

## GENERAL INSTALLATION INSTRUCTION

This section provides guidelines on storage, installation and use of Prysmian Optical and Metallic products. Product suitability for a particular application will depend on the environment and installation conditions. In all cases, it is recommended that reference also be made to:

> AS/ACIF S009, AS/NZS3080, AS3000 for standard installation methods and practice.

These notes are provided as a guide only and Prysmian accepts no liability for decisions made using this information. We strongly recommend that expert advice is sought for any decisions regarding cable choice, installation or network design.

### Installation

1. Cable shall be installed to the relevant National or International Standards, (e.g. AS/NZS3080, AS/ACIF S009, AS3000). Specific Prysmian product data sheets shall be referenced to ensure that the cable design parameters are not compromised.

2. In addition the following are recommended:

> Bend management systems shall be employed to restrict cable bend during installation so that min bend radius is not exceeded as specified in the relevant cable technical data sheet.

> Cables shall be installed at a tension that does not exceed their limits as specified in the relevant cable technical data sheet.

> Cable enclosures (e.g. pull boxes) shall be capable of accommodating the specified minimum bend radius.

> System & product details (including product history) shall be maintained and be made available to Prysmian in the event of any claim. Failure to do so will invalidate any warranty.

3. Any further recommendations made by Prysmian shall be adhered to when installing and preparing the cables.

4. Any applicable warranty is not extended to cables that have been re-installed.

### Typical Applications

Loose Tube Optical Cables:

Only Loose Tube Optical Cables with a metallic and/or Dry Blocking moisture barrier are designed to operate in continually flooded environments, not including river crossing or underwater applications.

Standard Cables - generally suitable for:

- installation in ducts or conduit (rope or hand pulled, typically up to 2000m subject to route)
- installation where there are a number of direction changes per pull section (tortuous route)
- laying in cable trunking / cable trays.
- direct burial in suitably prepared ground, e.g. sand, soil, etc.

High Strength Cables - generally suitable as per standard loose tube cables plus installations where increased mechanical protection (e.g. crush and impact) are required, such as:

- direct burial (in poorly prepared or rocky / stony ground).
- laying in cable trenches.
- installation in black / reactive soils.

Armoured Cables (e.g. Glass Reinforced Plastic GRP or Corrugated Steel Tape CST) - generally suitable as per high strength cables plus installations where a greater level of mechanical protection is required, such as:

- direct burial (in stony or rocky ground).
- installations where there is an increased risk of physical damage (e.g. impact by a fork lift).
- where protection from rodent attack is required.

Premises / Riser Optical Cables:

Light Duty Premises / Riser - Indoor version suitable for internal use only, and indoor/outdoor version suitable for internal/external environment as defined below. Cables are not designed for flooded environments and cannot be direct buried.

Generally suitable for:

- installation in ducts or conduit (rope or hand pulled, typically up to 500m subject to route)
- installation where there are minimal changes in direction in a single pull section.
- laying in cable trunking / cable trays.

Heavy Duty Premises / Riser - Indoor version suitable for internal use only, and indoor/outdoor version suitable for internal/external environment as defined below. Cables are not designed for flooded environments and cannot be direct buried.

Generally suitable for:

- installation in ducts (rope or hand pulled, typically up to 2000m subject to route)
- installation where there are a number of direction changes per pull section (tortuous route)
- laying in cable trunking / cable trays

Cords - Suitable for internal environments only. Strict adherence to pulling tensions and cable bend management is strongly recommended due to the light nature of the cables construction.

Metallic Cables:

Only Metallic Cables with a metallic and/or jelly moisture barrier are designed to operate in continually flooded environments, not including river crossing or underwater applications.

Refer also to specific temperature de-rating guidelines below.

Internal - Cables designed for use in internal environments only as defined below

External Telephone - Cable designed for use in external environments as defined below.

Internal / External Cat 5E LAN Cable - Designed for use in internal/external environments as defined below. Cable is not designed for use environments that maybe subject to flooding.

### Environments

Any warranty is only valid when cables are installed for stationary use as per the environmental guidelines below. Cables are designed and specified as appropriate for installation in internal, internal/external and external environments, and installation must follow the guidelines below.

#### INTERNAL

> Indoor location which is dry and protected from the weather.

Typical installation environment is a fully enclosed location in a temperature and humidity controlled environment, such as an office or shop. Cables must not be subject to heat radiation, condensed water, precipitation, or formation of ice, unless cable is specified to do so. It is not expected that these cables will ever be submerged.

#### INTERNAL / EXTERNAL

> Typical installation environment includes internal locations as well as external ones where cable may be soaked by water on an intermittent basis. When installed outdoors, cable must be installed in conduits or ducts that are dry or adequately drained and are effectively maintained throughout the life of the cable, to ensure cables are never submerged.

## EXTERNAL

> Outdoor locations with possible exposure to weather conditions, such as UV radiation, moisture or water and temperature excursions, including underground and aerial.

Other ENVIRONMENTAL conditions that must be considered for both Optical and Metallic Cables:-

Temperature:- Each individual data sheet specifies the temperature range applicable. Temporary excursions to these extremes are acceptable, however, the average constant operational temperature for all cables must be restricted to:- Minimum of - 5oC to Maximum of + 35oC, and relative humidity between 5% and 75%

The maximum length of individual cables runs may need to be reduced at elevated temperatures due to temperature derating guidelines as set out in the relevant standards. We recommend that relevant standards are reviewed if cable is at risk of being subject to elevated temperatures during operation.

Termites / Ants:- Standard cables must not be installed in locations with risk of termite or ant attack, without a Nylon jacket or an alternative form of ant / termite protection.

Rodents:- Standard cables must not be installed in locations with risks of attack from rodents and other animals harmful to products, unless cable is specified to do so.

Fungus:- Standard cables must not be installed in locations with risks of biological attacks, in the presence of mould/fungus or with the likely growth of mould/fungus, unless cable is specified to do so.

Atmospheric Contaminants:- Cables may be installed in environments with an atmosphere that may contain chemically active substances as experienced in urban areas with industrial activities. This is considered an atmosphere with normal level of contaminants. Cables cannot be installed in environments in the immediate neighbourhood of industrial sources with high levels of chemical emissions and locations within industrial process plants, unless cable is specified to do so.

Sand and Dust:- Cables can be installed in areas in close proximity to sand or dust sources BUT this excludes wind-driven sand and dust.

Impact & Crush:- Cables can be installed in locations which expose the cable to impact or crush forces up to the limits specified in the relevant technical datasheets. For environments with risk of high impact or crush, the use of high strength or armoured cables with higher resistance is recommended.

Hydrogen:- Cables shall not be installed or housed in high hydrogen atmospheres, for example corroding metallic ducts. Cables shall not be installed in area of high pressure above normal atmospheric pressure, such as submerged in a river, unless specified to do so.

UV:- All cables will show changes in colour and experience some surface blooming when exposed to solar radiation. This is neither a manufacturing defect nor concern to the cable performance. Cables that will be subjected to direct UV radiation shall incorporate a UV stabilised sheath. Cables should not be installed in the line of direct sunlight or in a position of direct radiation, i.e. green houses, unless specified to do so.

Tensile performance:- Tensile strength stated on relevant cable datasheets shall not be exceeded. Unless otherwise stated this is the maximum temporary applied axial tension to which a cable may be subjected during installation.

Minimum Bend Radius:- Minimum bend radius shown on the individual data sheets is the smallest curvature that a cable may be subject to during and after installation (i.e. throughout its working life) unless specifically given as static or dynamic minimum bend.

Local Standards and other relevant specifications:- In all instances consideration should be given to relevant fire performance characteristics needed, (either mandatory or specified), e.g. smoke and toxic gas emission, flame propagation, etc.

Harsh Environments:- For extreme or other environments outside those defined above, contact Prysmian for advise on cable selection.

Unless otherwise stated above all other cable characteristics are shown on the relative data sheets e.g. whether direct burial cable design or duct only, crush resistance, internal or external use etc.

## Traceability

All records relating to each cable length must be maintained from date of purchase, cable type, source of purchase, all test results, full product history showing that cables have been installed and housed within all requirements set out in this document throughout any warranty period.

## Handling Optical Fibre Cables

Safe handling practices should be maintained when handling, installing and terminating optical fibre. These include, but are not limited to:

- > Do not look at the direct beam of any laser source; therefore do not look into fibre cable.
- > When fibre snaps it may break into sharp splinters that are dangerous. Exercise caution when cutting fibre and dispose of any off cuts in a responsible manner.
- > Exercise caution when cutting armoured cable, as the armouring may be sharp when cut.
- > Please give special attention to training inexperienced staff as per the above.

## Storage of cables

All environmental, mechanical & traceability conditions must be adhered to in storage of cable.

NOTE! All fibre will age with an affect on the performance - Prysmian will warrant that cables will meet the cable transmission performance as required in TIA/EIA-568A Commercial Building Telecommunications Cabling Standard. All quoted cable performances are in accordance with product tests using IEC 60794-1-2.

Specific Installation Instructions may be provided upon request.