



CERTIFICATE NUMBER 19-1897005-PDA-DUP
EFFECTIVE DATE 22-April-2020
EXPIRATION DATE 26-September-2024
ABS TECHNICAL OFFICE CN Shanghai ESD

CERTIFICATE OF

Product Design Assessment

This is to certify that a representative of this Bureau did, at the request of

KONGSBERG MARITIME CHINA LTD.

located at

**No.6 Building, 555 ChuanQiao Road, JinQiao Export and Processing
Zone, PuDong District, Shanghai, China, 201206**

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product Cargo Tank Ullage Monitoring and Control System

Model K-Gauge

This Product Design Assessment (PDA) Certificate remains valid until 26 September 2024 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau of Shipping

Bin-Hong Wang, Director

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010)

KONGSBERG MARITIME CHINA LTD.

NO. 6 BUILDING, 555 CHUANQIAO ROAD,
JINQIAO EXPORT AND PROCESSING ZONE, PUDONG DISTRICT
SHANGHAI
China 201206

Telephone: +86 213279888

Fax: +86 2131279555

Email: kmcs.project@km.kongsberg.com

Web: www.kongsberg.com

Tier: 5 - Unit Certification Required

Product: Cargo Tank Ullage Monitoring and Control System

Model: K-Gauge

Intended Service:

ABS Classed Vessels and Offshore Facilities in accordance with the listed ABS Rules and International standards.

Description:

Cargo tank gauging, level measurement and custody transfer systems used on ABS classed oil & chemical tankers, LNG & LPG carriers with AMS, ACC, ABCU, ACCU Notations and offshore installations.

Microprocessor based cargo level (CLS) monitoring and custody transfer systems (CTS) with RCU 500/501/502/510 microprocessor units for signal processing and transmission to remote operator stations with 400 and 420 series RIO modules.

The GLA-100/5 and GLA-310/5 radar /Antenna units are 10 GHz radar tank gauging system that connect to GLK-100/300 signal conditioned units whilst temperature and pressure sensors connect to AL-100 repeaters via Ex-LON Node units or connect to GC-306 temperature converters or DZ-110/U, DZ-120 transmitter barriers.

Signal transmission is completed by LON network at the signal conditioner / repeater units or via HART communication and GLK-300 to the RCU microcomputers.

The Workstation consisting of the CPU unit for the PC and the monitor/screen will be supplied separately and are to be ABS approved items. The workstations are using AIM presentation program for both CLS and CTS with 3 alternative monitors for display purpose, normally 15", 17" and 21" screens. Redundant processor units are being implemented for custody transfer applications. The RCU processing unit includes dual Ethernet connections allowing full integration of the gauging system and connection to remote operator consoles such as the KM 5 console. Both level gauging and tank overfill protection signals fulfil the primarily and secondary requirements of the CTS for LNG/LPG carriers applications.

Rating:

Power supplies: 18 - 35 V DC

Service Restriction:

1. Unit Certification is required for this product. Each application and configuration is to be specifically approved.
2. ATEX certified equipment is not to be installed in hazardous areas on U.S. Flagged Vessels, unless it can be proven to have been tested to the IEC 60079 series standards by an independent laboratory accepted by the U.S. Coast Guard. USCG MI Notice 01-12 (February 7, 2012).

Comments:

1. The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
2. The AL100 Ex-LON Node unit and the GC-306 are applicable to sensors in hazardous areas. For all other products to be installed in hazardous area, valid EX-certificates are to be provided for each installation.
3. This assessment is valid to hardware only.
4. K-Gauge is assigned Category II as defined at 4-9-3/7.1 of the 2019 Steel Vessels and Marine Vessels Rules. Accordingly, documentation is to be maintained and made available to ABS on request and witness testing by an ABS Surveyor is to be carried out as detailed in 4-9-3/Table 2 of the 2019 Steel Vessels and Marine Vessels Rules.

Notes/Drawing/Documentation:

Drawing No. RMP420 Remote Multipurpose Input/Output 312743, Revision: B, Pages: 2;

Drawing No. GC-306 Cargo Temperature Unit 371645, Revision: C, Pages: 2;

Drawing No. GLA-310/5 Radar Tank Gauge for Gas Carriers 383758, Revision: C, Pages: 2;

Drawing No. GC-300 Cargo Temperature Unit P-GC300/CE, Revision: J, Pages: 2;

Drawing No. GLA-310/5-FUEL Radar Tank Gauge for LNG Fuel Tank 394663, Revision: B, Pages: 2;

Drawing No. GLA-310/5-NH3 Radar Tank Gauge for Liquefied Ammonia(NH3) 411509, Revision: A, Pages: 2;

Drawing No. GLA-310/5 DUAL Radar Tank Gauge for Gas Carriers 442205, Revision: A, Pages: 2;

Drawing No. SW revision history for K-Gauge 386311, Revision: N, Pages: 12;

KONGSBERG MARITIME CHINA LTD.

NO. 6 BUILDING, 555 CHUANQIAO ROAD,
JINQIAO EXPORT AND PROCESSING ZONE, PUDONG DISTRICT
SHANGHAI
China 201206

Telephone: +86 213279888

Fax: +86 2131279555

Email: kmcs.project@km.kongsberg.com

Web: www.kongsberg.com

Tier: 5 - Unit Certification Required

Test Reports:

E16236.00 NEMKO Shock Test Report dated 14 Nov 2016;
E17118.00 NEMKO Environment Test Report dated 22 Sep 2017;
443392 GLA-310/5 DUAL Kongsberg Vibration Statement dated 25 Oct 2018;
443414 GLA-310/5 DUAL Kongsberg Vibration Test dated 23 Nov 2018;
E13227.00 NEMKO Vibration Test dated 02 Oct 2013;
E15308.02 NEMKO Environment Test Report dated 25 July 2016.

Safety Certificates:

GLA-310: IECEX SIR 14.0025X - Ex ia IIC T4 Ta: -45C to 85 degree C(-45C to 80 degree C when fitted with GLH-320) and SIRA 14 ATEX 2056X - Ex II 1 G Ex ia IIC T4 Ta: -45C to 85 degree C(-45C to 80 degree C when fitted with GLH-320);
DZ-110/U: IECEX PRE 14.0005 - [Ex ia Ga] IIC Ta: -20C to 70 degree C and Presafe 14 ATEX 4368 - Ex II 1 G [Ex ia Ga] IIC Ta: -20C to 70 degree C;
DZ-120: IECEX PRE 16.0020 - [Ex ia Ga] IIC Ta: -20C to 70 degree C and Presafe 16 ATEX 7965 - Ex II 1 G [Ex ia Ga] IIC Ta: -20C to 70 degree C.

Terms of Validity:

This Product Design Assessment (PDA) Certificate remains valid until 26/Sep/2024 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

STANDARDS

ABS Rules:

Rules for Conditions of Classification, Part 1 - 2019: 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:
Rules for Building and Classing Marine Vessels (2019): 4-9-9/13
Rules for Building and Classing Steel Vessels (2019): 4-9-8/13
Rules for Building and Classing Steel Vessels Under 90 Meters (295 feet) in Length (2019): 4-7-1/5.39
Rules for Building and Classing Offshore Support Vessels (2019): 4-9-8/13

Rules for Conditions of Classification, Part 1 - 2019 Offshore Units and Structures 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:

Rules for Building and Classing Mobile Offshore Units (2019): 4-2-3/3, 4-3-1/15, 4-3-1/17
Rules for Building and Classing Mobile Offshore Drilling Units (2019): 4-2-3/3, 4-3-1/15, 4-3-1/17
Rules for Facilities on Offshore Installations (2019)

National:

NA

International:

IACS UR E10 (2014)
IEC 60079-0: 2011
IEC 60079-11: 2011

KONGSBERG MARITIME CHINA LTD.

NO. 6 BUILDING, 555 CHUANQIAO ROAD,
JINQIAO EXPORT AND PROCESSING ZONE, PUDONG DISTRICT
SHANGHAI

China 201206

Telephone: +86 213279888

Fax: +86 2131279555

Email: kmcs.project@km.kongsberg.com

Web: www.kongsberg.com

Tier: 5 - Unit Certification Required

IEC 60079-26: 2006

Government:

NA

EUMED:

NA

OTHERS:

NA