

铜·铝加工用内冷油孔硬质合金超长刃型

CARBIDE EXTRA LONG DRILL FOR COPPER ALLOYS ALUMINUM ALLOYS WITH INTERNAL COOLANT SUPPLY

CAO-GDXL

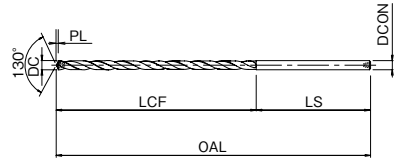
切削条件 Cutting Conditions **P.397**

15D-30D 的超深孔加工一气呵成。其加工效率和工具寿命为枪钻，高速钢钻头的数倍。

For non-step drilling deep holes from 15D ~ 30D. Greatly increases productivity and tool life compared to gun drills and HSS drills.



X 型横刃
X thinning



15D用 For 15D operation

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)
8567130	3 × 15D	55	105	3	50	0.7	●	10
8567140	4 × 15D	75	125	4	50	0.9		20
8567150	5 × 15D	90	140	5	50	1.2		31
8567160	6 × 15D	110	160	6	50	1.4		46
8567165	6.5 × 15D	120	175	7	50	1.5		60

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)
8567170	7 × 15D	125	175	7	50	1.6	●	62
8567180	8 × 15D	145	195	8	50	1.9		88
8567190	9 × 15D	160	210	9	50	2.1		115
8567200	10 × 15D	180	240	10	60	2.3		163

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CARBIDE
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硬质合金
铰刀

加工材料 Work Material	低碳素钢	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%	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	
CAO-GDXL														○	○	○					

●=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P.1页。 See p.1 for explanation of icons.

G-LIST No. | DW1012

铜·铝加工用内冷油孔硬质合金超长刃型
CARBIDE EXTRA LONG DRILL FOR COPPER ALLOYS ALUMINUM ALLOYS WITH INTERNAL COOLANT SUPPLY

CAO-GDXL

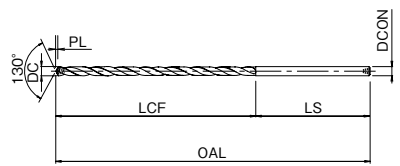
切削条件 Cutting Conditions | P.398

15D-30D 的超深孔加工一气呵成。其加工效率和工具寿命为枪钻，高速钢钻头的数倍。

For non-step drilling deep holes from 15D ~ 30D. Greatly increases productivity and tool life compared to gun drills and HSS drills.



X型横刃
X thinning



CARBIDE

20D用 For 20D operation

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)
8567340	4 × 20D	90	140	4	50	0.9		21
8567345	4.5 × 20D	110	165	5	50	1		29
8567350	5 × 20D	115			50	1.2	●	33
8567355	5.5 × 20D	140	190	6	50	1.3		46
8567360	6 × 20D				50	1.4		51

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)
8567370	7 × 20D	160	210	7	50	1.6		72
8567380	8 × 20D	180	230	8	50	1.9		104
8567390	9 × 20D	210	260	9	50	2.1	●	136
8567400	10 × 20D	230	290	10	60	2.3		194

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加工材料 Work Material	低碳素钢	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%	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	
CAO-GDXL														○	○	⊙					

●=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.

硬质合金钻头切削条件基准表 CARBIDE DRILLS CUTTING CONDITIONS

CAO-GDXL

15D用
For 15D

加工材料 Work Material	铝铸件 Aluminum Die Castings Aluminum Alloy Castings ADC·AC	铝延展材 Aluminum A20系·A70系	铝延展材 Aluminum A50系·A60系	铜合金 Copper Alloys C1020·C1100	铜合金 Copper Alloys CrCu·黄铜 Brass					
切削油剂 Coolant	水溶性切削油使用の場合 Use water-soluble									
切削速度 Cutting Speed	80 ~ 200m/min	60 ~ 120m/min	80 ~ 200m/min	80 ~ 200m/min	60 ~ 120m/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)
3	12,800	0.09 ~ 0.15	10,700	0.09 ~ 0.15	12,800	0.06 ~ 0.12	12,800	0.06 ~ 0.12	10,700	0.05 ~ 0.09
4	9,600	0.12 ~ 0.2	8,000	0.12 ~ 0.2	9,600	0.08 ~ 0.16	9,600	0.08 ~ 0.16	8,000	0.06 ~ 0.1
5	7,700	0.15 ~ 0.25	6,400	0.15 ~ 0.25	7,700	0.1 ~ 0.2	7,700	0.1 ~ 0.2	6,400	0.06 ~ 0.1
6	6,400	0.18 ~ 0.3	5,400	0.18 ~ 0.3	6,400	0.12 ~ 0.2	6,400	0.12 ~ 0.2	5,400	0.06 ~ 0.1
8	4,800	0.2 ~ 0.4	4,000	0.2 ~ 0.4	4,800	0.12 ~ 0.25	4,800	0.12 ~ 0.25	4,000	0.08 ~ 0.15
10	3,900	0.25 ~ 0.5	3,200	0.25 ~ 0.5	3,900	0.15 ~ 0.25	3,900	0.15 ~ 0.25	3,200	0.08 ~ 0.15

1. 进行 MQL 加工时，请参照以下条件。加工 A50、A60 系的铝合金时，若钻头直径小于 5mm，切削速度为 60m/min ~ 100m/min。进给量以 (0.02-0.03)x D 为基准，最大不可超过 0.15mm/rev。加工 A20、A70 系的铝合金以及铜合金时，请与本公司销售人员联系。
 2. 若使用水溶性切削油剂，请使用稀释倍率为 20 倍 ~ 30 倍的优质产品。
 3. 若使用油性切削油剂，请将切削速度降低至最小数值的 70% 左右。
 4. 若钻头推出时为断续切削，或者加工干涉孔时，请降低进给量。
 5. 切削条件的范围设定的较广，这是因为考虑到设备，切削油剂、工作的夹持状况等周边环境可能对加工条件的影响。
1. When machining with MQL (Minimum Quantity Lubrication), please follow these conditions. When drilling A50 & A60 aluminum, if the drill diameter is less than 5mm, please set the cutting speed to 60m/min~100m/min. With a target feed amount of (0.02~0.03) x D, be sure not to exceed a maximum of 0.15mm/rev. Please contact our sales staff when drilling A20 & A70 aluminum and copper alloys.
 2. The most suitable cutting fluid is water-soluble coolant (20-30 times dilution).
 3. When using non-water-soluble coolant, set the drilling speed between 70-100% of the lowest limit.
 4. When coming through to intermittent drilling and drilling interrupting holes, reduce the feed rate.
 5. There is a wide range of cutting conditions, and these should be chosen based on a wide variety of factors including the machine, cutting fluid and workholding.

使用30D用的 CAO-GDXL 时，请与我公司营业担当联络。To use CAO-GDXL for 30D times the drill diameter, please contact our sales.

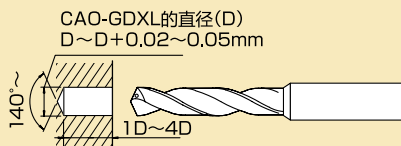
■ CAO-GDXL 的推荐加工方法 Recommended operation for using CAO-GDXL

① 导向孔加工 Make a pilot hole.

● 导向孔加工时请选用与 CAO-GDXL 的直径相同或大 0.02~0.05mm 的钻头。推荐在加工时将导向孔尽量加深。
For a pilot hole, select same size or 0.02~0.05mm larger size drill than CAO-GDXL.

● 导向孔加工工具推荐下表产品。
The recommended drills for a pilot hole are listed below.

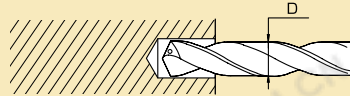
· ADO-3D · ADO-PLT



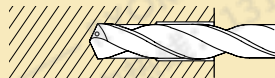
★ 弯曲部加工时，在定位孔加工前请先用 FX-ZDS 沉孔加工铣刀进行如图所示的沉孔加工。
When working on a curved surface, use the FX-ZDS (end mill for counterboring) to counterbore a pilot hole.



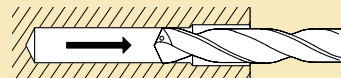
② CAO-GDXL 已停止或低转速插入 Insert the CAO-GDXL into a pilot hole with zero or low revolution.



③ 加速至规定转速后开始加工 Increase the revolution to the designated speed and start drilling.



④ 加工后，拔出钻头时，在钻头离开孔底后，请降低转速拔出。 After drilling, move the drill away from the bottom of the hole; then reduce its speed while pulling it out of the hole.



* 加工时请务必使用内冷方式。
Make sure to use an internal coolant supply when drilling.

硬质合金钻头切削条件基准表 CARBIDE DRILLS CUTTING CONDITIONS

CAO-GDXL

20D用
For 20D

加工材料 Work Material	铝铸件 Aluminum Die Castings Aluminum Alloy Castings ADC·AC	铝延展材 Aluminum A20系·A70系	铝延展材 Aluminum A50系·A60系	铜合金 Copper Alloys C1020·C1100	铜合金 Copper Alloys CrCu·黄铜 Brass					
切削油剂 Coolant	水溶性切削油使用の場合 Use water-soluble									
切削速度 Cutting Speed	80~200m/min	60~120m/min	80~200m/min	80~200m/min	60~120m/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)
3	12,800	0.09~0.15	10,700	0.09~0.15	12,800	0.06~0.12	12,800	0.06~0.12	10,700	0.05~0.09
4	9,600	0.12~0.2	8,000	0.12~0.2	9,600	0.08~0.16	9,600	0.08~0.16	8,000	0.06~0.1
5	7,700	0.15~0.25	6,400	0.15~0.25	7,700	0.1~0.2	7,700	0.1~0.2	6,400	0.06~0.1
6	6,400	0.18~0.3	5,400	0.18~0.3	6,400	0.12~0.2	6,400	0.12~0.2	5,400	0.06~0.1
8	4,800	0.2~0.4	4,000	0.2~0.4	4,800	0.12~0.25	4,800	0.12~0.25	4,000	0.08~0.15
10	3,900	0.25~0.5	3,200	0.25~0.5	3,900	0.15~0.25	3,900	0.15~0.25	3,200	0.08~0.15

1. 进行MQL加工时,请参照以下条件。加工A50、A60系的铝合金时,若钻头直径小于5mm,切削速度为60m/min~100m/min。进给量以(0.02-0.03)xD为基准,最大不可超过0.15mm/rev。加工A20、A70系的铝合金以及铜合金时,请与本公司销售人员联系。
2. 若使用水溶性切削油剂,请使用稀释倍率为20倍~30倍的优质产品。
3. 若使用油性切削油剂,请将切削速度降低至最小数值的70%左右。
4. 若钻头推出时为断续切削,或者加工干涉孔时,请降低进给量。
5. 切削条件的范围设定的较广,这是因为考虑到设备,切削油剂、工作的夹持状况等周边环境对可能加工条件的影响。

1. When machining with MQL (Minimum Quantity Lubrication), please follow these conditions. When drilling A50 & A60 aluminum, if the drill diameter is less than 5mm, please set the cutting speed to 60m/min~100m/min. With a target feed amount of (0.02~0.03) x D, be sure not to exceed a maximum of 0.15mm/rev. Please contact our sales staff when drilling A20 & A70 aluminum and copper alloys.
2. The most suitable cutting fluid is water-soluble coolant (20-30 times dilution).
3. When using non-water-soluble coolant, set the drilling speed between 70~100% of the lowest limit.
4. When coming through to intermittent drilling and drilling interrupting holes, reduce the feed rate.
5. There is a wide range of cutting conditions, and these should be chosen based on a wide variety of factors including the machine, cutting fluid and workholding.

使用30D用的CAO-GDXL时,请与我公司营业担当联络。To use CAO-GDXL for 30D times the drill diameter, please contact our sales.

CAO-GDXL的推荐加工方法 Recommended operation for using CAO-GDXL

①导向孔加工

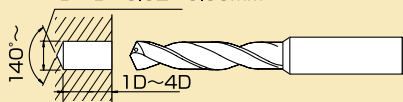
Make a pilot hole.

●导向孔加工时请选择与CAO-GDXL的直径相同或大0.02~0.05mm的钻头。推荐在加工时将导向孔尽量加深。
For a pilot hole, select same size or 0.02~0.05mm larger size drill than CAO-GDXL.

●导向孔加工工具推荐下表产品。
The recommended drills for a pilot hole are listed below.

·ADO-3D·ADO-PLT

CAO-GDXL的直径(D)
D~D+0.02~0.05mm

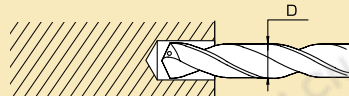


★弯曲部加工时,在定位孔加工前请先用FX-ZDS沉孔加工铣刀进行如图所示的沉孔加工。
When working on a curved surface, use the FX-ZDS (end mill for counterboring) to counterbore a pilot hole.



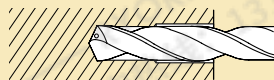
②CAO-GDXL已停止或低转速插入

Insert the CAO-GDXL into a pilot hole with zero or low revolution.



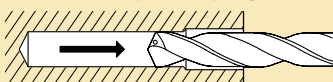
③加速至规定转速后开始加工

Increase the revolution to the designated speed and start drilling.



④加工后,拔出钻头时,在钻头离开孔底后,

请降低转速拔出。
After drilling, move the drill away from the bottom of the hole; then reduce its speed while pulling it out of the hole.



*加工时请务必使用内冷方式。

Make sure to use an internal coolant supply when drilling.

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TAPS

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板牙
ROUND
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CARBIDE
REAMER
硬质合金
铰刀