Cables Installed Directly Buried or in Underground Ducts in Waterlogged Conditions

Armoured Cables. (BS 5467, BS 6724, BS7846, BS 6622 and BS 7835)

Prysmian armoured cables (LV and MV with LSOH or PVC sheaths) are suitable for direct burial in 'free draining soils' as required by their respective British Standards. They are not recommended for installation in permanently water logged ground (in practice this is likely to occur in clay soils or below the water table). Such conditions may prematurely shorten the design life of the cable from our estimated 25 years minimum for a cable fully and continuously loaded in 'appropriate' conditions.

MDPE sheaths have significantly superior resistance to the migration of water (of the order of 20 times) and can be considered for selection where wet conditions do exist. In this case cables are more likely to achieve a full design life. However armoured cables with MDPE sheaths have limited application; being excluded from use in all LSOH cables and LV cables to BS 5467. It should be noted that the poor fire performance properties of MDPE may make it unsuitable for installation in buildings.

For cables suffering prolonged periods of saturation a PVC or LSOH sheath will allow faster migration of water than would a MDPE sheath. A primary concern is the premature corrosion of the armour. In such conditions it would be advisable to have a regime for periodic systematic testing. Additionally where the armour is the sole means of earth protection then the addition of a separate copper earth is highly recommended. For similar reasons a limited number of specifications may also require copper wires to be included in the armour.

Whilst it is of course not desirable for water to penetrate through to the insulation it should be noted that XLPE or EPR grades have good resistance to voltage failure in the presence of water and must comply with 'long term' testing requirements accordingly.

MV Copper Wire Screen Cables (e.g. BS 7870-4.10)

BS 7870-4.10 precludes the use of PVC sheath and in most cases MDPE is selected. If this is the case these cables then will have significantly more resistance to water penetration and be more suitable for wet conditions. In addition their copper screens are less susceptible to corrosion than that of steel or aluminium armour. Notwithstanding the above statement it is still likely that wet ground will reduce the life of the cable below that of dryer conditions. For installations known to be prone to wet conditions, such as Wind Farms, then customer specifications may stipulate water blocking of copper wire screens and/or conductor.

Contaminated water

The above discussion assumes that the prevailing conditions do not include 'contaminated water'. Where contamination is present further investigate may be required which could include chemical analysis of the surrounding soil. All sheaths as mentioned above may then be unsuitable.

Where contaminated conditions prevail historically EEMUA cables with lead sheaths have been specified. This is especially true in the case of contamination with hydrocarbons.