



**青岛骁海船舶设备有限公司**

**Qingdao Wingo Marine Co., Ltd**



**ASME "U" Stamp Certified Cryogenic Tanks Manufacture**  
**One-stop Service For Gas Suppliers & Users**



## About Wingo Marine

- 1988, built first workshop of marine fenders;
- 1998, begun to produce pressure water tanks for ship;
- 2005, sale marine equipment to global market and built "WINGO" as the sales company;
- 2015, design and sale LNG fuel gas supply system;
- 2016, built cryogenic tanks & ISO tanks workshop;
- 2020, built micro-bulk workshop;
- Our factory, certified with **ISO9001**, **ISO14001**, and **OHSAS18001**, also holds **A2**, **C2**, and **C3** pressure vessel manufacturing licenses, **A1**, **A2**, **C2**, and **C3** design licenses, an American Society of Mechanical Engineers "**ASME**," "**U**" and "**T**" steel seal authorization certificates, and a **CCS** classification Society factory certification.
- We focus on the design and production of **cryogenic tanks**(5-300m<sup>3</sup>), **micro bulk tanks**(3-10m<sup>3</sup>), **ISO tanks**(20, 40, 45 feet), **LNG fueling stations**, **fuel gas supply systems**, etc.
- We have three workshops, each 200 meters long, 25 meters high, and 30 meters wide, with a production area 80,000 m<sup>2</sup>.
- There are more than 300 sets of various equipment, including automatic welding machines, plasma cutting machines, vacuum room units, and high vacuum displacement process equipment.
- The testing equipment includes more than 30 sets of RT digital imaging systems, a spectrometer, hydraulic universal testing machines, cryogenic stamping testing instruments, and nuclear mass spectrometry leak detectors.
- We have over 300 employees, including 80 technical and quality inspection engineers. All have worked for leading cryogenic equipment companies such as CHART;
- Our annual production capacity is over 1,000 sets of cryogenic equipment, of which approximately 400 sets are sold to more than 20 countries around the world. This part's sales revenue exceeds 10 million US dollars.



## Cryogenic Tanks

- ✧ The cryogenic tanks are composed of S30408 stainless steel inner container, Q345R (or Q245R) low-alloy structural steel outer cylinder, inner and outer cylinder support structure, and vacuum insulation sandwich structure. They are used to store LN2, LO2, LAr, and LCO2.
- ✧ LN2, LO2, and LAr cryogenic tanks are divided into vertical and horizontal structural types, with vertical storage tanks being the primary type.
- ✧ Vacuum powder insulation is used.
- ✧ Designed and manufactured in accordance with national standards GB150 "Pressure Vessels," GB18442 "Cryogenic Insulated Pressure Vessels," and "Safety Technical Supervision Regulations for Fixed Pressure Vessels." The exported products have been designed and manufactured according to ASME or GB standards.
- ✧ WINGO cryogenic storage tank has reasonable structures, good insulation performance, long-lasting stability, safety and reliability, and easy maintenance.

### ● Technical Specification of Cryogenic Tanks (LO<sub>2</sub>, LN<sub>2</sub>, LAr, LCO<sub>2</sub>)

1	Effective volume(m³ )	LN <sub>2</sub> /LO <sub>2</sub> /LAr Storage Tanks										LCO <sub>2</sub> Storage Tanks									
		5	10	15	20	30	50	100	150	200	250	5	10	15	20	30	50	100	150	200	
2	Working pressure(Mpa)	0.2/0.8/1.6/2.2/3.2/3.5										2.2									
3	Filling rate (%)	95										95									
4	Adiabatic System	Vacuum powder/High vacuum multilayer winding insulation							Vacuum powder insulation			Vacuum powder insulation									
5	Support structure	Steel pipe support					Steel pipe support/ Sling construction					Steel pipe support					Steel pipe support/ Sling construction				
6	Inner, outer vessel material	Q30408, Q345R/Q245R										16MnDr, Q345R/Q245R									
7	Inner vessel process	National standard/strain							National standard			National standard									
8	Design Code	GB150/GB18442 (ASME for overseas)										GB150/GB18442 (ASME for overseas)									
9	Vacuum factory standard (Pa)	1					3		5			1				3		5			
10	Basic Configuration	Root valve, level gauge, pressure gauge, explosion-proof device, Vacuum valve, vacuum silicon tube										Root valve, level gauge, pressure gauge, explosion-proof device, Vacuum valve, vacuum silicon tube									
11	Paint	Jotun/PPG										Jotun/PPG									



## ● Technical Specification of Cryogenic Tanks (LNG)

1	Effective volume(m³)	20	30	50	60	100	150	200	250	300
		18	27	45	54	90	135	180	225	270
2	Working pressure (Mpa)	0.6/0.7/0.8/1.2								
3	Filling rate (%)	90								
4	Adiabatic System	Vacuum powder/High vacuum Multi-layer winding insulation						Vacuum powder		
5	Support structure	Steel pipe support					Steel pipe support/ Sling construction			
6	Inner   outer vessel material	Q30408   Q345R								
7	Inner vessel process	National standard/Strain						National standard		
8	Design Code	GB150/GB18442 (ASME for overseas)								
9	Vacuum factory standard (Pa)	1			3		5			
10	Basic Configuration	Root valve, level gauge, pressure gauge, explosion-proof device, Vacuum valve, vacuum silicon tube								
11	Paint	Jotun/PPG								





## Micro Bulk Tanks

1	Model Number	MT300	MT500	MT7500	MT10000LP
2	Type	Vertical & flat bottom			
3	Design Code	TSG21, GB/T150, GB/T18442-2019			
4	Design Pressure (Inner vessel/outer shell)	3000MP 1.6Mpa/-0.1Mpa	5000MP 1.6Mpa/-0.1Mpa	7500MP 1.6Mpa/-0.1Mpa	1.0Mpa/-0.1Mpa
		3000HP 2.3Mpa/-0.1Mpa	5000HP 2.3Mpa/-0.1Mpa	7500HP 2.4Mpa/-0.1Mpa	
		3000VHP 3.3Mpa/-0.1Mpa	5000VHP 3.3Mpa/-0.1Mpa	7500VHP 3.5Mpa/-0.1Mpa	
5	Max Working Pressure (Inner vessel/outer shell)	3000MP 1.6Mpa/-0.1Mpa	5000MP 1.6Mpa/-0.1Mpa	7500MP 1.6Mpa/-0.1Mpa	1.0Mpa/-0.1Mpa
		3000HP 2.3Mpa/-0.1Mpa	5000HP 2.3Mpa/-0.1Mpa	7500HP 2.3Mpa/-0.1Mpa	
		3000VHP 3.3Mpa/-0.1Mpa	5000VHP 3.3Mpa/-0.1Mpa	7500VHP 3.3Mpa/-0.1Mpa	
6	Design Temperature (Inner vessel/outer shell)	-196℃ / 50℃			
7	Full Volume	3.0m³	4.99m³	7.5m³	9.89m³
8	Filling Rate	95%			
9	Main Body Material	Inner vessel/sealing head: S30408 GB/T24511 Outer shell/sealing head: Q345R GB/T713			
10	Filling Medium	LO <sub>2</sub> , LN <sub>2</sub> , LAr			
11	Interlayer Medium	High vacuum multilayer insulation			
12	Helium Leak Test	Yes			
13	Vacuum Interlayer Leakage and Outgassing Rate	≤1x10 <sup>-6</sup> Pa.m³/s			≤1x10 <sup>-8</sup> Pa.m³/s
14	Static Evaporation Rate (Liquid Nitrogen)	≤0.66/d	≤0.45/d	≤0.40/d	≤0.22/d
15	Packing Pressure of inner vessel when leaving factory	20KPa			
16	Factory Vacuum	≤0.01Pa			
17	Paint Brand, Film Thickness	JUTON 200um			
18	Support Form	Hang Ceiling			
19	Dimensions(L*W*H) mm	2005*1872*3090	2140*2260*3360	2800*2780*3380	2887*2795*3330
20	Chassis Size(L*W)mm	1800*1800mm	2000*2000mm	2450*2450mm	2550*2550mm
21	Empty Weight (Including Chassis)	3000MP: 1890kgs; 3000HP: 2058kgs; 3000VHP: 2346kgs;	5000MP: 2786kgs; 5000HP: 3100kgs; 5000VHP: 3560kgs;	7500MP: 3390kgs; 7500HP: 3910kgs; 7500VHP: 4575kgs;	4272kg
22	Internal Piping Material	Stainless steel S30408 GB/T14976			
23	External Piping Material	Stainless steel S30408 GB/T14976			
24	Pressure Booster	25Nm³/h	25Nm³/h	45Nm³/h	25Nm³/h
25	Vaporizer	75Nm³/h	105Nm³/h	150Nm³/h	200Nm³/h
26	LOGO	According to customer's requirements			

## ● Features of Micro Bulk Tanks

- ✧ Due to the new process and excellent multi-layer insulation material, low static vaporization rate, stable insulation performance, and little gas consumption are realized.
- ✧ A vacuum regeneration chamber is set at both the entrance and exit to ensure a long-term lifetime and stable performance of the vacuum inter-layer.
- ✧ The use of a locating pin for the internal container avoids shifts caused by outside forces, upgrading the reliability of the whole structure.
- ✧ Compact structure: all pipelines are guided from the top distributor. The connection of pipes is welded but not screwed to reduce the possibility of medium leakage and upgrade safety.
- ✧ “Worcester” ball valve and “Generant” check valve are used on the filling interface. So, a transport truck and automatic liquid filling truck can be used to fill the tank directly and realize 0 wastage.
- ✧ The micro bulk can be placed on the ground directly without any foundation, taking only a little space. It can also be safely and quickly moved by lifting a lug on the top or a forklift pallet on the bottom.
- ✧ Digital liquid-level gauges can be installed. Multiple units of micro bulks can be managed simultaneously through a mobile phone APP. The remaining liquefied gas capacity can be checked at any time, and replenishment can be done quickly and accurately.





## ISO Tank Container

- ✧ The 20ft, 40ft, and 45ft ISO tank containers adopt dual-standard design (Chinese and American standards). They have special equipment manufacturing supervision and inspection certificates, as well as China Classification Society and BV Classification Society certificates.
- ✧ The ISO tank containers can meet the needs of road, sea, railway, and other combined transport, achieving "door-to-door" transport. They can be used as both a shipping tool and a temporary storage tank for liquid materials.
- ✧ They can be loaded and unloaded under complete seal with safety and reliability. Large loading capacity, moderate cost, and long-term use can significantly reduce the cost of shipping with excellent economy.

### ● Technical Specification of ISO Tank Container

Model	Design Code	Filling Medium	Geometric Volume (m <sup>3</sup> )	Filling Rate (%)	Working Pressure (Mpa)	Container Weight (kg)	Rated Weight (kg)	Adiabatic System	Overall Dimension (mm)
ZBGX4508-01 40Ft	GB/ ASME	LNG	45.62	90/81	0.8	11700	30480	High vacuum multi-layer insulation	12192*2438 *2591
ZBGX4508-02 40Ft		LNG/ LC <sub>2</sub> H <sub>4</sub>	45.62	90/81	0.8	11700	36000		12192*2438 *2591
ZBGX5508-01 45Ft		LNG/ LC <sub>2</sub> H <sub>4</sub>	50.53	90/81	0.8	12840	36000		15716*2438 *2591
ZBGX2017-01 20Ft		LO <sub>2</sub> /LN/ LAr/LNG	20.5	95/90/ 81	1.1	7980	36000		6058*2438 *2591



## Fuel Gas Supply System

- ✧ Core equipment such as storage tanks, heat ex-changers, and cold boxes are independently designed and manufactured, holding CCS product certificates, and reliable and stable performance;
- ✧ Complete system, compact structure, high space utilization;
- ✧ High vacuum multi-layer winding insulated storage tanks, low evaporation rate, long maintenance time;
- ✧ Single and two independent gas supply systems can be selected;
- ✧ Circulating water heating LNG, low energy consumption;
- ✧ Self-pressurizing adjustment function to ensure stable pressure;
- ✧ Economic gas supply mode to achieve BOG zero emission.

### ● Technical Specification of Fuel Gas Supply System for Marine LNG-powered Ship

Capacity( m <sup>3</sup> )	Working Pressure(MPa)	Filling Rate	Adiabatic System	Design Code
50-400	0.3-0.8	90	Vacuum powder insulation	CCS, ABS, DNV-GL, AR





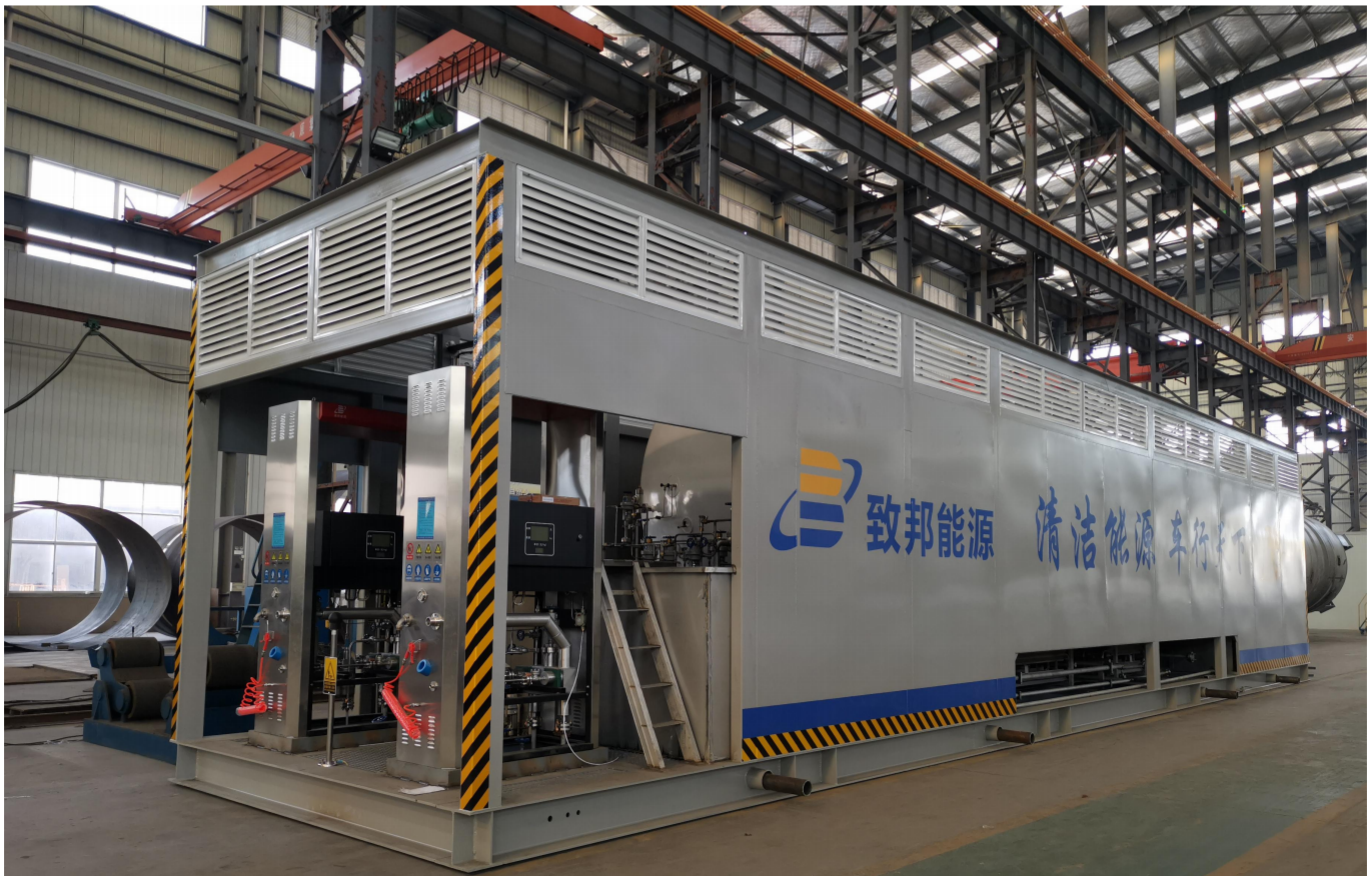
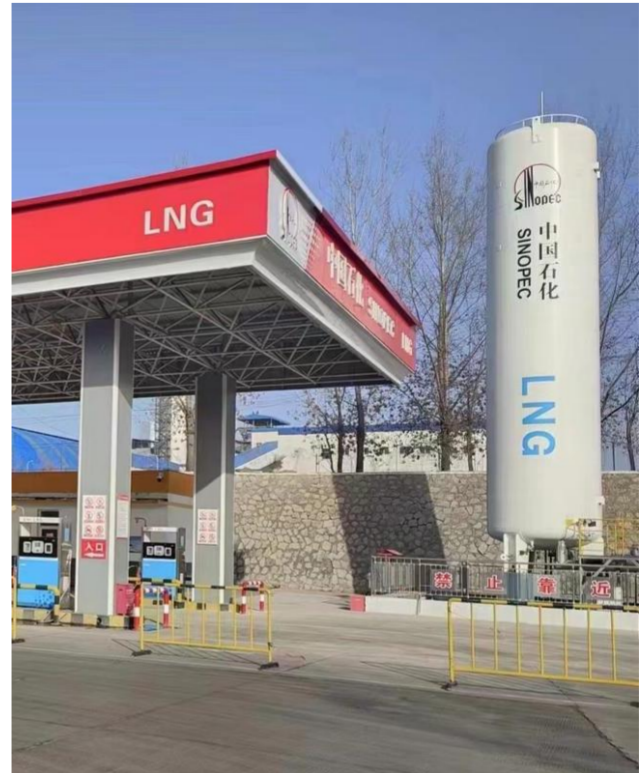
● Technical Specification of Fuel Gas Supply System for River LNG-powered Ship

Model	Geometric Volume(m <sup>3</sup> )	Effective Volume(m <sup>3</sup> )	Working Pressure(Mpa)	Daily Evaporation Rate(%)	Adiabatic System
ZBCG-10/1.0	11.12	10	1.0	0.22	High vacuum multi-layer insulation
ZBCG-15/1.0	16.67	15	1.0	0.175	High vacuum multi-layer insulation
ZBCG-20/1.0	22.23	20	1.0	0.15	High vacuum multi-layer insulation
ZBCG-25/1.0	27.28	25	1.0	0.14	High vacuum multi-layer insulation
ZBCG-30/1.0	33.3	30	1.0	0.13	High vacuum multi-layer insulation
ZBCG-50/1.0	55.6	50	1.0	0.23/0.10	High vacuum multi-layer insulation/Vacuum powder



## LNG Fueling Station

- ❖ Wingo's self-developed and designed gas-fueling storage tank has good insulation performance and long vacuum maintenance time and can be integrated with the pump pool design to reduce inlet resistance. The storage tank's liquid utilization rate can reach over 90%.
- ❖ It has a modular design, a high degree of standardization, high integration, a small installation quantity, a short construction period, convenient operation, and maintenance.
- ❖ The self-purchased parts are easy to buy, and the cryogenic tank is highly reliable, has a low failure rate, and requires little maintenance.
- ❖ In addition to fixed LNG fueling stations, we also design and produce skid-mounted gas filling stations. They are easy to install, and the gas supply location can be changed at any time.





## LNG Bunkering Barge

- ✧ LNG bunkering barges are a type of barge that arranges the LNG bunkering system on unpowered barges, which are used in inland water areas to refuel other ships with LNG fuel.
- ✧ The barge bunkering system's composition includes cryogenic storage tanks, cold boxes, cryogenic liquid pumps, pressurized vaporizers, buffer tanks, metering devices, bunkering devices (bunkering arms or flexible connection equipment), and electrical control systems.
- ✧ The design and production shall comply with the CCS "Specification for Liquefied Natural Gas Fuel Refueling Barges."
- ✧ The main specifications of pontoons include 2\*60m<sup>3</sup>, 2\*100m<sup>3</sup> and 2\*250m<sup>3</sup>.

### ● Technical Specification

1	Geometric Volume	100m <sup>3</sup>	150m <sup>3</sup>	200m <sup>3</sup>	250m <sup>3</sup>
2	Effective Volume	90m <sup>3</sup>	135m <sup>3</sup>	180m <sup>3</sup>	225m <sup>3</sup>
3	Adiabatic System	High vacuum multi-layer winding insulation			
4	Design Pressure(MPa)	1.0/0.1			
5	Working pressure(Mpa)	0.70/Vacuum			
6	Design Temperature(°C)	-165			
7	Working Temperature(°C)	162/50			
8	Sealed-off Vacuum Degree(Pa)	0.03	0.05	0.05	0.05
9	Static Evaporation Rate(%/d)	0.105	0.085	0.40	0.32
10	Main Vessel Material	S30408			
11	Empty Weight(Kgs)	48000	64200	80800	93300
12	Total Weight(Kgs)	88500	124900	161800	194550
13	Design Code	GB/150-2011, GB/T18842-2019			



## Ambient Vaporizer

- ❖ No energy consumption, no pollution, green environmental protection; Easy to install and maintain;
- ❖ Special aluminum heat exchange, high efficiency, lightweight design, long service life;
- ❖ Large diameter ( $\phi 200$ ) special aluminum heat exchange tube; defrosting speed is breakneck; effective inner fin structure; improves the heat transfer effect of heat exchange tube;
- ❖ The "bridge" type connection element is beautiful and generous, and the stress caused by thermal expansion and cold contraction of each part is eliminated during working;
- ❖ Optimized process design; the pressure drop is minimized; there is no drift current phenomenon, and the flow rate is controlled within the safe range;
- ❖ Special anti-oxidation treatment on the surface of the heat exchange tube; Sufficient design margin;
- ❖ Advanced high-pressure tube composite technology so that the pressure tube and the heat exchange tube are in 100% full contact to ensure heat transfer efficiency;
- ❖ All vaporizers are cleaned and manufactured in full accordance with oxygen service standards for safer use;
- ❖ It can be designed and manufactured according to electronic standards;
- ❖ Design conditions: ambient temperature  $-10^{\circ}\text{C}$ , relative temperature 70%, continuous use of 8-12 hours for gasification;
- ❖ Applicable media:  $\text{LO}_2$ ,  $\text{LN}_2$ ,  $\text{LAr}$ ,  $\text{LNG}$ ,  $\text{LCO}_2$ ,  $\text{LC}_2\text{H}_4$ ,  $\text{LPG}$ , etc;
- ❖ Working pressure: 0.8-40.0MPa;
- ❖ Single flow: 50-16000Nm<sup>3</sup>/h; Combined type can be used for a larger flow rate.







### Self-owned Workshop

We own our workshops and save about \$800,000 a year in rent. That would be a cost reduction of about \$2,000 per unit.



### One Stop Service

One-stop service covering the design, production and transportation of cryogenic tanks. Save your time and costs.



### Experienced Staffs

Most engineers and workers are from the top cryogenic storage tank manufacturers, such as Charter, Hang Oxygen, Jiang Oxygen, CIMC, etc.



### Digital Managment

The digital liquid level gauge replaces the traditional liquid level gauge and uses a SIM card to transmit the liquefied gas information to the mobile phone APP. One mobile phone can manage hundreds of cryogenic tanks. Super friendly to gas suppliers.



### 100% Inspection of Weld Seam

Each weld seam was inspected using X-rays, and the quality engineer confirmed no cracks, bubbles or impurities.



### Money Safe

We offer various payment methods such as telegraphic transfer(T/T) and sight letter of credit(L/C). The funds are safe and risk-free, and we aim to establish long-term cooperation.



### Third Party Detection

Third-party (CCS, ABS, BV, DNV, etc.) testing or testing by customer engineers is welcome.



### Free Certificates of Origin

We offer various certificates of origin for free and quickly. The correct certificates of origin can reduce import tariffs and make your business more competitive.



### Supply Chain Advantages

We supply cryogenic tanks to the global market, including China, with an annual output of over 1,000 sets. Our vast production capacity enables us to purchase large quantities when steel prices are low and gives us a price advantage when purchasing valves and meters.



### Vacuum Technology

Our unique vacuuming technology and vacuum holding technology make the sealed-off vacuum degree of the cryogenic storage tank better and the evaporation rate lower.



**QINGDAO WINGO MARINE CO., LTD**

**Phone:** 0086 0532-8703 7615

**Mobile:** 0086 18562793835

**Website:** [www.wingo-cryotanks.com](http://www.wingo-cryotanks.com)

**Email:** [ctsales@wingomarine.com](mailto:ctsales@wingomarine.com)

**Address:** No. 30 Lehong Road, Leyu Town, Zhangjiagang City, Jiangsu, China