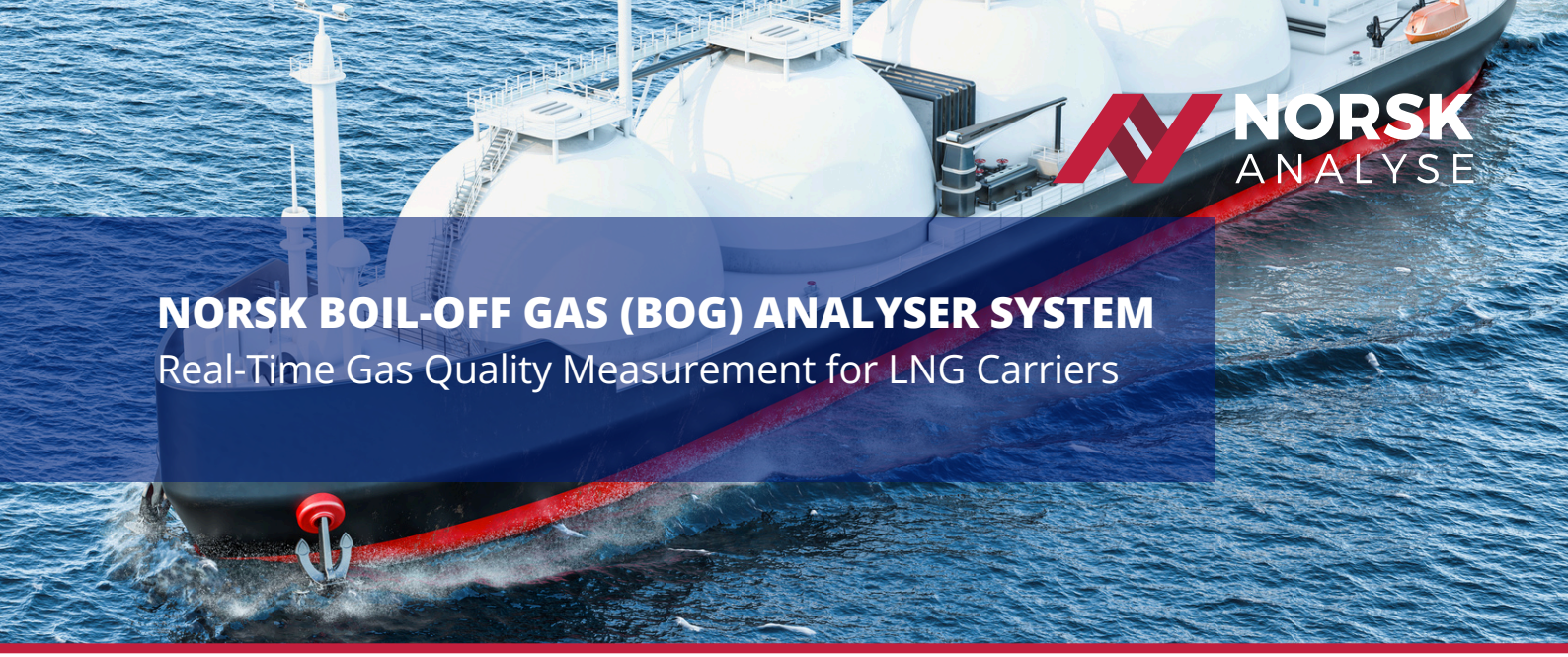

NORSK BOIL-OFF GAS (BOG) ANALYSER SYSTEM

Real-Time Gas Quality Measurement for LNG Carriers

Product Overview
The NORSK Boil-Off Gas Analyser System provides continuous, real-time measurement of gas composition onboard LNG carriers.

Based on Infrared Spectroscopy, the system measures key gas components and calculates Heating Value, Methane Number and Wobbe Index.

The analyser is designed for integration with LNG fuel gas systems and vessel automation systems, supporting fuel optimisation, engine performance, cargo management and operational reporting.

Applications
- Boil-off gas monitoring
- Fuel gas quality measurement
- Engine optimisation
- Cargo management

Measured Components
- Hydrocarbons C1–C5
- CO_2 – Carbon dioxide

Calculated Parameters
- HHV / LHV
- Wobbe Index
- Methane Number

Analyser performance:

Values	Range	Accuracy
Methane	0-100%	0.5% Vol
Ethane	0-20%	0.5% Vol
Propane	0-20%	0.5% Vol
Iso-Butane	0-5%	0.2% Vol
N-Butane	0-5%	0.2% Vol
C5 total	0-2%	0.2% Vol
CO2	0-10%	1.0% Vol
Nitrogen	0-100%	Balance

Calorific Value (GCV) (ISO 6976:2016)
Methane Number (MN) (ISO 22302:2014)

Key Benefits
- Real-time analysis of C1–C5 hydrocarbons and CO_2
- Calculation of HHV, LHV, Methane Number and Wobbe Index
- Fast response within seconds
- No carrier gas required
- Reduced maintenance and consumable requirements
- Compact design for marine installations

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Measurement Principle

The analyser uses Infrared Spectroscopy to detect and measure selected components in the gas stream.

The laser is tuned to specific gas absorption wavelengths, enabling direct optical measurement with minimal interference from other gas components. This provides fast, selective and stable real-time analysis.

Typical System Configuration

- Sample probe installed in the cargo or fuel gas line
- Heated sample line
- Sample conditioning unit
- Tunable gas analyser module
- Control system with PLC and HMI
- Interface to the ship automation system

Technical Specifications

Measurement Technology Infrared Spectroscopy

Response Time <10 seconds, typical

Accuracy ±1–2% of reading, typical

Repeatability ±1% FS, typical

Operating Temperature –50°C to +45°C

Hazardous-Area Rating ATEX Zone 1

Enclosure Rating IP66

Output Signals Modbus TCP/IP and RS485

Power Supply 24 VDC or 230 VAC

Integration and Data Handling

- Seamless integration with ship IAS and DCS systems
- Real-time data display and logging
- Support for digital reporting and performance analytics
- Optional cloud-enabled data transfer
- Remote diagnostics and service support

Installation

- Modular, compact system design
- Suitable for newbuild and retrofit installations
- Minimal installation footprint
- Configurable for vessel and hazardous-area requirements
- Designed for marine classification requirements

Optional Features

- Redundant analyser configuration
- Multi-stream sampling
- Integrated fuel flow measurement
- Data historian and cloud connectivity
- Remote diagnostics and service
- Customised communication interfaces

Operational Advantages

- Real-time fuel gas optimisation
- Improved engine efficiency
- Optimised cargo utilisation
- Reduced fuel consumption
- Lower maintenance and lifecycle costs
- Improved reporting and documentation

Why Infrared Spectroscopy?

Compared with conventional gas chromatography, Infrared Spectroscopy provides:

- Faster response time
- No carrier gas required
- Reduced consumable requirements
- Lower maintenance needs
- High availability in marine environments

Specifications are subject to change without notice.