

B03: Rodent protection

BACKGROUND

Optical cables may be attacked by several species of rodents e.g. rats (*Rattus norvegicus*), water voles (*Arvicola terrestris*) (in Northern Europe) or gophers (in North America). Also other animals may attack cables e.g. termites, woodpeckers (aerial cables in USA) or arctic foxes (in Greenland).

In most cases cables with a standard PE sheath may be installed without any special protection and survive in many years without any damage. In other cases the local conditions are so that unprotected cables may be attacked and damaged.

Due to their relatively small diameter optical cables are more exposed to rodent attack than traditional telecommunication cables. Internationally a vast number of rodent tests have been made on optical cables with different grades and types of rodent protections. Two main conclusions can be drawn from those investigations:

- If the rodent tests are organised under aggravating circumstances only cables with steel armouring gives 100 % protection, this is because the steel is much harder than the teeth of the rodents.
- Under more relaxed circumstances other means of rodent protection are sufficient, included just to keep the diameter of the cable above a certain figure.

TYPES OF RODENT PROTECTION OFFERED BY DRAKA COMTEQ

PA 12 (POLYAMIDE 12) OUTER SHEATH

A thin (0.5 mm) outer sheath of PA 12 has been used by Draka Denmark for more than 10 years: Almost 10.000 km of cable has been installed using this type of rodent protection, our experience shows us that this protection is effective under normal conditions in Northern Europe.

The PA 12 outer sheath gives the cables, in addition the rodent protection, a hard smooth surface, which makes the cables easier to draw in ducts. Standard colour of the PA 12 sheath is orange. Optionally this sheath is available in the following other colours: black, blue, red, green, yellow.

The hardness of the PA 12 grade used is above 70 Shore D.

PP (POLYPROPYLENE OUTER SHEATH)

A thin (0.5 mm) outer sheath of PP has been used by Draka Denmark in the recent years. This rodent protection method has been tested by the Danish Pest Infestation Laboratory, and been found effective. The effectiveness of the PP sheath is due to its hard surface; it is almost as hard as PA 12. The hardness of the PP grade used is 66 Shore D.

GLASS YARNS

In recent years the use of glass yarns for rodent protection has become more and more popular.

Draka Denmark has developed cables with glass yarns as rodent protection. These cables have been proven to be effective against attacks from rats in a test carried out by an independent laboratory.

The function of glass yarns differs from the other rodent protection principles. The glass yarns protects because the rodents, although they

can easily penetrate the glass yarns, they don't do it because they find it unpleasant to gnaw the glass yarns.

STEEL

Steel tape or wires are the rodent protection remedy, which is regarded 100 % effective.

CORRUGATED POLYMER ECCS TAPE

The ECCS tape consists of a 0.155 mm thick steel tape with a surface layer of chromium and chromium oxide. The chromium and chromium oxide makes the surface very corrosion resistant. On both sides of the tape it is coated with a 0.055 mm thick polymer coating. A common trade name for this material is Zetabon™.

During the cable manufacturing process the tape is corrugated in order to give the cable better bending performance. The corrugated tape is folded around the cable core with an overlap.

This rodent protection gives a 100 % effective protection. The cable is of relatively light weight, and has a good flexibility.

COATED STEEL

The zinc coated steel tape is 0.2 mm thick and coated with 150 g/m² zinc.

During the cable manufacturing process two layers is applied helically over the inner sheath in an open spiral, each layer covers about 70% of the cable surface.

The total covering is thus about 140 % of the cable surface.

This rodent protection gives a 100 % effective protection. However the zinc may liberate hydrogen, which may again contribute to added loss of the optical fibres.

Thus this type of rodent protection is only recommended for short cable routes (up to 10 km).