

# MannTek

LNG Solutions



[www.manntek.se/LNG](http://www.manntek.se/LNG)



Skangas - Coralus



Crowley - El Coqui



Viking Grace and Seagas



Anthony Veder - Coral Methane



Tallink - Megastar

# LNG Transfer Systems

MannTek LNG transfer systems feature simple ease of use and reliable designs. All components in the system are designed and carefully selected with safety as the highest concern. This combined with our vast experience in the majority of LNG bunkering projects around the world, our participation in the leading regulatory and trade associations, ensures the final product is cutting edge. It also employs the most current knowledge that is compliant in meeting today's industry regulations.

A transfer system design consists of a DCC coupling, CBC breakaway and a hose transfer line in its basic design but may include more advanced solutions such as the PERC (Powered Emergency Release Coupling), HPN2 release control system and ESD 1&2 wired system.

MannTek LNG system solutions will be tailored to meet exact customer needs, such as design specifications, safety requirements, local and international regulations.

Available sizes range from 2" to 10" and can consist of either single transfer hose line or multiple hoses of up to 10 hose lines. MannTek transfer systems can be used to transfer LNG either for cargo purpose or for LNG as fuel (bunkering operations). They can be used for applications such as:



## Ship to Ship

transfer between ships, either as fuel or cargo



## Shore to Ship

Shore-to-ship operations at an LNG bunker terminal or an LNG terminal.



## Truck to Ship

operations are generally where ships and ferries are fueled from tank trucks.



## Terminal Operations

cover both loading and unloading of rail tankers and tank trucks.

## Dry Cryogenic Couplings, DCC

The DCC, Dry Cryogenic Couplings, use the same design principles as our Dry Disconnect Couplings which have been in use for more than 25 years.

Over 25.000 LNG transfers have been done using the MannTek DCC. They are used in many areas such as marine application, filling tank trucks and LNG containers.

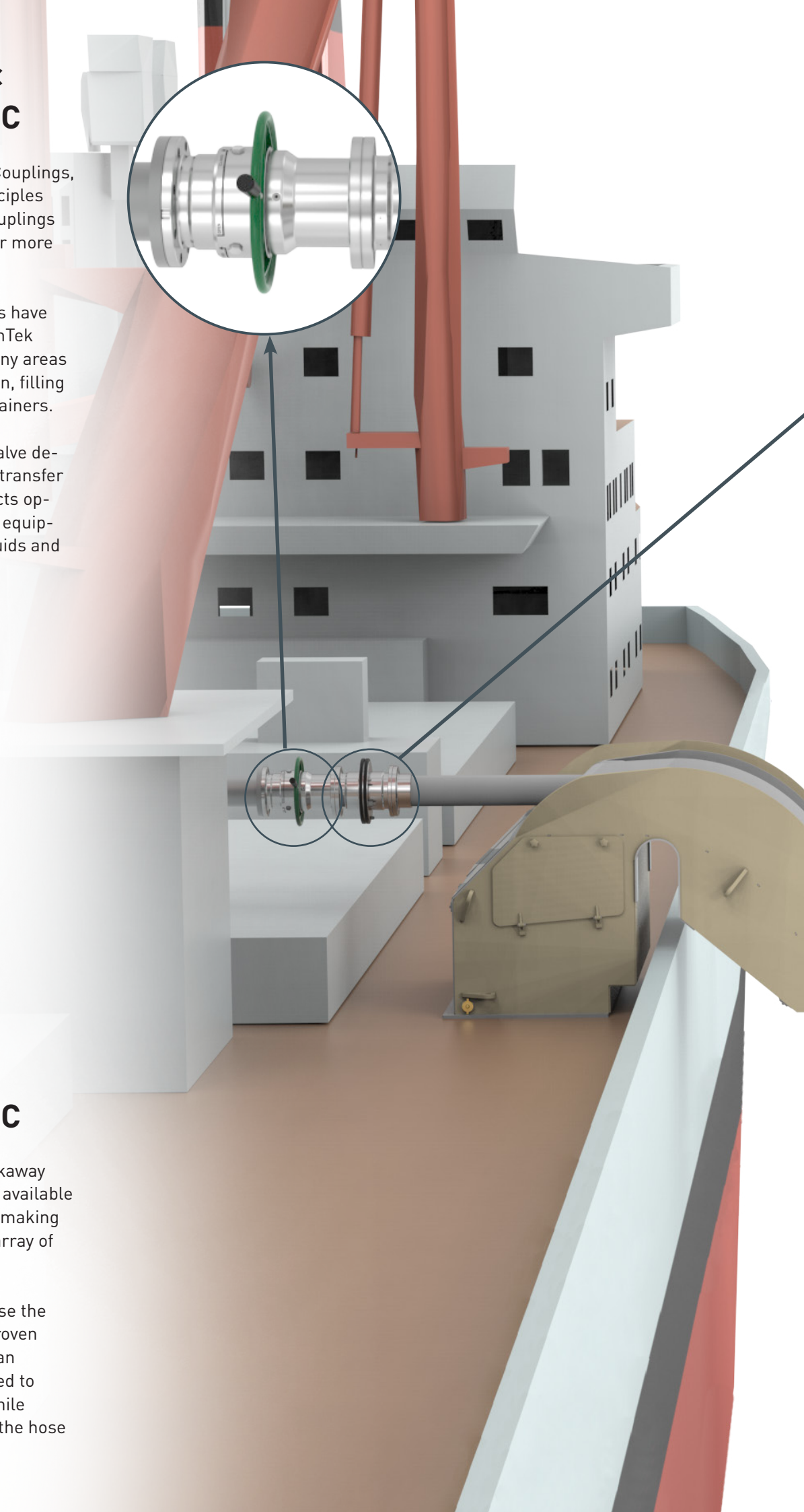
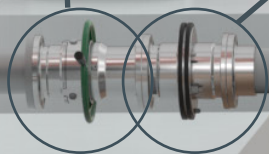
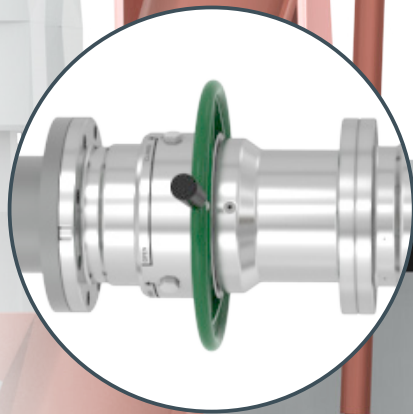
The proven self-sealing valve design contains products in transfer lines at all times. It protects operators, environment and equipment from dangerous liquids and vapours.



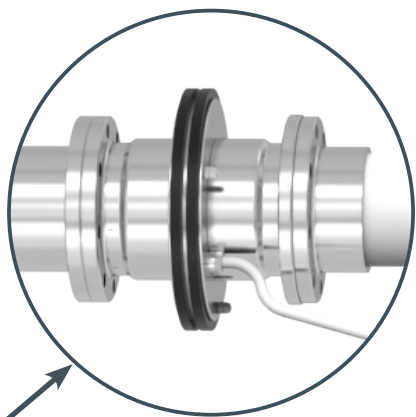
## Cryogenic Breakaway Couplings, CBC

The CBC, Cryogenic Breakaway Couplings, product line is available in three different designs making them suitable for a wide array of applications.

All three configurations use the same reliable and well-proven closure mechanism with an optimised poppet, designed to close and stop the flow while containing the product in the hose and pipe.



## Powered Emergency Release Coupling, PERC



PERC (Powered Emergency Release Coupling), uses the well proven technology from the breaking pin design breakaways but with the additional ability to actively and remotely release the coupling without strain on the transfer system. The release of the coupling is achieved by injecting high pressure Nitrogen into a dedicated chamber in the coupling body resulting in instantaneous release of the PERC.

Since the PERC is based on the same design as the breaking pin technology, the PERC will also activate and respond to stress on the loading system and release. This gives the PERC both an active and passive security level which means that the PERC is a safety device working to 100% even in case of electrical power failure.

## High Pressure Nitrogen System, HPN2

HPN2 (High Pressure Nitrogen) power unit is the dedicated release and monitoring system for the MannTek PERC coupling. It includes the complete control, monitoring and release system utilising high pressure Nitrogen as release mechanism. The system also features a pilot pressure to constantly control the system and keep the system free from moisture and ice. Nitrogen has a lower freezing point than LNG so no additional heating or circulation system is required, Nitrogen is non-hazardous and release or loss of nitrogen requires no clean up.



## ESD 1&2 system

ESD 1&2 system is designed as a vessel separation system utilising two robust wires. When sudden movement occurs (vessel drift-off), the wires will be stretched and when reaching a pre-set pull/load the wires will activate the ESD switches. At first the ESD 1, and then with continued movement the ESD 2 switches will be activated. Output from the ESD 1&2 control device via a terminal block are standard electrical signals that are taken into the ship or shore ESD system enabling the shut down of pumps and closure of manifold ESD valves (ESD1). ESD2 sends a signal to the ship or shore ESD system to the MannTek HPN2 (High Pressure N2) PERC release system to activate separation of the PERC's.



## LNG transfer hoses

LNG transfer Hoses are offered for various applications and requirements. MannTek supplies mainly two different hose technologies, either a composite hose or a stainless steel design, no matter of which hose technology you chose MannTek makes sure that safety is the highest priority and comes with highest level of certifications and approvals. Available in sizes 1" to 8" and WP 10-25 bar.

# Accessories

MannTek offers a big variety of options to help customise transfer systems according to the operators needs, such as: Remote controls for CCR, Y-piece reducers, conical reducers etc.

## SIL2 (Safety Integrity Level 2)

MannTek SIL2 PLC LNG transfer systems have been assessed by DNV-GL and declared compliant to SIL2. This extra safety feature has been developed in accordance with IEC 61508 and IEC 61511 with input data from the PDS Data Handbook 2010.

Identifying mean time between failure (MTBF), probability of failure on demand (PDF), all safety instrumented functions (SIF) and achieving a minimum probability of failure on demand is compliant with safety integrity level SIL2.

The SIL2 compliance is on the whole LNG Transfer System and includes; PERC, DCC, HPN2 PLC control system, ESD1&2 functionality, the logic solver i.e. Siemens PLC controller and software, sensor elements and final elements.



## Hose Saddle

A single or double hose saddle can be used to support the hose in position on both vessels and maintain the correct bend radius.

## Hose Break System

This friction device will maintain a constant rate of descent of the hose after the activation of the PERC following an ESD2. Once it has reached its full extent the rope will 'breakaway' from the friction device

## Other Accessories

MannTek offers a variety of other extra features, such as:

- Heated Parking Device
- Hose Lifting Device
- Hose Protection Covering
- Insulation Flanges
- Hose Reels
- Adjustable N2 Trigger Hoses
- N2 Purge Lines

# Approvals

MannTek complies to all applicable industrial standards and regulations as below. Transfer systems can be supplied with class approval from any major classification society.

Designation	Document Number	MannTek Comply
SIL compliance	SIL1/SIL2	✓
Installation and equipment for liquefied natural gas Shore to Ship	EN1473	✓
Installation and equipment for liquefied natural gas Ship to Ship – design (no longer valid)	EN1474 - 1	✓
Installation and equipment for liquefied natural gas Ship to Ship – design/functionality of whole LNG Transfer system)	EN1474 - 3	✓
Petroleum and natural gas industries – Design and testing of LNG marine transfer arms for conventional onshore terminals (superseded EN1474-1)	ISO 16904:2016	✓
Guidelines for systems and installations for supply of LNG as fuel to ships	ISO 18683	✓
Cryogenic vessels. Cryogenic flexible hoses.	EN12434	✓
Safety of Machinery – Safety-related parts of controls systems	ISO 13849	✓
Petroleum and natural gas industries – Installation and equipment for liquefied natural gas – Ship-to-shore interface and port operations	ISO 28460	✓
Ships and marine technology – specification for bunkering of liquefied natural gas fuelled vessels	ISO 20519	✓
Degrees of Protection provided by enclosures (IP Code)	IEC 60529	✓
Electrical and electronic installations in ships – Electromagnetic compatibility (EMC) – Ships with a metallic hull	IEC 60533	✓
Electrical installations in ships – including Parts: 201, 350, 351, 376, 502, 504	IEC 60092	✓
Functional safety – Safety instrumented systems for the process industry sector	IEC 61511 (all parts)	✓
Functional safety of electrical/electronic/programmable electronic safety-related systems	IEC 61508 (all parts)	✓
International Code for the Construction and Equipment of Ships Carrying Liquefied Gasses in Bulk	IMO IGC Code	✓
Manifold Arrangements for gas fuelled vessels	SGMF Publication	✓
Gas as a Marine Fuel Safety Guidelines	SGMF Publication	✓



**MannTek** is the world market leader in spill-free coupling technology, with more than 20 years of experience from demanding applications. We design and manufacture specialised equipment for safe and environmentally friendly handling of aggressive fluids under harsh climatic conditions, servicing demanding clients all over the world. Our dedication to constant development and improvement makes our couplings the logical choice wherever quality and safety matter.

# MannTek

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## Company Approvals

