LNG TRANSPORTATION
MAXIMIZE SAFETY AND EFFICIENCY

Move Forward with Confidence
Global demand for gas is increasing, resulting in strong growth in the LNG transportation industry. Bureau Veritas helps you rise to the challenge while ensuring safety at sea.

Our mission is to promote safety at sea. As such, our footprint can be found throughout the LNG chain. We serve all industry sectors, offer both classification and advisory services. We work closely with the International Maritime Organization and with flag authorities to implement their regulations. The result is unparalleled knowledge and experience of the LNG industry, which we share with our clients. Every day, we put our technical expertise, advanced software and in-depth knowledge of maritime regulations at the service of clients around the world.

Why Choose Bureau Veritas?

✓ Protect your ship, your crew and the environment
✓ One of the oldest classification societies (established 1828)
✓ The Bureau Veritas brand: a mark of reassurance for your clients
✓ Industry-leading research, knowledge and technical expertise
✓ In-depth knowledge of regulations
✓ Extensive global network

1962 Classification of the “Beauvais”, the first experimental LNG carrier in France.
1972 The first membrane LNG carrier is built to Bureau Veritas class. At 125,000 m³, the “Ben Franklin” is also the largest LNG carrier to date.
1965 - 1971 Bureau Veritas establishes a solid reputation in the classification of LNG carriers, including the “Jules Verne” (25,000m³), the “Descartes” (50,000m³), and the “Hassi R’Mel” (40,000m³).
1995 Classification of the first membrane LNG carrier built in Korea, “Hanjin Pyeong Taek”.
2005 Classification of the first LNG re-gasification vessel. The “Excellence” is now one of eight LNG-RV vessels classified by Bureau Veritas.
2006 Classification of the first ever DFDE LNG carrier “GDF Suez Global Energy”.
2009 The innovative multipurpose LNG/LPG/ethylene carrier, the “Coral Methane”, is built to Bureau Veritas class.
2012 Order by Exmar of the first FLNG at Chinese Wison with Bureau Veritas class, to be delivered in 2015.

Global appetite for clean energy has almost tripled demand for LNG since the beginning of the century*, resulting in rapid industry transformation. New gas fields and terminals are being developed, often in harsh or remote locations; small-scale LNG is seen increasingly as a solution to supply clean energy to islands or other isolated territories; and use of offshore LNG is expanding.

What does this mean in practice? More vessels, but also more complex requirements in terms of safety and performance.

Global LNG Transportation

Maximizing Safety and Efficiency

Helping the Global LNG Transportation Industry Move Forward with Confidence

Long-term Partner to the Global LNG Transportation Industry

In this context of rapid change, Bureau Veritas is a reassuring presence. We have been involved in every major innovation in LNG transportation since the industry’s birth in the early 1960s. From the introduction of membrane type containment systems in the late 1960s, to the development of re-gasification vessels and multipurpose gas carriers in the last decade, Bureau Veritas has been present every step of the way.

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*Source: Ernst & Young.

50 Years of Innovation

Bureau Veritas has pioneered safety and innovation in LNG transportation since the industry’s birth in the early 1960s.
CLASSIFICATION: MORE THAN JUST A LICENSE TO OPERATE

We were the first classification society to publish specific rules for LNG carriers, back in 1962. Since then, our rules have been continually reviewed and updated to reflect the strict demands of the LNG industry.

A ONE-STOP SHOP FOR CLASSIFICATION AND STATUTORY CERTIFICATES

Classification in a critical industry such as LNG has long been about more than simple compliance. It provides ship owners and charterers with confidence that their asset is seaworthy, and that their cargo will reach its destination safely.

Bureau Veritas, a leading classification society for LNG vessels since the industry’s inception, puts its experience, know-how and advanced software at the service of the industry. Our rules have dedicated sections covering gas carriers, and we provide detailed rules and guidance notes covering specific issues.

We also issue statutory certificates on behalf of flag administrations charged with applying international rules relating to safety and environmental protection. Some of these relate specifically to LNG carriers.

Our significant investment in research and development, and our participation in developing international rules, notably the IGC code to be adopted in 2014, means we lead rather than respond to innovations in the industry.

CLASSIFICATION NOTATIONS AND STATUTORY CERTIFICATES ISSUED TO LNG CARRIERS BY BUREAU VERITAS

Visit the Bureau Veritas client portal www.veristar.com for a full list and detail of classification notations and statutory certificates.

LNG CONTAINMENT AND PROPULSION: INNOVATION, AND DEEP INDUSTRY INVOLVEMENT

Bureau Veritas has been instrumental in the development of today’s LNG containment systems, from concept to shipboard application and safe transfer of technology. We have approved all the major containment systems available today, and continue to work closely with designers and engineering organizations to further develop and adapt systems for the needs of the future.

We have also been at the forefront of developments in LNG propulsion. The industry is moving away from traditional steam turbines, seeking greater efficiency in the form of solutions such as dual fuel diesel electric propulsion.

We are working closely with engine manufacturers and shipyards in the development of these alternative solutions, which also include slow speed dual fuel engines with re-liquefaction capability. The first three LNG ships in the world to be ordered with dual fuel diesel electric propulsion system were built to Bureau Veritas class.

As developments in LNG propulsion continue, driven by the need for ever-greater efficiency and changes in trading patterns and areas of operation for LNG carriers, Bureau Veritas will continue to play a key role in shaping future solutions.

CLASSIFICATION NOTATIONS

Some of the classification notations commonly used for new-build LNG carriers:

- HHULL, #MACH, #VeriSTAR HULL DFL40, #AUT – UMS, AUT – PORT,
- SYS – NEO, INWATERSURVEY, CPS(WBT), MON-SHAFT, GREEN PASSPORT,
- CLEANSHIP, SWT / BWE, LI, EFP-AMC, ALP, ERS.

Some of the common statutory certificates relating to LNG carriers:

- International Certificate of Fitness for the Carriage of Liquid Gases in Bulk.
- International Load Line Certificate.
- International Tonnage Certificate.
- SOLAS Certificates.
- MARPOL Certificates.
Advisory Services

Whether classed or not with Bureau Veritas, you can benefit from our wide range of industry-leading services, or those of our subsidiary Tecnitas. Headquartered in Paris, Tecnitas answers your needs by providing independent consulting services at global level.

Assessment of structure and fatigue analysis
Evaluate and Prove your Hull Strength

The large size of LNG carriers makes structural elements subject to stress. This might lead to fatigue, which can cause cracks in structural elements and decrease in hull strength. We use the detailed 3D Finite Element Model and our specialist VeriSTAR Hull software to evaluate a ship’s structure.

Sloshing assessment
Safeguard Against Containment System Damages

The rise in development of very large LNG carriers has resulted in bigger cargo tanks. Offshore cargo transfer operations are also becoming more common with partially filled cargo tanks. As a result, reliable sloshing assessment methods are growing in importance. We use Computerized Fluid Dynamics calculations to accurately assess liquid motions within the tank based on your ship’s movements. We then make appropriate recommendations on reinforcement of the tank or its surrounding steel structure. Our research department also contributes to innovation in the field via model tests and Joint Industrial Projects.

Energy efficiency services
Control Operational Costs and Ensure Compliance with Regulations

The International Maritime Organization is pushing the industry to reduce CO2 emissions; at the same time, ship owners need to manage operating costs. Bureau Veritas can assess all documentation relating to energy calculations and management, and provide the necessary advice. Our software tool, SEE CAT, models your ship, captures energy flows and usage, predicts emissions and allows you to predict the effectiveness of different fuel use mitigation measures. We have recently entered into a co-operation agreement with Hyd’Oscar, enabling our clients to benefit from the hydrodynamic specialists Computational Fluid Dynamics services.

Vibration and shaft alignment analysis
Improve Safety and Comfort

Incorrect shaft alignment can result in bearing failure or loss of propulsion, with possible catastrophic human and environmental consequences. Shipboard vibration and noise can also affect the safety, functionality and comfort of ships. Bureau Veritas’ specialist software helps you increase safety by identifying the cause of the problem, analyzing the most suitable repair method and procedure and providing a permanent solution.

Emergency Response Services
Be Prepared for an Unexpected Situation

At sea, an emergency situation can strike at any time, with high risk of loss of life, and damage to your ship and the environment. The first few hours following an incident are critical. Bureau Veritas’ Emergency Response Service, available within 2 hours for vessels enrolled in the service, provides technical assistance 365 days per year. It brings owners and operators confidence that, in the case of an accident at sea, they can rely on a fast response and precise advice from an experienced team.

Risk assessment & RAM* studies
Avoid Exposure, Improve Efficiency

The potential for pollution or explosions makes LNG is a high-risk industry. Not only that, but the cargo is extremely valuable. We help you maximize dependability and minimize the risks associated with transportation, through risk-based assessments.

Condition Assessment Program (CAP) and Life Extension Programs
Demonstrate Seaworthiness

Industry players, from oil majors to charterers, rely on Bureau Veritas’ condition assessment surveys, specially developed for LNG carriers. To date, we have successfully completed over 50 LNG Carrier CAP surveys. Life extension studies, meanwhile, focus on assessing and improving both short term and medium term maintenance regimes. Their aim is to help you sustain safe and cost-effective operation of your vessel up to the end of its planned life.

Qualification of transfer and offloading systems
Reduce Risk, Improve Safety

We offer assessments of innovative transfer and offloading systems: for example STS transfer systems between LNG carriers. The service is designed to prevent LNG leaks, spillage and venting of natural gas during non-conventional transfer operations.
SERVICES SUITED TO ALL TYPES OF VESSEL AND CLIMATE

Different types of LNG carrier bring different challenges. Bureau Veritas offers the experience and expertise for all your certification and classification requirements.

SMALL-SCALE LNG

Small-scale LNG carriers (typically with less than 30,000 m³ cargo capacity), have become more widespread in recent years. Popular in Europe, they are seen as solution to provide natural gas to regions dominated by islands not connected to continental gas networks, such as Indonesia or the Caribbean.

Certification of small-scale LNG carriers is very similar to that offered for a standard (150,000 to 180,000 m³) LNG carrier. However, containment systems are usually pressurized type C tanks built with materials suited to withstand temperatures up to -163 Celsius and with adequate insulation to prevent rapid boil off gas formation. Project assessment focuses on the cargo containment system with cylindrical or bi-lobular tanks, its design and compliance with the applicable rules. Cargo tank support design is also taken into account.

MULTI-PURPOSE GAS CARRIER

Multipurpose gas carriers are innovative solutions for small-scale LNG distribution and LPG or LEG transportation. They provide additional flexibility and profitability for ship owners, as they enable transportation of a wide range of products.

Small, with type C tanks and able to cargo cryogenic liquids, multipurpose gas carriers face similar challenges to small LNG carriers: they should be able to enter both standard and small scale terminals, a major advantage as demand grows for distribution of small LNG quantities. However the cargo piping system is much more complicated as tanks must be able to carry different types of cargo.

Statutory certification is the same as for a standard LNG carrier, but the complete list of cargoes must be mentioned in the “International certificate of fitness for the carriage of liquefied gases in bulk”.

RE-GASIFICATION GAS CARRIERS

Re-gasification ships are flexible compared with standard LNG carriers, able to offload gas via onboard re-gasification plant through STL system anchored to the seabed or an onboard high pressure gas manifold that connects to shore. This flexibility, together with few permit issues and short construction lead time compared to onshore terminals, has resulted in strong demand for re-gasification gas carriers.

Bureau Veritas has classed eight LNG carriers equipped with re-gasification plants on the cargo deck. We are also involved in the certification of two units under construction, one of which will be the largest unit ever built.

The specific RV notation has been developed for ships fitted with re-gasification facilities onboard. Where these ships are also equipped with sophisticated STL gas offloading systems, we have created specific classification notations STL-SPM.

Special attention is to be paid to the design of the structure supporting the re-gasification plant or the forward part of the hull that holds the offloading system.

We also carry out risk analyses and RAM, when requested, for re-gasification facilities and maintenance on board. This can result in the additional class notation STAR-REGAS.

ARCTIC LNG TRANSPORTATION

Reports that 30% of the earth’s undiscovered gas reserves lie in the Arctic are fuelling development of shipping in the area. A further boost to Arctic LNG shipping is coming from the prospect of shorter distances through the Northern Sea Route and North West Passage as a result of global warming.

But for LNG transportation to be successful, a number of challenges for operation in extreme climates must be overcome: extremely low temperatures, ice, and the vulnerable eco-system. These will all impact the design and operation of LNG units in these regions.

Bureau Veritas has a full range of in-house competences and technical standards, such as the evaluation of the impact of ice loads on the hull structure, sloshing and vibration effects and guidance for ice class selection. These are designed to ensure vessels are suitably designed for harsh conditions, while at the same time offering protection to the crew and the environment. We offer specific classification services (the COLD notation series) for ships operating in cold environments or weather and Polar Class notations addressing structure and propulsion issues.
A global leader in testing, inspection and certification, Bureau Veritas serves clients’ needs around the world in quality, health, safety, environmental protection and social responsibility. For over 180 years, our clients have looked to us to provide technical support, verify compliance, or obtain certification. Our mission is to help identify, prevent, manage and eliminate risks.

Our network of over 1,300 offices and laboratories meet our clients’ needs, wherever they are in the world. We pride ourselves on our technical expertise, impartiality and detailed knowledge of international and local regulations.

We offer three principal services. Testing provides confidence that commodities or consumer goods are of the right quality, and conform to specifications. Inspections of facilities, equipment and products are designed to reduce risk and meet regulatory requirements. Finally, certification represents a third party stamp of approval that a product, service or system conforms to a specified standard.

Within the shipping industry, we are a leading classification society. Over 10,000 ships are classed to Bureau Veritas rules and we provide a wide range of advisory services to the Marine sector.

A historical partner to the marine industry

Bureau Veritas was founded in 1828 for the initial purpose of collecting, verifying and providing maritime insurance companies with precise and up-to-date information about the condition of ships and their equipment around the world.

Involvement throughout the LNG and energy industries

Our testing, inspection and certification services go beyond shipping, giving us an unrivalled understanding of the energy sector. We are involved in all sectors of the energy industry, from oil and gas through nuclear and renewables, and at all stages, from extraction and processing to distribution. We also classify offshore structures.

Over 1,000 accreditations and authorizations

Our wide range of accreditations and authorizations across a range of industry sectors prove that we operate professionally and that our reports and certifications are recognized and respected. We hold 150 delegations of authority on behalf of national maritime authorities.

A key player in maritime research and development

Alongside our own research, Bureau Veritas’ marine business is involved in a number of European research programs, and several joint industrial projects with the oil and gas industries. This has led to the development of areas of expertise such as hydrodynamics, vibration and structural fatigue. We have also developed advanced calculation and simulation tools to analyze the behavior of ships and offshore structures.

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