DNV·GL

Certificate No:
TAA00001K0

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Exhaust Gas ,easuring device

with type designation(s)
testo 350 MARITIME_V2, Sensors

Issued to
Testo SE & Co. KGaA
Testostraße 1
79853 Lenzkirch, Germany

is found to comply with
DNV GL rules for classification – Ships

Application :

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

Type	Temperature	Humidity	Vibration	EMC	Enclosure
testo 350 MARITIME_V2	**A**	**A**	**A**	**A**	**A**
Sensors	**B**	**B**	**B**	**A**	**B**

Issued at **Høvik** on **2018-01-23**
This Certificate is valid until **2023-01-22**.
DNV GL local station: **Augsburg**

Approval Engineer: **Marco Rinkel**

for **DNV GL**

Joannis Papanuskas
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.

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Job Id: **262.1-027763-1**
Certificate No: **TAA00001K0**

Product description

testo 350 MARITIME_V2 including sensors as listed below, the analyzing unit, the control unit, sample probe and protective case.

Mobile exhaust gas measuring device for NOx, CO, CO2, SO2 and O2.

Power Supply: 110…240V AC 50/60Hz
Sample pressure range: -300hPa … +50hPa
Ambient temperature: -5°C … +45°C

Component / Sensor Type / Measuring Range

- NO / TNFDi / 0-3000 vol.-ppm
- NO2 / TNDi / 0-500 vol.-ppm
- CO / TCHDi / 0-3000 vol.-ppm
- CO2 / TCO2 / 0-40 vol.-%
- O2 / TO2i / 0-25 vol.-%
- SO2 / TSFi / 100-3000 vol.-ppm

Software version:		
	Analyzing-Unit	1.18
	Control-Unit	1.18,
	MARITIME-Kernel	1.00

Application/Limitation

The measuring range is variable for each application, and is dependent on the test gas concentration selected.

The "testo 350-MARITIME_V2" is found to comply with the requirements of MARPOL Annex VI and the NOx Technical Code 2008, appendix 3, 4 and 8 and suitable as a component for chapter 6.3 and 6.4; "Simplified measurement method" and "Direct measurement and monitoring method.

The "testo 350-MARITIME_V2" is found to comply with the requirements of MARPOL Annex VI and the NOx Technical Code 2008, appendix 3, 4 and 8 and suitable as a component of a complete monitoring system. In order to completely fulfill the requirements of appendix 8 of MARPOL Annex VI and the NOx Technical Code 2008, "Implementing of the direct and measurement and monitoring method", additional equipment will have to be installed.

Equivalencies of the alternative sensors have been demonstrated under surveillance and to the satisfaction of GL in accordance with ISO 8178:2006 Part 1, Section 7 and Appendix D.

The "testo 350 MARITIME_V2" must be operated and calibrated in accordance with the requirements and intervals as specified in MARPOL Annex VI and NOx Technical Code 2008.

The "testo 350 MARITIME_V2" is not suitable for the measurement of SO2 exhaust gas concentrations equivalent to fuel sulfur concentractions below 0,5%.

CO, SO2, NO and NO2 testing

- Principle of detection (NOx Technical Code 2008 Appendix 3, 1.2): Equivalence tests have been carried out.
- Measurement precision (NOx Technical Code 2008 Appendix 3, 1.7)
- Noise (NOx Technical Code 2008 Appendix 3, 1.8)
- Zero- and span drift (NOx Technical Code 2008 Appendix 3, 1.9 and 1.10)
- Interference effects (NOx Technical Code 2008 Appendix 4, 9)
- Leakage test (NOx Technical Code 2008 Appendix 4, 4)
- Calibration curve (NOx Technical Code 2008 Appendix 4, 5.5)

CO2 and O2 testing
- Principle of detection (NOx Technical Code 2008 Appendix 3, 1.2)
- Measurement precision (NOx Technical Code 2008 Appendix 3, 1.7)
- Noise (NOx Technical Code 2008 Appendix 3, 1.8)
- Zero- and span drift (NOx Technical Code 2008 Appendix 3, 1.9 and 1.10)
- Leakage test (NOx Technical Code 2008 Appendix 4, 4)
- Calibration curve (NOx Technical Code 2008 Appendix 4, 5.5)

Type Approval documentation

Tests carried out
Applicable tests according to Class Guidelines DNVGL-CG-0339, November 2016.

Marking of product
Manufacturer: Testo SE & Co. KGaA
Model name: As listed under Product description
Serial number: Unique for each delievered item

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 typeapproved 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