 DAK				
23,9				KDS 239 DAK				
24,0				KDS 240 DAK				
24,1				KDS 241 DAK				
24,2				KDS 242 DAK				
24,3				KDS 243 DAK				
24,4				KDS 244 DAK				
24,5				KDS 245 DAK	●			

### ● Diameter $\varnothing 24,6 \sim 40,5$ mm

Dimensions (mm)				Cat. No.	Extra Long Series (7D)						
$\varnothing D$ (mm)	Shank		Drill Head $\ell_1$		Stock DAK	Dimensions (mm)					
	$\varnothing d$	$\ell_4$				L	$\ell_2$	$\ell_3$			
24,6	32	60	4,5	KDS 246 DAK		294,5	187	200			
24,7				KDS 247 DAK							
24,8				KDS 248 DAK							
24,9				KDS 249 DAK							
25,0				KDS 250 DAK							
25,1				KDS 251 DAK							
25,2				KDS 252 DAK							
25,3				KDS 253 DAK							
25,4				KDS 254 DAK							
25,5				KDS 255 DAK							
25,6	32	60	4,7	KDS 256 DAK		304,7	197	210			
25,7				KDS 257 DAK							
25,8				KDS 258 DAK							
25,9				KDS 259 DAK							
26,0				KDS 260 DAK							
26,1				KDS 261 DAK							
~26,5				KDS 262 DAK							
26,6				KDS 266 DAK					309,9	201	215
~27,5				~275 DAK							
27,6				32	60				5,1	KDS 276 DAK	
~28,5	~285 DAK										
28,6	32	60	5,3	KDS 285 DAK		325,3	215	230			
~29,5				~295 DAK							
29,6	32	60	5,5	KDS 296 DAK		335,5	225	240			
~30,5				~305 DAK							
30,6	40	70	5,6	KDS 306 DAK		350,6	229	245			
~31,5				~315 DAK							
31,6	40	70	5,8	KDS 316 DAK		360,8	234	250			
~32,5				~325 DAK							
32,6	40	70	6,0	KDS 326 DAK		371,0	243	260			
~33,5				~335 DAK							
33,6	40	70	6,2	KDS 336 DAK		381,2	253	270			
~34,5				~345 DAK							
34,6	40	70	6,4	KDS 346 DAK		391,4	257	275			
~35,5				~355 DAK							
35,6	40	70	6,6	KDS 356 DAK		396,6	262	280			
~36,5				~365 DAK							
36,6	40	70	6,7	KDS 366 DAK		406,7	271	290			
~37,5				~375 DAK							
37,6	40	70	6,9	KDS 376 DAK		416,9	292	338			
~38,5				~385 DAK							
38,6	40	70	7,1	KDS 386 DAK		422,1	296	343			
~39,5				~395 DAK							
39,6	40	70	7,3	KDS 396 DAK		427,3	300	348			
~40,5				~405 DAK							

### ■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No.  
For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **KDS 102 DAK**, **ACW30** (Grade)

**KDS series:** Brazed carbide drill with coolant holes

**AK:** Brazed carbide and TiAlN coated drill

Drill diameter  
**10,2 mm**

**D** : 7 x D

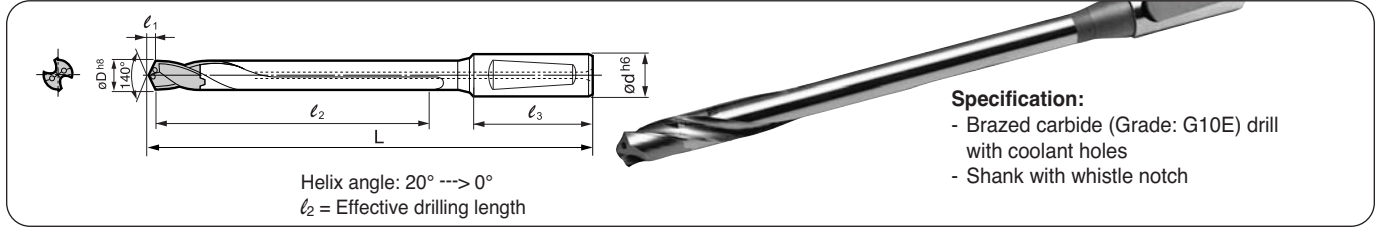


# Brazed Carbide MULTI-DRILLS KDS ... FA Type

( Available on Request )

## Extra Long Type (10 x D)

Brazed Carbide Drills with Coolant Holes



### Specification:

- Brazed carbide (Grade: G10E) drill with coolant holes
- Shank with whistle notch

### ● Diameter $\phi 8.0 \sim 15.0 \text{ mm}$

Dimensions (mm)			Cat. No.	Extra Long Series (10D)			
$\phi D$ (mm)	Shank			Drill Head	Stock	Dimensions (mm)	
	$\phi d$	$\ell_4$				FA10	L
8,0	16	48	1,5	KDS 080 FA10		156,5	93
~8,5				~085 FA10			
8,6	16	48	1,6	KDS 086 FA10		171,6	104
~9,5				~095 FA10			
9,6	16	48	1,8	KDS 096 FA10		181,8	115
~10,5				~105 FA10			
10,6	16	48	2,0	KDS 106 FA10		197,0	126
~11,5				~115 FA10			
11,6	16	48	2,2	KDS 116 FA10		207,2	137
~12,5				~125 FA10			
12,6	16	48	2,4	KDS 126 FA10		222,4	148
~13,5				~135 FA10			
13,6	16	48	2,5	KDS 136 FA10		232,5	159
~14,5				~145 FA10			
14,6	20	50	2,7	KDS 146 FA10		247,7	170
~15,5				~155 FA10			
15,6	20	50	2,9	KDS 156 FA10		262,9	181
~16,5				~165 FA10			
16,6	20	50	3,1	KDS 166 FA10		273,1	192
~17,5				~175 FA10			
17,6	20	50	3,3	KDS 176 FA10		288,3	203
~18,5				~185 FA10			
18,6	25	56	3,5	KDS 186 FA10		303,5	214
~19,5				~195 FA10			

### ● Diameter $\phi 15.1 \sim 19.5 \text{ mm}$

Dimensions (mm)			Cat. No.	Extra Long Series (10D)			
$\phi D$ (mm)	Shank			Drill Head	Stock	Dimensions (mm)	
	$\phi d$	$\ell_4$				FA10	L
19,6	25	56	3,6	KDS 196 FA10		318,6	225
~20,5				~205 FA10			
20,6	25	56	3,8	KDS 206 FA10		328,8	236
~21,5				~215 FA10			
21,6	25	56	4,0	KDS 216 FA10		344,0	247
~22,5				~225 FA10			
22,6	25	56	4,2	KDS 226 FA10		354,2	258
~23,5				~235 FA10			
23,6	32	60	4,4	KDS 236 FA10		374,4	269
~24,5				~245 FA10			
24,6	32	60	4,5	KDS 246 FA10		384,5	280
~25,5				~255 FA10			
25,6	32	60	4,7	KDS 256 FA10		399,7	291
~26,5				~265 FA10			
26,6	32	60	4,9	KDS 266 FA10		409,9	302
~27,5				~275 FA10			
27,6	32	60	5,1	KDS 276 FA10		425,1	313
~28,5				~285 FA10			
28,6	32	60	5,3	KDS 286 FA10		435,3	324
~29,5				~295 FA10			
29,6	32	60	5,5	KDS 296 FA10		450,5	335
~30,5				~305 FA10			

## Brazed Carbide Multi-Drills for Cast Irons and Aluminium Alloys

### ■ How to Order

Non-Stock Items will be required minimum order quantity for 6 pcs. Please specify the Cat. No. For example, if the diameter of the drill is 10,2 mm, please indicate as follow.

E.g., **KDS 102 FA 10** , **G10E** (Grade)

**KDS series:** Brazed carbide drill with coolant holes

Drill diameter  
**10,2 mm**

**10:** Effective drilling length

**FA:** Extra long type brazed carbide drill with special flutes (Helix angle:  $25^\circ \Rightarrow 0^\circ$ )



### ■ Recommended Cutting Conditions

(  $v_c$  : Cutting Speed (m/min),  $f$  : Feed rate (mm/rev) ) (Min - Standard - Max)

Diameter (mm)		Cast Irons	Aluminium Alloys	Remarks
~ $\phi 12$	$v_c$	30 - 55 - 60	50 - 70 - 90	To avoid the drill bending, which can cause breakage, please pre-drill or reduce the cutting conditions at the entrance of hole; RPM: 100 ~ 300, $f$ : 0,05 ~ 0,08 mm/rev. Higher feed rates and deep holes require high coolant pressure. Cutting fluid : Water soluble oil Cutting fluid pressure : 4 ~ 10 bar
	$f$	0,1 - 0,2 - 0,25	0,1 - 0,2 - 0,3	
~ $\phi 20$	$v_c$	40 - 60 - 70	60 - 70 - 100	
	$f$	0,2 - 0,3 - 0,4	0,3 - 0,35 - 0,5	
~ $\phi 30$	$v_c$	40 - 60 - 70	70 - 100 - 150	
	$f$	0,3 - 0,4 - 0,5	0,3 - 0,4 - 0,5	

# Replaceable Head Type MULTI-DRILLS SMD Type

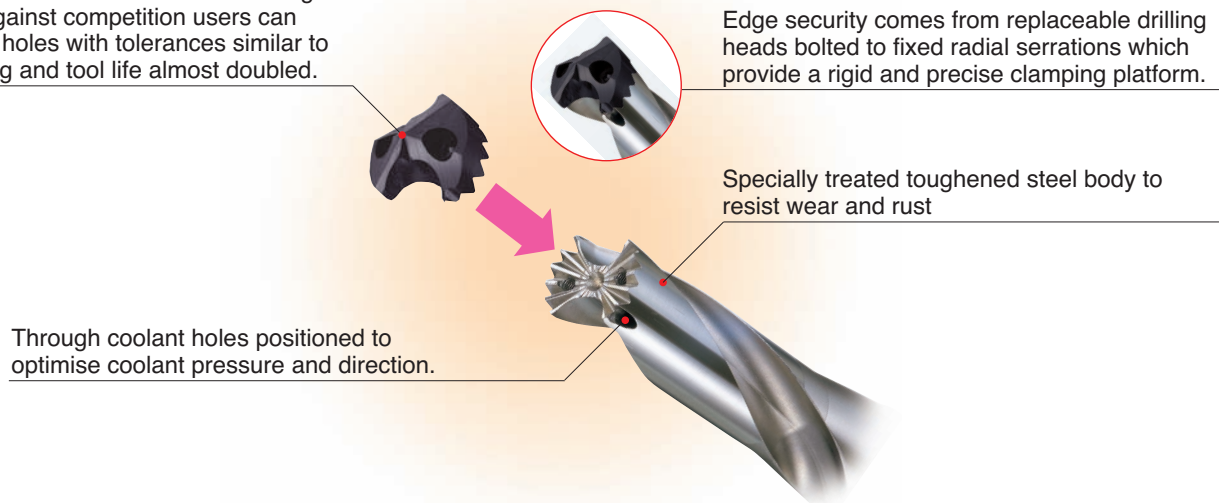
## General Features

Fast accurate and ideal for drilling steels, this newly developed drill from SUMITOMO gives similar hole accuracy to that of regrindable drills renowned within the industry as being the ultimate hole making tool.

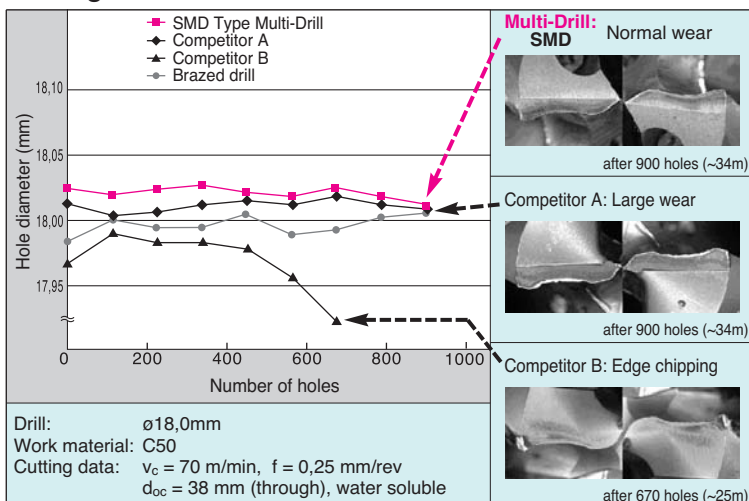


- ## Advantages
- Available in diameters ranging from 12,0~30,5mm
  - Drilling Depths to 8 x Diameter
  - Optimised heat dissipation via precisely located coolant holes
  - Maximised rigidity from newly developed clamping system
  - High performance drilling of precision holes from solid
  - 2 different type of head for general and smooth cutting

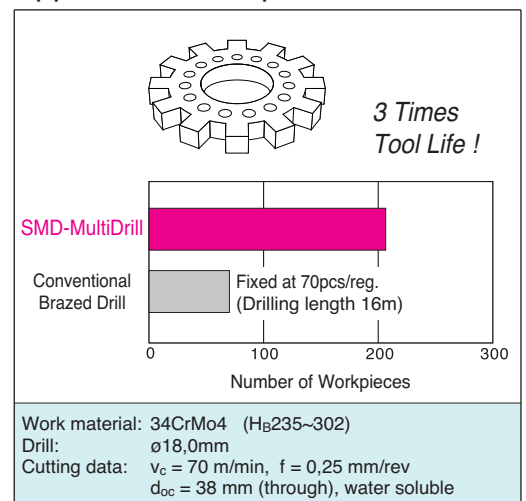
The newly developed tungsten carbide substrate with its ultra hard smooth coating proved that against competition users can expect to see holes with tolerances similar to that of reaming and tool life almost doubled.



## Drilling Precision

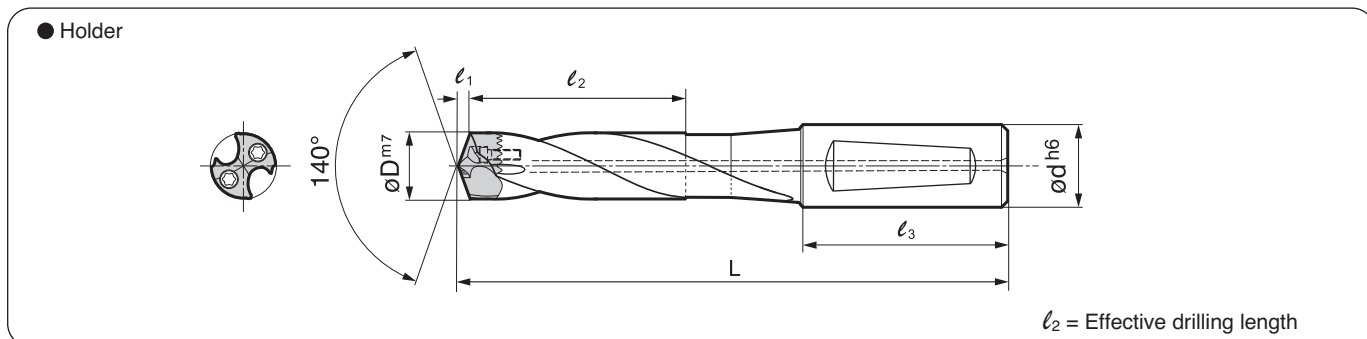


## Application Example



# Replaceable Head Type Drill Holder

## SMDH Type



### Holder

(mm)

Dimensions (mm)				Cat. No.	Short Series (3D)			Long Series (5D)			Deep Hole Series (8D)			Applicable Drill Head
Drill Head		Shank			Stock	Dimensions		Stock	Dimensions		Stock	Dimensions		
$\phi D$	$l_1$	$\phi d$	$l_3$		M3	L	$l_2$	M5	L	$l_2$	M8	L	$l_2$	
12,0	2,2	16	48	SMDH 120 □□	●	107,2	38,0	●	132,2	63,0	—	—	—	SMDT 1200~1249 D MOL
12,5	2,3			SMDH 125 □□	●	107,3	37,8	●	132,3	62,8	—	—	—	SMDT 1250~1299 D MOL
13,0	2,4			SMDH 130 □□	●	112,4	40,5	●	142,4	67,5	—	—	—	SMDT 1300~1349 D MOL
14,0	2,5			SMDH 140 □□	●	119,0	45,5	●	149,0	74,5	●	194,0	117,5	SMDT 1350~1450 D MOL
15,0	2,7	20	50	SMDH 150 □□	●	129,2	48,0	●	159,2	79,0	●	204,2	126,0	SMDT 1451~1550 D MOL
16,0	2,9			SMDH 160 □□	●	134,4	51,5	●	169,4	84,5	●	214,4	133,5	SMDT 1551~1650 D MOL
17,0	3,1			SMDH 170 □□	●	139,6	54,0	●	174,6	89,0	●	224,6	142,0	SMDT 1651~1750 D MOL
18,0	3,3			SMDH 180 □□	●	144,8	57,5	●	179,8	94,5	●	229,8	149,5	SMDT 1751~1850 D MOL
19,0	3,5	25	56	SMDH 190 □□	●	160,1	60,0	●	195,0	99,0	●	255,0	158,0	SMDT 1851~1950 D MOL
20,0	3,6			SMDH 200 □□	●	160,1	63,5	●	200,1	104,5	●	265,1	165,5	SMDT 1951~2050 D MOL
21,0	3,8			SMDH 210 □□	●	160,3	66,0	●	200,3	109,0	●	270,3	174,0	SMDT 2051~2150 D MOL
22,0	4,0			SMDH 220 □□	●	165,1	69,1	●	205,1	114,1	●	275,1	181,1	SMDT 2151~2280 D MOL
23,0	4,2	32	60	SMDH 230 □□	●	164,8	71,0	●	214,8	118,1	●	284,8	189,1	SMDT 2281~2380 D MOL
24,0	4,4			SMDH 240 □□	●	174,6	74,2	●	224,6	123,2	●	299,6	196,2	SMDT 2381~2480 D MOL
25,0	4,6			SMDH 250 □□	●	174,6	75,5	●	229,6	127,5	●	304,6	204,5	SMDT 2481~2580 D MOL
26,0	4,7			SMDH 260 □□	○	179,7	79,0	○	234,7	133,0	○	314,7	212,0	SMDT 2581~2680 D MOL
27,0	4,9	32	60	SMDH 270 □□	○	179,9	80,5	○	239,9	137,5	○	324,9	220,5	SMDT 2681~2780 D MOL
28,0	5,1			SMDH 280 □□	○	185,1	83,0	○	245,1	143,0	○	330,1	228,0	SMDT 2781~2880 D MOL
29,0	5,3			SMDH 290 □□	○	190,3	85,5	○	250,3	147,5	○	340,3	236,5	SMDT 2881~2980 D MOL
30,0	5,5			SMDH 300 □□	○	190,5	89,0	○	260,5	152,0	○	350,5	244,0	SMDT 2981~3080 D MOL

● = Euro stock  
○ = Delivery on request

### Recommended Torque

Screw		Applicable Insert
	Torque (N·m)	
BXD 02208 IP	0,8 ~ 1,0	SMDT 1200 ~ 1550 M□L
BXD 02509 IP	0,9 ~ 1,2	SMDT 1551 ~ 1850 M□L
BXD 03011 IP	1,8 ~ 2,4	SMDT 1851 ~ 2150 M□L
BXD 03512 IP	2,8 ~ 3,7	SMDT 2151 ~ 2480 M□L
BXD 04014 IP	4,1 ~ 5,5	SMDT 2481 ~ 2780 M□L
BXD 04515 IP	5,0 ~ 6,6	SMDT 2781 ~ 3050 M□L

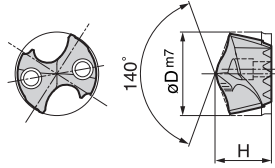
### Spare Parts

Screw	Wrench	Applicable Holder
BXD 02208 IP	TRDR 08 IP	SMDH 120 ~ 150 M□
BXD 02509 IP	TRDR 10 IP	SMDH 160 ~ 180 M□
BXD 03011 IP	TRDR 15 IP	SMDH 190 ~ 210 M□
BXD 03512 IP	TRDR 15 IP	SMDH 220 ~ 240 M□
BXD 04014 IP	TRDR 20 IP	SMDH 250 ~ 270 M□
BXD 04515 IP	TRDR 25 IP	SMDH 280 ~ 300 M□





PVD coated grade: **ACX70**



### ■ Drill Head (Insert)

#### ● øD: 12,0~15,3mm

øD (mm)	Cat. No.	Stock	H (mm)
12,0	SMDT 1200 D MTL	●	9,1
12,1	SMDT 1210 D MTL	●	9,1
12,2	SMDT 1220 D MTL	●	9,1
12,3	SMDT 1230 D MTL	●	9,1
12,4	SMDT 1240 D MTL	●	9,1
12,5	SMDT 1250 D MTL	●	9,4
12,6	SMDT 1260 D MTL	●	9,4
12,7	SMDT 1270 D MTL	●	9,4
12,8	SMDT 1280 D MTL	●	9,4
12,9	SMDT 1290 D MTL	●	9,4
13,0	SMDT 1300 D MTL	●	9,7
13,1	SMDT 1310 D MTL	●	9,7
13,2	SMDT 1320 D MTL	●	9,7
13,3	SMDT 1330 D MTL	●	9,7
13,4	SMDT 1340 D MTL	●	9,7
13,5	SMDT 1350 D MTL	●	10,3
13,6	SMDT 1360 D MTL	●	10,3
13,7	SMDT 1370 D MTL	●	10,3
13,8	SMDT 1380 D MTL	●	10,3
13,9	SMDT 1390 D MTL	●	10,3
14,0	SMDT 1400 D MTL	●	10,3
14,1	SMDT 1410 D MTL	●	10,3
14,2	SMDT 1420 D MTL	●	10,3
14,3	SMDT 1430 D MTL	●	10,3
14,4	SMDT 1440 D MTL	●	10,3
14,5	SMDT 1450 D MTL	●	10,3
14,6	SMDT 1460 D MTL	●	10,3
14,7	SMDT 1470 D MTL	●	10,3
14,8	SMDT 1480 D MTL	●	10,3
14,9	SMDT 1490 D MTL	●	10,3
15,0	SMDT 1500 D MTL	●	11,0
15,1	SMDT 1510 D MTL	●	11,0
15,2	SMDT 1520 D MTL	●	11,0
15,3	SMDT 1530 D MTL	●	11,0

#### ● øD: 15,4~18,7mm

øD (mm)	Cat. No.	Stock	H (mm)
15,4	SMDT 1540 D MTL	●	11,0
15,5	SMDT 1550 D MTL	●	11,0
15,6	SMDT 1560 D MTL	●	11,0
15,7	SMDT 1570 D MTL	●	11,0
15,8	SMDT 1580 D MTL	●	11,0
15,9	SMDT 1590 D MTL	●	11,0
16,0	SMDT 1600 D MTL	●	11,6
16,1	SMDT 1610 D MTL	●	11,6
16,2	SMDT 1620 D MTL	●	11,6
16,3	SMDT 1630 D MTL	●	11,6
16,4	SMDT 1640 D MTL	●	11,6
16,5	SMDT 1650 D MTL	●	11,6
16,6	SMDT 1660 D MTL	●	11,6
16,7	SMDT 1670 D MTL	●	11,6
16,8	SMDT 1680 D MTL	●	11,6
16,9	SMDT 1690 D MTL	●	11,6
17,0	SMDT 1700 D MTL	●	12,2
17,1	SMDT 1710 D MTL	●	12,2
17,2	SMDT 1720 D MTL	●	12,2
17,3	SMDT 1730 D MTL	●	12,2
17,4	SMDT 1740 D MTL	●	12,2
17,5	SMDT 1750 D MTL	●	12,2
17,6	SMDT 1760 D MTL	●	12,2
17,7	SMDT 1770 D MTL	●	12,2
17,8	SMDT 1780 D MTL	●	12,2
17,9	SMDT 1790 D MTL	●	12,2
18,0	SMDT 1800 D MTL	●	12,9
18,1	SMDT 1810 D MTL	●	12,9
18,2	SMDT 1820 D MTL	●	12,9
18,3	SMDT 1830 D MTL	●	12,9
18,4	SMDT 1840 D MTL	●	12,9
18,5	SMDT 1850 D MTL	●	12,9
18,6	SMDT 1860 D MTL	●	12,9
18,7	SMDT 1870 D MTL	●	12,9

#### ● øD: 18,8~30,5mm

øD (mm)	Cat. No.	Stock	H (mm)
18,8	SMDT 1880 D MTL	●	12,9
18,9	SMDT 1890 D MTL	●	12,9
19,0	SMDT 1900 D MTL	●	13,5
19,1	SMDT 1910 D MTL	●	13,5
19,2	SMDT 1920 D MTL	●	13,5
19,3	SMDT 1930 D MTL	●	13,5
19,4	SMDT 1940 D MTL	●	13,5
19,5	SMDT 1950 D MTL	●	13,5
19,6	SMDT 1960 D MTL	●	13,5
19,7	SMDT 1970 D MTL	●	13,5
19,8	SMDT 1980 D MTL	●	13,5
19,9	SMDT 1990 D MTL	●	13,5
20,0	SMDT 2000 D MTL	●	14,1
20,5	SMDT 2050 D MTL	●	14,1
21,0	SMDT 2100 D MTL	●	14,8
21,5	SMDT 2150 D MTL	●	14,8
22,0	SMDT 2200 D MTL	●	15,0
22,5	SMDT 2250 D MTL	●	15,0
23,0	SMDT 2300 D MTL	●	15,1
23,5	SMDT 2350 D MTL	●	15,1
24,0	SMDT 2400 D MTL	●	15,4
24,5	SMDT 2450 D MTL	●	15,4
25,0	SMDT 2500 D MTL	●	15,8
25,5	SMDT 2550 D MTL	○	15,8
26,0	SMDT 2600 D MTL	○	16,4
26,5	SMDT 2650 D MTL	○	16,4
27,0	SMDT 2700 D MTL	○	17,1
27,5	SMDT 2750 D MTL	○	17,1
28,0	SMDT 2800 D MTL	○	17,7
28,5	SMDT 2850 D MTL	○	17,7
29,0	SMDT 2900 D MTL	○	18,3
29,5	SMDT 2950 D MTL	○	18,3
30,0	SMDT 3000 D MTL	○	19,0
30,5	SMDT 3050 D MTL	○	19,0

● = Euro stock  
○ = Delivery on request

### ■ Recommended Cutting Conditions

#### ● SMDT\_ \_ \_ D MTL Type Insert

Note ( ) : is the cutting conditions for using 8xD type drills.  
Hogh cutting performance is enhanced when using a high quality machine and rigid set up.

Drill Ø (mm)	Work material			
	General steel (HB250~320)	Harden steel (HRC45)	Nodular cast iron	
~ 16,0	<b>v<sub>c</sub></b>	80 ~ 110 (50 ~ 80)	50 ~ 80 (40 ~ 60)	70 ~ 100 (40 ~ 70)
	<b>f</b>	0,15 ~ 0,3	0,1 ~ 0,2	0,15 ~ 0,3
~ 20,0	<b>v<sub>c</sub></b>	80 ~ 110 (50 ~ 80)	60 ~ 90 (50 ~ 80)	70 ~ 100 (50 ~ 80)
	<b>f</b>	0,15 ~ 0,35	0,15 ~ 0,25	0,15 ~ 0,35
~ 30,5	<b>v<sub>c</sub></b>	80 ~ 130 (60 ~ 90)	60 ~ 90 (50 ~ 70)	80 ~ 110 (60 ~ 90)
	<b>f</b>	0,2 ~ 0,35	0,15 ~ 0,25	0,2 ~ 0,4

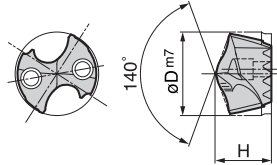
[ v<sub>c</sub> : Cutting Speed (m/min), f : Feed rate (mm/rev), Min ~ Max ]

# Regrindable Drill Head Insert SMDT... D MEL Type

MEL Type for Smooth Cutting

(Soft Steel, Stainless Steel, Grey Cast Iron)

PVD coated grade: **ACX80**



## ■ Drill Head (Insert)

● øD: 12,0~15,3mm

øD (mm)	Cat. No.	Stock	H (mm)
12,0	SMDT 1200 D MEL	●	9,1
12,1	SMDT 1210 D MEL	●	9,1
12,2	SMDT 1220 D MEL	●	9,1
12,3	SMDT 1230 D MEL	●	9,1
12,4	SMDT 1240 D MEL	●	9,1
12,5	SMDT 1250 D MEL	●	9,4
12,6	SMDT 1260 D MEL	●	9,4
12,7	SMDT 1270 D MEL	●	9,4
12,8	SMDT 1280 D MEL	●	9,4
12,9	SMDT 1290 D MEL	●	9,4
13,0	SMDT 1300 D MEL	●	9,7
13,1	SMDT 1310 D MEL	●	9,7
13,2	SMDT 1320 D MEL	●	9,7
13,3	SMDT 1330 D MEL	●	9,7
13,4	SMDT 1340 D MEL	●	9,7
13,5	SMDT 1350 D MEL	●	10,3
13,6	SMDT 1360 D MEL	●	10,3
13,7	SMDT 1370 D MEL	●	10,3
13,8	SMDT 1380 D MEL	●	10,3
13,9	SMDT 1390 D MEL	●	10,3
14,0	SMDT 1400 D MEL	●	10,3
14,1	SMDT 1410 D MEL	●	10,3
14,2	SMDT 1420 D MEL	●	10,3
14,3	SMDT 1430 D MEL	●	10,3
14,4	SMDT 1440 D MEL	●	10,3
14,5	SMDT 1450 D MEL	●	10,3
14,6	SMDT 1460 D MEL	●	10,3
14,7	SMDT 1470 D MEL	●	10,3
14,8	SMDT 1480 D MEL	●	10,3
14,9	SMDT 1490 D MEL	●	10,3
15,0	SMDT 1500 D MEL	●	11,0
15,1	SMDT 1510 D MEL	●	11,0
15,2	SMDT 1520 D MEL	●	11,0
15,3	SMDT 1530 D MEL	●	11,0

● øD: 15,4~18,7mm

øD (mm)	Cat. No.	Stock	H (mm)
15,4	SMDT 1540 D MEL	●	11,0
15,5	SMDT 1550 D MEL	●	11,0
15,6	SMDT 1560 D MEL	●	11,0
15,7	SMDT 1570 D MEL	●	11,0
15,8	SMDT 1580 D MEL	●	11,0
15,9	SMDT 1590 D MEL	●	11,0
16,0	SMDT 1600 D MEL	●	11,6
16,1	SMDT 1610 D MEL	●	11,6
16,2	SMDT 1620 D MEL	●	11,6
16,3	SMDT 1630 D MEL	●	11,6
16,4	SMDT 1640 D MEL	●	11,6
16,5	SMDT 1650 D MEL	●	11,6
16,6	SMDT 1660 D MEL	●	11,6
16,7	SMDT 1670 D MEL	●	11,6
16,8	SMDT 1680 D MEL	●	11,6
16,9	SMDT 1690 D MEL	●	11,6
17,0	SMDT 1700 D MEL	●	12,2
17,1	SMDT 1710 D MEL	●	12,2
17,2	SMDT 1720 D MEL	●	12,2
17,3	SMDT 1730 D MEL	●	12,2
17,4	SMDT 1740 D MEL	●	12,2
17,5	SMDT 1750 D MEL	●	12,2
17,6	SMDT 1760 D MEL	●	12,2
17,7	SMDT 1770 D MEL	●	12,2
17,8	SMDT 1780 D MEL	●	12,2
17,9	SMDT 1790 D MEL	●	12,2
18,0	SMDT 1800 D MEL	●	12,9
18,1	SMDT 1810 D MEL	●	12,9
18,2	SMDT 1820 D MEL	●	12,9
18,3	SMDT 1830 D MEL	●	12,9
18,4	SMDT 1840 D MEL	●	12,9
18,5	SMDT 1850 D MEL	●	12,9
18,6	SMDT 1860 D MEL	●	12,9
18,7	SMDT 1870 D MEL	●	12,9

● øD: 18,8~30,5mm

øD (mm)	Cat. No.	Stock	H (mm)
18,8	SMDT 1880 D MEL	●	12,9
18,9	SMDT 1890 D MEL	●	12,9
19,0	SMDT 1900 D MEL	●	13,5
19,1	SMDT 1910 D MEL	●	13,5
19,2	SMDT 1920 D MEL	●	13,5
19,3	SMDT 1930 D MEL	●	13,5
19,4	SMDT 1940 D MEL	●	13,5
19,5	SMDT 1950 D MEL	●	13,5
19,6	SMDT 1960 D MEL	●	13,5
19,7	SMDT 1970 D MEL	●	13,5
19,8	SMDT 1980 D MEL	●	13,5
19,9	SMDT 1990 D MEL	●	13,5
20,0	SMDT 2000 D MEL	●	14,1
20,5	SMDT 2050 D MEL	●	14,1
21,0	SMDT 2100 D MEL	●	14,8
21,5	SMDT 2150 D MEL	●	14,8
22,0	SMDT 2200 D MEL	●	15,0
22,5	SMDT 2250 D MEL	●	15,0
23,0	SMDT 2300 D MEL	●	15,1
23,5	SMDT 2350 D MEL	●	15,1
24,0	SMDT 2400 D MEL	●	15,4
24,5	SMDT 2450 D MEL	●	15,4
25,0	SMDT 2500 D MEL	●	15,8
25,5	SMDT 2550 D MEL	○	15,8
26,0	SMDT 2600 D MEL	○	16,4
26,5	SMDT 2650 D MEL	○	16,4
27,0	SMDT 2700 D MEL	○	17,1
27,5	SMDT 2750 D MEL	○	17,1
28,0	SMDT 2800 D MEL	○	17,7
28,5	SMDT 2850 D MEL	○	17,7
29,0	SMDT 2900 D MEL	○	18,3
29,5	SMDT 2950 D MEL	○	18,3
30,0	SMDT 3000 D MEL	○	19,0
30,5	SMDT 3050 D MEL	○	19,0

● = Euro stock  
○ = Delivery on request

## ■ Recommended Cutting Conditions

● SMDT\_ \_ \_ D MEL Type Insert

Note ( ) : is the cutting conditions for using 8xD type drills.  
Hogh cutting performance is enhanced when using a high quality machine and rigid set up.

Drill Ø (mm)	Work material		
	Soft steel (~HB250)	Stainless steel (~HB200)	Grey cast iron
~ 16,0	<b>v<sub>c</sub></b>	<b>80 ~ 120</b> (50 ~ 80)	<b>50 ~ 80</b> (40 ~ 60)
	<b>f</b>	0,15 ~ 0,3	0,1 ~ 0,2
~ 20,0	<b>v<sub>c</sub></b>	<b>80 ~ 120</b> (50 ~ 80)	<b>60 ~ 90</b> (50 ~ 70)
	<b>f</b>	0,15 ~ 0,35	0,15 ~ 0,25
~ 30,5	<b>v<sub>c</sub></b>	<b>80 ~ 130</b> (60 ~ 90)	<b>70 ~ 100</b> (60 ~ 90)
	<b>f</b>	0,2 ~ 0,4	0,15 ~ 0,25

[ v<sub>c</sub> : Cutting Speed (m/min), f : Feed rate (mm/rev), Min ~ Max ]



# Regrindable Drill Head Insert SMDT... MEL Type

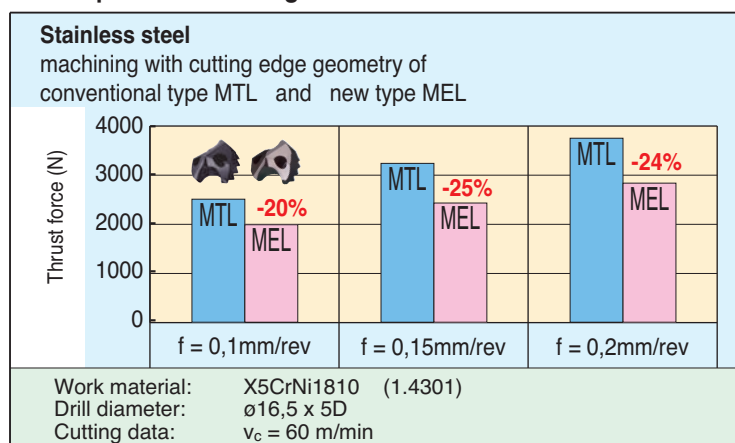


## Advantages

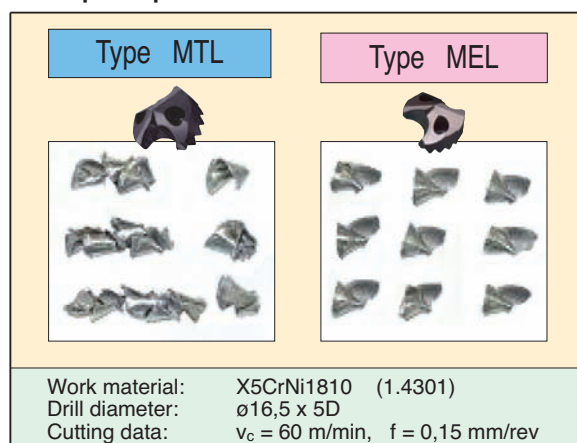
- Replaceable and regrindable drill head
- New design decreases cutting force by 25%
- Ideal for stainless steels - soft steels etc
- Excellent tool life when drilling cast iron
- Improves drilling performance on low powered machines
- Increases productivity

## Performance (Stainless steel machining)

### Comparison of cutting force

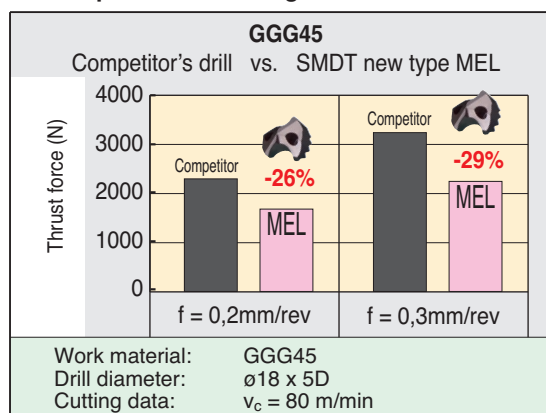


### Chip comparison

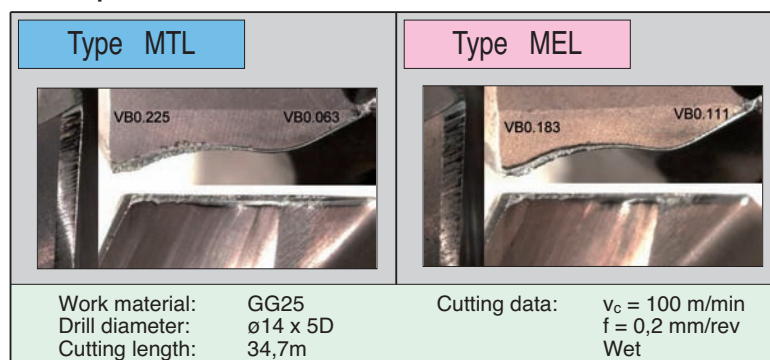


## Performance (Cast iron machining)

### Comparison of cutting force



### Comparison of wear resistance



# Indexable Insert Type "SumiDrill" WDX Type

ECONOMICAL - FAST - ACCURATE - RIGID

High Feed Drilling - 4 Edge Inserts



## General Features

The newly designed WDX drill features indexable inserts with 4 cutting edges and a range of optimised chipbreakers; light (L) - general purpose (G) - heavy (H) for rapid chip removal.

The balanced cut design maximises feed rates and accuracy whilst the super ZX ultra hard coated inserts double the tool life.

## Advantages

### Rigid - Economical - Multi-function

Drills - Bores - External Turns  
Diameter range 13,0 ~ 55,0 mm  
Drilling depth ~ 2D - 3D - 4D

### Excellent chip control

Wide application suitability - choose from 3 styles of chipbreaker



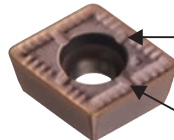
L Type

- Excellent chip control under low feed rate conditions
- Excellent hole accuracy
- Excellent surface finish



G Type

- General purpose chipbreaker
- Excellent chip control
- Low cutting force
- Low / medium feed rates



H Type

- Strong cutting edge at higher feed rates
- Stable machining ~ eliminates vibration and noise

Additional grooves for optimised swarf control



### One insert style for both pockets

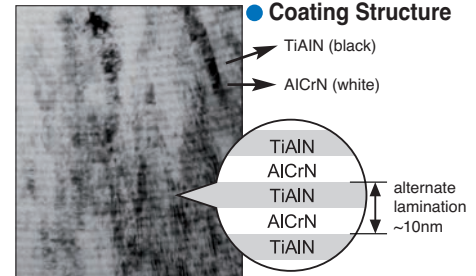
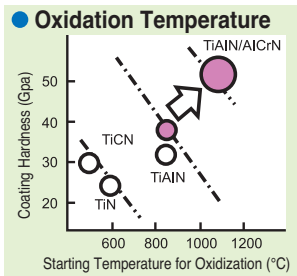
4 Edge insert provides both Inner and Outer cutting edges  
Newly designed insert style simplifies insert management.

### Ultra hard Super ZX inserts double tool life

ACP300 for steels - stainless steels - difficult to cut materials  
ACK300 for cast irons

### Features of Super ZX Coating

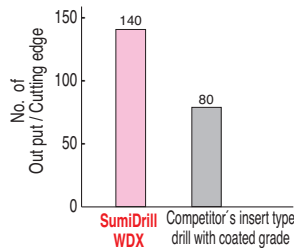
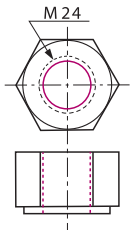
- Super-multi layered coating with ultra-thin (nanometer) layers of TiAlN and AlCrN, alternately stacked up to 1.000 layers.
- 40% increase in coating hardness and 200% increase in oxidation temperature as compared with conventional grades



## Application Examples

### X 22 CrMoV 12-1 Nut

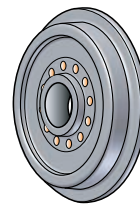
Longer Tool Life!  
Stable edge condition and smooth cutting.



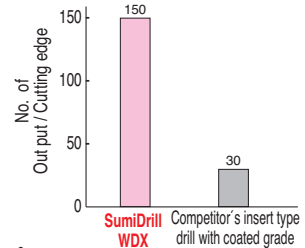
Tool: WDX 220 D2 S25  
Insert: WDX 063006 - L (ACP300)  
Cutting data:  $v_c = 120$  m/min,  $f = 0,06$  mm/rev, Wet

### High Toughness Railway Wheel

5 times longer Tool Life!  
Stable machining with lower cutting force.

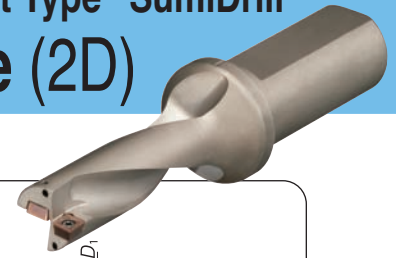


Tensile strength : ~ 900 N/mm<sup>2</sup>



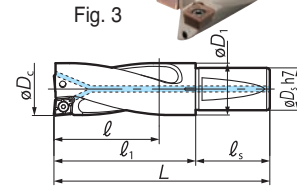
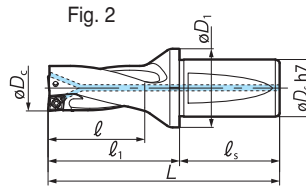
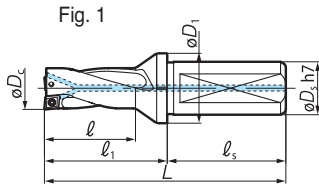
Tool: WDX 245 D3 S25  
Insert: WDX 073506 - G (ACP300)  
Cutting data:  $v_c = 185$  m/min,  $f = 0,1$  mm/rev, Wet

# Indexable Insert Type "SumiDrill" WDX Type (2D)



Max. Depth : 2 x  $\phi D$

Guide for machining tolerance : -0,05 ~ +0,15

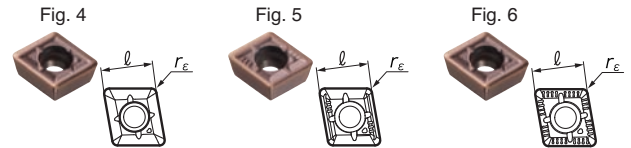


## Holder

$\phi D_c$ (mm)	Cat. No.	Stock	Dimensions						Applicable Insert	Fig.	
			L	$l_1$	$l_s$	$\phi D_1$	$\phi D_s$	$l_s$			
13,0	WDX 130D2S20	●	88	44	29	28,0	20	44	WDX 042004	1	
13,5	WDX 135D2S20	●	89	45	30						
14,0	WDX 140D2S20	●	90	46	31						
14,5	WDX 145D2S20	●	91	47	32						
15,0	WDX 150D2S20	●	92	48	33	30,0	20	44	WDX 052504		
15,5	WDX 155D2S20	●	93	49	34						
16,0	WDX 160D2S20	●	94	50	35						
16,5	WDX 165D2S20	●	95	51	36						
17,0	WDX 170D2S20	●	96	52	37	32,0	25	56			WDX 063006
17,5	WDX 175D2S25	●	109	53	38						
18,0	WDX 180D2S25	●	110	54	39						
18,5	WDX 185D2S25	●	111	55	40						
19,0	WDX 190D2S25	●	112	56	41	33,0	25	56		WDX 073506	
19,5	WDX 195D2S25	●	113	57	42						
20,0	WDX 200D2S25	●	114	58	43						
20,5	WDX 205D2S25	●	115	59	44						
21,0	WDX 210D2S25	●	116	60	45	37,0	25	56	WDX 094008		
21,5	WDX 215D2S25	●	117	61	46						
22,0	WDX 220D2S25	●	118	62	47						
22,5	WDX 225D2S25	●	119	63	48						
23,0	WDX 230D2S25	●	123	67	49	41,0	32	60			WDX 125012
23,5	WDX 235D2S25	●	124	68	50						
24,0	WDX 240D2S25	●	125	69	51						
24,5	WDX 245D2S25	●	126	70	52						
25,0	WDX 250D2S25	●	127	71	53	49,5	40	70		WDX 156012	
25,5	WDX 255D2S32	●	134	74	54						
26,0	WDX 260D2S32	●	135	75	55						
26,5	WDX 265D2S32	●	136	76	56						
27,0	WDX 270D2S32	●	137	77	57	50,0	32	60	WDX 156012		
27,5	WDX 275D2S32	●	138	78	58						
28,0	WDX 280D2S32	●	139	79	59						
28,5	WDX 285D2S32	●	140	80	60						
29,0	WDX 290D2S32	●	143	83	62	54,0	40	70			WDX 156012
29,5	WDX 295D2S32	●	144	84	63						
30,0	WDX 300D2S40	●	158	88	64						
31,0	WDX 310D2S40	●	160	90	66						
32,0	WDX 320D2S40	●	162	92	68	49,5	40	70		WDX 156012	
33,0	WDX 330D2S40	●	164	94	70						
34,0	WDX 340D2S40	●	166	96	72						
35,0	WDX 350D2S40	●	168	98	74						
36,0	WDX 360D2S40	●	170	100	76	49,5	40	70	WDX 156012		
37,0	WDX 370D2S40	○	179	109	79						
38,0	WDX 380D2S40	○	181	111	81						
39,0	WDX 390D2S40	○	183	113	83						
40,0	WDX 400D2S40	○	185	115	85	49,5	40	70			WDX 156012
41,0	WDX 410D2S40	○	187	117	87						
42,0	WDX 420D2S40	○	189	119	89						
43,0	WDX 430D2S40	○	191	121	91						
44,0	WDX 440D2S40	○	193	123	93	49,5	40	70		WDX 156012	
45,0	WDX 450D2S40	○	195	125	95						
46,0	WDX 460D2S40	○	197	127	97						
47,0	WDX 470D2S40	○	199	129	99						
48,0	WDX 480D2S40	○	201	131	101	49,5	40	70	WDX 156012		
49,0	WDX 490D2S40	○	203	133	103						
50,0	WDX 500D2S40	○	205	135	105						
51,0	WDX 510D2S40	○	207	137	107						
52,0	WDX 520D2S40	○	209	139	109	49,5	40	70			WDX 156012
53,0	WDX 530D2S40	○	211	141	111						
54,0	WDX 540D2S40	○	213	143	113						
55,0	WDX 550D2S40	○	215	145	115						

## Inserts

(mm)



**L Type**  
Excellent chip control  
at low feed rates

**G Type**  
General purpose  
chipbreaker

**H Type**  
Strong cutting edge  
at higher feed rates

Cat. No.	Coated		Fig.	Dimensions (mm)			Applicable Holder
	ACP300	ACK300		$l$	Thickness	$r_e$	
WDX 130 D2 S20	●	●	1	4,2	2,0	0,4	WDX 130 DO S20 ~ 150 DO S20
WDX 135 D2 S20	●	●	2				
WDX 140 D2 S20	●	●	3				
WDX 145 D2 S20	●	●	1	5,0	2,5	0,4	WDX 155 DO S20 ~ 180 DO S25
WDX 150 D2 S20	●	●	2				
WDX 155 D2 S20	●	●	3				
WDX 160 D2 S20	●	●	1	6,0	3,0	0,6	WDX 185 DO S25 ~ 225 DO S25
WDX 165 D2 S20	●	●	2				
WDX 170 D2 S20	●	●	3				
WDX 175 D2 S25	●	●	1	7,5	3,5	0,6	WDX 230 DO S25 ~ 285 DO S32
WDX 180 D2 S25	●	●	2				
WDX 185 D2 S25	●	●	3				
WDX 190 D2 S25	●	●	1	9,6	4,0	0,8	WDX 290 DO S32 ~ 360 DO S40
WDX 195 D2 S25	●	●	2				
WDX 200 D2 S25	●	●	3				
WDX 205 D2 S25	○	○	1	12,4	5,0	1,2	WDX 370 DO S40 ~ 450 DO S40
WDX 210 D2 S25	○	○	2				
WDX 215 D2 S25	○	○	3				
WDX 220 D2 S25	○	○	1	15,2	6,0	1,2	WDX 460 DO S40 ~ 550 DO S40
WDX 225 D2 S25	○	○	2				
WDX 230 D2 S25	○	○	3				

● = Euro stock  
○ = Delivery on request

## Spare Parts

Screw	Wrench	Wrench	Applicable Holders	Recommended Torque (Nm)
BFTX 01604 N	TRX 06	-	WDX 130 DO S20 ~ 150 DO S20	0,5
BFTX 0204 N	TRX 06	-	WDX 155 DO S20 ~ 180 DO S25	0,5
BFTY 02206	-	TRD 07	WDX 185 DO S25 ~ 225 DO S25	1,0
BFTX 02506 N	-	TRD 08	WDX 230 DO S25 ~ 285 DO S32	1,5
BFTX 03584	-	TRD 15	WDX 290 DO S32 ~ 360 DO S40	3,5
BFTX 0511 N	-	TRD 20	WDX 370 DO S40 ~ 450 DO S40	5,0
BFTX 0611 N	-	TRD 25	WDX 460 DO S40 ~ 550 DO S40	5,0

Identification of Drill Body

### WDX 200 D2 S25

Drill Diameter ( $\phi 20,0$  mm) | Flute Length L/D (2 x D) | Shank Size ( $\phi 25,0$  mm)

Identification of Indexable Insert

### WDX 06 30 06 -G

Width Across Flats (6,0 mm) | Thickness (3,0 mm) | Corner Radius (0,6 mm) | Breaker Type

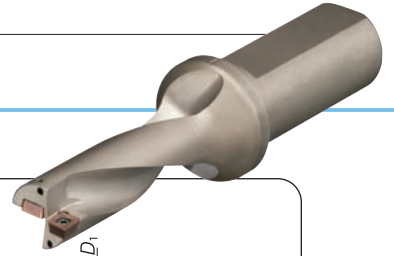
Multi-Drills



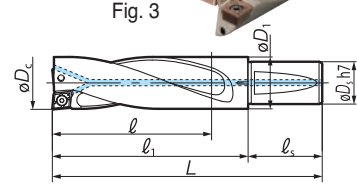
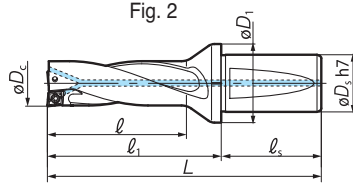
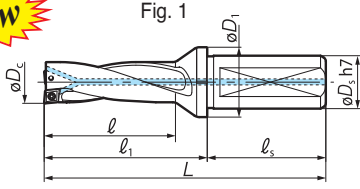
# Indexable Insert Type "SumiDrill" WDX Type (3D)

Max. Depth : 3 x  $\varnothing D$

Guide for machining tolerance : +0,00 ~ +0,20



**New**

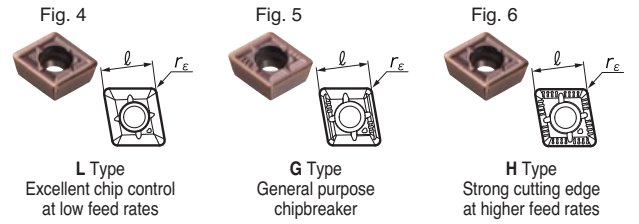


## Holder

$\varnothing D_c$ (mm)	Cat. No.	Stock	Dimensions			$\varnothing D_1$	$\varnothing D_s$	$l_s$	Applicable Insert	Fig.				
			L	$l_1$	$l$									
13,0	WDX 130D3S20	●	101,0	57,0	42,0	28,0	20	44	WDX 042004	1				
13,5	WDX 135D3S20	●	102,5	58,5	43,5									
14,0	WDX 140D3S20	●	104,0	60,0	45,0									
14,5	WDX 145D3S20	●	105,5	61,5	46,5	30,0	20	44	WDX 052504					
<b>15,0</b>	WDX 150D3S20	●	107,0	63,0	58,0									
15,5	WDX 155D3S20	●	108,5	64,5	49,5									
16,0	WDX 160D3S20	●	110,0	66,0	51,0									
16,5	WDX 165D3S20	●	111,5	67,5	52,5									
17,0	WDX 170D3S20	●	113,0	69,0	54,0	32,0	25	56	WDX 063006					
17,5	WDX 175D3S25	●	126,5	70,5	55,5									
18,0	WDX 180D3S25	●	128,0	72,0	57,0									
18,5	WDX 185D3S25	●	129,5	73,5	58,5						37,0	25	56	WDX 073506
19,0	WDX 190D3S25	●	131,0	75,0	60,0									
19,5	WDX 195D3S25	●	132,5	76,5	61,5									
<b>20,0</b>	WDX 200D3S25	●	134,0	78,0	63,0									
20,5	WDX 205D3S25	●	135,5	79,5	64,5									
21,0	WDX 210D3S25	●	137,0	81,0	66,0									
21,5	WDX 215D3S25	●	138,5	82,5	67,5	41,0	32	60	WDX 094008					
22,0	WDX 220D3S25	●	140,0	84,0	69,0									
22,5	WDX 225D3S25	●	141,5	85,5	70,5									
23,0	WDX 230D3S25	●	146,0	90,0	72,0									
23,5	WDX 235D3S25	●	147,5	91,5	73,5									
24,0	WDX 240D3S25	●	149,0	93,0	75,0									
24,5	WDX 245D3S25	●	150,5	94,5	76,5									
<b>25,0</b>	WDX 250D3S25	●	152,0	96,0	78,0									
25,5	WDX 255D3S32	●	159,5	97,5	79,5					49,5	40	70	WDX 125012	
26,0	WDX 260D3S32	●	161,0	101,0	81,0									
26,5	WDX 265D3S32	●	162,5	102,5	82,5									
27,0	WDX 270D3S32	●	164,0	104,0	84,0									
27,5	WDX 275D3S32	●	165,5	105,5	85,5									
28,0	WDX 280D3S32	●	167,0	107,0	87,0									
28,5	WDX 285D3S32	●	168,5	108,5	88,5									
29,0	WDX 290D3S32	●	172,0	112,0	91,0	54,0	40	70	WDX 156012					
29,5	WDX 295D3S32	●	173,5	113,5	92,5									
<b>30,0</b>	WDX 300D3S40	●	188,0	118,0	94,0									
31,0	WDX 310D3S40	●	191,0	121,0	97,0									
32,0	WDX 320D3S40	●	194,0	124,0	100,0									
33,0	WDX 330D3S40	●	197,0	127,0	103,0									
34,0	WDX 340D3S40	●	200,0	130,0	106,0									
<b>35,0</b>	WDX 350D3S40	●	203,0	133,0	109,0									
36,0	WDX 360D3S40	●	206,0	136,0	112,0									
37,0	WDX 370D3S40	○	216,0	146,0	116,0					49,5	40	70	WDX 156012	
38,0	WDX 380D3S40	○	219,0	149,0	119,0									
39,0	WDX 390D3S40	○	222,0	152,0	122,0									
<b>40,0</b>	WDX 400D3S40	○	225,0	155,0	125,0									
41,0	WDX 410D3S40	○	228,0	158,0	128,0									
42,0	WDX 420D3S40	○	231,0	161,0	131,0									
43,0	WDX 430D3S40	○	234,0	164,0	134,0									
44,0	WDX 440D3S40	○	237,0	167,0	137,0									
<b>45,0</b>	WDX 450D3S40	○	240,0	170,0	140,0									
46,0	WDX 460D3S40	○	243,0	173,0	143,0	49,5	40	70	WDX 156012					
47,0	WDX 470D3S40	○	246,0	176,0	146,0									
48,0	WDX 480D3S40	○	249,0	179,0	149,0									
49,0	WDX 490D3S40	○	252,0	182,0	152,0									
<b>50,0</b>	WDX 500D3S40	○	255,0	185,0	155,0									
51,0	WDX 510D3S40	○	258,0	188,0	158,0									
52,0	WDX 520D3S40	○	261,0	191,0	161,0									
53,0	WDX 530D3S40	○	264,0	194,0	164,0									
54,0	WDX 540D3S40	○	267,0	197,0	167,0									
<b>55,0</b>	WDX 550D3S40	○	270,0	200,0	170,0									

## Inserts

(mm)



Cat. No.	Coated		Fig.	Dimensions (mm)			Applicable Holder
	ACP300	ACK300		$l$	Thickness	$r_e$	
WDX 042004-L	●	●	1	4,2	2,0	0,4	WDX 130 DOS20 ~ 150 DOS20
WDX 042004-G	●	●	2				
WDX 042004-H	●	●	3				
WDX 052504-L	●	●	1	5,0	2,5	0,4	WDX 155 DOS20 ~ 180 DOS25
WDX 052504-G	●	●	2				
WDX 052504-H	●	●	3				
WDX 063006-L	●	●	1	6,0	3,0	0,6	WDX 185 DOS25 ~ 225 DOS25
WDX 063006-G	●	●	2				
WDX 063006-H	●	●	3				
WDX 073506-L	●	●	1	7,5	3,5	0,6	WDX 230 DOS25 ~ 285 DOS32
WDX 073506-G	●	●	2				
WDX 073506-H	●	●	3				
WDX 094008-L	●	●	1	9,6	4,0	0,8	WDX 290 DOS32 ~ 360 DOS40
WDX 094008-G	●	●	2				
WDX 094008-H	●	●	3				
WDX 125012-L	○	○	1	12,4	5,0	1,2	WDX 370 DOS40 ~ 450 DOS40
WDX 125012-G	○	○	2				
WDX 125012-H	○	○	3				
WDX 156012-L	○	○	1	15,2	6,0	1,2	WDX 460 DOS40 ~ 550 DOS40
WDX 156012-G	○	○	2				
WDX 156012-H	○	○	3				

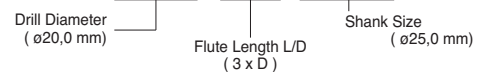
● = Euro stock  
○ = Delivery on request

## Spare Parts

Screw	Wrench	Wrench	Applicable Holders	Recommended Torque (Nm)
BFTX 01604 N	TRX 06	-	WDX 130DOS20 ~ 150DOS20	0,5
BFTX 0204 N	TRX 06	-	WDX 155DOS20 ~ 180DOS25	0,5
BFTY 02206	-	TRD 07	WDX 185DOS25 ~ 225DOS25	1,0
BFTX 02506 N	-	TRD 08	WDX 230DOS25 ~ 285DOS32	1,5
BFTX 03584	-	TRD 15	WDX 290DOS32 ~ 360DOS40	3,5
BFTX 05111 N	-	TRD 20	WDX 370DOS40 ~ 450DOS40	5,0
BFTX 06111 N	-	TRD 25	WDX 460DOS40 ~ 550DOS40	5,0

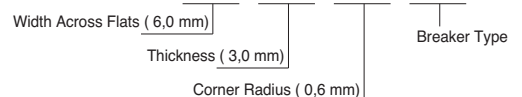
## Identification of Drill Body

**WDX 200 D3 S25**



## Identification of Indexable Insert

**WDX 06 30 06 -G**



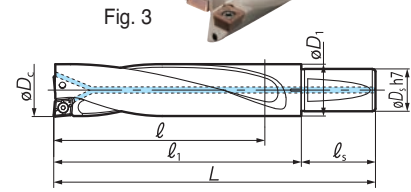
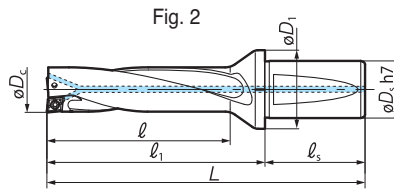
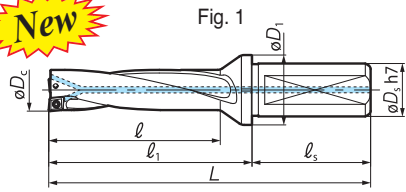
# Indexable Insert Type "SumiDrill" WDX Type (4D)



**Max. Depth : 4 x  $\phi D$**

Guide for machining tolerance : +0,00 ~ +0,25

**New**

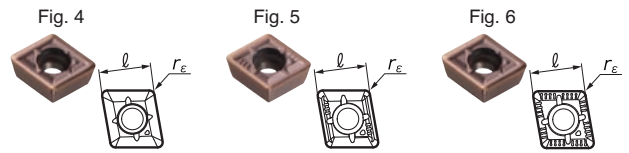


## Holder

$\phi D_c$ (mm)	Cat. No.	Stock	Dimensions			$\phi D_1$	$\phi D_3$	$l_2$	Applicable Insert	Fig.
			L	$l_1$	$l$					
13,0	WDX 130D4S20	●	114	70	55	28,0	20	44	WDX 042004	1
13,5	WDX 135D4S20	●	116	72	57					
14,0	WDX 140D4S20	●	118	74	59					
14,5	WDX 145D4S20	●	120	76	61					
15,0	WDX 150D4S20	●	122	78	63	30,0	20	44	WDX 052504	1
15,5	WDX 155D4S20	●	124	80	65					
16,0	WDX 160D4S20	●	126	82	67					
16,5	WDX 165D4S20	●	128	84	69					
17,0	WDX 170D4S20	●	130	86	71	32,0	25	56	WDX 063006	1
17,5	WDX 175D4S25	●	144	88	73					
18,0	WDX 180D4S25	●	146	90	75					
18,5	WDX 185D4S25	●	148	92	77					
19,0	WDX 190D4S25	●	150	94	79	33,0	25	56	WDX 073506	1
19,5	WDX 195D4S25	●	152	96	81					
20,0	WDX 200D4S25	●	154	98	83					
20,5	WDX 205D4S25	●	156	100	85					
21,0	WDX 210D4S25	●	158	102	87	37,0	25	56	WDX 094008	2
21,5	WDX 215D4S25	●	160	104	89					
22,0	WDX 220D4S25	●	162	106	91					
22,5	WDX 225D4S25	●	164	108	93					
23,0	WDX 230D4S25	●	169	113	95	41,0	32	60	WDX 125012	3
23,5	WDX 235D4S25	●	171	115	97					
24,0	WDX 240D4S25	●	173	117	99					
24,5	WDX 245D4S25	●	175	119	101					
25,0	WDX 250D4S25	●	177	121	103	49,5	40	70	WDX 156012	3
25,5	WDX 255D4S32	●	185	125	105					
26,0	WDX 260D4S32	●	187	127	107					
26,5	WDX 265D4S32	●	189	129	109					
27,0	WDX 270D4S32	●	191	131	111	50,0	32	60	WDX 156012	3
27,5	WDX 275D4S32	●	193	133	113					
28,0	WDX 280D4S32	●	195	135	115					
28,5	WDX 285D4S32	●	197	137	117					
29,0	WDX 290D4S32	●	201	141	120	54,0	40	70	WDX 156012	3
29,5	WDX 295D4S32	●	203	143	122					
30,0	WDX 300D4S40	●	218	148	124					
31,0	WDX 310D4S40	●	222	152	128					
32,0	WDX 320D4S40	●	226	156	132	49,5	40	70	WDX 156012	3
33,0	WDX 330D4S40	●	230	160	136					
34,0	WDX 340D4S40	●	234	164	140					
35,0	WDX 350D4S40	●	238	168	144					
36,0	WDX 360D4S40	●	242	172	148	49,5	40	70	WDX 156012	3
37,0	WDX 370D4S40	○	253	183	153					
38,0	WDX 380D4S40	○	257	187	157					
39,0	WDX 390D4S40	○	261	191	161					
40,0	WDX 400D4S40	○	265	195	165	49,5	40	70	WDX 156012	3
41,0	WDX 410D4S40	○	269	199	169					
42,0	WDX 420D4S40	○	273	203	173					
43,0	WDX 430D4S40	○	277	207	177					
44,0	WDX 440D4S40	○	281	211	181	49,5	40	70	WDX 156012	3
45,0	WDX 450D4S40	○	285	215	185					
46,0	WDX 460D4S40	○	289	219	189					
47,0	WDX 470D4S40	○	293	223	193					
48,0	WDX 480D4S40	○	297	227	197	49,5	40	70	WDX 156012	3
49,0	WDX 490D4S40	○	301	231	201					
50,0	WDX 500D4S40	○	305	235	205					
51,0	WDX 510D4S40	○	309	239	209					
52,0	WDX 520D4S40	○	313	243	213	49,5	40	70	WDX 156012	3
53,0	WDX 530D4S40	○	317	247	217					
54,0	WDX 540D4S40	○	321	251	221					
55,0	WDX 550D4S40	○	325	255	225					

## Inserts

(mm)



Cat. No.	Coated		Fig.	Dimensions (mm)			Applicable Holder
	ACP300	ACK300		$l$	Thickness	$r_e$	
WDX 130 DO S20	●	●	1	4,2	2,0	0,4	WDX 130 DO S20 ~ 150 DO S20
WDX 155 DO S20	●	●	2				
WDX 180 DO S25	●	●	3				
WDX 155 DO S20	●	●	1	5,0	2,5	0,4	WDX 155 DO S20 ~ 180 DO S25
WDX 185 DO S25	●	●	2				
WDX 225 DO S25	●	●	3				
WDX 185 DO S25	●	●	1	6,0	3,0	0,6	WDX 185 DO S25 ~ 225 DO S25
WDX 230 DO S25	●	●	2				
WDX 285 DO S32	●	●	3				
WDX 230 DO S25	●	●	1	7,5	3,5	0,6	WDX 230 DO S25 ~ 285 DO S32
WDX 290 DO S32	●	●	2				
WDX 360 DO S40	●	●	3				
WDX 290 DO S32	●	●	1	9,6	4,0	0,8	WDX 290 DO S32 ~ 360 DO S40
WDX 370 DO S40	●	●	2				
WDX 450 DO S40	●	●	3				
WDX 370 DO S40	○	○	1	12,4	5,0	1,2	WDX 370 DO S40 ~ 450 DO S40
WDX 460 DO S40	○	○	2				
WDX 550 DO S40	○	○	3				
WDX 460 DO S40	○	○	1	15,2	6,0	1,2	WDX 460 DO S40 ~ 550 DO S40
WDX 500 DO S40	○	○	2				
WDX 550 DO S40	○	○	3				

● = Euro stock  
○ = Delivery on request

## Spare Parts

Screw	Wrench	Wrench	Applicable Holders	Recommended Torque (Nm)
BFTX 01604 N	TRX 06	-	WDX 130 DO S20 ~ 150 DO S20	0,5
BFTX 0204 N	TRX 06	-	WDX 155 DO S20 ~ 180 DO S25	0,5
BFTY 02206	-	TRD 07	WDX 185 DO S25 ~ 225 DO S25	1,0
BFTX 02506 N	-	TRD 08	WDX 230 DO S25 ~ 285 DO S32	1,5
BFTX 03584	-	TRD 15	WDX 290 DO S32 ~ 360 DO S40	3,5
BFTX 0511 N	-	TRD 20	WDX 370 DO S40 ~ 450 DO S40	5,0
BFTX 0611 N	-	TRD 25	WDX 460 DO S40 ~ 550 DO S40	5,0

Identification of Drill Body

### WDX 200 D4 S25

Drill Diameter ( $\phi 20,0$  mm) | Flute Length L/D (4 x D) | Shank Size ( $\phi 25,0$  mm)

Identification of Indexable Insert

### WDX 06 30 06 -G

Width Across Flats (6,0 mm) | Thickness (3,0 mm) | Corner Radius (0,6 mm) | Breaker Type



# Indexable Insert Type "SumiDrill" WDX Type

## Recommended Cutting Conditions

### Recommended Cutting Conditions (2D)

[ min. - optimal - max. ]

Material Group			Chip breaker	Cutting Speed Vc (m/min)	Feed rate (mm/rev)			
ISO	Work material	Hardness (HB)			ø13,0 ~ ø18,0	ø18,5 ~ ø29,0	ø29,5 ~ ø36,0	ø37,0 ~ ø55,0
P	Carbon steel	125	L	150 - 220 - 250	0,04 - 0,08 - 0,12	0,04 - 0,08 - 0,12	0,04 - 0,08 - 0,13	0,05 - 0,10 - 0,15
		190	G	150 - 220 - 250	0,08 - 0,13 - 0,24	0,08 - 0,13 - 0,24	0,08 - 0,14 - 0,26	0,09 - 0,16 - 0,29
		250	G	125 - 170 - 230	0,06 - 0,11 - 0,18	0,06 - 0,11 - 0,18	0,06 - 0,12 - 0,19	0,07 - 0,13 - 0,22
		270	G	125 - 170 - 230	0,08 - 0,13 - 0,22	0,08 - 0,14 - 0,24	0,08 - 0,14 - 0,23	0,09 - 0,16 - 0,26
	Low alloyed steel	300	G	100 - 130 - 170	0,06 - 0,11 - 0,17	0,06 - 0,12 - 0,18	0,06 - 0,12 - 0,18	0,07 - 0,13 - 0,20
		180	L	150 - 180 - 220	0,05 - 0,08 - 0,14	0,05 - 0,08 - 0,14	0,05 - 0,08 - 0,16	0,06 - 0,09 - 0,17
		275	G	125 - 150 - 200	0,06 - 0,11 - 0,17	0,06 - 0,11 - 0,17	0,06 - 0,12 - 0,18	0,07 - 0,13 - 0,20
		300	G	100 - 140 - 170	0,06 - 0,11 - 0,17	0,06 - 0,11 - 0,17	0,06 - 0,12 - 0,18	0,07 - 0,13 - 0,20
High alloyed steel	350	G	80 - 120 - 150	0,06 - 0,11 - 0,17	0,06 - 0,11 - 0,17	0,06 - 0,12 - 0,18	0,07 - 0,13 - 0,20	
	200	G	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	
M	Stainless steel, martensitic / ferritic Stainless steel, martensitic / tempered austenitic / quenched austenitic / ferritic (Duplex)	325	G	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
		200	L / G	100 - 150 - 200	0,06 - 0,11 - 0,18	0,06 - 0,11 - 0,18	0,06 - 0,12 - 0,19	0,07 - 0,13 - 0,22
		240	L / G	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
		180	L / G	100 - 150 - 200	0,04 - 0,08 - 0,18	0,06 - 0,11 - 0,18	0,06 - 0,12 - 0,19	0,07 - 0,13 - 0,22
K	Cast iron (GG)	230	L / G	80 - 120 - 150	0,04 - 0,08 - 0,18	0,06 - 0,11 - 0,18	0,06 - 0,12 - 0,19	0,07 - 0,13 - 0,22
		180	H	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
	Nodular cast iron (GGG)	260	H	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
S	Heat resistant alloys	160	H	90 - 120 - 250	0,09 - 0,20 - 0,32	0,10 - 0,22 - 0,36	0,11 - 0,24 - 0,39	0,12 - 0,26 - 0,44
		250	H	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

### Recommended Cutting Conditions (2D)

[ min. - optimal - max. ]

Material Group			Chip breaker	Cutting Speed Vc (m/min)	Feed rate (mm/rev)			
ISO	Work material	Hardness (HB)			ø13,0 ~ ø18,0	ø18,5 ~ ø29,0	ø29,5 ~ ø36,0	ø37,0 ~ ø55,0
P	Carbon steel	125	L	150 - 220 - 250	0,04 - 0,07 - 0,1	0,04 - 0,07 - 0,10	0,04 - 0,08 - 0,11	0,05 - 0,09 - 0,12
		190	G	150 - 220 - 250	0,08 - 0,12 - 0,2	0,08 - 0,12 - 0,20	0,08 - 0,13 - 0,22	0,09 - 0,14 - 0,24
		250	G	125 - 170 - 230	0,06 - 0,1 - 0,15	0,06 - 0,10 - 0,15	0,06 - 0,11 - 0,16	0,07 - 0,12 - 0,18
		270	G	125 - 170 - 230	0,08 - 0,12 - 0,18	0,08 - 0,12 - 0,18	0,08 - 0,13 - 0,19	0,09 - 0,14 - 0,22
	Low alloyed steel	300	G	100 - 130 - 170	0,06 - 0,10 - 0,14	0,06 - 0,10 - 0,14	0,06 - 0,11 - 0,15	0,07 - 0,12 - 0,17
		180	L	150 - 180 - 220	0,05 - 0,07 - 0,12	0,05 - 0,07 - 0,12	0,05 - 0,08 - 0,13	0,06 - 0,08 - 0,15
		275	G	125 - 150 - 200	0,06 - 0,10 - 0,14	0,06 - 0,10 - 0,14	0,06 - 0,11 - 0,15	0,07 - 0,12 - 0,17
		300	G	100 - 140 - 170	0,06 - 0,10 - 0,14	0,06 - 0,10 - 0,14	0,06 - 0,11 - 0,15	0,07 - 0,12 - 0,17
High alloyed steel	350	G	80 - 120 - 150	0,06 - 0,10 - 0,14	0,06 - 0,10 - 0,14	0,06 - 0,11 - 0,15	0,07 - 0,12 - 0,17	
	200	G	100 - 150 - 200	0,08 - 0,12 - 0,2	0,08 - 0,12 - 0,20	0,08 - 0,13 - 0,22	0,09 - 0,14 - 0,24	
M	Stainless steel, martensitic / ferritic Stainless steel, martensitic / tempered austenitic / quenched austenitic / ferritic (Duplex)	325	G	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
		200	L / G	100 - 150 - 200	0,06 - 0,10 - 0,15	0,06 - 0,10 - 0,15	0,06 - 0,11 - 0,16	0,07 - 0,12 - 0,18
		240	L / G	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
		180	L / G	100 - 150 - 200	0,04 - 0,10 - 0,15	0,06 - 0,10 - 0,15	0,06 - 0,11 - 0,16	0,07 - 0,12 - 0,18
K	Cast iron (GG)	230	L / G	80 - 120 - 150	0,04 - 0,10 - 0,15	0,06 - 0,10 - 0,15	0,06 - 0,11 - 0,16	0,07 - 0,12 - 0,18
		180	H	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
	Nodular cast iron (GGG)	260	H	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
S	Heat resistant alloys	160	H	90 - 120 - 250	0,09 - 0,18 - 0,27	0,10 - 0,20 - 0,30	0,11 - 0,22 - 0,32	0,12 - 0,24 - 0,36
		250	H	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

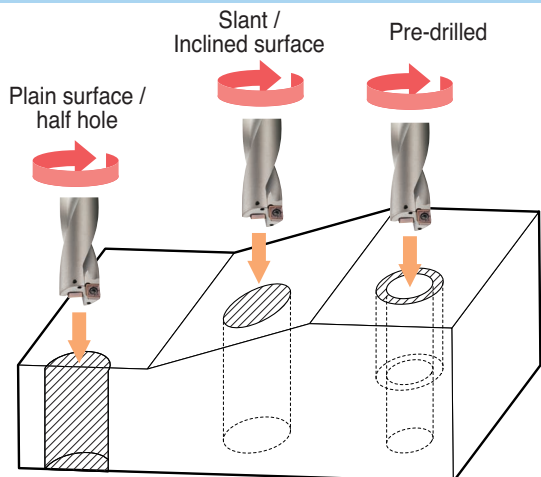
### Recommended Cutting Conditions (2D)

[ min. - optimal - max. ]

Material Group			Chip breaker	Cutting Speed Vc (m/min)	Feed rate (mm/rev)			
ISO	Work material	Hardness (HB)			ø13,0 ~ ø18,0	ø18,5 ~ ø29,0	ø29,5 ~ ø36,0	ø37,0 ~ ø55,0
P	Carbon steel	125	L	150 - 220 - 250	0,04 - 0,07 - 0,09	0,04 - 0,07 - 0,09	0,04 - 0,07 - 0,09	0,05 - 0,08 - 0,10
		190	G	150 - 220 - 250	0,08 - 0,11 - 0,17	0,08 - 0,11 - 0,17	0,08 - 0,12 - 0,18	0,09 - 0,14 - 0,21
		250	G	125 - 170 - 230	0,06 - 0,10 - 0,13	0,06 - 0,10 - 0,13	0,06 - 0,10 - 0,14	0,07 - 0,11 - 0,15
		270	G	125 - 170 - 230	0,08 - 0,11 - 0,15	0,08 - 0,11 - 0,15	0,08 - 0,12 - 0,17	0,09 - 0,14 - 0,19
	Low alloyed steel	300	G	100 - 130 - 170	0,06 - 0,10 - 0,12	0,06 - 0,10 - 0,12	0,06 - 0,10 - 0,13	0,07 - 0,11 - 0,14
		180	L	150 - 180 - 220	0,05 - 0,07 - 0,10	0,05 - 0,07 - 0,10	0,05 - 0,07 - 0,11	0,06 - 0,08 - 0,12
		275	G	125 - 150 - 200	0,06 - 0,10 - 0,12	0,06 - 0,10 - 0,12	0,06 - 0,10 - 0,13	0,07 - 0,11 - 0,14
		300	G	100 - 140 - 170	0,06 - 0,10 - 0,12	0,06 - 0,10 - 0,12	0,06 - 0,10 - 0,13	0,07 - 0,11 - 0,14
High alloyed steel	350	G	80 - 120 - 150	0,06 - 0,10 - 0,12	0,06 - 0,10 - 0,12	0,06 - 0,10 - 0,13	0,07 - 0,11 - 0,14	
	200	G	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	
M	Stainless steel, martensitic / ferritic Stainless steel, martensitic / tempered austenitic / quenched austenitic / ferritic (Duplex)	325	G	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
		200	L / G	100 - 150 - 200	0,06 - 0,10 - 0,13	0,06 - 0,10 - 0,13	0,06 - 0,10 - 0,14	0,07 - 0,11 - 0,15
		240	L / G	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
		180	L / G	100 - 150 - 200	0,04 - 0,10 - 0,13	0,06 - 0,10 - 0,13	0,06 - 0,10 - 0,14	0,07 - 0,11 - 0,15
K	Cast iron (GG)	230	L / G	80 - 120 - 150	0,04 - 0,10 - 0,13	0,06 - 0,10 - 0,13	0,06 - 0,10 - 0,14	0,07 - 0,11 - 0,15
		180	H	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
	Nodular cast iron (GGG)	260	H	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	Heat resistant alloys	160	H	90 - 120 - 250	0,09 - 0,17 - 0,23	0,10 - 0,19 - 0,26	0,11 - 0,21 - 0,28	0,12 - 0,23 - 0,31
		250	H	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

## Multi-Purpose Functionality

### Applications for machining centre

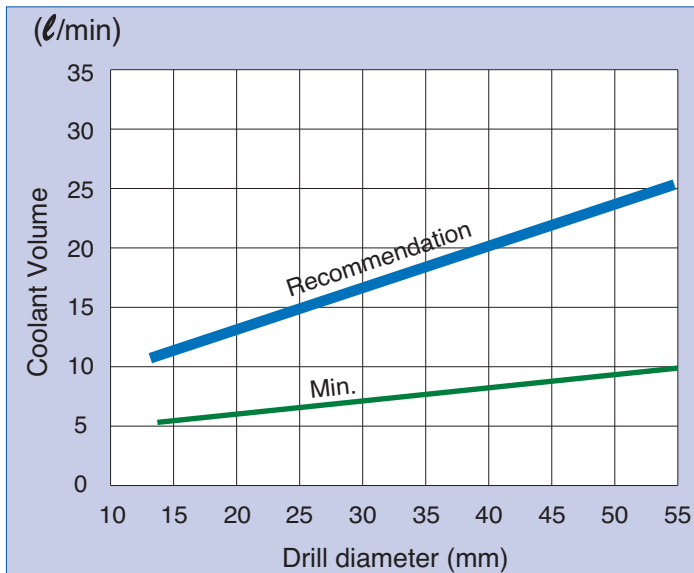


Recommended conditions - reduce feed rate to 70%

### I Hole profile

	Drill Diameter	t (mm)
	14,0 - 18,0	0,4
	18,5 - 28,5	0,6
	29,0 - 36,0	0,8
	37,0 - 55,0	1,2

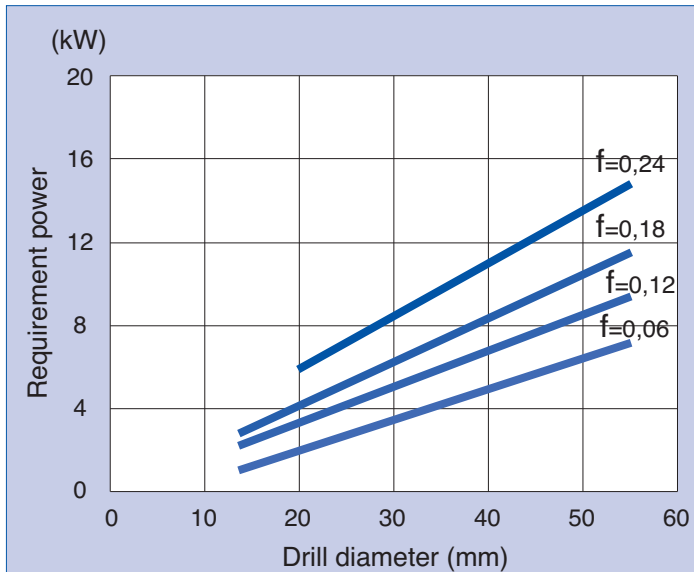
## Recommended Coolant Volume



It is important to provide an adequate supply of coolant at the recommended volume in order to ensure smooth chip removal. This chart shows the recommended coolant volume required for each drill.



## Erforderliche Maschinenleistung



Work piece : C50  
 Drill : WDX200D3S25  
 Insert : WDXT063006G  
 Cutting speed :  $v_c = 180\text{m/min}$

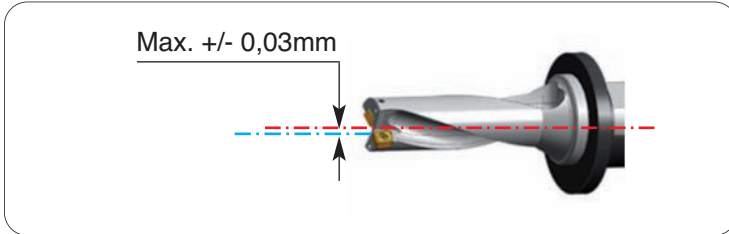
# Indexable Insert Type "SumiDrill" WDX Type

## Applications for Lathes

### Setting Instruction

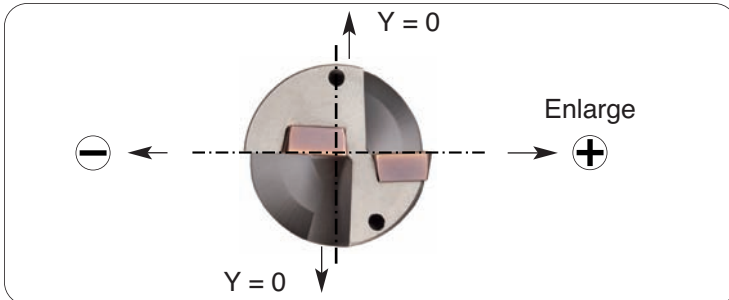
Ensure the face of the drill flange is hard against the face of the tool holder.

Align the centreline of the drill to the centreline of the lathes Y axis



### Drilling Over Holes

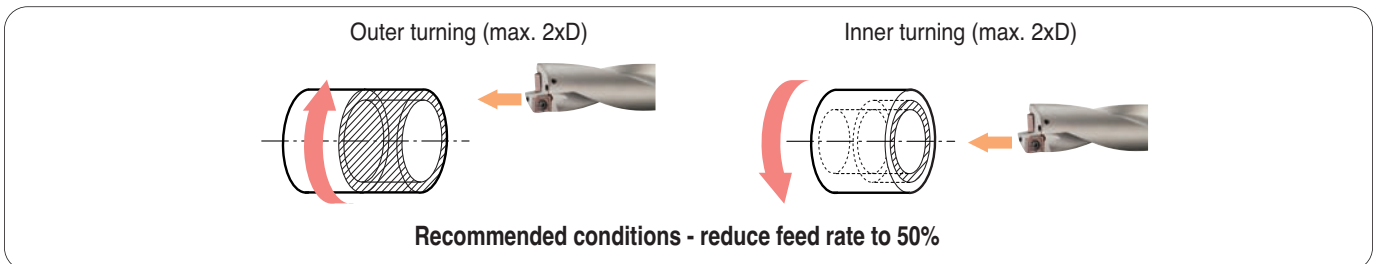
Offset the lathes X axis within the maximum amount stated in the table



Drill description	Max. Offset (mm)	Drill description	Max. Offset (mm)
WDX130...	0,35	WDX280...	0,15
WDX135...	0,30	WDX285...	0,10
WDX140...	0,25	WDX290...	1,00
WDX145...	0,20	WDX295...	0,95
WDX150...	0,15	WDX300...	0,90
WDX155...	0,40	WDX310...	0,80
WDX160...	0,40	WDX320...	0,70
WDX165...	0,35	WDX330...	0,55
WDX170...	0,30	WDX340...	0,45
WDX175...	0,25	WDX350...	0,35
WDX180...	0,20	WDX360...	0,20
WDX185...	0,50	WDX370...	1,00
WDX190...	0,45	WDX380...	1,00
WDX195...	0,40	WDX390...	0,90
WDX200...	0,30	WDX400...	0,80
WDX205...	0,30	WDX410...	0,70
WDX210...	0,20	WDX420...	0,60
WDX215...	0,15	WDX430...	0,50
WDX220...	0,10	WDX440...	0,50
WDX225...	0,06	WDX450...	0,40
WDX230...	0,70	WDX460...	1,50
WDX235...	0,70	WDX470...	1,40
WDX240...	0,60	WDX480...	1,30
WDX245...	0,50	WDX490...	1,20
WDX250...	0,50	WDX500...	1,10
WDX255...	0,45	WDX510...	1,00
WDX260...	0,40	WDX520...	0,90
WDX265...	0,35	WDX530...	0,80
WDX270...	0,25	WDX540...	0,60
WDX275...	0,20	WDX550...	0,50

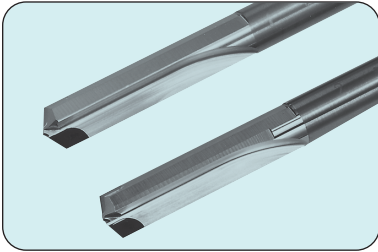
Recommended conditions - reduce feed rate to 30%

### Turning by lathes



# SUMIDIA Drills

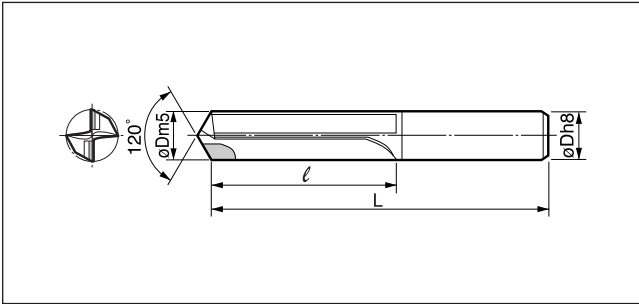
## DAL/DDL/DML Type



### From general to High Precision Drilling of Aluminum Alloys!

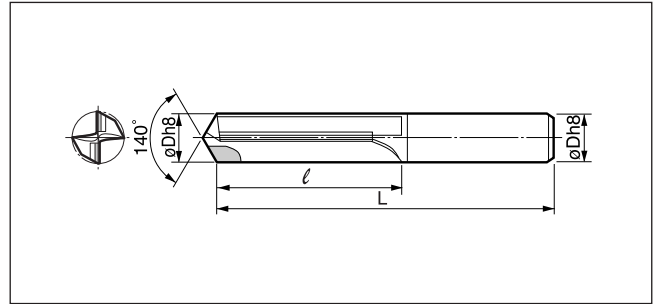
- High precision DAL type is able to produce holes of IT Class of 7~8.
- General DDL type is able to produce holes of IT class of 11~12, mainly for drilling of pre-tap holes.
- DML type is DDL type with a chamfer edge, incorporating 2 processes in one operation.

#### ■ DAL Type



Cat. No.	Stock	øD	L	l
	DA2200			
DAL 0500H ~ 0600H		$\phi 5 \leq D \leq \phi 6$	80	30
DAL 0601H ~ 0700H		$\phi 6 < D \leq \phi 7$	90	35
DAL 0701H ~ 0800H		$\phi 7 < D \leq \phi 8$	90	35
DAL 0801H ~ 0900H		$\phi 8 < D \leq \phi 9$	100	40
DAL 0901H ~ 1000H		$\phi 9 < D \leq \phi 10$	100	40
DAL 1001H ~ 1100H		$\phi 10 < D \leq \phi 11$	110	50
DAL 1101H ~ 1200H		$\phi 11 < D \leq \phi 12$	110	50

#### ■ DDL Type



Cat. No.	Stock	øD	L	l
	DA2200			
DDL 050V ~ 060V		$\phi 5 \leq D \leq \phi 6$	80	30
DDL 061V ~ 070V		$\phi 6 < D \leq \phi 7$	90	35
DDL 071V ~ 080V		$\phi 7 < D \leq \phi 8$	90	35
DDL 081V ~ 090V		$\phi 8 < D \leq \phi 9$	100	40
DDL 091V ~ 100V		$\phi 9 < D \leq \phi 10$	100	40
DDL 101V ~ 110V		$\phi 10 < D \leq \phi 11$	110	50
DDL 111V ~ 120V		$\phi 11 < D \leq \phi 12$	110	50

#### ■ Recommended Conditions

	Cutting Speed (m/min)	Feed Rate (mm/rev)	Drilling Length L/D	Oil
$\phi D < 8$	80 ~ 250	0,05 ~ 0,2	Below 3 x D	Water soluble
$8 \leq \phi D$		0,1 ~ 0,3		

#### ■ Important Notes

- Select a high rigidity machine and high precision tool holder.
- Enough coolant to drilled hole.

#### ■ Application Examples (DAL Type)

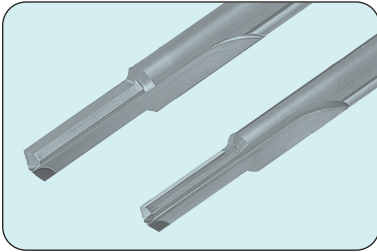
Work Shape	Work	Conditions	Results
	A390 High silicon Aluminum	$V_c=100\text{m/min}$ $f=0,1\text{mm/rev}$	<ul style="list-style-type: none"> <li>• Holes by carbide drill was out of specifications after 2.000 holes/reg.</li> <li>• SumiDia drill could drill up to 30.000 holes/reg.</li> <li>• 15 times tool life that of carbide drills.</li> </ul>
	A390 High silicon Aluminum (pre-cast hole of ø10)	$V_c=120\text{m/min}$ $f=0,12\text{mm/rev}$	<ul style="list-style-type: none"> <li>• Average 40,000 holes/reg</li> <li>• Surface roughness <math>R_y = 1\mu\text{m}</math></li> </ul>
	ADC10 Aluminum Die Cast	$V_c=90\text{m/min}$ $f=0,08\text{mm/rev}$	<ul style="list-style-type: none"> <li>• More than 50.000 holes and still running</li> </ul>

#### ■ Application Examples (DDL Type)

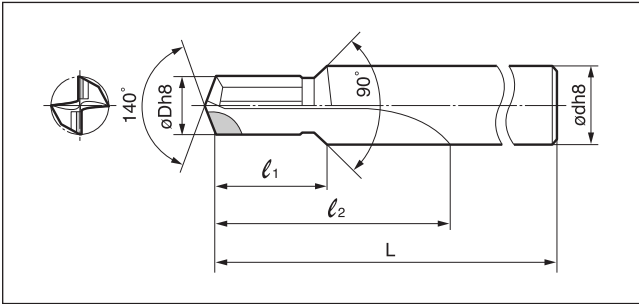
Work Shape	Work	Conditions	Results
	ADC12 Aluminum Die Cast M8 Pre-tap holes	$V_c=214\text{m/min}$ $f=0,14\text{mm/rev}$	<ul style="list-style-type: none"> <li>• Regrind after 100.000 holes</li> </ul>
	ADC12 Aluminum Die Cast	$V_c=200\text{m/min}$ $f=0,17\text{mm/rev}$	<ul style="list-style-type: none"> <li>• Regrind after 74.000 holes (2.000m) (Preset tool change)</li> </ul>
	AC2A Aluminum Casting	$V_c=234\text{m/min}$ $f=0,28\text{mm/rev}$	<ul style="list-style-type: none"> <li>• Regrind after 80.000 holes (Preset tool change)</li> </ul>

# SUMIDIA Drills

## DAL/DDL/DML Type



### ■ DML Type

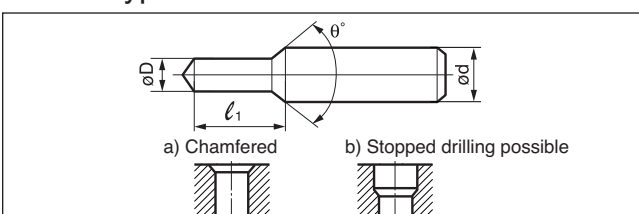


Applicable Tap Size	Cat. No.	Stock	$\phi D$	$\phi d$	L	$l_1$	$l_2$
		DA2200					
M6	<b>DML 050V</b>		5	8	90	18	36
M8	<b>DML 068V</b>		6,8	10	104	24	48
M10	<b>DML 085V</b>		8,5	12	122	30	60
M12	<b>DML 103V</b>		10,3	14	136	36	72

### ■ Application Examples (DML Type)

Work Shape	Work	Conditions	Results
	AC4C-T6 Aluminum Casting M6 Pre-tap holes	$V_c=100\text{m/min}$ $f=0,1\text{mm/rev}$ $m/c=6$ spindles	<ul style="list-style-type: none"> <li>• Regrind after 150.000 holes</li> <li>• Tool life for carbide drill is 500 holes.</li> <li>• 30 times tool life that of carbide drills</li> </ul>
	AC2C-T2 Aluminum Casting M8 Pre-tap holes	$V_c=210\text{m/min}$ $f=0,15\text{mm/rev}$	<ul style="list-style-type: none"> <li>• 100.000 holes/reg (2.000m) and still running.</li> <li>• Drilling and chamfering in the same process</li> </ul>
	AC4C-T6 Aluminum Casting M10 Pre-tap holes	$V_c=250\text{m/min}$ $f=0,2\text{mm/rev}$	<ul style="list-style-type: none"> <li>• 80.000 holes/reg (1,840m) and still running.</li> <li>• Drilling and chamfering in the same process</li> </ul>

### ■ DML Type Possible Profiles



- (1) Tolerance for dimension L is more than 0,2mm.
- (2)  $\theta^\circ$  is less than  $180^\circ$ .