

LNG TRANSFER SYSTEM

DCC – Dry Cryogenic Couplings

CBC – Cryogenic Break-away Couplings

PERC – Powered Emergency Release Coupling

HPN2 – High Pressure Nitrogen System

VSD – Vessel Separation Device

LNG TRANSFER HOSES

DCC Dry Cryogenic Couplings

DCCs, Dry Cryogenic Couplings, employ the same design principles as our Dry Disconnect Couplings, which have been in use for more than 25 years. Dry Cryogenic Couplings have been tested under cryogenic conditions by connecting and disconnecting over 10,000 times. With more than 25,000 LNG transfers having been completed using MannTek DCCs, they are considered by operators worldwide to be the safest in the market. These couplings are used for ship to ship transfer, LNG Bunkering, Marine applications, filling tank trucks and LNG containers. The proven self-sealing valve design enables quick connection and disconnection while protecting operators, the environment and equipment from dangerous liquids and vapours. The MannTek DCC is designed to be compliant with both ISO 18683 and the new ISO 21593.

+ Key benefits

TIME SAVING Connect or disconnect hoses and pipelines in seconds. No need for retightening during cool down phase. Wet disconnect possible. No need for draining or purging.

EASY TO HANDLE Push and turn - free flow. Turn and pull - closed.

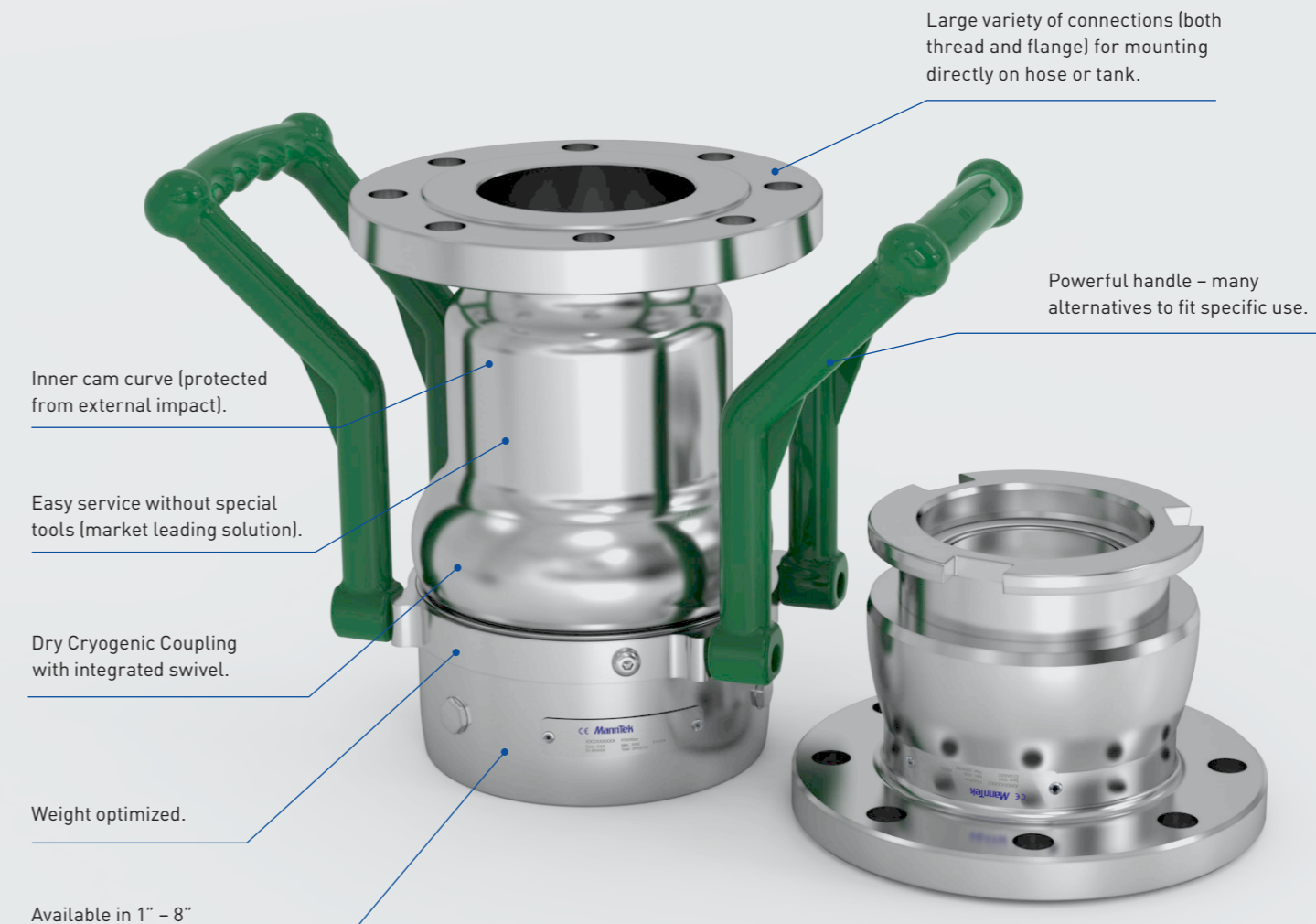
SAFE The valve cannot be opened until the unit is coupled and closes automatically when disconnecting.

ENVIRONMENTALLY FRIENDLY Accidental spillage eliminated.

RELIABILITY No loss or spillage of liquids on connection or disconnection.

Applications

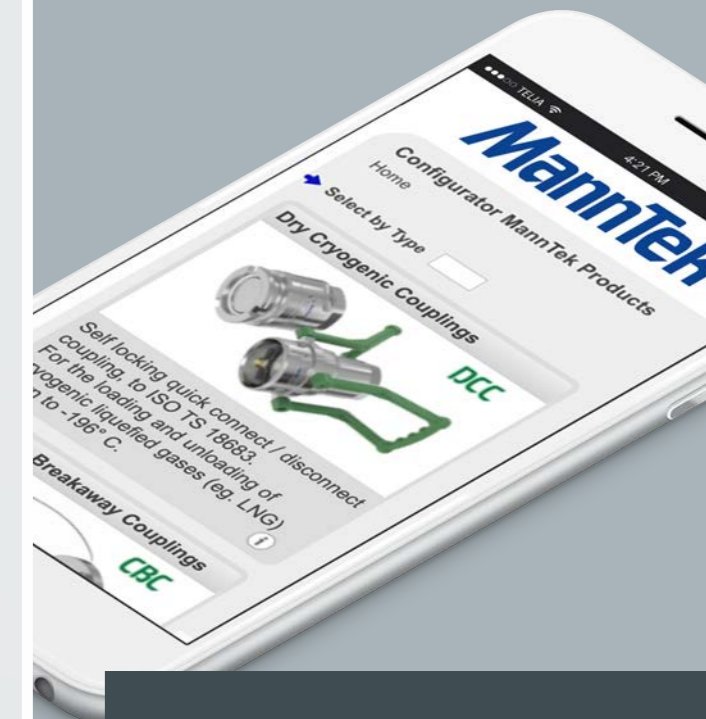
- Container discharge
- Fuel bunkering
- Loading/unloading of tank trucks, rail tankers, bunkering and tank vessels
- Vapour recovery lines



Large variety of connections (both thread and flange) for mounting directly on hose or tank.

Powerful handle – many alternatives to fit specific use.

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VESSEL SEPERATION DEVICE (VSD)

is designed as a vessel separation system utilising two robust wires of different lengths both shorter than the hose. 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 VSD switches.

The first VSD 1 will create an ESD 1 signal, and then with continued movement the VSD 2 will create an ESD 2 signal. Output from the VSD 1&2 control device via a terminal block are standard electrical signals that are taken into the ship or shore ESD system enabling pumps to be shut down and manifold ESD valves to be closed (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.



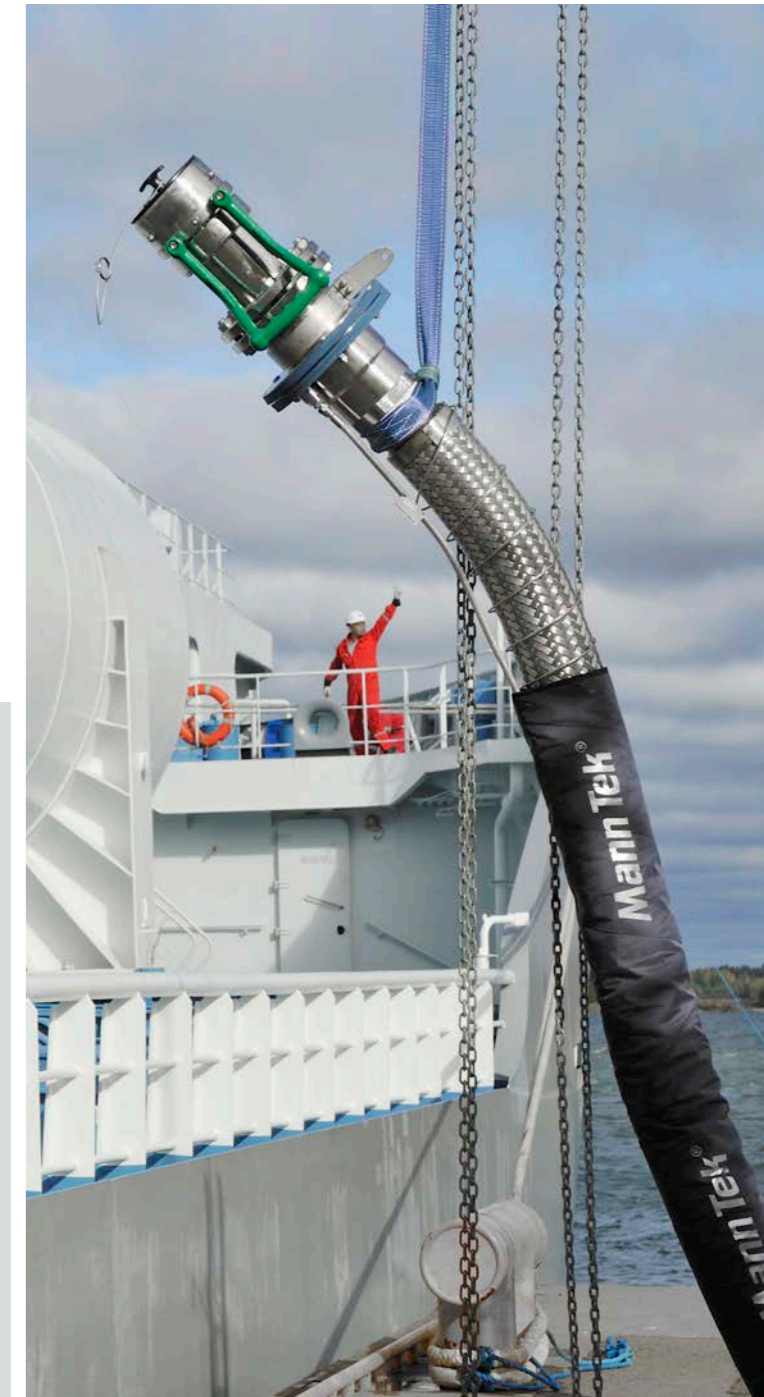
HIGH PRESSURE NITROGEN SYSTEM, HPN2 – SIL1 SIL2

power unit is the dedicated release and monitoring system for the MannTek PERC coupling. It includes the complete control, monitoring and release system, which uses high pressure Nitrogen in the release mechanism. The system also features a pilot pressure regulator to constantly monitor the system and keep the system free from moisture and ice.



LNG TRANSFER HOSES

are offered for various applications and requirements. MannTek offers two different hose technologies, either a composite hose or a stainless steel design. No matter which hose technology you choose, MannTek makes sure that safety is the highest priority and offers the highest level of certifications and approvals. Available in sizes 1" to 10" and WP 10-25 bar.



ACCESSORIES

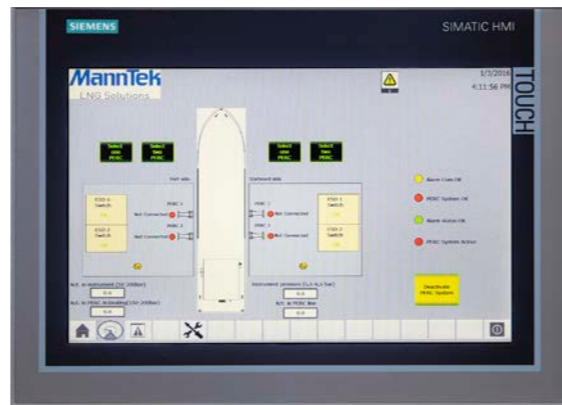
MannTek offers a large variety of options to help customise transfer systems according to the operator's needs, including remote controls for CCR, Y-piece reducers, conical reducers etc.

SIL2 (SAFETY INTEGRITY LEVEL 2)

MannTek SIL2 PLC LNG transfer systems have been assessed by DNV-GL and certified 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 the 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.

Safety functions of the LNG Transfer System is SIL2 compliant, including the PERC, HPN2 PLC control system, the ESD1&2 functionality, the logic solver (Siemens PLC controller) as well as the software, sensor elements and final elements.



HOSE SADDLE

A single or double hose saddle can be used to hold the hose in position on both vessels and maintain the correct bend radius. Can be supplied with or without integrated hose break/fall arrest, with an option for adjustable height.



HOSE BREAK SYSTEM/FALL ARREST

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



HEATED PARKING DEVICE

Heated parking device is used to easily defrost and dry the hose unit after LNG transfer operation. The heated parking device ensures that the hose unit will be ready for transfer operations again within minutes.



OTHER ACCESSORIES

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

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

APPROVALS MannTek complies with 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	✓

DESIGNATION	DOCUMENT NUMBER	MANNTEK COMPLY
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	✓
Preview Ships and marine technology – Technical requirements for dry-disconnect/connect couplings for bunkering liquefied natural gas	ISO 21593:2019	✓
LNG STS Guidelines	SIGTTO	✓