

# SPECIALTY FIBER SBS-SUPPRESSED FIBERS

## OPTICAL FIBERS WITH SUPPRESSED STIMULATED BRILLOUIN SCATTERING GAIN

### ARTICLE SBS-DC-20/125-1550PM

Stimulated Brillouin scattering (SBS) is the major factor limiting maximal power of narrow-band (less than 100MHz in linewidth) fiber lasers. It is especially crucial in applications, which require small mode field diameter (MFD), i.e. Raman amplifiers. Suppression of SBS gain, while MFD (and Raman gain) in such a fibers is fixed, become a very important task. Another promising application of single-frequency lasers is LIDAR (Light Detection And Ranging). In the case of all-fiber systems it is the passive fibers at the amplifier output (pigtails of isolators, circulators, collimators) limit the maximum achievable peak power. Thus, development of large mode area (LMA) passive fibers with increased SBS threshold (as compare to standard LMA fibers) become an important task.

To suppress SBS gain for a fixed MFD we use a specialty designed multi-layer multi-components doped core. It allows us to suppress SBS gain by 3-5 dB relative to standard uniformly-doped Ge-doped passive fibers with the same MFD. The developed method allows us to design custom dopants distribution over the core to suppress SBS by 3-5 dB for the most of the actual optical refractive index profile (any core numerical aperture and diameter).

The SBS-DC-20/125-1550PM fiber series was specially designed to be used in pigtails of output components (isolators, collimators, pump-and-signal combiners and etc) of high-peak-power single-frequency lasers operated near 1550 nm. The fiber is intended for utilization in systems with ability to maintain polarization.

FIBER SPECIFICATIONS	SBS-DC-20/125-1550PM
Core diameter, $\mu\text{m}$	$20 \pm 2$
Clad diameter, $\mu\text{m}$	$127 \pm 5$
Core numerical aperture	$0.09 \pm 0.02$
Gray loss (1550nm), dB/km	$< 20$
Polarization extinction ratio (after 2 m), dB	$> 20$
SBS suppression at 1550 nm (relative to uniformly Ge-doped fiber with the same MFD), dB	$> 3$

Fibers with suppressed SBS-gain for a custom designed operating wavelength, core NA and diameter are available on the request.