



TYPE APPROVAL CERTIFICATE

Certificate No:
TAA00000S6
Revision No:
2

This is to certify:

That the Monitoring System

with type designation(s)
K-Gauge Tank Gauging System

Issued to
Kongsberg Maritime AS
Ranheim, 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	B
Humidity	B
Vibration	A
EMC	B
Enclosure	Required protection according to the Rules to be provided upon installation on board

Issued at **Høvik** on **2021-06-30**

This Certificate is valid until **2023-06-29**.

DNV local station: **Trondheim**

Approval Engineer: **Jens Erling Bråten**



for **DNV**
Digitally Signed By: **Lisbeth Iversland**
Location: **DNV Høvik, Norway**
on behalf of

Jan Tore Grimsrud
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

K-Gauge Kongsberg gauging systems for level, pressure and temperature, typically configured in system types as listed below:

K-Gauge CLS 600/700

Cargo Level System for monitoring of level, pressure and temperature on cargo tanks for oil, product and chemical cargo. Also included monitoring of level in ballast and service tanks when operated from the same system. Based on either K-Chief 600 or K-Chief 700 system and SW components.

K-Gauge HLA 600/700

High Level and Overfill system independent from the CLS system on oil, product and chemical tanks. Based on either K-Chief 600 or K-Chief 700 system and SW components.

K-Gauge GAS 600/700

Cargo Level System for monitoring of level, pressure and temperature on gas tankers. Also included monitoring of tank and pressure related to gas as fuel. Based on either K-Chief 600 or K-Chief 700 system and SW components.

K-Gauge CTS 600/700

Custody Transfer System for LNG tankers. Based on either K-Chief 600 or K-Chief 700 system and SW components.

K-Gauge TOPS 600/700

Radar based Tank Overfill Protection System for gas tankers. Based on either K-Chief 600 or K-Chief 700 system and SW components.

K-Gauge RSS

Remote Sounding System for ballast and service tanks. Including both electro and electro-pneumatic type. Based on either K-Chief 600 or K-Chief 700 system and SW components.

(*) This system alone is not required to be certified, see "Product Certificate" section below.

The hardware components used in the K-Gauge concept are based on either K-Chief 600 or K-Chief 700 technology, and covered by the following type approvals:

- The hardware for the microcomputer (RCU) and I/O modules is covered by TAA00000W5 (K-Chief 700) Type Approval certificate.
- The hardware for DPU series is covered by TAA0000018 (K-Chief 600) Type Approval certificate.
- The special components for K-Gauge are covered by TAA000010Z Type Approval Certificate.
- Level switch and Zener barriers utilized for HLA concept is covered by TAA000002E.

Software versions:

As listed in document "SW revision history for K-Gauge", issue O, dated 2020-10-08.

Application/Limitation

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.

The following documentation of the actual application is to be submitted for approval by system integrator in each case:

- Reference to this Type Approval Certificate
- Clear description of the scope of delivery (i.e. level gauging, pressure/temperature monitoring, high level alarm, overfill protection).
- System block diagram showing full topology/arrangement (note that independency of systems/functions of high level alarm and overfill protection must be documented in every case)
- Single line diagram for IS-circuits
- Drawing showing location of equipment
- Power supply arrangement (may be part of the System block diagram)
- List of control and monitored points
- Test program for certification test (FAT)

Product certificate

Each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The Certification of Application Functions is to be performed at the manufacturer of the application system before the system is shipped to the yard. After the certification the clause for application software control will be put into force.



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Application software control

All changes in software are to be recorded as long as the system is in use on board. Documentation of major changes is to be forwarded to DNV for evaluation and approval before implemented on board. Certification of modified functionality may be required for the particular vessel.

Place of manufacture

Skonnertvegen 1
7053 Ranheim,
NORWAY

Type Approval documentation

CD with manuals, datasheets, drawings, Ex certificates, test reports etc as described in document "TA- documentation for certificate application of K-Gauge", issue F, dated 2011-04-12.

"Test Report – Electromagnetic Compatibility" by Nemko. Order No.: 16562, Rev.2.0, issued 2008-05-14.

Updated manuals, datasheets and Ex certificates as described in email of 2013-03-22, correspondence No. 262.1-001437-J-24.

New documentation as submitted on 2013-12-17 described in "TA- documentation for extension to existing K-Gauge Type Approval from DnV Certificate number: A-13309 and A-13204".

"SW revision history for K-Gauge", issue K, dated 2015-02-16.

Revised data sheets for renewal of A-13759.

Additional documentation for renewal/update of A-14296, received 2016-05-12.

Additional documentation for renewal/update of TAA00000S6, received 2018-08-08.

K-Gauge CLS 600 Operator Manual, doc. No. 385541C, dated Nov. 2019.

K-Gauge GAS 600 Operator Manual, doc. No. 387761B, dated Nov. 2019.

SW revision history for K-Gauge", issue O, dated 2020-08-17.

K-Gauge CLS 700 Operator Manual, doc. No. 458335A, dated Jan. 2020.

K-Gauge GAS 700 Operator Manual, doc. No. 458319A, dated Nov.2020.

K-Gauge HLA High Level Alarm System (600) Operator Manual, doc. No. 448723A, dated Apr. 2019.

K-Gauge HLA 700 High Level and Overfill Alarm System, Operator Manual, doc. No. 422699A, dated Mar. 2017.

Type approval renewal assessment report, DNV GL Trondheim, dated 2021-03-04.

Tests carried out

Applicable tests according to Standard for Certification No. 2.4, April 2006.

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

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

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE