

## Article Overview

Optical splitters must meet strict material, optical, mechanical, and reliability standards to ensure efficient, scalable, and durable FTTH/PON network performance.

## Materials and Components

- o Optical Fiber Core: Must be made of quartz glass with low water peak fiber (LWPF) characteristics for minimal signal loss and bending sensitivity. Coatings should be plastic-based, with 900 um tight buffer or ribbon-type resin coatings for protection and flexibility .
- o PLC Chip: Planar Lightwave Circuit chips should be quartz-based to ensure uniform splitting and low insertion loss .
- o Housing: Aluminum, stainless steel, or equivalent corrosion-resistant materials are required to protect the splitter from environmental factors, including moisture, UV exposure, and mechanical stress .
- o Connectors: SC/PC or SC/APC connectors must withstand temperature variations, vibration, and chemical exposure while maintaining optical performance .

## Optical Performance

- o Split Ratios: Common ratios include 1:2, 1:4, 1:8, 1:16, 1:32, and 1:64, with odd ratios like 1:3 or 1:5 used in some networks. The choice affects bandwidth distribution and network scalability .
- o Insertion Loss: Splitters must maintain low insertion loss to ensure sufficient optical power reaches each ONT, typically specified under standardized test conditions .
- o Uniformity: Output signals should be evenly distributed across all ports to prevent service degradation .
- o Wavelength Range: Splitters should support the operational wavelengths of the PON system, typically 1260-1625 nm for GPON/XGS-PON networks .

## Mechanical and Structural Requirements

- o Form Factor: Splitters must fit within optical terminal boxes or closures, with compact, lightweight, and flexible designs for easy installation .
- o Fiber Arrangement: Ribbon or fan-out configurations should allow clear identification of fibers, often using color coding or numbered tags .
- o Environmental Protection: Housings must be waterproof, moisture-proof, and resistant to contamination and corrosion .
- o Maintenance: Designs should facilitate hardware replacement, testing, and network expansion without disrupting service .

## Reliability and Standards Compliance

# Basic Requirements for Optical Splitters

- o Telcordia GR-1209 and GR-1221: Splitters must comply with generic requirements and reliability assurance standards for passive optical components .
- o ITU-T G.657: Optical fibers should meet bending loss-insensitive single-mode fiber standards for access networks .
- o Operational Lifetime: Components must maintain performance over the expected service life under temperature, humidity, and mechanical stress conditions .

## Deployment Considerations

- o Centralized vs. Distributed Splitting: Centralized splitters are located in a central office or cabinet and allow flexible customer assignment via jumpers, while distributed splitters are installed in closures or pedestals with fixed assignments .
- o Network Planning: Splitter placement and ratio selection impact fiber counts, network cost, and operational efficiency, including customer onboarding and maintenance .
- o Scalability: Splitters should support future network expansion without requiring major infrastructure changes . In summary, optical splitters for FTTH/PON networks must combine high-quality materials, precise optical performance, robust mechanical design, and compliance with industry standards to ensure reliable, scalable, and cost-effective network operation. Proper selection of split ratios and deployment architecture is critical for balancing bandwidth, cost, and service quality.

At the same time, higher split ratio splitters reduce bandwidth per ONU (optical network unit). And there will be

An optical splitter is a device that divides light transmission in a network into multiple output ends. It plays a crucial

The optical splitter is an optical power distribution device that splits one optical signal into multiple optical fiber signals

Unearth in-depth insights into FTTH Network Design. Learn about the critical role of optical splitters, understand

As optical networks continue to evolve, splitter technology advances to meet emerging requirements: Higher Split

Explore the workings of fiber optic splitters, their technical specifications, and wide-ranging

Optical fused couplers are generally made using configuration in multiples of 2 such as 2<sup>&#215</sup>2 or

# Basic Requirements for Optical Splitters

4x4 but can be made in

What's an optical splitter? How does the fiber optic splitter work? How many fiber splitter types? How to choose the

Master fiber optic splitter specifications like insertion loss and uniformity. From bare fiber to rack-mount modules,

Fiber optic splitters are quite important in today's optical network. Splitters can help users maximize the functionality

Where splitters are placed in the network can make significant impacts on fiber counts, network cost and deployment time and

4.1 General Information 4.1.1 In this section, technical requirements, such as material, structure, function, etc. of optical splitter

Fiber optic splitters and couplers are fundamental passive components in modern optical communication networks.

Optical splitters work by using different methods--such as fused biconical taper, planar

There are two main manufacturing technologies for optical splitters, each with its own advantages and ideal use

Optical Splitter Types Optical splitters are classified based on their package style, transmission medium, and

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