WF Double Tube Series

The WF series is a range of components which produces 76,92 and 112mm cores suitable for soft to medium hard geology.

It comprises of a core barrel head, inner and outer tubes, extension tube, core lifter, reaming shell and core bit. Different types of lifters, reaming shells and core bits need to be selected according to the application and geology.

It uses a thin wall double tube core barrel used in combination with metric casing and is easily converted to a triplex system with the addition of a coreliner for increased core recovery.

Applications

- Geotechnical investigation
- Mining exploration

Features

- Made in the UK
- Robust construction
- Medium penetration
- Suitable soft to medium hard geology
- Can be converted to triplex system with coreliner
- Thin kerf allows rapid penetration
- Large core relative to hole size
- Suitable for water or polymer flush
- Face discharge flushing ports reduce core erosion
- Good for coring in hard rock formations using impregnated bits
- Barrel head thread to suit individual requirements

Barrel Sizes			
	HWF	**PWF**	**SWF**
Hole Diameter (mm)	99.2	120.6	146.3
Core Diameter (mm)	76.2	92.1	112.8
Kerf / Crown Thickness (mm)	11.35	13.95	16.3
Cutting Area (cm^2)	31.7	47.7	68.1
Hole Area (cm^2)	77.3	114.3	168.1
Cutting Area as % of Hole Area	41%	42%	41%
Core Area (cm^2)	45.6	66.6	100.0
Thread Connection in Head*	NW, NWY	2⅞" API IF, NWY	2⅞" API IF
Recommended Casing	HW	PW	SW
Conversion to triple tube possible	Yes	Yes	Yes

*Cross-over sub required for drill rods not matching the thread connection in core barrel head

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Core Bit Dimensions		
Size	**Outside Diameter (mm)**	**Inside diameter (mm)**
HWF	98.98/98.6	76.33/76.08
HWF Coreliner	99.36/98.98	77.089/76.885
PWF	120.78/120.4	92.33/91.95
PWF Coreline	120.78/120.4	87.12/86.86
SWF	145.67/145.16	112.95/112.5
SWF Coreliner	146.18/145.8	107.18/106.78

Accessories

- Inner ring spanner
- Outer ring spanner
- Lay keys

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System Components

Barrel Head or back end; this part of the core barrel is precision engineered and consists several features that keep the core barrel performing perfectly:

- The threaded connection to the rest of the drill string – see thread types
- Central flush ways providing a pathway for the drill flush to flow down through the drill rods down to the cutting end of the core bit
- Fixes both inner and outer core barrels
- Allows length adjustment of the inner barrel to suit the core bit
- Central bearings in the barrel head allow the inner barrel to remain still to accept the core sample; reducing core disturbance while the outer barrel rotates with the drill string, thereby rotating the core bit, causing the rotary coring action

Inner Barrel is a thin wall tube that is fixed between the barrel head and the core bit, catcher spring arrangement. The length of the inner barrel dictates the sample length the barrel can take. As the complete core barrel is rotated into the rock the core sample cut by the core bit is directed into the inside of the inner barrel. Either standard set, where the core sample fits the inside ID of the inner barrel or more commonly set to core line (CL) where a PVC plastic liner is first placed into the inner barrel. The liner allows easier core sample handling, transporting and sampling – see core liner

Outer Barrel The outer barrel is a protective steel tube which fits between the barrel head and the core bit. The outer barrel transfers the rotating force from the drill string to the core bit, which cuts the rock at the core barrels leading edge. The internal gap between inner and outer barrels is the passageway for the drill flush to flow down and out of the core bit. Reaming shells (see below) can be added to the core barrel assembly to reduce the wear on the outer barrel caused by friction against the walls of the cored hole.

Core Lifter Assembly consists of three key parts that allow you to firmly grip the core sample so that it can be broken and brought to the surface. The correct gap between the core lifter, the core lifter case and the stop ring are essential.

Stop Ring ensures that the core lifter stays in the core lifter case. It is easily inserted into the grooved space provided in the core lifter case.

Core Lifter, also known as a core spring, the core lifter is one of the most important parts for core recovery. The inside of the lifter comes in two styles, slotted and fluted (also known as broached), to ensure a good grip regardless of the ground conditions. A core lifter that is slotted is good for competent rock whereas a fluted core lifter provides better recovery in fractured ground.

Core lifters can also be supplied with flexible steel fingers, differing in length to help retain the rock core when is it weak, weathered or of mixed composition.

Core Lifter Case is essential when it is time to break the core sample. Its tapered interior prevents the core lifter from moving and allows it to keep its grip on the core sample.

Both the core lifter and core lifter case are consumable items that do wear through use. It is essential to use compatible core lifter cases and core lifters to maintain performance and sample recovery.

Reaming Shell is usually situated between the outer tube and the coring bit. Its purpose is two-fold: to maintain a constant and correct hole diameter plus stabilise the core barrel during the drilling operation and prevent vibration and hole deviation. This helps to minimise wear on the outer tube of the core barrel.

The outside diameter of the reaming shell is slightly larger than the outside diameter of the core bit. It is important to occasionally check the outside diameter of the reaming shell as if the hole becomes undersized due to excessive wear on both core bit and reaming shell, when the bit is eventually replaced, the new bit will become quickly damaged by reaming out an undersized hole.

Reaming shells are available in two types. Tungsten carbide (TC) for use in soil, clay and soft rocks and Diamond for harder rocks. Diamond reaming shells consist of premium grade natural diamonds set into spiral panels on the outside diameter of the shell.

The type of reaming shell should be selected according to the application and geology.

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Core Bit Types

Tungsten Carbide Bits

Normally used for coring in soft rock formations and are available with octagonal or crushed carbide chips which cause less vibration and better core recovery than octagonal.

PDC Core Bits

Recommended for coring soft to medium hard formations, with water, air, mud or foam as the flushing medium. Ideal for air flush applications where a high rate of production is required.

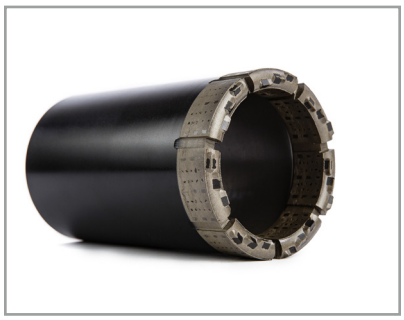
The size, number and layout of the cutters can be varied to suit the rock hardness, abrasiveness and other details of the application.

Surface Set Diamond Core Bits

Used for drilling soft, abrasive, unconsolidated formations that are not effectively drilled by impregnated diamond bits. They can also be used for drilling harder formations with low powered drills, where the rotational speed or bit load produced is not sufficient to run impregnated bits.

They provide higher rates of penetration than impregnated bits in soft formations due to the greater degree of exposure of the individual diamond stones. However, as they are set with only a single layer of diamonds, they generally yield a lower overall bit life. Available with a range of diamond stone sizes and crown profiles to suit different rock formations.

Geocube Core Bits



Recommended for coring soft to medium hard, abrasive and fragmented formations, giving a high percentage core recovery even where there are rapid changes in formation hardness. The cutters are stable at high temperature and are therefore suitable for air flush drilling, as well as water, mud and foam.

Diamond Impregnated Core Bits

The most economical choice for geotechnical, engineering and shallow mining investigation projects. They provide greater resistance to wear in most formations and particularly in fractured formations.

Various waterways are available for diamond impregnated bits. Differing waterways allow for better flushing in various ground conditions and drilling systems.

Diamond cutters are impregnated into a matrix which bond the cutting edge to the core bit. Arranged in series of 1 – 10 your choice of impregnated bit depends on the hardness and abrasiveness of the geology measured on the Mohs scale.