

一般加工用标准刃长型钻头

REGULAR FOR GENERAL APPLICATION

EX-GDR

切削条件 Cutting Conditions | P.423

用途广泛，能实现直径 4~5 倍无停顿式高速加工。

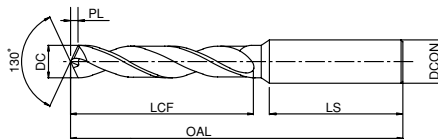
Non-step processing to depth 4~5 times the hole diameter allows this drill to be used for numerous high speed applications.



X 型横刃
X thinning
(DC < 4°)



R 型横刃
R thinning
(4 ≤ DC)



※超过φ13的尺寸为带凹槽直柄，但库存消耗完后将改为普通直柄。

※ For shank size over 13mm, shank geometry "with flat on shank" is changed to "without flat on shank" accordingly.

单位:mm Unit:mm

HSS-Co
TiN
h8
SHANK h7
30°

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	库存 Stock	重量 (g)
60520	2	24	56	3	28.7	0.5		4
62120	2.05				28.8	0.5	4	
60521	2.1	28.9	0.5		4			
62121	2.15	29	0.5		4			
60522	2.2	29.1	0.5		4			
62122	2.25	29.2	0.5		4			
60523	2.3	29.3	0.5		4			
62123	2.35	29.4	0.5		4			
60524	2.4	29.5	0.6		4			
62124	2.45	29.6	0.6		4			
60525	2.5	29.7	0.6		4			
62125	2.55	29.8	0.6		4			
60526	2.6	29.8	0.6	4				
62126	2.65	29.9	0.6	4				
60527	2.7	30	0.6	4				
62127	2.75	30.1	0.6	4				
60528	2.8	30.2	0.7	4				
62128	2.85	30.3	0.7	4				
60529	2.9	30.3	0.7	4				
62129	2.95	30.4	0.7	5				
60530	3	30.5	0.7	5				
62130	3.05	28.8	0.7	6				
60531	3.1	28.9	0.7	7				
62131	3.15	29	0.7	7				
60532	3.2	29.1	0.7	7				
62132	3.25	29.2	0.8	7				
60533	3.3	29.2	0.8	7				
62133	3.35	29.3	0.8	7				
60534	3.4	29.5	0.8	7				
62134	3.45	29.6	0.8	7				
60535	3.5	29.7	0.8	7				
62135	3.55	29.8	0.8	7				
60536	3.6	29.9	0.8	7				
62136	3.65	30	0.9	7				
60537	3.7	30.1	0.9	7				
62137	3.75	30.2	0.9	7				
60538	3.8	30.3	0.9	7				
62138	3.85	30.3	0.9	8				
60539	3.9	30.3	0.9	8				
62139	3.95	30.4	0.9	8				
60540	4	30.5	0.9	8				
62140	4.05	36	0.9	15				
60541	4.1	36	1	15				
62141	4.15	36.2	1	15				
60542	4.2	36.3	1	15				
62142	4.25	36.3	1	15				
60543	4.3	36.5	1	15				
62143	4.35	37.1	1	15				
60544	4.4	37.2	1	15				
62144	4.45	37.3	1	15				
60545	4.5	37.3	1	15				
62145	4.55	37.4	1.1	16				

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	库存 Stock	重量 (g)
60546	4.6	47	91	6	37.6	1.1		16
62146	4.65				37.6	1.1	17	
60547	4.7	37.7	1.1		16			
62147	4.75	37.8	1.1		16			
60548	4.8	37.9	1.1		16			
62148	4.85	38	1.1		17			
60549	4.9	38.7	1.1		17			
62149	4.95	38.7	1.2		17			
60550	5	38.8	1.2		17			
62150	5.05	38.9	1.2		17			
60551	5.1	39	1.2		17			
62151	5.15	39.1	1.2		17			
60552	5.2	39.2	1.2	17				
62152	5.25	39.5	1.2	18				
60553	5.3	39.7	1.2	17				
62153	5.35	39.8	1.2	17				
60554	5.4	39.9	1.3	18				
62154	5.45	40	1.3	18				
60555	5.5	39.8	1.3	19				
62155	5.55	40	1.3	18				
60556	5.6	41.6	1.3	19				
62156	5.65	41.6	1.3	19				
60557	5.7	41.7	1.3	19				
62157	5.75	41.7	1.3	19				
60558	5.8	41.6	1.4	19				
62158	5.85	41.7	1.4	20				
60559	5.9	41.8	1.4	20				
62159	5.95	41.8	1.4	20				
60560	6	42	1.4	20				
62160	6.05	36	1.4	29				
60561	6.1	36	1.4	29				
62161	6.15	36.1	1.4	30				
60562	6.2	36.3	1.4	29				
62162	6.25	36.3	1.5	29				
60563	6.3	37.1	1.5	29				
62163	6.35	37.1	1.5	30				
60564	6.4	37.9	1.5	30				
62164	6.45	37.2	1.5	30				
60565	6.5	37.4	1.5	30				
62165	6.55	37.4	1.5	30				
60566	6.6	37.6	1.5	31				
62166	6.65	37.6	1.6	31				
60567	6.7	37.7	1.6	31				
62167	6.75	37.7	1.6	32				
60568	6.8	37.9	1.6	32				
62168	6.85	37.9	1.6	33				
60569	6.9	38.7	1.6	33				
62169	6.95	38.7	1.6	33				
60570	7	38.8	1.6	33				
62170	7.05	38.8	1.6	34				
60571	7.1	38.9	1.7	34				
62171	7.15	39	1.7	34				

加工材料 Work Material	低碳素钢 软钢	中碳素钢	高碳素钢	合金钢	调质钢		淬火钢				不锈钢	工具钢	铸铁	球墨 铸铁	铜合金	变形铝	铸造 铝合金	钛合金	镍基合金	复合材料 CFRP	镁合金	金属复合 材料 (MMC)
	Low Carbon Steel Mild Steel	Medium Carbon Steel	High Carbon Steel	Alloy Steel	Hardened Steel	Quenched and Tempered Steel	Stainless Steel	Tool Steel	Cast Iron	Ductile Cast Iron	Copper Alloy	Aluminum	Aluminum Alloy Casting	Titanium Alloy	Inconel	Composite Material	Magnesium Alloy	Metal Matrix Composites				
商品记号 Abbreviation	C~0.25%	0.25~0.45%	0.45%~	SCM	~35 HRC	35~45 HRC	45~50 HRC	50~62 HRC	62~70 HRC	SUS	SKD SKS	FC	FCD	Cu	AL	AC			CFRP	AZ91D		
EX-GDR	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

上一页
FROM 直径 DC 2~7.15

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	库存 Stock	重量 (g)
60572	7.2	69	113	8	39.2	1.7		34
62172	7.25				39.2	1.7	34	
60573	7.3				39.6	1.7	34	
62173	7.35				39.7	1.7	34	
60574	7.4				39.8	1.7	35	
62174	7.45				39.9	1.7	35	
60575	7.5				41.5	1.7	35	
62175	7.55				41.5	1.8	36	
60576	7.6				41.6	1.8	36	
62176	7.65				41.6	1.8	37	
60577	7.7				41.7	1.8	37	
62177	7.75	41.7	1.8	37				
60578	7.8	41.6	1.8	38				
62178	7.85	41.7	1.8	38				
60579	7.9	41.8	1.8	38				
62179	7.95	41.8	1.9	38				
60580	8	42	1.9	38				
62180	8.05	42	1.9	56				
60581	8.1	42.1	1.9	56				
62181	8.15	42.1	1.9	56				
60582	8.2	42.3	1.9	56				
62182	8.25	42.3	1.9	57				
60583	8.3	43	1.9	57				
62183	8.35	43.1	1.9	57				
60584	8.4	43.2	2	57				
62184	8.45	43.2	2	58				
60585	8.5	43.3	2	58				
62185	8.55	43.4	2	59				
60586	8.6	43.5	2	60				
62186	8.65	43.6	2	61				
60587	8.7	43.7	2	61				
62187	8.75	43.7	2	61				
60588	8.8	43.8	2.1	61				
62188	8.85	43.9	2.1	61				
60589	8.9	43.9	2.1	61				
62189	8.95	44	2.1	62				
60590	9	44.8	2.1	62				
62190	9.05	44.8	2.1	63				
60591	9.1	45	2.1	63				
62191	9.15	45	2.1	64				
60592	9.2	45.2	2.1	64				
62192	9.25	45.2	2.2	64				
60593	9.3	45.2	2.2	64				
62193	9.35	45.2	2.2	64				
60594	9.4	45.8	2.2	64				
62194	9.45	45.9	2.2	65				
60595	9.5	47.5	2.2	65				
62195	9.55	47.5	2.2	68				
60596	9.6	47.6	2.2	68				
62196	9.65	47.6	2.2	68				
60597	9.7	47.7	2.3	68				
62197	9.75	47.7	2.3	69				

单位:mm Unit:mm

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	库存 Stock	重量 (g)
60598	9.8	137	10	87	47.6	2.3		69
62198	9.85				47.8	2.3	69	
60599	9.9				47.8	2.3	69	
62199	9.95				47.8	2.3	69	
60600	10				48	2.3	70	
62200	10.05				49	2.3	89	
60601	10.1				49.1	2.4	89	
62201	10.15				49.1	2.4	90	
60602	10.2				49.2	2.4	90	
62202	10.25				49.3	2.4	90	
60603	10.3				50	2.4	90	
62203	10.35	50.1	2.4	90				
60604	10.4	50.2	2.4	90				
62204	10.45	50.2	2.4	91				
60605	10.5	50.4	2.4	91				
62205	10.55	50.4	2.5	93				
60606	10.6	50.5	2.5	93				
62206	10.65	50.7	2.5	95				
60607	10.7	50.7	2.5	96				
62207	10.75	50.9	2.5	96				
60608	10.8	50.8	2.5	98				
62208	10.85	51.5	2.5	98				
60609	10.9	51.6	2.5	98				
62209	10.95	51.7	2.6	100				
60610	11	51.7	2.6	99				
62210	11.05	51.9	2.6	100				
60611	11.1	51.9	2.6	100				
62211	11.15	52.1	2.6	100				
60612	11.2	52.1	2.6	100				
62212	11.25	52.5	2.6	102				
60613	11.3	52.6	2.6	102				
62213	11.35	52.8	2.6	102				
60614	11.4	52.8	2.7	102				
62214	11.45	52.9	2.7	103				
60615	11.5	54.5	2.7	103				
62215	11.55	54.6	2.7	104				
60616	11.6	54.6	2.7	104				
62216	11.65	54.6	2.7	105				
60617	11.7	54.7	2.7	105				
62217	11.75	54.7	2.7	106				
60618	11.8	54.6	2.8	106				
62218	11.85	54.7	2.8	109				
60619	11.9	54.8	2.8	109				
62219	11.95	54.8	2.8	110				
60620	12	55	2.8	110				
60621	12.1	55	2.8	110				
60622	12.2	55	2.8	111				
60623	12.3	55	2.9	112				
60624	12.4	55	2.9	114				
60625	12.5	55	2.9	114				
60626	12.6	55	2.9	115				
60627	12.7	55	3	116				

直径 DC 12.8~23.1 NEXT

下一页

●=标准库存品 ●=Standard stock item. □=特定代理店库存品 □=Stocked by specific distributors. Contact us for price & availability.

一般加工用标准刃长型钻头

REGULAR FOR GENERAL APPLICATION

EX-GDR

切削条件 Cutting Conditions | P.423

用途广泛，能实现直径 4~5 倍无停顿式高速加工。

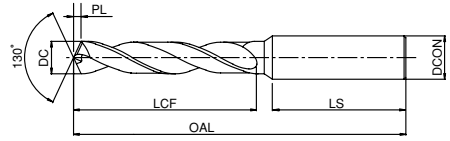
Non-step processing to depth 4~5 times the hole diameter allows this drill to be used for numerous high speed applications.



X 型横刃
X thinning
(DC < 4)



R 型横刃
R thinning
(4 ≤ DC)



※超过φ13的尺寸为带凹槽直柄，但库存消耗完后将改为普通直柄。

※ For shank size over 13mm, shank geometry "with flat on shank" is changed to "without flat on shank" accordingly.



上一页

FROM 直径 DC 7.2 ~ 12.7

单位:mm Unit:mm

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	库存 Stock	重量 (g)
60628	12.8	101	158	12	55	3		117
60629	12.9				55	3	●	118
60630	13				55	3		119
	13.1	85	145		48	3.1		—
	13.2				48	3.1	□	—
	13.3				48	3.1		—
	13.4	90	150	16	48	3.1		—
60635	13.5				48	3.1	●	162
	13.6				48	3.2		—
	13.7				48	3.2	□	—
	13.8				48	3.2		—
	13.9				48	3.2		—
60640	14	95	155	16	48	3.3	●	165
60641	14.1				48	3.3		171
	14.2				48	3.3		—
	14.3				48	3.3	□	—
	14.4				48	3.4		—
60645	14.5				48	3.4	●	176
	14.6	161	161	16	50	3.4		—
	14.7				50	3.4	□	—
	14.8				50	3.5		—
	14.9				50	3.5		—
60650	15				50	3.5	●	244
	15.1	100	166	20	50	3.5		—
	15.2				50	3.5	□	—
	15.3				50	3.6		—
	15.4				50	3.6		—
60655	15.5				50	3.6	●	252
60656	15.6				50	3.6	●	254
	15.7				50	3.7		—
	15.8				50	3.7	□	—
	15.9				50	3.7		—
60660	16				50	3.7	●	261
	16.1	106	172	20	50	3.8		—
	16.2				50	3.8	□	—
	16.3				50	3.8		—
	16.4				50	3.8		—
60665	16.5				50	3.8	●	270
	16.6				50	3.9		—
	16.7				50	3.9	□	—
	16.8				50	3.9		—
	16.9				50	3.9		—
60670	17				50	4	●	279
	17.1	112	178	20	50	4		—
	17.2				50	4	□	—
	17.3				50	4		—
	17.4				50	4.1		—
60675	17.5				50	4.1	●	294
60676	17.6				50	4.1	●	294
	17.7				50	4.1		—
	17.8				50	4.2	□	—
	17.9				50	4.2		—

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	库存 Stock	重量 (g)
60680	18	112	178	20	50	4.2	●	305
	18.1				50	4.2		—
	18.2				50	4.2		—
	18.3	184	184	20	50	4.3	□	—
	18.4				50	4.3		—
	18.5				50	4.3	●	350
60685	18.5	118	194	20	56	4.3		—
	18.6				56	4.4	□	—
	18.7				56	4.4		—
	18.8				56	4.4		—
	18.9				56	4.4		—
60690	19	125	201	25	56	4.4	●	443
	19.1				56	4.5		—
	19.2				56	4.5	□	—
	19.3				56	4.5		—
	19.4				56	4.5		—
60695	19.5				56	4.5		—
60696	19.6				56	4.6	●	461
	19.7				56	4.6		465
	19.8				56	4.6	□	—
	19.9				56	4.6		—
60700	20	128	204	25	56	4.7	●	474
	20.1				56	4.7		—
	20.2				56	4.7	□	—
	20.3				56	4.7		—
	20.4				56	4.8		—
60705	20.5				56	4.8	●	489
	20.6				56	4.8		—
	20.7				56	4.8	□	—
	20.8				56	4.8		—
	20.9				56	4.9		—
60710	21	132	208	25	56	4.9	●	497
60711	21.1				56	4.9		511
	21.2				56	4.9		—
	21.3				56	5	□	—
	21.4				56	5		—
60715	21.5				56	5	●	515
	21.6				56	5		—
	21.7				56	5.1	□	—
	21.8				56	5.1		—
	21.9				56	5.1		—
60720	22				56	5.1	●	529
	22.1				56	5.2		—
	22.2				56	5.2	□	—
	22.3				56	5.2		—
	22.4				56	5.2		—
60725	22.5	136	212	25	56	5.2	●	546
	22.6				56	5.3		—
	22.7				56	5.3	□	—
	22.8				56	5.3		—
	22.9				56	5.3		—
60730	23				56	5.4	●	567
	23.1				56	5.4	□	—

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加工材料 Work Material	低碳素钢 软钢	中碳素钢	高碳素钢	合金钢	调质钢		淬火钢				不锈钢	工具钢	铸铁	球墨 铸铁	铜合金	变形铝	铸造 铝合金	钛合金	镍基合金	复合材料 CFRP	镁合金	金属基 复合材料 (MMC)
	Low Carbon Steel Mild Steel	Medium Carbon Steel	High Carbon Steel	Alloy Steel	Hardened Steel		Quenched and Tempered Steel				Stainless Steel	Tool Steel	Cast Iron	Ductile Cast Iron	Copper Alloy	Aluminum	Aluminum Alloy Casting	Titanium Alloy	Inconel	Composite Material	Magnesium Alloy	Metal Matrix Composites
商品记号 Abbreviation	C~0.25%	0.25~0.45%	0.45%~	SCM	~35 HRC	35~45 HRC	45~50 HRC	50~62 HRC	62~70 HRC		SUS	SKD SKS	FC	FCD	Cu	AL	AC			CFRP	AZ91D	
EX-GDR	○	○	○	○	○							○	○			○	○				○	

上一页

FROM 直径 DC 12.8 ~ 23.1

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	库存 Stock	重量 (g)			
	23.2	136	212	25	56	5.4	—	—			
	23.3				56	5.4	□	—	—		
	23.4				56	5.5	—	—	—		
60735	23.5				56	5.5	●	567			
	23.6				56	5.5	—	—			
	23.7				60	5.5	—	—			
	23.8				60	5.5	□	—			
	23.9				60	5.6	—	—			
60740	24	140	220	32	60	5.6	●	780			
	24.1				60	5.6	—	—	—		
	24.2				60	5.6	—	—	—		
	24.3				60	5.7	□	—	—		
	24.4				60	5.7	—	—	—		
60745	24.5							60	5.7	●	792
	24.6							60	5.7	—	—
	24.7							60	5.8	□	—
	24.8							60	5.8	—	—
	24.9							60	5.8	—	—
60750	25				60	5.8	●	801			
	25.1				60	5.9	—	—			
	25.2				60	5.9	□	—			
	25.3				60	5.9	—	—			
	25.4				60	5.9	—	—			
60755	25.5	145	225	32	60	5.9	●	832			
	25.6				60	6	—	—	—		
	25.7				60	6	□	—	—		
	25.8				60	6	—	—	—		
	25.9				60	6	—	—	—		
60760	26							60	6.1	●	846
	26.1							60	6.1	—	—
	26.2							60	6.1	□	—
	26.3				60	6.1	—	—			
	26.4				60	6.2	—	—			
60765	26.5	150	230	32	60	6.2	●	859			
	26.6				60	6.2	□	—	—		
	26.7				60	6.2	—	—	—		

单位:mm Unit:mm

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	库存 Stock	重量 (g)			
	26.8	150	230	32	60	6.2	—	—			
	26.9				60	6.3	□	—	—		
60770	27							60	6.3	●	908
	27.1							60	6.3	—	—
	27.2							60	6.3	—	—
	27.3							60	6.4	—	—
	27.4							60	6.4	—	—
	27.5							60	6.4	□	—
	27.6							60	6.4	—	—
	27.7							60	6.5	—	—
60780	28	155	235	32	60	6.5	●	917			
	28.1				60	6.6	—	—	—		
	28.2				60	6.6	—	—	—		
	28.3				60	6.6	—	—	—		
	28.4				60	6.6	—	—	—		
	28.5				60	6.6	□	—	—		
	28.6				60	6.7	—	—	—		
	28.7				60	6.7	—	—	—		
	28.8				60	6.7	—	—	—		
	28.9				60	6.7	—	—	—		
60790	29				60	6.8	●	972			
	29.1				60	6.8	—	—			
	29.2				60	6.8	—	—			
	29.3				60	6.8	—	—			
	29.4				60	6.9	—	—			
	29.5				60	6.9	□	—			
	29.6				60	6.9	—	—			
	29.7				60	6.9	—	—			
	29.8				60	6.9	—	—			
	29.9				60	7	—	—			
60800	30				60	7	—	1,028			
60810	31	160	240		60	7.2	●	1,060			
60820	32	165	245		60	7.5	—	1,125			

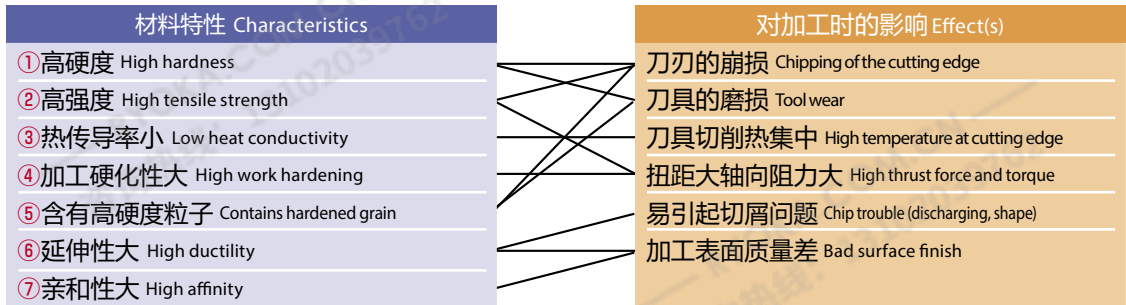
●=标准库存品 ●=Standard stock item. □=特定代理店库存品 □=Stocked by specific distributors. Contact us for price & availability.

难切削材料的钻孔 DRILLING DIFFICULT TO MACHINE MATERIALS

所谓难切削材料就如下所示具有不同种材料特性所组合，为此加工难度非常高，切削材料上钻孔，不仅要把握其特性，选择适当的工具，还需参考下面的注意事项，寻找出合适的切削条件。

Certain materials have special characteristics (listed below), that make drilling difficult. In order to successfully drill these materials, it is critical to use proper cutting conditions based on information about the material and the tool, and to understand how variations of these characteristics can influence the final outcome.

■难切削材料的特性 Characteristics of Difficult to Machine Materials



■具有代表性的难切削材料的加工注意事项 Machining Recommendations for Difficult to Machine Materials

加工材料 Work Material	材料特性 Characteristics	加工建议 Machining Recommendations	推荐钻头 Recommended drills
奥氏体系不锈钢 Austenitic Stainless Steel SUS304, SUS316	<ul style="list-style-type: none"> ●加工硬质大 ●高温强度大 ●热传导率小 ●易延展，易生成刀瘤 ● High work hardening ● High tensile strength at high temperatures ● Low heat conductivity ● High ductility. Easy to get build up at the edge. => chipping 	<ul style="list-style-type: none"> ●应选用高韧性的工具及切削刃锋利的涂层工具。 ●加快进给速度 ●加中切削油 ● Use tough drill material with sharp cutting edge and coating ● High feed rate ● High coolant supply 	ADO-3D NEXUS-GDS ADO-5D NEXUS-GDR EX-SUS-GDS EX-SUS-GDN EX-SUS-GDR MT-SUS-GDR VP-HO-GDS VP-HO-GDR EX-HO-GDR
模具钢 Die Steel SKD11	<ul style="list-style-type: none"> ●含有大而硬的碳化物 ● Made of hard carbide grain (under 0.4%C => carbide grain is melted) 	<ul style="list-style-type: none"> ●应选用高刚性高速工具 ●降低转速，加快进给速度 ● Use high rigid HSS coated tools ● Use lower cutting speed and higher feed rate 	AD-2D ADO-3D AD-4D ADO-5D EX-GDS VPH-GDS EX-GDN EX-GDR
高锰钢 High Manganese Steel SCMnH	<ul style="list-style-type: none"> ●强度高，韧性强 ●加工硬化性大 ● High tensile strength and high toughness ● High work hardening 	<ul style="list-style-type: none"> ●提高工具和机械的刚性，固定夹具 ● Use rigid tools, machine and work clamping device 	AD-2D VPH-GDS AD-4D VP-HO-GDS EX-GDS
钛合金 Titanium Alloy Ti-6Al-4V	<ul style="list-style-type: none"> ●强度高 ●热传导率小 ●与工具的化学亲和力高 ● High tensile strength per Lower case ● Low heat conductivity ● Chemically active High affinity with tools 	<ul style="list-style-type: none"> ●充分冷却，控制发热 ● Use sufficient coolant and low cutting speed to maintain low cutting temperature. 	VP-HO-GDS ADO-3D EX-SUS-GDS ADO-5D EX-GDR VP-HO-GDR EX-HO-GDR
耐热合金 Heat Resistant Alloy Inconel, Hastelloy	<ul style="list-style-type: none"> ●高硬度 ●韧性大，加工硬化大 ● High hardness ● High work hardening Tough Difficult to machine 	<ul style="list-style-type: none"> ●提高工具和机械的刚性 ●使用有刚性的短刃涂层工具 ● Improve rigidity of tools and machines ● Use an Stub Drill with coating and rigidity 	FT-GDS ADO-3D VPH-GDS ADO-5D FT-GDN EX-GDS
高硬度淬火钢 High Hardened Quenched and Tempered Steels	<ul style="list-style-type: none"> ●高硬度剪应力高，抗切削性大 ● High hardness High shearing stress High cutting resistance 	<ul style="list-style-type: none"> ●请选用高硬度的工具和高刚性的工具 ● Use a drill made from high hardened and rigid material if the work material is over 45 HRC, use a carbide drill. 	FHL-GDTS FH-GDN AD-2D VPH-GDS AD-4D FTO-M-GDXL FTO-H-GDXL
高硅铝合金 High Silicon Aluminum Alloy AC9A, A390	<ul style="list-style-type: none"> ●含有高硬度粒子，易引起强烈工具磨损 ● High hardened grain causes large wear on tools 	<ul style="list-style-type: none"> ●请选用高硬度的工具 ●供足切削油 ● Use a drill made from high hardened material ● Provide sufficient coolant supply 	D-GDN NF-GDN
铁镍钴合金 Kovar Fe-Ni-Co 合金	<ul style="list-style-type: none"> ●低热膨胀材料 ●凝着力高易加工 ● Low thermal Expansion material ● Tend to Build-up, but easy to machine 	<ul style="list-style-type: none"> ●请选用大螺旋角切削刃锋利的钻头 ● Use high helix and sharp edge drill 	WX-MS-GDS NEXUS-GDS EX-SUS-GDS NEXUS-GDR EX-SUS-GDR EX-SUS-GDN
钴铬合金 Co-Cr Alloy	<ul style="list-style-type: none"> ●耐腐蚀，韧性好 ●和谐性好 ● Better anti-rust, Better rigidity ● Harmonize with organism 	<ul style="list-style-type: none"> ●使用切屑分断性好，耐磨损的钻头 ● Easy to break chips, but recommended to use better drill on wear resistance 	FT-GDN ADO-3D ADO-5D
复合材料 Composite CFRP GFRP	<ul style="list-style-type: none"> ●内部的硬纤维物质导致强烈磨损 ●易产生细毛和剥离 ● Tough fiber causes exframe wear ● Tend to have naps and peel off 	<ul style="list-style-type: none"> ●请使用锋利且耐磨损的工具 ●防止产生毛刺及毛刺剥离的设计要求 ● Use sharp and wear resistant tools ● Design the tool to prevent naps and peeling 	D-STAD PCD-CF-GDN

EX-黄金钻头切削条件基准表 EX-GOLD DRILLS CUTTING CONDITIONS

EX-GDN·EX-GDR·EX-MT-GDR

加工材料 Work Material	低碳素钢·软钢 Low Carbon Steel Mild Steel S15C-SS400 ~500N/mm ²		碳素钢 Carbon Steel S50C 500 ~ 710N/mm ²		合金钢 Alloy Steel SCM·SCr 710 ~ 900N/mm ²		特殊钢·调质钢 Special Alloy Steel·Hardened Steel				铸铁 Cast Iron FC250 ~350N/mm ²		铸造铝合金 Aluminum Alloy Castings ADC·AC	
	SKD61 ~900N/mm ²		SKD11 900~1060N/mm ²											
切削速度 Cutting Speed	32 ~ 40m/min		22 ~ 30m/min		20 ~ 25m/min		10 ~ 16m/min		8 ~ 12m/min		32 ~ 40m/min		63 ~ 100m/min	
直径 Drill Dia. (mm)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)	转速 Speed (min ⁻¹)	进给量 Feed Rate (mm/rev)
0.5	17,800	0.01 ~ 0.015	12,700	0.01 ~ 0.015	11,100	0.01 ~ 0.015	6,600	0.01 ~ 0.015	5,100	0.01 ~ 0.015	17,800	0.01 ~ 0.015	37,600	0.01 ~ 0.015
1	11,500	0.03 ~ 0.05	8,000	0.03 ~ 0.05	7,000	0.03 ~ 0.05	3,800	0.03 ~ 0.05	3,200	0.03 ~ 0.05	11,500	0.04 ~ 0.06	20,000	0.06 ~ 0.09
2	5,700	0.06 ~ 0.09	4,000	0.06 ~ 0.09	3,500	0.06 ~ 0.09	1,900	0.06 ~ 0.09	1,600	0.06 ~ 0.09	5,700	0.08 ~ 0.11	10,000	0.12 ~ 0.18
3	3,850	0.1 ~ 0.13	2,800	0.1 ~ 0.13	2,400	0.1 ~ 0.13	1,320	0.1 ~ 0.13	1,060	0.1 ~ 0.13	3,850	0.11 ~ 0.16	10,000	0.2 ~ 0.28
4	2,900	0.11 ~ 0.15	2,100	0.11 ~ 0.15	1,800	0.11 ~ 0.15	950	0.11 ~ 0.15	800	0.11 ~ 0.15	2,900	0.13 ~ 0.19	7,500	0.24 ~ 0.34
5	2,260	0.12 ~ 0.18	1,600	0.12 ~ 0.18	1,400	0.12 ~ 0.18	750	0.12 ~ 0.18	630	0.12 ~ 0.18	2,260	0.16 ~ 0.22	6,300	0.28 ~ 0.4
6	1,900	0.13 ~ 0.19	1,320	0.13 ~ 0.19	1,180	0.13 ~ 0.19	630	0.13 ~ 0.19	530	0.13 ~ 0.19	1,900	0.19 ~ 0.26	5,000	0.34 ~ 0.48
8	1,400	0.17 ~ 0.24	1,000	0.17 ~ 0.24	900	0.17 ~ 0.24	480	0.17 ~ 0.24	400	0.17 ~ 0.24	1,400	0.21 ~ 0.3	4,000	0.38 ~ 0.53
10	1,120	0.2 ~ 0.28	800	0.2 ~ 0.28	710	0.2 ~ 0.28	380	0.2 ~ 0.28	320	0.2 ~ 0.28	1,120	0.25 ~ 0.35	3,150	0.45 ~ 0.63
12	950	0.24 ~ 0.34	670	0.24 ~ 0.34	600	0.24 ~ 0.34	320	0.24 ~ 0.34	270	0.24 ~ 0.34	950	0.3 ~ 0.42	2,650	0.53 ~ 0.75
13	880	0.26 ~ 0.36	610	0.26 ~ 0.36	540	0.26 ~ 0.36	290	0.26 ~ 0.36	240	0.26 ~ 0.36	880	0.31 ~ 0.42	2,400	0.56 ~ 0.79
14	820	0.28 ~ 0.39	570	0.28 ~ 0.39	500	0.28 ~ 0.39	270	0.28 ~ 0.39	230	0.28 ~ 0.39	820	0.32 ~ 0.44	2,250	0.57 ~ 0.81
16	720	0.3 ~ 0.43	500	0.3 ~ 0.43	440	0.3 ~ 0.43	240	0.3 ~ 0.43	200	0.3 ~ 0.43	720	0.34 ~ 0.46	1,950	0.61 ~ 0.85
18	640	0.34 ~ 0.49	440	0.34 ~ 0.49	390	0.34 ~ 0.49	210	0.34 ~ 0.49	180	0.34 ~ 0.49	640	0.36 ~ 0.5	1,750	0.63 ~ 0.9
20	570	0.36 ~ 0.5	400	0.36 ~ 0.5	350	0.36 ~ 0.5	190	0.36 ~ 0.5	160	0.36 ~ 0.5	570	0.4 ~ 0.56	1,550	0.68 ~ 0.98
22	520	0.4 ~ 0.55	360	0.4 ~ 0.55	320	0.4 ~ 0.55	170	0.4 ~ 0.55	150	0.4 ~ 0.55	520	0.42 ~ 0.59	1,400	0.73 ~ 1.06
24	480	0.41 ~ 0.6	330	0.41 ~ 0.6	290	0.41 ~ 0.6	160	0.41 ~ 0.6	135	0.41 ~ 0.6	480	0.46 ~ 0.65	1,300	0.77 ~ 1.13
26	440	0.42 ~ 0.65	310	0.42 ~ 0.65	270	0.42 ~ 0.65	150	0.42 ~ 0.65	120	0.42 ~ 0.65	440	0.47 ~ 0.68	1,200	0.81 ~ 1.2
28	410	0.45 ~ 0.7	290	0.45 ~ 0.7	250	0.45 ~ 0.7	140	0.45 ~ 0.7	110	0.45 ~ 0.7	410	0.5 ~ 0.73	1,100	0.84 ~ 1.26
30	380	0.48 ~ 0.75	270	0.48 ~ 0.75	230	0.48 ~ 0.75	130	0.48 ~ 0.75	105	0.48 ~ 0.75	380	0.54 ~ 0.78	1,000	0.87 ~ 1.32
32	360	0.51 ~ 0.8	250	0.51 ~ 0.8	220	0.51 ~ 0.8	120	0.51 ~ 0.8	100	0.51 ~ 0.8	360	0.58 ~ 0.83	950	0.9 ~ 1.38
40	285	0.6 ~ 0.95	200	0.6 ~ 0.95	175	0.6 ~ 0.95	95	0.6 ~ 0.95	80	0.6 ~ 0.95	290	0.7 ~ 1	750	1 ~ 1.6
50	230	0.75 ~ 1.2	160	0.75 ~ 1.2	140	0.75 ~ 1.2	75	0.75 ~ 1.2	65	0.75 ~ 1.1	230	0.85 ~ 1.3	600	1 ~ 2

1. 此切削条件基准表适用于使用水溶性切削油剂的情况。
2. 请使用稀释倍率为5 ~ 10倍的优质水溶性切削油剂。
3. 使用油性切削液或大于10倍的乳化液时，请把切削速度降低20%。
4. 使用铣夹头以外的夹具时，要夹紧，并注意防止振动。
5. 在孔深超过直径4倍的情况，请在上表基础上再适当下调切削速度。
6. 使用直径未满1mm的钻头时，请将切削速度（转速）降低20%。

1. The indicated speeds and feeds are for drilling with **water-soluble coolant**.
2. The most suitable cutting fluid is water-soluble high density coolant (5~10 times dilution).
3. When using non-water-soluble or water-soluble coolant (over 10 times dilution), reduce the drilling speed by 20%.
4. Unless you are using milling chucks, pay careful attention to ensure that the drill is tightly clamped in order to minimize deflection.
5. For drilling depth > 4D, reduce the drilling speed and feed rate appropriately.
6. For drill dia. < 1.0mm, reduce the drilling speed by 20%.