Certificate No:
TAA000037R

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Fiber optic accelerometer sensor

with type designation(s)
Fiber Optic Accelerometer FOACC: FOACC-f25, FOACC-f17, FOACC-f06

Issued to
Light Structures AS
Oslo, **Norway**

is found to comply with
DNV rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Location classes:

Temperature	**C**
Humidity	**B**
Vibration	**A**
EMC	**Not relevant**
Enclosure	**B / IP44**

Issued at **Høvik** on **2022-12-07**
This Certificate is valid until **2027-12-06**.
DNV local unit: **Oslo Maritime and CAP**

for **DNV**

Approval Engineer: **Ståle Sneen**

Frederik Tore Elter
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

This type approval covers fiber optic accelerometer sensors, when installed according to the manufacturers' installation instructions. The sensors are used for uniaxial acceleration measurements applications such as the SENSFIB Hull Monitoring System. The measurement is characterized using a pair of Fiber Bragg Gratings (FBG), ensuring temperature neutral operation. The sensor has two pigtails and may be coupled in series with other FBG-based sensors. The following sensor types are covered by this approval:

Type	Description
FOACC-f25	FBG accelerometer, accuracy (with LS FBGA) ±0.1 m/s^2, frequency range (with LS FBGA) 0.01-100 Hz
FOACC-f17	FBG accelerometer, accuracy (with LS FBGA) ±0.2 m/s^2, frequency range (with LS FBGA) 0.01-200 Hz
FOACC-f06	FBG accelerometer, accuracy (with LS FBGA) ±0.1 m/s^2, frequency range (with LS FBGA) 0.01-25 Hz

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV rules for classification of ships Pt.4 Ch.9 Control and monitoring systems.

Application/Limitation

The Type Approval is only valid for sensors installed according to manufacturer installation instructions given in document LS97000_060159 Rev.0103.

When the sensors are used in a system for Hull Monitoring to obtain the HMON notation, the DNV rules for classification of ships Pt.6 Ch.9 Sec.3 Hull monitoring systems – HMON needs to be adhered to.

Ex-certification is not covered by this certificate.
For Ex verification reference is made to certificate no.: Presafe 14 ATEX 5585 Issue 2
Ex installations to be approved in each case according to the Rules and valid Ex-certificate.

Type Approval documentation

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.

Marking of product

The products to be marked with:
- manufacturer name
- model name
- serial number

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE