

Gas Carrier Service

**ClassNK**

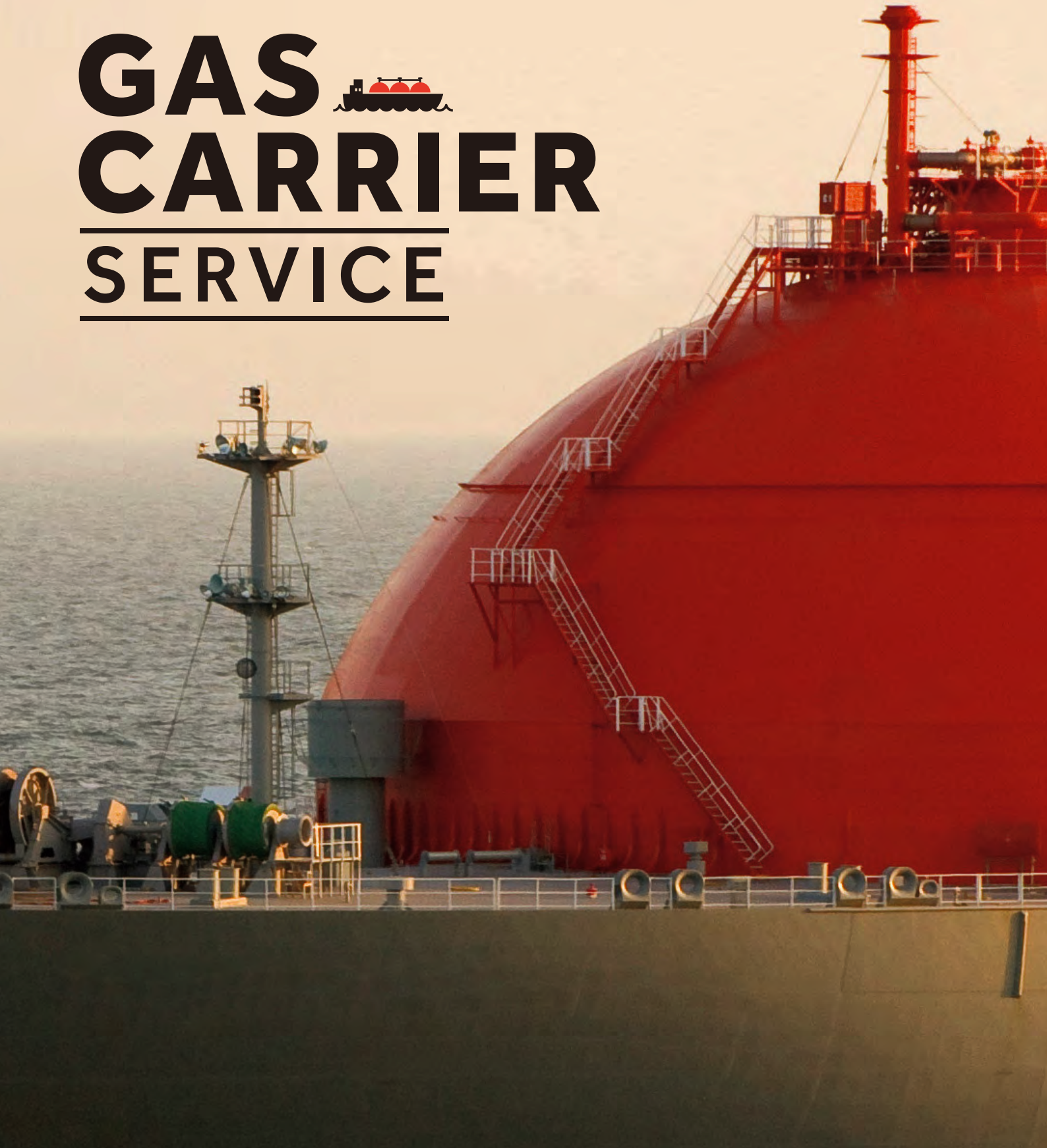
[English]

**GAS**   
**CARRIER**  

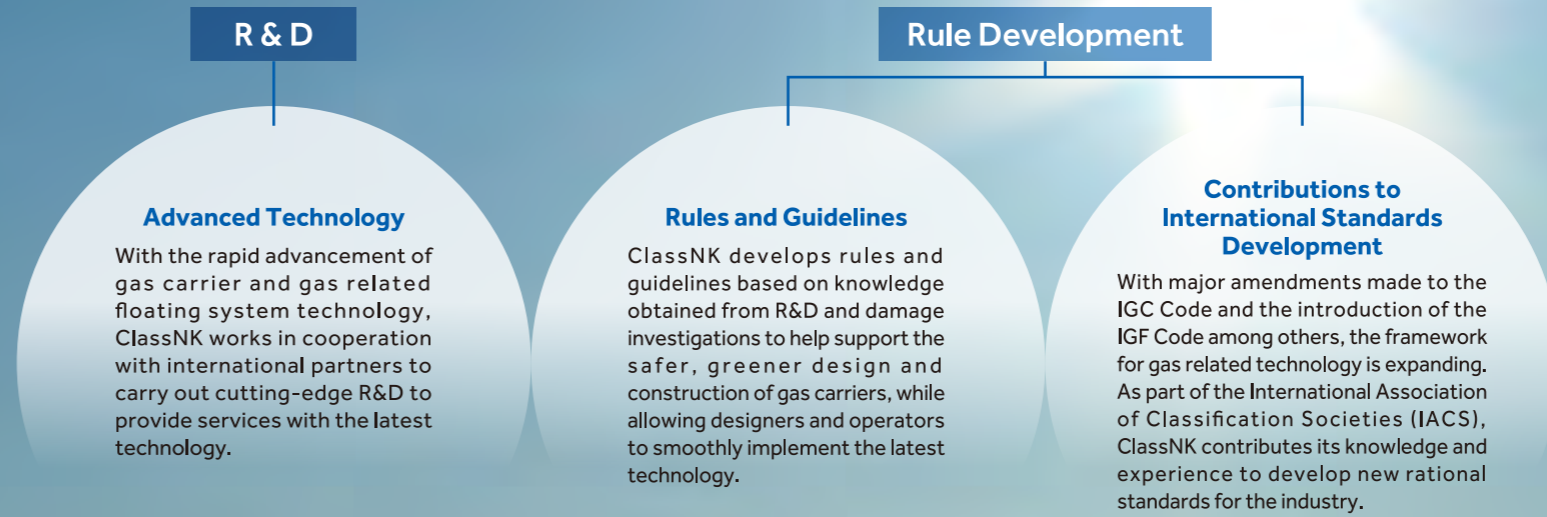
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**SERVICE**

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# Technology and Rule Development



# Services for Individual Projects



**Class & Statutory**  
(Regulatory)

### AIP/General Approval

When applying new technologies, the concept and basic design may require third party approval at the request of stakeholders. To fulfil these needs, ClassNK offers design approval services such as Approval In Principle and General Approval to support the realization of new projects.

### Plan Approval

Designs for gas carriers employ the latest and most specialized technologies. ClassNK experts use knowledge based on their rich experience in plan approval together with hands on survey experience at shipyards to provide quick and accurate plan approval services.

### On-site Surveys

Expert knowledge of gas carrier designs is essential for carrying out site surveys for gas carriers. ClassNK's newbuilding surveyors with a wealth of plan approval experience are at the field.

ClassNK gas experts are stationed at exclusive survey offices strategically located along the main gas routes to enable smooth operations after a ship enters into service.

**ClassNK**

**Third Party Technical Services**

Planning

Design

Construction

Operation

### Risk Assessment and Engineering Analysis

Depending on factors such as specifications provided by a third party and various other experience, ClassNK offers a diverse range of services necessary for each project. from the ordering party, gas carrier designs systems may be subject to risk assessment engineering analyses. Based on a wealth of

### CAP/Residual Life Assessment

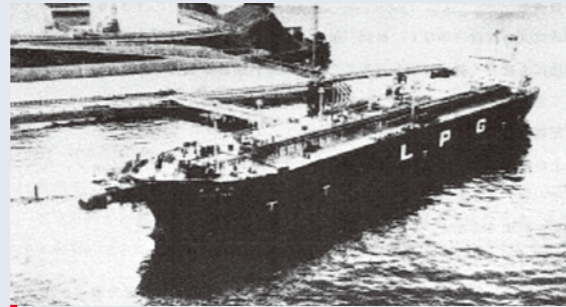
In some cases, gas carriers will stay in service beyond the assumed lifespan that was planned at the time of construction. ClassNK provides Condition Assessment Program and longevity or residual life study (TLA) services to meet the needs of each project.

# A Gas Carrier Milestone



1961  
World's First Type A LPG Vessel  
**Goshu Maru**

1969  
World's First Semi-membrane Type LPG Vessel  
**Bridgestone Maru No.5**



1980  
World's First Type B LPG Vessel  
**Genkai Maru**

1981  
World's First Semi-membrane Type LEG Vessel  
**Shokaku Maru No.2**



1983  
ClassNK's First MOSS LNG Vessel  
**Bishu Maru, Banshu Maru, Echigo Maru**



1988  
World's First Type B LEG Vessel  
**Kayo Maru**



1993  
World's First Technigaz Mark III Membrane LNG Vessel  
**Aman Bintulu**



2003  
ClassNK's First Small Scale Type C LNG Vessel  
**Shinju Maru**



2012  
ClassNK's First Sayaendo Type MOSS LNG Vessel  
**LNG Venus**



2015  
ClassNK's First SPB LNG Vessel (Under Construction)

1950

1960

1970

1980

1990

2000

2010



## Worldwide

1958  
World's First Successful transport of LNG by Oceaongoing Vessel  
**Methane Pioneer (Independent Prismatic Tank)**

1964  
World's First Membrane LNG Vessel  
**Pythagore**

1965  
World's First Cylindrical Tank LNG Merchant Vessel  
**Jules Verne**

1973  
World's First MOSS LNG Vessel  
**NORMAN LADY**

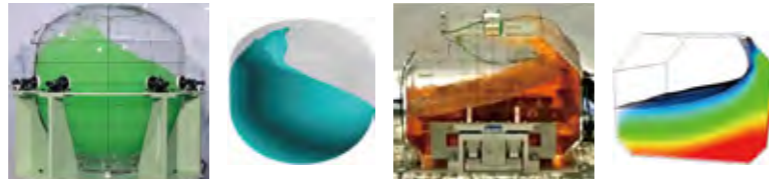
1993  
World's First SPB LNG Vessel  
**Polar Eagle**

2016  
GTT Membrane New System  
**Mark V / NO 96 Max**

# R&D for Cutting-edge Solutions

## Safety Assessment for New LNG Tank Designs

With LNG trade and transportation patterns changing, the need for partial filling of LNG tanks has expanded. LNG cargo tank technology is constantly advancing in an effort to achieve ever greater transport efficiency and capabilities. Safety assessments for sloshing effects are crucial in such cases. ClassNK carries out a wide range of safety assessment study for sloshing and other loads related to cargo containment system of LNG carriers.



## CO<sub>2</sub> Shuttle Vessel

ClassNK carries out investigations into the implementation of CO<sub>2</sub> Capture and Storage (CCS) using vessels.



## LNG Carrier and Bunkering Vessel

With the growing number of LNG fueled vessels on the horizon, ClassNK is supporting the development of the related technologies, including the provision of Approval in Principle for a Small Scale LNG carrier/bunkering ship design developed by the Cooperative Association of Japan Shipbuilders and other companies.

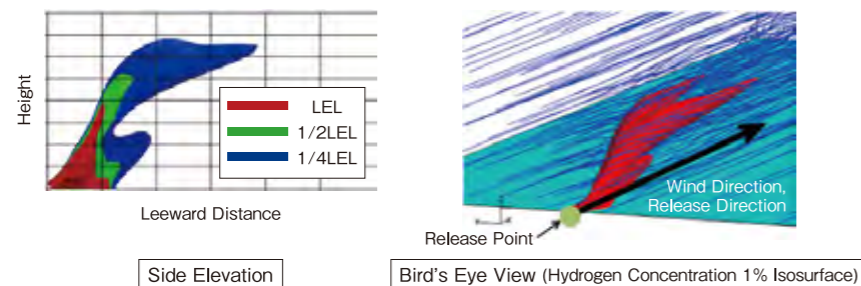


## Analysis and Risk Assessment Services for LH<sub>2</sub> Carriers

As the world turns towards clean energy, the use of hydrogen has the potential to realize a low carbon society. ClassNK has been involved in the development of LH<sub>2</sub> carrier since its early research stage, providing risk and safety assessments for the transport of cryogenic liquid hydrogen. As one of its outcomes, ClassNK published the world's first guidelines for the LH<sub>2</sub> carriers.



【 LH<sub>2</sub> at Sea Disposal Analysis Results 】



# Rule and Guideline Development for New Technologies

## Rules and Guidance for the Survey and Construction of Steel Ships Part N: Liquefied Gas Carriers



ClassNK established class and installation related requirements for liquefied gas carriers based on the International Code for Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code). The requirements include those from the IGC Code as well as their interpretations.

## Guidelines for Liquefied Gas Carrier Hull Structures - Independent Spherical Tanks of Type B -



These guidelines were developed for hull structure strength evaluations of liquefied gas carriers designed with independent spherical tank type B such as Moss tank systems, which include the latest expertise from the IACS Common Structural Rules.

## Guidelines for Compressed Natural Gas Carriers



While the IGC Code plays a central regulatory role for LNG carriers, there are currently no international standards for the carriage of CNG. These guidelines are specific to CNG, taking into account the unique hazards of carriage of CNG associated with handling high pressure gas to provide requirements for the safe design and construction of equipment and systems.

## Guidelines for Floating Offshore Facilities for LNG/LPG Production, Storage, and Offloading (Fourth Edition)



Since the release of the first edition in 2011, ClassNK has regularly updated the guidelines for FLNG/FLPG, FSU and FRSU technical requirements in line with the advancement of technology and the introduction of new rule amendments. These guidelines also contain requirements for the conversion of older LNG vessels, LPG vessels into FSU and FRSU.

## Risk Assessment Guidelines



These guidelines give a general overview of risk assessment procedures, which can also be applied in the verification of various technical elements of liquefied gas carriers through risk assessment techniques.

## Guidelines for Liquefied Hydrogen Carriers



In realizing the long anticipated hydrogen powered society, the establishment of safe and stable bulk transportation infrastructure of hydrogen is essential. Liquefied hydrogen carrier is considered one of the most prospective elements of this infrastructure. ClassNK developed guidelines to ensure the safety of liquefied hydrogen carriers based on the interim recommendations developed by IMO as well as requirements from other major recognized standards used in the design of hydrogen facilities onshore.

## Guidelines for Gas Fueled Ships (Ver. 4)



These guidelines contain safety regulations for the construction of LNG fuelled vessels. Based on IGF Code regulations developed by the IMO to safeguard gas fueled vessels, these guidelines have been regularly updated since their first publication in 2009.

