Certificate No:
TAA0000329

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Fixed Gas Detection And Sampling System

with type designation(s)
RKMC-2021GDS

Issued to
RIKEN MARINE CHINA Co., Ltd
Nanjing, Jiangsu, China

is found to comply with
DNV rules for classification – Ships

Application :

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

Temperature	**A**
Humidity	**B**
Vibration	**A**
EMC	**A**
Enclosure	**B**

Issued at **Hamburg** on **2021-12-08**
This Certificate is valid until **2026-12-07**.
DNV local station: **Nanjing NB & CMC**

Approval Engineer: **Didier Girardin**

for **DNV**

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.

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.

Product description

RKMC-2021GDS is a detection system alarming gas leakage through the individual detector or sequential sampling system.
Air sample are controlled by magnetic valves and for warded in sequences to the gas sensors inside the panel allowing Automatic scanning time of 30 minutes /1 cycle. Protective shut down of sampling operation in case of gas leakage inside the panel exceeding 30%LEL. HMI by touch screen operation device.

Sequential sampling type gas detection system indicating and alarming gas concentration Measuring Combustible Gas (HC), Toxic gases (H2S、CO), Oxygen (02),
Measuring points: 30 Points
Sampling type: continuous
Automatic Scanning time: 30 minutes /1 cycle
Detecting range: 0-100%LEL（Combustible Gas）/ 0-25%VOL(O2)/0-30PPM(H2S)/0-150PPM(CO)(Accuracy: Within ±5% of full scale),
Gas alarm pre-set level: 1st -10%LEL, 2nd -30%LEL (Combustible Gas) /1st -19%VOL, 2nd -17%VOL(O2)/1st -5PPM, 2nd -10PPM(H2S) 1st -25PPM, 2nd -50PPM(CO)

Components Name	**Description**
O2 gas detector	SD-1OX
H2S/CO gas detector	SD-1EC
Combustible gas detector	SD-1RI/SD-1GP (with duct kit)
Sample gas pump	N86-KTE/N828-KNE
Logic controller with I/O	SEP-A100
Solenoid valve(2-way)	3V1
Solenoid valve(3-way)	3V2
Flow switch	SN31C
Water filter	GAF300-08/GPF300-08
Relay	G2R-2-SND/MY4N-GS
Touch screen	F010
Repeater	F007
Beacon	TGBBJ
Switch	S202 C10
AC/DC POWER	WDR-120-24

Note:
Gas analyzing functionalities not covered by present certificate

Manufacturing place

Building 23, Kecheng Science South Park,
No.19 Lanhua Road, Pukou,
Nanjing, China

Application/Limitation

The Type Approval covers hardware listed under Product description, not including gas analyzing functionalities for specific gazes

Present certificate is only valid for the complete system as described by the bill of material listed under product description together with tested housing (according test report 21BAX3103Y14-00418-4I/1)

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

- Ref. to this type approval certificate
- Ref. to valid Sensor type approval certificate(s): MED certificate or DNV type approvals certificate(s) covering specific gas to be detected (see combustible, toxic gases, or oxygen). Please consider MED requirements in case of EU flag vessels according valid implementation directive.
- System block diagram
- Power supply arrangement (may be part of the System block diagram)
- Arrangement drawings including sampling piping, location sampling points, detectors, call points and alarm devices.
- Functional description
- Test program for certification

Product certificate
Each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The certification test 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.

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.

Ex-certification is not covered by this certificate. Application in hazardous area to be approved in each case according to Ex-Certification/ Special Condition for Safe Use listed in valid Ex-certificate issued by a notified/recognized Certification Body.

Type Approval documentation

RKMC-2021GDS-A01	System description& Application examples
RKMC-2021GDS-M01	Installation and repair manual
RKMC-2021GDS-M02	Touch screen operation manual
RKMC-2021GDS-M03	Detector operation manual
RKMC-2021GDS-P01	Performance test procedure
RKMC-2021GDS-P02	Environment test Procedure
21BAX3103Y14-00418-4I-2	Test report of environment test
RKMC-2021GDS-P01 (06.12.2021)	Performance test

Tests carried out
Applicable tests according to DNV GL CG-0339, August 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 after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE