



Optical Fibre Installation

GUIDELINES

Document information

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Installation is to be performed by qualified service personnel

Optical Fibre Safety Warnings

Risks of inhaling fumes, or allergic reactions to, chemicals used to prepare and process optical fibres. The installer shall have documented procedures for the control of substances hazardous to health meeting the requirements of relevant national legislation.

Risks of optical fibre fragments piercing the skin (and the eyes) which can lead to infection and complications due to the difficulty in their removal.

Risks from exposure to the skin (and the eyes) from optical power either direct from sources (LED, VCSEL or Laser) or from free interfaces (connectors, fractured optical fibres or joints).

Working Practice

Certain chemicals used to prepare and clean optical fibres may be considered hazardous when inhaled or ingested by mouth. Other such as the epoxy resins used in the production of joints may cause allergic reactions.

The following practices should be adopted, failure to do so may endanger the health of those involved.

The work should be carried out in well ventilated areas or forced ventilation should be provided. Prolonged and repeated breathing of vapour fumes should be avoided.

Precautions should be taken to avoid contact with eyes or skin or clothing.

Eating and smoking should not be permitted in the vicinity of processing chemicals used since this may represent an enhanced hazard due to potential explosion.

In case of contamination a basic First Aid kit should be available together with a ready supply of water.

All chemicals should be stored in clearly and correctly marked containers and should be securely sealed when not in use.

Exposed optical fibre ends must be kept away from skin and eyes.

Waste fragments should be treated with care and collected (not by hand) together with other waste materials and disposed of in suitable containers.

Under no circumstances should a connector end-face, prepared optical fibre or fractured optical fibre be viewed directly unless the power received from the optical fibre is known to be safe under local control. This allows inspection of components using locally injected visible light and prevents the inspection of components using light injection from a remote non-controlled location.

The provision of the correct safety labelling is a mandatory requirement on all products where transmission features an optical hazard. All potential hazard areas must be similarly marked.

Adaptors within Patch Panel closures and free connectors should be permanently capped to prevent accidental eye or skin contact which might result in injury.

The user should ensure that all authorised personnel are aware of the relevant safety issues and should obtain training where appropriate.

Precautions

During the delivery of the optical cable somebody should monitor the off-loading of the reels to ensure that no mechanical damage occurs.

The optical fibre should be stored in a suitable place until required (Check the datasheet of the cable used).

The optical fibre should not be unpacked until required.

Pre-installation procedures

The route defined by the design should be accessible and available in accordance with the installation schedule. The users should be advised of all proposed deviations.

The installer should establish that the environmental conditions within the routes and the installation methods to be used are suitable for the optical fibre cable to be installed (Check the datasheet of the cable used). If the route contains sections where the optical cable is subjected to high temperatures the necessary protection should be provided. Look out for heating tubes which are not heated all the time.

Where direct burial of optical cable is not undertaken, ground conditions should be given careful consideration. It is recommended that a depth of cover in excess of 350 mm (450 mm in cultivated ground) should be provided and the optical cable should be suitably armoured. Where the cable is to be laid beneath roadways or railway lines the ducts should be used and laid with a depth in excess of 600 mm.

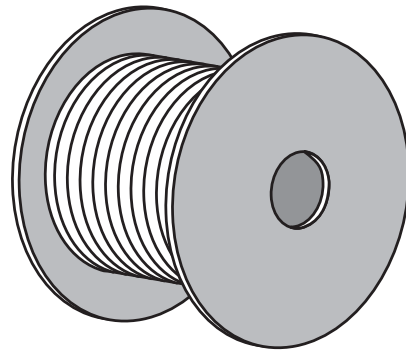
Any measure necessary should be taken to prevent the optical cable experiencing direct stress following installation.

The installer should determine the locations at which reels are to be positioned during the installation program. Where necessary, the minimum quantity of ceiling tiles, floor covers or duct covers should be removed.

The installer should ensure that all necessary guards, protective structures and warning signs are used to protect both the optical cable and third parties. Relevant national legislation for safe working practices must be complied with.

Conditioning

The bulk cable is supplied on lightweight reels.

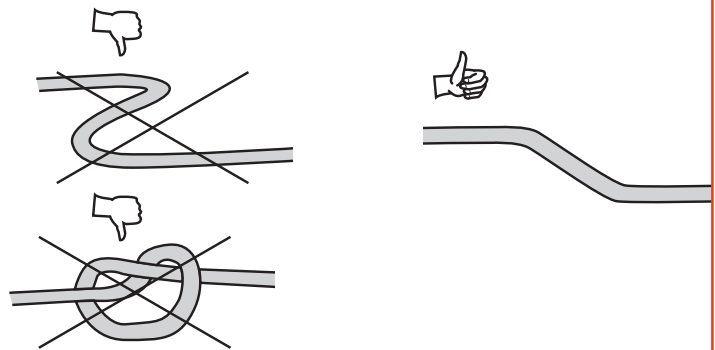


Pulling

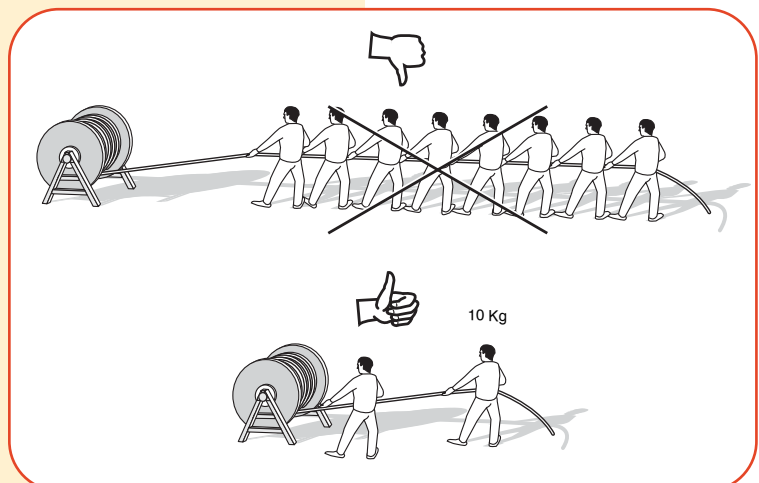
When pulling cables, respect the minimum bending radius and maximum pulling forces for the optical fibre cables..

Check the datasheet of the cable used.

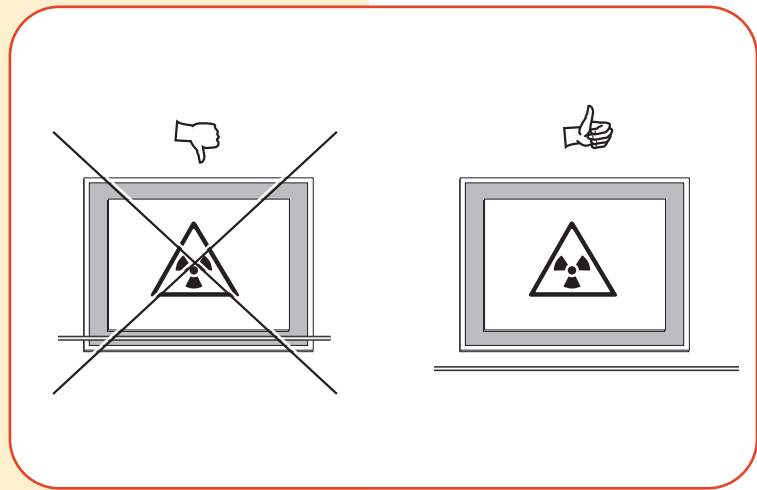
Be aware that in cold environment the cable jackets are stiffer and more sensitive to bending and pulling. The range of recommended installation temperatures of cables is much smaller than the operating temperature ranges.



During cable installation one operative should remain with the reel to take all necessary precautions to prevent cable kinking, raveling or twisting.

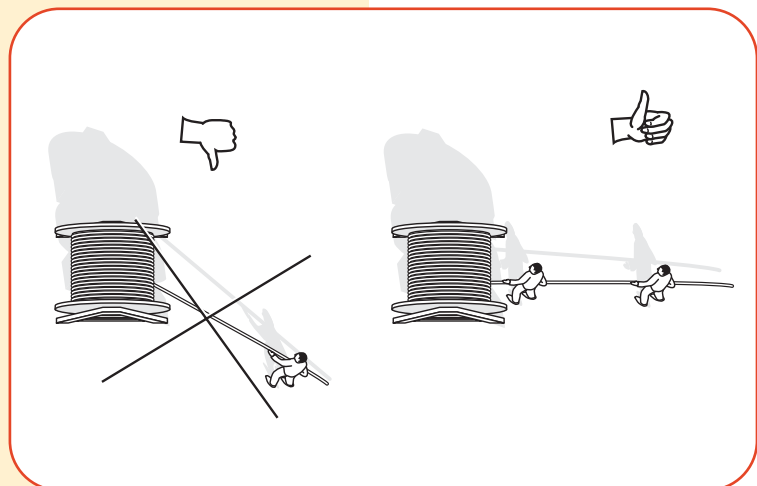


Do not install optical fibre cable in areas where it will be exposed to radiation.

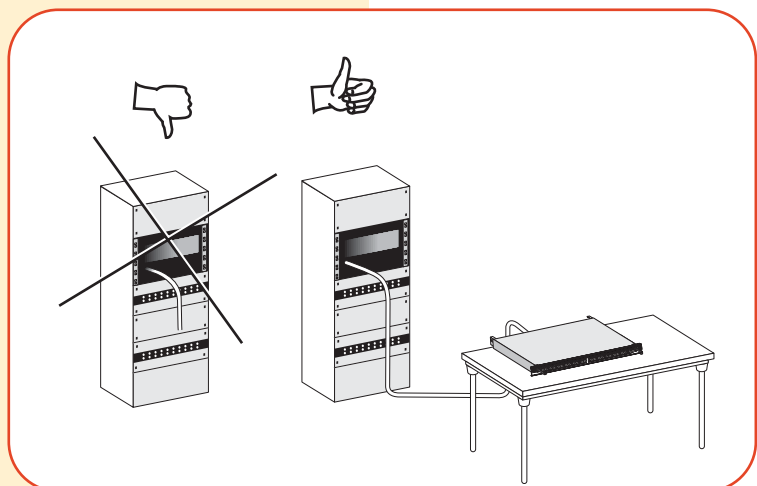


Optical cable should be removed from the reel with the reel in a vertical position without the optical cable being drawn across the reel flange.

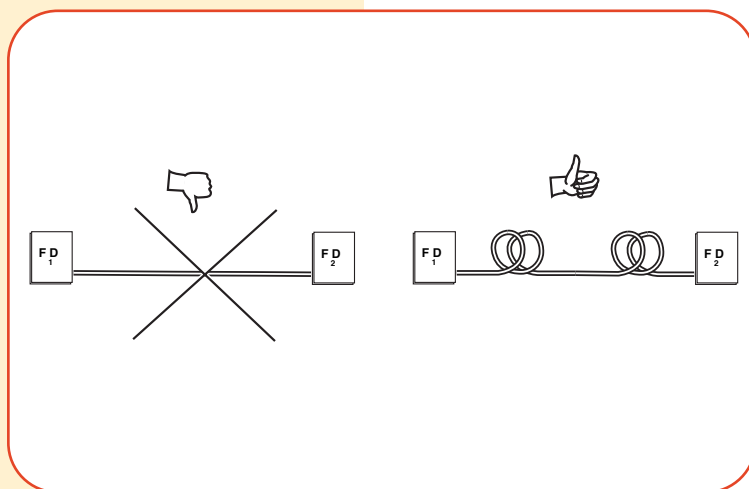
The person close to the reel has to stop the reel from turning if enough length is achieved.



A minimum of 5 meter OF cable should be foreseen in the cabinet as this will facilitate the termination of the cable in the OF patchpanel. Preferably do the termination of th OF in the patch panel on a table before screwing the patch panel into the frame.



Always cut first meter of cable as this part can be damaged by pulling of the cable, bending, water...
Leave some extra cable ($\pm 5m$) at different places on the cable link.
This makes it easier to repair in case of a broken cable.



Fibre termination

GENERAL COMMENTS :

- Perform installation in a clean environment.
- Respect min bending radius of cables and pigtails.
- Use of industry standard tools, accessories and cleaning materials.
- Equipment shall be appropriately stored and adequately protected when not in use.
- Equipment shall be verified or recalibrated at established intervals to assure compliance and precision.
- Stripping can cause nicks, scratches or chips that are not easily detectable. Therefore, extreme care shall be taken during tool evaluation and selection.
- After stripping, isopropyl alcohol (reagent grade, 99% or better) must be used to clean the fibres and for cleaning components before connecting them. Isopropyl alcohol may be also used to clean the lapping acetate and stripping tools when necessary.
- Fibre cleaving tools should be guaranteed clean, fragment free, crack-free cleave which minimize chips or other defects.
- Care should be taken not to introduce bubbles or voids into adhesive as they increase the risk of breakage.
- Control each termination by visual inspection and authorised testing equipments.
- Direct termination of SM connectors is not recommended.
- For additional guidelines, please refer to FIA website : www.FIA-online.co.uk

PROHIBITED :

- The use of index matching gel.
- The used of diamond paper.
- The use of glass plate for polishing.
- The use of acetone for cleaning.
- To clean an optical connector attached to a fibre carrying light. This may cause an explosive ignition of the cleaning material when it contacts the end of the optical connector, destroying the connector.