



TYPE APPROVAL CERTIFICATE

Certificate No:
TAA00000Z4
Revision No:
2

This is to certify:

That the Gas Detector

with type designation(s)

**Type G16 Smoke Density Monitor, Type G26 Ambient Oil Mist Detector,
Type G16.1/G26.1 Opacity Transceiver, Type G16/G26 Ex Opacity Transceiver, Accessories***

Issued to

**Green Instruments A/S
Brønderslev, Nordjylland, Denmark**

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:

Type	Temperature	Humidity	Vibration	EMC	Enclosure
Type G16 Smoke Density Monitor	A	B	B	A	B / IP66
Type G26 Ambient Oil Mist Detector	A	B	A	A	B / IP66
Type G16.1/G26.1 Opacity Transceiver	A	B	B	A	B / IP66
Type G16/G26 Ex Opacity Transceiver	A	B	B	A	B / IP54
Accessories*	N/A**	N/A**	B	N/A**	N/A**

* Accessories to Opacity Transceiver include reflector and mounting bracket.

**N/A: Not applicable because they are non-electrical parts.

Issued at **Høvik** on **2022-03-07**

This Certificate is valid until **2027-01-16**.

DNV local station: **Denmark CMC**

Approval Engineer: **Frode Nygård**



for **DNV**

Digitally Signed By: Sneen, Ståle

Location: DNV Høvik, Norway

on behalf of

**Trond Sjøvåg
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.



Form code: TA 251

Revision: 2021-03

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Product description

Green Instruments' G16/G26 is an opacity monitor for monitoring of the clarity of air or gaseous media. The opacity monitor uses a green light beam based on the principle of light transmission. It is a double-pass system from which a light beam with specific spectral characteristics is projected across the media to be monitored. The amount of light reflected back to the instrument from the reflector after passing through the media is compared with the maximum possible return when light absorbing and scattering media are not present in the area. By calculating the difference between the emitted light and the received light specifications related to the light absorbing or scattering media can be obtained.

The Opacity Monitor can be used in two applications:

- Type G16 Smoke Density Monitor: Monitoring the opacity inside a process (e.g. the exhaust emission from the vessels, flue gas, air ducts, etc.)
- Type G26 Ambient Oil Mist Detector: Monitoring opacity in an open space (e.g. for detecting oil mist leakage in engine/pump room, dust in concentration from industrial processes, etc.)

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.

Product certificate

If specified in the Rules, ref. Pt.4 Ch.9 Sec.1, the control and monitoring system in which the above listed hardware is used shall be delivered with a product certificate. For each such delivery the certification test is to be performed at the manufacturer of the application system before the system is shipped to the yard. The test shall be done according to an approved test program. After certification the clause for software control will be put into force

Application/Limitation

The Ex Opacity Transceiver G16/G26 must be connected to a power supply certified EX [ia] or [ib] with a max. output voltage of 24 VDC. The I.S. Power supply shall be installed according to makers recommendation.

Ex installations to be approved in each case according to the Rules and Ex-Certification/ Special Condition for Safe Use listed in valid Ex-certificate issued by a notified/recognized Certification Body.

Ex-certification is not covered by this certificate and the following paragraph, which is for information only, is based on information received from the manufacturer, but not verified by DNV.

Information on Ex-Certification received from manufacturer – Not verified by DNV		
Equipment	Certified	Certificate No.
Ex Opacity Transceiver Type: G16/G26 with accessories	Ex ib op is IIB T4 Gb Ex ib op is IIIB T135°C Db	DTI 17ATEX0079X IECEx CNEX 21.0001X

Type Approval documentation

	Document:	Version:	Comment:
Manuals:	02892	1.9 / 2019-07	G26 Instruction Manual
	02891	2.3 / 2019-05	G16 Instruction Manual
	103520	2.0 / 2021-04	EX Opacity G26 system Instruction Manual
Drawings:	16-10853-03	2021-03-16	Transceiver House Assembly
	HB-10308-09	A / 2021-06-21	Opacity Transceiver Type G16.1/G26.1
	06772	F / 2021-03-29	EX Opacity Transceiver Type G16/G26
Test reports:	6P02723-1	2016-07-14	Type approval testing G16/G26 Opacity Monitor
	P21-0048	2021-05-12	Supplementary Test Report G16/G26
	P20-0201-1	1 / 2021-04-28	Vibration Test of Opacity Transceiver Type G16.1G26.1
	P20-0201-3	1 / 2021-04-28	Type approval testing Opacity Transceiver Type G16.1/G26.1
	P21-0036	1 / 2021-04-28	Vibration Test G26 accessories to EX Opacity Transceiver
	-	1.2 / 2016-12	Performance Test Report for G16-G26
	-	2016-12-14	Performance Test result table 1 and 2
	-	1.1 / 2021-06-17	Performance Test results G16.1/G26.1 & Ex G16/G26
-	1.1 / 2021-04-20	IP impact assessment for G16.1/G26.1	

Other docs: 1 / 2016-07-01 G16-G26_SW_Description
1.1 / 2016-06 Product type approval - Brief Description
1.0 / 2021-04 About the modification of product type approval

Type approval renewal assessment report, DNV Aalborg 2021-02-09.

Tests carried out

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

Performance tests according to ASTM D6216-20: Section 7.5 & A.1.3.3, section 7.7, section 7.8 & A1.3.5, section 7.11 & A.1.3.12, section 6.10, section 6.12

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings

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