

DIAMOND CORE BITS

RANGE OF DIAMOND CORE BITS

APAGEO OFFER A WIDE RANGE OF QUALITY DIAMOND CORE BITS: HEXADIAM.

As a result of a massive investment in powder technology and a partnership with a metallurgical laboratory and mineral exploration drilling companies, APAGEO has developed its new range of diamond core bits HEXADIAM.

Our core bits are manufactured with high quality raw materials and advanced equipment, thus offering the best penetration speed/life ratio. HEXADIAM core bits can be used in all conditions, regardless of the level of abrasion or the type of rock.

Thanks to a permanent stock in our warehouse, we can respond immediately to your needs. If necessary, our production unit based in France will allow us to manufacture these tools in a very short time.

Finally, more specific tools can be supplied on request (particular profile, specific diamond height, made to measure, etc.).

TOOLS TYPE GROUNDS

IMPREGNATED	Soft to extremely hard rocks Rocks fine to coarse grains Abrasive to non-abrasive Fractured to compact
SURFACE SET	Soft rocks to hard Rocks fine to coarse grains Abrasive to non-abrasive Fractured to compact
PCD (POLY-CRYSTALLINE DIAMOND)	Soft soil to hard soils Coarse grains Abrasives Fractured
TSD (THERMALLY STABLE DIAMOND)	Softs Abrasives Fractured
TUNGSTEN CARBIDE INSERTS AND CRUSHED CARBIDE	Soft and very soft soils



CHARTER SELECTION OF MATRICES



SOFT
Calcite
Limestone
Sandstone
Talc

MEDIUM
Dolomite
Greestone
Serpentine
Shale

HARD
Granite
Basalt
Hard limestone
Hard shale

VERY HARD
Gneiss
Pegmatite
Quartz
Silicified

EXTREMELY HARD
Ironstone
Jasperite
Quartzite
Rhyolite

IMPREGNATED DIAMOND
CORE BITS

hexadram S2

hexadram S6

hexadram S9

hexadram S10

hexadram S12

PDC / TSD/
CUBIPAX

CUBIPAX ●

PDC ●

TSD ●

SURFACE SET DIAMOND
CORE BITS

16/25

25/40

40/60

AVAILABLE PROFILES



Standard spacing 3 or 5 mm
Most used in industry
Excellent fluid flow



Turbo
Used with less pressure on the tool
Better evacuation of cuttings
Used with high rotation speed



DD (Deep Discharge)
Excellent in fractured formations
A best seller for ironstone
Reduces the risk of core leaching when passing through sandy and clayey layers



Twist
The standard for triple core barrels
Excellent design for fluid and cuttings evacuation
Allows for reduced grouting pressure
Excellent performance in fractured formations

DIAMOND CORE BITS

CORE BIT OPERATING PARAMETERS

1. CHOICE OF ROTATION SPEEDS DEPENDING ON

- penetration rate;
- core bit diameter;
- drilling depth;
- vibration.

In estimating the appropriate rotation speed it is recommended to follow the concept of peripheral rotation speed: the smaller the core bit diameter, the weaker its circumference, requiring a higher rotation speed in order to maintain adequate peripheral velocity.

For reference, the required peripheral velocity is typically 2 to 5 m/s for impregnated core bits and 1 to 3 m/s for surface-set core bits.

Figure 1 illustrates target ranges for rotation speed based on tool diameter..

2. CHOICE OF WATER FLOW RATE

Flow rate should generally be as high as possible but also depends on the core bit diameter and rock type.

For example, soft or fractured rock requires a higher flow rate. On the other hand, very hard, resistant rock associated with a low penetration rate calls for a lower flow rate to improve rock cutting and reduce polishing risk for the diamonds

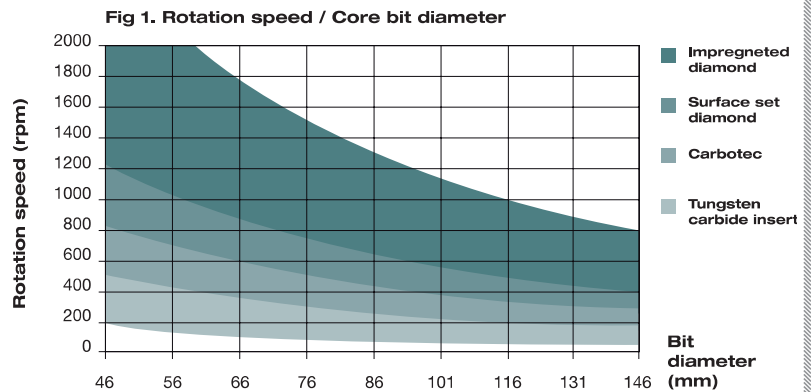
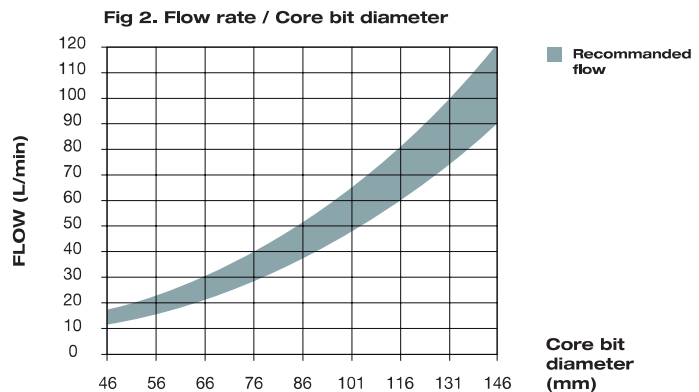
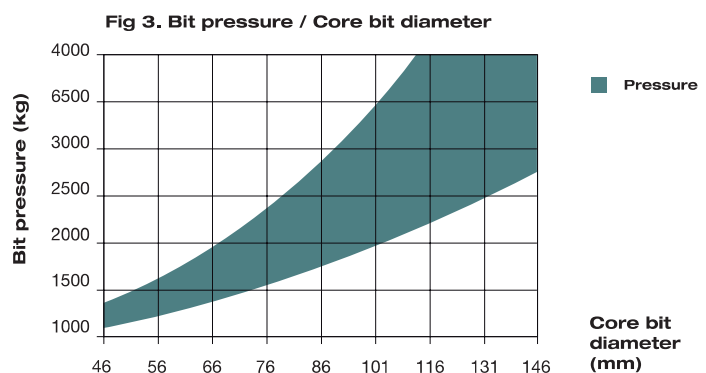
Figure 2 shows suggested water flow rates for various core bit diameters.

3. BIT PRESSURE

During drilling, the force applied by the rig and the weight of the rods must also be as weak as possible whilst maintaining a sufficient penetration rate to prevent polishing of the diamonds.

The consequences of excessive pressure include:

- wearing of mechanical components of the rig, rods and core barrel;
- premature wearing of the core bit;
- increased deviation likelihood.



DIAMOND CORE BITS

ANALYSIS OF WEAR



NEW IMPREGNATED BIT



IDEAL WEAR

Even wear, complete up to the carbide with the diamonds evenly worn.



CONSUMED BIT

Impregnated bit consumed perfectly.



DIAMOND OVER EXPOSED

The matrix wears too fast before the diamonds have worn out. The diamonds pop-out prematurely thus reducing the life of the bit. Caused by: Drilling pressure too high for speed of rotation, water flow too low, matrix too soft.



CORE BIT POLISHED OR GLAZED

The bit doesn't cut anymore, diamonds are polished. Caused by: Drilling pressure too low for the speed of rotation, water flow too high, matrix too hard. Solution: Sharpen the bit, reduce the rotation speed and increase drilling pressure, reduce water flow, select a softer matrix.



BURNT CORE BIT

Bit is completely melted and destroyed. Caused by: Lack of water. Solution: Increase the water flow, check the pump is working well, check the rods for leaks in the joints, check the inner tube is not too long.



CRACKS IN THE WATER WAYS

Caused by: Too much weight on the bit, Dropped the rods, bit crushed by the foot clamp or rod holder. Solution: Take some weight off the bit.



LOSS OF INSIDE DIAMETER

Wear of inside diameter and ringing. Caused by: Drilling pressure too high, very broken ground, core left in the hole, water flow too low, matrix too soft.



LOSS OF OUTSIDE DIAMETER

Cause: vibration, rotation speed too high, water flow too low, fragmented rock present in the borehole. Solution: increase water flow, reduce rotation speed, check the diameter of reaming shell, add drilling fluid (to reduce vibration)



INSIDE WEAR PATTERN

Caused by: drilling pressure too high for rotation speed, Core left in the hole had to be drilled, very broken ground. Solution: decrease drilling pressure, increase rotation speed, check the core barrel, add drilling fluids.



OUTSIDE WEAR PATTERN

Caused by: water flow too low, loss of water by the rods, hole "reamed" Solution: increase the water flow, check for leaks, check the diameter of shell.