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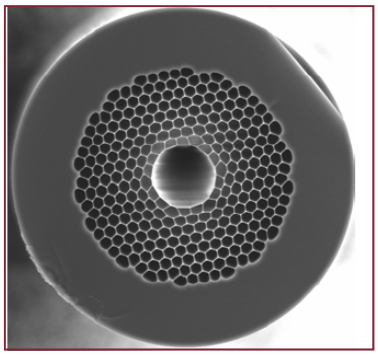
Hollow Core  Spectral Filtering

# HC19-1550-01

## *Hollow Core Photonic Bandgap Fiber*

- ›97% of optical power located in air
- Quasi-Gaussian fundamental mode
- Can be filled with gas
- Low bend loss down to few mm bend radius
- Fresnel reflection to air at the end faces ‹$10^{-4}$
- Around 65% of fiber cross section composed of solid silica, facilitating fusion splicing to conventional fibers



Photonic Bandgap Fibers guide light in a hollow core, surrounded by a microstructured cladding formed by a periodic arrangement of air holes in silica.

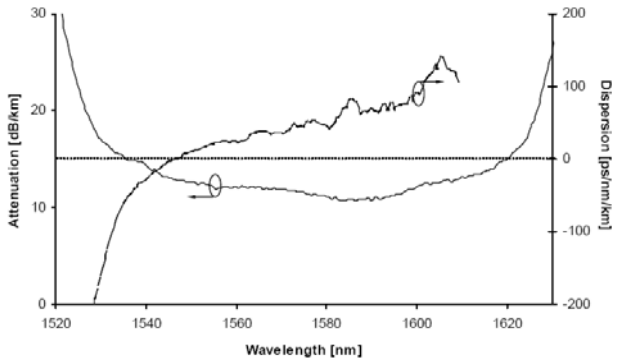
Since only a small fraction of the light propagates in glass, the effect of material nonlinearities is significantly reduced and the fibers do not suffer from the same limitations on loss as conventional fibers made from solid material alone.

While hollow core PCF holds the promise to become the next generation ultra-low loss transmission fiber, it already finds important applications in power delivery, pulse shaping and compression, sensors and non-linear optics.

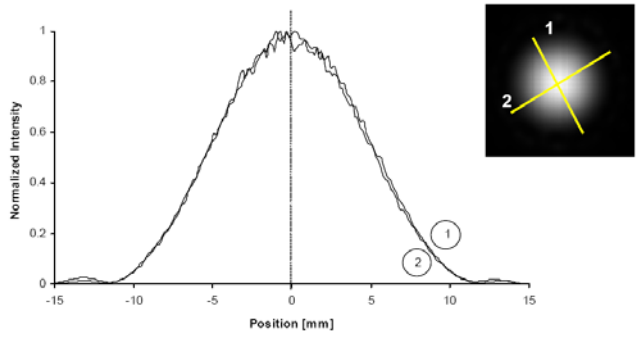
Hollow core fibers for 1550 nm wavelength are now available with two different core sizes, formed by removing either 7 cells (HC-1550-02) or 19 cells (HC19-1550-01) from the cladding.

The larger core fibers offer lower loss, lower dispersion and higher breakdown threshold, while the smaller core fibers provide a wider uninterrupted operating wavelength band and support a smaller number of modes.

### Typical attenuation and Chromatic dispersion spectrum




### Typical near field intensity distribution




| Physical properties | |
|---|---|
| Core diameter(1) | 20 µm ± 2 µm |
| Pitch | 3.9 µm |
| Air filling fraction in the holey region(2) | › 90% |
| Diameter of holey region | 73 µm |
| Cladding diameter | 115 µm |
| Coating diameter (single layer acrylate) | 220 µm |

| Optical properties | |
|---|---|
| Center wavelength(3) | 1570 nm |
| Attenuation @ 1570 nm | ‹ 0.02 dB/m |
| Width of transmission band(4) | › 80 nm |
| Fraction of light in air(5) | › 97% |
| Mode field diameter(6) | 13 µm |
| Numerical aperture(7) | 0.13 ± 0.03 |
| Effective mode index(8) | ~0.995 |

1. *Core formed by removing 19 hexagonal unit cells of the cladding*
2. *Excluding core and outermost ring of holes*
3. *Other wavelengths available on request*
4. *Bandwith over which loss ‹ 0.05 dB/m*
5. *Derived from numerical model*
6. *Full 1/e-width of the near field intensity distribution*
7. *Sine of half angle at which a Gaussian fit to the far field intensity distribution has dropped to 1% of its peak value.*
8. *Excluding core and outermost ring of holes*

HC19-1550-01-100409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