

Article Overview

The long-term allowable tension of optical cables is typically much lower than the installation tensile strength and is designed to prevent fiber elongation beyond 0.3% to ensure a service life of 25 years.

Definition and Purpose

The long-term tensile strength of a fiber optic cable is the maximum load the cable can sustain during normal operation after installation without causing permanent damage to the fibers or degrading optical performance . Unlike the installation tensile strength, which accounts for short-term stresses during pulling or handling, the long-term tension is meant for continuous operational conditions.

Typical Values

- o For self-supporting optical cables, the long-term allowable tensile load is generally at least 3 kN, though specific values vary by manufacturer and cable design .
- o The relative elongation of the fiber under long-term load should not exceed 0.3%, which is about one-third of the fiber elongation during factory proof testing (typically 1%) to maintain a service life of 25 years .
- o Installation tensile loads should be kept well below the manufacturer's maximum, often not exceeding 2,700 N (600 lbs) for short-term pulls .

Factors Affecting Long-Term Tension

- o Cable Construction: The number of reinforcing elements (e.g., aramid yarns, glass fiber reinforced plastic) and the type of sheath influence tensile capacity .
- o Fiber Count and Type: Higher fiber counts or specialty fibers may reduce allowable tension.
- o Environmental Conditions: Temperature fluctuations, UV exposure, and moisture can affect long-term mechanical performance .
- o Standards Compliance: IEC 60794-3-20 specifies that the fiber elongation under maximum permissible tensile load must not exceed one-third of the proof test elongation, and attenuation increase should be ≤ 0.05 dB .

Practical Guidelines

- o Always monitor tension during installation and avoid jerking or pushing the cable .
- o Use pulling grips and breakaway swivels rated for the cable's maximum tension.
- o Maintain minimum bend radius under tension (typically 20x cable diameter during pulling, 10x after installation) to prevent additional stress .
- o For aerial or self-supporting cables, consult manufacturer datasheets for maximum allowable tension (MAT)

Long-term allowable tension of optical cable

and long-term operating tension (TL) values . By adhering to these guidelines, the optical cable can maintain its mechanical integrity and optical performance over its expected operational life.

Another two terms we urgently need to understand are the diameter and minimum bend radius. Because the bending

There are two tensile strength values used to define fiber optic cable: 1) installation (or short term) and 2) long term (or operating

Application note: Practical overview of optical loss testing theory and practice for fiber optic communication systems.

Engineering guide to cable bend radius limits, including static and dynamic requirements based on IEC, TIA, and fiber

Pull tension specifications distinguish between two conditions: installation (dynamic) load --the tension applied while the cable is

Tensile strength testing ensures fiber optic cables withstand installation stress, preventing damage and maintaining

Automated figure-eight machines that coil fiber optic cable on a drum may exceed cable design limits by exceeding torsion, tension,

According to this parameter, meteorological conditions and controlled sag, the allowable

Fiber Lifetime - Mechanical Fiber is proof tested at manufacture to "weed out" flaws in the extrinsic region. Install stress and long

The International Telecommunication Union (ITU) has published several documents gathering an up-to-date knowledge on this long

The simultaneous availability of compact sources and of low-loss optical fibres led to a worldwide effort for developing optical fibre

Fiber optic cables can be easily damaged if they are improperly handled or installed. It is imperative that certain procedures be

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The normal recommendation for fiber optic cable bend diameter is the minimum bend diameter under

The objective of this document is to give an understanding of an optical cable datasheet. In this document, the interaction between

Different types of cable are used for fiber-optic communication in different applications, for example long

Fiber optic cable bend radius is a critical mechanical parameter that determines how sharply a cable can be bent

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