

WD I[®] 涂层

WDO硬质合金内冷油孔钻头系列

Coolant-Through WDO Carbide Drill Series

10D·15D·20D·30D
深孔加工型

0.1mm间隔

尺寸齐全!

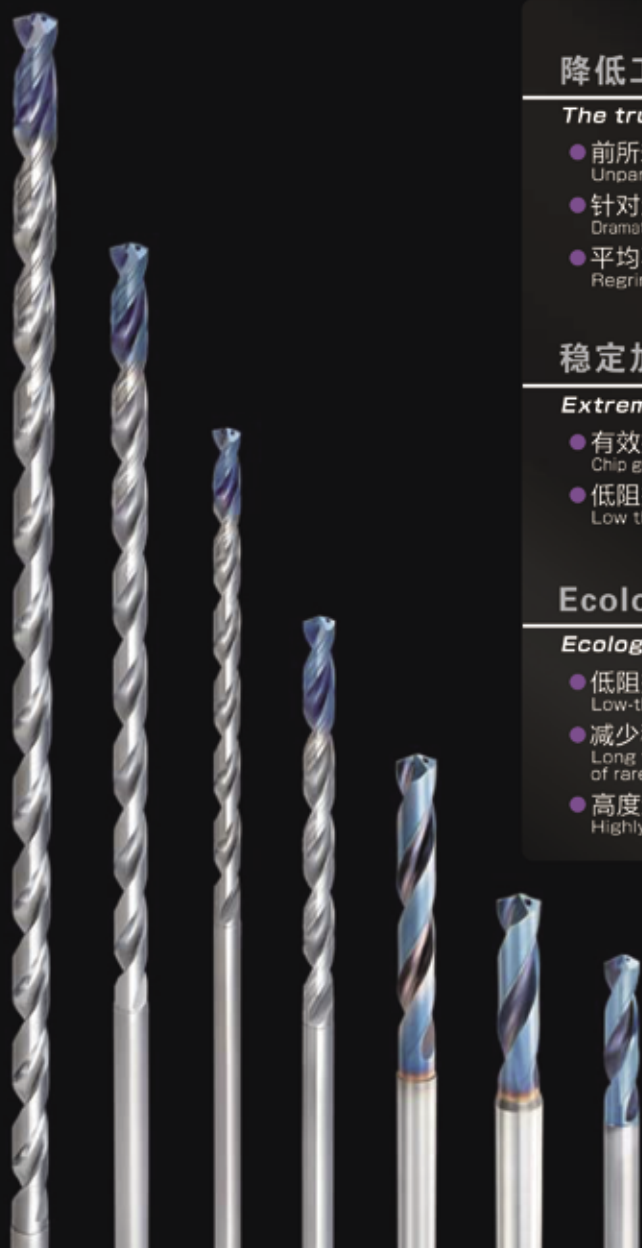
10D, 15D, 20D and 30D additional sizes in 0.1mm increments have been added!

深孔加工

一般加工

WDO 339 + 306 = 全645种尺寸

WDO offers Long Type 339 + Short Type 306 = Total 645 Items.



降低工具成本的 王牌

The trump card for reducing tool costs

- 前所未有的长寿命
Unparalleled long tool life
- 针对炭素钢及铸铁加工能大幅抑制对刃带的磨损
Dramatically inhibits margin wear when working on carbon steel and cast iron
- 平均再研磨次数
Regrinding frequency with minimal variance

稳定加工的 极限

Extremely stable machining

- 有效控制切屑，排屑流畅
Chip generation is controlled, promoting smooth chip evacuation
- 低阻抗，无异常扭矩
Low thrust and disturbance-free machining torque

Ecology的 共生

Ecological coexistence

- 低阻抗带来能耗的降低
Low-thrust for reduced electricity consumption
- 减少稀有金属的浪费，增加寿命和再研磨次数
Long tool life and high regrinding frequency prevents waste of rare metal
- 高度适应各种机加工环境
Highly adaptable to a variety of machining environments

90%以上!
工具費削減

90% Over!

Powerfully supports manufacturing through tool cost reduction!

切削范围广泛!

The wide product lineup provides ideal machining conditions for every application!

根据钢材加工的加工深度·用途，采用最适合的加工刀具!

An ideal point form has been adopted for machining depth and utility in machining steels!

- 对稳定性有要求的深孔加工用钻头，采用了重视强度的直线形切削刃。
- 要求成孔高质量的3D·5D孔加工用钻头，采用了重视切削性的波纹刃形。

A strong, direct-cutting point has been adopted for deep hole drilling that requires stability.

A sharp wave point form has been adopted for high-quality 3D/5D drilling.

【孔径制作对应表】 Production Table by Drill Diameter

■ 标准库存品
Standard stock item.
Stocked by specific distributors

■ 订单对应 (根据情况有可能无法对应。)
Special order item
(Under certain circumstances, some drills cannot be produced.)

■ 请联系我司营业人员。根据情况有可能无法对应。
Please contact our sales staff for more information.
Under certain circumstances, some drills cannot be produced.

外径 Dc	L/D	PLT	3D	5D	10D	15D	20D	25D	30D	35D	40D	45D	50D
2.76													
2.78													
2.8							64						
2.9							67						
3							69						
3.03													
3.1									102				
3.2									106				
3.3									109				
3.4									112				
3.5									116				
3.53													
3.6									119				
3.66													
3.68													
3.7									122				
3.8									125				
3.9									129				
4									132				
4.03													
4.1										156			
4.2										160			
4.3										163			
4.4										167			
4.5										171			
4.53													
4.6										175			
4.62													
4.64													
4.7										179			
4.8										182			
4.9										186			
5										190			
5.1										194			
5.03													
5.2										198			
5.3										201			
5.4										205			
5.5										209			
5.52													
5.53													
5.54													
5.6										213			
5.7										217			
5.8										220			

外径 Dc	L/D	PLT	3D	5D	10D	15D	20D	25D	30D	35D	40D	45D	50D
5.9										224			
6										228			
6.03													
6.1										232			
6.2										236			
6.3										239			
6.4										243			
6.5										247			
6.53													
6.6										251			
6.7										255			
6.8										258			
6.9										262			
7										266			
7.03													
7.1										270			
7.2										274			
7.3										277			
7.36													
7.38													
7.4										281			
7.5										285			
7.52													
7.54													
7.6										289			
7.7										293			
7.8										296			
7.9										300			
8										304			
8.03													
8.1										308			
8.2										312			
8.3										315			
8.4										319			
8.5										323			
8.53													
8.6										327			
8.7										331			
8.8										334			
8.9										338			
9										342			
9.03													
9.1										300			
9.2										304			
9.24													

表中数值为可以制作的最大槽长。 The values in the table indicate the maximum possible flute lengths.

我们的目标“发挥潜在力，彻底解决客户需求”

- 对应客户的种种需求，选取最佳的产品设计并获得订单。
- 针对通用性较高的大量需求，备有丰富的标准品系列并可及时发货。

这就是OSG新硬质合金内冷油孔钻头系列!

Aimed at "Complete satisfaction of needs" and "Exceeding potential!"
 · The depth and breadth of our customers' various needs can be met through specially-designed tools.
 · An abundant lineup of standard products can be delivered immediately to meet the wide range of general-purpose needs.
 That is OSG's Coolant-Through WDO Carbide Drill Series

通用性 General-Purpose

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Stocked by specific distributors

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外径 Dc	L/D	PLT	3D	5D	10D	15D	20D	25D	30D	35D	40D	45D	50D
9.26													
9.3									307				
9.36													
9.38													
9.4									310				
9.5									314				
9.52													
9.54													
9.6									317				
9.7									320				
9.8									323				
9.9									327				
10									330				
10.03													
10.1								283					
10.2								286					
10.3								288					
10.4								291					
10.5								294					
10.6								297					
10.7								300					
10.8								302					
10.9								305					
11								308					
11.1								311					
11.2								314					
11.22													
11.24													
11.3								316					
11.36													
11.38													
11.4								319					
11.5								322					
11.6								325					
11.7								328					
11.8								330					
11.9								333					
12								336					
12.1							278						
12.2							281						
12.3							283						
12.4							285						
12.5							288						
12.6							290						
12.7							292						

外径 Dc	L/D	PLT	3D	5D	10D	15D	20D	25D	30D	35D	40D	45D	50D
12.8							294						
12.9							297						
13							299						
13.1							301						
13.2							304						
13.25													
13.3							306						
13.4							308						
13.5							311						
13.6							313						
13.7							315						
13.8							317						
13.9							320						
14							322						
14.1							324						
14.2							327						
14.3							329						
14.4							331						
14.5							334						
14.6							336						
14.7							338						
14.8							340						
14.9							343						
15							345						
15.1							272						
15.2							274						
15.25													
15.3							275						
15.4							277						
15.5							279						
15.6							281						
15.7							283						
15.8							284						
15.9							286						
16							288						
16.5							297						
17							306						
17.5							315						
18							324						
18.5													
19													
19.5													
20													
20~													

表中数值为可以制作的最大槽长。 The values in the table indicate the maximum possible flute lengths.



降低工具成本的王牌

The trump card for reducing tool costs

抑制肩部及刃带磨损

采用新开发的钻头专用WDI® 涂层

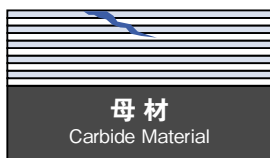
The WDI® Coating has been adopted specially for the newly developed drill to inhibit wear at the cutting edge and margin.

复合多层构造

Multi-Layer Construction

可抑制钻孔加工时导致的裂纹传播。加工碳素钢、铸铁是效果显著。

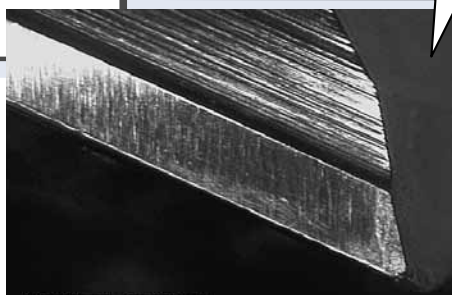
WDO will control the cracks to spread which tend to happen during the drilling operation.



母材
Carbide Material

大幅抑制对研磨量(工具费)有很大影响的外周横刃的磨损。

WDO controls dramatically the wear amount at outer diameter margin which will effect major regrinding cost.



WDI®涂层 WDI® coating

3,300HV 的高硬度涂层

3,300HV Coating Hardness

优异的耐磨损性能, 实现稳定长寿命的加工, 这是WDO系列钻头的重要因素。

WDO shows consistent longer tool life with superior friction-resistance which is one of the major factor of WDO seriee drills.



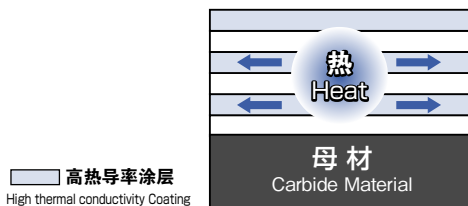
TiAlN涂层 (传统涂层)
TiAlN coating (previous coating)

1,100°C 高温氧化开始温度

1,100°C Oxidation Temperature

独特的热扩散性涂层构造, 可以防止切削热滞留在切削刃上, 在针对高硬度材料的高速加工、高进给加工、MQL加工中发热量增大, 涂层性能能被最好的体现出来。

WDO will avoid the built up heat during cutting action by the unique coating with heat defusion capability. The unique coating will show the superior capability even on high speed, high feed and MQL operations.



高热导率涂层
High thermal conductivity Coating

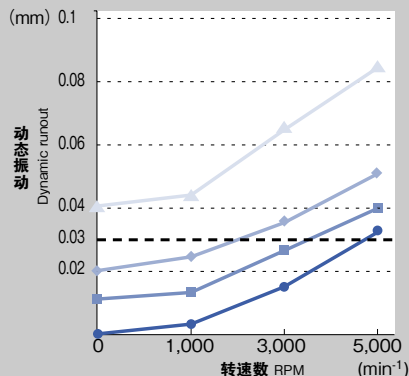
	涂层构造 Coating Structure	厚度(μm) Thickness	硬度(HV) Surface Hardness	氧化开始温度(°C) Oxidation Temperature
WDI®涂层 WDI® coating	复合多层 Multiple layer	3.5	3,300	1,100
TiAlN系涂层 TiAlN coating	2层 Dual layer	4	2,700	800

深孔钻实现稳定加工的关键

Key point for stable drilling with long drills

工具装夹时的跳动会随着转速的提高而上升。右为上升量的示意图。OSG为了实现更加稳定的加工, 推荐“使用+0.02~0.08mm的导向孔钻头”及“长钻头以停止或低转速状态插入”两种方法。其理由正如右图所示, 转速提高后, 加工时跳动随之增大, 有超出导向孔公差的风险性。因此不仅仅要一直静止时的跳动, 而且要按照长钻头推荐加工方法(参照P20页)才能有效控制跳动。

The runout of a gripped cutting tool increases with the speed. The graph on the right indicates this increase. To ensure a higher level of work stability, OSG recommends "making +0.02~0.08mm pilot holes" and "inserting long drills stopped or at low speeds". The reason for this is made evident in the graph on the right: increasing the speed increases the dynamic runout, posing a higher risk of the drill not fitting properly in the pilot hole. Therefore, this is effective not only for inhibiting static runout, but is also the recommended drilling method for long drills (see page 20).



静态振幅 Static runout (mm)	0mm	0.01mm	0.02mm	0.04mm
1,000 RPM	0.003	0.013	0.024	0.046
3,000 RPM	0.014	0.026	0.036	0.066
5,000 RPM	0.033	0.04	0.049	0.087

使用工具 tool: φ6×30D



稳定加工的极限

Extremely stable machining

根据加工深度采用最适合的方法

The most suitable specifications based on drilling depth have been adopted.

WDO-10D·15D·20D·30D 深孔钻的特点 Special characteristics of WDO-10D, 15D, 20D, 30D Long Type

① 直线形切削刃，保证切削刃的强度

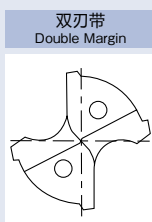
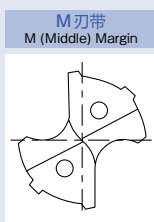
对于悬长较长的长钻头，解决刃尖负荷的对策就是采用直线形切削刃和外周正前角。由此将切削刃的研磨量最适化，实现刃尖强度和低切削抵抗的平衡。

The linear cutting edge ensures superior point strength

As a countermeasure against loads applied to the point of long drills with long projection lengths, a linear cutting edge and a negative peripheral rake angle have been adopted. This results in optimizing the honing amount of the cutting edge, as well as achieving both superior point strength and low cutting resistance.

② 采用 M(Middle) 刃带

与一般的双刃带设计在外周圆中心部设计第二刃带所不同，从切入部位开始形成双刃带，缩短了钻头到达四点定位的时间。另外，采用交叉孔。斜面贯通等设计提高了断续切削时的稳定性。



Adoption of M (Middle) Margin

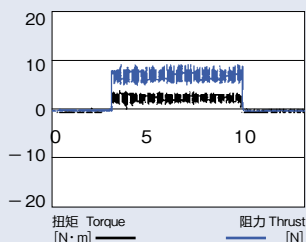
Unlike the conventional double margin, the second margin has been placed in the center of the peripheral land. This has shortened the time from the start of the bite to the four-point restraint by the double margin. Furthermore, it has improved stability during intermittent cutting such as cross-drilling or when penetrating an angled surface.

③ 控制排屑并且实现稳定的低阻抗

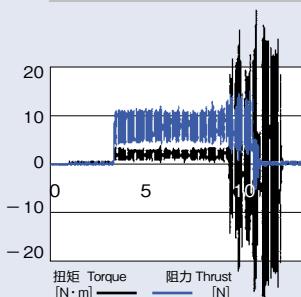
Controls chip generation and achieves low thrust and stable torque

加工材质 Work Material	S50C
切削速度 Drilling Speed	100m/min (6,369min ⁻¹)
进给速度 Feed	1,273mm/min (0.2mm/rev)
切深量 Depth of Hole	150mm (盲孔) (Blind)
切削油剂 Coolant	MQL MQL—ECO MQL = Environmentally friendly
使用机床 Machine	卧式加工中心 Horizontal Machining Center

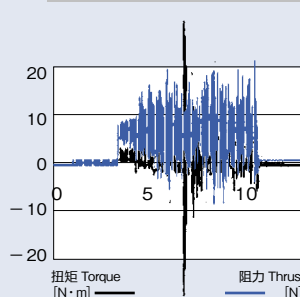
WDO-30D φ5



其他公司产品 A φ5 Competitor A



其他公司产品 B φ5 Competitor B



WDO-3D·5D 的特点 Special characteristics of WDO-3D, 5D

采用了重视切削性能的“波浪形”刃型 A new wave point form that emphasizes sharpness has been adopted

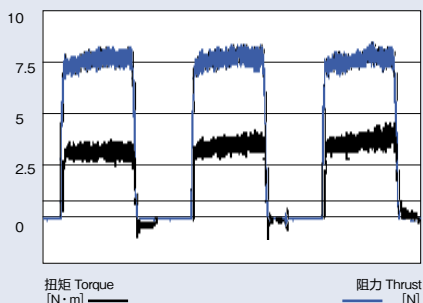


新“波浪形”刃型，切削刃的切削力会根据切削速度的改变而变化，提高各个部位切削刃的锋利度，实现了「低阻抗」，「工具的长寿命」。

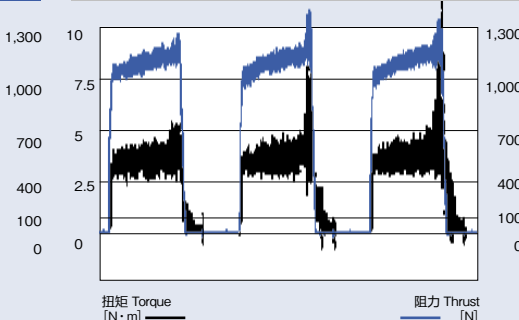
The new wave point form improves the sharpness of the cutting edge at various areas where the cutting force fluctuates with the cutting speed, thereby achieving "low thrust", "stable torque", and a "long tool life".

加工材质 Work Material	SCM440(30HRC)
切削速度 Drilling Speed	80m/min (4,246min ⁻¹)
进给速度 Feed	764mm/min (0.18mm/rev)
切深量 Depth of Hole	30mm (盲孔) (Blind)
切削油剂 Coolant	MQL MQL—ECO MQL = Environmentally friendly
使用机床 Machine	立式加工中心 Vertical Machining Center

WDO-5D φ6



其他公司产品 φ6 Competitor





降低工具成本的王牌

The trump card for reducing tool costs

90%大幅降低工具成本!

Tool cost reduction of over 90%

使用工具 Tool	WDO-3D ϕ 10.8
加工材质 Work Material	S53C
切削速度 Drilling Speed	80m/min (2,369min ⁻¹)
进给速度 Feed	590mm/min(0.25mm/rev)
切深量 Depth of Hole	15.25mm (1.4D 通孔) (Through)
切削油剂 Coolant	水溶性切削油剂 Water Soluble
使用机床 Machine	复合车床 Multifunction Lathe

在使用以前，“工具成本降低那么多是不可能的吧”，这是我们的一个客户在看到加工案例后觉得不可置信的反应。6倍的耐久寿命可以降低大约91.7%的成本。尽管这是一个极限加工案例，但是在实际加工中仍旧可以大幅的降低成本。我们OSG想要为顾客实现更多这样的例子。

Here is an example of a paradigm shift experienced by one of our customers who was pleasantly surprised after being skeptical about achieving further cost reductions. The six-fold improvement in durability resulted in a running cost reduction of 91.7%. Although this may be an extreme example, a greater amount of cost reduction is also possible. At OSG, we aim to support to our customers with more examples such as this.

钻头 Drills	切削孔数 Number of Holes
	5,000 10,000 15,000 20,000
WDO-3D	16,200孔 Holes
其他公司产品 Competitor	2,700孔 Holes

6倍
6 times

	工具寿命 Tool Life (孔)(Hole)	再研磨次数 Regrounding frequency (次)(Time)
WDO-3D	16,200	16
其他公司产品 Competitor	2,700	8

轴承钢加工工具成本减半!

Tool cost halved even in bearing steel!

使用工具 Tool	WDO-5D ϕ 5.7
加工材质 Work Material	SUJ2
切削速度 Drilling Speed	80m/min (4,469min ⁻¹)
进给速度 Feed	536mm/min(0.11mm/rev)
切深量 Depth of Hole	30mm (5D 通孔) (Through)
切削油剂 Coolant	水溶性切削油剂 Non-Water Soluble
使用机床 Machine	立式加工中心 Vertical Machining Center

采用切削锋利性好的“波浪形”刃型后，即使在加工SUJ2中，仍然可以很好的控制切屑形状，并且流畅的排屑。并且，刃尖及外周部的磨损亦得到有效抑制。刀具寿命耐久性达到1.3倍，再研磨次数可以多1.75倍，工具成本可以达到50%削减!

Thanks to the wavy form of the point, even when drilling sticky SUJ2, better chips were produced and evacuation was smoother. As a result, wear on the point and peripheral edge were suppressed. Durability was increased 1.3 times, regrounding frequency improved 1.75 times, and tool costs were reduced 50%!

钻头 Drills	切削孔数 Number of Holes
	200 400 600 800
WDO-5D	800孔 Holes
其他公司产品 Competitor	600孔 Holes

	工具寿命 Tool Life (孔)(Hole)	再研磨次数 Regrounding frequency (次)(Time)
WDO-5D	800	14
其他公司产品 Competitor	600	8

难加工材料达到85%工具成本降低!

85% tool cost reduction in hard-to-drill material!

使用工具 Tool	WDO-3D ϕ 6.8
加工材质 Work Material	SUS630
切削速度 Drilling Speed	50m/min (2,300min ⁻¹)
进给速度 Feed	115mm/min(0.05mm/rev)
切深量 Depth of Hole	10mm (1.4D 通孔) (Through)
切削油剂 Coolant	水溶性切削油剂 Water Soluble
使用机床 Machine	立式加工中心 Vertical Machining Center

这个是在沉淀硬化不锈钢加工中成功降低成本的案例。使用之前，客户方经理认为对于这种难加工材料加工束手无策，使用新FTO硬质合金内冷油孔钻头系列之后，他又提出要削减丝锥的成本，这对我们来说，既是高兴，又是苦恼...

Here is a successful example of cost reduction when drilling in precipitation hardened stainless steel. Before using our drills, a manager at a client had resigned himself to the high cost incurred in working in hard-to-drill materials. After using our drills, he is now eager for us to reduce his tooling costs for taps, and we are happy to accept this challenge!

钻头 Drills	切削孔数 Number of Holes
	300 600 900 1,200 1,500
WDO-3D	1,337孔 Holes
其他公司产品 Competitor	506孔 Holes

	工具寿命 Tool Life (孔)(Hole)	再研磨次数 Regrounding frequency (次)(Time)
WDO-3D	1,337	13
其他公司产品 Competitor	506	5



降低工具成本的王牌

The trump card for reducing tool costs

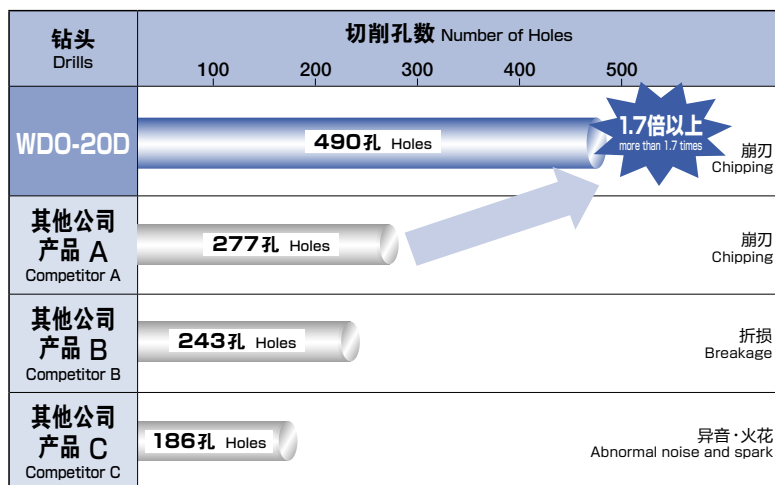
■深孔加工有着如此的不同！1.7倍的耐久寿命可以相差3~5倍的工具成本！

What a difference in drilling deep holes! The durability difference of 1.7 times results in a tool cost differential of 3 to 5 times!

这是工序改善后的试验结果，这个案例很好的展示了钻头优异的排屑性能以及耐磨耗性。工具相差1.7倍的耐久寿命，折合到每个孔上的工具成本可以降低3-5倍（请参照下表）。这不仅仅因为工具的长寿命，也因为损耗量稳定的再研磨是循环成本减少的重要因素之一。

Here are the results of a process improvement trial. It is a good example demonstrating the drill's superior chip evacuation and wear inhibiting properties at the margin. The durability difference of over 1.7 times converts into 3 to 5 times of tool cost advantage per hole (see the table below). This does not simply indicate longer tool life; it results in even wear allowing the drill to be reground in a stable manner, an important factor in reducing the running cost.

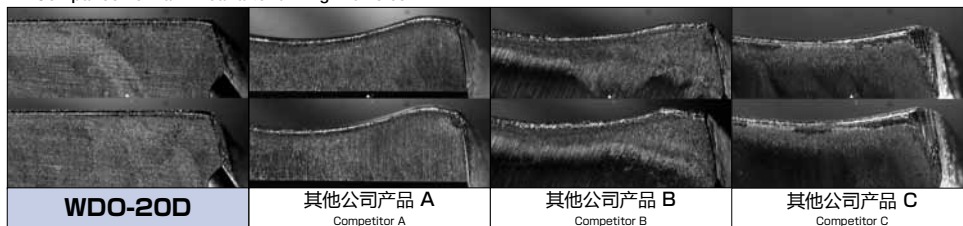
使用工具 Tool	WDO-20D $\phi 6$
加工材质 Work Material	SCM440(30HRC)
切削速度 Drilling Speed	60m/min (3,184min ⁻¹)
进给速度 Feed	764mm/min(0.24mm/rev)
切深量 Depth of Hole	120mm (20D 盲孔) (Blind)
切削油剂 Coolant	MQL
使用机床 Machine	卧式加工中心 Horizontal Machining Center



	工具寿命 Tool Life (孔)(Hole)	再研磨次数 Regrinding frequency (次)(Time)
WDO-20D	490	20
其他公司产品 A Competitor A	277	10
其他公司产品 B Competitor B	243	1
其他公司产品 C Competitor C	186	10

●加工210孔后后刀面磨损比较

Comparison of flank wear after drilling 210 holes.



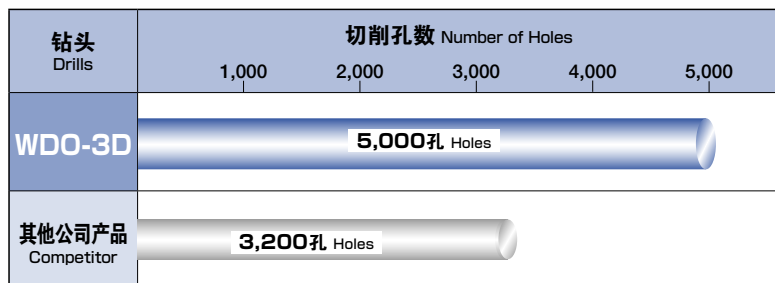
■总切削长度200m，工具成本削减74%

Drills 200 meters on a lathe! Tool cost reduced by 74%.

这是一个WDI®涂层能很好抑制刃带磨损的加工案例。工具相差1.56倍的耐久寿命，折合到每个孔上工具成本相差了3.91倍。由此可以得出，到钻头报废为止前进行的再研磨次数也是考量工具成本不可忽视的重要因素。

Here is a good example of the WDI® Coating's ability to inhibit wear at the margin. The durability difference example of 1.56 times converts into a tool cost differential per hole of 3.91 times. The regrinding frequency, which indicates the number of times a drill can be reground until it is discarded, is also an important factor that should not be ignored in calculating the running cost.

使用工具 Tool	WDO-3D $\phi 13$
加工材质 Work Material	S15C
切削速度 Drilling Speed	102m/min (2,500min ⁻¹)
进给速度 Feed	500mm/min(0.2mm/rev)
切深量 Depth of Hole	40mm (3D 盲孔) (Blind)
切削油剂 Coolant	水溶性切削油剂 (15倍稀释) Water Soluble (14:1 RATIO)
使用机床 Machine	NC 车床 NC Lathe



	工具寿命 Tool Life (孔)(Hole)	再研磨次数 Regrinding frequency (次)(Time)
WDO-3D	5,000	20
其他公司产品 Competitor	3,200	8



降低工具成本的王牌

The trump card for reducing tool costs

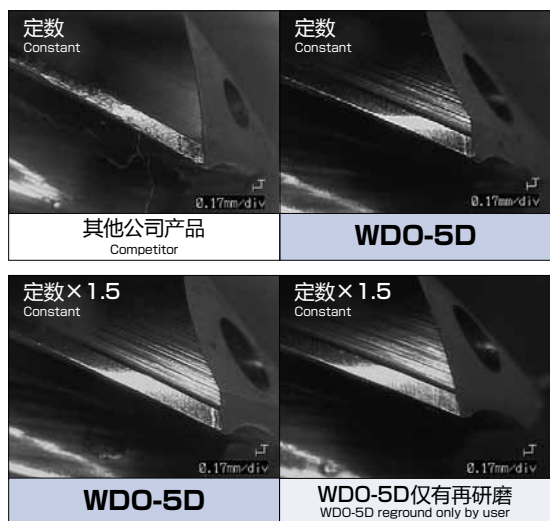
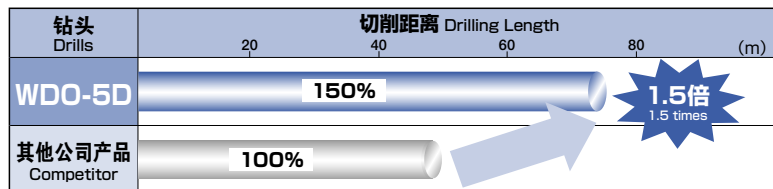
低成本，高效率的铸铁加工！

Low-cost and high-efficiency drilling of cast iron

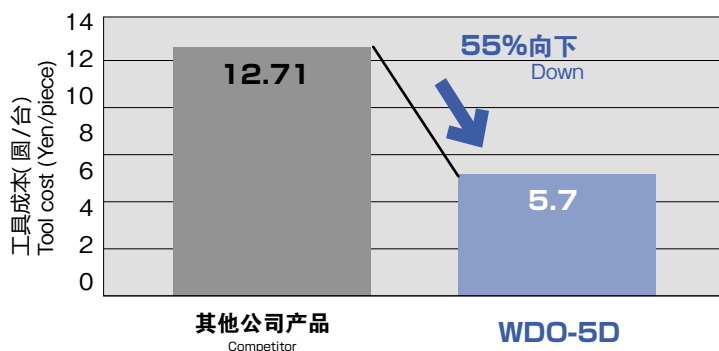
使用工具 Tool	WDO-5D $\phi 8.5$
加工材质 Work Material	FC250
切削速度 Drilling Speed	120m/min (4,500min ⁻¹)
进给速度 Feed	1,485mm/min (0.33mm/rev)
切深量 Depth of Hole	35mm (4D 盲孔) (Blind)
切削油剂 Coolant	水溶性切削油剂 (20倍稀释, 2MPa) Water Soluble (5%)
使用机床 Machine	立式加工中心 (HSK) Vertical Machining Center

有效抑制钻头外周磨损，增加工具1.5倍的耐久寿命，降低55%的工具成本。钻头外周磨损的抑制可以消除再研磨的成本(研磨费用及研磨时间)。请注意比较在规定孔数以及规定孔数1.5倍加工时，其它公司钻头以及WDO-5D钻头的磨损状态。

Inhibiting the wear at the periphery of the drill increases durability 1.5 times and reduces the tool cost by 55%. The effect of inhibiting periphery wear increases the regrinding frequency by 1.5 times, eliminating the grinding cost (grinding expense and time). Please compare the distinct difference in the wear conditions between the competitor's constant machining time and WDO-5D's machining time of 1.5 times.



每台(个)工具成本比较
Comparison of tool cost per piece



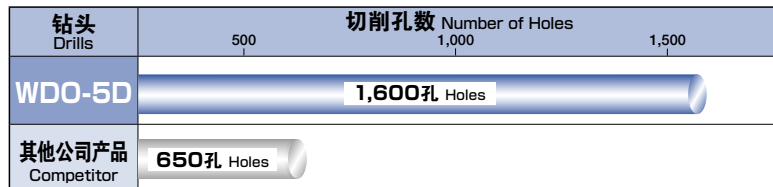
工具成本降低，稳定加工——这是世界共通的需求

The need for reduction and stability in tool costs is common throughout the world

使用工具 Tool	WDO-5D 1 1/32inch
加工材质 Work Material	S30C 相当材 Equivalent of S30C
切削速度 Drilling Speed	122m/min (4,454min ⁻¹)
进给速度 Feed	44mm/min (0.009mm/rev)
切深量 Depth of Hole	1.562inch (4.5D 盲孔) (Blind)
切削油剂 Coolant	水溶性切削油剂 Water Soluble
使用机床 Machine	卧式加工中心 Horizontal Machining Center

这是一个来自于美国的加工案例，由于折损导致寿命的不稳定，工具费难以预算。按这种状况给予解决方案，以钻头报废为止的平均再研磨次数5次作比较，大约可以降低85%的工具费。钻头的磨损稳定，可以达到预计寿命，甚是欣慰。

These examples are from the United States. OSG was able to provide a solution to a situation in which the tool cost could not be calculated due to erratic durability associated with broken drills. Compared to the average regrinding frequency of five times until the drill was discarded, a tool cost reduction of approximately 85% was achieved. Our customers around the world have truly appreciated the arrival of drills that exhibit stable wear.



	工具寿命 Tool Life (孔)(Hole)	再研磨次数 Regrinding frequency (次)(Time)
WDO-5D	1,600	13
其他公司产品 Competitor	650	5



稳定加工的极限

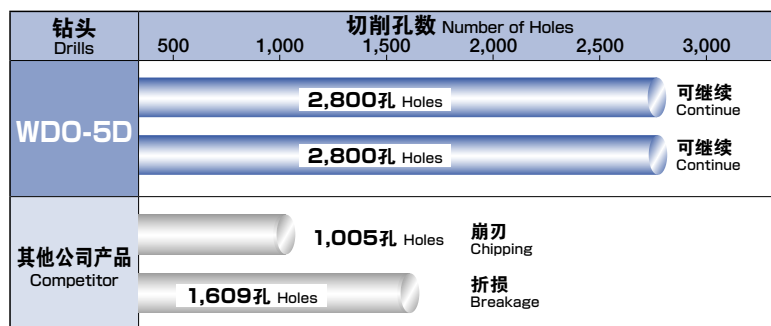
Extremely stable machining

预硬钢的稳定加工！

Stable drilling of pre-hardened steel!

使用工具 Tool	WDO-5D $\phi 5$
加工材质 Work Material	NAK80 (40HRC)
切削速度 Drilling Speed	60m/min (3,821min ⁻¹)
进给速度 Feed	382mm/min (0.1mm/rev)
切深量 Depth of Hole	15mm (3D 盲孔) (Blind)
切削油剂 Coolant	水溶性切削油剂 (20倍) Water Soluble (5%)
使用机床 Machine	立式加工中心 Vertical Machining Center

这是一个树脂模具生产企业提供的加工案例。优异的涂层性能以及最佳的切削刃型可以抑制由于钻头崩损而造成的寿命不稳定，实现加工现场的稳定加工。稳定的加工条件也可以实现无人化加工，并且使加工设备自由度大大提高。Here is an example provided by a plastic mold manufacturer. The superior coating performance and optimization of the cutting edge form helped reduce durability variances associated with broken drills, thereby bringing stable machining conditions to the shop floor. Moreover, the stable working conditions of the drills that do not break enabled unmanned operations and improved the flexibility of the machines.



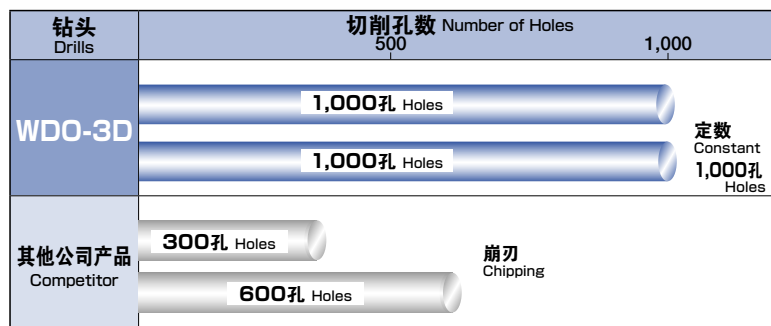
奥氏体不锈钢的稳定加工！

Stable drilling of austenitic stainless steel!

使用工具 Tool	WDO-3D 1 1/32inch
加工材质 Work Material	SUS303
切削速度 Drilling Speed	50m/min (1,850min ⁻¹)
进给速度 Feed	203mm/min (0.11mm/rev)
切深量 Depth of Hole	1 inch (2.9D 通孔) (Through)
切削油剂 Coolant	水溶性切削油剂 Water Soluble
使用机床 Machine	立式加工中心 Vertical Machining Center

以前的钻头，通常在加工300-600个孔时，尚可进行比较稳定持久的加工。但是由于WDO-3D的优异排屑性能以及低阻抗，使它可以实现1000个孔的稳定加工，并且可以进行切削速度50m/min，每转进给量为钻头直径3.2%的高效率加工。

Conventional drills, which drill 300 to 600 holes, should be improved in terms of stable durability. The better chip evacuation and low thrust of the WDO-3D enable the stable drilling of up to 1,000 holes. Furthermore, the WDO-3D is highly efficient, resulting in a feed rate of 3.2% of drill diameter at the cutting speed of 50m/min.



Ecology共生

Ecological coexistence

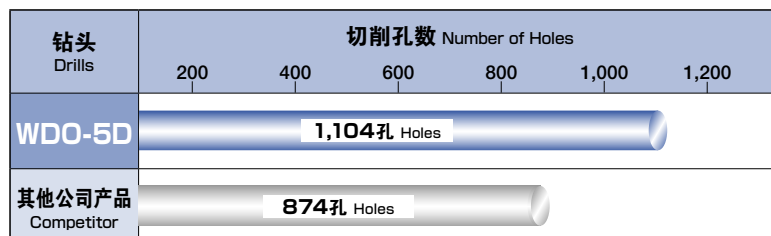
大孔径MQL加工！

Drilling large-diameter holes using MQL (Minimum Quantity Lubrication)

使用工具 Tool	WDO-5D $\phi 17.5$
加工材质 Work Material	SS400
切削速度 Drilling Speed	72m/min (1,300min ⁻¹)
进给速度 Feed	390mm/min (0.3mm/rev)
切深量 Depth of Hole	55mm (3D 通孔) (Through)
切削油剂 Coolant	MQL
使用机床 Machine	立式加工中心 Vertical Machining Center

软钢的MQL加工。WDI®涂层具有耐热性及热传导性好的特点。这可以使有WDI®涂层的钻头比其它公司的钻头寿命耐久性好1.25倍。这是经济且环保的。OSG致力于为低碳化加工提供支援。

MQL drilling of mild steel. The heat resistance and heat dissipation effects of the WDI® Coating resulted in 1.25 times the durability of our competitor's product. This is both economical and ecological. OSG supports machining processes geared towards a carbon-free society.



WDO-10D



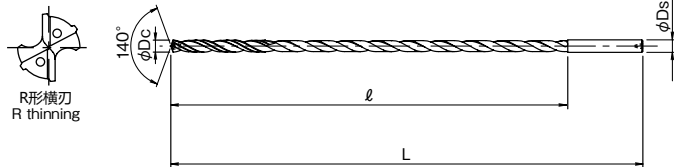
WDO-15D



WDO-20D



WDO-30D



在少数钻头上涂层会有色差的情况,但是这不妨碍钻头的性能。

On some drills, the coating may have some discoloration. This does not pose any performance problems.

●材 质 超微粒子超硬合金
Tool Material Micro Grain Carbide

●表面处理 WDI® 涂层
Surface Treatment WDI® Coating

单位:mm Unit:mm

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8636300	3	10D	40	90	3	B
8638300		15D	55	105	3	B
	3.1	20D	70	120	3	□
		10D	45	100	4	□
	3.2	15D	60	125	4	□
		20D	80	140	4	□
	3.3	10D	45	100	4	□
		15D	60	125	4	□
	3.4	20D	80	140	4	□
		10D	50	100	4	□
	3.5	15D	65	125	4	□
		20D	85	140	4	□
	3.6	30D	116	185	4	□
		10D	50	100	4	□
	3.7	15D	65	125	4	□
		20D	85	140	4	□
		30D	116	185	4	□

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
	3.8	10D	50	100	4	□
		15D	75	125	4	□
		20D	90	140	4	□
		30D	132	185	4	□
	3.9	10D	50	100	4	□
		15D	75	125	4	□
		20D	90	140	4	□
		30D	132	185	4	□
8636400	4	10D	50	100	4	B
8638400		15D	75	125	4	B
8646400		20D	90	140	4	B
		30D	132	185	4	□
	4.1	10D	55	115	5	□
		15D	75	140	5	□
		20D	100	165	5	□
	4.2	30D	140	215	5	□
		10D	55	115	5	□
		15D	75	140	5	□
	4.3	20D	100	165	5	□
		30D	140	215	5	□
		10D	60	115	5	□
	4.4	15D	85	140	5	□
		20D	110	165	5	□
		30D	150	215	5	□

导孔钻的推荐进给速度及进给率, 请参照P20页。

About the recommended speed and feed rate for Pilot Drill, please refer Page 20.

B=标准库存品 □=特定代理店库存品

B=Standard stock item.

□=Stocked by specific distributors. Contact us for price & availability.



请咨询我司营业人员。
Please contact our sales staff for more information.

可制作不同直径, 长度的非标品(请参照P.1·2)。
也可制作如铝合金加工用等其他特殊加工材质的
专用非标钻头。

Special orders are accepted for your diverse diameter and length needs (see pages 1 and 2). Also, orders are accepted for special types of drills for a particular work material types, such as aluminum alloys, etc.



单位:mm Unit:mm

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
NEW	4.5	10D	60	115	5	<input type="checkbox"/>
NEW		15D	85	140	5	<input type="checkbox"/>
NEW		20D	110	165	5	<input type="checkbox"/>
NEW		30D	150	215	5	<input type="checkbox"/>
NEW	4.6	10D	60	115	5	<input type="checkbox"/>
NEW		15D	85	140	5	<input type="checkbox"/>
NEW		20D	110	165	5	<input type="checkbox"/>
NEW		30D	150	215	5	<input type="checkbox"/>
NEW	4.7	10D	60	115	5	<input type="checkbox"/>
NEW		15D	85	140	5	<input type="checkbox"/>
NEW		20D	110	165	5	<input type="checkbox"/>
NEW		30D	150	215	5	<input type="checkbox"/>
NEW	4.8	10D	65	115	5	<input type="checkbox"/>
NEW		15D	90	140	5	<input type="checkbox"/>
NEW		20D	115	165	5	<input type="checkbox"/>
NEW		30D	165	215	5	<input type="checkbox"/>
NEW	4.9	10D	65	115	5	<input type="checkbox"/>
NEW		15D	90	140	5	<input type="checkbox"/>
NEW		20D	115	165	5	<input type="checkbox"/>
NEW		30D	165	215	5	<input type="checkbox"/>
NEW	5	8636500	10D	65	115	B
NEW		8638500	15D	90	140	B
NEW		8646500	20D	115	165	B
NEW		8648500	30D	165	215	B
NEW	5.1	10D	70	128	6	<input type="checkbox"/>
NEW		15D	95	160	6	<input type="checkbox"/>
NEW		20D	120	190	6	<input type="checkbox"/>
NEW		30D	180	250	6	<input type="checkbox"/>
NEW	5.2	10D	70	128	6	<input type="checkbox"/>
NEW		15D	95	160	6	<input type="checkbox"/>
NEW		20D	120	190	6	<input type="checkbox"/>
NEW		30D	180	250	6	<input type="checkbox"/>
NEW	5.3	10D	70	128	6	<input type="checkbox"/>
NEW		15D	95	160	6	<input type="checkbox"/>
NEW		20D	120	190	6	<input type="checkbox"/>
NEW		30D	180	250	6	<input type="checkbox"/>
NEW	5.4	10D	78	128	6	<input type="checkbox"/>
NEW		15D	110	160	6	<input type="checkbox"/>
NEW		20D	140	190	6	<input type="checkbox"/>
NEW		30D	200	250	6	<input type="checkbox"/>
NEW	5.5	10D	78	128	6	<input type="checkbox"/>
NEW		15D	110	160	6	<input type="checkbox"/>
NEW		20D	140	190	6	<input type="checkbox"/>
NEW		30D	200	250	6	<input type="checkbox"/>

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
NEW	5.6	10D	78	128	6	<input type="checkbox"/>
NEW		15D	110	160	6	<input type="checkbox"/>
NEW		20D	140	190	6	<input type="checkbox"/>
NEW		30D	200	250	6	<input type="checkbox"/>
NEW	5.7	10D	78	128	6	<input type="checkbox"/>
NEW		15D	110	160	6	<input type="checkbox"/>
NEW		20D	140	190	6	<input type="checkbox"/>
NEW		30D	200	250	6	<input type="checkbox"/>
NEW	5.8	10D	78	128	6	<input type="checkbox"/>
NEW		15D	110	160	6	<input type="checkbox"/>
NEW		20D	140	190	6	<input type="checkbox"/>
NEW		30D	200	250	6	<input type="checkbox"/>
NEW	5.9	10D	78	128	6	<input type="checkbox"/>
NEW		15D	110	160	6	<input type="checkbox"/>
NEW		20D	140	190	6	<input type="checkbox"/>
NEW		30D	200	250	6	<input type="checkbox"/>
NEW	6	8636600	10D	78	128	B
NEW		8638600	15D	110	160	B
NEW		8646600	20D	140	190	B
NEW		8648600	30D	200	250	B
NEW	6.1	10D	87	140	7	<input type="checkbox"/>
NEW		15D	120	175	7	<input type="checkbox"/>
NEW		20D	155	210	7	<input type="checkbox"/>
NEW		30D	215	280	7	<input type="checkbox"/>
NEW	6.2	10D	87	140	7	<input type="checkbox"/>
NEW		15D	120	175	7	<input type="checkbox"/>
NEW		20D	155	210	7	<input type="checkbox"/>
NEW		30D	215	280	7	<input type="checkbox"/>
NEW	6.3	10D	87	140	7	<input type="checkbox"/>
NEW		15D	120	175	7	<input type="checkbox"/>
NEW		20D	155	210	7	<input type="checkbox"/>
NEW		30D	215	280	7	<input type="checkbox"/>
NEW	6.4	10D	87	140	7	<input type="checkbox"/>
NEW		15D	120	175	7	<input type="checkbox"/>
NEW		20D	155	210	7	<input type="checkbox"/>
NEW		30D	215	280	7	<input type="checkbox"/>
NEW	6.5	10D	87	140	7	<input type="checkbox"/>
NEW		15D	120	175	7	<input type="checkbox"/>
NEW		20D	155	210	7	<input type="checkbox"/>
NEW		30D	215	280	7	<input type="checkbox"/>
NEW	6.6	10D	87	140	7	<input type="checkbox"/>
NEW		15D	120	175	7	<input type="checkbox"/>
NEW		20D	155	210	7	<input type="checkbox"/>
NEW		30D	215	280	7	<input type="checkbox"/>

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special types of drills for a particular work material types, such
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接上页

单位:mm Unit:mm

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
NEW	6.7	10D	87	140	7	<input type="checkbox"/>
NEW		15D	120	175	7	<input type="checkbox"/>
NEW		20D	155	210	7	<input type="checkbox"/>
NEW		30D	215	280	7	<input type="checkbox"/>
NEW	6.8	10D	90	140	7	<input type="checkbox"/>
NEW		15D	125	175	7	<input type="checkbox"/>
NEW		20D	160	210	7	<input type="checkbox"/>
NEW	6.9	30D	230	280	7	<input type="checkbox"/>
NEW		10D	90	140	7	<input type="checkbox"/>
NEW		15D	125	175	7	<input type="checkbox"/>
NEW		20D	160	210	7	<input type="checkbox"/>
NEW	8636700	30D	230	280	7	<input type="checkbox"/>
NEW		10D	90	140	7	B
NEW		15D	125	175	7	<input type="checkbox"/>
NEW		20D	160	210	7	<input type="checkbox"/>
NEW	7	30D	230	280	7	<input type="checkbox"/>
NEW		10D	100	155	8	<input type="checkbox"/>
NEW		15D	135	195	8	<input type="checkbox"/>
NEW		20D	170	230	8	<input type="checkbox"/>
NEW	7.1	30D	250	315	8	<input type="checkbox"/>
NEW		10D	100	155	8	<input type="checkbox"/>
NEW		15D	135	195	8	<input type="checkbox"/>
NEW		20D	170	230	8	<input type="checkbox"/>
NEW	7.2	30D	250	315	8	<input type="checkbox"/>
NEW		10D	100	155	8	<input type="checkbox"/>
NEW		15D	135	195	8	<input type="checkbox"/>
NEW		20D	170	230	8	<input type="checkbox"/>
NEW	7.3	30D	250	315	8	<input type="checkbox"/>
NEW		10D	100	155	8	<input type="checkbox"/>
NEW		15D	135	195	8	<input type="checkbox"/>
NEW		20D	170	230	8	<input type="checkbox"/>
NEW	7.4	30D	250	315	8	<input type="checkbox"/>
NEW		10D	100	155	8	<input type="checkbox"/>
NEW		15D	135	195	8	<input type="checkbox"/>
NEW		20D	170	230	8	<input type="checkbox"/>
NEW	7.5	30D	250	315	8	<input type="checkbox"/>
NEW		10D	100	155	8	<input type="checkbox"/>
NEW		15D	135	195	8	<input type="checkbox"/>
NEW		20D	170	230	8	<input type="checkbox"/>
NEW	7.6	30D	250	315	8	<input type="checkbox"/>
NEW		10D	100	155	8	<input type="checkbox"/>
NEW		15D	135	195	8	<input type="checkbox"/>
NEW		20D	170	230	8	<input type="checkbox"/>

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
NEW	7.7	10D	105	155	8	<input type="checkbox"/>
NEW		15D	145	195	8	<input type="checkbox"/>
NEW		20D	180	230	8	<input type="checkbox"/>
NEW		30D	265	315	8	<input type="checkbox"/>
NEW	7.8	10D	105	155	8	<input type="checkbox"/>
NEW		15D	145	195	8	<input type="checkbox"/>
NEW		20D	180	230	8	<input type="checkbox"/>
NEW		30D	265	315	8	<input type="checkbox"/>
NEW	7.9	10D	105	155	8	<input type="checkbox"/>
NEW		15D	145	195	8	<input type="checkbox"/>
NEW		20D	180	230	8	<input type="checkbox"/>
NEW		30D	265	315	8	<input type="checkbox"/>
NEW	8636800	10D	105	155	8	B
NEW		15D	145	195	8	B
NEW		20D	180	230	8	B
NEW		30D	265	315	8	B
NEW	8.1	10D	110	165	9	<input type="checkbox"/>
NEW		15D	155	210	9	<input type="checkbox"/>
NEW		20D	195	260	9	<input type="checkbox"/>
NEW		30D	280	350	9	<input type="checkbox"/>
NEW	8.2	10D	110	165	9	<input type="checkbox"/>
NEW		15D	155	210	9	<input type="checkbox"/>
NEW		20D	195	260	9	<input type="checkbox"/>
NEW		30D	280	350	9	<input type="checkbox"/>
NEW	8.3	10D	110	165	9	<input type="checkbox"/>
NEW		15D	155	210	9	<input type="checkbox"/>
NEW		20D	195	260	9	<input type="checkbox"/>
NEW		30D	280	350	9	<input type="checkbox"/>
NEW	8.4	10D	110	165	9	<input type="checkbox"/>
NEW		15D	155	210	9	<input type="checkbox"/>
NEW		20D	195	260	9	<input type="checkbox"/>
NEW		30D	280	350	9	<input type="checkbox"/>
NEW	8.5	10D	110	165	9	<input type="checkbox"/>
NEW		15D	155	210	9	<input type="checkbox"/>
NEW		20D	195	260	9	<input type="checkbox"/>
NEW		30D	280	350	9	<input type="checkbox"/>
NEW	8.6	10D	115	165	9	<input type="checkbox"/>
NEW		15D	160	210	9	<input type="checkbox"/>
NEW		20D	210	260	9	<input type="checkbox"/>
NEW		30D	300	350	9	<input type="checkbox"/>

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接上页

单位:mm Unit:mm

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
NEW	8.7	10D	115	165	9	<input type="checkbox"/>
NEW		15D	160	210	9	<input type="checkbox"/>
NEW		20D	210	260	9	<input type="checkbox"/>
NEW		30D	300	350	9	<input type="checkbox"/>
NEW	8.8	10D	115	165	9	<input type="checkbox"/>
NEW		15D	160	210	9	<input type="checkbox"/>
NEW		20D	210	260	9	<input type="checkbox"/>
NEW		30D	300	350	9	<input type="checkbox"/>
NEW	8.9	10D	115	165	9	<input type="checkbox"/>
NEW		15D	160	210	9	<input type="checkbox"/>
NEW		20D	210	260	9	<input type="checkbox"/>
NEW		30D	300	350	9	<input type="checkbox"/>
NEW	8636900 9	10D	115	165	9	B
NEW		15D	160	210	9	<input type="checkbox"/>
NEW		20D	210	260	9	<input type="checkbox"/>
NEW		30D	300	350	9	<input type="checkbox"/>
NEW	9.1	10D	125	190	10	<input type="checkbox"/>
NEW		15D	170	240	10	<input type="checkbox"/>
NEW		20D	220	290	10	<input type="checkbox"/>
NEW		30D	315	390	10	<input type="checkbox"/>
NEW	9.2	10D	125	190	10	<input type="checkbox"/>
NEW		15D	170	240	10	<input type="checkbox"/>
NEW		20D	220	290	10	<input type="checkbox"/>
NEW		30D	315	390	10	<input type="checkbox"/>
NEW	9.3	10D	125	190	10	<input type="checkbox"/>
NEW		15D	170	240	10	<input type="checkbox"/>
NEW		20D	220	290	10	<input type="checkbox"/>
NEW		30D	315	390	10	<input type="checkbox"/>
NEW	9.4	10D	125	190	10	<input type="checkbox"/>
NEW		15D	170	240	10	<input type="checkbox"/>
NEW		20D	220	290	10	<input type="checkbox"/>
NEW		30D	315	390	10	<input type="checkbox"/>
NEW	9.5	10D	125	190	10	<input type="checkbox"/>
NEW		15D	170	240	10	<input type="checkbox"/>
NEW		20D	220	290	10	<input type="checkbox"/>
NEW		30D	315	390	10	<input type="checkbox"/>
NEW	9.6	10D	130	190	10	<input type="checkbox"/>
NEW		15D	180	240	10	<input type="checkbox"/>
NEW		20D	230	290	10	<input type="checkbox"/>
NEW		30D	330	390	10	<input type="checkbox"/>

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
NEW	9.7	10D	130	190	10	<input type="checkbox"/>
NEW		15D	180	240	10	<input type="checkbox"/>
NEW		20D	230	290	10	<input type="checkbox"/>
NEW		30D	330	390	10	<input type="checkbox"/>
NEW	9.8	10D	130	190	10	<input type="checkbox"/>
NEW		15D	180	240	10	<input type="checkbox"/>
NEW		20D	230	290	10	<input type="checkbox"/>
NEW		30D	330	390	10	<input type="checkbox"/>
NEW	9.9	10D	130	190	10	<input type="checkbox"/>
NEW		15D	180	240	10	<input type="checkbox"/>
NEW		20D	230	290	10	<input type="checkbox"/>
NEW		30D	330	390	10	<input type="checkbox"/>
NEW	8637000 8639000 10	10D	130	190	10	B
NEW		15D	180	240	10	B
NEW		20D	230	290	10	<input type="checkbox"/>
NEW		30D	330	390	10	<input type="checkbox"/>
NEW	10.1	10D	140	205	11	<input type="checkbox"/>
NEW		15D	190	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW		30D	350	410	11	<input type="checkbox"/>
NEW	10.2	10D	140	205	11	<input type="checkbox"/>
NEW		15D	190	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW		30D	350	410	11	<input type="checkbox"/>
NEW	10.3	10D	140	205	11	<input type="checkbox"/>
NEW		15D	190	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW		30D	350	410	11	<input type="checkbox"/>
NEW	10.4	10D	140	205	11	<input type="checkbox"/>
NEW		15D	190	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW		30D	350	410	11	<input type="checkbox"/>
NEW	10.5	10D	140	205	11	<input type="checkbox"/>
NEW		15D	190	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW		30D	350	410	11	<input type="checkbox"/>
NEW	10.6	10D	140	205	11	<input type="checkbox"/>
NEW		15D	190	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW		30D	350	410	11	<input type="checkbox"/>
NEW	10.7	10D	145	205	11	<input type="checkbox"/>
NEW		15D	200	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW		30D	350	410	11	<input type="checkbox"/>
NEW	10.8	10D	145	205	11	<input type="checkbox"/>
NEW		15D	200	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW		30D	350	410	11	<input type="checkbox"/>

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单位:mm Unit:mm

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NEW	10.9	10D	145	205	11	<input type="checkbox"/>
NEW		15D	200	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW	11	10D	145	205	11	<input type="checkbox"/>
NEW		15D	200	260	11	<input type="checkbox"/>
NEW		20D	250	310	11	<input type="checkbox"/>
NEW	11.1	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>
NEW	11.2	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>
NEW	11.3	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>
NEW	11.4	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>

商品号 EDP No.	直径 Dc	刃长 L/Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
NEW	11.5	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>
NEW	11.6	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>
NEW	11.7	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>
NEW	11.8	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>
NEW	11.9	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>
NEW	12	10D	155	215	12	<input type="checkbox"/>
NEW		15D	210	280	12	<input type="checkbox"/>
NEW		20D	270	330	12	<input type="checkbox"/>

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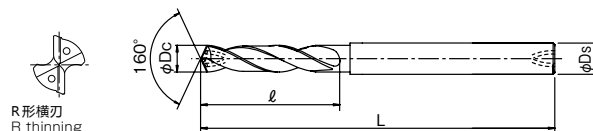
WDO-PLT 超长钻用导孔钻

Pilot Drill for Extra Long Drill



●材 质 超微粒子超硬合金
Tool Material Micro Grain Carbide

●表面处理 FX (TiAlN 多层复合材料) 涂层 / WDI® 涂层 注)
Surface Treatment FX (composite multi-layered TiAlN) coating / WDI® Coating

R形横刃
R thinning注) 逐渐以WDI®替层替代生产。
Start manufacturing with WDI® Coating.

单位:mm Unit:mm

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8568903	3.03	15	65	3	C
8568923	3.53	18	70	4	C
8568904	4.03	20	70	4	C
8568924	4.53	23	75	5	C
8568905	5.03	25	75	5	C
8568925	5.53	28	80	6	C
8568906	6.03	30	80	6	C
8568926	6.53	33	85	7	C

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8568907	7.03	35	85	7	C
8568908	8.03	40	90	8	C
8568928	8.53	43	95	9	C
8568909	9.03	45	95	9	C
8568910	10.03	50	100	10	C
8568911	11.03	55	115	11	C
8568912	12.03	60	120	12	C

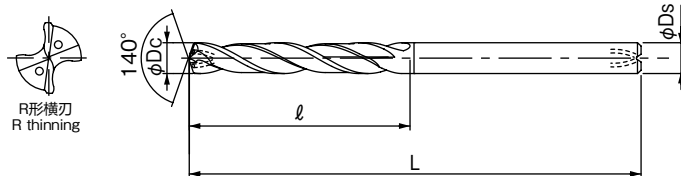
C = 标准库存品 C = Standard stock item.

可制作不同直径, 长度的非标品

Different diameters and length are available as specials.



- 材 质 超微粒子超硬合金
Tool Material Micro Grain Carbide
- 表面处理 WDI® 涂层
Surface Treatment WDI® Coating



在少数钻头上涂层会有色差的情况,但是这不妨碍钻头的性能。
On some drills, the coating may have some discoloration. This does not pose any performance problems.

●3D用 For 3D Operation

单位:mm Unit:mm

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8630280	2.8	17	66	3	B
8630290	2.9	18	66	3	B
8630300	3	18	66	3	B
8630310	3.1	19	74	4	B
8630320	3.2	20	74	4	B
8630330	3.3	20	74	4	B
8630340	3.4	21	74	4	B
8630350	3.5	21	74	4	B
8630360	3.6	22	74	4	B
8630370	3.7	23	74	4	B
8630380	3.8	23	74	4	B
8630390	3.9	24	74	4	B
8630400	4	24	74	4	B
8630410	4.1	25	80	5	B
8630420	4.2	26	80	5	B
8630430	4.3	26	80	5	B
8630440	4.4	27	80	5	B
8630450	4.5	27	80	5	B
8630460	4.6	28	80	5	B
8630470	4.7	29	80	5	B
8630480	4.8	29	80	5	B
8630490	4.9	30	80	5	B
8630500	5	25	80	5	B
8630510	5.1	26	82	6	B
8630520	5.2	26	82	6	B
8630530	5.3	27	82	6	B
8630540	5.4	27	82	6	B

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8630550	5.5	28	82	6	B
8630560	5.6	28	82	6	B
8630570	5.7	29	82	6	B
8630580	5.8	29	82	6	B
8630590	5.9	30	82	6	B
8630600	6	30	82	6	B
8630610	6.1	31	88	7	B
8630620	6.2	31	88	7	B
8630630	6.3	32	88	7	B
8630640	6.4	32	88	7	B
8630650	6.5	33	88	7	B
8630660	6.6	33	88	7	B
8630670	6.7	34	88	7	B
8630680	6.8	34	88	7	B
8630690	6.9	35	88	7	B
8630700	7	35	88	7	B
8630710	7.1	36	94	8	B
8630720	7.2	36	94	8	B
8630730	7.3	37	94	8	B
8630740	7.4	37	94	8	B
8630750	7.5	38	94	8	B
8630760	7.6	38	94	8	B
8630770	7.7	39	94	8	B
8630780	7.8	39	94	8	B
8630790	7.9	40	94	8	B
8630800	8	40	94	8	B
8630810	8.1	41	101	9	B

为了冷却液的稳定供给,在柄部端面留有缝隙。

To ensure a stable flow of coolant, there is a groove on the bottom of the shank.

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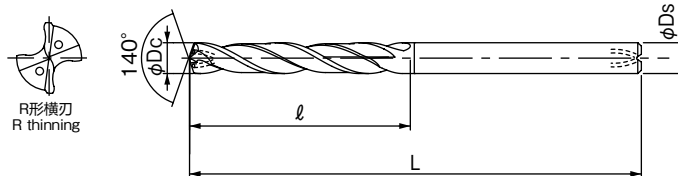


●材 质 超微粒子超硬合金
Tool Material Micro Grain Carbide

●表面处理 WDI® 涂层
Surface Treatment WDI® Coating



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单位:mm Unit:mm

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8630820	8.2	41	101	9	B
8630830	8.3	42	101	9	B
8630840	8.4	42	101	9	B
8630850	8.5	43	101	9	B
8630860	8.6	43	101	9	B
8630870	8.7	44	101	9	B
8630880	8.8	44	101	9	B
8630890	8.9	45	101	9	B
8630900	9	45	101	9	B
8630910	9.1	46	106	10	B
8630920	9.2	46	106	10	B
8630930	9.3	47	106	10	B
8630940	9.4	47	106	10	B
8630950	9.5	48	106	10	B
8630960	9.6	48	106	10	B
8630970	9.7	49	106	10	B
8630980	9.8	49	106	10	B
8630990	9.9	50	106	10	B
8631000	10	50	106	10	B
8631010	10.1	51	113	11	B
8631020	10.2	51	113	11	B
8631030	10.3	52	113	11	B
8631040	10.4	52	113	11	B
8631050	10.5	53	113	11	B
8631060	10.6	53	113	11	B
8631070	10.7	54	113	11	B

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8631080	10.8	54	113	11	B
8631090	10.9	55	113	11	B
8631100	11	55	113	11	B
8631110	11.1	56	120	12	B
8631120	11.2	56	120	12	B
8631130	11.3	57	120	12	B
8631140	11.4	57	120	12	B
8631150	11.5	58	120	12	B
8631160	11.6	58	120	12	B
8631170	11.7	59	120	12	B
8631180	11.8	59	120	12	B
8631190	11.9	60	120	12	B
8631200	12	60	120	12	B
8631210	12.1	61	128	13	B
8631220	12.2	61	128	13	B
8631230	12.3	62	128	13	B
8631240	12.4	62	128	13	B
8631250	12.5	63	128	13	B
8631260	12.6	63	128	13	B
8631270	12.7	64	128	13	B
8631280	12.8	64	128	13	B
8631290	12.9	65	128	13	B
8631300	13	65	128	13	B
8631310	13.1	66	134	14	B
8631320	13.2	66	134	14	B
8631330	13.3	67	134	14	B

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接上页

单位:mm Unit:mm

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8631340	13.4	67	134	14	B
8631350	13.5	68	134	14	B
8631360	13.6	68	134	14	B
8631370	13.7	69	134	14	B
8631380	13.8	69	134	14	B
8631390	13.9	70	134	14	B
8631400	14	70	134	14	B
8631410	14.1	71	140	15	B
8631420	14.2	71	140	15	B
8631430	14.3	72	140	15	B
8631440	14.4	72	140	15	B
8631450	14.5	73	140	15	B
8631460	14.6	73	140	15	B
8631470	14.7	74	140	15	B
8631480	14.8	74	140	15	B
8631490	14.9	75	140	15	B
8631500	15	75	140	15	B
8631510	15.1	76	145	16	B

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8631520	15.2	76	145	16	B
8631530	15.3	77	145	16	B
8631540	15.4	77	145	16	B
8631550	15.5	78	145	16	B
8631560	15.6	78	145	16	B
8631570	15.7	79	145	16	B
8631580	15.8	79	145	16	B
8631590	15.9	80	145	16	B
8631600	16	80	145	16	B
8631650	16.5	83	150	17	B
8631700	17	85	150	17	B
8631750	17.5	88	155	18	B
8631800	18	90	155	18	B
8631850	18.5	93	160	19	B
8631900	19	95	160	19	B
8631950	19.5	98	165	20	B
8632000	20	100	165	20	B

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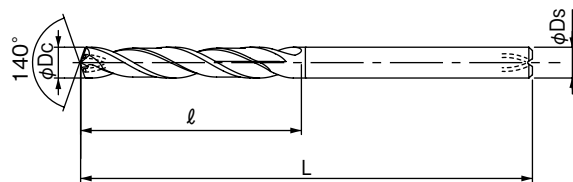
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●材 质 超微粒子超硬合金
Tool Material Micro Grain Carbide

●表面处理 WDI® 涂层
Surface Treatment WDI® Coating



在少数钻头上涂层会有色差的情况,但是这不妨碍钻头的性能。
On some drills, the coating may have some discoloration. This does not pose any performance problems.

●5D用 For 5D Operation

单位:mm Unit:mm

商品号 EDP No.	直径 Dc	槽长 l	全长 L	柄径 Ds	库存 Stock
8632276	2.76	25	78	3	B
8632278	2.78	26	78	3	B
8632280	2.8	26	78	3	B
8632290	2.9	27	78	3	B
8632300	3	27	78	3	B
8632310	3.1	28	86	4	B
8632320	3.2	29	86	4	B
8632330	3.3	30	86	4	B
8632340	3.4	31	86	4	B
8632350	3.5	32	86	4	B
8632360	3.6	33	86	4	B
8632366	3.66	33	86	4	B
8632368	3.68	34	86	4	B
8632370	3.7	34	86	4	B
8632380	3.8	35	86	4	B
8632390	3.9	36	86	4	B
8632400	4	36	86	4	B
8632410	4.1	37	95	5	B
8632420	4.2	38	95	5	B
8632430	4.3	39	95	5	B
8632440	4.4	40	95	5	B
8632450	4.5	41	95	5	B
8632460	4.6	42	95	5	B
8632462	4.62	42	95	5	B
8632464	4.64	42	95	5	B
8632470	4.7	43	95	5	B
8632480	4.8	44	95	5	B
8632490	4.9	45	95	5	B
8632500	5	45	95	5	B

商品号 EDP No.	直径 Dc	槽长 l	全长 L	柄径 Ds	库存 Stock
8632510	5.1	41	100	6	B
8632520	5.2	42	100	6	B
8632530	5.3	43	100	6	B
8632540	5.4	44	100	6	B
8632550	5.5	44	100	6	B
8632552	5.52	45	100	6	B
8632554	5.54	45	100	6	B
8632560	5.6	45	100	6	B
8632570	5.7	46	100	6	B
8632580	5.8	47	100	6	B
8632590	5.9	48	100	6	B
8632600	6	48	100	6	B
8632610	6.1	49	109	7	B
8632620	6.2	50	109	7	B
8632630	6.3	51	109	7	B
8632640	6.4	52	109	7	B
8632650	6.5	52	109	7	B
8632660	6.6	53	109	7	B
8632670	6.7	54	109	7	B
8632680	6.8	55	109	7	B
8632690	6.9	56	109	7	B
8632700	7	56	109	7	B
8632710	7.1	57	118	8	B
8632720	7.2	58	118	8	B
8632730	7.3	59	118	8	B
8632736	7.36	59	118	8	B
8632738	7.38	60	118	8	B
8632740	7.4	60	118	8	B
8632750	7.5	60	118	8	B

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单位:mm Unit:mm

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8632752	7.52	61	118	8	B
8632754	7.54	61	118	8	B
8632760	7.6	61	118	8	B
8632770	7.7	62	118	8	B
8632780	7.8	63	118	8	B
8632790	7.9	64	118	8	B
8632800	8	64	118	8	B
8632810	8.1	65	128	9	B
8632820	8.2	66	128	9	B
8632830	8.3	67	128	9	B
8632840	8.4	68	128	9	B
8632850	8.5	68	128	9	B
8632860	8.6	69	128	9	B
8632870	8.7	70	128	9	B
8632880	8.8	71	128	9	B
8632890	8.9	72	128	9	B
8632900	9	72	128	9	B
8632910	9.1	73	136	10	B
8632920	9.2	74	136	10	B
8632924	9.24	74	136	10	B
8632926	9.26	75	136	10	B
8632930	9.3	75	136	10	B
8632936	9.36	75	136	10	B
8632938	9.38	76	136	10	B
8632940	9.4	76	136	10	B
8632950	9.5	76	136	10	B
8632952	9.52	77	136	10	B
8632954	9.54	77	136	10	B
8632960	9.6	77	136	10	B

商品号 EDP No.	直径 Dc	槽长 ℓ	全长 L	柄径 Ds	库存 Stock
8632970	9.7	78	136	10	B
8632980	9.8	79	136	10	B
8632990	9.9	80	136	10	B
8633000	10	80	136	10	B
8633010	10.1	81	146	11	B
8633020	10.2	82	146	11	B
8633030	10.3	83	146	11	B
8633040	10.4	84	146	11	B
8633050	10.5	84	146	11	B
8633060	10.6	85	146	11	B
8633070	10.7	86	146	11	B
8633080	10.8	87	146	11	B
8633090	10.9	88	146	11	B
8633100	11	88	146	11	B
8633110	11.1	89	156	12	B
8633120	11.2	90	156	12	B
8633122	11.22	90	156	12	B
8633124	11.24	90	156	12	B
8633130	11.3	91	156	12	B
8633136	11.36	91	156	12	B
8633138	11.38	92	156	12	B
8633140	11.4	92	156	12	B
8633150	11.5	92	156	12	B
8633160	11.6	93	156	12	B
8633170	11.7	94	156	12	B
8633180	11.8	95	156	12	B
8633190	11.9	96	156	12	B
8633200	12	96	156	12	B
8633210	12.1	97	167	13	B

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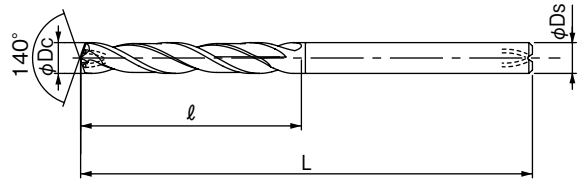
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单位:mm Unit:mm

商品号 EDP No.	直径 Dc	槽长 l	全长 L	柄径 Ds	库存 Stock
8633220	12.2	98	167	13	B
8633230	12.3	99	167	13	B
8633240	12.4	100	167	13	B
8633250	12.5	100	167	13	B
8633260	12.6	101	167	13	B
8633270	12.7	102	167	13	B
8633280	12.8	103	167	13	B
8633290	12.9	104	167	13	B
8633300	13	104	167	13	B
8633310	13.1	105	176	14	B
8633320	13.2	106	176	14	B
8633325	13.25	106	176	14	B
8633330	13.3	107	176	14	B
8633340	13.4	108	176	14	B
8633350	13.5	108	176	14	B
8633360	13.6	109	176	14	B
8633370	13.7	110	176	14	B
8633380	13.8	111	176	14	B
8633390	13.9	112	176	14	B
8633400	14	112	176	14	B
8633410	14.1	113	185	15	B
8633420	14.2	114	185	15	B
8633430	14.3	115	185	15	B
8633440	14.4	116	185	15	B
8633450	14.5	116	185	15	B

商品号 EDP No.	直径 Dc	槽长 l	全长 L	柄径 Ds	库存 Stock
8633460	14.6	117	185	15	B
8633470	14.7	118	185	15	B
8633480	14.8	119	185	15	B
8633490	14.9	120	185	15	B
8633500	15	120	185	15	B
8633510	15.1	121	193	16	B
8633520	15.2	122	193	16	B
8633525	15.25	122	193	16	B
8633530	15.3	123	193	16	B
8633540	15.4	124	193	16	B
8633550	15.5	124	193	16	B
8633560	15.6	125	193	16	B
8633570	15.7	126	193	16	B
8633580	15.8	127	193	16	B
8633590	15.9	128	193	16	B
8633600	16	128	193	16	B
8633650	16.5	132	201	17	B
8633700	17	136	201	17	B
8633750	17.5	140	209	18	B
8633800	18	144	209	18	B
8633850	18.5	148	217	19	B
8633900	19	152	217	19	B
8633950	19.5	156	225	20	B
8634000	20	160	225	20	B

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WDO-10D·15D·20D·30D

10D·15D·20D·30D用

For 10D, 15D, 20D, 30D

加工材料 WORK MATERIAL	软钢·低碳素钢 MILD STEELS LOW CARBON STEELS SS400·S10C ~150HB ~500N/mm ²	炭素钢 CARBON STEELS S35C·S50C ~210HB ~710N/mm ²	合金钢 ALLOY STEELS SCM·SCr·SNM 16~28HRC 710~900N/mm ²	铸铁 CAST IRON FC250 ~350N/mm ²	球墨铸铁 DUCTILE CAST IRON FCD450 FCD600 400~600N/mm ²	不锈钢 STAINLESS STEELS SUS400系 480~800N/mm ²
切削速度 DRILLING SPEED	60~125m/min	60~125m/min	60~125m/min	60~125m/min	50~80m/min	40~80m/min
直径 DRILL DIA. (mm)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)
3	7,500	0.06~0.12	7,500	0.06~0.12	7,500	0.06~0.12
4	6,400	0.08~0.16	6,400	0.08~0.16	6,400	0.08~0.16
5	5,800	0.1~0.2	5,800	0.1~0.2	5,800	0.1~0.2
6	4,800	0.12~0.24	4,800	0.12~0.24	4,800	0.12~0.24
8	3,600	0.16~0.28	3,600	0.16~0.28	3,600	0.16~0.28
10	2,900	0.2~0.35	2,900	0.2~0.35	2,900	0.2~0.35
12	2,400	0.24~0.42	2,400	0.24~0.42	2,400	0.24~0.42

1. 此切削条件基准表适用于，水溶性切削油剂或油雾式冷却加工。
2. 请使用稀释倍率为20倍~30倍的优质水溶性切削油。
3. 使用非水溶性切削油剂时，请把切削速度设置在上述速度的最低速度到70%之间。
4. 请对照《WDO-10D / WDO-15D / WDO-20D / WDO-30D的推荐加工方法》资料进行定位孔加工。
5. 油污堵塞会造成折损，因此供油装置务必安装过滤网。

1. The indicated speeds and feeds are for drilling with water-soluble oil or MQL (We do not recommend mist drilling with stainless steels.).
2. The most suitable cutting fluid is water-soluble oil (20-30 times dilution).
3. When using non-water soluble oil, set the drilling speed between 70-100% of the lowest limit.
4. Make a pilot hole before using WDO-10D/WDO-15D/WDO-20D/WDO-30D in accordance with recommended operation.
5. A clogged oil hole can lead to a breakage. Make sure that a filter is attached to the oil feeder.

WDO-10D/WDO-15D/WDO-20D/WDO-30D 的推荐加工方法

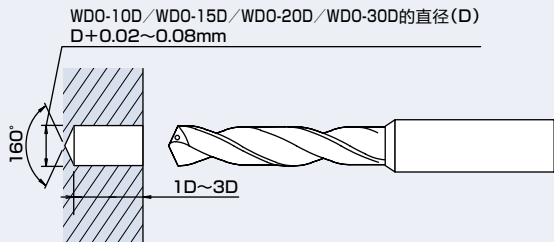
Recommended operation for using
WDO-10D / WDO-15D / WDO-20D / WDO-30D

① WDO-PLT, WDO-3D 导向孔加工

Make a pilot hole.

●导向孔加工用工具请选择比WDO-10D/WDO-15D/WDO-20D/WDO-30D的直径(D)+0.02~0.08mm的钻头，推荐在加工时将导向孔尽量加深。

For a pilot hole, select 0.02~0.08mm larger size drill than WDO-10D/WDO-15D/WDO-20D/WDO-30D.

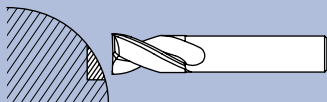


若WDO-PLT标准品没有适合的尺寸，也可使用同样直径的WDO-3D钻头。

If the size is no available from standard WDO-PLT, we recommend the same diameter drill from WDO-3D.

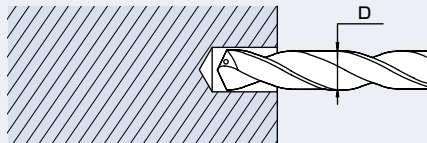
★弯曲部加工时，在定位孔加工前请先用FX-ZDS沉孔加工铣刀进行如图所示的沉孔加工。

When working on a curved surface, use the FX-ZDS (end mill for counterboring) to counterbore a pilot hole.



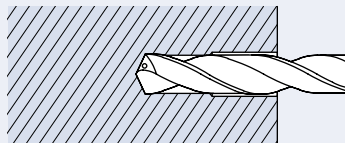
② 以静止或低转速状态下将深孔钻头插入 (P3参照)

Insert the extra long drill into a pilot hole with zero or low revolution. (See page 3)



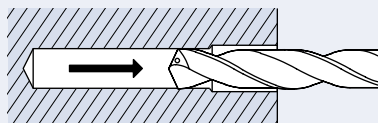
③ 加速至规定转速后开始加工。

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.



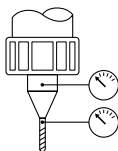
※加工时请务必使用内冷方式。

Make sure to use an internal coolant supply when drilling.

WDO-PLT

加工材料 WORK MATERIAL	软钢·低炭素钢 MILD STEELS LOW CARBON STEELS SS400・S10C ~150HB ~500N/mm ²		炭素钢 CARBON STEELS S35C・S50C ~210HB ~710N/mm ²		合金钢 ALLOY STEELS SCM・SCr・SNM 16~28HRC 710~900N/mm ²		铸铁 CAST IRON FC250 ~350N/mm ²		球墨铸铁 DUCTILE CAST IRON FCD450 FCD600 400~600N/mm ²		不锈钢 STAINLESS STEELS SUS400系 480~800N/mm ²	
切削速度 DRILLING SPEED	60~125m/min		60~80m/min		60~80m/min		60~80m/min		60~80m/min		40~60m/min	
直径 DRILL DIA. (mm)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)
3.03	7,400	0.06~0.09	7,400	0.06~0.09	7,400	0.06~0.09	7,400	0.06~0.09	7,400	0.06~0.09	5,200	0.06~0.09
4.03	5,600	0.08~0.12	5,600	0.08~0.12	5,600	0.08~0.12	5,600	0.08~0.12	5,600	0.08~0.12	3,900	0.08~0.12
5.03	4,500	0.1~0.15	4,500	0.1~0.15	4,500	0.1~0.15	4,500	0.1~0.15	4,500	0.1~0.15	3,100	0.1~0.15
6.03	3,700	0.12~0.18	3,700	0.12~0.18	3,700	0.12~0.18	3,700	0.12~0.18	3,700	0.12~0.18	2,600	0.12~0.18
7.03	3,200	0.14~0.2	3,200	0.14~0.2	3,200	0.14~0.2	3,200	0.14~0.2	3,200	0.14~0.2	2,300	0.14~0.2
8.03	2,800	0.14~0.2	2,800	0.14~0.2	2,800	0.14~0.2	2,800	0.14~0.2	2,800	0.14~0.2	2,000	0.14~0.2
9.03	2,500	0.14~0.22	2,500	0.14~0.22	2,500	0.14~0.22	2,500	0.14~0.22	2,500	0.14~0.22	1,800	0.14~0.22
10.03	2,200	0.15~0.24	2,200	0.15~0.24	2,200	0.15~0.24	2,200	0.15~0.24	2,200	0.15~0.24	1,600	0.15~0.24
11.03	2,000	0.16~0.26	2,000	0.16~0.26	2,000	0.16~0.26	2,000	0.16~0.26	2,000	0.16~0.26	1,400	0.16~0.26
12.03	1,800	0.18~0.28	1,800	0.18~0.28	1,800	0.18~0.28	1,800	0.18~0.28	1,800	0.18~0.28	1,300	0.18~0.28

1. 此切削条件基准表适用于，水溶性切削油剂或油雾式冷却加工。
2. 请使用稀释20倍以下的优质水溶性切削油剂。
3. 使用油性切削油剂或者稀释倍率超过20倍时，切削速度请下调30%。
4. 使用油性切削液时，切削速度为标准条件下差以下，并是不适用于高速加工。
5. 此切削条件基准表适用于，孔深3D以下的加工。
6. 装夹钻头时，请使用无损伤，无油污的弹簧夹头，并将径向跳动控制在0.02mm以下。
7. 工件夹持必须做到无变形，无振动。
8. 油污堵塞会造成折损，因此供油装置务必安装过滤网。



1. The indicated speeds and feeds are for drilling with water-soluble oil or MQL. (We do not recommend mist drilling with stainless steels.)
2. Suitable cutting fluid is water-soluble high density oil (less than 20 times dilution).
3. When using water soluble fluid with over 20 times dilution, reduce drilling speed by 30% below the standard conditions. Do not use the high speed drilling conditions in this case.
4. When using non-water soluble oil, the lower cutting speed in the table should be selected. Do not use the high speed drilling conditions in this case.
5. These conditions are for drilling depth less than 3 times the drill diameter.
6. When clamping a drill into the machine, use a collet that does not have any scratches or dust in the internal bore. Also, reduce the tool runout to less than 0.02mm.
7. Fasten the work material to reduce the possibility of work deformation, deflection of machined surface, or vibration.
8. A clogged oil hole can lead to a breakage. Make sure that a filter is attached to the oil feeder.

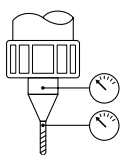
WDO-3D·5D

3D·5D用

For 3D, 5D

加工材料 WORK MATERIAL	软钢·低碳素钢 MILD STEELS LOW CARBON STEELS SS400·S10C ~150HB ~500N/mm ²		炭素钢 CARBON STEELS S35C·S50C ~210HB ~710N/mm ²		合金钢 ALLOY STEELS SCM·SCr·SNM 16~28HRC 710~900N/mm ²		合金钢 ALLOY STEELS SCM·SCr·SNM 28~35HRC 900~1100N/mm ²		铸铁 CAST IRON FC250 ~350N/mm ²		球墨铸铁 DUCTILE CAST IRON FCD450 FCD600 400~600N/mm ²		不锈钢 STAINLESS STEELS SUS300系 SUS400系 480~800N/mm ²	
切削速度 DRILLING SPEED	80~120m/min		80~120m/min		80~120m/min		60~90m/min		80~120m/min		60~100m/min		40~70m/min	
直径 DRILL DIA. (mm)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)	转速 SPEED (min ⁻¹)	进给量 FEED (mm/rev)
3	10,600	0.06~0.12	10,600	0.06~0.12	10,600	0.06~0.12	7,400	0.06~0.12	10,600	0.06~0.12	8,500	0.06~0.12	6,400	0.06~0.12
4	8,000	0.08~0.16	8,000	0.08~0.16	8,000	0.08~0.16	5,600	0.08~0.16	8,000	0.08~0.16	6,400	0.08~0.16	4,800	0.08~0.16
5	6,400	0.1~0.2	6,400	0.1~0.2	6,400	0.1~0.2	4,500	0.1~0.2	6,400	0.1~0.2	5,100	0.1~0.2	3,800	0.1~0.2
6	5,300	0.12~0.24	5,300	0.12~0.24	5,300	0.12~0.24	3,700	0.12~0.24	5,300	0.12~0.24	4,200	0.12~0.24	3,200	0.12~0.24
7	4,500	0.14~0.26	4,500	0.14~0.26	4,500	0.14~0.26	3,200	0.14~0.26	4,500	0.14~0.26	3,600	0.14~0.26	2,700	0.14~0.26
8	4,000	0.16~0.28	4,000	0.16~0.28	4,000	0.16~0.28	2,800	0.16~0.28	4,000	0.16~0.28	3,200	0.16~0.28	2,400	0.16~0.28
9	3,500	0.18~0.3	3,500	0.18~0.3	3,500	0.18~0.3	2,500	0.18~0.3	3,500	0.18~0.3	2,800	0.18~0.3	2,100	0.18~0.3
10	3,200	0.2~0.3	3,200	0.2~0.3	3,200	0.2~0.3	2,200	0.2~0.3	3,200	0.2~0.3	2,500	0.2~0.3	1,900	0.2~0.3
11	2,900	0.2~0.3	2,900	0.2~0.3	2,900	0.2~0.3	2,000	0.2~0.3	2,900	0.2~0.3	2,300	0.2~0.3	1,700	0.2~0.3
12	2,700	0.21~0.3	2,700	0.21~0.3	2,700	0.21~0.3	1,900	0.21~0.3	2,700	0.21~0.3	2,100	0.21~0.3	1,600	0.21~0.3
13	2,400	0.21~0.33	2,400	0.21~0.33	2,400	0.21~0.33	1,700	0.21~0.33	2,400	0.21~0.33	2,000	0.21~0.33	1,500	0.21~0.33
14	2,300	0.22~0.35	2,300	0.22~0.35	2,300	0.22~0.35	1,600	0.22~0.35	2,300	0.22~0.35	1,800	0.22~0.35	1,400	0.22~0.35
16	2,000	0.25~0.36	2,000	0.25~0.36	2,000	0.25~0.36	1,400	0.25~0.36	2,000	0.25~0.36	1,600	0.25~0.36	1,200	0.25~0.36
18	1,800	0.28~0.38	1,800	0.28~0.38	1,800	0.28~0.38	1,200	0.28~0.38	1,800	0.28~0.38	1,400	0.28~0.38	1,100	0.28~0.38
20	1,600	0.3~0.4	1,600	0.3~0.4	1,600	0.3~0.4	1,100	0.3~0.4	1,600	0.3~0.4	1,300	0.3~0.4	1,000	0.3~0.4

1. 此切削条件基准表适用于，**水溶性切削油剂**或油雾式冷却加工。
2. 请使用稀释20倍以下的优质水溶性切削油剂。
3. 使用油性切削油剂或者稀释倍率超过20倍时，切削速度请下调30%。
4. 此切削条件基准表适用于，**孔深5D以下**的加工。
5. 装夹钻头时，请使用无损伤，无油污的弹簧夹头，并将**径向跳动控制在0.02mm以下**。
6. 工件夹持必须做到无变形，无振动。
7. 油污堵塞会造成折损，因此供油装置务必安装过滤网。



1. The indicated speeds and feeds are for **water soluble oil or MQL**.
2. Suitable cutting fluid is water-soluble high density oil (less than 20 times dilution).
3. When using non-water soluble oil or water-emulsifiable (over 20times dilution), reduce drilling speed by 30%.
4. These conditions are for **drilling depth less than 5 times the drill diameter**.
5. When inserting a drill into the machine, use a collet that does not have any scratches or dust located within internal bore. **Also, reduce deflection of drill to less than 0.02mm.**
6. Fasten the work material to reduce the possibility of work deformation, deflection of machined surface, or vibration.
7. A clogged oil hole can lead to a breakage. Make sure that a filter is attached to the oil feeder.

加工材料SCM440时，每孔的工具费降低75%以上！

The tool cost per hole has been reduced more than 75% in SCM440!

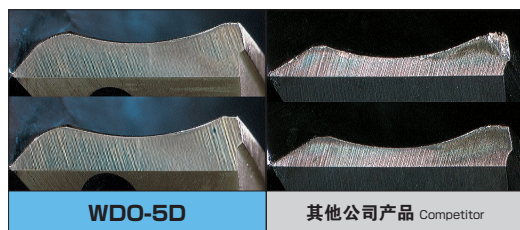
使用工具 Tool	WDO-5D $\phi 10$
加工材质 Work Material	SCM440(30HRC)
切削速度 Drilling Speed	70m/min (2,229min ⁻¹)
进给速度 Feed	668mm/min(0.3mm/rev)
切深量 Depth of Hole	50mm (5D 通孔) (Through)
切削油剂 Coolant	水溶性切削油剂 (20倍稀释) Water Soluble (5%)
使用机床 Machine	立式加工中心 (HSK) Vertical Machining Center

寿命及再研磨次数可以延长2倍以上的实例。

有着2X2倍以上，共计4倍的降低成本效果刀具成本可以削减75%以上，30HRC下70m/min，每转进给速度达直径3%的高效率加工。

Here is an example of more than doubling the durability and the frequency of regrounding. 2x2 equals a four-fold cost reduction. Also note that while reducing the tool cost by more than 75% it efficiently achieves "a feed rate of 3% of the diameter at a speed of 70m/min in 30HRC material".

加工42m(840孔)后刀面磨损比较 Wear condition after drilling 42m (840 holes)



钻头 Drills	工具寿命 Tool Life (孔)(Hole)	再研磨次数 Regrounding frequency (次)(Time)
WDO-5D	1,848	16
其他公司产品 Competitor	840	8

TOOL COMMUNICATION
OSG CORPORATION
欧士机 (上海) 精密工具有限公司

OSG免费技术热线
400 888 2086

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