



**Transfer lines for liquefied natural gas
for fast and safe offloading in rough seas
and onshore**

Nexans, worldwide leader in cables and cabling systems

As a global expert in cables and cabling systems, Nexans brings an extensive range of advanced copper and optical fiber solutions to three key sectors of the economy: **infrastructure, industry and buildings.**

Its cables and systems can be found in every area of people's lives, from rolling stock and railway infrastructure to telecommunications and energy networks, aeronautics, aerospace, automobiles,

petrochemicals, windmills, medical applications, etc.

The presence of Nexans in over 65 countries gives it a full mastery of both national and international standards. Its 10 Competence Centers and International Research Center work closely with customers to constantly improve its standard range of products and technologies and to develop customized, country and industry-specific solutions.



Transfer lines for liquefied natural gas from Nexans to assure your operational efficiency

Faced with rising demand, and green concerns, the oil & gas industry is seeking to explore new reserves, reduce costs, and improve operational efficiency. Remotely-managed “smart wells”, both land-based and offshore, are a definite trend, as well as longer and deeper umbilicals. Meanwhile, the industry is forever looking for safer, more reliable and environmentally-friendly methods in extraction and processing.

Nexans provides a wide range of energy and telecom cables for prospecting, production and distribution, as well as for refineries, storage depots and petrochemical complexes, including safer lead-free energy cables. Aside from mastering installation techniques both onshore and offshore, Nexans has developed deepwater umbilicals, new protective sheathings, high-speed optical fiber solutions,

and fire-performance products, all of which are recyclable.

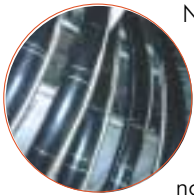
With gas as the fastest growing primary energy source worldwide (+2.8% annually) you are anxious to get your product to market fast and safely, and that means direct transfer from floating production ship to shuttle tanker in ocean conditions. For this you need cables that not only maintain LNG gas in a supercool liquefied state, but that are flexible enough to withstand violent seas. You also want high flow rates, since a complete transfer must be done during daytime. Since LNG is highly flammable, you want to make sure that a breakage or puncture does not affect the transfer, or pose a danger.

To help you improve efficiency, Nexans offers safe and dynamic **transfer lines for LNG**.



Transfer lines for liquefied natural gas

Transfer lines for liquefied natural gas: dynamic flexibility and cable redundancy for speed and safety



Nexans has 20 years of experience in cryogenic transfer lines for liquid nitrogen, helium, oxygen, hydrogen, methane, and now natural gas. Its latest maritime version, Cryodyn[®], is designed to handle dynamic ocean conditions. Rather than transferring LNG in dangerous side-by-side position, Cryodyn[®] uses tandem loading. Six 55-meter-long separate tubes suspended from a dynamically-positioned crane on the Floating Production, Storage and Offshore Loading (FPSO) vessel are connected to the shuttle tanker. Each tube has a “vacuum-flask” design with an inner and outer tube maintaining ultra-low temperatures while supporting violent roll and pitch. Similar designs (Cryoflex[®]) can also be used on land for tank-to-tank, -tanker, -truck or -train transfers.

This Nexans solution gives you:

- **Enhanced safety** since vacuum construction uses two concentric tubes per line; if the inner one breaks, the outer one keeps functioning, and vice versa
- **Ruggedness** to handle waves up to 5 meters in harsh North Sea conditions
- **Long-lasting** with up to three years flawless functioning even with daily use
- **Consistent coolness** because of a very reliable insulation design
- **Quick and easy replacement** since you just have to disconnect the 55-meter separate tube and attach a new one without disturbing gas flow
- **High capacity** capable of delivering 10,000 cubic meters per hour
- **Easy hookup** to shuttle tankers using specialized Nexans terminations
- **Backup** since if one of the 6 tubes fail, the others easily fill a ship in a day
- **Seaworthy design** with stainless steel to resist salt water and protective rubber housings to prevent damage by impact.



Nexans continues to improve LNG transfer technologies

When Statoil of Norway was seeking better ways of offloading LNG in high-sea conditions, it contacted Nexans to see if an existing, high-performance transfer line, Cryoflex[®], could be used. Working together, a new maritime transfer technology was developed.

Over a five-year period, with the added input of other oil companies, the original product was further tested and improved. The latest version, Cryodyn[®] was qualified in 2003 to meet the high quality and performance standards of major gas suppliers.



Transfer lines for liquefied natural gas



Product families	Product family names	Standards / Specs
Cryoflex	Standard Transfer Lines for LN2 Transfer Lines for LOX, LH2, LHe Special Transfer Lines for all liquified gases Cryogenic Envelope for HTS-Cables	<ul style="list-style-type: none">• DIN ISO 9001/DGRL 97/23/EG• DIN ISO 9001/DGRL 97/23/EG• DIN ISO 9001/DGRL 97/23/EG• DIN ISO 9001/DGRL 97/23/EG
Cryodyn	Transfer Lines for LNG transfer	<ul style="list-style-type: none">• DIN ISO 9001/DGRL 97/23/EG





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