

# Upgraded version of hollow fiber optic cable for local area networks



## Overview

Technologie Optic Inc. recognizes the transformative potential of hollow-core fiber technology and is actively investing in research, prototyping, and strategic partnerships to accelerate its adoption.

## Key Takeaways

Next-generation hollow-core fiber optic cables offer ultra-low latency, high bandwidth, and reduced signal loss, making them a promising upgrade for local area networks.

## Key Advancements in Hollow-

Core Fiber (HCF) TechnologyHollow-core fibers replace the solid glass core with an air-filled channel, allowing light to travel nearly at vacuum speed, which reduces latency by 30–50% compared to conventional fibers and minimizes nonlinear effects such as Kerr, Brillouin, and Raman scattering. Modern designs, such as Linfiber Tech's LinearCore™, feature anti-resonant hollow-core structures with losses as low as 0.5 dB/km in the C+L band and support ultra-high capacity transmission, including 128 Tb/s over 20 km.

Microsoft's double nested antiresonant nodeless fiber (DNANF) further enhances bandwidth and transmission distance, achieving up to 45% faster propagation and extending reach to 33 km.



## Benefits for LAN Deployment

**Low Latency:** HCFs reduce signal delay, which is critical for high-speed LAN applications, including data centers and inter-building connections. **High Bandwidth:** Advanced HCFs support wide optical spectra and high-capacity transmission, enabling future-proof LAN infrastructure. **Reduced Loss and Energy Efficiency:** Modern HCFs require fewer amplifiers and repeaters, lowering energy consumption and operational costs.

**Simplified Signal Management:** Minimal nonlinear and dispersion effects reduce the need for complex compensation systems, simplifying network design.

## Practical LAN Cable Options

For LAN-specific applications, fiber optic cables are available in tight-buffered and loose-tube structures: **Tight-buffered cables:** Flexible, lightweight, and easy to install indoors or for interconnection between racks. **Loose-tube cables:** Higher fiber density, suitable for fusion splicing, and can be gel-filled or armored for indoor/outdoor use. **Hybrid solutions:** Combining HCF with standard single-mode fibers allows integration into existing LAN infrastructure while leveraging low-latency benefits.

## Deployment Considerations

### While HC

Fs offer superior performance, they are still emerging in commercial LAN applications. Installation requires careful handling due to the delicate hollow core, and splicing techniques may differ from conventional fibers. However, companies like Linfiber provide complete solutions, including HCF connectors, splicing methods, and characterization tools, facilitating adoption in data centers and high-speed LANs.

## Conclusion

Upgraded hollow-core fiber optic cables, such as LinearCore™ and DNANF, represent a significant advancement for LANs, offering ultra-low latency, high bandwidth, and energy-efficient operation. When combined with flexible LAN cable designs, these fibers can enhance both inter- and intra-building network performance, making them a compelling choice for next-generation local area networks.

## Article Content

### Hollow-Core Fibers (HCF): The Next Frontier in Optical Communication

Technologie Optic Inc. recognizes the transformative potential of hollow-core fiber technology and is actively investing in research, prototyping, and strategic partnerships to accelerate its adoption.

### Testing and Certifying Hollow Core Fiber: From Novel Physics to

Hollow core fiber has the potential to redefine performance limits in optical networks. Its successful adoption, however, depends on testing and certification practices that acknowledge its

### Hollow-core breakthrough

A hollow-core optical fibre which surpasses silica fibre's long-standing limits and provides an attenuation below 0.1 dB/km across a record-wide bandwidth, could yield more energy-efficient...

### Novel hollow-core optical fiber transmits data 45% faster with record ...

But now, researchers from the University of Southampton and Microsoft claim to have made a breakthrough in HCF design in a recently published study in Nature Photonics. The new fiber

### Emerging Trends in Optical Fiber: Hollow-core and

Discover the latest optical fiber trends in 2024: Learn how hollow-core and multicore fibers will play a key role in supporting next-gen data transmission.

### Hollow-Core Optical Fibers for Telecommunications and Data ...

In this paper, we comprehensively review the progress in the development of HCFs including fiber design, fabrication and parameters (with comparisons to conventional single-mode

### Linfiber Tech Unveils LinearCore™: The Next-Generation Hollow-Core ...

Linfiber Tech. announces its hollow-core fiber cable solution Linearcore™ featuring an innovative anti-resonant hollow-core fiber (AR-HCF) structure with loss of 0.5 dB/km in C+L band,

### Hollow-Core Optical Fiber: Faster, Low-Latency Networks

Discover how hollow-core optical fiber reduces latency, boosts data speed, and revolutionizes telecommunications for AI and global networks.

### Next-Gen Hollow-Core Fiber Optics Boost Data Speeds and Cut

Microsoft and researchers in the UK have created advanced hollow-core fiber optic cables that carry data faster and farther than conventional fibers. These new fibers promise to meet

Copper vs Fiber Optic Cable Migration | Upgrading

Copper vs fiber optic cable? Learn why the time is now to replace copper with fiber optic cabling to upgrade the network infrastructure.

Hollow-Core Optical Fiber

Hollow-Core Optical Fibers offer low latency performance and are on the verge of becoming more applicable for mainstream communications networks.

Hollow Core Fiber: The Next Frontier in Ultra-Low

Hollow Core Fiber (HCF) replaces the traditional solid glass core of optical fiber with an air-filled channel. This allows light to travel faster and

This fiber optic cable full of air could be the key to better 5G ...

This fiber optic cable full of air could be the key to better 5G networks UK telecoms company BT is trialing the use of hollow core fiber cables in its 5G networks, with some promising

Hollow-core fibre: the next game-changer in optical cables

Continuing growth in the volume of data traffic and the need for low latency will lead operators to deploy hollow-core fibre networks.

YOFC Unveils Game-Changing Hollow-Core Fibre Advances at OFC

At the OFC Conference, from March 30 to April 3, 2025, at San Francisco's Moscone Center, Yangtze Optical Fibre and Cable Joint Stock Limited Company (YOFC) (stock tickers:

Understanding Fiber Optics & Local Area Networks Just the ...

Large bandwidth, light weight and small diameter The amount of information carried in two strands of optical fiber would require a copper cable four inches in diameter. While today's applications require

On the Benefits of Hollow-Core Fiber in Next-Generation Optical ...

While silica-based fibers have been the go-to solution in optical communications for the past 50 years, recent advancements in Hollow-Core Fibers (HCF) (in which the optical signal is transmitted in a

The Hollow Fiber Revolution: How Air-Filled Fibers Could Reshape the ...

The future of the internet may not lie in more powerful servers or bigger data centers, but in a strand of glass that is—ironically—mostly empty. Scientists at the University of Southampton

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