



## ZBO Drill Services LLC, Russia

### Instruments and tools for wireline diamond drilling

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- Diamond bits B, N, H, P,
- Diamond reaming shells
- Core barrels
- Wireline drill rods
- Casing tubes
- ...and much more.

#### Contact

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## Impregnated diamond bits



ZBO Drill Services LLC offers impregnated diamond drill bits for wireline drilling applications with sizes B, N, H, P with modifications of type and matrix profiles, sizes and grades of diamonds.

Impregnated diamond bits have different types of matrices with small industrial grade diamonds. During the drilling process part of the matrix is eroded which exposes new diamonds. Thus, the matrix are self-sharpening.

Standard impregnated diamond bits are available with matrices of different heights and matrix hardness levels. There are matrices with heights 6,8,9,10,12, 14 mm. Matrices with 6 mm height are generally used for conventional drilling applications. Matrices that are above 8 mm in height are used for wireline drilling.

### SELECTION OF BIT MATRIX TYPE IN RELATION TO ROCK FORMATION

Type of formations	Abrasiv.	Formation hardness	Matrix hardness	Series	Цвет
Clay, shale, siltstone, gypsum	Medium	Low	HRC 50	DVY1#	Black
Coal, mudstone, volcanic, sandy gravel	Very high	Low	HRC 48-50	DVY1/DVY2	Black
Sandstone, sandy shale, limestone	Very high	Medium low	HRC 45-48	DVY1#/DVY2	Black
Hard limestone, hard shale, solid ash rocks	High	Medium	HRC 40-45	DVY3/DVY4	Red
Marble, hard shale	Medium	Medium	HRC 38-42	DVY5/DVY6/ DVY7	Blue
Diabase, andesite, gneiss	Medium	Medium high	HRC 38	DVY6/DVY7	Blue
Granodiorite, limonite	Medium	Medium high	HRC 35-38	DVY7/DVY8	Green
Granite, basalt	Medium low	High	HRC 32-35	DVY8/DVY9	Green
Rhyolite crystals gneiss, quartz porphyry	Medium low	High	HRC 25-30	DVY9/DVY10	Yellow
Siliceous rock, hard sandstone	Medium low	Very high	HRC 20-25	DVY11/DVY1 2	Silver
Rhyolite, dense quartzite, iron stone	Low	Very high	HRC 10-20	DVY12#	White

### MATRIX PROFILE OF DIAMOND BITS



#### W-PROFILE

Standard profile for most of impregnated crowns the height of the matrix greater than 7 mm. Profile is designed for sustained use indifferent rocks.

# ZBO Drill Services LLC: Diamond Drilling Instruments



## FLAT PROFILE

Designed for a variety of rock formations. Often used in crowns, casing shoes, and crowns with a solid matrix.



## CROSS PROFILE

Designed for very hard formations such as granite, quartzite, limestone and other. 10-12 levels of bits are usually made with a cross profile.



## HEMISPHERE PROFILE

Profile is designed for high-level penetration into the rock and heavily fractured formations.



## STEP PROFILE

Designed for soft and medium rock formations.

If you have already used the bits of world producers such as Boart Longyear, Atlas Copco, and others, and know which bits are you most satisfied with; you can find the correct bit in a comparative table of the bit matrices down below.

## DRILL BITS MATRIX COMPARISON CHART

ZBO	TEREK-ALMAZ	Boart Longyear	Christe-nsen.	Hobic	Hoffman	Dimatec	Fordia	Hubby
DVY12	И3	Series#10	Gold	Hobic#10	10-Copper/Black	MX12/MX-10/MX-8	DXP-2	H-10
DVY12		Series#10/#9/9-F	Purple	Hobic#9	9-Copper/Blue	MX10/MX-8/GX8B	Shark#9	H-8/Gold
DVY11	И3	Series#9/#9-F	Gold	Hobic#9	9-Copper Blue	MX-10/MX-8/GX8B	Shark#9	H-6
DVY10		Series#8	Purple	Hobic#8	9-Copper	GX8B/GX8C	Shark#7	Copper
DVY8	И4	Series#8/#7-F	Black	Hobic#7-R/#7-C	8-Copper	GX8A/GX7B/GX7C	Shark#7	Yellow
DVY7		Series#7	White	Hobic#7AA/#7	7-Bronze	GX7C/GX7A/MX-7	P-200/P-150	Orange
DVY6	И4	Series#7	Black	Hobic#6	7-Bronze	MX-7	DXP-33	Red
DVY5		Series#6	White	Hobic#5/#4	6-Gray	GX6/MX-5	P-150	
DVY4	И4	Series#6	Grey	Hobic#4/#3	6-Gray	GX6/MX-5	DXP-33	Green
DVY3		Series#4/#2	Black		5-Blue	MX-4	P-155	Silver-Blue
DVY3	И5	Series#2	Green	Hobic#3	2-Green(Dark)	MX-2	P-155	Blue
DVY2		Series#1	Grey	Hobic#2	1-Saper Green(Bright)	MX-1	P-160	
DVY1	И5	Series#2/#1	Green	Hobic#1	6-Grey	MX-2	DXP-2	Black
DVY1		Series#2/#1	Green	Hobic#1		MX-1	P-150	

## DRILL BITS AVAILABILITY

#	Name	OD	ID	Matrix Height	Profile
1	BQ impregnated	59.69	36.27	6,8,9,10,12	W-profile, flat, hemisphere, cross profile step profile
2	NQ impregnated	75.44	47.50	6,8,9,10,12	W-profile, flat, hemisphere, cross profile step profile
3	HQ impregnated	95.76	63.38	6,8,9,10,12	W-profile, flat, hemisphere, cross profile step profile
4	PQ impregnated	122.30	84.84	6,8,9,10,12	W-profile, flat, hemisphere, cross profile step profile



## Surface set diamond bits



Surface set diamond bits are made with a single layer of industrial diamonds, which are located on the surface of the solid matrix. These bits are recommended to drill hard and soft rock formations. The level of penetration into the rock is high enough for stable drilling. In order to select the correct location of diamonds in the matrix, it is important to consider the following aspects:

- **Diamond size**
- **Diamond grade**
- **Profile design**

Diamond size	Formation hardness
10/20 SPC*	Soft formations
20/30 SPC	Soft and medium formations
30/40 SPC	Medium formations
40/60 SPC*	Medium and hard formations
< 60/80 SPC	Very hard formations

- \* SPC – stones per carat
- \*\* 40/60 – standard size used on most drill bits
- \*\*\* Other sizes available upon request

Diamond grade	Formation hardness
A class	Soft formations
AA* class	Soft and medium formations
AAA class	Hard and very hard formations

- \* AA is a standard used in most drill bits

### Profile design

**Hemisphere profile:** traditionally used with bits, internal slot (kerf) which does not exceed 11 mm. Crown with this profile can be used to drill various rocks. Bits with kerf which exceeds 11 mm with this profile are mainly used for drilling abrasive formations.

**Step profile:** traditionally bits with kerf more than 11 mm have this profile. They can be used to increase the speed with stable drilling. These bits are not recommended for drilling in fractured or highly abrasive rocks.

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## SURFACE SET DRILL BITS AVAILABILITY

	Type	OD	ID	SPC	Diamond Grade	Profile	# of Steps
<b>BQ</b>	surface set	59.69	36.27	20/30; 40/60	A, AA, AAAA	Hemisphere; step profile	5 steps
<b>NQ</b>	surface set	75.44	47.50	20/30; 40/60	A, AA, AAAA	Hemisphere; step profile	5 steps
<b>HQ</b>	surface set	95.76	63.38	20/30; 40/60	A, AA, AAAA	Hemisphere; step profile	<b>7 steps</b>
<b>PQ</b>	surface set	122.30	84.84	20/30; 40/60	A, AA, AAAA	Hemisphere; step profile	<b>7 steps</b>

## Tungsten Carbide Bits

These bits are designed specifically for the survey of soil and geotechnical drilling. They are also suitable for limited types of mineral exploration. Since tungsten carbide is softer than industrial diamonds, tungsten carbide bits are designed for drilling rocks with soft to medium hardness. They also are used to clean wells, removal of fragments of steel and similar applications.

### Tungsten Carbide Bits Availability

	Type	OD	ID	Profile
<b>BQ</b>	tungsten carbide	59.69	36.27	8-angle, 4-angle
<b>NQ</b>	tungsten carbide	75.44	47.50	8-angle, 4-angle
<b>HQ</b>	tungsten carbide	95.76	63.38	8-angle, 4-angle
<b>PQ</b>	tungsten carbide	122.30	84.84	8-angle, 4-angle



## Polycrystalline (PCD) Diamond Bits

TSP profile



Spicula-profile



Cylinder profile



These types of bits are similar to the single-layered surface set diamond bits. The main difference is that instead of natural synthetic industrial diamonds Polycrystalline diamond elements are used. Bits with Polycrystalline diamond cutter in the matrix have a high lifetime, good rate of penetration and the percentage of core extraction in the soft and medium rocks. These crowns are used when drilling in soft, unconsolidated, fractured and abrasive rocks.

### PCD Drill Bits Availability

	Type	OD	ID	Profile
<b>BQ</b>	Polycrystalline	59.69	36.27	TSP, Spicula, Cylinder
<b>NQ</b>	Polycrystalline	75.44	47.50	TSP, Spicula, Cylinder
<b>HQ</b>	Polycrystalline	95.76	63.38	TSP, Spicula, Cylinder
<b>PQ</b>	Polycrystalline	122.30	84.84	TSP, Spicula, Cylinder



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## Reaming Shells

Reaming shells are intended for calibration of walls of the wells in different categories of rocks formations. Traditionally, reaming shells are coated with industrial diamonds from 20/30 SPC. Waterway design ensures reliable flushing of the rock cutting tool.

This catalog shows 2 Type and profiles of diamond extender:

- Spiral Segment
- Spiral Rib



### Reaming Shells Availability

	Type	Max. diameter	Min. diameter	SPC	Diamond Grade	Profile
<b>BQ</b>	Surface set	60.07	59.82	20/30;	AA	Spiral Segment, Spiral Rib
<b>NQ</b>	Surface set	75.82	75.57	20/30;	AA	Spiral Segment, Spiral Rib
<b>HQ</b>	Surface set	96.27	96.89	20/30;	AA	Spiral Segment, Spiral Rib
<b>PQ</b>	Surface set	122.81	96.27	20/30;	AA	Spiral Segment, Spiral Rib

## Tungsten Carbide Reaming Shells

### TC Reaming Shells Availability

	Type	OD max.	OD min.
<b>BQ</b>	tungsten carbide reaming shell	60.07	59.82
<b>NQ</b>	tungsten carbide reaming shell	75.82	75.57
<b>HQ</b>	tungsten carbide reaming shell	96.27	96.89
<b>PQ</b>	tungsten carbide reaming shell	122.81	96.27



## Casing Shoes

### Casing Shoes Availability

	Type	OD	ID
<b>BW</b>	Impregnated, Surface set, tungsten carbide	75.2	60.2
<b>NW</b>	Impregnated, Surface set, tungsten carbide	91.8	76
<b>HW</b>	Impregnated, Surface set, tungsten carbide	117.4	99.7
<b>PW</b>	Impregnated, Surface set, tungsten carbide	143.4	123.4

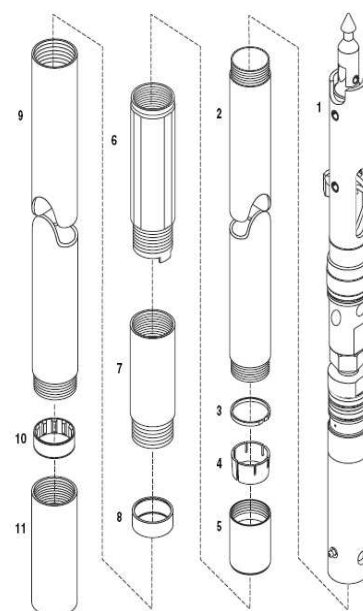


## Core Barrels



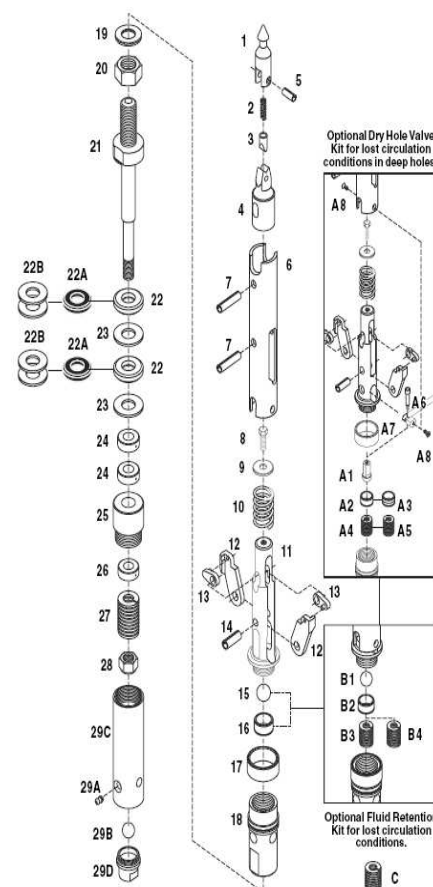
## B, N, H, P (Q) Core Barrels

#	Name	Имя	Клв
	Core Barrel 1.5 m / 5 ft	Колонковый бур 1.5 м / 5 футов	1
	Core Barrel 3.0 m / 10 ft	Колонковый бур 3.0 м / 10 футов	1
1	Head Assembly*	Головной блок	1
2	Inner Tube, 1.5 m / 5 ft	Внутренняя труба, 1.5 м / 5 футов	1
2	Inner Tube, 3.0 m / 10 ft	Внутренняя труба, 3.0 м / 10 футов	1
3	Stop Ring	Стопорное (упорное)	1
4	Core Lifter	Кернорватель	1
5	Core Lifter Case	Корпус кернорвателя	1
6	Full-Hole Tanged Locking Coupling	Бескверновая блокировочная соединительная муфта с хвостовиком (Релитовый переход)	1
7	Adapter Coupling	Переходная муфта (Подрелитовый переход)	1
8	Landing Ring	Посадочное кольцо	1
9	Outer Tube, 1.5 m / 5 ft	Внешняя труба, 1.5 м / 5 футов	1
9	Outer Tube, 3.0 m / 10 ft	Внешняя труба, 3.0 м / 10 футов	1
10	Inner Tube Stabilizer	Стабилизатор внутренней трубы	1
11	Thread Protector	Предохранитель резьбы	1



## B, N, H, P (Q) Head Assembly

#	Name	Имя	Клв
1	Spearhead Point	Копьевидный наконечник	1
2	Compression Spring	Пружина сжатия	1
3	Detent Plunger	Стопорный плунжер	1
4	Spearhead Base	Основание копьевидного наконечника	1
5	Spirol Pin 7/16" x 1"	Штифт Spirol 7/16" x 1"	1
6	Latch Retracting Case	Цилиндр, в который отводится стопор	1
7	Spring Pin 1/2" x 2-3/4"	Пружинный штифт 1/2" x 2-3/4"	2
8	Nyloc Bolt 3/8"-16UNC x 3/4"	Болт Nyloc 3/8"-16UNC x 3/4"	1
9	Washer	Шайба	1
10	Latch Compression Spring	Стопорная пружина сжатия	1
11	Upper Latch Body	Верхняя часть корпуса стопора	1
12	Latch	Стопор	2
13	Link	Соединительная деталь	2
14	Spring Pin 1/2" x 2"	Пружинный штифт 1/2" x 2"	1
15	Stainless Steel Ball, 22 mm	Шарик из нержавеющей стали, 22 мм	1
16	Landing Indicator Bushing	Вкладыш индикатора места посадки	1
17	Landing Shoulder	Посадочный буртик	1
18	Lower Latch Body	Нижняя часть корпуса стопора	1
19	Washer, Nord-lock	Шайба, Nord-lock	1
20	Hex Nut	Шестигранная гайка	1
21	Spindle	Шпиндель	1
22	Shut-Off Valve, Hard	Отсечной клапан, жесткий	2
23	Valve Adjusting Washer	Прокладочная шайба клапана	2

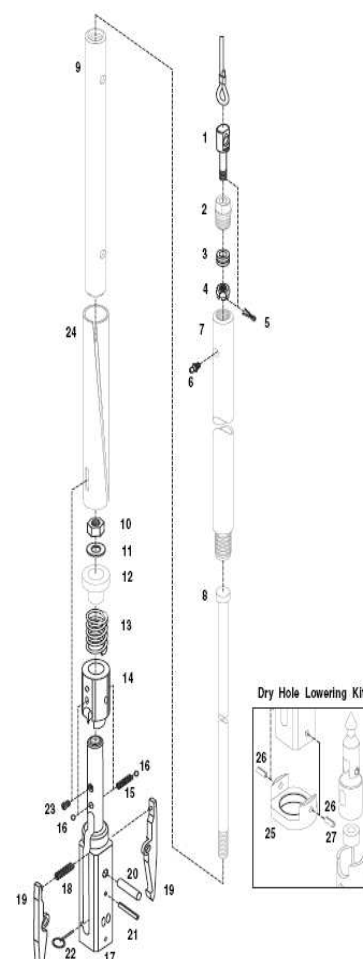


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24	Thrust Bearing	Упорный подшипник	2
25	Spindle Bearing	Подшипник полуоси	1
26	Hanger Bearing	Подшипник на подвеске	1
27	Compression Spring	Пружина сжатия	1
28	Stover Lock Nut	Стопорная гайка Stover	1
29	Inner Tube Cap Assembly (28A, B, C, D)	Блок колпачка внут. трубы (28A, B, C, D)	-
29A	Grease Fitting	Смазочный фитинг	1
29B	Stainless Steel Ball, 22 mm	Шарик из нержавеющей стали, 22 мм	1
29C	Inner Tube Cap	Колпачок внутренней трубы	1
29D	Check Valve Body	Корпус запорного клапана	1

## Overshots Easy Lock

#	Name	Имя	Клв
1	Eye Bolt	Болт с проушиной	1
2	Cable Swivel Collar	Фланец кабельного вертлюга	1
3	Thrust Bearing	Упорный подшипник	1
4	Castle Nut	Корончатая гайка	1
5	Cotter Pin	Проволочный шплинт	1
6	Grease Fitting	Смазочный фитинг	1
7	Cable Swivel Body	Корпус кабельного вертлюга	1
8	Jar Staff	Приспособление для выбивания снаряда	1
9	Jar Tube	Трубка приспособления для выбивания снаряда	1
10	Hex Nut 3/4 UNC	Шестигранная гайка 3/4 UNC	1
11	Washer, Nord-lock	Шайба, Nord-lock	1
12	Cap, Ezy Lock O/Shot	Колпачок овершота Ezy Lock	1
13	Spring, Ezy Lock O/Shot	Пружина овершота Ezy Lock	1
14	Sleeve, Ezy Lock O/Shot	Муфта овершота Ezy Lock	1
15	Compression Spring	Пружина сжатия	1
16	Ball 11/32"	Шарик 11/32"	2
17	Ezy Lock Overshot Head	Головка овершота Ezy Lock	1
18	Compression Spring	Пружина сжатия	1
19	Lifting Dog	Захватывающее приспособление	2
20	Plain Pin 1/2" x 2-1/8"	Гладкий штифт 1/2" x 2-1/8"	1
21	Spring Pin 1/4" x 2"	Пружинный штифт 1/4" x 2"	1
22	Locking Pin	Стопорный штифт	1
23	Set Screw, 3/8 UNF x 3/4 Nyloc	Установочный винт, 3/8 UNF x 3/4 Nyloc	1
24	Locking Sleeve	Стопорная муфта	1



## Wireline Drill Rods: WL (Q) - series

### - Wireline Drill Rods –

#	Name	Имя	Length	OD	ID
1	Wireline drill rod BQ	Бурильные трубы BQ	1,5 – 3 м	55.6	46.0
2	Wireline drill rod NQ	Бурильные трубы NQ	1,5 – 3 м	69.9	60.3
3	Wireline drill rod HQ	Бурильные трубы HQ	1,5 – 3 м	89.0	77.8
4	Wireline drill rod PQ	Бурильные трубы PQ	1,5 – 3 м	114.5	101.5

## Casint tubes: W - series

### - Casing tubes –

#	Name	Имя	Length	OD	ID
1	Casing rod BW	Обсадные трубы BW	1,5 – 3 м	73.0	60.3
2	Casing rod NW	Обсадные трубы NW	1,5 – 3 м	88.9	76.2
3	Casing rod HW	Обсадные трубы HW	1,5 – 3 м	114.3	101.5
4	Casing rod PW	Обсадные трубы PW	1,5 – 3 м	139.7	127.0

## Other drilling tools



ZBO Drill Services can also supply geologist and drillers with various types of drilling consumables including:

- Pipe wrenches BQ, NQ, HQ, PQ
- Thread adaptors
- Fishing tools
- Water swivels and much more...