LNG 40ft ISO container tank

CTT Cryo Trans Tech

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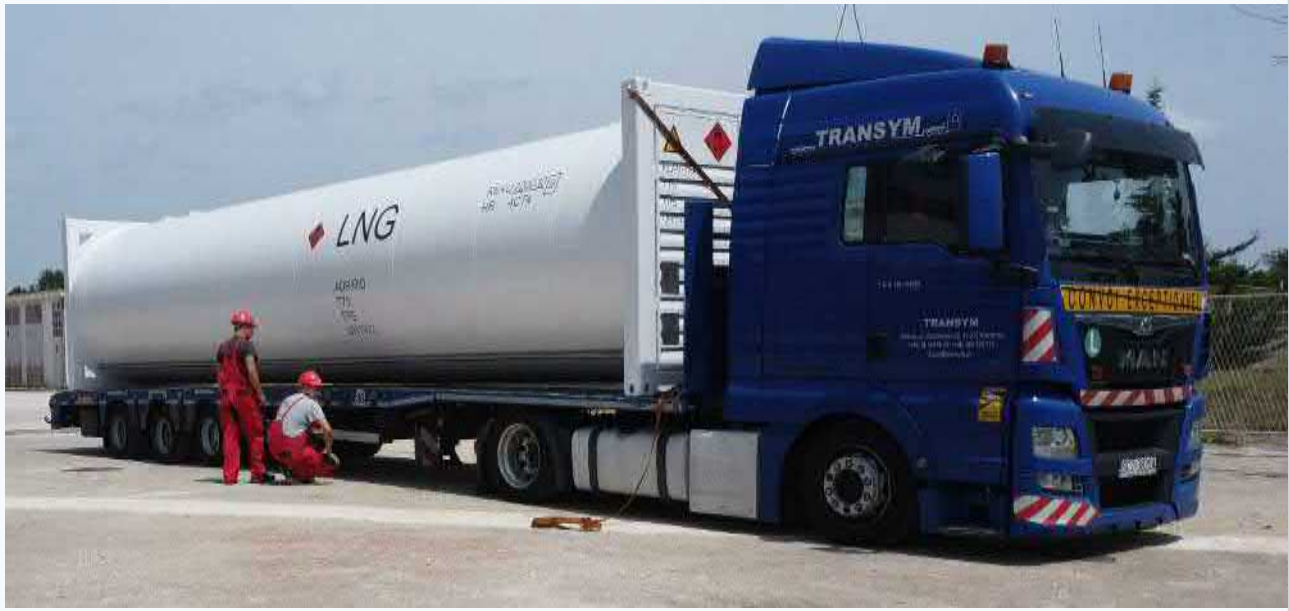

CTT CRYO TRANS TECH

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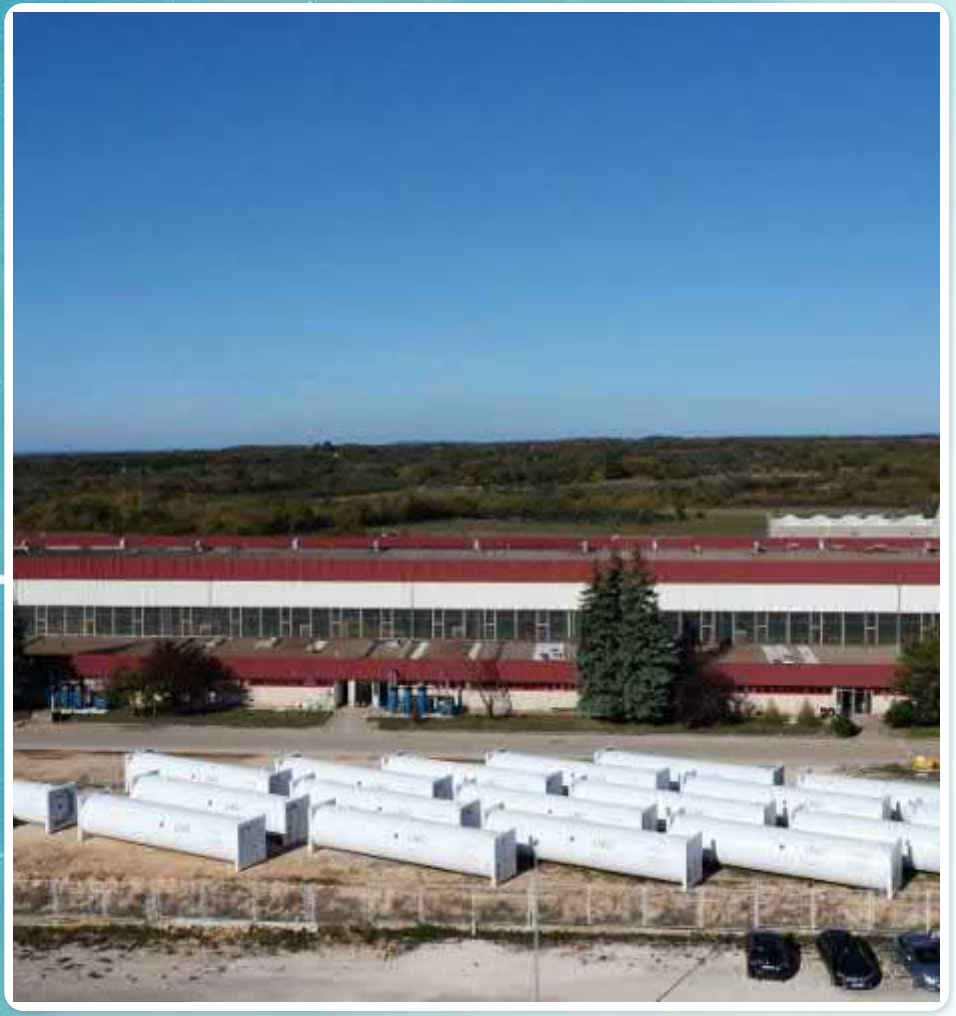
CTT Cryo Trans Tech

Company overview

LNG 40ft ISO container tank

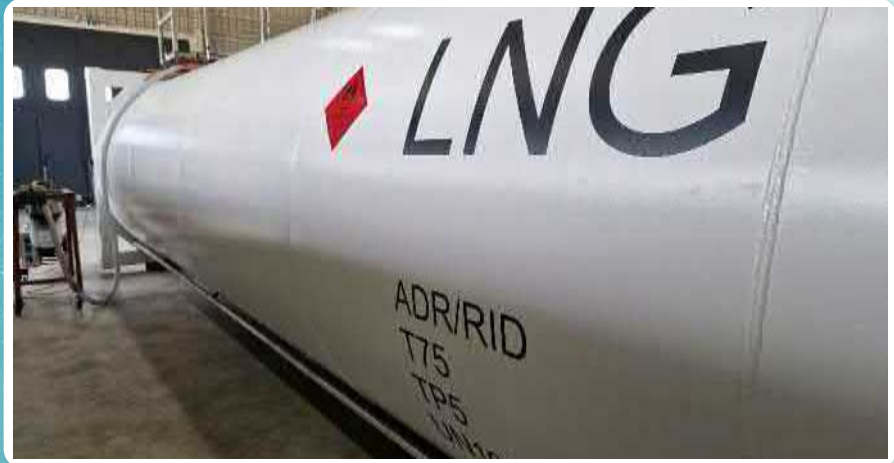
- The CTT – Cryo Trans Tech company was founded in 2004 and specializes in the production of cryogenic vessels for gas transportation.
- Company is located in Vodnjan, Croatia, where our factory is located on a total area of 78,000 square meters.
- The special features of the TCC LNG ISO container tank are great durability, solid construction and most importantly, special insulation that enables superior holding time.
- All products have been designed, certified, and approved and satisfy all relevant well-known standards.



Our Solutions: Optimizing ISO Cryogenic Containers for Multi-Modal Transport

- We understand the critical demands of transporting liquefied gases by both rail and ship. These multi-modal journeys involve significant handling, transshipment, and constant exposure to vibrations and impacts. In such a challenging environment, the robustness of our container, and reliability of its insulation aren't just features, they are necessities, as vital as thermal efficiency itself.

- These factors often lead to degraded insulation performance over the course of a long, varied journey, resulting in higher product losses and increased operational costs compared to stationary storage or single-mode transport.

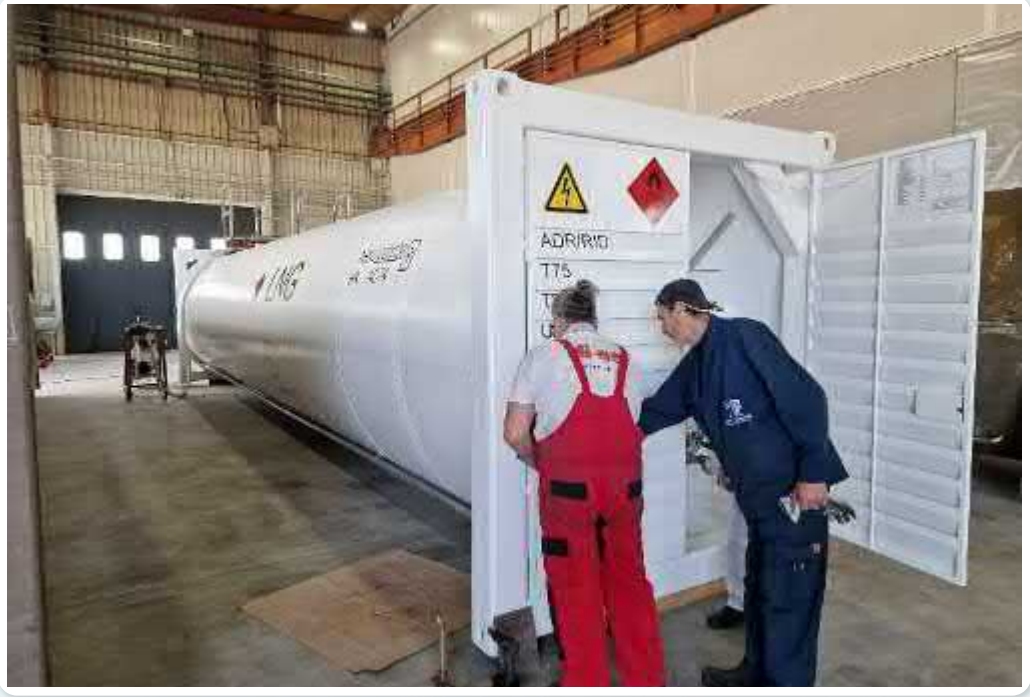


Addressing a Critical Market Gap

There's a critical gap in the market for cryogenic ISO containers truly designed for the rigors of multi-modal transport, by both rail and ship. Standard insulation solutions, while adequate for stationary or less demanding applications, simply fall short when faced with the realities of frequent handling, challenging transshipment, and constant exposure to vibrations and impacts.

Why conventional insulation was not enough

We concluded that relying on conventional insulation methods wasn't an option for our cryogenic tanks for the following reasons:



Traditional Multi-Layer Insulation (MLI): Despite its thermal performance in lab conditions, MLI proved too fragile for real-world logistics. We observed that even slight compression or the usual vibrations from rail and sea transport drastically degrade its insulating properties, leading to higher boil-off rates (BOR) and shorter holding times. Moreover, MLI's efficiency drastically drops if the vacuum isn't near perfect. Any minor vacuum degradation can lead to rapid heat transfer through the layers of MLI, making it less reliable for extended journeys where vacuum integrity might fluctuate.

Perlite Insulation - Compaction and Settling: Perlite compacts and settles over time, which directly increases heat transfer through the insulation layer and shortens holding times.

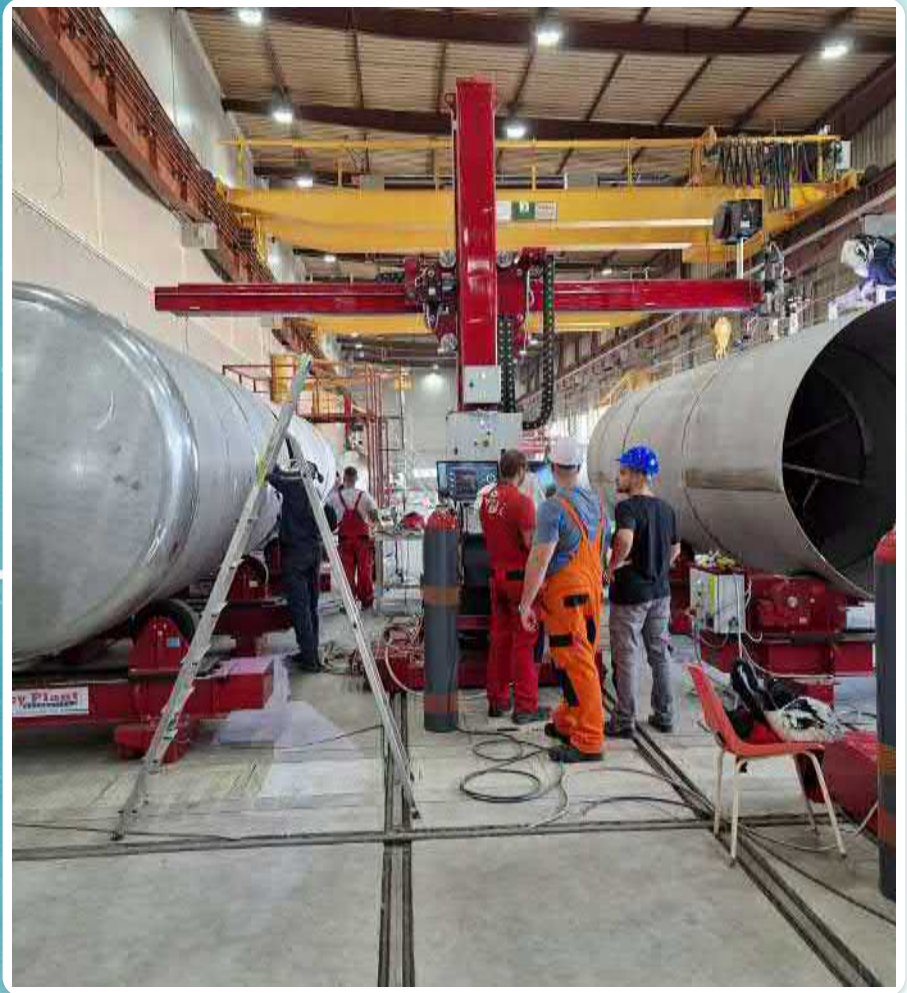
Ultimately, these factors often result in degraded insulation performance and a reduction in the holding time over a container's lifespan, particularly during long, varied journeys. This leads to higher product losses and increased operational costs.

Engineering Uncompromising Performance

- Understanding these limitations, we committed to an ambitious goal: to engineer a superior ISO Cryogenic Container for Multi-Modal Transport, with an insulation method that offers long-term, uncompromising performance.
- Smart Thermal Design: First, we focused on smart thermal design to minimize radiant heat transfer to the inner vessel. This significantly improved the Boil-Off Rate (BOR) and extended holding times, yielding substantial benefits even before considering advanced insulation materials.

- Proprietary In-House Insulation Method: We then undertook a second mission, integrating advanced materials science with engineering to develop our proprietary, in-house insulation method. This method wasn't just an improvement; it was a fundamental rethink. It was designed from the ground up to ensure that our cryogenic ISO containers maintain optimal thermal integrity no matter how many times they are transferred, or how challenging the journey is.

- We developed this solution so you can have complete confidence in the reliability and efficiency of your transport operations, giving you a competitive edge in a demanding market.



Stationary Performance of Our In-House Insulation

When used in stationary applications, our in-house insulation method demonstrates exceptionally stable holding times under optimal vacuum conditions. The absence of vibration, impact, and temperature increases found in transport scenarios allows the insulation structure and vacuum integrity to remain undisturbed, resulting in minimal boil-off and extended thermal efficiency over long periods.

Insulation Method Comparison

Parameter	Multi-Layer Insulation (MLI)	Our Proprietary In-House Insulation Method
Mechanical Stability	Sensitive to layer shifting; performance degrades under vibrations.	Highly vibration resistant - unaffected.
Impact Resistance	Layers can crumple or rupture under shock.	Highly impact resistant - unaffected.
Vacuum Degradation Risk	Higher risk due to micro-leaks and gas permeation.	Low — The insulating material functions as a passive diffusion barrier.
Long-term Reliability	Performance drops after several load/unload cycles.	Remains stable over many cycles, maintains satisfactory performance even if the vacuum degrades.

CTT LNG cryogenic ISO tank container Concept 2
TECHNICAL SPECIFICATIONS

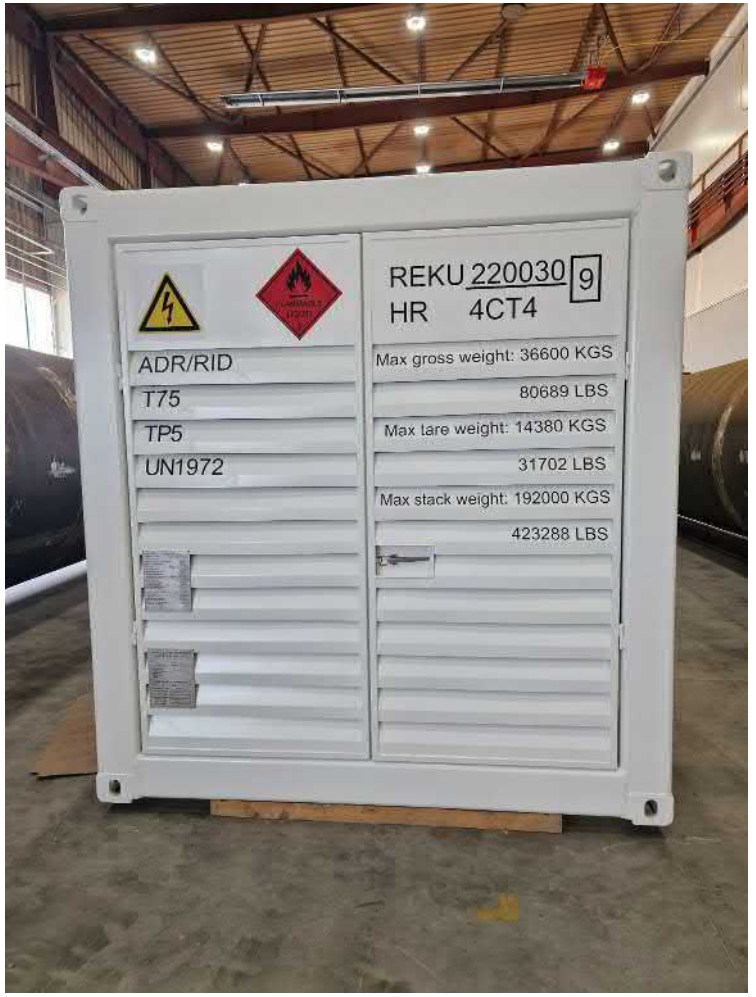
MODEL OF TANK-CONTAINER Concept 2

Purpose

Container Tank-container model Concept 2 (hereinafter – the container) is the transport equipment designed for safe transport of liquefied natural gas (LNG) by road, rail and sea transport, domestic and international traffic and keeping them from the consignee.

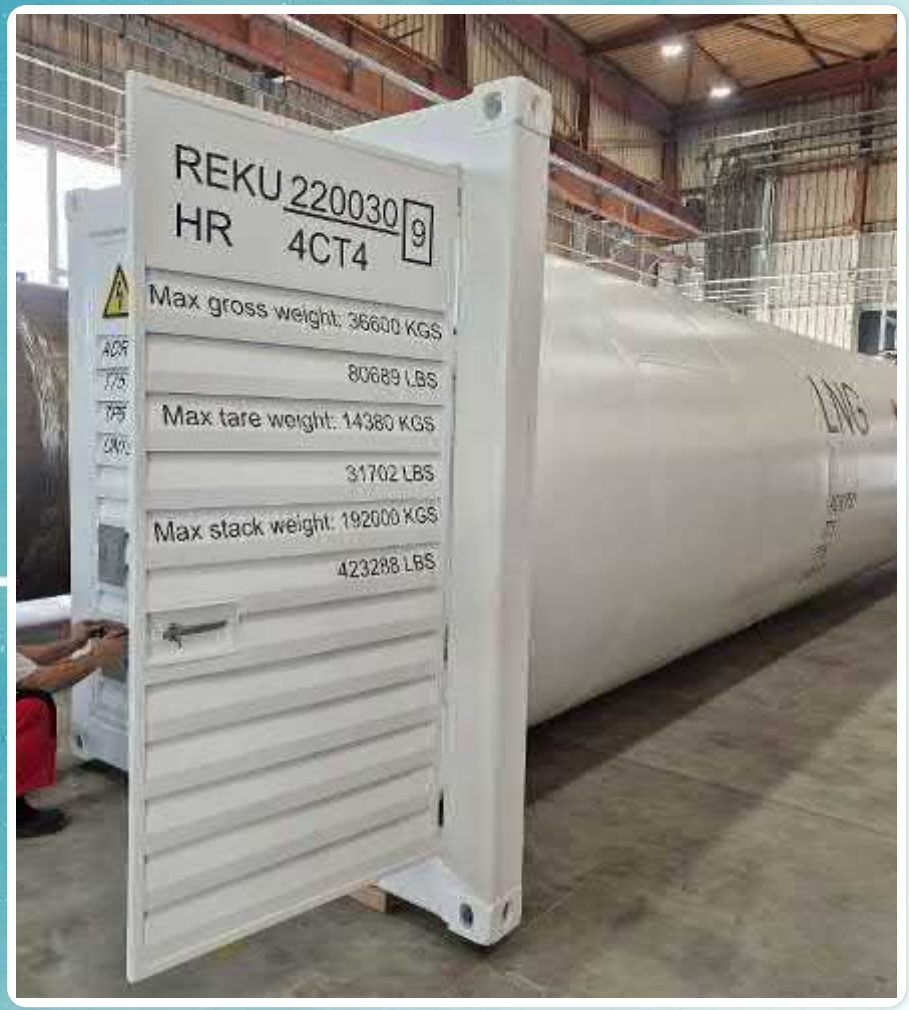
TEHNICAL CHARACTERISTICS

Type of container	UN T75
Nominal volume (±1%)	36600 litters
The maximum allowable gross weight, kg	36600 (under ISO 668:1995)
Mass of empty container (tare), (±1,5%)	15.000kg
The maximum load	16100kg
Permitted weight of top container stacking, kg	192000



Regulations, which corresponds to the container

- ASME VIII div1.
- EN 13530-2/A1
- Bureau Veritas Certificate
- The International Maritime Dangerous Goods Code (IMDG)
- International Regulations for the carriage of dangerous goods by rail (RID)
- European Agreement Concerning the International Carriage of Dangerous Goods (ADR)
- International Convention for Safe Containers (CSC)
- Customs Convention for Safe Containers (CCC)
- International standards: ISO 688:1995



Dimension and weight

Dimensions of ISO 668:1995 IAA

Length, mm	12192
Width, mm	2438
Height, mm	2591
Along the length of	11985
From the width of	2259

The size of the tank

Diameter, mm:	
Inner vessel	2100
Outer vessel	2400
Length, mm:	
Inner vessel	10950
Outer vessel	12160

Dimension and weight

The maximum allowable gross weight, kg	36600 (under ISO 668:1995)
Mass of empty container (tare), (±1,5%)	15.000kg
The maximum load	16100kg
Permitted weight of top container stacking, kg	192000

The distance between the centres of corner fittings, mm:

Along the length of 11985
From the width of 2259

Pressure, temperature, isolation and confinement time

The maximum allowable working pressure, MPa	0,6
The design pressure, MPa	0,76
Test pressure, MPa	0,91
The pressure of the opening of the safety Valve, MPa	0,6 (±2,5%)
Estimated ambient pressure, MPa	0,1
Calculated temperature °C, the vessel wall	-196
Operating temperature range °C	-40 to +50
The volume of insulating space m^3	15,6
Reference holding time (the time between the establishment of the initial state filling and increased opening pressure relief valve), (at a working pressure of 0,15 MPa abs. and a working temperature of -156°C), days	86, at least, certified by Bureau Veritas, Paris.

Materials and inspection of welded joints

Materials

- Bottoms
- Stainless steel vessel, X6CrNiTi18-10
- Low alloy steel vessel, P355NL2
- The cylindrical portion
- Stainless steel vessel, X6CrNiTi18-10, t=6mm
- Low alloy steel vessel, P355NL2, t=9mm
- End frames and struts low alloy steel, grade P355J2H, t=10mm
- Corner fittings carbon-manganese steel

Inspection of welded joints

- Visual inspection 100% inner and outer vessel
- Inner vessel US control 100%
- Outer vessel US control 100%
- Inner vessel pressure testing at 9,1 bar
- Outer vessel pressure testing at 5,4 bar
- Inner vessel He-leak test
- Outer vessel He-leak test
- End frames and containers sockets visual 100%, MPI /PT 100%

VALVES, SAFETY AND TEST FIXTURES, ACCESS DEVICE INSIDE TANK

Safety valve	Type ‘’Herose” (or equivalent), 1½”x2” number 06388,
Location of reinforcement	it the compartment
Loading device (drain) of the liquid phase	Type 1. ‘’Herose’ (or equivalent), DN 50, PN40 number 01341,
The device drains the gas phase	’Herose” (or equivalent), DN 50, PN40 number 01341,
The level of liquid gas	‘’Wika” (or equivalent), the mechanical type, differential pressure gauge
Manometer	‘’Wika” (or equivalent), the mechanical type, measuring range from 0 to 1MPa, 100mm in diameter
Thermometers	not provided for the construction of the container
Internal piping material	Stainless steel X5CrNi18-10
Hatch	is not provided for the construction of the container
Stairs	are provided for the construction of the container, 1 pc. at the end and lateral surface

PROTECTIVE CONTAINER AND CARGO FROM OVERHEATING AND FIRE

Device for grounding	the design of the M8 screws made of stainless steel
Pencil case for documents	the material is stainless steel
Location	on the rear face of the frame
One set of marks	under the technical documentation of the container
Decals names	Plaque on the tank / CSC plate / Manufacturer plate
Remote closing valves	The construction of galvanized stainless-steel wire with a diameter of 3mm and length of 13m, equipped with a karabiner
Valve compartment	The material and design of steel, painted with lockable door, with a sign – the instructions on the inside of the door
Location	on the end of the container
Instrument panel	The material and design of stainless steel/brass,
Location	on the end of the container

FINISH OPERATION

Tank shot blasting outside, ready for coating:

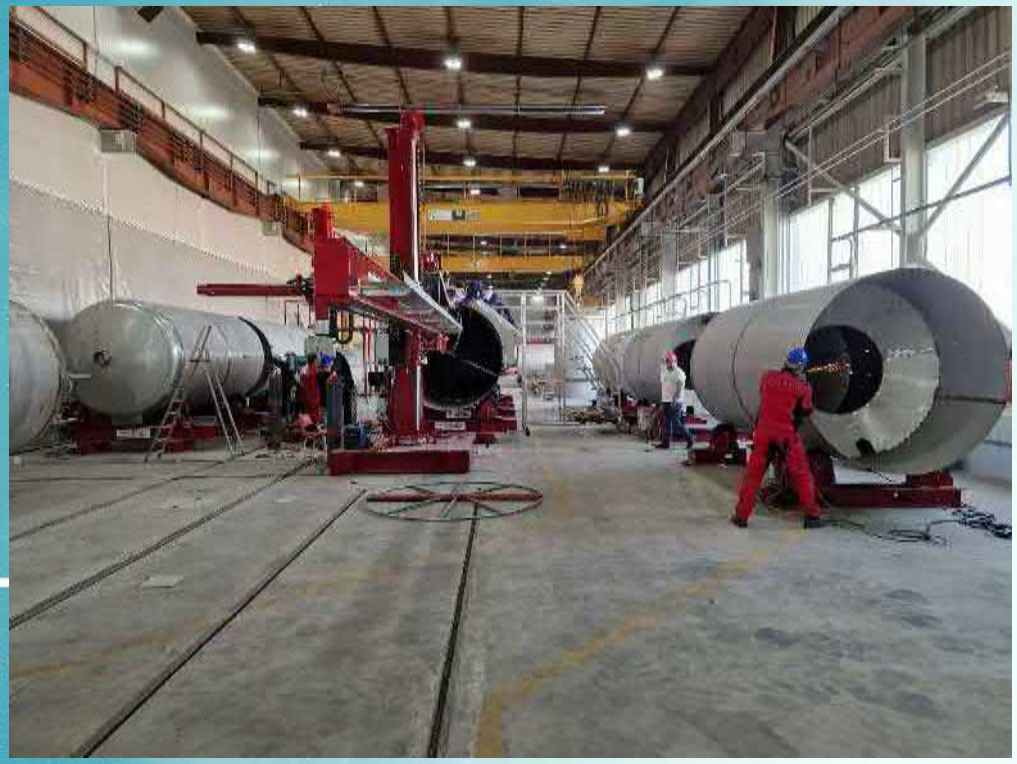
- - Surface cleanliness grade: Sa 2,5 Spec. ISO 8501-1
- - Surface roughness: G (50-70 mic) Spec. ISO 8503-1
- End frame Sandblasting, prepared for coating
- Paint system:
- The paint system meets two corrosivity categories:
- 1. C4(H)/C4.06 (15-25 years) according to ISO 12944-5
- 2. C5(M)/C5.02 (7-15 years) according to ISO 12944-5
- Paint layers:
- - First (base) coat: Heliopox 10-10 (90 microns DFT/170 microns WFT)
- - Second (intermediate) coat: Heliopox 11-30 (90 microns DFT/120 microns WFT)
- - Third (finish) coat: Heliopur 31-00 50 (60 microns DFT/120 microns WFT)
- Total paint system DFT: 240 microns
- Fire sunscreen is not provided for the construction of the container

- Reinforcement and instrument bays free of scale and rust, are prepared for coating
- Cleaning the tank
- On completion of the container, the inner vessel is purged with nitrogen gas, the pressure 0,05 MPa
- Sealed tank and set it on the stop, safety and test valves are tested for leaks by the method of the manufacturer, the internal excess pressure of air or inert gas (nitrogen) at a pressure of 0,6 MPa
- Filling of the gas with an inert gas after testing for leaks, the tank is filled by the procedure of the manufacturer with an inert gas (nitrogen).
- The internal pressure of inert gas of 0.5 MPa, the residual oxygen content-not more than 5% (by volume), optional.

APPROVALS AND TESTS

The container is made on the project, approved in the established order of Classification Societies (Bureau Veritas).

- The container prototype was tested in Piacenca Collaudi & Manutenzioni.
- Container subjected to factory testing and non-destructive inspection methods following the requirements of the project design document and under the requirements of the quality assurance system operating in the factory.
- THE CONTAINER EXAMINED BY CLASSIFICATION SOCIETY, Bureau Veritas), inspector.
- THE CONTAINER MEETS THE REQUIREMENTS OF THE DOCUMENTS SPECIFIED IN 1.1.
- The accompanying documentation
- Duly filled and attached to the container' left door.
- CARGOES ALOWED FOR TRANSPORTATION Liquefied Natural Gas UN 1972
- SUPPORTING DOCUMENTATION
- User Manual
- Certificate of Bureau Veritas



Thank you for the time you dedicated to us.