Selection & Use of the Cobra Continuous Fibreglass Rodding System

Cobra rodding systems are available in any length of various diameters of rod. Certain diameters are available with copper trace wires incorporated for use with a cable avoidance tool.

Trace systems are available in 4.5mm and 6.7mm diameter rod. Frames for these incorporate connections for signal generators.

On the standard Cobra System five different frames are used to accommodate different lengths and diameters.

Choice of appropriate Cobra Rodding System:

Choice of diameter may depend on length, although size of duct may influence choice.

When pushing a long length of cobra rod it will want to corkscrew. If it is in a narrow duct, the wall of the duct will keep it straight. In a wider duct, a larger diameter rod will be stiffer and less likely to corkscrew.

Typically the relationship of length to diameter could be:

Required length	Suitable diameter rod
50m – 100m	4.5mm
80m – 150m	6.7mm
100m – 250m	9mm
150m – 350m	11mm
300m – 400m	14mm

A narrow duct with tight bends might suggest that a narrower rod might be suitable.
A large diameter duct or a requirement to push a sonde might make a larger diameter rod appropriate.

Long lengths of large diameter rod can be very heavy, and the difficulty of pushing a heavy rod may make a narrower rod more practical (eg 400 metres of 14mm rod weighs approximately 86kg whereas 400m of 11mm would weigh 52kg).

If there is a tight bend in the duct, rod diameter may be restricted by minimum bend radius:

Rod Diameter	**Minimum Bend Radius** At -25°C to +80°C
4.5mm	300mm
4.5mm + Cu Trace	300mm
6.7mm	300mm
6.7mm + Cu Trace	450mm
9mm	600mm
11mm	700mm

14mm	700mm

If a rod is of too small diameter for the size of duct and corkscrews, pushing harder will only force the rod harder against the wall of the duct and the rod will eventually break close to the pushing point.

If the guide tip gets caught between two cables in the duct, further pushing may bend the rod tighter than the minimum bend radius and in this case the rod breaks just behind the end fitting and guide tip.

Frames:

Frames for 4.5mm and 6.7mm diameter rods do not have wheels. The longest practical 6.7mm (about 150m) on it's frame will weigh less than any manual handling limit imposed by safe systems of work.

120m of 9mm rod on a MEDCO frame weighs less than 25kg. The optional wheel kit weighs 3kg and total weight will exceed 25kg if this is fitted. If manual handling limit is set at 25kg and the method of use is to bring the Cobra Rodding System to the location by vehicle and lift it out of the van, then it would be better to order the unit without wheels.

If the Cobra Rodding System is to be used by moving from access manhole to manhole then the unit is more convenient if fitted with the wheel kit.

The larger MAXCO frame used for 11mm rod and longer lengths of 9mm is always fitted with wheels.

The MAXCO HIGH CAPACITY frame used for 14mm rod and long lengths of 11mm is always fitted with wheels and will usually be lifted from a vehicle with a forklift or crane.

Use:

The two main uses for Cobra Rodding Systems are:

To push a sonde through a duct or pipe to track it's course with a cable avoidance tool.
To put through a duct to bring back a draw string to pull a winch rope through the duct.

If used with a sonde, unless it is a mini-sonde, select a cobra a diameter larger than would usually thought appropriate for the length. This will give a heavy sonde more support.

Before pushing the cobra through the duct, slacken the brake handle enough to allow the reel to rotate but retain sufficient drag to prevent over-run and excess rod to come off the reel.

As you feed the rod into the duct, check the outer polypropylene for damage from previous usage. If damage is discovered, short lengths of damage can be cut out and a repair splice fitted. If several areas of damage are discovered it may be more appropriate to replace the rod.

Do not use a damaged rod as there may be more damage to the inner fibre-glass core than can be seen from the outside.

After returning the rod to the reel, tighten the brake handle to prevent unravelling in transit.

Specification:

4.5, 6.7, 9, 11 & 14mm Continuous Fibreglass Rodding Systems

ROD DIAMETER:	3,4.5,6.7,9,11 & 14mm.
ROD LENGTH:	1-550m.
ROD CORE MATERIAL:	Stranded Fibreglass, Epoxy Bonded.
CORE REINFORCING LAYER:	Extra Fibreglass Stranding, radially wrapped along the length of the rod.
MODULUS OF ELASTICITY (DIN EN ISO 527-4) (N/mm²):	>50000
TENSILE STRENGTH (DIN EN ISO 527-4) (N/mm²):	1600 ± 5%
BREAKING ELONGATION (DIN EN ISO 527-4) (%):	>2
OVALISATION (%):	<5
MINIMUM BENDING DIAMETER: At -25°C to +80°C	4.5mm 300mm 6.7mm 300mm 6.7mm c/w 4 Cu Conductors 450mm 9mm 600mm 11mm 700mm 14mm 700mm
LONG TERM BENDING TEST 80°C:	No Breaking or Delamination
LONG TERM BENDING TEST 100°C:	No Breaking or Delamination
SOLIDITY (g/cm³):	2.0
THERMAL COEFFICIENT OF EXPANSION DIN ISO 7991)(1°C):	6.0 x 10-6
WATER ABSORPTION (DIN 53475)%:	<0.25
GLASS CONCENTRATION (%):	80 ± 2
THERMAL CONDUCTIVITY kcal/m xhx°C:	0.17 VDE0304
CONTINUOUS TEMPERATURE °C:	155 VDE0304
PROTECTIVE OUTER LAYER:	Hard wearing, abrasion resistant polypropylene.

ULTRA VIOLET PROTECTION:	U.V. Inhibitors incorporated into the polypropylene outer layer, to prevent degradation of the rod from the sun's harmful U.V. rays
ROD GUIDING TIP:	Smooth Profile Brass or Aluminium Guiding Tip c/w Hole for shackle pin & M5 or M12 internal thread for connection onto the end of the rod.
ROD END FITTINGS:	Brass Fitting c/w External M5 or M12 Thread.
PORTABLE FRAME/REELS:	Robust, portable frame/reel unit, made from heavy duty tubular steel, zinc electroplated finish for protection. c/w wheels(depending on rod size). Integral fully adjustable safety brake.

REPAIRS

If a fibre-glass rod becomes damaged from wear and tear or broken from getting jammed in a tight bend, there are three alternative solutions.

1. A break can be repaired by cutting out the damaged length and joining the rod with a repair splice to the other half or to a replacement length of rod.

   Method: Cut away any rod that has the fibre-glass visible though the yellow cover or any lengths that are broken or have internal splits caused by over radiusing. Repair splices and end fittings have two internal diameters. Trim back the yellow polypropylene so that the fibre-glass inner rod goes right to the bottom of the smaller diameter. Leave the yellow polypropylene long enough to go to the bottom of the larger diameter.

   Mix a quantity of two-part epoxy adhesive (MAXGLUE) and thoroughly coat the exposed fibre-glass and push into the brass fitting. The brass fittings have a small blow-hole towards the bottom of the smaller diameter to vent air and excess glue and to ensure that the join contains no air pockets. Wipe away any excess glue that may vent from the blow-hole.

   Give the adhesive time to achieve it's full strength and hardness before using the rod.

   A join near the front end of the rod may be a nuisance if it catches on obstructions in the duct, consider reversing the rod to put the repair to the inner end.

2. A complete replacement rod can be supplied. This is usually worthwhile if there is already more than one repair in the rod or a length of rod has been lost.

3. The Cobra Rodding System can be returned for repair by Ritelite Systems Ltd.