



Innovation. Experience. Performance.®

LNG Distribution And Storage Products

Chart Cryogenic Engineering Systems (Changzhou) Co.,Ltd.

Address:No.299 huanghe West Road,New District Changzhou,
Jiangsu Province,China PC: 213032
TEL: +86 519 85966000 (switchboard)
FAX: +86 519 85966001 (switchboard)
E-mail: chartchina@chartindustries.com
Web: www.chartindustries.com
CSH: 400-887-8865

Chart Cryogenic Distribution Equipment (Changzhou) Co.,Ltd.

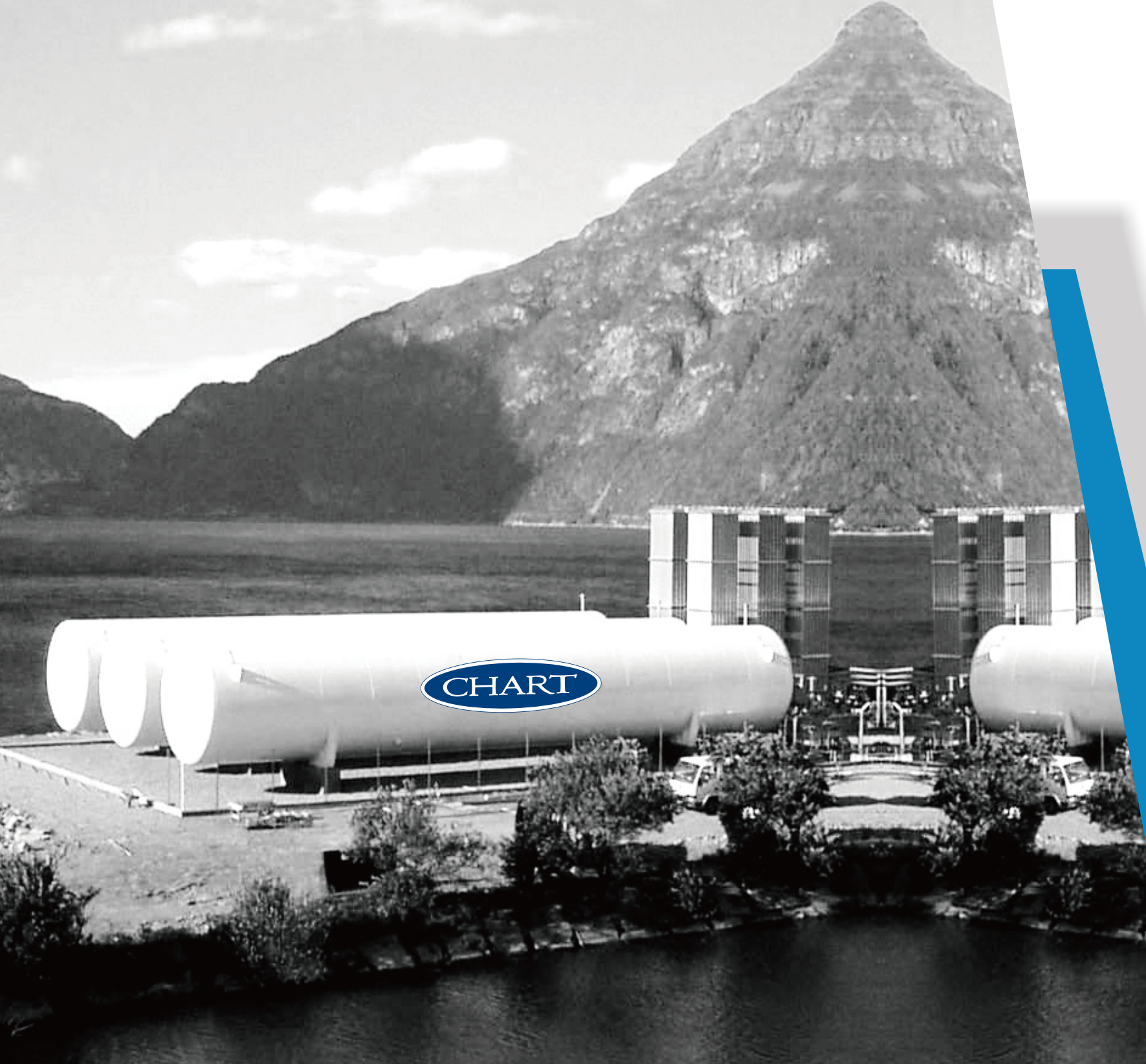
Address:No.12 Fu Kang Road,New District Changzhou,
Jiangsu Province,China PC: 213032
TEL: +86 519 85966190 (switchboard)
FAX: +86 519 85966189
E-mail: chartchina@chartindustries.com
Web: www.chartindustries.com
CSH: 400-887-8865

Nanjing New Metallurgy Electric Engineering Co.,Ltd.

Address:No.2,Tongyu Road,Pukou District,Nanjing,
Jiangsu Province,China PC: 210061
TEL: +86 25 68513322 (switchboard)
FAX: +86 25 58744541
E-mail: chartchina@chartindustries.com
Web: www.chartindustries.com
CSH: 400-650-1088

Printed in china Q7-2019





80 Years Of Cryogenic
Industry Experience

CONTENS

02	COMPANY PROFILE
03	SOLUTIONS ACROSS THE LNG SUPPLY CHAIN
05	CHART IN CHINA
06	QUALIFICATION CERTIFICATE
07	CHART LNG Fueling Stations
08	CHART LNG-LCNG Fueling Stations
09	Multifunctional LNG Storage Stations
10	Bunkering LNG Fueling Stations
11	CHART Patented LNG Container-type Skidded Fueling Stations- IMC
13	CHART Vehicle and Marine LNG Dispensers
14	CHART Patented New LNG Offloading Metering System
15	CHART LNG Transportable Semi-trailer
16	CHART Patented LNG Submerged Pump Transfer (ORCA)
17	CHART Large-scale LNG Cryogenic Storage Tanks
19	CHART LNG Supplying System
21	LNG liquid cylinder (DC160L~DC200L series)
23	LNG Framed liquid cylinder Mega-Cyl (MC390L/450L series)
25	Marine LNG solutions
26	CHART Patented LNG ISO Tanks (T75)
27	CHART Patented Vacuum Insulated Pipe (Python)
28	Thermafin™ Supergap™
30	Application case
34	AFTER-SALES SERVICE GUARANTEE

WE ARE CHART



- | | | |
|---|--|--|
| <ul style="list-style-type: none"> 1 LNG liquefaction 2 LNG receiving terminals 3 Satellite LNG Stations 4 Air Cooled Heat Exchangers 5 Vaporizers 6 Cryogenic Storage tanks 7 Mobile cryogenic vessels 8 LNG Vehicle Fuel Tanks 9 LNG fueling systems | <ul style="list-style-type: none"> 10 Chart MVE cro-preservation solutions 11 Turn-Key oxygen Systems 12 MicroBulk delivery system for packaged gases 13 CO22 Beverage Systems 14 LNG/CNG Ffeling stations 15 LNG fuel dispensers 16 Axial flow fans 17 Specialty heat exchangers & reactors 18 Brazed aluminum heat exchangers | <ul style="list-style-type: none"> 19 Cold Boxes 20 Chart Lifecycle 21 Packaged gas systems 22 Liquid nitrogen dosing systems 23 Cryogenic ISO containers 24 Chartparts 25 Vacuum Insulated Pipe (VIP) 26 Chart process technology |
|---|--|--|

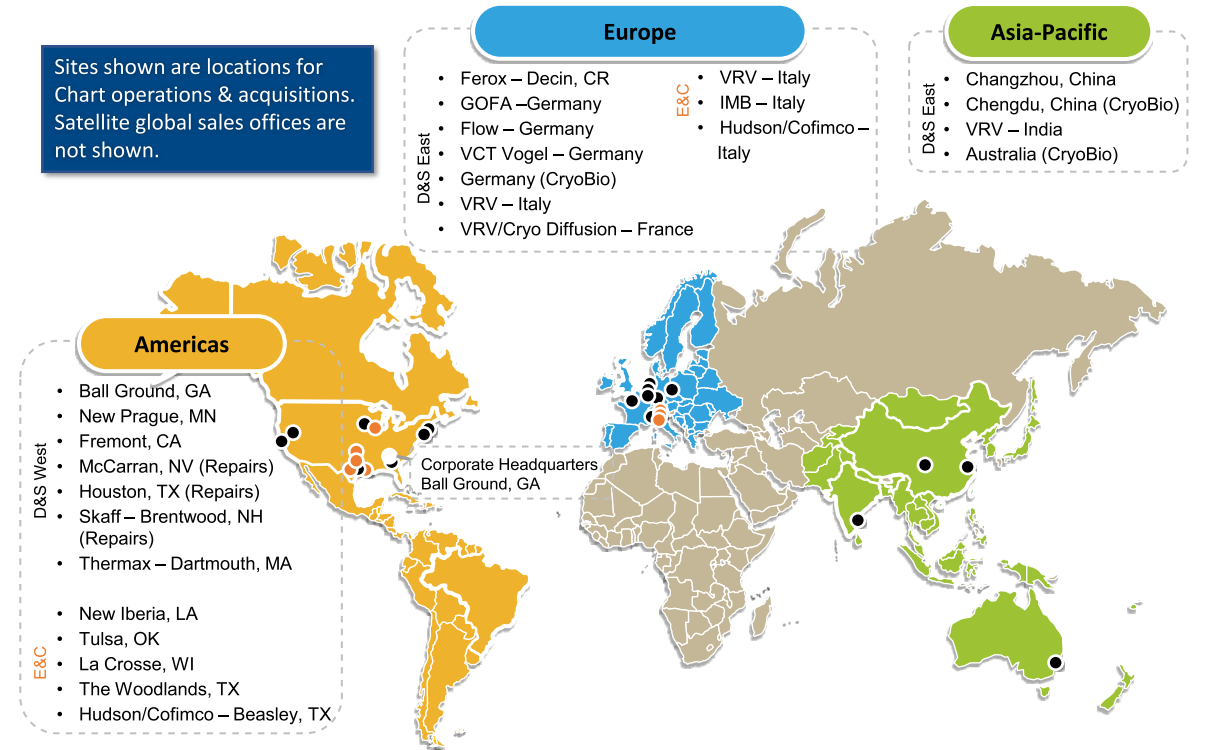
COMPANY PROFILE



Chart Industries, Inc. (Nasdaq: GTLS) is a leading independent global manufacturer of highly engineered equipment servicing multiple market applications in Energy and Industrial Gas. Our unique product portfolio is used throughout the liquid gas supply chain in the production, storage, distribution and end-use of atmospheric, hydrocarbon, and industrial gases. Chart has domestic operations located across the United States and an international presence in Asia, Australia, Europe and Latin America.

As the world transitions to a low carbon energy future, Chart is a key player in the development of LNG as a clean burning fuel alternative for power and transportation. It is the only international company equipped to provide complete solutions across the value chain; from liquefaction to end-use, particularly through the development of small-scale models and associated infrastructure that are revolutionizing the industry.

CHART HAS OPERATIONS ACROSS THE GLOBE



SOLUTIONS ACROSS THE LNG SUPPLY CHAIN

Upstream

LNG receiving terminal

Brazed aluminum heat exchangers
Cold box
Liquefaction technology
Liquefaction plants

--- Non turnkey business

Midstream

Cryogenic semi-trailer

Cryogenic railway tanker

Cryogenic ISO container

Downstream

LNG small industrial gasification station

Marine LNG fueling system

Regasification stations

LNG fueling stations

LNG bunkering terminals

LNG pump transfer trailer

Liquefaction Distribution

Chart brazed aluminum heat exchangers (BAHX) and cold boxes are at the heart of processes used for the liquefaction of natural gas.

Chart's proprietary IPSMR® process technology is 10% more efficient than other comparable processes.

Chart provides complete liquefaction plant solutions for small-scale LNG.

Chart's offers a complete range of products for the safe and efficient distribution of liquid gases by road, rail and sea.

It's more than 25 years since we pioneered the concept of cryogenic ISO containers and our mobile units are rugged and extremely reliable.

All Chart distribution products are supported by our best in class service packages.

Storage Terminal application

Chart provides a complete range of cryogenic storage tanks from the smallest standard units through to the world's largest shop built units.

Chart Vacuum Technology® provides the highest thermal efficiency for maximum hold times and significantly reduced product loss.

Since developing the world's first LNG vehicle fuel tank and building the world's first commercial LNG fueling station, Chart has continued to pioneer the development of natural gas vehicle (NGV) fueling. We work closely with the OEM's in the development of fuel tanks and provide both private and public fueling stations.

On the marine side Chart offers various bunkering solutions and on-board fueling systems.

CHART IN CHINA

QUALIFICATION CERTIFICATE



In the early nineties, Chart introduced mature cryogenic technology into China, and has maintained a strong presence in the country ever since. Our wholly owned subsidiary located in Changzhou, Jiangsu is one of the six global research and manufacturing centers. Our motto is "US and European quality, Chinese Price", and our world class development team ensures that the performance of our products is perfectly consistent with equivalent items built in any of Chart's US and European facilities and totally trusted by our customers.

Through our products we serve two major applications; liquefied natural gas (LNG) and industrial gases. LNG products include liquefaction plants, heat exchangers and cold boxes, road trailers, railcars, ISO containers, fueling stations, vehicle tanks and marine solutions. From liquefaction to fuel systems, all LNG products utilize state-of-the-art US technology, providing optimal solutions and complete, one-stop service.

Industrial gas products are widely used in industrial, commercial and scientific applications, such as the purification, liquefaction, transportation, storage and utilization of various gases (helium, nitrogen, argon, oxygen, carbon dioxide). Applications served include: welding, laser cutting and a wide variety of industrial processes, biomedical, video production, entertainment, aviation, thermal testing, alternative fuels, vacuum systems, drinks dispense and many others for science and leisure.



- ISO 9001 Quality Certification
- ISO 14001 Environmental Certification
- OHSAS 18001 Health & Safety Certification
- IATF 16949 Automotive Quality Certification
- Manufacture license of special equipment of PRC (A2,B4,C2,C3)
- Design license of special equipment of PRC (A2,C2,C3)
- Installation license of special equipment of PRC (GC2,1)
- China Compulsory Certification
- ASME U Authorization
- NB R Authorization
- DOT approval for Welded Insulated Cylinders
- PED European Pressure Equipment Directive (CE Mark)
- KGSC Manufacturing Registration for Korean
- CCS approval for Marine Products
- BV approval for Marine Products

CHART LNG Fueling Stations



Da Li Zhuang Permanent LNG Fueling station, Kunlun Energy(Xuzhou)

CHART delivers complete fueling stations for LNG buses and trucks comprising storage tanks with submerged pump and pump sump, vacuum insulated pipelines, dispenser and control system. We select only the most reliable components and our advanced design programs, manufacturing excellence and more than 30 years of practical project experience in China and overseas, ensure Chart fueling stations provide complete reliability and lowest overall total cost.

Product features

- Compact solutions and minimized floor plan reduces installation costs and civil construction. Equipment can be pre-packaged and skid mounted for added convenience
- Zero emissions to atmosphere ——not only does this benefit the environment but eliminating boil-off-gas (BOG) means reduced operating costs
- Storage tanks incorporate Chart Vacuum Technology® and multi-layer insulation that is proven to provide the best long term thermal protection of your valuable cryogenic gases
- Smallest pump sump in the industry
- Gas and liquid phases are isolated and controlled
- Chart vacuum insulated pipework (VIP) delivers insulation performance dozens of times better than foam insulation
- Valve selection to reduce pipe resistance
- Chart's patented differential flowmeter eliminates pre-cooling
- High efficiency —— increase efficiency and profitability for users High speed filling. Design calculation and equipment selection enables Chart to offer stations that can fuel two dispensers filling vehicles simultaneously through a single pump with no reduction in efficiency.
- High security —— improved security means reduced risks for customers. Pipe welding with no leakage; PARKER air pipes, Auto-Shut Off of liquid supply in case of fire. One-touch controls, automation system for easy and safe operation.
- Highest reliability—— reduced maintenance saves cost and downtime for operators. All components, including valves, instrumentation and control systems are proven to deliver stable and long-term performance through extensive experience in the field. The metering section of the flowmeter is maintenance free for its entire lifetime.

Specifications

Level		Class III	Class II	Class I
Tank Volume		30m ³ ~60m ³	60m ³ ~120m ³	120m ³ ~180m ³
Design pressure		1. 2MPa		
Recommended configuration	Submerged pump	1 set -2 sets	2 sets - 4 sets	3 set - 6 sets
	LNG vehicle use dispenser	1 set - 4 sets	2 sets - 8 sets	3 set - 12 sets
Power supply		380V 50HZ		
Main reference standard		GB50156-2012 (2014 edition) "Code for Design and Construction of Automobile Refueling and Gas Station" GB50316-2000 (2008 edition) "Industrial Metal Pipeline Design Specification" GB50235-2010 "Code for Construction of Industrial Metal Pipeline Engineering" GB/T14976-2012 "Stainless steel seamless pipe for fluid transportation" NB/T47013.1-47013.13-2015 "Non-destructive testing of pressure equipment" GB/T12459-2017 "Steel butt welded pipe fittings types and parameters" GB/T18442.1~6-2011 "Fixed vacuum insulated cryogenic pressure vessel"		

CHART LNG-LCNG Fueling Stations



Century Avenue Permanent LNG-LCNG Fueling station, Ningxia Baoqing Energy

CHART permanent LNG-LCNG fueling stations are based on the standard LNG stations and incorporate an additional high-pressure plunger pump, high-pressure vaporizer, gas cylinder group and CNG filling dispenser to convert LNG into CNG for storage and use. It provides filling services for LNG buses and heavy trucks, and at the same time for CNG vehicles (such as CNG taxis). The fixed LNG-LCNG fueling station has successfully developed and widely used the siphon tank system, which overcomes the shortcomings of the conventional LNG storage tank and plunger pump system, such as slow pump cooling and high failure rates. As a result station efficiency has been significantly improved

Product features

- Reduces pump pre-cooling time, speeds up pump starting speed and improves vehicle fueling efficiency.
- Extends the service life of the high-pressure plunger pump and reduce maintenance cost.
- In the case of extremely low tank pressure (0.2 MPa), the pump can be started without pressure building up.
- The application of the siphon tank system can effectively reduce the occurrence of air blockage faults for high-pressure plunger pump and reduce operating losses.

Specifications

Level		Class III	Class II	Class I
Tank Volume		30m ³ ~60m ³	60m ³ ~120m ³	120m ³ ~180m ³
Design pressure		1. 2MPa		
Recommended configuration	Submerged pump	1 set -2 sets	2 sets - 4 sets	3 sets - 6 sets
	LNG vehicle filling dispenser	1 set - 4 sets	2 sets - 8 sets	3 sets - 12 sets
	Plunger pump	2 sets - 4 sets		
	High pressure vaporizer	2 sets - 4 sets		
	High pressure gas cylinder	≤9m ³	≤9m ³	≤12m ³
	CNG fueling machine	1 sets - 6 sets		
Power supply		380V 50HZ		
Main reference standard		GB50156-2012 (2014 version) "Design and Construction Specification for Automobile Refueling and Gas Station" GB50316-2000 (2008 edition) "Industrial Metal Pipeline Design Specification" GB50235-2010 "Code for Construction of Industrial Metal Pipeline Engineering" GB/T14976-2012 "Stainless steel seamless pipe for fluid transportation" NB/T47013.1-47013.13-2015 "Non-destructive testing of pressure equipment" GB/T12459-2017 "Steel butt welded pipe fittings types and parameters" GB/T18442.1~6-2011 "Fixed vacuum insulated cryogenic pressure vessel"		

Multifunctional LNG Storage Stations



Anji Fengling multifunctional LNG Storage Station

The CHART multifunctional LNG storage station usually has the functions of LNG storage, vaporization and LNG Dewar filling. The multifunctional LNG storage station is mainly composed of LNG storage tank, LNG submerged pump and pump sump, vaporizer, pressure regulating metering and odorizing skid, vacuum pipeline, explosion-proof filling electronic scale and control system, which can be used as a supplementary gas source for urban pipe network, and also provide filling services for LNG Dewar.

Product features

- The use of large-volume, high-vacuum multi-layer insulation storage tanks saves operating cost.
- Small floor space, improve land utilization – the construction cost is lower, which saves the civil construction cost for the customer.
- Filling with submerged pump is more efficient than filling by differential pressure.
- Reduce BOG and save operating costs for users.
- One-touch operation, convenient and safe, to avoid mal-operation.
- The selected valves, instrumentations and control systems have been verified by long-term experience and performance is stable and reliable. Reduced maintenance means reduced costs and down-time.
- The pump works in conjunction with the explosion-proof filling electronic scale.

Specifications

Level		Class II
Tank Volume		60m³~120m³
Design pressure		1.2MPa
Recommended configuration	Submerged pump	2 sets - 4 sets
	LNG filling dispenser	2 sets - 8 sets
	Plunger pump	2 sets - 4 sets
	High pressure vaporizer	2 sets - 4 sets
Power supply		380V 50HZ
Main reference standards		GB50028-2006 "town gas design code" GB50316-2000 (2008 edition) "Industrial Metal Pipeline Design Specification" GB50235-2010 "Code for Construction of Industrial Metal Pipeline Engineering" GB/T14976-2012 "Stainless steel seamless pipe for fluid transportation" NB/T47013.1-47013.13-2015 "Non-destructive testing of pressure equipment" GB/T12459-2017 "Steel butt welded pipe fittings types and parameters" GB/T18442.1~6-2011 "Fixed vacuum insulated cryogenic pressure vessel"

Bunkering LNG Fueling Stations



Shanghai Laogang Bunkering LNG fueling station

The CHART Bunkering LNG fueling station is mainly composed of LNG storage tank, LNG submerged pump and pump sump, vacuum insulated pipelines, LNG marine filling dispenser, LNG vehicle filling dispenser and control system. It provides gas fueling service for LNG ships in navigable waters such as rivers and lakes and it also has the function of gas fueling for LNG vehicles. The CHART Bunkering LNG fueling station combined with the successful experience of many projects in the United States and Europe, successfully solved a series of problems, such as long-distance LNG transportation, low gas filling efficiency and water level drop, and provides guaranteed reliable and efficient station operation.

Product features

- The siphon tank system is adopted to improve the operating efficiency of the submerged pump and reduce the occurrence of gas blockage.
- Tank with multi-layer insulation technology.
- Vacuum piping with excellent thermal insulation properties.
- The large-flow submerged pump and the filling dispenser specified for ship filling are used to greatly improve the filling efficiency.
- Reasonable selection of various valves to reduce pipe resistance.
- CHART's patented differential pressure flowmeter eliminates pre-cooling.
- Specified ship gas filling boom to reduce the filling workload of staff.

Specifications

Level	Class V	Class IV	Class III	Class II	Class I
Tank Volume	60m³~120m³	120m³~180m³	180m³~500m³	500m³~1000m³	1000m³~2000m³
Design pressure		1.2MPa			
Recommended configuration	Submerged pump	2 sets - 6 sets			
	LNG marine filling dispenser	1 sets - 6 sets			
	LNG vehicle filling dispenser	1 sets - 6 sets			
Power supply		380V 50HZ			
Main reference standard		GB/T51312-2018 "Design standard for ship LNG fueling station" GB50156-2012 (2014 edition) "Code for Design and Construction of Automobile Refueling and Gas Station" GB50316-2000 (2008 edition) "Industrial Metal Pipeline Design Specification" GB50235-2010 "Code for Construction of Industrial Metal Pipeline Engineering" GB/T14976-2012 "Stainless steel seamless pipe for fluid transportation" NB/T47013.1-47013.13-2015 "Non-destructive testing of pressure equipment" GB/T12459-2017 "Steel butt welded pipe fittings types and parameters" GB/T18442.1~6-2011 "Fixed vacuum insulated cryogenic pressure vessel"			

CHART Patented LNG Container-type Skidded Fueling Stations-IMC



China-First container-type LNG Skidded fueling station - Beijing Yucheng , PetroChina



Beijing Kangzhuang Expressway LNG Skidded fueling station



Changzhou 312 National Road LNG Skidded fueling station

The CHART container-type LNG skidded fueling station(IMC) is mainly composed of LNG storage tank, LNG submerged pump and pump sump, vacuumed pipelines, LNG vehicle filling dispenser, container shell and control system, which are used to fill LNG vehicles. In 1995, CHART successfully developed the World- First container-type LNG filling equipment(IMC). After nearly 20 years of market validation in the United States, it was introduced to China in February 2012. Chart China built the first IMC in Beijing, and it serves the Two Sessions in Beijing. CHART's IMC is recognized by customers for its excellent quality, flexibility, fast operation and reliable and stable performance.

Product features

- Smaller overall dimensions, minimized floor space, about 15% less than competitor.
- Low operating cost, optimized design of storage tank, vacuum tube, flow meters to ensure zero system emissions.
- Reduced site construction time and cost. All process equipment is installed in a full factory welded enclosure, which fully meets the requirements of the China national codes.
- Quick installation, integrated skid mounted equipment, single site lift, delivery to operation in 5 days.
- Easy to operate, one-touch independent operation.
- Quick filling, no pre-cooling required, fueling can commence immediately on arrival, no backflow of LNG.

Specifications

Name	Specifications	
Tank Volume	30m ³	60m ³
Design pressure	1. 2MPa	
Filling equipment container	L16292mm*W3038mm*H2896mm	L18798mm*W3720mm*H3570mm (unilateral filling) L21000mm*W3720mm*H3570mm (both sides filling)
	20ft	40ft
Control room container	L6096mm*W2438mm*H2591mm	L12192mm*W2438mm*H2591mm
	Includes control system, air compressor system and lounge	
Equipment container empty weight / full weight	21000kg/33000kg	35500kg/59000kg, 40500kg/64000kg
Filling equipment	with IC card filling management system	
Main components	More than 95% of the main components are foreign first-class brands	
Input power supply	380V, 50HZ, 30KW	

CHART patented IMC

- In March 2012, successfully applied for the patent for IMC in China, and took the lead in the use in China.
- In April 2013, applied for the overall explosion-proof review and obtained the explosion-proof certificate.
- In November 2013, domestic LNG experts conducted a technical review of the IMC, and received unanimous approval from the experts.
- In March 2014, CHART assisted in the preparation of Beijing local standard DB11/1093, which was officially released in June 2014.
- In July 2014, the national code GB50156-2012 (2014 edition) has accepted the CHART's suggestions on revision to write the Container-type LNG skidded-mounted filling device into the code (Article 9.1.3A), and released it in July 2014.

CHART Vehicle and Marine LNG Dispensers



The vehicle LNG dispenser is mainly composed of the valve system, cryogenic flowmeter system, IC card system and control system, and is used for metering and transaction amount settlement of the current LNG filling amount. At present, the core components (flowmeter) of the vehicle LNG dispenser produced by CHART and its subsidiary Nanjing Xinye Co., Ltd. –can be selected from differential pressure flowmeter or mass flowmeter according to customer requirements. The differential pressure flowmeter is produced by CHART’s German subsidiary FLOW Instruments. This flowmeter is widely used in global LNG fueling stations, LNG satellite stations, LNG storage stations, LNG receiving stations, LNG liquefaction plants and other projects. It has more than half of the market share in the European and US cryogenic industry, also has thousands of project verification experiences in China, and is well regarded by customers.

Product features

- The metering section in the differential pressure flowmeter is guaranteed for service life (worldwide only)
- Automatic density measurement, applicable to China's fluid source variable situation
- Eliminates pre-cooling, improved efficiency of gas filling, and virtually eliminates BOG
- Reduced schedule and zero on-site commissioning
- The flowmeter has multiple protection functions for the submerged pump

Specifications

Project	Vehicle LNG dispenser technical indicators	Marine LNG dispenser technical indicators
Service	Liquefied natural gas (LNG)	Liquefied natural gas (LNG)
Flow range	12~80KG/min	35~225KG/min
Measurement accuracy	±1.0%	±1.0%
Input power	220V	220V
Power	100W	100W
Ambient temperature	—40℃~55℃	—40℃~55℃
Ambient humidity	≤95%	≤95%
Ambient atmospheric pressure	86~110 KPa	86~110 KPa
Pipeline temperature	—19℃	—19℃
Unit of measurement	Kg、L、Nm³	Kg、L、Nm³
Minimum reading value	0.01 Kg、(L、Nm³)	0.01 Kg、(L、Nm³)
Printer	with ticket printing function	with ticket printing function

CHART Patented New LNG Offloading Metering System

CHART's new LNG offloading metering system is mainly composed of flowmeter column, differential pressure flowmeter and controller, which is used to accurately measure LNG discharge volume. CHART's new LNG offloading metering system solves the problems of large floor space for the traditional wagon balance and the large measurement deviation for the mass flowmeter, effectively saving space while also ensuring accurate measurement.



Patent No. 201430C96485X

Product features

- It is specially designed for the offloading of LNG trailers without flowmeter, effectively solving the problem of metering and offloading for trailers.
- High measurement accuracy, both gas and liquid phase can be measured.
- Automatic density measurement prevents problematic liquid source from entering the tank.
- Eliminates pre-cooling, improved efficiency of gas filling, and virtually eliminates BOG
- The column in the differential pressure flowmeter is guaranteed for service life (worldwide only).
- Save space on site.
- Available in both mobile and fixed versions. Mobile version is suitable for stations already in the field, fixed version is suitable for new stations.

Specifications

Name	Specifications	
Installation	fixed	mobile
Controller	display Real-time display of data such as density, temperature, pressure, flow, etc.	
Base wheel	φ 100	None
outer shell Material	304 Stainless Steel	
Dimensions	1100mm x 800mm x1700mm	1200mm x 800mm x1700mm
Connection type	Standard DN50 flange connection	
Ambient temperature	-40℃~55℃	
Working temperature	-200℃~100℃	
Power supply	AC~220V	
Monitoring density range	5~470kg/m3	
Monitoring flow range	5~286kg/min	
Monitoring pressure range	0bar - 10bar	

CHART LNG Transportable Semi-trailer



LNG semi-trailer is used to transport liquefied natural gas. The products are designed and manufactured in accordance with relevant domestic codes and standards. The products are integrated with GOFA's (CHART German subsidiary) lightweight design, advanced technology, reliable quality and high safety standard.

The inner vessel and pipeline of the semi-trailer is made of austenitic stainless steel. The outer vessel is made of high-quality carbon steel and protected by high-quality paint. The interlayer provides a superior thermal insulation performance by using multi-layer super insulation with cryogenic dedicated glass fiber.

The cabinet has a sunken structure design and is ergonomically designed to make it more convenient and safe during handling, filling and unloading.

Each trailer receives a comprehensive Chart 12 month warranty with 36 month warranty on the vacuum quality.

Product features

- **Lighter**—lightweight design

Higher transportation efficiency

Lower fuel consumption
- **Cost**—Better tank insulation design

Lower daily evaporation rate

Better interlayer pipeline design

Minimum BOG emissions
- **Safer**—the safer products

Always regard safety as the starting point of all designs

Multiple options to improve the safety performance of trailer effectively

Improve active and passive safety design

More protection for trailers and operators

Specifications

Specification	LNG Trailer
	52.6m³
model	CTZ9386GDY
medium	LNG
Gross capacity (m³)	52.6
design pressure (MPa)	0.65
insulation method:	Super insulation (aluminum foil + fiberglass paper)
Loading and unloading method:	differential pressure
axle	3
net weight (Kg)	14900
Rated load (Kg)	*
gross mass (Kg)	37900
dimensions : length (mm) x width (mm) x height (mm)	13100x2550x3950
Tractor model	6x4/6x2

Note: The above pictures and data are only for reference and the actual structure and data are subject to the actual product.
* Calculated according to relevant standards.

CHART Patented LNG Submerged Pump Transfer (ORCA)



LNG submerged pump transfer (known as ORCA) is used for LNG transportation and especially for accurate metering of liquid filling with small and medium-sized LNG tanks.

In 2001, CHART US launched own LNG trailer with submerged pump. This is a kind of cryogenic distribution trailer with the most advanced technology, the highest safety, the easiest operation and no emissions in operation. It fills the gap in the global cryogenic transportation industry.

In 2006, CHART China introduced this technology into China and completed the localization design in accordance with the current domestic specifications and standards.

In 2013, it passed the technical review organized by the National Quality Inspection Bureau.

CHART China's ORCA series of cryogenic liquid delivery trailers are equipped with the satellite positioning system in accordance with relevant regulations. It has twin functions of filling stationary storage tanks and LNG vehicle tanks in an emergency.

Product features

- Quick filling, without precooling, flexible filling

■ Highly integrated, one-button operation, reduced operation errors

■ Equipped with satellite positioning system, with fixed point offloading function

■ Automatic cut off, pump stop system, filling without leakage and discharge
- Completely in accordance with relevant regulations and standards

■ Equipped with high quality parts, low failure rate, high stability

■ With anti - slip device, with anti - break device for discharge hose

Specifications

Specification	LNG ORCA
	51.6m³
model	CTZ9371GDY
medium	LNG
Gross capacity (m³)	51.6
design pressure (MPa)	0.65
insulation method:	Super insulation (aluminum foil + fiberglass paper)
Loading and unloading method:	Differential pressure (loading) / pump (unloading)
axle	3
Net weight (Kg)	15625
Rated load (Kg)	*
gross mass (Kg)	36570
dimensions : length (mm) x width (mm) x height (mm)	13725x2550x3950
Tractor model	6x4/6x2

Note: The above pictures and data are only for reference and the actual structure and data are subject to the actual product.
* Calculated according to relevant standards.

CHART Large-scale LNG Cryogenic Storage Tanks



Construction of the 1000 m³ large-scale storage tank for the Norwegian project (made in the Czech factory)

The large-scale LNG storage tank produced by CHART is a vacuum insulated pressure vessel that can store cryogenic liquids for a long time without venting. Consequently, it is widely used in LNG satellite stations, gasification stations, peaking stations and small & medium-sized LNG liquefaction plants. The quantity and volume of storage tanks are usually determined by storage requirements, transportation restrictions, and on-site conditions. Chart designs and manufactures both vertical and horizontal tanks up to a maximum capacity of 1225m3. Multiple optional features enable a high degree of customization according to customer requirements. In 2008, CHART China successfully produced its first 500m3 vacuum insulated storage tanks for export (to Israel).

Product Features

- Unique design of inner support, insulation and piping in the annular space.
- Advanced flexibility calculation and mature manufacturing technology.
- Advanced RTR (Real Time Detection) Technology.
- Stable NER performance, long-term preservation of liquids without venting.
- Lower daily losses of LNG, at the same relief valve set pressure.
- Low evaporation rate, high efficiency and energy saving.
- Multi-layer winding (SI) technology applied to the tank volume up to 380 m³, which is the largest volume in the industry.



Construction of the 500 m³ horizontal tank for Israel

Specifications

Model		HS32/12	HS60/12	VS60/12	VS150/8	HS150/8	HS500/8
MAWP, barg		12	12	12	8	8	8
Gross volume, m³		32	59.9	59.9	150	150	500
Net volume, m³		28.80	53.91	53.91	135.00	135.00	450.00
Medium		LNG					
NER % (Nitrogen)		0.19	0.14	0.14	0.085	0.085	0.055
Transport Dimension (mm)	Wide	2620	2824	3080	3900	3830	5030
	Height	2860	3260	3100	3950	4120	5250
	Length	9980	14600	14750	21220	20920	35460



CHART LNG Supplying System



10 m³ LNG Supplying System

LNG supplying system is a storage platform with depressurization and gasification functions. It is mainly composed of LNG tank, ambient air vaporizer or water bath electric heater, EAG vaporizer, pressure regulating, metering and skidding, instrument and PLC control system. According to the client's request, the system can be designed with leak monitoring systems, deflagration, operation protection functions, alarms, emergency shut down and other functions. Specially designed for industrial, transportation, scientific, medical and gas boiler applications.

Product Features

- More safety
Tanks are equipped with high quality root valves according to clients' requirements, greatly reducing the possibility of leakage. Gasification & regulating skid incorporates high quality pressure regulator valve and is equipped with automatic overpressure cut-off. The globe valve is manufactured locally by a high quality supplier and has a very low maintenance rate. PLC control system can be equipped according to client's requirement, to meet the linkage requirement of tank emergency cut-off valve and gas detector. Unmanned operation - optional wireless data transmission to the control platform, real-time monitoring of the flow, temperature, pressure and other data of the equipment, to ensure the safe operation of the site. Total safety - All kinds of LNG supply system products have been supplied worldwide with zero safety incidents.

- More mature
The market application is mature and reliable. In the 1990s, LNG gas supply system has been successfully applied in the United States. After 20 years of market practice, since 2010, CHART has bring this technology to China. Up to now, the LNG gas supply system manufactured by CHART has been successfully applied all over the country, providing about 1000 sets of equipment for the coal-to-gas project.
- Better for the environment
In line with the national energy conversion strategy. The LNG gas supply system is equipped with economical line, which can achieve zero emission during the using.

Specifications

Vertical with stainless steel outer vessel							Horizontal with carbon steel outer vessel	
Product description	Specification	1m³	2m³	3m³	5m³	10m³	10m³	20m³
Design pressure	Bar	16	16	16	11	11	8	8
LNG storage capacity	Nm³	595	1, 125	1, 690	2, 815	5, 630	5, 630	11, 260
NER	LIN	0. 80%	0. 70%	0. 60%	0. 45%	0. 35%	0. 35%	0. 23%
Withdrawal rate	Nm³/h	15	25	200	200	200	200	300/500
Dimension of gas supply system	length,width ,height mmxmm	3150x2350x3300				5000x2300x5500	10000x2300x5500	16000x2600x3500



LNG liquid cylinder (DC160L~DC200L series)



With nearly 60 years of production history, CHART liquid cylinder (Dura-Cyl) is the market leader and most prestigious and recognized brand in the cryogenic industry throughout the world. CHART's liquid cylinder manufacturing center is located in Canton, Georgia, USA. The products contain many patented design features that ensure high quality, low product loss and long life.

CHART's high-performance cylinder technology extends across the LNG liquid cylinder range. Domestic design is fully in accordance with all relevant regulations and standards. The products continue to receive endorsements for reliability, durability and longevity from the market and individual clients.

Product features

- Full stainless steel construction
- Industry-leading Chart Vacuum Technology®
- Humanized design height, readable regulator pressure set
- 100% Oxygen Clean
- Float level gauge, easy to read

Specifications

Type name	LNG450-176-1.38	LNG450-196-1.38	LNG450-209-1.38
Model name	DC160MP	DC180MP	DC200MP
Gross capacity (liter)	176	196	209
Net capacity (liter)	165	185	196
Diameter (cm)	50.8	50.8	50.8
Height (cm)	152	162	167
Primary Relief Valve Set PSI/MPa	1.58	1.58	1.58
Secondary Relief Valve Set PSI/MPa	2.41	2.41	2.41
Empty cylinder weight(KG)	113	117	127
Filling weight(KG)	*	*	*
NER per/day	2.20%	2.10%	2.00%

* Calculated according to relevant standards.

LNG Framed liquid cylinder Mega-Cyl (MC390L/450L series)

CHART MEGA-CYL series cylinders are palletized cryogenic cylinders with high vacuum integrity. Two capacities, 390L and 450L are available for LNG. The palletized frame structure is easy to handle and protects the cylinder. The product has a large volume and low evaporation rate which can save liquid for a long time and reduce product loss.

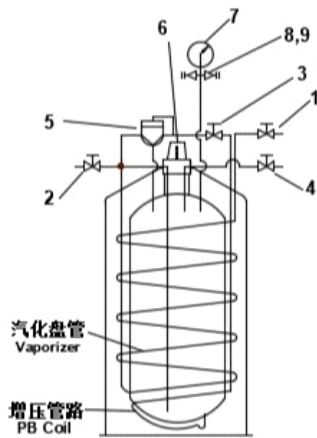
Product features

- Full stainless steel construction
- Palletized frame for easy transport and protection
- High vacuum and super insulation for long LNG holding time
- Float level gauge, easy to read



Nomenclature

- 1. Gas-use valve
- 2. Liquid valve
- 3. Pressure Control Valve
- 4. Vent Valve
- 5. Regulator
- 6. Float level gauge
- 7. Pressure Gauge
- 8. Primary Relief Valve
- 9. Secondary Relief Valve



Specifications

Type name		LNG700-390-1.38	LNG700-450-1.38
Model name		MC390	MC450
Dimensions	Unit	MC390MP	MC450MP
Cylinder diameter	cm	75	75
Cylinder height	cm	141	156
Frame length	cm	86	86
Frame width	cm	86	86
Frame height	cm	200	200
Empty cylinder weight	kg	197	252
Frame weight	kg	164	164
Liquid filling weight *			
LNG	kg	127	147
Technical specifications Relief valve setting			
Primary Relief Valve Set	PSIG/Mpa	230/1.58	230/1.58
Secondary Relief Valve Set	PSIG/Mpa	350/2.41	350/2.41
NER(per day %)	液氮	1.84%	1.80%
Gross capacity	升 (L)	390	450
Net capacity	升 (L)	371	428

* Calculated according to relevant standards.

Marine LNG solutions



CHART has provided multiple ship LNG complete solutions for China domestic and overseas projects. Solutions include LNG fuel tanks, TCS (Tank Connection Space, also called Cold Box), portable fuel tank containers, ship LNG fuel gas supply systems, and marine LNG bunkering stations.

Product features

- Customized insulation materials supplied through CHART global sourcing team.
- Super insulation, a leading insulation technology, which is applied in the LNG fuel tanks.
- Minimum size and weight comparing with other same volume tanks.
- High quality and compliance with the strictest requirements of IMO IGF code.
- Close contact with the main classification societies all over the world.
- Advanced and reasonable designing on TCS, electrical control system, valve configuration and piping arrangement.
- Excellent performance, easy to operate, safe and reliable.

Product Configurations

- Gross volume of tank: 3 to 500m³
- Design pressure of tank: 0 to 1.2MPa.
- Type of tank: double walls tank with super vacuum insulation or perlite insulation, and single wall tank with foam insulation.
- Material of tank and piping: 304、304L、316、316L or other grade of austenitic stainless steel.
- TCS configuration: Single TCS、double TCS.
- Heating media of vaporizer: Cold water、glycol water.
- Classification society: CCS、BV、DNV-GL、LR、ABS or other.
- Valve configuration: Import brand、local brand with high quality or specified by customer.

CHART Patented LNG ISO Tanks (T75)



Tank container for refrigerated liquefied gas (UN T75)

In 1994, CHART launched the first generation of cryogenic ISO tank container in Denver United States, and it immediately won the respect of both domestic and overseas customers for quality and reliability and has maintained that respect ever since. CHART China introduced cryogenic container technology from CHART Germany in 2013 and, under the guidance of European experts, developed a new generation of cryogenic tank container (UN T75). This product integrates the advanced design concepts, but also offers greater security, lighter weight, and is totally in accordance with market demand.

Product features

- Since 1994, we have been focusing on the research and development and manufacturing of cryogenic container, and accumulated customer reputation for decades.
- Multiple cryogenic services for intermodal transportation including LNG、LOX、LIN、LAR、LCO2、LC2H4、LN2O etc.
- Dual design code compliance (if required) for maximum flexibility according to geographic and market requirements.
- After long-term verification and continuous optimization of inner structural design, to make sure the safe operation of equipment for a long time.
- All operating valves and gauges are ergonomically designed for safe and efficient operation and maintenance.
- Chart's excellent thermal insulation performance is verified through the continued performance and reliability of thousands of products in the field.
- Options available to customize the configuration (optional pump, flowmeter etc.)
- Optimized pressure build-up reduces offloading time.
- Continuous product improvement provides customers with enhanced safety, reduced weight, enhanced user experience and improved efficiency and economics.

Specifications

Dimension	Model	Capacity (M3)	Working pressure (Mpa)	Tare weight (Kg)	Payload (Kg)	Rating mass (Kg)
20Ft	GX20. 1/10-ASME-01 CS SI	20. 11	1. 0	6, 900	29, 100	36000
	GX20. 1/17-ASME-01 CS SI	20. 11	1. 7	8, 210	27, 790	36000
	GX20. 1/23-ASME-01 CS SI	20. 11	2. 3	9, 400	Note1	36000
40Ft	GX45. 6/8. 4-ASME-01 CS SI	45. 6	0. 84	11, 400	Note1	30480
	GX45. 6/8-GB-01 CS SI	45. 6	0. 8	11, 400	Note1	30480

Note 1: comply with the requirement of code

CHART Patented Vacuum Insulated Pipe (Python)

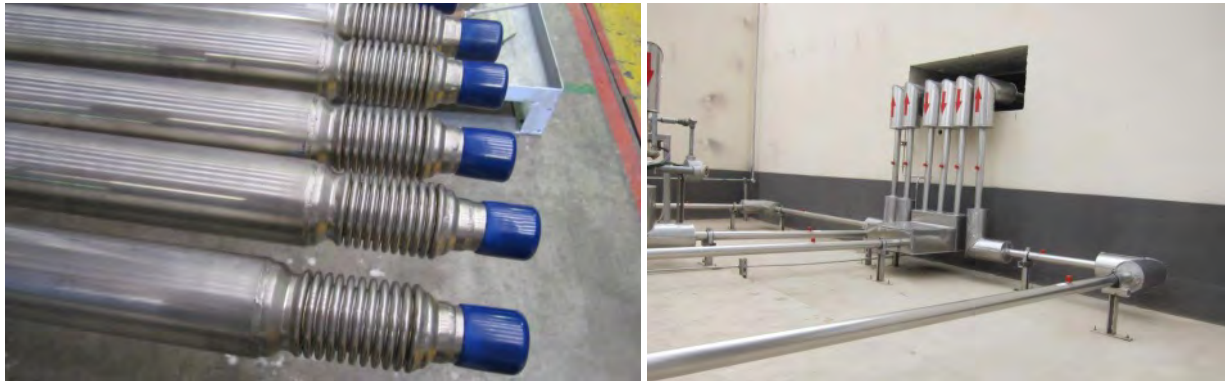


CHART is leading the way in the design, manufacture and installation of vacuum insulated pipe (VIP) systems across the globe. We combine more than 50 years of practical experience with advanced design techniques to achieve the optimum balance between high quality liquid delivery and cost performance.

CHART VIP is available in two types; rigid pipe and flex hose, with internal diameters from 1/2" to 3". All VIP is TIG welded stainless steel construction. Helium mass spectrometer leak detection ensures high vacuum stability and complete reliability in operation. CHART can also design and customize vacuum -insulated pipe systems for customers with special needs.

Product features

- Frost-free, moisture-free, can be used in environments where it is necessary to keep dry.
- Liquid savings: lower inherent heat leak, minimizes vaporization and provides a controllable, high quality liquid when and where you need it.
- Insulation performance: Thermal insulation material is specially selected by CHART to minimize product losses.
- Precision machined vacuum port ensures the vacuum is maintained long-term.
- Low installation cost: on-site installation is very convenient, easy and quick.
- Minimum maintenance: CHART's world-leading super-insulation technology and reliable accessories ensure continued, long term excellent performance of VIP with minimal maintenance.
- Fast, efficient and unrivalled service: CHART VIP uses standard components and we maintain an inventory of spare parts enabling us to satisfy customer needs immediately.

Specifications

Type Name	Size	Inner pipe size	Outer pipe size	Working pressure (MPa)	Operating temperature	Material
Python	1" Python	Φ33.4×1.65	Φ60.3×2.0	≤4.0	-196/50	SS304
	1.5" Python	Φ48.3×1.65	Φ88.9×2.0	≤4.0	-196/50	SS304
	2" Python	Φ60.3×2.11	Φ88.9×2.0	≤4.0	-196/50	SS304
	3" Python	Φ88.9×2.11	Φ141.3×2.5	≤4.0	-196/50	SS304

Thermafin™ Supergap™



Thermax Thermafin™ Supergap™ Ambient Vaporizers have become the industry standard for ambient air vaporization. Supergap Vaporizers use natural convection of air to vaporize liquefied gases. Finned aluminum tubes absorb heat from the air and transfer that heat to the product gas. The huge 4 inch gap between fin tips provides room for ice growth and allows for more than 500 hours of continuous operation without defrost, making Supergap vaporizers ideal for severe climates and long duration operation. Extended operation requires a system of switching vaporizers designed by Thermax. In addition to our standard aluminum construction, units are available with stain-less steel and other alloy liners for high pressure and corrosive applications.

Connection type	Design pressure	
MNPT	4. 1 MPA	41 BARG
150 LB.ANSI F.F.	1. 9 MPA	19 BARG
300 LB.ANSI F.F.	3. 1 MPA	31 BARG

Product Features

- 12 inch fin tube center to center spacing
 - 4 inch gap between fins
 - Standard models rated up to 200 MSCFH
 - Aluminum corrosion resistant construction
 - High strength welded base frame
 - Withstands 100 mph winds and Zone 4 seismic forces
 - 600 psig standard design pressure on all aluminum units
- Severe thermal cycling design
 - Enhanced internal heat transfer area, highest in industry
 - No-crate shipping design for larger models
 - Perimeter frame and legs for unrestricted airflow
 - ASME B31.3, CRN(all provinces), and PED module D compliant
 - Patent pending, internal flow balancing design
 - Taperfin gives 99% fin efficiency

Options

- Stainless steel, monel and other alloy liners
- Design pressures exceeding 15,000 psig
- Design as ASCE 7-05 for 150 MPH wind
- Low inlet pressure and low pressure drop designs
- Flanged, tongue and groove, butt weld end connections
- Continuous operation with switching system
- Electropolished 316LSS internals for ultra-pure applications



Specifications

Model	Flow rate*				Standard Inlet/Outlet Connection Size		Dimensions		Weight	
	8 hours, Nitrogen						W x D x H			
	Aluminum		SS Lined		Inch	mm	Inch	cm	Lbs	Kg
	SCFH	Nm ³ /Hr	SCFH	Nm ³ /Hr						
SG25HF	2,600	70	2,100	60	3/4	19	22X22X152	56x56x386	155	70
SG35HF	3,900	100	3,100	80	3/4	19	32X22X152	81x56x386	215	98
SG50HF	5,200	140	4,200	110	3/4	19	44X22X152	112x56x386	275	125
SG70HF	7,800	210	6,200	160	3/4	19	48X36X152	122x91x386	405	183
SG95HF	10,400	273	8,300	218	3/4	19	48X48X152	122x122x386	515	234
SG110HF	11,700	310	9,400	250	3/4	19	48X36X213	122x91x541	580	263
SG140HF	15,600	410	12,500	330	3/4	19	48X48X213	122x122x541	760	345
SG180HF	19,400	500	15,500	400	3/4	19	48X60X213	122x152x541	935	424
SG215HF	23,300	610	18,600	490	1-1/2	38	72X48X224	182x122x569	1,160	526
SG270HF	29,200	770	23,400	620	1-1/2	38	60X72X224	152x182x569	1,425	646
SG320HF	35,000	900	28,000	700	1-1/2	38	73X73X224	185x185x224	1,690	767
SG360HF	38,900	1,000	31,100	800	1-1/2	38	75X62X284	191x157x721	1,890	857
SG430HF	46,700	1,200	37,400	1,000	1-1/2	38	75X72X284	191x182x721	2,245	1,018
SG500HF	54,400	1,400	43,500	1,100	1-1/2	38	75X93X284	191x236x721	2,590	1,175
SG580HF	62,200	1,600	49,800	1,300	2	51	75X98X284	191x249x721	2,950	1,338
SG670HF	72,600	1,900	58,100	1,500	2	51	98X86X284	249x218x721	3,410	1,547
SG770HF	82,900	2,200	68,300	1,800	2	51	98X98X284	249x249x721	3,875	1,758
SG860HF	93,300	2,500	74,600	2,000	2	51	98X110X284	249x279x721	4,340	1,967
SG1150HF	124,400	3,300	99,500	2,600	3	76	101X101X414	256x256x1051	6,155	2,792
SG1300HF	140,400	3,700	112,000	2,900	3	76	101X114X414	256x290x1052	6,870	3,116
SG1500HF	165,900	4,400	132,700	3,500	4	102	101X101X534	256x256x1356	8,095	3,672

*The nominal flow rate is based on the following: 8 hour continuous service between defrost, 10 ° C ambient temperature, 50% relative humidity and 11 ° C approach temperature.

Application case: fueling station



Application case: Regas station



Linan Hangran regas station



Enereco (Tibet) regas station



Xuzhou Huagang regas station



Nantong Mengqirui regas station

Application case: LNG marine projects (CHINA)



5.6 m³ fuel tank with two drip tray on 600DWT bulk cargo ship of Shanghai Green Power Shipping Company in 2015.



5.6 m³ fuel tank with two TCS on 800DWT bulk cargo ship of Shanghai Green Power Shipping Company in 2017.



11 m³ fuel tank with two TCS on 30TEU household garbage ship of Shanghai Municipal Investment Group Corporation in 2018.



14 m³ portable fuel tank with 20' ISO container frame and single TCS on pilot vessel of Shanghai International Port Group Co., Ltd. in 2019.

Application case: LNG marine projects (overseas)



- 3units fjord LNG ferries in Northern Europe in 2006.
- 130m length, 589 passengers, 212 vehicles.
- Operating speed: 21 knots.
- Service area: Norway.
- CHART supply scope: 6x125m3 horizontal tanks including cold boxes.



- High-speed catamaran ferry in Argentina, South America in 2008.
- World first high-speed ferry, 99m length, over 1000 passengers, 153 cars
- Operating speed: 50 knots
- Service area: Buenos Aires – Montevideo
- CHART supply scope: 2x43m3 horizontal tanks, coldboxes with vaporizers and valves.



- 3units offshore supply vessels of Harvey Gulf in 2011.
- First dual fueled vessel under US flag.
- Service area: Gulf of Mexico
- CHART supply scope: 3x290m3 horizontal tanks.



- Power barge of Hybrid Port Energy in Germany in 2014.
- Service area: Port of Hamburg.
- CHART supply scope: 40' ISO tank container, gas piping, etc.

AFTER-SALES SERVICE GUARANTEE

The regional service center works closely with the contractor , service hotlin: 400-887-8865

Changzhou	299 Huanghe west road, Changzhou City Responsible Area:Jiangsu、Shanghai、Zhejiang、Anhui Contact number: 13775278010	Tianjin	Responsible Area: Tianjin、Beijing、Hebei、Henan、Shandong、Mengdong Contact number : 18262965493
Xi'an	Responsible Area: Shanxi、Shanxi、Gansu、Ningxia、Xinjiang、Mengxi Contact number: 13775278010	Wuhan	Responsible Area: Hubei、Hunan、Jiangxi、Sichuan、Guizhou、Chongqin、Fujian、Guangxi、Guangdong、Hainan Contact number: 1596121353
Shenyang	Responsible Area:Heilongjiang、Jilin、Liaoning Contact number : 15940582639		

