

SERIES	DH510	DH515	DH520
DRILLING DEPTH	10XD	15XD	20XD
LENGTH	EXTRA LONG	EXTRA LONG	EXTRA LONG
SIZE MIN	D3.0	D3.0	D3.0
SIZE MAX	D14.0	D12.0	D12.0
PAGE	150	151	151

SURFACE TREATMENT

TiAIN

# SOLID CARBIDE DREAM DRILLS MQL TYPE

Minimum Quantity Lubrication  
Drilling Deep Holes (10×D ~ 40×D)

◎ : Excellent ○ : Good

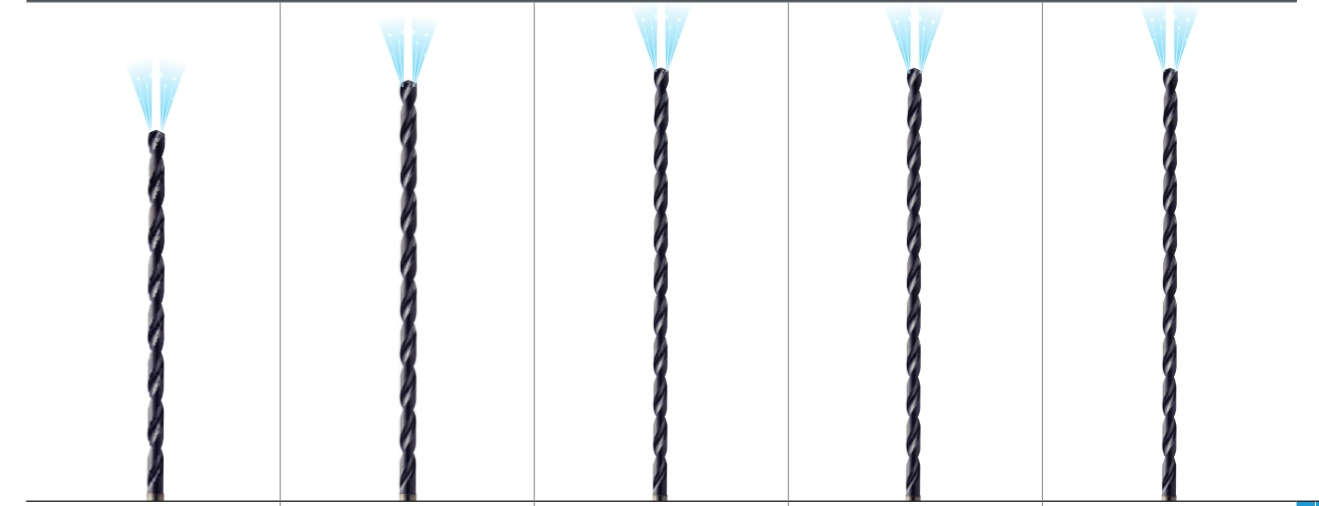
Recommended cutting conditions : P.154



ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc				
P	1	Non-alloy steel	About 0.15% C Annealed	125		◎	◎	◎	
	2		About 0.45% C Annealed	190	13	◎	◎	◎	
	3		About 0.45% C Quenched & Tempered	250	25	○	○	○	
	4		About 0.75% C Annealed	270	28				
	5		About 0.75% C Quenched & Tempered	300	32				
	6	Low alloy steel	Annealed	180	10	◎	◎	◎	
	7		Quenched & Tempered	275	29	○	○	○	
	8		Quenched & Tempered	300	32	○	○	○	
	9		Quenched & Tempered	350	38				
	10	High alloyed steel, and tool steel	Annealed	200	15	○	○	○	
	11		Quenched & Tempered	325	35	○	○	○	
M	12	Stainless steel	Ferritic / Martensitic Annealed	200	15				
	13		Martensitic Quenched & Tempered	240	23				
	14		Austenitic	180	10				
K	15	Grey cast iron	Pearlitic / ferritic	180	10	◎	◎	◎	
	16		Pearlitic (Martensitic)	260	26	○	○	○	
	17	Nodular cast iron	Ferritic	160	3	◎	◎	◎	
	18		Pearlitic	250	25	○	○	○	
	19	Malleable cast iron	Ferritic	130		◎	◎	◎	
	20		Pearlitic	230	21	○	○	○	
N	21	Aluminum-wrought alloy	Not Curable	60					
	22		Curable Hardened	100					
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable	75					
	24		≤ 12% Si, Curable Hardened	90					
	25		> 12% Si, Not Curable	130					
	26	Copper and Copper Alloys (Bronze / Brass)	Cutting Alloys, PB>1%	110					
	27		CuZn, CuSnZn (Brass)	90					
	28	Non Metallic Materials	CuSn, lead-free copper and electrolytic copper	100					
	29		Duroplastic, Fiber Reinforced Plastic						
	30	Rubber, Wood, etc.							
S	31	Heat Resistant Super Alloys	Fe Based	Annealed	200	15			
	32			Cured	280	30			
	33		Ni or Co Based	Annealed	250	25			
	34			Cured	350	38			
	35			Cast	320	34			
	36	Titanium Alloys	Pure Titanium	400 Rm					
	37		Alpha + Beta Alloys	Hardened	1050 Rm				
H	38	Hardened steel	Hardened	550	55				
	39		Hardened	630	60				
	40	Chilled Cast Iron	Cast	400	42				
	41	Hardened Cast Iron	Hardened	550	55				

DHM10	DHM15	DHM20	DHM25	DHM30
10XD	15XD	20XD	25XD	30XD
EXTRA LONG	EXTRA LONG	EXTRA LONG	EXTRA LONG	EXTRA LONG
D3.0	D3.0	D3.0	D3.0	D3.0
D14.0	D12.0	D12.0	D10.0	D8.0
152	152	152	153	153

TiAIN

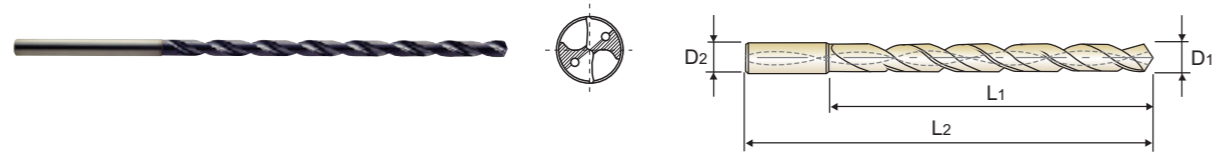


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**CARBIDE, DREAM DRILLS MQL TYPE with COOLANT HOLES** *EXTRA LONG*

● VOLLHARTMETALL DREAM SPIRALBOHRER MQL - TYPE mit KÜHLKANAL in GERADZÄHLIGER SCHAFTAUSFÜHRUNG *ÜBERLANG*  
● Forets DREAM DRILLS carbure Type MQL avec arrosage central, série extra-longue *EXTRA-LONGUE*  
● PUNTE ELICOIDALI IN MD, DREAM DRILLS MQL (con fori di refrigerazione) *EXTRA LUNGA*

- ▶ 4-Facet Point for good centering capability
- ▶ Optimized special flutes are ideal for removing chips and for productive drilling
- ▶ Enhanced chip evacuation by polished flute upgraded TiAlN nano layer full coating
- ▶ MQL system compatible (Minimum Quantity Lubrication)
- ▶ 4-Facetten-Spitze für gute Zentrierfähigkeit
- ▶ Optimierte Spezialnuten für die ideale Spanabfuhr und zum produktiven Bohren
- ▶ Verbesserte Spanabfuhr durch hochglanzpolierte TiAlN-Nano-Vollbeschichtung
- ▶ MMS geeignet



10 × D

EDP No.	Drill Diameter	Shank Diameter	Flute Length	Overall Length	Unit : mm				
					TiAlN	D1	D2	L1	L2
DH510030	3.0	3	39	90	DH510080	8.0	8	104	161
DH510033	3.3	4	46	97	DH510085	8.5	9	111	169
DH510035	3.5	4	46	97	DH510090	9.0	9	117	175
DH510040	4.0	4	52	103	DH510095	9.5	10	124	182
DH510042	4.2	5	59	112	DH510100	10.0	10	130	188
DH510045	4.5	5	59	112	DH510105	10.5	11	137	201
DH510050	5.0	5	65	118	DH510110	11.0	11	143	207
DH510055	5.5	6	72	127	DH510115	11.5	12	150	215
DH510060	6.0	6	78	133	DH510120	12.0	12	156	221
DH510065	6.5	7	85	141	DH510125	12.5	13	163	229
DH510068	6.8	7	91	147	DH510130	13.0	13	169	235
DH510070	7.0	7	91	147	DH510135	13.5	14	176	243
DH510075	7.5	8	98	155	DH510140	14.0	14	182	249

◎ : Excellent ○ : Good

ISO	P										M				K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel		Grey cast iron	Nodular cast iron		Malleable cast iron		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	32	10	29	32	38	15	35	15	23	10	10	26	3	25	21	21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	○	○	○	◎	○	○	○	○	○	◎	○	○	◎	○	◎	○	◎	○

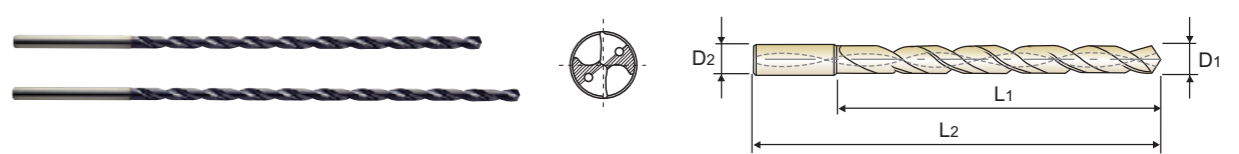
  

ISO	N				S						H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials		Heat Resistant Super Alloys			Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron					
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400Rm	1050Rm	550	630	400	550
Recommended																					

**CARBIDE, DREAM DRILLS MQL TYPE with COOLANT HOLES** *EXTRA LONG*

● VOLLHARTMETALL DREAM SPIRALBOHRER MQL - TYPE mit KÜHLKANAL in GERADZÄHLIGER SCHAFTAUSFÜHRUNG *ÜBERLANG*  
● Forets DREAM DRILLS carbure Type MQL avec arrosage central, série extra-longue *EXTRA-LONGUE*  
● PUNTE ELICOIDALI IN MD, DREAM DRILLS MQL (con fori di refrigerazione) *EXTRA LUNGA*

- ▶ 4-Facet Point for good centering capability
- ▶ Optimized special flutes are ideal for removing chips and for productive drilling
- ▶ Enhanced chip evacuation by polished flute upgraded TiAlN nano layer full coating
- ▶ MQL system compatible (Minimum Quantity Lubrication)
- ▶ 4-Facetten-Spitze für gute Zentrierfähigkeit
- ▶ Optimierte Spezialnuten für die ideale Spanabfuhr und zum produktiven Bohren
- ▶ Verbesserte Spanabfuhr durch hochglanzpolierte TiAlN-Nano-Vollbeschichtung
- ▶ MMS geeignet



15 × D (DH515) 20 × D (DH520)

EDP No.	Drill Diameter	Shank Diameter	Flute Length	Overall Length	Unit : mm				
					TiAlN	D1	D2	L1	L2
DH515030	3.0	3	54	105	DH520030	3.0	3	69	120
DH515035	3.5	4	63	114	DH520035	3.5	4	81	132
DH515040	4.0	4	72	123	DH520040	4.0	4	92	143
DH515045	4.5	5	81	134	DH520045	4.5	5	104	157
DH515050	5.0	5	90	143	DH520050	5.0	5	115	168
DH515055	5.5	6	99	154	DH520055	5.5	6	127	182
DH515060	6.0	6	108	163	DH520060	6.0	6	138	193
DH515070	7.0	7	126	182	DH520070	7.0	7	161	217
DH515080	8.0	8	144	201	DH520080	8.0	8	184	241
DH515090	9.0	9	162	220	DH520090	9.0	9	207	265
DH515100	10.0	10	180	238	DH520100	10.0	10	230	288
DH515110	11.0	11	198	262	DH520120	12.0	12	276	341
DH515120	12.0	12	216	281					

◎ : Excellent ○ : Good

ISO	P										M				K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel		Grey cast iron	Nodular cast iron		Malleable cast iron		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	32	10	29	32	38	15	35	15	23	10	10	26	3	25	21	21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	○	○	○	◎	○	○	○	○	○	◎	○	○	◎	○	◎	○	◎	○

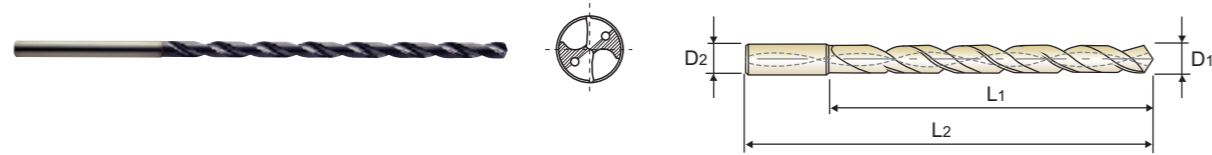
  

ISO	N				S						H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials		Heat Resistant Super Alloys			Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron					
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400Rm	1050Rm	550	630	400	550
Recommended																					

**CARBIDE, DREAM DRILL MQL TYPE END MILL SHANK with COOLANT HOLE** *EXTRA LONG*

● VOLLHARTMETALL DREAM SPIRALBOHRER MQL - TYPE MIT KÜHLKANAL *ÜBERLANG*  
● Forets DREAM DRILLS carbure Type MQL avec arrosage central, série extra-longue *EXTRA-LONGUE*  
● PUNTE MD, DREAM DRILLS MQL GAMBO RINFORZATO (con fori di refrigerazione) *EXTRA LUNGA*

- ▶ 4-Facet Point for good centering capability
  - ▶ Optimized special flutes are ideal for removing chips and for productive drilling
  - ▶ Enhanced chip evacuation by polished flute upgraded TiAIN nano layer full coating
  - ▶ MQL system compatible (Minimum Quantity Lubrication)
- ▶ 4-Facetten-Spitze für gute Zentrierfähigkeit
  - ▶ Optimierte Spezialnuten für die ideale Spanabfuhr und zum produktiven Bohren
  - ▶ Verbesserte Spanabfuhr durch hochglanzpolierte TiAIN-Nano-Vollbeschichtung
  - ▶ MMS geeignet



10 × D (DHM10)	15 × D (DHM15)	20 × D (DHM20)
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**DHM10** Unit : mm

EDP No.	Drill Diameter	Shank Diameter	Flute Length	Overall Length
TiAIN	D1	D2	L1	L2
DHM10030	3.0	6	40	80
DHM10033	3.3	6	47	87
DHM10035	3.5	6	47	87
DHM10040	4.0	6	53	93
DHM10042	4.2	6	60	100
DHM10045	4.5	6	60	100
DHM10050	5.0	6	66	106
DHM10055	5.5	6	73	113
DHM10060	6.0	6	79	119
DHM10065	6.5	8	86	126
DHM10068	6.8	8	92	132
DHM10070	7.0	8	92	132
DHM10075	7.5	8	99	139
DHM10080	8.0	8	105	145
DHM10085	8.5	10	112	156
DHM10090	9.0	10	118	162
DHM10095	9.5	10	126	170
DHM10100	10.0	10	132	176
DHM10105	10.5	12	139	188
DHM10110	11.0	12	145	194
DHM10115	11.5	12	152	201
DHM10120	12.0	12	158	207
DHM10125	12.5	14	165	214
DHM10130	13.0	14	171	220
DHM10135	13.5	14	178	227
DHM10140	14.0	14	184	233

**DHM15** Unit : mm

EDP No.	Drill Diameter	Shank Diameter	Flute Length	Overall Length
TiAIN	D1	D2	L1	L2
DHM15030	3.0	6	55	95
DHM15035	3.5	6	64	104
DHM15040	4.0	6	73	113
DHM15045	4.5	6	82	122
DHM15050	5.0	6	91	131
DHM15055	5.5	6	100	140
DHM15060	6.0	6	109	149
DHM15070	7.0	8	127	167
DHM15080	8.0	8	145	185
DHM15090	9.0	10	163	207
DHM15100	10.0	10	182	226
DHM15110	11.0	12	200	249
DHM15120	12.0	12	218	267

**DHM20** Unit : mm

EDP No.	Drill Diameter	Shank Diameter	Flute Length	Overall Length
TiAIN	D1	D2	L1	L2
DHM20030	3.0	6	70	110
DHM20035	3.5	6	82	122
DHM20040	4.0	6	93	133
DHM20045	4.5	6	105	145
DHM20050	5.0	6	116	156
DHM20055	5.5	6	128	168
DHM20060	6.0	6	139	179
DHM20070	7.0	8	162	202
DHM20080	8.0	8	185	225
DHM20090	9.0	10	208	252
DHM20100	10.0	10	232	276
DHM20110	11.0	12	255	304
DHM20120	12.0	12	278	327

◎ : Excellent ○ : Good

ISO	P										M				K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25	21	21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	○	○	○	◎	○	○	○	○	○	○	○	○	◎	○	◎	○	◎	○

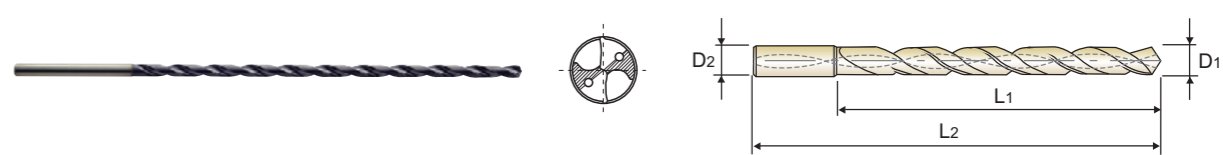
  

ISO	N				S						H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials		Heat Resistant Super Alloys			Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron					
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	55	60	55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400Rm	1050Rm	550	630	400	550
Recommended																					

**CARBIDE, DREAM DRILL MQL TYPE END MILL SHANK with COOLANT HOLE** *EXTRA LONG*

● VOLLHARTMETALL DREAM SPIRALBOHRER MQL - TYPE MIT KÜHLKANAL *ÜBERLANG*  
● Forets DREAM DRILLS carbure Type MQL avec arrosage central, attacheement type fraise, série extra-longue *EXTRA-LONGUE*  
● PUNTE MD, DREAM DRILLS MQL GAMBO RINFORZATO (con fori di refrigerazione) *EXTRA LUNGA*

- ▶ 4-Facet Point for good centering capability
  - ▶ Optimized special flutes are ideal for removing chips and for productive drilling
  - ▶ Enhanced chip evacuation by polished flute upgraded TiAIN nano layer full coating
  - ▶ MQL system compatible (Minimum Quantity Lubrication)
- ▶ 4-Facetten-Spitze für gute Zentrierfähigkeit
  - ▶ Optimierte Spezialnuten für die ideale Spanabfuhr und zum produktiven Bohren
  - ▶ Verbesserte Spanabfuhr durch hochglanzpolierte TiAIN-Nano-Vollbeschichtung
  - ▶ MMS geeignet



25 × D (DHM25)	30 × D (DHM30)
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**DHM25** Unit : mm

EDP No.	Drill Diameter	Shank Diameter	Flute Length	Overall Length
TiAIN	D1	D2	L1	L2
DHM25030	3.0	6.0	85	125
DHM25035	3.5	6.0	99	139
DHM25040	4.0	6.0	113	153
DHM25045	4.5	6.0	127	167
DHM25050	5.0	6.0	141	181
DHM25055	5.5	6.0	155	195
DHM25060	6.0	6.0	169	209
DHM25070	7.0	8.0	197	237
DHM25080	8.0	8.0	225	265
DHM25090	9.0	10.0	253	297
DHM25100	10.0	10.0	282	326

**DHM30** Unit : mm

EDP No.	Drill Diameter	Shank Diameter	Flute Length	Overall Length
TiAIN	D1	D2	L1	L2
DHM30030	3.0	6.0	100	140
DHM30035	3.5	6.0	117	157
DHM30040	4.0	6.0	133	173
DHM30045	4.5	6.0	150	190
DHM30050	5.0	6.0	166	206
DHM30055	5.5	6.0	183	223
DHM30060	6.0	6.0	199	239
DHM30070	7.0	8.0	232	272
DHM30080	8.0	8.0	265	305

▶ Made to order in depth 35 & 40D(3~6mm)

◎ : Excellent ○ : Good

ISO	P										M				K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25	21	21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	○	○	○	◎	○	○	○	○	○	○	○	○	◎	○	◎	○	◎	○

ISO	N				S						H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials		Heat Resistant Super Alloys			Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron					
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	55	60	55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400Rm	1050Rm	550	630	400	550
Recommended																					

**DH510, DH515, DH520, DHM10, DHM15, DHM20, DHM25, DHM30 SERIES with COOLANT HOLES**

RPM = rev./min.  
FEED = mm/rev.

ISO	VDI 3323	Material Description	Vc(m/min)		Parameter	Drill Diameter (mm)			
			10xD ~ 20xD	25xD ~ 30xD		3.0	4.0	5.0	6.0
P	1	Non-alloy steel	120	100	RPM(10xD-20xD)	12730	9550	7640	6370
					RPM(25xD-30xD)	10610	7960	6370	5310
					FEED	0.08-0.12	0.10-0.14	0.12-0.18	0.14-0.20
	2		100	80	RPM(10xD-20xD)	10610	7960	6370	5310
					RPM(25xD-30xD)	8490	6370	5090	4240
					FEED	0.08-0.12	0.10-0.14	0.12-0.18	0.14-0.20
	3		80	65	RPM(10xD-20xD)	8490	6370	5090	4240
					RPM(25xD-30xD)	6900	5170	4140	3450
					FEED	0.06-0.10	0.08-0.12	0.10-0.16	0.12-0.18
	6		100	100	RPM(10xD-20xD)	10610	7960	6370	5310
					RPM(25xD-30xD)	10610	7960	6370	5310
FEED		0.08-0.12			0.10-0.14	0.12-0.18	0.14-0.20		
7	70	60	RPM(10xD-20xD)	7430	5570	4460	3710		
			RPM(25xD-30xD)	6370	4770	3820	3180		
			FEED	0.06-0.10	0.08-0.12	0.10-0.16	0.12-0.18		
8	55	50	RPM(10xD-20xD)	5840	4380	3500	2920		
			RPM(25xD-30xD)	5310	3980	3180	2650		
			FEED	0.06-0.10	0.08-0.12	0.10-0.16	0.12-0.18		
10	60	50	RPM(10xD-20xD)	6370	4770	3820	3180		
			RPM(25xD-30xD)	5310	3980	3180	2650		
			FEED	0.05-0.09	0.07-0.11	0.08-0.14	0.10-0.16		
11	50	45	RPM(10xD-20xD)	5310	3980	3180	2650		
			RPM(25xD-30xD)	4770	3580	2860	2390		
			FEED	0.04-0.08	0.06-0.10	0.07-0.13	0.08-0.14		
M	13	Stainless steel							
K	15	Grey cast iron	90	75	RPM(10xD-20xD)	9550	7160	5730	4770
					RPM(25xD-30xD)	7960	5970	4770	3980
					FEED	0.10-0.14	0.12-0.16	0.17-0.23	0.19-0.25
	16	70	60	RPM(10xD-20xD)	7430	5570	4460	3710	
				RPM(25xD-30xD)	6370	4770	3820	3180	
				FEED	0.10-0.14	0.12-0.16	0.17-0.23	0.19-0.25	
	17	100	80	RPM(10xD-20xD)	10610	7960	6370	5310	
				RPM(25xD-30xD)	8490	6370	5090	4240	
				FEED	0.10-0.14	0.12-0.16	0.17-0.23	0.19-0.25	
	18	70	60	RPM(10xD-20xD)	7430	5570	4460	3710	
				RPM(25xD-30xD)	6370	4770	3820	3180	
				FEED	0.08-0.12	0.10-0.14	0.12-0.18	0.14-0.20	
19	80	65	RPM(10xD-20xD)	8490	6370	5090	4240		
			RPM(25xD-30xD)	6900	5170	4140	3450		
			FEED	0.10-0.14	0.12-0.16	0.17-0.23	0.19-0.25		
20	70	55	RPM(10xD-20xD)	7430	5570	4460	3710		
			RPM(25xD-30xD)	5840	4380	3500	2920		
			FEED	0.08-0.12	0.10-0.14	0.12-0.18	0.14-0.20		

RPM = rev./min.  
FEED = mm/rev.

VDI 3323	Parameter	Drill Diameter (mm)			
		8.0	10.0	12.0	14.0
1	RPM(10xD-20xD)	4770	3820	3180	2730
	RPM(25xD-30xD)	3980	3180	2650	2270
	FEED	0.18-0.24	0.20-0.26	0.22-0.26	0.25-0.31
2	RPM(10xD-20xD)	3980	3180	2650	2270
	RPM(25xD-30xD)	3180	2550	2120	1820
	FEED	0.18-0.24	0.20-0.26	0.22-0.26	0.25-0.31
3	RPM(10xD-20xD)	3180	2550	2120	1820
	RPM(25xD-30xD)	2590	2070	1720	1480
	FEED	0.14-0.20	0.16-0.22	0.18-0.24	0.20-0.26
6	RPM(10xD-20xD)	3980	3180	2650	2270
	RPM(25xD-30xD)	3980	3180	2650	2270
	FEED	0.18-0.24	0.20-0.26	0.22-0.26	0.25-0.31
7	RPM(10xD-20xD)	2790	2230	1860	1590
	RPM(25xD-30xD)	2390	1910	1590	1360
	FEED	0.14-0.20	0.16-0.22	0.18-0.24	0.20-0.26
8	RPM(10xD-20xD)	2190	1750	1460	1250
	RPM(25xD-30xD)	1990	1590	1330	1140
	FEED	0.14-0.20	0.16-0.22	0.18-0.24	0.20-0.26
10	RPM(10xD-20xD)	2390	1910	1590	1360
	RPM(25xD-30xD)	1990	1590	1330	1140
	FEED	0.12-0.18	0.14-0.20	0.16-0.22	0.18-0.24
11	RPM(10xD-20xD)	1990	1590	1330	1140
	RPM(25xD-30xD)	1790	1430	1190	1020
	FEED	0.10-0.16	0.12-0.18	0.13-0.19	0.15-0.21
15	RPM(10xD-20xD)	3580	2860	2390	2050
	RPM(25xD-30xD)	2980	2390	1990	1710
	FEED	0.22-0.28	0.24-0.30	0.28-0.34	0.30-0.36
16	RPM(10xD-20xD)	2790	2230	1860	1590
	RPM(25xD-30xD)	2390	1910	1590	1360
	FEED	0.22-0.28	0.24-0.30	0.28-0.34	0.30-0.36
17	RPM(10xD-20xD)	3980	3180	2650	2270
	RPM(25xD-30xD)	3180	2550	2120	1820
	FEED	0.22-0.28	0.24-0.30	0.28-0.34	0.30-0.36
18	RPM(10xD-20xD)	2790	2230	1860	1590
	RPM(25xD-30xD)	2390	1910	1590	1360
	FEED	0.18-0.24	0.20-0.26	0.22-0.26	0.25-0.31
19	RPM(10xD-20xD)	3180	2550	2120	1820
	RPM(25xD-30xD)	2590	2070	1720	1480
	FEED	0.22-0.28	0.24-0.30	0.28-0.34	0.30-0.36
20	RPM(10xD-20xD)	2790	2230	1860	1590
	RPM(25xD-30xD)	2190	1750	1460	1250
	FEED	0.18-0.24	0.20-0.26	0.22-0.26	0.25-0.31

1. Guide Drilling should be done as Diameter+0.1mm between 3xD and 5xD depth.
2. For Main Drilling, proceed with low RPM at Guide Drilling segment. (RPM 300, FEED 400mm/min)
3. Just before the end of Guide Drilling segment, reduce feed to zero and increase the RPM according to Recommended Cutting Condition chart (See above).

4. After then, proceed main drilling by increasing feed without step drilling.
5. When coming out from Guide Drilling start point after drilling, RPM should be reduced as 300 and feed should be 1000 mm/min.
6. When coming out from Guide Drilling segment to the outside, the feed should be decreased as 50%.