



## CORE BARREL SELECTION GUIDE

### CONVENTIONAL DOUBLE TUBE CORE BARRELS

#### TT Series Core Barrels

Ultra thin wall core barrels available in diameters 46 and 56mm, suitable for underground mining operations. These core barrels require relatively light feed pressure and torque, which means that they cut effectively at high rotation speeds using lightweight diamond drills.

#### T2 Series Core Barrels

Thin wall core barrels available in diameters 46, 56, 66, 76, 86 and 101mm, suitable for general exploration purposes. These core barrels have a relatively small cutting area and therefore permit rapid penetration, especially in harder rock formations. Water or polymer flush is required. Designed for use in conjunction with metric casing.

#### T6 Series Core Barrels

The T6 series is a continuation of the T2 series, but of a sturdier design, and available in larger diameters, 76, 86, 101, 116, 131 and 146mm, suitable for general exploration purposes. Water, mud or air can be used as the flushing medium, but when using air, oversized bits and head couplings are recommended to allow sufficient space for the cuttings to clear. Designed for use in conjunction with metric casing. The T6H core barrel is the imperial sized equivalent of the T6-101, virtually identical in design, but with a slightly smaller O.D. enabling it to fit inside HW or HX casing.

#### T6S Series Core Barrels

These core barrels have an aluminium split inner tube and are intended for use in geotechnical work in very loose formations. The split inner tube combined with face discharge bits gives an undisturbed sample. A large annulus between inner and outer tube allows for mud and air flushing. Available diameters are 101 and 131mm.

#### WF / WG Series Core Barrels

Geotechnical core barrels, available in DCDMA diameters N, H, P and S. The WF series is designed for coring soft formations using face-discharge core bits, with water or mud as the flushing medium. The WG series use internal discharge core bits and are designed for slightly harder rocks. Core bits have a relatively large crown area compared with metric series T2 and T6, and this tends to slow penetration and cause faster bit wear in harder rocks. The head design is rather primitive and utilises only a single thrust bearing so they do not rotate as smoothly as the more modern core barrels. They continued to be widely used largely due to clients wishing to specify hole and core sizes according to U.S. and U.K. Standards.

### CONVENTIONAL TRIPLE TUBE CORE BARRELS

Triple Tube Core Barrels are designed to maximize core recovery in site investigation and core exploratory drilling programs. Triple tube core barrels may use either a split steel tube that fits snugly inside the inner tube (e.g. "Triefus" NMLC and HMLC core barrels) or a clear plastic tube known as the "Coreliner" or "Triplex" system. Clear, semi-rigid PVC "Coreliners" are available to convert many double tube conventional core barrels into triple tube type. These thin PVC tubes are pushed into the inner tube before each core run. After retrieving the core barrel from the hole, the coreliner (which now contains the drilled core) is removed quickly and in "one piece" simply by gripping the lower end of the liner and easing it out of the inner tube with a pair of pliers. This method can give 100% core recovery even in difficult formations. Special core bits, core lifters and core lifter cases with a slightly reduced internal diameter are required when using coreliners.

### WIRELINER DOUBLE TUBE CORE BARRELS "W/L"

Wireline core barrels are used in deep holes, mainly because they drastically reduce the time spent handling the rod string each time the core is retrieved. An overshot device is dropped on a cable and directly couples onto the inner tube assembly, allowing fast retrieval of the core after each core run. Available in DCDMA sizes B, N, H. and P. A geotechnical version of the wireline system ("GBS") is also available in S size, giving cores in excess of 100 mm.



## WIRELINER TRIPLE TUBE CORE BARRELS “W/L3”

These are modifications of standard wireline double tube barrels but incorporate a third, split tube. The split tube is pumped out of the inner tube after retrieval, allowing the core to be examined in its in-situ state. Generally used when high quality core is required in broken, fractured formations, using face-discharge core bits. The use of a third tube requires the bits to cut a slightly smaller diameter core than double tube wireline barrels. PVC Coreliners can be used instead of the split inner tube, enabling the core to be retained in one piece within the core box.

## CORE BARRELS FOR SPECIAL APPLICATIONS

### Air Flush Core Barrels

The 412F core barrel has been specially designed with a larger space than usual between the inner and outer tubes, making it possible to pump a high volume of air through the barrel onto the face of the bit. This core barrel is normally used with face discharge type core bits, with or without Coreliners. T6S series core barrels are also optimally designed for use of air flush.

### Core Barrels for Very Soft, Friable Formations

In very soft formations the rotation of the core bit and the passage of the flush may destroy the core before it passes into the inner tube. Mazier core barrels have a spring-loaded inner tube that allows the core lifter case to protrude in advance of the bit when coring in soft formations, and to retract back into the bit when coring harder rocks. The bits are face discharge type and Coreliners are used in the inner tube. Mazier core barrels can achieve 100% core recovery even in the most difficult formations. Similar to the Mazier, the NMLC / HMLC “Retractor” core barrels also incorporate a spring loaded inner tube and achieve very good recovery in soft formations.

### Single Tube Core Barrels

Single tube core barrels are used when the quality of the core is only of minor importance, or in very hard consolidated formations where there is little chance that the flush will erode the core. Nowadays, single tube core barrels are used mainly as starter barrels (to begin the first stages of the borehole) or for coring in concrete. The B series single tube core barrels are available in diameters 46, 56, 66, 76, 101, 116, 131 and 146 mm.

## TIPS FOR CHOOSING THE CORRECT CORE BARREL

Which type of core barrel is best for your application? The overall aim is to choose the core barrel that will give as close as possible to 100% core recovery, whilst maintaining a good rate of production. Below we consider some of the most important questions to ask:

### How deep is the borehole?

For shallow holes (less than 30 metres deep) a conventional double tube core barrel is the most economical choice. For deeper holes (greater than 30 meters) consider using a wireline core barrel. The advantage switches strongly to wireline as hole depth increases because of the effect of reduced rod handling time on the overall rate of production.

### What is the geology?

In hard, competent formations choose a thin-walled double core barrel for the fastest rate of penetration with lowest pressure on bit: T2 series double tube core barrels are recommended.

In soft or broken formations, consider using a triple tube core barrel, T6 with Coreliners, T6S or Triefus Triple Tube. If core washing is a problem consider use face-discharge core bit to minimize erosion of the core.

For very soft formations, when core recovery is very difficult, consider using Mazier or Triefus Retractor core barrels. For coring concrete, the most economical choice is a B series single tube core barrel.



### What is the flushing medium?

When water is used as the flushing medium (usually in hard rocks), T2 core barrels are the best design.  
When mud or polymers are used as the flushing medium (softer rocks), T6 core barrels are the best design.  
When air or foam is used as the flushing medium, 412F or T6S core barrels are most suitable.

### What diameter core is required?

Generally speaking, core recovery is maximized by choosing a large diameter core barrel. This is because the cutting area (amount of rock removed) decreases as a proportion of the hole area as diameter increases, thus causing less disturbance of the sample at larger diameters. If core recovery is a problem, consider switching to a larger diameter. The largest diameter core barrels readily available are T6-146 (metric series), SWF (DCDMA) and GBS (geotechnical wireline).

## CORE BARREL APPLICATION GUIDE

Hole Diameter (mm)	46	56	66	76	86	101	116	131	146	Typical Application
Hole diameter (DCDMA)	A	B	N			H		P	S	
Single Tube B Series	x	x	x	x	x	x	x	x	x	Core recovery not important, starter holes, concrete coring; water flush
Double Tube TT Series	x	x								Very hard competent rock, underground mining; water flush
Double Tube T2 Series	x	x	x	x	xt	xt				Hard rock, water and polymer flush
Double Tube T6 Series				x	xt	xt	xt	xt	xt	Soft – hard rock, water, polymer and mud flush
Double Split Tube T6S Series						x		x		Soft fragmented rock; polymer, mud and air flush
Double Tube DCDMA			x	x		xt		xt	xt	Soft – medium rock, water, mud and polymer flush
Wireline Double Tube			x	xt	xt		xt			Deep holes, medium – very hard competent rock, water and polymer flush
Wireline TripleTube				xt		xt		xt		Deep holes, soft – hard fragmented rock, water and polymer flush
Wireline Geotechnical GBS									xt	Large diameter core, soft – hard, competent or fragmented rock; water, mud, polymer and air flush
Airflush 412F							xt			Soft – medium rock, air flush
Mazier & Retractor Core Barrels				xt		xt	xt			Extremely soft, friable formations, water, mud and polymer flush.

x indicates available diameter, t indicates triple tube is possible as standard, or by using plastic coreliners inside the inner tube.