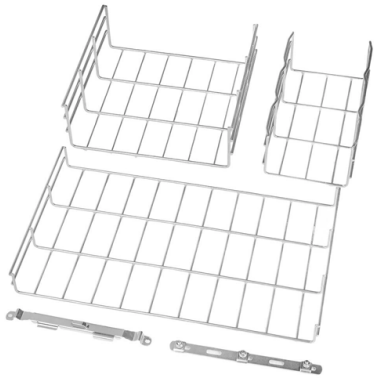
Airborne high-temperature resistant optical cable



Overview

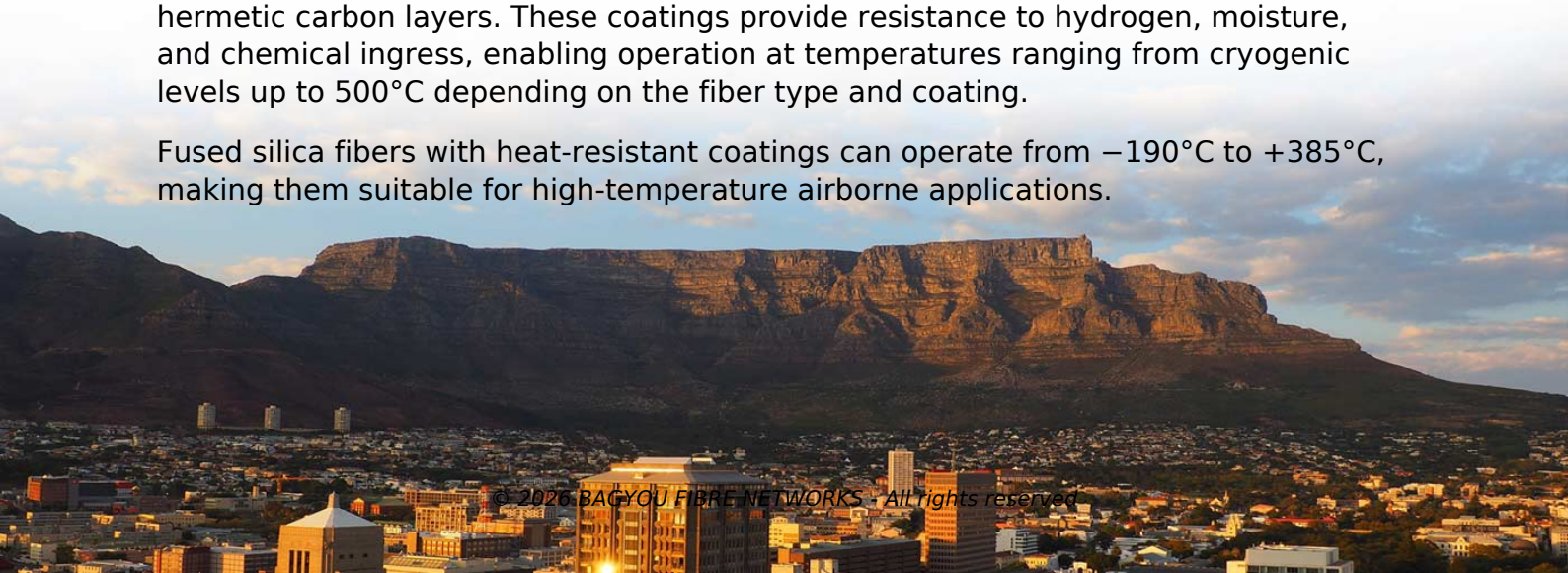
GORE® Fiber Optic Cables balance strength, small size, less weight and high flexibility compared to alternatives.

Key Takeaways

High-temperature airborne optical cables are engineered for extreme environments, offering thermal resistance, vibration immunity, EMI protection, and long-term reliability for aerospace and defense applications. Key FeaturesAirBorn FOCuS Active Optical Cables are specifically designed for aerospace, defense, and space applications. They integrate a space-rated optical transceiver directly into the connector housing, supporting data rates up to 14 Gbps per lane while providing superior electromagnetic interference (EMI) protection and significant weight savings.

These cables are factory pre-terminated, environmentally sealed, and meet NASA and MIL standards for outgassing, vibration, and temperature extremes, ensuring reliable performance in airborne and space environments. High-temperature fibers from manufacturers like Corning and AFL are designed to withstand extreme thermal conditions, with coatings such as polyimide, silicone, high-temperature acrylates, and hermetic carbon layers. These coatings provide resistance to hydrogen, moisture, and chemical ingress, enabling operation at temperatures ranging from cryogenic levels up to 500°C depending on the fiber type and coating.

Fused silica fibers with heat-resistant coatings can operate from −190°C to +385°C, making them suitable for high-temperature airborne applications.



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Environmental and Mechanical Considerations

Vibration and Shock Resistance: Multiple points of contact and ruggedized connector designs enhance mechanical stability in high-vibration airborne environments.

EM

I Immunity: Optical signal transmission inherently resists electromagnetic interference, critical for sensitive avionics and data-intensive systems. Chemical and Moisture Resistance: Hermetic coatings and sealed optical paths prevent contamination from moisture, dust, and chemical exposure, maintaining signal integrity. Temperature Range: Depending on the fiber and coating, cables can operate reliably from −190°C to +500°C, accommodating both high-altitude cold and engine-proximate heat.

Applications

These cables are ideal for: Aerospace and defense systems requiring high-speed, EMI-immune data transmission. Spaceflight and satellite systems where outgassing, radiation, and vibration are critical concerns. Harsh industrial environments such as oil & gas, geothermal, and high-temperature monitoring applications.

Standards and Compliance

Airborne high-temperature optical cables typically comply with: MIL-STD for vibration, shock, and EMI performance.

NAS

A outgassing standards for space-rated applications.

IE

C 60794 and IEEE 1222 for fiber optic cable construction and environmental resistance.

Summary

For airborne applications requiring high-temperature resistance, ruggedized active optical cables like AirBorn FOCuS, combined with high-temperature fibers featuring polyimide, silicone, or hermetic coatings, provide reliable, high-speed data transmission. These solutions ensure durability under extreme thermal, mechanical, and chemical conditions, making them suitable for aerospace, defense, and other harsh environments.

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Article Content

Fiber Optic Cables for Aerospace, Defense Air & Land

GORE® Fiber Optic Cables balance strength, small size, less weight and high flexibility compared to alternatives. They deliver reliable signals at high

AirBorn FOCuS Rugged Active Optical Cables | Molex

AirBorn FOCuS Active Optical Cables are built for spaceflight and harsh environments, ensuring exceptional signal integrity in shock, vibration and

High Temp/Harsh Environment Fiber | OEM Optical

Corning''s High Temperature Fibers are designed for applications requiring improved fatigue resistance, high usable strength, and excellent resistance to higher

Fiber Optic Aerospace Cables for Defense Air & Land | Gore

For outside-the-box systems that need more durability and high-temperature protection, we offer fiber options packaged with our GORE ® Cable Protection Systems.

Wires & Cables for Aerospace Applications

Draka Fileca offers a wide portfolio of products and the core competencies of its highly skilled and experienced specialists focus on improving all aspects of the cable performance, such as high

High Temperature Fiber Optic Interconnects

DIAMOND SA offers high temperature fiber optic interconnects designed for extreme thermal environments. Ensure stable performance, durability, and signal integrity

AirBorn Connectors and Interconnect Products | Molex

The AirBorn product portfolio, engineering expertise and dedicated support team are now backed by the significant scale and market

Military Tactical Fiber Optic Cables for Extreme

Rugged, tight-buffered fiber optic cable construction for the highest possible survivability in severe crush, impact, vehicle runover, deployment and retrieval

High Temperature Cable | High Temp Cable | Eland Cables

Our Intemp 250 cables, sometimes referred to as a high performance glass fibre braid cable or mica glass tape cable, can withstand temperatures of up to 250°C whilst our mineral insulated cables are

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High-temperature fibers | WEINERT Industries AG

For use in higher temperature ranges, all optical fibers based on Fused Silica can be optionally equipped with heat-resistant coating materials. This extends the potential field of application to a range from

Fiber optic cables for harsh environmental conditions | AFL Global

Harsh environment fiber optic cable - Deploy in industrial facilities, mines, subsea and other environments where extreme conditions exist. Ultra-low and high temperature operations or

Harsh Environment Fiber Optic Cable Solutions for

Explore how to select the right fiber optic cable for challenging environments including high temperatures, extreme cold, salt spray, humidity,

How does fiber optic cable perform in extreme environments or ...

Fiber optic cables are known for their robust performance in a variety of environments, including some extreme conditions. Here''s how fiber optic cable performs in extreme environments

500°C-Rated Optical Fiber for High Temperature

500°C-Rated Optical Fiber for High Temperature Applications Specialty optical fibers can be produced with a polyimide coating, which allows

Proterial High Temperature Fiber Cable | Industrial Fiber Optics

Hitachi Proterial Fiber Cable - Industrial Fiber Optics, Inc. offers two highly heat-resistant plastic optical fiber (HPOF) (HPOF-S) for above 100 degrees C.

Choosing the Right Optical Cable for Military and Marine Applications

Military and marine applications present unique demands of extreme temperatures, moisture, pressure, vibrations, salt corrosion, and mechanical stress. Choosing the right type of

High Temperature Fiber Optic Interconnects | DIAMOND SA

Diamond''s Low / High Temperature Interconnects are designed for applications where conventional fiber optic assemblies fail under extreme thermal and cryogenic conditions. These interconnects utilize

Aerospace Rated High Temperature -55°C to +150°C Ethernet Cables ...

Aerospace Rated High Temperature -55°C to +150°C Ethernet Cables, Category 5e - L-com''s Aerospace and High Temperature Ethernet assemblies are here to meet your aerospace, high temp,

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