

Er and ErYb Doped Fibers for Space

IXF-NS-AMP and IXF-2CF-EY-NS series



The IXF-NS series is a portfolio of active and passive iXblue fibers dedicated to New Space applications involving fiber amplifiers and lasers at 1.5 μm .

The idea behind this new product line is to leverage the expertise accumulated during the development of our radiation hardened fibers and apply the recipe to standard production providing COTS (Commercial Off The Shelf) products.

Indeed, the chemical composition used for the IXF-NS fibers is strictly identical to our RADiation hardened – RAD – series, which has been perfected over 15 years of R&D in doped fibers for radiative and space environments. Therefore, the radiation resistance of the IXF-NS series remains excellent and on par with the performance of our RAD series. We are happy to share results of past radiation tests with you. The IXF-NS series includes single clad erbium doped fiber - IXF-NS-AMP - and double cladding Erbium Ytterbium co-doped fibers - IXF-2CF-EY-NS - with their respective matching un-doped versions.

This cost-effective radiation hardened fiber solution is an ideal choice for large projects such as optical amplifiers / lasers for satellite constellations.

Fibers are available from stock: try them today.



FEATURES & BENEFITS

- COTS: from stock, attractive volume pricing
- Composition optimized for radiation resistance
- Heritage from 15 years of R&D on doped fibers for space
- Wide selection: Erbium and double clad Erbium-Ytterbium co-doped fibers
- Available in PM and non-PM
- Radiation Induced Attenuation (RIA) and Radiation Induced Gain Variation (RIGV) reference data available

APPLICATIONS

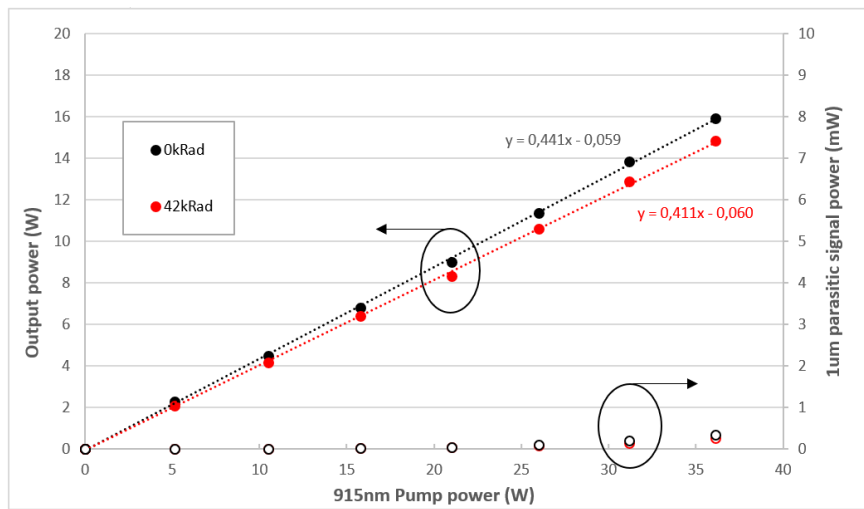
- Large volume price-sensitive space projects
- All space projects where radiation assessment is performed by customer
- Prototype and brass-board development units

Difference between RAD and NS series:

	RAD series	NS series
Composition optimized for space/radiation	✓	✓
RIA and RIGV reference data available	✓	✓
Under PCN (Product Change Notification) procedure	✓	✓
Manufacturing process and quality system compatible with space requirement	✓	✓
Associated passive fibers available	✓	✓
Radiation test performed on each fiber draw	✓	X

NS Series fibers:

Type	Application	Reference	Specs
Erbium	Core pumping ASE source and < 200 mW amplifier	IXF-NS-AMP-2	
		IXF-NS-AMP-2-PM	PM
Double Clad Erbium-Ytterbium	Clad pumping Few watts amplifier/laser	IXF-2CF-EY-O-6-130-NS	6 μm core
		IXF-2CF-EY-PM-6-130-NS	6 μm core, PM
	2-20 W amplifier/laser	IXF-2CF-EY-O-12-130-NS	12 μm core
		IXF-2CF-EY-PM-12-130-NS	12 μm core, PM
		Double Clad Passive Manufacturing of passive component	IXF-2CF-PAS-6-130-0.17-NS
IXF-2CF-PAS-PM-6-130-0.17-NS	6 μm core, PM		
IXF-2CF-PAS-12-130-0.17-NS	12 μm core		
		IXF-2CF-PAS-PM-12-130-0.17-NS	12 μm core, PM



Power Conversion Efficiency (PCE) of IXF-2CF-EY-PM-12-130-NS fiber under radiative and non-radiative conditions

Double Clad Erbium Ytterbium co-Doped Fiber IXF-2CF-EY TECHNICAL SPECIFICATIONS

Parameters	IXF-2CF-EY-O-6-130-LNF-NS	IXF-2CF-EY-PM-6-130-LNF-NS	IXF-2CF-EY-O-12-130-NS	IXF-2CF-EY-PM-12-130-NS
Core diameter (µm)	6 ± 0.5	6 ± 0.5	12 ± 1	12 ± 1
Clad diameter (flat/flat) (µm)			125 ± 3	
Coating diameter (µm)	245 ± 15	245 ± 15	210 ± 15	210 ± 15
Core NA			0.19 ± 0.02	
Cladding NA			≥ 0.46	
Clad absorption @915 nm (dB/m)	> 0.6	> 0.6	2.9 ± 0.6	2.8 ± 0.6
Clad absorption @976 nm* (dB/m)	> 2.0	> 2.0	11.6 ± 2.4	11.2 ± 2.4
Core absorption @1536 nm (dB/m)	> 30	> 30	60 ± 10	50 ± 15
Multimode background losses (dB/km)			< 50	
Core-clad offset (µm)			< 1.0	
Proof test level (kpsi)			100	
Birefringence	NA	> 1.10 ⁻⁴	NA	> 1.10 ⁻⁴

RIGV information

RIGV @ 1560nm (dB/kRad)	< 0.02
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RIGV has been measured in amplifier configuration with 915nm backward pumping and following parameters :
 IXF-2CF-EY-O-6-130-LNF-NS & IXF-2CF-EY-PM-6-130-LNF-NS: 1 W output power with 12 m fiber length
 IXF-2CF-EY-O-12-130-NS: 10 W power with 6 m fiber length
 IXF-2CF-EY-PM-12-130-NS: 10 W power with 6.6 m fiber length

Matching Double Clad Passive Fiber IXF-2CF-PAS TECHNICAL SPECIFICATIONS

Parameters	IXF-2CF-PAS-6-130-0.17-NS	IXF-2CF-PAS-PM-6-130-0.17-NS	IXF-2CF-PAS-12-130-0.17-NS	IXF-2CF-PAS-PM-12-130-0.17-NS
Core diameter (µm)	6 ± 0.5	Please	12 ± 1	12 ± 1
Clad diameter (µm)	125 ± 3	contact us	125 ± 3	125 ± 3
Coating diameter (µm)	245 ± 15		245 ± 15	245 ± 15
Core NA	0.17 ± 0.02		0.17 ± 0.02	0.17 ± 0.02
Cladding NA	≥ 0.46		≥ 0.46	≥ 0.46
Multimode background losses (dB/km)	< 50		< 50	< 50
Core-clad offset (µm)	< 1.0		< 1.0	< 1.0
Birefringence	NA		NA	> 1.10 ⁻⁴

Single Clad Erbium Doped Fiber IXF-NS-AMP TECHNICAL SPECIFICATIONS

Parameters

	IXF-NS-AMP-2	IXF-NS-AMP-2-PM
Absorption @ 1530 nm (dB/m)	25 ± 3	25 ± 3
Absorption @ 980 nm (dB/m)	17 ± 2	15.5 ± 1.5
MFD@1550 nm (µm)	5.5 ± 1	5.5 ± 1
Background losses (dB/km)	< 20	
Cutoff wavelength (nm)	< 1150	< 1200
Cladding diameter (µm)		125 ± 2
Coating diameter (µm)		245 ± 10
Proof test level (kpsi)		100
Splice Loss (dB)	< 0.20 (to SMF28)	< 0.20 (to PM1550)
Birefringence	NA	> 2.10 ⁻⁴

RIA and RIGV information

RIA @1545nm (dB/m/kRad)	< 0.015
RIA @980nm (dB/m/kRad)	< 0.025
RIGV @1545nm (dB/kRad)	< 0.03

RIGV has been measured in amplifier configuration with -20dBm 1545nm input signal and 100mW 976nm constant forward pumping (fiber length = 6m)



Specifications are subject to change without notice