Method for splicing explosion-proof optical cables



Overview

The present invention provides an explosion proof fusion splicer system for splicing optical fibers with an arc contained within an enclosed space. Splicing is carried out in the...

Key Takeaways

Explosion-proof optical cables are spliced using certified fusion splicers within protective enclosures designed for hazardous areas, following strict safety standards to prevent ignition.

Equipment and Enclosures

Splicing in explosive atmospheres requires specialized enclosures such as the BXJ93 Fibre Optic Splice Box, which is certified for Zone 1 and Zone 2 hazardous areas. These enclosures are made from stainless or carbon steel, rated IP66 for dust and water ingress, and can accommodate up to 288 fibers. They feature configurable internal splice trays, multiple gland entries, and maintenance-friendly hinged covers to ensure safe operation without exposing personnel to hazards.

Explosion-

Proof Fusion Splicers

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Certified explosion-proof fusion splicers are essential. Devices like the Aurora MiniMod or patented designs (CN201852956U) allow low-loss, stable splicing in hazardous environments. These splicers are designed to operate safely under explosive gas or dust conditions, often incorporating a fusion splicing cavity and thermal shrinkage protection.

The optical fiber enters the splicing cavity through explosion-proof connecting cavities, ensuring that any potential sparks or heat are contained.

Safety Principles

Splicing must comply with IEC 60079-28, which governs optical radiation in explosive atmospheres. The “op is” principle (inherently safe optical radiation) limits optical energy to prevent ignition, similar to intrinsic safety in electrical systems. Systems may also use the “op sh” principle, where broken fibers are detected and optical radiation is immediately switched off to prevent hazards.

Splicing Procedure

Prepare the cable: Strip the outer jacket and buffer layers in a controlled, non-sparking environment. Insert into splice box: Feed fibers through explosion-proof glands into the splice tray. Align and splice fibers: Use a certified explosion-proof fusion splicer to align and fuse fibers.

Ensure the splicer is fully enclosed and operational according to manufacturer instructions. Protect the splice: Apply thermal shrink sleeves or protective covers within the splice tray. Test and secure: Verify optical continuity and loss, then close the enclosure, ensuring all glands are tightened and the box is sealed.

Standards and CertificationIEC 60079-28: Optical radiation safety in explosive atmospheresIEC 61508 / IEC 61511: Functional safety standards for process systemsAS6479/1: Aerospace and industrial explosion-proof fiber optic splicer specificationATEX / IECEx: Certification for hazardous area equipment Following these methods ensures safe, reliable, and compliant splicing of optical cables in environments with explosive gases or dust, minimizing the risk of ignition while maintaining high-quality optical performance.

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Article Content

Optical Fiber Splicing: The Complete Technical Guide to

This guide breaks down the fundamentals of optical fiber splicing, compares fusion and mechanical techniques, explains factors that influence splice loss, and

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Splice boxes, which are also available in a certified Zone 1 version, are an extremely suitable, reliable option for laying and distributing optical cables.

Aurora Optics, Inc.

The fully-automatic miniature modular fusion splicer creates low-loss and highly stable splices in any optical fiber from 5.8/125 µm single mode up to 200/230 µm

Fiber Splicing Methods and Protection with Splice Closures

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Discover the differences between fusion and mechanical splicing, learn how to ensure safe fiber optic splicing, and see why splice closures are essential for long-term network reliability.

Cables and cable glands for hazardous locations

Cable glands (cable entry devices) used in hazardous locations are intended to provide the safe connection of suitable cables to enclosures, maintaining the explosion protection and ingress

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Explosion proof fusion splicer for optical fibers

The present invention relates to an explosion proof fusion splicing system for optical fiber. The system finds use in ambient conditions wherein explosive or hazardous gases are present or suspected to

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Optical Fiber Splicing: The Complete Technical Guide to

Poor fiber splicing, on the other hand, can lead to performance issues and increased maintenance costs. This guide breaks down the fundamentals of optical fiber

Aurora Optics, Inc.

This explosion-proof miniature modular fusion splicer can go anywhere – up a ladder, hanging from overhead cable bundles, or in the tightest of cramped

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Splicing with fusion splicers, in particular, has become an attractive method to quickly and easily connect fiber optic fibers. Using the proper tool allows to connect the individual fibers of fiber optic cables

Fiber Splicing Methods and Protection with Splice Closures

Fiber optic cable splicing is the process of joining two fibers end-to-end to create a continuous optical path. In PON and FTTx networks (e.g., FTTH, FTTP, FTTM), splicing is essential

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The Ultimate Guide to Splicing of Fiber: Techniques and Tips

Looking to understand fiber splicing? It''s the process of joining two fiber optic cables using techniques such as fusion splicing and mechanical splicing, crucial for maintaining

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