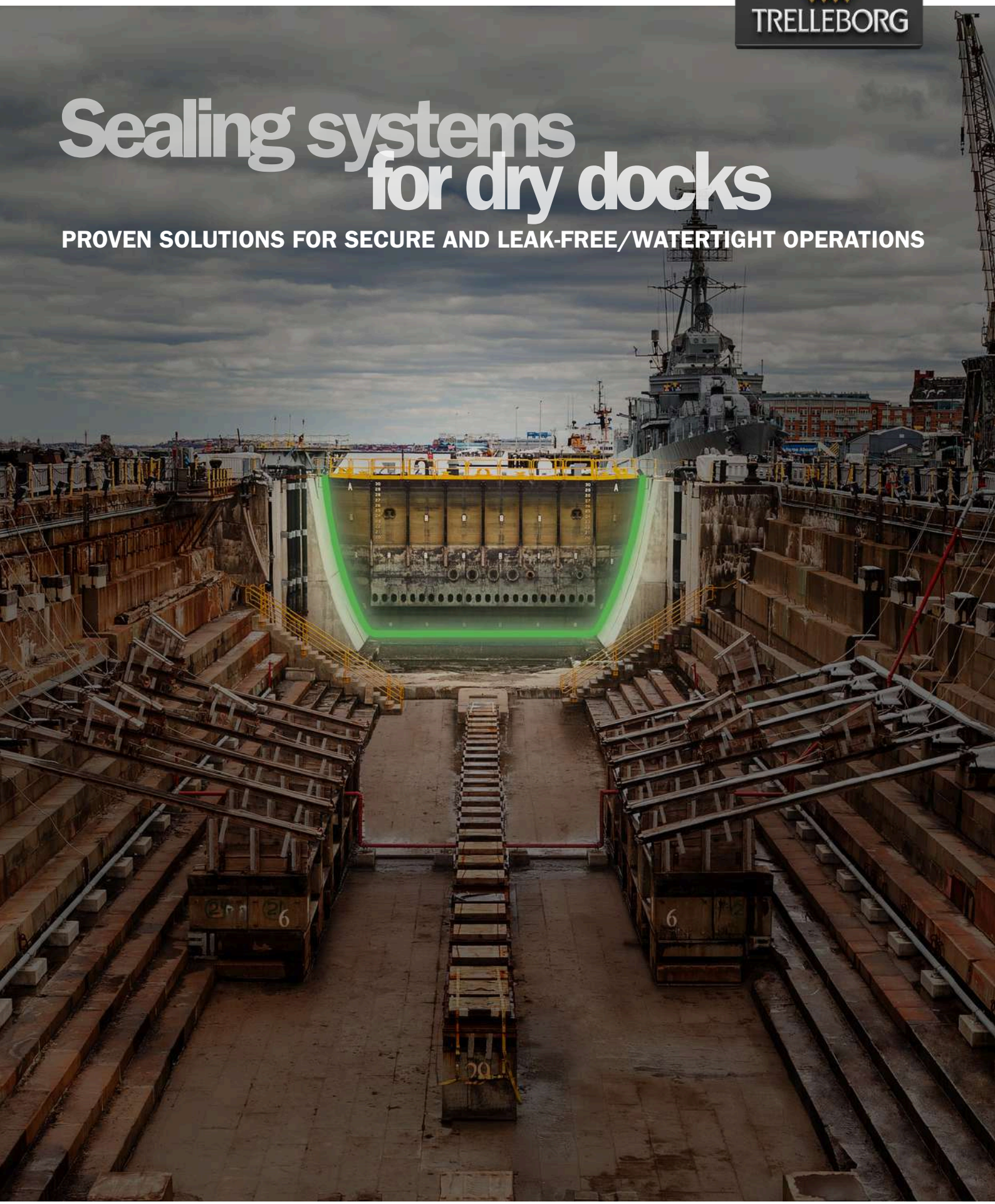
# Sealing systems for dry docks

## PROVEN SOLUTIONS FOR SECURE AND LEAK-FREE/WATERTIGHT OPERATIONS




Extreme conditions demand exceptional solutions. Trelleborg's precision-engineered sealing systems eliminate leaks, reduce maintenance, and withstand the toughest conditions. Because complex challenges drive our best work.

**SCAN FOR MORE INFO**

# Smarter, reliable and sustainable sealing

**Trelleborg is a global leader in designing and manufacturing advanced sealing systems for dry docks. Our innovative, precision-engineered systems ensure watertight performance, reducing maintenance and downtime. By leveraging advanced materials and engineering expertise, we enhance the safety, efficiency, and sustainability of dry dock operations, delivering reliable solutions tailored to meet the unique demands of every project.**

Operating a dry dock comes with many challenges. From meeting industry requirements and keeping maintenance costs low, to reducing project turnaround times in a sustainable way, having the right partner that can provide complete and efficient solutions is key.

At Trelleborg, we go beyond simply recognizing these requirements—we provide tailored solutions that directly address them. Our engineered products are designed to simplify operations, reduce downtime, and enhance long-term reliability, helping you stay ahead in a competitive market. By partnering with us, you gain access to innovative technologies and expert support that enable your dry dock to operate at its full potential, no matter the challenges.

## Contents

### Sealing Systems for Dry Docks



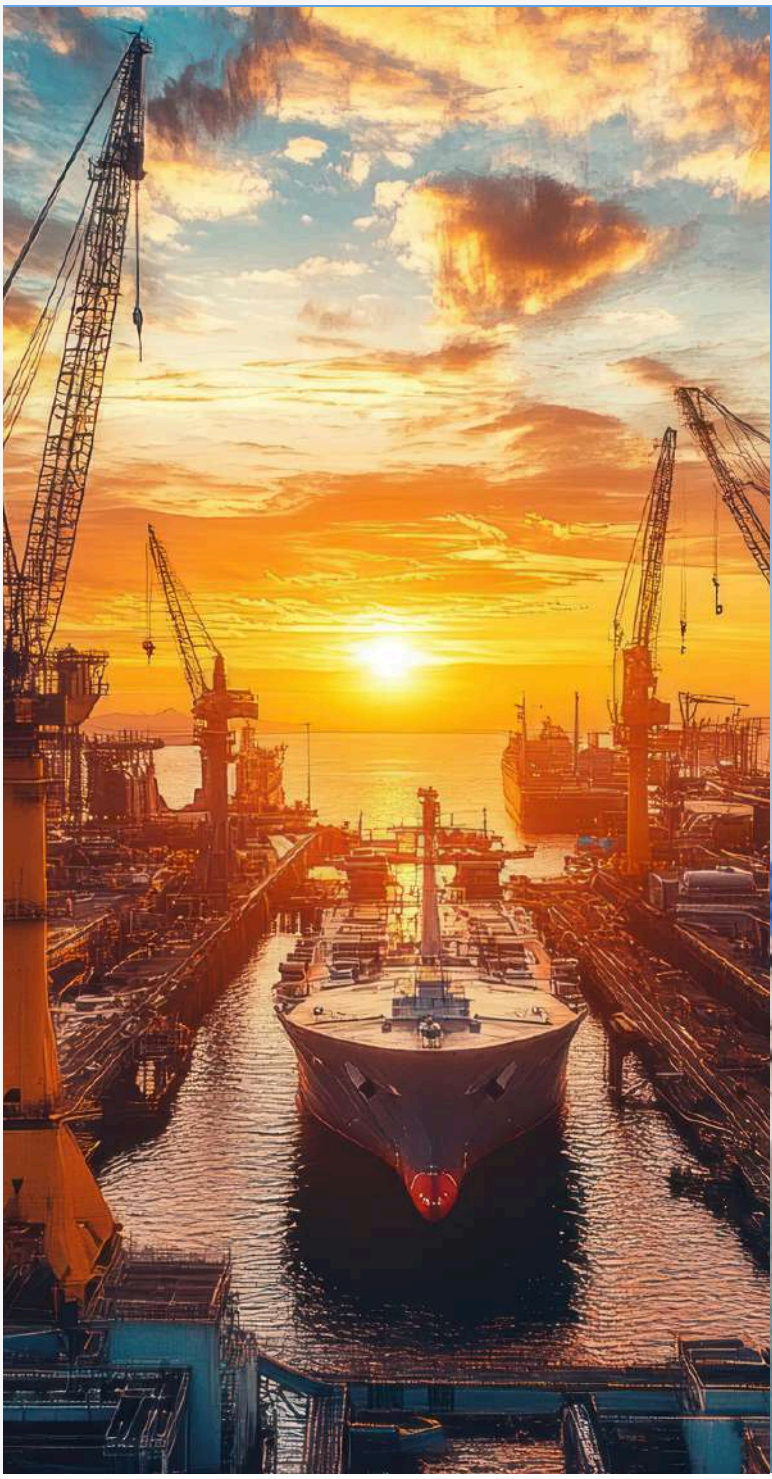
# Why effective dry dock sealing matters

**Dry docks are vital for ship maintenance, repair, and construction, ensuring vessels remain operational. As global naval demands grow, expansion alone isn't enough—modern facilities require durability, reliability, and efficiency. Trelleborg's engineered polymer seals thrive in harsh marine environments, delivering superior performance and watertight protection during critical operations.**

Dry docks offer a controlled, water-free environment where vessels can be securely positioned for maintenance and repairs. The scope of operations within these facilities is vast and dynamic, ranging from routine upkeep to complex retrofitting projects. To support these diverse activities, dry docks require optimized environments tailored to the specific tasks at hand. As a result, modern dry docks are evolving—expanding in size, adopting new technologies, and diversifying in shape, type, and function. However, this growth and transformation are only possible through a steadfast commitment to efficiency.

While the evolution of dry docks brings exciting advancements in size, technology, and functionality, these changes alone are not enough to address the unique challenges faced by operators. At Trelleborg, we recognize that true progress lies in more than just expansion—it's about ensuring durability, reliability, and efficiency in every operation. Our engineered polymer solutions are specifically designed to thrive in harsh marine environments, delivering unmatched performance that protects vessels during critical repair and maintenance processes.

Rather than simply adapting to change, we partner with dry dock operators to optimize their services, enabling them to meet modern demands while maintaining the highest standards. Together, we can redefine what it means to operate efficiently in the dynamic dry dock market, ensuring ships are prepared to navigate the world's oceans with confidence and precision.



# Our sealing system

At Trelleborg, we take pride in delivering reliable sealing systems that redefine performance and reliability in dry dock operations. The Gina gasket together with our clamping strips represent our flagship system engineered to provide unmatched watertight integrity, ensuring smooth and efficient operations even in the most demanding conditions.

Developed with advanced polymer technology and exceptional clamping properties, this system adapts seamlessly to the unique challenges of any dry dock environment, delivering long-lasting durability and requiring minimal maintenance. More than just products, our system represents our commitment to helping dry dock operators achieve long-lasting operational excellence.

## THE GINA GASKET

**Material & performance:** made from high-quality natural rubber, it absorbs hydrostatic loads, adapt to surface irregularities, and withstand environmental factors such as tidal differences, wave impacts, and temperature fluctuations.

**Design features:** its fully continuous design eliminates weak points, ensuring long-term reliability and minimal maintenance. The soft nose delivers an immediate low-compression seal, the body is tuned to project-specific requirements, and the hard flange ensures secure fixation with our clamping strips.

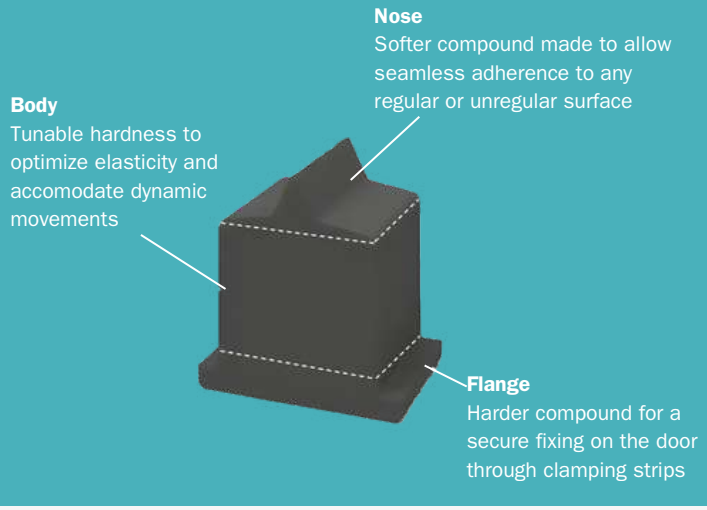
## THE CLAMPING STRIPS

**Functionality & durability:** the design of our clamping strips ensures stable fixation and optimal compression, delivering durable long-term performance.

**Ease of installation:** our clamping strips are designed to make installation faster and easier, ensuring a smooth and reliable fit.

## BENEFITS

- **Watertight Integrity:** prevents water ingress even under high pressure.
- **Durability:** 50 years design life in dry dock applications. Reduces the need for frequent replacements.
- **Flexibility:** Adapts to uneven surfaces, tidal variations, and structural movements.
- **Low maintenance:** minimizes operational disruptions and associated costs.
- **Eco-friendly:** Eliminates auxiliary pumps, reducing CO2 emissions and energy consumption.
- **Cost efficiency:** Simplifies installation with fewer components, saving time and resources.
- **Proven reliability:** Backed by decades of expertise and third-party testing.
- **Customizable design:** Tailored to meet the specific requirements of each dry dock.



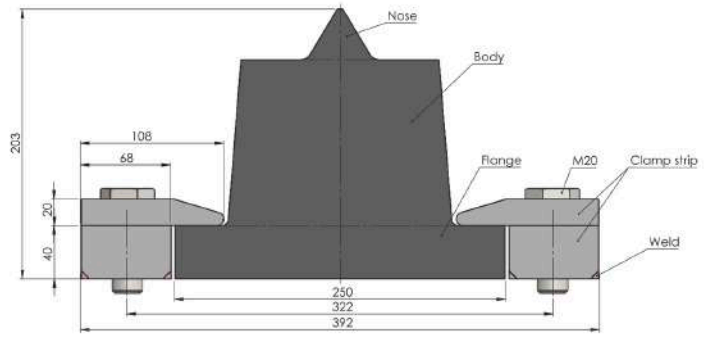
# Types of Gina gaskets

## FOR MEDIUM TO LARGE DRY DOCKS

The Gina Gasket Type G150-125 is specifically engineered for use in medium to large dry docks, where it excels in providing a reliable and durable watertight seal that can accommodate higher compression or sealing forces, making it suitable for uneven or aging dock structures, ensuring reliable performance in demanding conditions.

### SPECIFICATIONS

- Medium to large dry docks
- Height: 203 [mm]
- Width: 250 [mm]
- Compression range: 10 - 90 [mm]
- Water pressure range: Watertightness depending on compression, as shown in Graph 3 (Page 8)

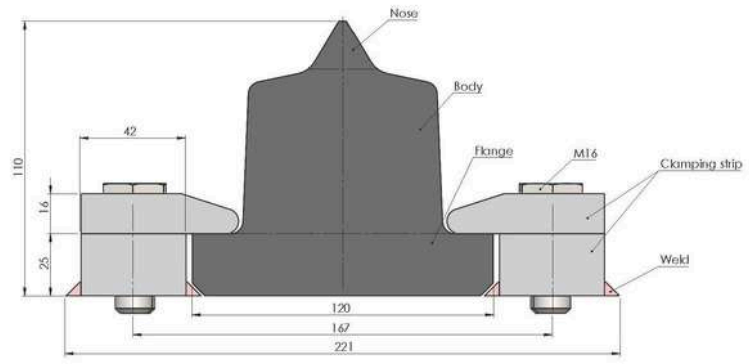



## FOR SMALL TO MEDIUM DRY DOCKS

The Gina Gasket Type G110-80 is tailored for small to medium dry docks, delivering a dependable watertight seal with a focus on efficiency and adaptability, also making it suitable for uneven or aging dock structures, ensuring reliable performance in demanding conditions.

### SPECIFICATIONS

- Small to medium dry docks
- Height: 110 [mm]
- Width: 120 [mm]
- Compression range: 10 - 45 [mm]
- Water pressure range: Watertightness depending on compression as shown in Graph 4 (page 8)



# Ensuring watertight operations

## GINA GASKET RUBBER COMPOUND

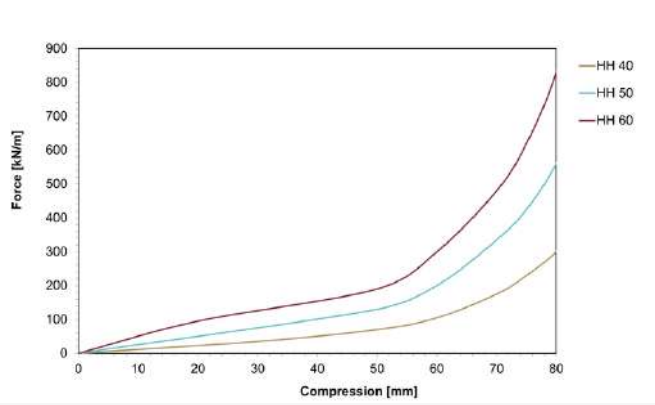
The body of the gasket is crafted from a rubber compound that can be customized to suit the specific characteristics and requirements of each dry dock. To ensure optimal performance, we offer three distinct rubber compounds with varying levels of hardness: HH40, HH50, and HH60. This flexibility allows the selection of the ideal compound for unique operational needs, ensuring durability, reliability, and a perfect fit for every application.


## TESTED PERFORMANCE

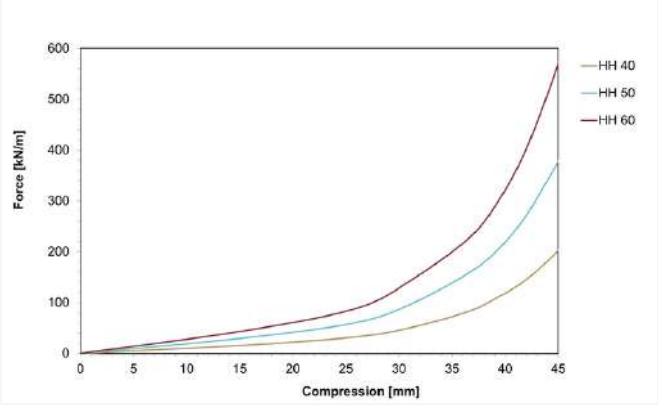
A reaction load graph is a visual representation that illustrates the relationship between the force applied to a gasket and the resulting compression achieved. This graph is a critical tool for understanding how the gasket will perform under different load conditions, helping operators determine the optimal force required to achieve a secure and watertight seal.

For both the Type G150-125 and G110-80 gaskets, the reaction load graph highlights an important characteristic: as you move from variant HH40 to HH60, a greater force is required to achieve the same level of compression.

**Graph 1**
Force compression graph of the Gina Gasket Type G150-125




**Graph 2**
Force compression graph of the Gina Gasket Type G110-80



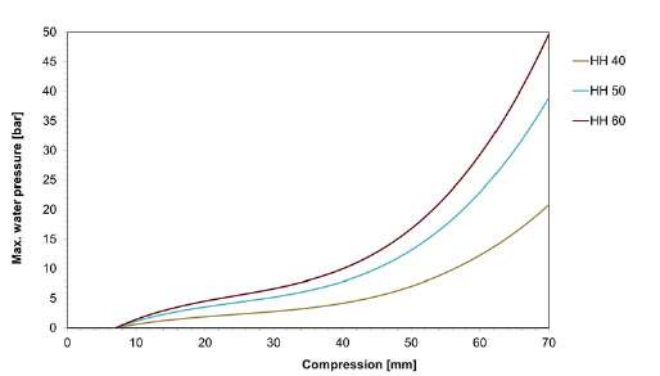
# Ensuring watertight operations

## LONG-TERM RELIABILITY

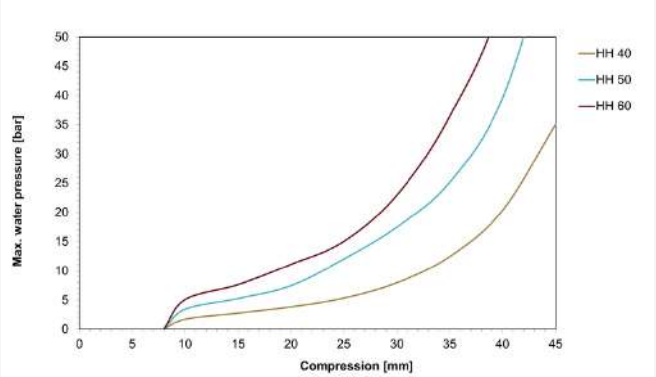
After 50 years of service, both the Type G150-125 and G110-80 gaskets continue to exhibit exceptional performance, retaining their elasticity and controlled behavior even as water pressure increases. This long-term reliability underscores their durability and suitability for demanding dry dock applications.

The watertightness graphs below show how the gasket performs under varying water pressures, highlighting its ability to maintain a secure seal. These graphs are crucial for assessing the gasket's reliability and effectiveness in preventing water ingress, even in high-pressure environments.

**Graph 3**
Watertightness graph of the Gina Gasket Type G150-125




**Graph 4**
Watertightness graph of the Gina Gasket Type G110-80



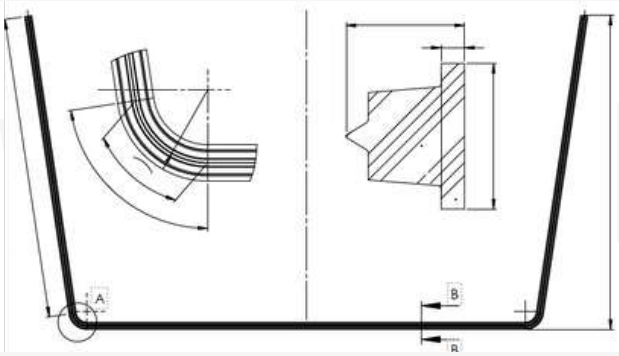

## SUPERIOR WATERTIGHT FRAME

The continuous U-shape design of the Gina gasket frame is ideal for achieving superior watertightness, as it eliminates weak points in the sealing system and minimizes the risk of leakages caused by gaps. This seamless design significantly reduces the need for maintenance and eliminates the reliance on auxiliary water-ejecting pumps, ensuring a consistently dry dock environment. Not only does this solution enhance the efficiency of dry dock operations and lower long-term costs but it also reduces energy consumption and $CO_2$ emissions, making it a smart and eco-friendly choice for modern dry dock facilities. To further support customization and adaptability, we offer standard molded corners, including 90-degree angles with 180, 400, and 500 radiuses, as well as a flat T-piece. Additionally, we can provide custom corners upon request, ensuring a perfect fit for any unique dry dock configuration.


Flat 90° R180


Flat 90° R400


Flat 90° R500



# Redefining Reliability: Gina Gasket vs. Traditional Seals

## GINA GASKET VS TRADITIONAL SYSTEMS

The Gina Gasket represents a breakthrough in dry dock sealing technology, offering a reliable and efficient solution to the challenges often faced with traditional sealing systems. While non-engineered extruded seals have proven to be effective in certain applications, they may not consistently ensure a fully watertight environment, sometimes requiring auxiliary pumps to manage water ingress. This approach can increase operational costs and environmental impact.

The Gina Gasket eliminates these concerns by delivering a superior watertight seal, tailored to meet the unique demands of dry dock environments. Its innovative design handles tidal differences, wave impacts, and surface irregularities with ease, ensuring enhanced efficiency, reduced costs, and a more sustainable approach to dry dock operations.

| | GINA GASKET | TRADITIONAL SYSTEM |
|---|---|---|
| **MAINTENANCE DEMANDS** | Designed for decades of reliable performance, it requires no maintenance and rarely needs replacement within the first 50 years | Needs routine maintenance and occasional part replacements |
| **LONG-TERM COSTS** | No additional costs after installation | Requires regular maintenance and replacements costs plus additional water pump costs to keep dock watertight |
| **ENERGY CONSUMPTION AND EMISISONS** | Reduces energy consumption by eliminating the need for high-capacity pumps | Often requires pumps to eject water from leakages |

**SCAN TO READ THE CONDENSED WHITEPAPER**

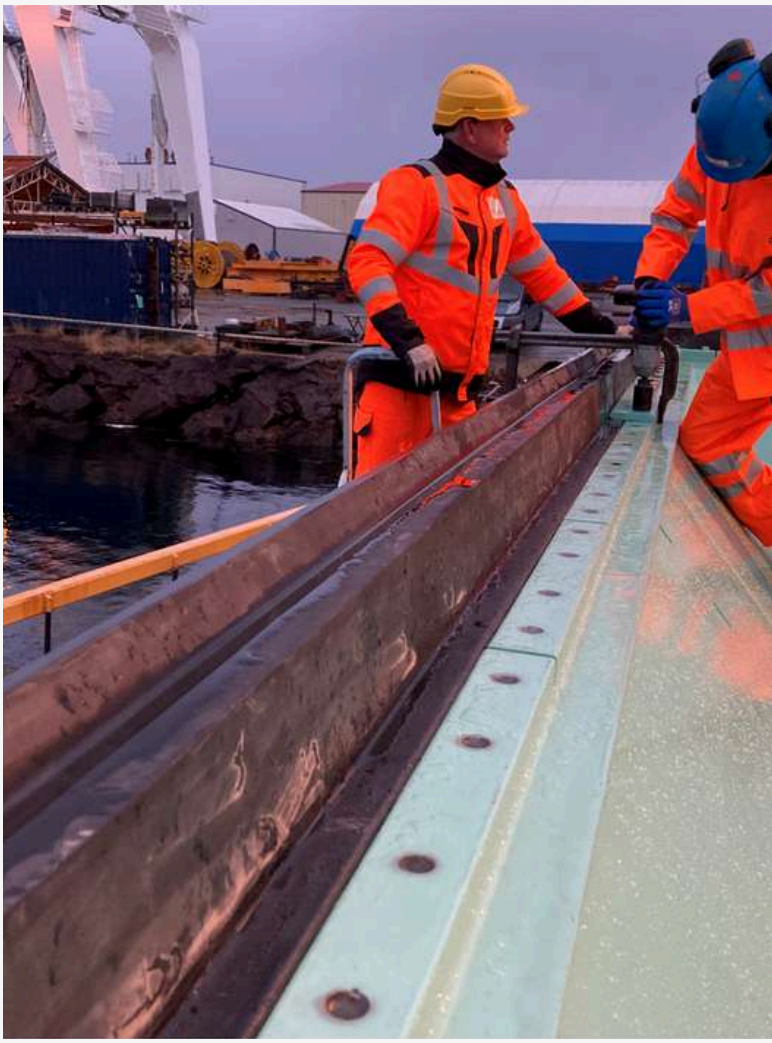
# Clamping strips

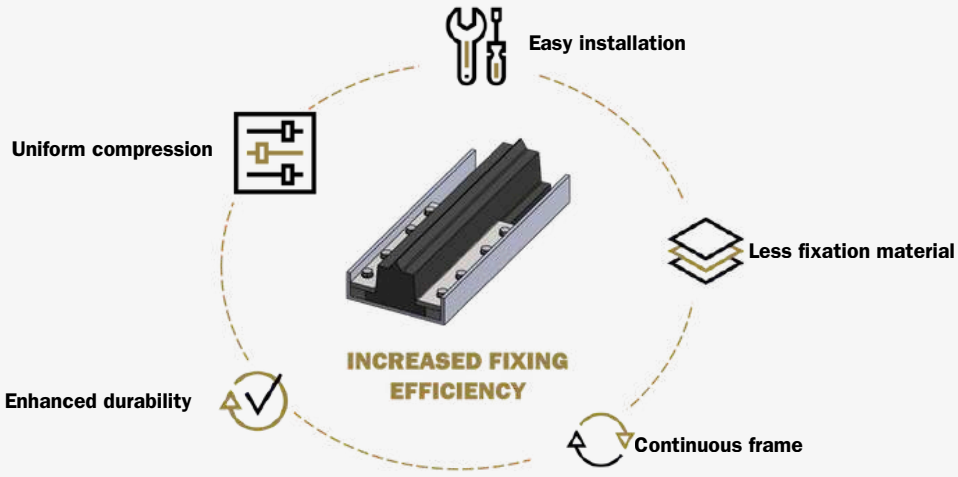
## THE CRITICAL ROLE OF FIXING SYSTEMS

A good fixing system is a cornerstone of effective seals, as it ensures the gasket remains securely in place while maintaining consistent performance over time. Without reliable clamping, even the most advanced gasket designs can fail to deliver optimal watertightness, leading to leaks, uneven compression, and increased maintenance requirements.

A well-engineered fixing system secures the gasket, distributes loads evenly, prevents weak points, and simplifies the installation process. Additionally, it reduces the need for excessive fixation materials, saving both time and resources while ensuring long-term reliability and durability. With Trelleborg's clamping strips, you get all of this in one solution: reliability, efficiency, and durability you can trust.

Our steel clamping strips are bolted along the sides of the gasket. This design maintains reliable watertight performance and minimizes the risk of leaks, even under challenging conditions. By eliminating the need for steel embedded within the rubber, our gaskets are free from internal corrosion, significantly enhancing their durability and extending their lifespan. The reduced fixation material and simplified installation process make our system efficient and cost-effective.





# Lifecycle support

By leveraging advanced polymer technologies and a wealth of industry experience through our engineering and field service teams, we provide comprehensive solutions that not only meet regulatory compliance but also enhance operational efficiency and sustainability.

## ENGINNERING SUPPORT

Our global dedicated engineering team is committed to providing tailored solutions that meet the unique specifications and needs of every project. Through state-of-the-art design and technical expertise, we deliver comprehensive support to our customers at every stage.

## FIELD SERVICE SUPPORT

At Trelleborg, our field service teams possess a deep understanding of the unique challenges faced by dry dock operators and are dedicated to delivering top-tier installation and service solutions. From installation assistance to maintenance and swift product replacement, we ensure that you are never left without a solution during critical operations.

## GLOBAL REACH

Our global presence allows us to deploy our field service teams rapidly to virtually any site, providing prompt and effective assistance with installation and ongoing service needs. This swift responsiveness ensures minimal disruption to your operations. Partnering with Trelleborg means gaining access to a network of skilled professionals who are committed to delivering innovative solutions and unparalleled service so that your dry dock operations remain seamless.

# Manufacturing & quality control

## IN-HOUSE MANUFACTURING

Manufacturing the Gina gasket in-house is essential to ensuring the highest level of performance and reliability. By keeping the entire production process under control, we can maintain the strictest quality standards at every stage, from material selection to final testing.

This approach allows us to optimize manufacturing processes to meet the specific needs of our customers, ensuring that each gasket is tailored to deliver exceptional performance in its intended application. In-house production also enables us to implement continuous improvements, adapt quickly to unique project requirements, and uphold our commitment to delivering durable, high-quality solutions that exceed industry standards.

## QUALITY CONTROL

To ensure that every gasket meets the highest standards, we implement a comprehensive range of quality control measures throughout the production process. Below is an overview of the key quality control measures we perform.

- **Material validation:** Extensive testing of compound materials
- **Batch control:** Physical testing of compound batch properties
- **Load deflection test** to validate product performance
- **Segment stamp test:** 100% to verify quality
- **Corner stamp test:** 100% to verify quality
- **Joint stamp test:** 100% to verify quality
- **Visual and dimensional inspection** on full frame to ensure quality

## PRODUCTION PROCESS

The production process of the Gina gasket is a meticulous and highly controlled operation designed to ensure superior quality and performance.

- It begins with the preforming phase, where the different rubber compounds for the nose, body, and flange are extruded through precision-engineered molds to create the individual components of the gasket.
- Following this, the process moves to the Segment Vulcanization phase, a critical step that can take up to 14 hours. During this phase, the rubber segments are vulcanized to achieve the desired strength, elasticity, and durability.
- Once the segments are prepared, the vulcanization of the joining takes place, seamlessly bonding the components together to create a continuous, watertight gasket.
- Finally, the completed gasket is carefully packaged by folding it into 40ft open containers, ensuring safe transportation while maintaining its structural integrity.

This rigorous production process guarantees that every Gina gasket meets the highest standards of quality and reliability, ready to perform in the most demanding dry dock applications.

# Real-world impact: proven success

## MARIEHAMN MARITIME MUSEUM, FINLAND

**Challenge:** The Pommern is a renowned museum ship in the Mariehamn Maritime Museum in Finland. Built in 1903, Pommern is the only four-masted steel merchant barque in the world left in its original state and has been a centerpiece in the museum since 1957.

Following a significant investment into the ship's refurbishment and preservation, the vessel was moved into a floating dry dock constructed by EE Engineering. To ensure the dry dock remained watertight during the ship's refurbishment, Trelleborg was tasked with providing a purpose-built, leak-free alternative to a standard D-fender.

**Solution:** Trelleborg developed a specially-designed Gina gasket (G110-80) that would produce the same results as a conventional D-fender solution, but only required a single gasket. Supplied as a U-frame to fit the dry dock door, the gasket ensured the ship was protected from water ingress.

This approach facilitated less fixation materials on the dock door and meant the installation was simple and hassle-free. In addition to the gasket, Trelleborg's low-friction, wear-resistant UHMW-PE fender panels were used to guide the floating dry dock door into its recess before the Gina gasket was compressed.

Trelleborg's single, specially-designed Gina gasket G110-80 provided the level of watertightness needed for the ship's refurbishment, which was supplied as a U-frame to fit the dry dock door and protect against water ingress.

## ROYAL VAN LENT, THE NETHERLANDS

**Challenge:** The Royal Van Lent shipyard at the port of Amsterdam set out to upgrade its facilities in order to enable the construction of luxury superyachts of up to 160 meters in length. As part of the upgrade, a self-contained floating dry dock door was built to keep each yacht afloat during construction.

Crucial to this was a high-quality sealing solution that would prevent water ingress and damage to the mega yachts. With manufacturing on such a large scale, finding the right partner to supply the seals was critical.

**Solution:** Securing the dry dock door and ensuring it was completely leak-free was not possible with a standard D-fender. In response, Trelleborg supplied one of its highly resilient and multi-functional Gina gaskets (G150-125). This was critical for ensuring that the luxury yachts were not exposed to humidity or water during the construction process.

Made from natural rubber with varying hardnesses, Trelleborg's Gina gasket ensures watertight closure, greater tolerance bandwidth and lower jacking force. Varying hardnesses also enables the gasket to withstand variation in hydrostatic pressure and remain watertight throughout construction.

Trelleborg supplied one of its highly resilient and multi-functional Gina gasket G150-125, ensuring watertight closure of the dry dock door, which was critical for ensuring the luxury yachts were not exposed to humidity or water during construction.

## DISCLAIMER

Trelleborg AB has made every effort to ensure that the technical specifications and product descriptions in this brochure are correct.

The responsibility or liability for errors and omissions cannot be accepted for any reason whatsoever. Customers are advised to request a detailed specification and certified drawing prior to construction and manufacture. In the interests of improving the quality and performance of our products and systems, we reserve the right to make specification changes without prior notice. All dimensions, material properties and performance values quoted are subject to normal production and testing tolerances.
This brochure supersedes the information provided in all previous editions. If in doubt, please check with Trelleborg Marine and Infrastructure.




At Trelleborg, sustainability isn't an afterthought - it's the foundation upon which we build our success and the promise we make to every customer and our environment. Through advanced solutions, we actively support the maritime and build infrastructure industry's transition to a low-carbon future—reducing emissions, improving efficiency, and creating lasting value for our customers.

**SCAN FOR MORE INFO**

TRELLEBORG

Trelleborg is a world leader in engineered polymer solutions that seal, damp, and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Marine and Infrastructure is a leading provider of premium solutions for critical marine, port, and built infrastructure applications. Its innovative polymer and smart technology solutions enhance operational efficiency, safety, and sustainability.

WWW.TRELLEBORG.COM/MARINEANDINFRASTRUCTURE

Linkedin: Linkedin.com/company/trelleborg-marine-and-infrastructure
YouTube: Youtube.com/c/TrelleborgMarineInfrastructure
Facebook: TrelleborgMarineandInfrastructure
Twitter: @TrelleborgMI

Trelleborg Marine and Infrastructure
Email: marine_infra@trelleborg.com