DBC

DBC DRILL BITS

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FASTDRILL

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IMPREGNATED DIAMOND DRILL BITS

Diamonds in impregnated drill bits are embedded in a matrix which is designed to erode at the same rate as the diamonds wear. As the matrix wears, new sharp diamonds are successively exposed.

The crown is composed of two layers: the matrix layer which cuts the rock, and the backing layer which connects the matrix layer to the steel shank and also serves to support any set diameter protection materials.

MANUFACTURING **PROGRAM**

Although the backing layer does not contain synthetic diamond, it is also composed of a powdered metal bond. The exposed outside and inside diameter surfaces of this layer are set with a combination of natural mined “kicker” grade diamond and tungsten-carbide wear pads. These assist in maintaining the critical gauge diameter setting of the bit throughout its life.

The manufacturing process to produce diamond tools is infiltration. The interconnected pores of the compacted dry-matrix powders are filled with a braze that has a lower melting point.
Diamonds- Matrix combination determines the performance of impregnated drill bit. The simultaneous erosion of the matrix/diamonds makes the bit self-sharpening, consequently forming the ideal combination of optimal penetration rate and wear resistance and ultimately proving the best drilling economy.

Through advanced manufacturing technology, suitable matrixes and diamond qualities, DBC - FASTDRILL can satisfy all drilling requirements with an extensive range of matrixes.

In impregnated diamond drill bits, only the highest quality of synthetic diamonds depending on the application. The consistency of shape, granular size and strength make this diamond better than natural stones.

ROCK GROUP	FORMATION DESCRIPTION	ROCK TYPE	FASTDRILL STANDARD	FASTDRILL EXTRA	FASTDRILL EXTRA ECONOMY
1-4	Soft to medium hard, Very abrasive to slightly abrasive, Very fractured to slightly broken	Unmetamorphosed or weakly metamorphosed shales, Sandstone and limestone	SM	XSY	EST
			SM	XSK	EST
5	Medium hard, Abrasive, Moderately fractured to slightly broken	Limestone and dolomite. Weathered granite and gneiss. Serpentinite and metaperidotite	SM	XSK	EST
6	Medium hard, Moderately abrasive, Moderately fractured to slightly broken	Unmetamorphosed or weakly metamorphosed diorite. Gabbro, Peridotite and gneiss. Basalt, andesite	OS	XSK	EST / SK
7	Medium hard - hard, Moderately abrasive. Slightly fractured to competent	Metabasalt, amphibolite. Metamorphosed diorite and gabbro. Diabase	OS	XSK	EST / SK
8	Hard, Slightly abrasive, Competent	Quartz rich skarn. Granite and pegmatite	YS	XSK	SK
9	Very hard, Slightly abrasive, Very competent	Metamorphosed granitic rock and quartz rich gneiss	YS	XSK	XSJ
10	Extremely hard, Non-abrasive, fine grained, Very competent	Chert and jasperite. Quartzite. Highly metamorphosed volcanic	YS	XSG	XSJ

Fastdrill drill bits are manufactured in three product groups;

MATRIX GROUP	APPLICATION
FASTDRILL STANDARD	Suitable for drill rigs with less than 50 kW power
FASTDRILL EXTRA	The best drilling performance for high power drill rigs..
FASTDRILL EXTRA ECONOMY	More economical than EXTRA serie and with less drilling speed.

Matrix height

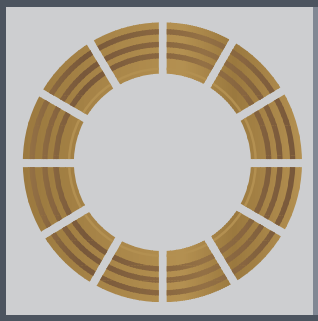
Standard matrix height is 9mm. Low (6mm) and high (12, 15 mm) are also available.

Profile

For the thick kerf bits, (wall thickness ≥10mm) such as wire line bits, the W profile is standard which gives more free-cutting drilling performance than bits with a conventional flat face.

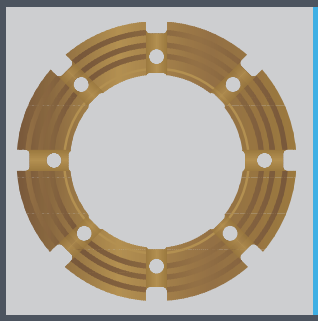
WATER WAYS

Different water ways designs are used in impregnated bits.



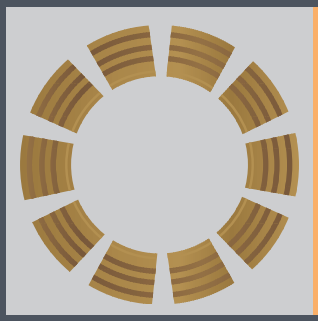
STRAIGHT WATER WAYS

- 4 or 8 mm wide
- Standard profile - general purpose design
- Suitable for a broad range of formations



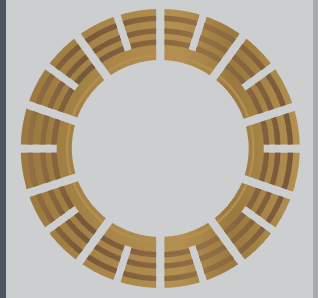
FACE DISCHARGE (FD)

- Designed to minimize flushing of core sample
- Suitable for broken/granular formations
- To be used with triple tube core barrels



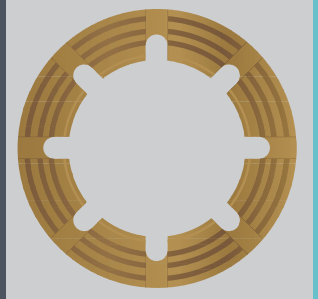
CONICAL WATER WAYS (CWW)I

- Standard profile - general purpose design
- Preferable in competent and semi-broken rock
- Suitable for mixed formations containing containing broken and competent zones



TURBOi

- High productivity
- Suitable for competent formations
- High penetration rate



SAND

- Suitable for extremely broken or clay, clay/ sand
mixed formations
- Alternative to face discharge bits

In hard formations, impregnated bits are more economical to run than surface bits and they normally offer better durability against tough abuse and rough handling and provide greater resistance to wear in fissured formations.

SURFACE SET DIAMOND DRILL BITS

Surface set bits manufactured for high performance give high penetration rate, long service life and good adaptability to variable formations. The diamonds in these bits are arranged in special patterns, developed from many years of practical field experience, which vary according to the size of stone used. Such patterns play an important role in the service life and penetration rates of the drill bit. The diamonds are embedded or bonded in a matrix which has high resistance to erosion.

MATRiX

All surface set diamond bits are made from a very hard matrix.

DIAMOND GRADE

Only AAA super quality selected diamonds with highly polished surface, tough crystals with high impact resistance are used.

DIAMOND SIZE

Fastdrill standard diamond sizes are 10/15, 20/25, 30/50 and 50/70 spc. As a general rule, the softer the formation the larger is the diamond (10/15, 20/25 spc) to be used. While in hard formations, smaller diamonds (30/50, 50/70 spc) are used.

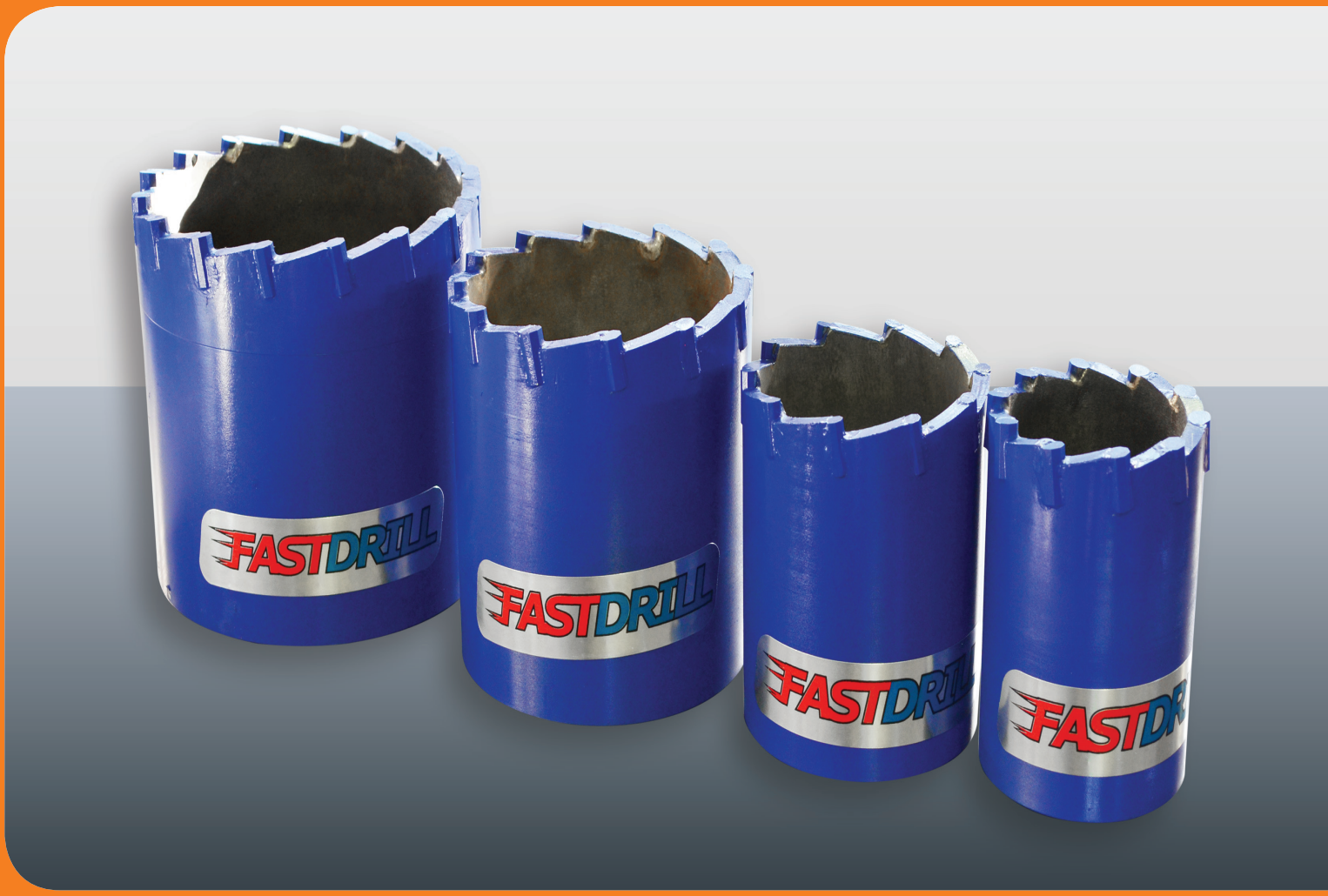
PROFİİLES

Surface set bits are available in different profiles to produce maximum penetration rates and straight holes for each specific type of bit; three are standard (semi-round, step type, step type with face discharge) and others are optional.

REAMING SHELLS

Reaming shells are designed to be placed behind the drill bit and the core barrel to ream the hole. A reaming shell has to be replaced when its diameter becomes less than that of the new bit to be introduced in the hole. This is intended to avoid new bits getting stuck in a too slim hole. A reaming shell also helps to stabilize the core barrel. Reaming shells are available for all types of core barrels and drill bits.

Standard Fastdrill reaming shells are set using especially chosen diamonds, with a stone size of 30/50 spc. Well designed waterways between the diamond segments facilitate effective flushing and contribute to long



TC (TUNGSTEN CARBIDE) BITS

Carbide bits are normally used for coring in softer rock formations, overburden drilling, and cleaning of drill holes.

These bits have octagonal tungsten carbide inserts that are ground at an angle of 10° to form the cutting edges. The quality of the tungsten carbide chosen has been specially developed for rotary drilling to give high wear resistance.

CTC (CRUSHED TUNGSTEN CARBIDE) BITS

CTC is another type of tungsten carbide bits manufactured of crushed carbide chips with a granular size of 2-5 mm, mixed with a special alloy.

CTC bits have considerably more cutting edges than standard TC bits and are recommended in medium to medium hard sedimentary formations.

CTC bits cause less vibration and offer better core recovery than standard TC bits.

DRILL BIT RECOMMENDATIONS

Many factors influence the final choice of bits; such as geology, type of core barrel, diameter of the rods, rotation speed, drill bit pressure, flushing medium. It is not easy task to give general rules for the drill bits to be used in a given situation or formation.

Suitable matrix can be selected from the product range. Evaluate the four criteria below to make an initial selection.

Evaluate the four criteria below to make an initial

Rock Hardness	Rock Grain Size	Formation	Drill Power
HARD MATRIX for soft formation	HARD MATRIX for large grain size	HARD MATRIX for broken formation	HARD MATRIX for high power
SOFT MATRIX for hard formation	SOFT MATRIX For fine grain size	SOFT MATRIX for competent formation	SOFT MATRIX for low power

Drill with the selected bit
Note the penetration rate and the bit life.

- **IF PENETRATION RATE IS LOW: try a softer matrix to increase the penetration rate**
- **IF BIT LIFE IS SHORT: try a harder matrix to increase bit life**

SIZE	RPM RANGE	OPTIMUM RPM	RPC (RPM/CM)	FLUSHING WATER (LIT/MIN)	FEED FORCE, kN
A	1500-1700	1650	100	15-20	8,9-22,25
B	1200-1450	1350	79	30-36	8,9-22,25
N	900-1200	1100	67	38-45	12,25-26,00
H	750-950	850	51	50-60	17,75-35,00
P	600-750	650	40	75-84	25,45-44,00

ROTATIONAL SPEED

Many factors influence the performance of impregnated bits. In addition to the type of formation being drilled, factors such as hole diameter, depth, ground conditions, type of drill, weight on bit, water flow and RPM all have an impact on performance. The top priority of today's drillers is performance. To achieve optimum drilling production while balancing bit life, a correlation between RPM and penetration rate has been developed for impregnated diamond bits. This parameter is referred to as Rotation per centimeter (RPC). This parameter can be utilized as a guideline to increase penetration rates while maintaining reasonable bit life.

As an example; in N size at 1100 rpm, 1100/67= 16.4 cm/min penetration rate is suitable.

BIT LOAD

When drilling with impregnated bits, the lowest possible bit load should be applied that still provide a satisfactory rate of penetration. Excessively high bit pressure will only result in abnormally high wear of the bit. At the same time, too low bit pressure will polish the diamonds and the bit will lose its self-sharpening ability.

FLUSHING WATER

The flushing medium is pumped through the drill string, between the inner and outer tubes of the core barrel, providing three major functions, cooling and lubricating the drill bit and transportation of cuttings up out of the drill hole.

As conditions vary widely from one drilling operation to another, it is difficult to define absolute parameters for the fluid volume to be used during drilling. Some factors that influence the amount of fluid volume include: ground conditions, the viscosity of the fluid used, the waterway design of the bit and the annular space between the core barrel/rods and the wall of the drill hole. In general, the volume of fluid required for cooling the bit increases with the hardness of the rock. In addition, a higher fluid volume will be required to transport larger cuttings, such as those encountered in broken, abrasive formations. It should be remembered that a minor build-up of cuttings at the bit face will assist in abrading the matrix, thus allowing the bit to cut freely and maintain its sharpness.

ORDERING INFORMATION

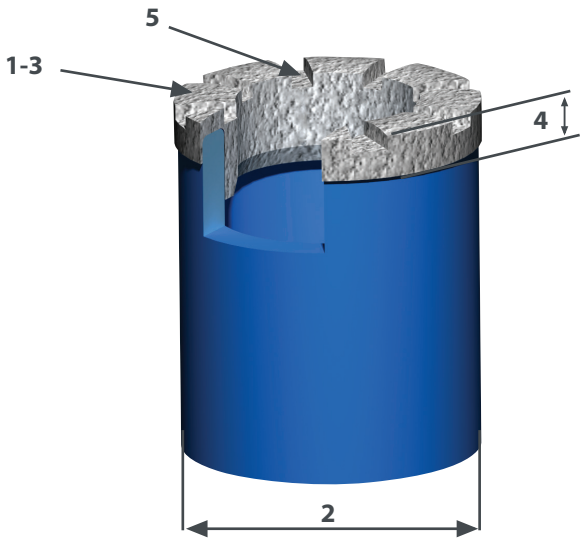
Fastdrill can manufacture and supply drill bits according to all current standards and in compliance with special customer demands and wishes.
The following key shall be used to order bits.

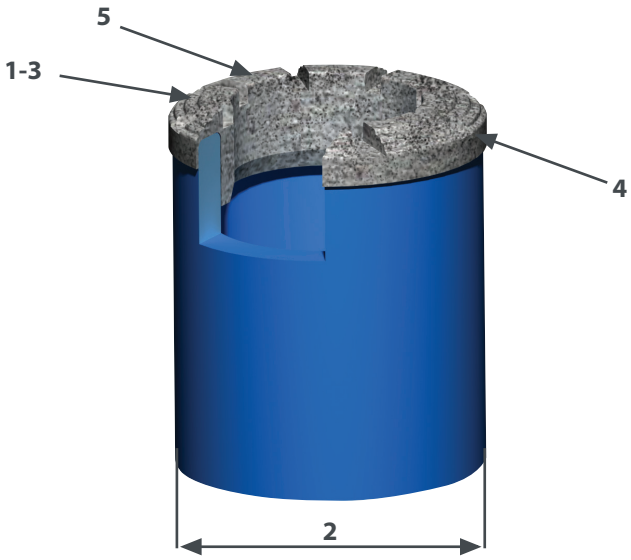
Impregnated drill bits

1. Core barrel type
2. Dimension of the drill bit / size of the core barrel
3. Matrix type
4. Matrix height
5. The design of the waterways

Surface set diamond drill bits

1. Core barrel type
2. Dimension of the drill bit / size of the core barrel
3. Diamond size
4. Diamond quality, AAA
5. Profile type





THE LEADING EDGE IN DIAMOND TOOL TECHNOLOGY

Quality is built into every FASTDRILL product right from the start. Through innovative designs, the use of only the finest raw materials and strict process controls, our engineering team is committed to developing products that offer outstanding value and reliability.
State-of -the-art process equipment along with high-tech manufacturing techniques allows us to produce the most consistent diamond tools in the industry. This is your assurance of long tool life and high performance... EVERY TIME!
We are constantly striving to improve our products by taking advantage of the latest innovations in material and process technology along with an on-going commitment to research and development.

- UNDERGROUND AND SURFACE DRILLING MACHINES
- FASTDRILL DRILL BITS
- CORE BARRELS IN EACH SIZE AND STANDARD
- HEAT TREATED WIRELINE RODS
- FRICTION WELDED RODS
- CASING RODS
- DRILLING ACCESSORIES
- PLASTIC CORE BOXES
- DRILLING ADDITIVES
- DEVICO BORE HOLE SURVEY TOOL

"advanced drilling technology"

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