

# Floating LNG Solutions



**Floating LNG solutions**

Catalogue

[www.trelleborg.com/oilandmarinehoses](http://www.trelleborg.com/oilandmarinehoses)

# Trelleborg group, **leader in polymer solutions**

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments.

Its innovative engineered solutions accelerate performance for customers in a sustainable way.

The Trelleborg Group has annual sales of about SEK 21 billion (EUR 2.3 billion, USD 3.2 billion) in over 40 countries.

In addition, Trelleborg owns 50 percent of Trelleborg Vibracoustic, a global leader within

antivibration solutions for light and heavy vehicles, with annual sales of approximately SEK 14 billion (EUR 1.55 billion, USD 2.2 billion) in about 20 countries.

The Trelleborg share has been listed on the Stock Exchange since 1964 and is listed on NASDAQ OMX Stockholm, Large Cap.

**[www.trelleborg.com](http://www.trelleborg.com)**

## **The group** comprises **5** business areas

► Trelleborg Coated Systems



► Trelleborg Offshore & Construction



► Trelleborg Wheel Systems



► Trelleborg Industrial Solutions

► Trelleborg Sealing Solutions

# Trelleborg Fluid Handling Solutions

## **Trelleborg Fluid Handling Solutions is part of Trelleborg Industrial Solutions.**

With over 1000 employees and head office located in Clermont-Ferrand (France), Trelleborg Fluid Handling Solutions is a key leading player proposing high performance and optimal solutions for every situation with low and medium pressure Industrial Hose, Oil and Marine Hoses, Rubber Sheetting & Matting and Expansion Joint based on advanced polymer technology with production sites in France, Spain, Sweden and Brazil.

Trelleborg Fluid Handling Solutions offers a very large range of competitive products, solutions and services that meet your needs and requirements for all types of application for your different businesses.



### **► Your Partner for Fluid Handling**

Trelleborg Fluid Handling Solutions is organized around 9 applications areas:

- **Oil and Gas**
- **Construction and Mining Equipment**
- **Energy**
- **Chemical, Pharma and Food**
- **Agriculture and Farms**
- **Environment and Cleaning Waste Water**
- **Processing Equipment and Machine Tools**
- **Industrial Transportation**
- **Life Science**

This enables better reactivity to adapt our offer to fast moving application or to design special solutions tailor-made for you. In all cases we follow closely legal requirements or standard evolutions.

### **► Our logistics platform: availability, reactivity and reliability**

Over 5000 different items are stored in our 3 logistic platforms in Clermont-Ferrand (France), Trelleborg (Sweden) and Izarra (Spain) to meet your need for immediate and reliable delivery.

### **► Our research and development centers through continuous innovations**

Located in France and Brazil for Oil & Marine Hose, France and Sweden for Industrial Hose and Spain for Rubber Sheetting/ Matting and Expansion Joint, our R&D centers provide innovating solutions for compound, finished products and customized solutions.

All production sites are well equipped with laboratory, test bench and calculation centers to provide ready-to-use solutions based on our experience of the applications and competences.

### **► Our couplings technical centers**

With location all over Europe (Germany, Norway, Sweden and France), Brazil and China we offer a large range of rubber hose assembly, composite hose, Stainless Steel or PTFE hose with dedicated service (24 hours to 48 hours delivery) and accessories.

### **► Trelleborg Oil & Marine Hoses**

**Trelleborg Oil & Marine is the leading supplier of innovative and field-proven large-bore flexible bonded hoses for crude oil, chemicals, and LPG/LNG offshore transfer applications.**

Trelleborg Oil & Marine provides full service worldwide through global life cycle – engineering studies, delivery of complete solutions (hoses and ancillary equipments), on-site supervision, and recommendations for installation, maintenance and repairs. Trelleborg Oil & Marine is a technology and innovation driven company that makes flexible bonded hoses with unrivalled and undisputed performance.

Our products are designed and built with cutting edge solutions used in tire and aerospace industry, with high resistance to extreme operating environments and severe fatigue conditions. The acquisition of a Brazilian company in 2011 in Sao Paulo enlarged and completed the range of products and technologies. In Brazil, the business focuses on specially designed oil hoses for floating and submarine applications in order to answer the strongly growing local offshore oil and gas extraction industry.

**Trelleborg Oil & Marine provides a wide range of products specifically designed for demanding applications with long service life and high level of reliability:**

**One team, two world class factories,  
in France and Brazil,  
serving the global Oil & Gas transfer and offloading business**



São Paulo, Brazil



Clermont-Ferrand, France

**In order to help you to accelerate the development of your business, our service list also covers**



| Compounding formulation | Hose configuration modeling | Finite element calculations | Hose design

| Hose testing (pressure, bending, elongation resistance, ...) | Hose certification (PED, ADR, REACH, ...) | Handling and storage instructions

| Installation instruction and supports | Hose inspection and refurbishment | Hose failure analysis

| After sales support | Training for sales team | Training for assembly workshop operators

# FLNG offloading solutions



To global FLNG operators who want to maintain the utmost levels of safety and give increased flexibility to LNG production, Trelleborg Oil & Marine Hoses is your global partner delivering high-performing, innovative and qualified solutions to enhance overall efficiency of FLNG terminals.



Trelleborg provides dedicated solutions for the transfer of cool seawater, LNG, LPG and Condensate on FLNG terminals. Trelleborg solutions help the operators to meet the demanding set of challenges onboard the FLNG terminals, i.e. safety, availability and operability.

## ➡ Safety

They pioneer a step change in the safety of offloading & intake operations

## ➡ Operability

They enable to consider FLNG projects for harsher conditions

## ➡ Availability

They increase offloading system and liquefaction process availability

# Cryoline LNG hose

➔ **Cryoline LNG hoses enable to consider FLNG projects for harsh environmental conditions. Unlike side-by-side LNG transfer solutions, this solution enhances safety, operability and availability of the FLNG facilities as it enables to increase the distance between the vessels.**

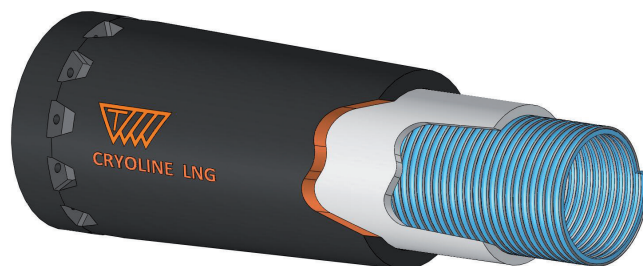
➤ **Combination of unrivalled expertise in both composite and rubber-bonded hoses.**

➤ **A dedicated design for cryogenic application:**

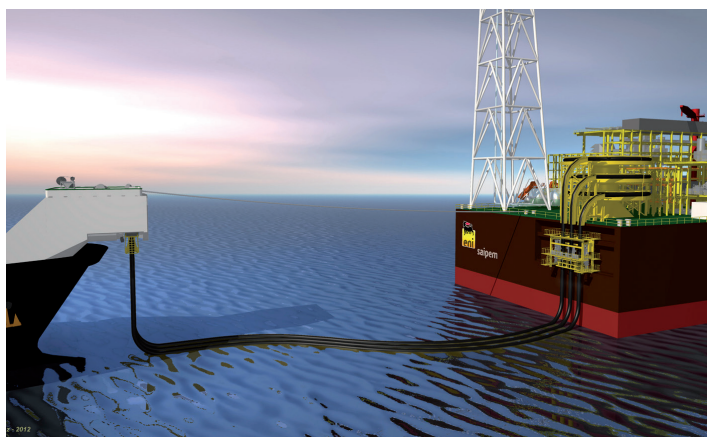
- Ensure LNG transfer with minimum BOG generation
- Meet LNG offloading requirements vs. safety and flowrate availability
- Combine high flexibility, reliability and long service life

➤ **Main features**

- Configuration: Floating or submarine
- Internal diameter: From 6" to 20"
- Max. working pressure: 20 bar
- Min. burst pressure: 100 bar
- Range of temperature: - 196 °C/+ 50 °C
- Minimum bending radius: < 3 m for 20" hose
- Dynamic application: Designed for fatigue resistance
- Thermal performance: No ice on the outer cover
- Applicable standard: EN 1474 - 2



## A key component for offshore LNG tandem offloading solutions



*Trelleborg would like to acknowledge its partners Total and Saipem for the development of the Cryoline LNG hose.*

# SWILINE Hose



**SWILINE hoses provide a dedicated and reliable solution to cooling process challenges on FLNG facilities. Unlike standard products, this solution enables to secure the liquefaction process because of its extended service life based on API Spec 17K certification, with limited maintenance.**

**A complete and dedicated solution for seawater intake systems proposed by Trelleborg & SEAL Engineering.**

**➤ Main features**

- From 24" to 40" ID
- No corrosion issue
- Integrated hypochlorine lines
- Offshore installation procedure
- Designed for long service life and survival conditions
- Suitable solution for water intake system up to -300m or more
- Derived from reliable and field-proven technology used on FPSO terminals
- Service life of 25 years with limited maintenance, according to API Spec 17K standard



# Reeline hose



Reeline hoses provide a dedicated and reliable solution for condensate offloading system on FLNG facilities. Unlike other products, Reeline hose has been specifically designed for reeling system. It is a cost effective solution when considering global costs (Capex and Opex), as it has a long service life and enables to optimize the design of the reel.

**A dedicated design for offshore condensate transfer.**

## ➤ General data

- Internal diameter: From 6" to 24"
- Rated working pressure: 15, 19, 21 or 25 barg
- Applicable standard: GMPHOM 2009 / API Spec 17K

## ➤ Main features

- Reinforced flanges embedded in rubber
- Integrated bending stiffener
- Continuous inner liner and integrated gaskets
- Steel cable layers and steel ring reinforcement



**Trelleborg has capabilities to provide a turnkey based solution, including the reel, Reeline hoses and mooring devices.**

# Cryoline LPG hose

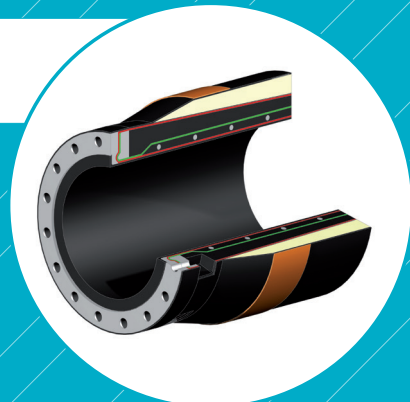


Cryoline LPG hose is a dedicated and reliable solution for offshore LPG transfer on FLNG facilities. This solution has been already successfully commissioned on several offshore LPG transfer terminals, operating in harsh environments.

**A dedicated design for offshore tandem LPG transfer**

## ➤ Main features

- Internal diameter: From 6" to 20"
- Max. working pressure: 50 barg
- Range of temperature: - 50 °C/+ 85 °C (- 58 °F/+ 185 °F)
- Dynamic application: High fatigue resistance
- Thermal performance: No ice on the outer cover
- Applicable standard: Based on GMPHOM 2009





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