

# aeroGAIN-BASE-1.1

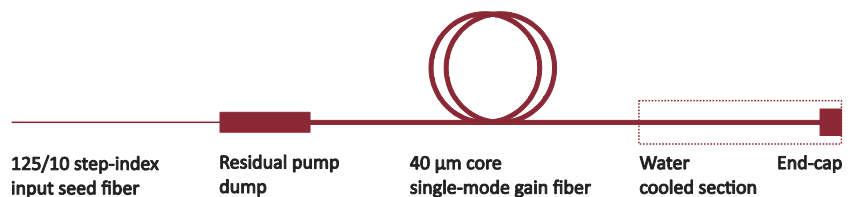
High power ytterbium fiber gain module

- Truly single mode polarization maintaining system
- Excellent pointing stability
- Robust industrial construction
- 10  $\mu\text{m}$  or 15  $\mu\text{m}$  step-index fiber input
- Easy thermal management
- Long lifetime



The *aeroGAIN-BASE-1.1* is a high performance ytterbium fiber gain module designed for industrial manufacturers of pulsed fiber lasers, and is also suited as an easy entry into high power scientific setups. The module is equipped with a 10 or 15  $\mu\text{m}$  step-index standard single-mode fiber input that can easily be spliced to a seed source. The gain medium is our world-renowned DC-200/40-PZ-Yb fiber providing the largest single mode MFD in the industry. The gain fiber is heatsunk to the aluminum base-plate that can be clamped to e.g. a water chilled plate or an air-cooled heat sink. The output end of the module is equipped with a large AR coated endcap that provides mode expansion and reduces reflections. Excess pump light is removed by the integrated residual pump dump.

For optimal performance, the *aeroGAIN-BASE-1.1* is designed for counter propagating pumping through the output endcap. The end-cap and the last part of the gain fiber is mounted in a water cooled housing to ensure maximum performance and lifetime.



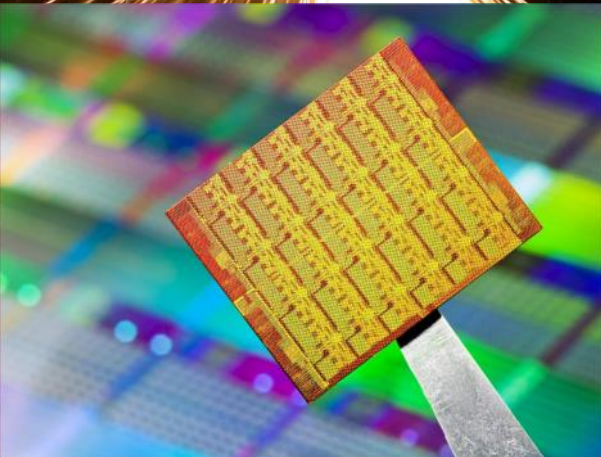
| Model             | Yb Fiber Length | Recommended signal wavelength |
|-------------------|-----------------|-------------------------------|
| aeroGAIN-BASE-1.1 | 3.0 m           | 1064 nm                       |

All modules are assembled and tested in cleanrooms, and come mounted on a tooling plate to ensure the endcap is clean. This tooling plate can also be used as a mount in the laboratory.

The *aeroGAIN-BASE* design has proven its industrial 24/7 reliability through a significant number of long term tests including continuous 25,000 hours operation at 55 W output power. Lifetime in specific OEM systems depends on pump power, pump wavelength, cooling efficiency etc. and NKT Photonics is available for supporting system design.

## Applications

- Ultrafast fiber lasers



# Specifications

## Optical

### Seed input

|                                |   |
|--------------------------------|---|
| Signal wavelength              | 1060 – 1070 nm  |
| Recommended signal input power | > 500 mW for high power operation   |
| Recommended pulse duration     | fs, ps or ns pulses shorter than 2 ns   |
| Signal input fiber             | - 10 $\mu\text{m}$ core PM 125 $\mu\text{m}$ / 250 $\mu\text{m}$ or<br>- 15 $\mu\text{m}$ core PM 250 $\mu\text{m}$ / 350 $\mu\text{m}$ |

### Signal Output

|                                   |                        |
|-----------------------------------|------------------------|
| Max signal gain                   | < 20 dB                |
| Rated output power                | 75 W                   |
| $M^2$                             | $\leq 1.3$             |
| Mode field diameter               | $31 \pm 2 \mu\text{m}$ |
| PER                               | $\geq 15 \text{ dB}$   |
| Typical optical efficiency*       | > 70 %                 |
| Typical core to clad power ratio* | > 96 %                 |

### Pump Input

|                          |   |
|--------------------------|---|
| Pump center wavelength   | $976 \pm 2 \text{ nm}$                    |
| Maximum pump power $P_p$ | 100 W @ fiber facet                       |
| Recommended pump type    | Fiber delivered 200/0.22<br>(max NA<0.55) |
| Pump cladding diameter   | $200 \pm 2 \mu\text{m}$                   |

\* Evaluated with 2 W input power at 1064 nm and 75 W output power.

## Mechanical

|                                |                                |
|--------------------------------|--------------------------------|
| Base plate dimensions (HxBxW)* | See drawing                    |
| Weight                         | 1.8 kg (without tooling plate) |
| Length of input pigtail        | 1 m                            |
| Output end facet angle         | 0 degree                       |
| Endcap length / diameter       | 6 mm / 7 mm** - AR coated      |

\* The system is shipped on a larger tooling plate that can also be used for mounting the module during test

\*\* Open aperture

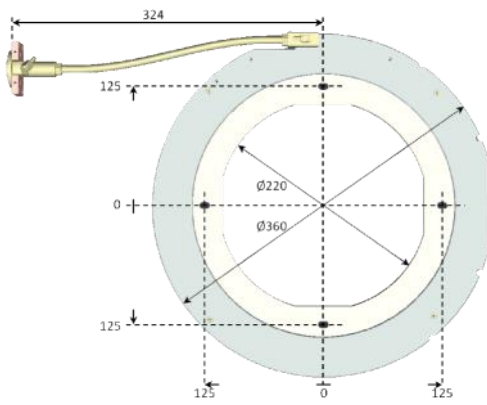
## Water cooling

|                               |                                |
|-------------------------------|--------------------------------|
| Cooling flow for base         | $4 \pm 2 \text{ liter/minute}$ |
| Cooling flow in the tube      | 0.2 - 0.5 liter/minute         |
| Cooling water temperature     | $25 \pm 5^\circ\text{C}$       |
| Max temperature of base-plate | $35^\circ\text{C}$             |

All NKT Photonics products are produced under our quality management system certified in accordance with the ISO 9001:2015 standard.



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Output end-cap fixture

## Other aeroGAIN products

### aeroGAIN-ROD

When a 40  $\mu\text{m}$  core is not big enough our aeroGAIN-ROD modules deliver the ultimate gain solution. With MFDs in excess of 65  $\mu\text{m}$ , ROD systems sits at the very top of the amplifier chain reaching power levels normally only found in DPSS systems but with the benefits of a fiber waveguide and the efficient ytterbium material system.



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