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# TRIEFUS TRIPLE TUBE CORE BARRELS

## Introduction

The Triefus Triple Tube Core Barrel is a precision instrument designed to maximise core recovery in site investigation and exploratory drilling programmes. With this cafe barrel it is possible to obtain as near to 100% volumetric core recovery in as undisturbed condition as it is possible to achieve with rotary core drilling equipment. It is not uncommon for drillers to report 98%+ core recovery in the most difficult formations.

The results obtained from the use of Triefus Triple Tube Core Barrels can be a deciding factor in the investment of large sums of money in areas such as foundation design for dam sites, bridges and buildings, as well as the development of mineral resources. These results must be as accurate as it is possible to obtain. Triefus Triple Tube Core Barrels are capable of giving these results even under the most adverse circumstances provided they are used with the care that their function demands.

When used in conjunction with the Triefus Borehole Impression Device, it is possible to orient the core, differentiate drilling fractures from natural bedding planes and precisely locate the position of any core loss. An easily transportable permanent record of cored borings is also available for laboratory use.

In addition to the standard Triefus Triple Tube Core Barrel a retractor model is available in most sizes for coring very soft formations where the core may be washed away by any excess jetting action while circulating. Many parts are interchangeable between both types of barrels and the retractor barrel can be converted to a standard barrel on site.

## Triple Tube Core Barrels (Standard)

The Triefus Triple Tube Core Barrel, as described in Figure 1, was developed nearly 30 years ago in conjunction with the Snowy Mountains Hydro Electric Authority and the Joint Coal Board of Australia for coring the badly weathered and decomposed granite in South Eastern New South Wales "from the grass roots down".

| DIMENSIONS | | | |
|---|---|---|---|
| SIZE: | SET 0.0. OF BIT | SET CORE DIAMETER | SET REAMER DIAMETER |
| AMLC | 47.37 mm | 26.97 mm | 48.00 mm |
| BMLC | 59.18 mm | 35.20 mm | 59.94 mm |
| NMLC | 74.80 mm | 51.94 mm | 75.69 mm |
| HMLC | 98.42 mm | 63.50 mm | 99.21 mm |
| 3 5/8 x 2C | 91.31 mm | 63.50 mm | 92.07 mm |
| 4 3/8 x 3C | 110.31 mm | 76.20 mm | 111.12 mm |
| 5 x 4C | 138.89 mm | 101.60 mm | 139.70 mm |
| 7 x 5C | 196.04 mm | 146.05 mm | 196.85 mm |
| 1O x 8C | 259.10 mm | 202.70 mm | 260.35 mm |

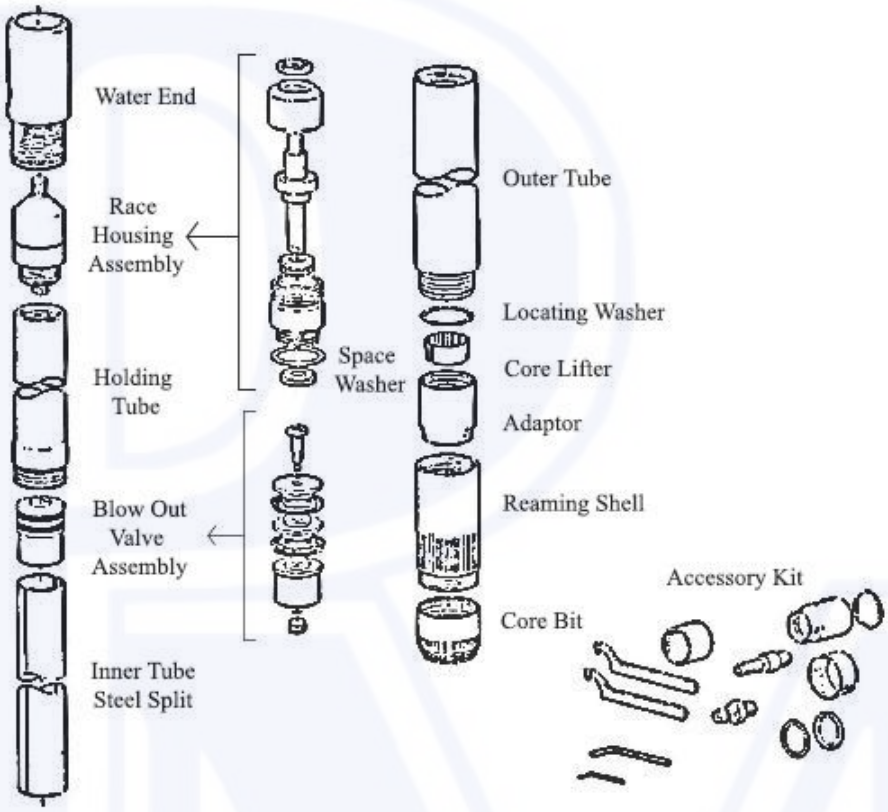
The cutting sizes AMLC. BMLC. NMLC and HMLC are to international standards and are used with standard W series casing. Water Ends are threaded to accept W series drill rods. From 2~C to 8C the barrels are supplied with rod connections specified by the client.

The letters "LC" used in the reference nomenclature refer to "Iarge core" to differentiate between the original double tube core barrels (NM etc.) in which the core diameter was much smaller than that obtainable with these barrels.

All Triefus Triple Core Barrels are normally supplied with steel split inner tubes; however plastic (non-split) inner tube is available in NMLC size and stainless *and* hard chromed split tubes can be supplied for most other sizes. The plastic inner tube is used in NMLC triple tube core barrels where it is desired to retain the core exactly as it is recovered from the hole. The core is not removed from the plastic inner tube which is sealed at each end and despatched undisturbed to the laboratory. Because the plastic is clear and only 1 mm thick, visual examination of the core is possible at the drill site.

The outer tubes of all Trtefus Triple Tube Core Barrels are hard faced at each end. Staggered hard facing over the full length of the outer tube can be supplied if required.

## TRIEFUS TRIBLE TUBE STANDARD CORE BARREL




## Operating Instructions

## Triple Tube Core Barrels (Standard)

Before attempting to use the barrel, it is important to ensure that all threads are tight. The barrel is delivered assembled but the threaded components are not tightened, to minimise risk of damage during transit.

The barrel should be completely dismantled and all threads firmly tightened. Failure to do this could result in water leaking through the inner tube and washing the core. It is generally not necessary to dismantle the bearing housing except where the barrel has been stored for any length of time, in which case the bearings should be checked in order to ensure they are fully greased.

In addition to the assembled barrel, the following accessories will be supplied as a separate kit.

| | |
|---|---|
| Spacer Washer 1.5 mm | 1 piece |
| Spacer Washer 3 mm | 1 piece |
| Locating Washer | 1 piece |
| Core Lifter | 1 piece |
| Adaptor | 1 piece |
| Pump Coupling | 1 piece |
| Allen Key | 1 piece |
| Blow-out Valve Loader | 1 piece |
| "C" Spanner | 2 pieces |

The water end should be unscrewed and the water end and holding tube assemblies withdrawn from the outer tube. The set screws should be removed from the bearing housing and the grease nipple Inserted. Grease should then be applied. Remove the grease nipple, replace the set screw and re-assemble the barrel ensuring all threads are firmly tightened.

Check the distance between the end of the core lifter adaptor and the inner shoulder of the core bit. For medium or hard formations, this clearance should be about 1.5 mm. For soft or friable formations, this distance should be reduced to about 1 mm to prevent water from washing the core away. A small clearance must be maintained to prevent the adaptor from rubbing on the shoulder of the bit and also to allow the cuttings to be washed from the Inner diameter of face (bottom) discharge bits. To adjust this distance sees servicing note 6.

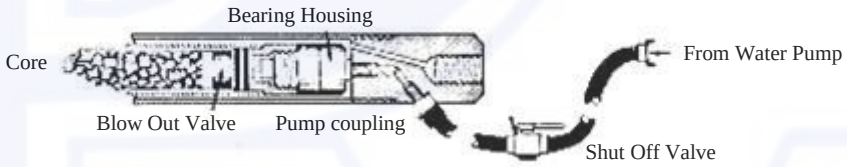
Clearance to be about
1.5 mm for normal conditions

## Removal of Core

At the completion of a drilling run, the reamer shell/outer tube thread should be broken and the adaptor, core lifter and locating washer removed. The plug should then be removed from the water end body and the pump coupling inserted. Connect the pump coupling to the shut off valve of the water pump and, starting with the shut off valve in the closed position, slowly open the valve.

Pressure will be applied to the top of the blowout valve causing the valve and split inner tubes to move freely out of the holding tube.

The barrel should be slightly tilted with the bit end at the lowest point to allow water to wash through the barrel and at the same time rotate the holding tube. This will wash any particles of dirt out of the barrel facilitating the easy replacement of the inner tubes.

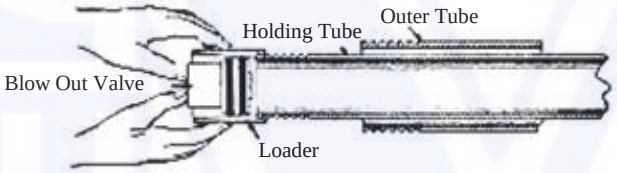



It is important that, where possible, only clean water is used to hydraulically expel the core and it is preferable to maintain a separate supply for this purpose if possible.

## Replacing the Inner Tubes

Disconnect the pump coupling from the water end body and replace the plug. Place the end of the loader with the machined lip over the end of the holding tube and insert the blowout valve as shown below.

Use both thumbs to push the valve through the loader and into the end of the holding tube. Remove the loader and place the split inner tubes over the protruding portion of the valve and firmly push the whole assembly into the holding tube until the valve stops on its seating in the holding tube assembly. At this point the split inner tubes should be flush with the end of the holding tube.




It should be noted that split inner tubes are supplied in pairs and they should not be interchanged with any other pair. Each half is marked at one end only with small indentations or numbers and these ends should always be placed together and inserted on the blowout assembly valve.

When the inner tubes are seated correctly in the holding tube, replace the locating washer, core 1ifter adaptor etc. and the core barrel is ready for another run.

## Notes

It is important that the hole in the water end plug is not blocked for any reason. In the past some drillers have imagined that they would lose water through this hole while drilling. This is not possible if the seals are in good condition and all threads are firmly tightened.

If the hole is blocked there is no way for the air to escape from the holding tube as the core enters the barrel. The result is that a core blockage is indicated after only one or two feet and if drilling continues the pressure will stop the core from entering the barrel. In softer formations the core may be washed away due to the grinding action and there will be no apparent reason for the lost core.

## Servicing the Triefus Triple Tube Core Barrel

Basic servicing can be undertaken on the drill site, by visual inspection of components and their renewal if necessary. This should be done as often as possible and in any case not less than every 100 metres or every week, whichever is the lesser. As often as possible, the barrel should be removed to the workshop for a full check and service. The following is a suggested sequence for servicing the barrel in the workshop. Some parts can, and should, be serviced more often in the field.

1. Inspect all hard facings and tube walls for signs of excessive wear. Dismantle the barrel completely, referring to the assembly diagram, Figure 2. Clean all parts (except seals) with diesoline or other non-acidic cleaning fluid.
2. Water End Body.
   Clean all the waterways in the water and body ensuring that no dirt or pieces of cleaning rag etc. are left inside to block the waterways when the barrel is reassembled.

   Check the water end plug and if the Allen keyway (or screwdriver slot) and threads are in good condition and the hole is clear, screw back into the body.
3. Bearing Housing Assembly.
   Inspect the race housing body and bearing clamp for damage. Inspect the spindle and make sure the centre hole is not blocked. Check the radial and thrust bearings for wear and the oil seals.

   Replace any item which shows signs of wear or .damage and reassemble as shown in the assembly diagram, Figure 2. Tighten all threads firmly, taking care to apply tools over the thick shoulder of the race clamp and the main part of the body. Make sure the grease nipple is clean and the passage is free, and grease the bearing assembly. Remove the grease nipple and insert the setscrew.
4. Blow Out Valve Assembly.
   Inspect the assembly screw, top valve body, centre valve body, bottom valve body and plug for damage. Check the 'U' packing, tension spring, rubber ball valve and sieve for wear.

   Replace items which show signs of damage or excessive wear and reassemble as shown in Figure 2, taking care not to damage the packing. Ensure the ball valve seat is clean and none of the holes are blocked. Tighten all threads very firmly.
5. Tubes.
   Inspect the outer tube, holding tube and split inner tube for wear or damage. If the holding tube or inner tube is dented, they will be difficult to assemble and move when in use causing damage to the inner tube which may result in jamming the core before the barrel is full. Check that the split inner tubes are properly circular when held together and that they fit snugly over the bottom valve body. Make sure that the blowout valve assembly and the inner tubes, when fitted together, will pass easily through the holding tube. There will be some resistance if the packing are fitted to the blowout valve assembly but there should be no "solid" resistance at any point. If the packing are not fitted, or they are very worn, the whole assembly will slide freely through the holding tube.
6. Assembly.
   The holding tube assembly should be fitted to the bearing housing as shown in Figure 2. Fit the two spacer washers (if necessary) between the holding tube and the bearing housing. Fit the spindle thread of the bearing assembly into the water end body. Tighten all threads firmly. A light application of grease on all threads when assembling the barrel will ease the dismantling procedure when this is required again.

   Place the assembly onto a bench or trestles at about waist height. Place the blowout valve in the loader and insert the valve and split inner tubes as directed in "Replacing the Inner Tubes".

   The blowout valve and bearing seals can then be tested by removing the plug in the water end head and coupling to a pump or compressor and blowing out the inner tube as shown in the operating instructions, page 2. The inner tube and valve assembly should slide slowly, but freely, out of the holding tube. If water (or air) blows past the inner tube and out of the end of the holding tube then the 'u' packing are worn or incorrectly fitted. If water (or air) is forced up through the bearing assembly then the oil seals must be replaced.

   If this test is satisfactory then the inner tube and blowout valve should be reloaded. Place the outer tube onto the bench and slide the holding tube/water end assembly into the female thread end until the water end body can be screwed into the outer tube. Screw in by hand, and tighten firmly using a pair of Stilson, placing one on the water end body and the other so that it is just over the bottom section of the female thread in the outer tube. This will avoid pinching the thread or damaging the barrel by applying force on an unsupported section

   Take the adaptor and insert the core lifter and the locating washer. Screw the adaptor onto the holding tube. Fit a new reamer shell and core bit, then measure the clearance between the bottom of the core lifter adaptor and the internal shoulder of the core bit. This should be approximately 1.5 mm.

   If this clearance is not correct, unscrew the bit and reamer shell, undo the water end body and remove assembly from the outer tube. Unscrew the bearing housing from the holding tube assembly and remove or insert spacer washers as required to increase or decrease the clearance.

   Reassemble the barrel, as described above, taking care to tighten all threads firmly and check the clearance again. This should now be correct and the barrel ready for further use.

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