

bluewater

Offshore LNG transfer solutions

The future of LNG transfer

Type approved flexible LNG hose

Bluewater's large bore Composite Cryogenic Hose is type-approved by Lloyd's Register for offshore marine service in suspended aerial applications for repetitive and continuous use. The Composite Cryogenic Hose is available in diameters of 8 inch and 16 inch to meet the transfer rates required. Hose sections can be joined together using their flanged end fittings to form large strings of hose of the length required for any given project.

The future of LNG transfer

Bluewater has successfully installed many offshore terminals based on SPM technology over the last 30 years. The design and operational philosophies applicable to those terminals have also been applied to the design and implementation of the transfer solutions enabling offshore production units as well as fully weathervaning LNG SPM type offshore terminals.

The technology for cryogenic fluid handling and regasification has now evolved to maturity for implementation in LNG offshore terminals that are expected to provide an economical and safe alternative to traditional methods of LNG transfer.

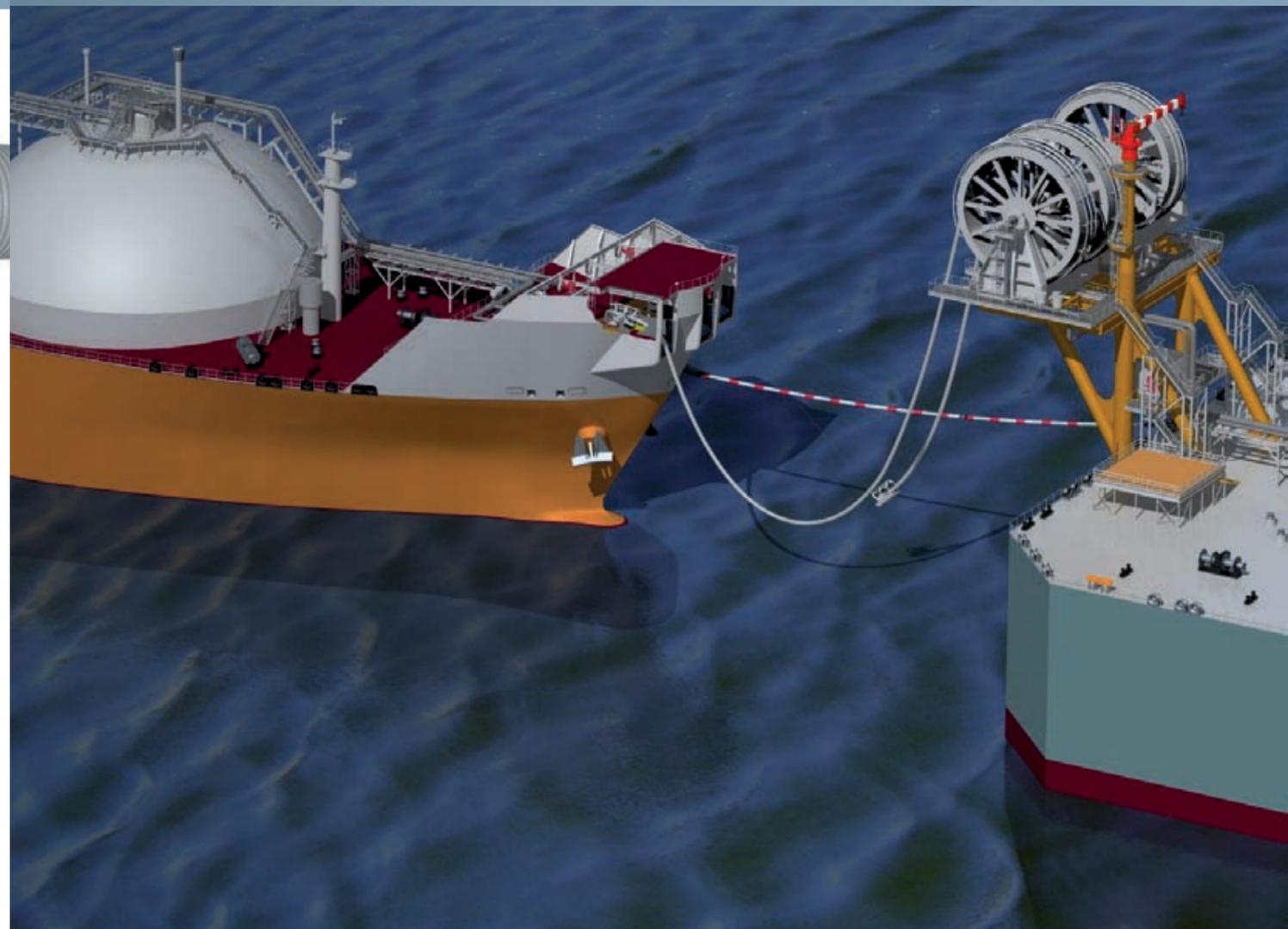
Bluewater Energy Services is able to offer a complete LNG transfer system suitable for floating offshore production and re-gasification facilities as well as near shore terminals. All systems are based on the Composite Cryogenic Hose, the one large bore hose truly suitable for offshore LNG transfer.

Further details

For further information on LNG transfer solutions please contact:

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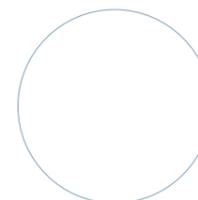
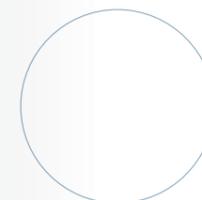
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Innovative solutions for offshore LNG transfer

With the development of LNG production offshore and the introduction of re-gasification vessels, ship to ship LNG transfer operations will more and more become a regular operation. Offloading technology is a key enabler in the evolution of offshore facilities for the export or import of liquefied natural gas. Essential to this technology is the large bore Bluewater Composite Cryogenic Hose, providing the highest possible safety and reliability as the LNG industry moves offshore.

Predictability, availability and reliability are critical requirements for controlled and safe transfer operations, especially in a dynamic, offshore environment. For this reason Bluewater combines the Composite Cryogenic Hose, the one truly flexible, large bore hose for offshore LNG transfer, with offloading technology that has been proven in the LNG and offshore oil industry.



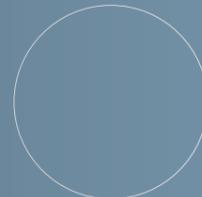
To allow flexible and efficient operation of offshore production facilities, it may be essential that for the transfer of LNG standard carriers can be utilized. This requires the transfer of LNG to take place at the mid-ship manifold.

For the benign marine environment, Bluewater has developed Side-by-Side transfer solutions, based on the Composite Cryogenic Hose to make use of this manifold with only minimum adaptation of the LNG carrier.



For the less benign and harsh environments a stern to bow transfer system has been designed. The qualification of this tandem LNG transfer system follows the RPA203 technology qualification process of DNV.

The hoses are deployed from and stored on reels, located at the back of an FLNG or FSRU. A receiving system is required on the bow of an LNG shuttle carrier for tandem loading. This bow loading system will comprise a hose connection and loading system, emergency release and a hawser connection system.



Near-shore LNG transfer terminals

Offshore transfer terminals offer an attractive alternative to new land based terminals in existing port areas or located in specially developed new port infrastructure. Increased port infrastructure may result in port congestion and related availability problems and may also result in notably high construction and maintenance costs.

Offshore terminals have proven to be very cost effective as there is no need to develop an extensive port infrastructure, e.g. channel dredging, breakwaters, trestles and jetties. Also operations are more efficient and safe since navigation of congested waterways is avoided and offloading operations can be performed at a safe distance from the storage tanks and from other human activity. The berthing of carriers at the SPM can take place with minimum tug assistance and with vessels of virtually any type and size. Loading operations can continue in sea states of up to 3.5 m significant wave height, which is significantly higher than the wave height limit typical on most conventional jetties.



For locations with mild environmental conditions a conventional buoy mooring (CBM) terminal system can be designed for standard LNG carriers.

In this type of system an LNG carrier is moored in between a number of buoys in a fixed heading. Composite Cryogenic Hoses can be deployed from a simple offshore crane facility to connect to the mid-ship manifold on any LNG carrier.



For the more demanding environments, the weathervaning SPM type terminal has been successfully implemented and accepted over the past three decades by the oil and petrochemical industry.

A tower type of SPM terminal system allows the design of a weathervaning system deploying aerial suspended Composite Cryogenic Hoses to connect to a dedicated bow manifold.