G-LIST No. | DH1024

高速钢NEXUS钻头 标准刃长型

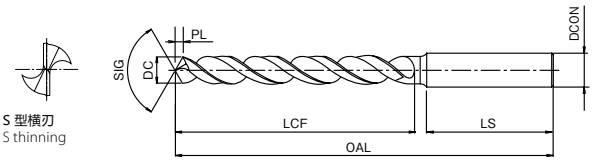
NEXUS DRILL REGULAR

NEXUS-GDR

切削条件 Cutting Conditions | P.419

采用WDI涂层抑制外周刃带的磨损、实现高速领域加工中寿命更长、最适合于加工不锈钢、软钢、铝合金、铜合金等等。

The WDI Coating inhibits wear on the margin to achieve long tool life in high-speed machining. Providing outstanding peifnmanie in stainless steels,aluminum alloys and copper alloys.



HSSE | WDI | h8 | SHANK h7 | 35~40°

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	先端角 SIG	库存 Stock	重量 (g)
8655200	**2**	24	56	3	28.7	0.5	130°	●	4
8655230	**2.3**	27	59		29.2	0.5			5
8655250	**2.5**	30	62		29.6	0.6			5
8655260	**2.6**				29.8	0.6			5
8655280	**2.8**	33	65		30.2	0.7			5
8655300	**3**				30.5	0.7			6
8655330	**3.3**	36	68	4	29.2	0.8			7
8655340	**3.4**	39	71		29.5	0.8			7
8655350	**3.5**				29.7	0.8			7
8655400	**4**	43	75		30.5	0.9			8
8655420	**4.2**		87	6	36.2	1.2	120°		8
8655430	**4.3**	47	91		36.4	1.2			15
8655450	**4.5**				37.3	1.3			20
8655500	**5**	52	96		38.8	1.4			20
8655510	**5.1**				38.9	1.5			17
8655520	**5.2**				39.1	1.5			17

商品号 EDP NO.	直径 DC	槽长 LCF	全长 OAL	柄径 DCON	柄长 LS	先端 PL	先端角 SIG	库存 Stock	重量 (g)
8655550	**5.5**	57	101	6	39.7	1.6	120°	●	17
8655600	**6**				42	1.7			17
8655680	**6.8**	69	113	8	37.9	2			31
8655690	**6.9**				38.6	2			31
8655700	**7**				38.8	2			31
8655800	**8**	75	119		42	2.3			31
8655850	**8.5**		125	10	43.4	2.5			54
8655860	**8.6**	81	131		43.5	2.5			56
8655880	**8.8**				43.9	2.5			56
8655900	**9**				44.8	2.6			58
8656000	**10**	87	137		48	2.9			66
8656030	**10.3**		144	12	49.2	3			82
8656040	**10.4**				50	3			84
8656050	**10.5**				50.2	3			84
8656100	**11**	94	151		51.7	3.2			89
8656200	**12**	101	158		55	3.5			97

加工材料 Work Material / 商品记号 Abbreviation	低碳素钢 软钢 Low Carbon Steel Mild Steel	中碳素钢 Medium Carbon Steel	高碳素钢 High Carbon Steel	合金钢 Alloy Steel	调质钢 Hardened Steel		淬火钢 Quenched and Tempered Steel			不锈钢 Stainless Steel	工具钢 Tool Steel	铸铁 Cast Iron	球墨铸铁 Ductile Cast Iron	铜合金 Copper Alloy	变形铝 Aluminum	铸造铝合金 Aluminum Alloy Casting	钛合金 Titanium Alloy	镍基合金 Inconel	复合材料 CFRP Composite Material	镁合金 Magnesium Alloy	金属基复合材料 (MMC) Metal Matrix Composites
	C~0.25%	C0.25~0.45%	C0.45%~	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	
NEXUS-GDS	◎	○								◎				◎	◎	◎				○	
NEXUS-GDR	◎	○								◎				◎	◎	◎				○	

●=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.

■记号说明请参考P1页。 See p.1 for explanation of icons.

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

材料特性 Characteristics	对加工时的影响 Effect(s)
①高硬度 High hardness	刀刃的崩损 Chipping of the cutting edge
②高强度 High tensile strength	刀具的磨损 Tool wear
③热传导率小 Low heat conductivity	刀具切削热集中 High temperature at cutting edge
④加工硬化性大 High work hardening	扭距大轴向阻力大 High thrust force and torque
⑤含有高硬度粒子 Contains hardened grain	易引起切屑问题 Chip trouble (discharging, shape)
⑥延伸性大 High ductility	加工表面质量差 Bad surface finish
⑦亲和性大 High affinity	

■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	●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	●应选用高韧性的工具及切削刀刃锋利的涂层工具。 ●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 ADO-5D EX-SUS-GDS EX-SUS-GDR VP-HO-GDS EX-HO-GDR NEXUS-GDS NEXUS-GDR EX-SUS-GDN MT-SUS-GDR VP-HO-GDR
模具钢 Die Steel SKD11	●含有大而硬的碳化物 ● Made of hard carbide grain (under 0.4%C =>carbide grain is melted)	●应选用高刚性高速工具 ●降低传速，加快进给速度 ● Use high rigid HSS coated tools ● Use lower cutting speed and higher feed rate	AD-2D AD-4D EX-GDS EX-GDN ADO-3D ADO-5D VPH-GDS EX-GDR
高锰钢 High Manganese Steel SCMnH	●强度高，强韧大 ●加工硬化性大 ● High tensile strength and high toughness High work hardening	●提高工具和机械的刚性，固定夹具 ● Use rigid tools, machine and work clamping device	AD-2D AD-4D VP-HO-GDS EX-GDS VPH-GDS
钛合金 Titanium Alloy Ti-6Al-4V	●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	●充分冷却，控制发热 ● Use sufficient coolant and low cutting speed to maintain low cutting temperature.	VP-HO-GDS EX-SUS-GDS EX-GDR ADO-3D ADO-5D VP-HO-GDR EX-HO-GDR
耐热合金 Heat Resistant Alloy Inconel、Hastelloy	●高硬度 ●韧性大，加工硬化大 ● High hardness ● High work hardening Tough Diifficult to machine	●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 VPH-GDS ADO-3D ADO-5D FT-GDN EX-GDS
高硬度淬火钢 High Hardened Quenched and Tempered Steels	●高硬度剪断应力高，抗切削性大 ● High hardness High shearing stress High cutting resistance	●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 materialif the work material is over 45 HRC, use a carbide drill.	FHL-GDTS AD-2D AD-4D FH-GDN VPH-GDS FTO-M-GDXL FTO-H-GDXL
高硅铝合金 High Silicon Aluminum Alloy AC9A、A390	●含有高硬度粒子，易引起强烈工具磨损 ● High hardened grain causes large wear on tools	●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	●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	●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 EX-SUS-GDS EX-SUS-GDR EX-SUS-GDN NEXUS-GDS NEXUS-GDR
钴铬合金 Co-Cr Alloy	●耐蚀好，韧性好 ●和谐性好 ● Better anti-rust, Better rigidity ● Harmonize with organism	●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	●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 extrame wear ● Tend to have naps and peel off	●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

形状尺寸表 SPECIFICATION CHARTS
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EX-黄金钻头切削条件基准表 EX-GOLD DRILLS CUTTING CONDITIONS

NEXUS-GDR

加工材料 Work Material	不锈钢 Stainless Steel									
	奥氏体系列 Austenitic SUS304 (S:0.02%未满) SUS304N		奥氏体系列 Austenitic SUS304 (S:0.02%以上) SUS303		马氏体系列 Martensitic SUS420·440		铁素体系列 Ferritic SUS430·405		析出硬化系列 Precipitation SUS630·631	
切削速度 Cutting Speed	12～15m/min※		15～25m/min		15～25m/min		15～30m/min		10～20m/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)
1	4,460	0.01 ～ 0.018	6,370	0.02 ～ 0.04	6,370	0.01 ～ 0.02	7,000	0.01 ～ 0.03	4,770	0.01 ～ 0.03
2	2,230	0.02 ～ 0.036	3,180	0.05 ～ 0.07	3,180	0.02 ～ 0.04	3,500	0.03 ～ 0.05	2,390	0.03 ～ 0.05
3	1,490	0.03 ～ 0.054	2,120	0.06 ～ 0.09	2,120	0.03 ～ 0.06	2,330	0.04 ～ 0.06	1,590	0.04 ～ 0.06
4	1,030	0.04 ～ 0.08	1,590	0.08 ～ 0.12	1,590	0.04 ～ 0.08	1,750	0.06 ～ 0.08	1,190	0.06 ～ 0.08
5	830	0.05 ～ 0.1	1,270	0.1 ～ 0.15	1,270	0.05 ～ 0.1	1,400	0.08 ～ 0.1	950	0.08 ～ 0.1
6	690	0.06 ～ 0.12	1,060	0.12 ～ 0.18	1,060	0.06 ～ 0.12	1,170	0.09 ～ 0.12	800	0.09 ～ 0.12
8	480	0.08 ～ 0.16	800	0.16 ～ 0.24	800	0.08 ～ 0.16	880	0.12 ～ 0.16	600	0.12 ～ 0.16
10	380	0.10 ～ 0.2	640	0.2 ～ 0.28	640	0.1 ～ 0.2	700	0.15 ～ 0.2	480	0.15 ～ 0.2
12	320	0.12 ～ 0.24	530	0.24 ～ 0.34	530	0.12 ～ 0.24	580	0.18 ～ 0.24	400	0.18 ～ 0.24

加工材料 Work Material	铝合金延展材 Aluminum A5052·7075		铸造·铝合金 Alminum Alloy Casting AC4C·ADC		铜·铜合金 Copper Copper Alloy C1020·2600		低碳素钢·软钢 Low Carbon Steel Mild Steel S15C·SS400 ～500N/㎟	
切削速度 Cutting Speed	32～63m/min		63～100m/min		40～60m/min		40～60m/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)
1	15,000	0.02 ～ 0.06	25,000	0.02 ～ 0.06	15,920	0.01 ～ 0.03	15,920	0.02 ～ 0.05
2	8,000	0.04 ～ 0.12	10,000	0.04 ～ 0.12	7,960	0.04 ～ 0.06	7,960	0.06 ～ 0.09
3	5,300	0.06 ～ 0.18	6,700	0.06 ～ 0.18	5,310	0.06 ～ 0.09	5,310	0.1 ～ 0.13
4	4,000	0.08 ～ 0.24	6,400	0.08 ～ 0.24	3,980	0.08 ～ 0.11	3,980	0.11 ～ 0.15
5	3,200	0.1 ～ 0.3	5,000	0.1 ～ 0.3	3,180	0.1 ～ 0.13	3,180	0.12 ～ 0.18
6	2,700	0.12 ～ 0.36	4,200	0.12 ～ 0.36	2,650	0.12 ～ 0.15	2,650	0.13 ～ 0.19
8	2,000	0.16 ～ 0.45	3,200	0.16 ～ 0.45	1,990	0.16 ～ 0.2	1,990	0.17 ～ 0.24
10	1,600	0.2 ～ 0.55	2,500	0.2 ～ 0.55	1,590	0.2 ～ 0.25	1,590	0.2 ～ 0.28
12	1,350	0.24 ～ 0.66	2,100	0.24 ～ 0.66	1,330	0.24 ～ 0.3	1,330	0.24 ～ 0.34

1. 此切削条件标准表只适用于使用水溶性切削油剂加工时。
2. 请使用稀释率5到10倍的优质水溶性切削油剂。
3. 铸肌面出现黑皮时，请将切削速度降低20%。
4. 孔深度超过直径的3倍时，请将切削速度降低如下列表。
5. 孔深度超过直径的4倍时，请采用阶梯式进给。
6. 当使用油性切削液和稀释大于10倍的乳化液时，请把切削速度降低20%。
7. 不锈钢的种类与硬度不同、其切削性也会发生变化、请根据实际状况、适当调节切削速度和进给量。(在使用前务必确认Mill sheet。)

※ 钻头直径越大切削时产生的热量越大、而会直接导致溶着现象的产生、以及切屑形状恶化、请根据以下推荐切削速度进行加工。

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 drilling cast surface and black (ie.not ground surface), reduce drilling speed by 20%.
4. For drilling depth>3D.reduce drilling speed (using the table below).
5. Step feeding is required for drilling depth>4D.
6. When using non-water-soluble or water-soluble coolant (over 10 times dilution), reduce the drilling speed by 20%.
7. The machineability of stainless steels may vary depending on the type and hardness. Therefore, adjust the cutting speed and the feed rate to suit the conditions. (Be sure to check the Mill Sheet before use.)

※ The larger the drill diameter, the higher the milling temperature generated during machining, which can lead to fusing and deterioration of the shape of the cutting chips. Therefore, use a setting that is lower than the recommended cutting speed.

D : drill dia

孔深(D为直径) Depth of Hole	4D以下 ≦4D	5D以下 ≦5D	6D以下 ≦6D
切削速度抑制系数 Coefficient for reducing speed	×0.9	×0.8	×0.8