

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Monitoring System**

with type designation(s)
T1000 Natural Gas Analyser

Issued to

Tunable AS
Oslo, Norway

is found to comply with

DNV GL 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 GL.

Location classes:

Temperature A
Humidity A
Vibration A
EMC B
Enclosure B (IP66)

Issued at **Høvik** on **2021-02-12**

This Certificate is valid until **2023-02-11**.

for **DNV GL**

DNV GL local station: **Oslo Maritime and CAP**

Approval Engineer: **Frode Nygård**

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Marta Alonso Pontes
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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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

The T1000 Natural Gas Analyser is designed for real-time gas analysis of natural gas composition in hazardous areas.

- Gas sample extraction,
- Gas sample handling,
- Gas sample analysis,
- Modbus interface to system for remote diagnostic,
- Ethernet port for service purpose,
- 24 VDC outputs for external valve control.

The standard system setup-up will include communication between the T1000 Gas Analyser and customer/application specific controller using Modbus (not covered by this type approval).

Place of manufacture

Tunable AS
Kabelgata 8,
0580 Oslo
Norway

Approval conditions

This Type Approval certificate covers hardware listed under Product description.

For installation of the subject system onboard DNV GL classed vessels, the following project specific documentation of the actual application shall be submitted for information (I) in each case:

- (I) Reference to this Type Approval certificate
- (I) Signal block diagram (shall indicate the physical location of the components listed under product description).
- (I) Power supply arrangement (may be part of the System block diagram)

The T1000 Natural Gas Analyser shall be installed, operated and calibrated in accordance with the requirements and intervals as specified in *Tunable T1000 Natural Gas Analyser Operating Manual*.

Correct configuration and set up for each delivery to be tested during commissioning after installation.

Application/Limitation

This Type Approval certificate does not cover the gas sample lines.

Ex-certification is not covered by this certificate. Application in hazardous area 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.

Type Approval documentation

Job Id: **262.1-034549-1**
Certificate No: **TAA00002Y9**

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, December 2019.

Test for Marine Type Approval of Natural Gas Analyser, document no. E20013.01, 15. January 2021.

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 at renewal of this certificate.

END OF CERTIFICATE