

GAS TRANSPORT MODULES (GTM)



Gas Transport Modules (GTM) are pressure vessels constructed from Composite Reinforced Line Pipe (CRLP) sections with end-caps welded on and associated manifolding attached.

The Technology was developed by NCF Industries Inc., and licensed to TransCanada PipeLines Limited.

The Modules are used to transport highly compressed natural gas at up to 3,600 psi (24,800 kPa) via ocean, river, rail or roads to markets where transportation by pipeline or liquified natural gas (LNG) is uneconomic or otherwise infeasible. They are typically up to 42 in (1067 mm) in diameter and up to 80 ft (24.4 mm) long, although other diameters and lengths can be produced. Stranded gas can be collected offshore and delivered directly to the onshore market (such as power plants, industrial operations or municipalities) or into pipelines or intermodal containers that would then deliver the gas to inland markets.

ECONOMICS OF MONETIZING STRANDED GAS

GTM Technology provides an economical and environmentally sound solution to delivering distressed or stranded gas reserves to market. Gas reserves up to 2.8 tcf that cannot be economically monetized using traditional pipeline or LNG technology are ideally suited to a GTM solution. GTM technology provides the means to transport volumes between 10 and 500 MMscf/day (0.3 to 14MMm³/day) using any combination of intermodal containers, trucks, barges or ships. In particular, customers considering LNG may find that Gas Transport Modules offer a much more economic option as well as offering multi-point collection and delivery.

TESTING AND APPROVALS OBTAINED

- Approval of an inland CNG barge design, utilizing GTM vessels, was granted by the American Bureau of Shipping (ABS) in December 2001.
- Approval for the use of GTM as a pressure vessel was granted by the American Society of Mechanical Engineers (ASME) in October 2002.
- Approved in Principle for the use of GTM pressure vessels in ships was granted by Lloyds Register in September 2003.
- Results of technical and commercial feasibility tests have been presented to ASME, the Alberta Energy and Utilities Board (EUB), the Canadian National Energy Board, Canadian Standards Association (CSA), and U.S. Department of Transportation (DOT) for regulatory approval.

POSSIBLE APPLICATIONS


Gas Transport Modules can be used in a variety of areas to transport gas that is presently uneconomic to transport using conventional technology such as:


- Offshore where the size of the reserves or nearby markets do not justify the economics of either a pipeline or LNG facility.
- Onshore or offshore in areas where small fields, short-term producing reservoirs or peaking or short-term market needs do not justify the long-term investment for permanent facilities. The Modules can be moved at the end of the life of the field or market.
- In areas where short-term incremental capacity (supply or markets) is required but economics do not justify expanding existing infrastructure.
- In areas where waterways, roads or rail are present and pipelines are environmentally unacceptable.
- In areas where markets are in their infancy and an infrastructure needs to be developed and the market grown before pipelines become an economical alternative.


GTM™ is a trademark of NCF Industries, Inc. GTM™ is manufactured under license from NCF Industries, Inc. U.S. and foreign patents have been issued and are pending.

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GTM MODES OF TRANSPORT (typical volumes)

TRUCK/INTERMODAL CONTAINER	CARRIED VOLUME		CARRIED ENERGY	
	std 10^3 m ³	MMscf	GigaJoules	BTUs (millions)
	up to 7.1	up to 0.25	280	270

RIVER BARGE	CARRIED VOLUME		CARRIED ENERGY	
	std 10^3 m ³	MMscf	GigaJoules	BTUs (millions)
	up to 850	up to 30	33,500	31,800

SHIP	CARRIED VOLUME		CARRIED ENERGY	
	std 10^3 m ³	MMscf	GigaJoules	BTUs (millions)
	up to 28,289	up to 1,000	1,116,000	1,057,800

