CONTAINERSHIPS

The Preferred Choice for Class
From the voyage of the very first containership, Ideal X in 1956, ABS has been at the forefront of providing classification services for containerships operating around the world.

Through an unparalleled commitment to providing superior service and serving as a recognized technology leader, ABS is helping containership owners and operators tackle their most pressing operational and regulatory challenges. With a wide range of knowledge on technical trends, current and future regulatory requirements, and unique operational needs of markets around the world, ABS is positioned to serve as a trusted advisor in the success of any containership project.

ABS is able to provide a comprehensive portfolio of safety, risk and compliance services tailored to the containership market. From the most basic design to the most advanced, ABS leverages more than 60 years of containership experience to advance safety and innovation in existing and new technologies.

### A HISTORY OF LEADERSHIP

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>1956</td>
<td>ABS-classed vessel, IDEAL X, begins first container voyage</td>
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<tr>
<td>1972</td>
<td>Classes fastest containership, 33 knots</td>
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<tr>
<td>1985</td>
<td>Classes first dedicated slow steaming containership</td>
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<tr>
<td>1988</td>
<td>Classes first post-Panamax containership</td>
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<tr>
<td>1998</td>
<td>Classes first 8,200 TEU vessel</td>
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<tr>
<td>2005</td>
<td>Classes first 9,500 TEU vessel, along with 6 MW full waste heat recovery system</td>
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<tr>
<td>2006</td>
<td>Classes first 15,500 TEU vessel</td>
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<tr>
<td>2010</td>
<td>Launches world’s first hull integrated maintenance system developed by a class society</td>
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<tr>
<td>2011</td>
<td>Begins contract work on first 18,000 TEU containership</td>
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<tr>
<td>2012</td>
<td>Launches first Energy and Environmental Management software module</td>
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<tr>
<td>2013</td>
<td>First 18,000 TEU vessel enters service</td>
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<tr>
<td>2015</td>
<td>Provide Class services for record-breaking 21,100 TEU vessel</td>
</tr>
<tr>
<td>2016</td>
<td>Conducts cutting-edge technical evaluation on next generation neo feeder containerships.</td>
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</table>

All Fleet Statistics Verified by IHS Fairplay
FUTURE TRENDS FOR CONTAINERSHIPS

Shipowners are looking to build cutting-edge vessels that incorporate the latest in technology while anticipating future trends that could impact the market. As owners and operators look at operational efficiencies and regulatory compliance, focus on designs has shifted toward optimization of route-specific profiles. When developing future containership concepts, owners need to assess a number of factors:

- **Energy management** – In order to maximize energy efficiency, owners should take a holistic approach to energy management that aligns energy-saving designs and operational practices in a systematic fashion.

- **Building for current and future service speed** – Ten years ago, market trends required vessels to operate at maximum speed to cut transit time. Today’s trend in the market calls for slow steaming to save on fuel costs combined with schedule reliability. A versatile vessel able to adjust operations for market conditions is a necessity.

- **Environmental regulations** – ABS provides owners and operators with reliable advice and confidence in an ever-changing regulatory environment. Emissions controls, ballast water, biofouling and acoustics regulations are changing; the vessel owner looking to the future must be prepared to design a vessel that anticipates future regulatory scrutiny to minimize long-term cost.

- **Gas as fuel** – As LNG bunkering infrastructure develops, more opportunities will exist for LNG as a fuel in global trade. The containership market is well-positioned to take advantage of this future trend due to the regularity of trade patterns. The world’s first LNG-powered containership has been ordered and has been classed by ABS.

Recognizing the changing landscape and increased industry focus on gas, ABS launched its Global Gas Solutions team in 2013 to support industry in developing gas-related projects. ABS is the industry leader in LNG carriers and in providing guidance as the use of LNG as fuel for marine applications expands.

- **Behavior of steel structures** – As containerships continue to increase in size, operational demands are pushing designs into areas where direct experience may be limited. Vessel owners need to be assured that an accurate assessment of structural behavior takes place by bringing together modern analysis tools and sound engineering.

TECHNOLOGY LEADERSHIP

Shipbuilders, owners and operators in the container sector are facing design and operational challenges. ABS is helping to meet these challenges head on in a constantly evolving market. ABS works alongside its partners to tackle the most pressing technical, operational and regulatory challenges in order to help the industry operate safely, efficiently and responsibly.
Every year, ABS undertakes more than 100 technology projects, including joint development and industry research projects. These projects, along with partnerships with leading academic institutions around the world, support the development of new, industry-leading Rules, Guides, Guidance Notes, Advisories and software applications that help address regulatory and operational issues. Top areas of research include gas as fuel, environmental regulatory solutions, energy efficiency, hull optimization, human factors safety and future regulatory and safety issues such as cybersecurity and data analytics.

**Container Deck Firefighting**

Container fires continue to be a critical hazard for all containership operators. As vessels and stack heights continue to grow, the task of container deck firefighting is becoming even more challenging. ABS is at the forefront of this issue, publishing its *Guide for Fire-Fighting Systems for On-Deck Cargo Areas of Container Carriers.* By applying this tool, owners and operators can take advantage of a clearly defined system of firefighting resources dedicated to cargo deck protection. This optional, enhanced criteria builds on SOLAS regulations leading to better preparation for potential incidents that threaten the safety of the ship, crew and cargo.

**Cargo Securing**

As ships get larger, container stacks grow higher and stack weights increase, improving safety and reliability of cargo securing systems is an absolute necessity. To assist in finding unique solutions to this challenge, ABS developed the *ABS Guide for Certification of Container Securing Systems (Lashing Guide).* The Guide addresses lashing system technology, including the effects of fully automatic twistlocks, as well as defining the procedure for lashing bridge strength evaluation. It also introduces a nonlinear lashing analysis procedure established on rigorous analytical models that represents a significant upgrade to other linear-based procedures.

ABS C-LASH™ software was also developed to fully implement all the analysis features covered in the nonlinear lashing analysis procedure. The software employs the most modern, non-linear analysis methods to realistically model lashing arrangements, allowing designers to provide safer and more efficient cargo securing systems.

**Shaft Alignment**

ABS provides full-scale shaft alignment technical services, including analysis, optimization, measurements, condition evaluation, trouble shooting and failure investigation.
proprietary systems such as ABS Digital Shaft Alignment Monitoring (D-SAM) and ABS SmartBearing significantly enhances the ability to detect and correct shaft alignment issues before they significantly impact vessel performance or lead to serious marine casualties.

TRUSTED ADVISOR

ABS has developed several service lines that assist in analyzing the solutions available to meet operational, regulatory and safety requirements. ABS technical specialists are prepared to aide designers, builders, owners and operators in areas such as market evaluation, configuration analysis, energy efficiency analysis, environmental analysis and operational support. Whether used in a single instance or in a comprehensive offering, each service leverages the latest technology, tools and practices in developing tailored solutions for each client.

Ballast Water Management Technology Evaluation Service

As international and national ballast water requirements enter into force, owners and operators are challenged with selecting the right system to meet the unique operational, technical and regulatory needs of their fleets. The ABS Ballast Water Management Technology Evaluation Service leverages in-depth knowledge and experience with various regulations and systems to help clients identify the best system to demonstrate compliance. ABS technical specialists are ready to help clients identify their custom solutions.

Emissions Solutions

As ship emissions become a growing area of focus for regulators and the public, shipowners and operators must identify technical and operational solutions to meet future standards. ABS provides a full suite of technology evaluation and classification services to help owners and operators demonstrate a commitment to environmental stewardship. From scrubber technology to selection of alternative fuels, ABS technical specialists are prepared to help identify practical solutions to emissions requirements that meet the unique needs of each client while maintaining the highest level of safety.

Performance and Efficiency

Energy cost uncertainties, changing regulations and a dynamic global marketplace are changing the way ships are designed and operated. ABS provides a full suite of technical and advisory services in areas like hull optimization, evaluation of energy saving devices, propulsion system evaluation, hydrodynamic evaluation and optimum trim guidance, to name a few. Our world-class technical specialists are prepared to help owners, operators and designers identify practical solutions to meet efficiency and performance goals.
Techno Economic Evaluation
Now more than ever, owners and operators are looking to design ships that can safely and efficiently operate in the multitude of market conditions and regulatory shifts the asset will see in its operating lifetime. Through modern, proprietary models and tools, ABS technical specialists can identify viable technical solutions and their potential impacts unique to individual projects. This information allows ABS clients to make better informed decisions on key aspects impacting the performance, efficiency, safety and environmental stewardship of their assets across the entire life cycle of a project.

Gas as Fuel
ABS is guiding the integration of liquefied natural gas (LNG) fuel concepts into vessels throughout the shipping industry. With experience in all phases of gas-fueled maritime projects—from the ground floor of the design process to the construction, classification and modification of gas-powered ships—the ABS Global Gas Solutions team is prepared to help owners, operators and designers identify technical options that best fit their needs. From specification review to adoption of LNG-Ready standards to full development of LNG-fueled assets, ABS is prepared to help clients realize their operational, environmental and safety goals.

GREAT CLASS SERVICE
ABS has been a global leader in the containership market since its inception. Today, ABS serves as a major provider of classification services to owners of all sizes of containerships. This is not only because of its years of experience in the market, but also because of its deep understanding of the unique challenges that the container shipping industry faces today and will face in the coming years.

Today, over 3,000 employees operating in more than 200 offices around the world are assisting the global operations of ABS clients. Surveyors, engineers, technical specialists and researchers are helping to define the practical solutions needs for the operational, regulatory, and safety challenges faced by our clients.

Guided by the enduring principles of the Spirit of ABS, employees are committed to the ABS mission and the strong values ABS has embraced since its founding in 1862. Safety, People, Innovation, Reliability and Quality, Integrity and Teamwork enable ABS to make the world a safer place and nothing is more important.

The practical, real-life industry experience of its people uniquely positions ABS to support innovation that considers both an efficient operation and the safety requirements that are critical to protecting the safety of life, property and the natural environment.
CONTACT INFORMATION

ABS WORLD HEADQUARTERS
ABS Plaza
16855 Northchase Drive
Houston, TX 77060 USA
Tel: 1-281-877-5800
Fax: 1-281-877-5803
Email: ABS-WorldHQ@eagle.org

ABS AMERICAS DIVISION
ABS Plaza
16855 Northchase Drive
Houston, TX 77060 USA
Tel: 1-281-877-6000
Fax: 1-281-877-6001
Email: ABS-Amer@eagle.org

ABS EUROPE DIVISION
ABS House
No. 1 Frying Pan Alley
London E1 7HR, UK
Tel: 44-20-7247-3255
Fax: 44-20-7377-2453
Email: ABS-Eur@eagle.org

ABS GREATER CHINA DIVISION
5th Floor, Silver Tower
No. 85 Taoyuan Road
Huang Pu District
Shanghai, 200021 P.R. China
Tel: 86-21-2327-0888
Fax: 86-21-6322-9649
Email: ABS-GreaterChina@eagle.org

ABS PACIFIC DIVISION
438 Alexandra Road #10-00
Alexandra Point
Singapore 119958
Republic of Singapore
Tel: 65-6276-8700
Fax: 65-6276-8711
Email: ABS-Pac@eagle.org

www.eagle.org

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