

AIR WATER ENGINEERING

Corporate profile



Meeting society's needs with nature's blessings.

 *AIR WATER ENGINEERING INC.*

Innovation Created by gas technology

For AIR WATER ENGINEERING INC., “Be creative” is the origin of “creativity.”

AIR WATER is a comprehensive engineering company covering design, construction, maintenance, safety, and quality control. The AW brand offers large-scale cryogenic air separation unit.

Keywords for our further progress are “Original technology” and “Excellent cost performance.”

AIR WATER responds to the customers’ needs of when, where and how and supplies the most suitable system from the view of the customers’.

INDUSTRIAL GAS SOLUTIONS.
PRODUCTION BY GAS TECHNOLOGIES.
BUILD A BRIDGE TO THE FUTURE WITH US.

Products available

LOW TEMPERATURE VACUUM

[01-13]

INDUSTRY

[14-16]

GAS

[17-24]

→ Product Name

CE:Low Temperature Liquefied Gas Storage Tank

01



→ Product Features

→The double structure tank with inner vessel and outer vessel to safely store liquefied oxygen, liquefied nitrogen, liquefied argon, liquefied carbon dioxide, LNG, etc. The incorporated pressurized vaporizer maintains pressure at a constant level for transporting self-pressurized liquids. The liquid is vaporized by the gas vaporizers and supplied stably as gas enables and guarantees a stable supply.

→ Applications

For equipment associated with the storage, manufacturing, and consumption of ultra- low temperature liquefied gases

→ Specifications

Model	Internal volume	Model	Internal volume
CE-2900 MHT	2900	CE-30000 MHT	30000
CE-4900 MHT	4900	Max. Loading Pressure	Model M:0.93MPaG
CE-10000 MHT	10000		Model H:1.47MPaG
CE-18000 MHT	18000		Model T:2.15MPaG

01

→ Product Name
Air Fin Type Vaporizer

02



→ Product Features

→ We offer two types of vaporizers, applying aluminum which has good low temperature properties and ultra high thermal conductivity: an ambient air heat exchanger and a hot water type, suitable for evaporating and vaporizing ultra low temperature liquefied gas. Our vaporizers are installed at various high pressure gas production sites and are space-saving units with stable performance.

→ Applications

For plants, auxiliary equipment for the manufacture of various gases, and for the gasification of liquefied gas

→ Specifications

Model	Capacity(Nm ³ /hr)	Design Pressure(Mpa)	Design Temp.(°C)
SF-1~12	40~500	2	-196°C~40°C
LV-10~80	10~80		
LVL100~3000	100~3000		

→ Product Name
Vacuum Insulation Pipe

04



→ Product Features

→ Compact pipes developed and manufactured in-house with extremely high thermal insulation properties, that are light-weight and energy-efficient. These high-precision vacuum insulation pipes are easily installed and thus can drastically reduce capital costs.

→ Applications

Low-temperature liquefied gas supply pipe for the manufacture of liquid crystals, plasma displays, semiconductors, steel, solar batteries cells, etc.

→ Specifications

Inner & outer pipe material: SUS304/SUS316/SUS316L
Operating Pressure (Standard Type): 1MPa
Pipe length, applied welding method, and other specifications are customized to the customer's requirements.

→ Product Name
Cryogenic Liquefied Gas Lorry

03



→ Product Features

→ An efficient tool for the supply and transport of ultra-low temperature liquefied gases including oxygen, nitrogen, argon and hydrogen from the production site to the customer site. Unique thermal insulation technology reduces the weight of the insulation material one-fifth, which enables an increased loading capacity and reduced maintenance cost.

→ Applications

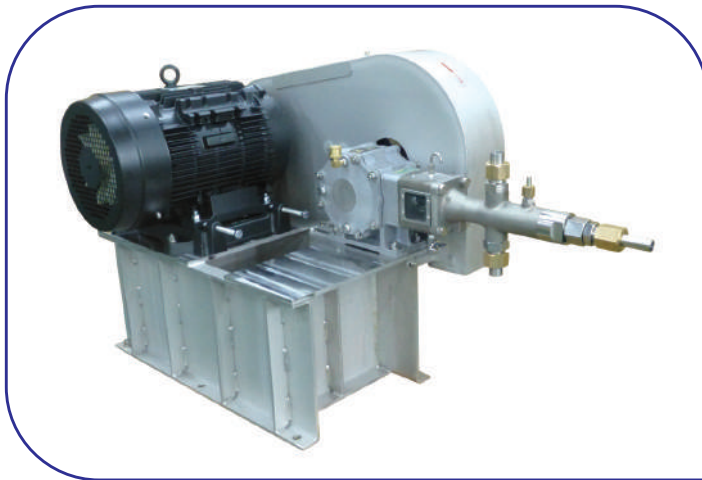
Transport of ultra-low temperature liquefied gases, such as oxygen, nitrogen, argon, and hydrogen, etc.

→ Specifications

Model	Kinds of Liquefied gas	Loading Pressur(MPa)
Pump-loading	O ₂ ·N ₂ ·Ar·H ₂ ·CO ₂	0.3
Self-pressuring		2.0

→ Product Name
High-Pressure Liquefied Gas Pump

05



→ Product Features

→ Pumps are designed for boosting the pressure of various low-temperature liquefied gases such as liquefied oxygen, liquefied nitrogen, liquefied hydrogen, and LNG. These pumps are compact with super-high power efficiency and pressure boosting, enabling pre-cooling in a short period. The small NPSH (Net Positive Suction Head) allows minimum pressure loading on the tank and provides stable operation.

→ Applications

Charging liquefied gas liquid to high-pressure vessels, supplying liquids from back-up facilities, etc. It can be loaded on tank lorries.

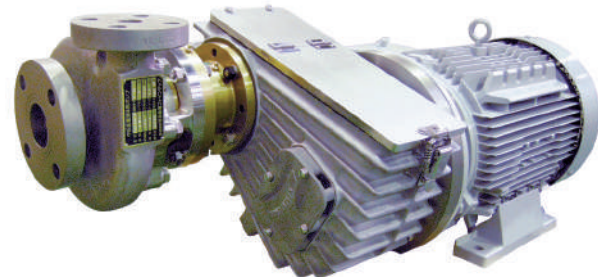
→ Specifications

Model	Max. Discharge Pressure(MPa)	Discharge Volume (m ³ /hr)	Maximum Operating Suction Pressure(MPa)
CL-1-75S	29.4	0.11~0.3	2.16
CL-1-125S	24.5	0.3~0.9	
CL-1A-150S	19.6	0.55~1.5	

Products available

→ Product Name
Medium-Pressure Liquefied Gas Pump

06



→ Product Features

→ Centrifugal pumps are light weight and compact with high performance, suitable for transporting various liquefied gases at low temperatures and require limited space. The inducer impellor design provides stable operation from the small NPSH (Net Positive Suction Head). To meet piping layout needs, the discharge direction of the liquefied gas is flexible. Operation can be preset to a wide range of flow rates from low-pressure/low flow to high-pressure/high flow.

→ Applications

Transporting of liquefied gas, supplying liquids from back-up facilities, etc. It can be loaded on tank lorries.

→ Specifications

Model	Discharge Head(m)	Discharge Volume (m ³ /hr)	Maximum Operating Suction Pressure(MPa)
TC-21 1×2×6-1S	20 ~ 276	2 ~ 20	0.49
TC-21 1×2×6-2S	123 ~ 446		
TC-21 32×10	46 ~ 126		

→ Product Name
Vertical Centrifugal Pumps (VCP Series)

07



→ Product Features

→ The centrifugal pumps for liquefied gases have achieved a longer operating life with their unique structure (vertical liquid-gas dual compartment structure). The pump consists of a motor part and a pump part separated into upper and lower compartments, respectively. Although the lower pump part is filled with liquefied gas while the upper motor part is an ambient temperature gaseous atmosphere, these two compartments are in an integral sealless structure with no shaft sealing being used. Therefore, there is no risk of leaking through shaft sealing, as well as a realizing of a longer operating life, free of maintenance, and low noise.

→ Applications

Used for filling to tank trucks, circulating a filler liquid from a tank truck to a storage tank, and transfer processes. Applicable to LNG.

→ Specifications

Model	NPSHR (m)	Capacity (m ³ /hr)	Motor power (kW)
VCP0510	6 ~ 120	0.7 ~ 5	7.5
VCP1010	10 ~ 250	2 ~ 20	7.5, 15
VCP2010	10 ~ 250	20 ~ 80	30

→ Product Name
PLC ultra-low temperature container[PLC-N/PLC-ND]

08



→ Product Features

→ Both inner and outer tanks are made entirely with stainless steel, making them resistant to corrosion. Adopted a LCCM valve. The foot ring reduces shocks to the container during unloading, etc. For the PLC-ND type, the liquid dispensing opening and the upper filling opening are made to be independent from each other.

→ Applications

Standard-type container for LO₂, LN₂, and LAr.

→ Specifications

Model	PLC-N/PLC-ND
内容積	176 liter
Maximum fill volume LCO ₂	LO ₂ 169kg, 133m ³ (1atm, 35°C) LN ₂ 119kg, 107m ³ (#) LAr 202kg, 127m ³ (#)
Supply volume	Max 25m ³ /hr (1atm, 35°C)
Maximum filling pressure	1.34MPa
Setting pressure for LCCM valve	0.9MPa
Inner tank safety valve	1.76MPa
Thermal insulation performance	2.2kg/day or less (LO ₂ equivalent, outside air temperature 20°C)
Size(H) × (φ)	Approximately 1,580mm × 508mm
Empty weight	Approximately 106kg
Applicable regulation	DOT-4L High Pressure Gas Safety Act

→ Product Name
PLC ultra-low temperature container[PLC-T/PLC-H]

09



→ Product Features

→ Both inner and outer tanks are made entirely with stainless steel, making them resistant to corrosion. The foot ring reduces shocks to the container during unloading, etc.

→ Applications

Standard-type container for liquefied carbon dioxide gas (LCO₂). Ultra-low temperature container with a high-pressure design for liquefied carbon dioxide gas (LCO₂).

→ Specifications

Model	PLC-T	PLC-H
Inner volume	176 liter	176 liter
Maximum fill volume LCO ₂	161kg	LO ₂ 169kg, 133m ³ (1atm, 35°C) LN ₂ 119kg, 107m ³ (#) LAr 202kg, 127m ³ (#)
Supply volume	Max 15kg/min	Max 15m ³ /hr (1atm, 35°C)
Maximum filling pressure	2.4MPa	
Pressure relief valve	-	2.0MPa
Economizer valve	3.13MPa	
Inner tank safety valve	2.2kg/day or less (LO ₂ equivalent, outside air temperature 20°C)	
Size(H) × (φ)	Approximately 1,580mm × 508mm	
Empty weight	Approximately 130kg	
Applicable regulation	DOT-4L High Pressure Gas Safety Act	DOT-4L High Pressure Gas Safety Act *If a pressure above 1.0 MPa is used, it is required to register as a manufacturing facility.

Products available

→ Product Name

PLC ultra-low temperature container[PLC-60R,PLC-120]

10



→ Product Features

→Achieved the best performance and lightest weight as possible. A compact ultra-low temperature container perfect for handling a small amount of liquefied nitrogen. Adopted a casters base for easy transfer.

→ Specifications

Model	PLC-60R	PLC-120
Inner volume	60 liter	120 liter
Material	Inner and outer stainless-steel tanks	
Maximum fill volume	40kg(LN2)	81kg(LN2)
Maximum filling pressure	0.68MPa	0.68MPa
Pressure protection device	0.24MPa	0.24MPa
Liquid extraction opening	3/4-16UNF	3/4-16UNF
Discharging opening	3/4-16UNF	3/4-16UNF
Empty weight	Approximately 60kg	Approximately 82kg
Size(H)×(φ)	Approximately 1,060mm×508mm	Approximately 1,400mm×508mm
Applicable regulation	DOT-4L High Pressure Gas Safety Act	

→ Applications

Small and light container for LN2.

→ Product Name

V Satellite

11



→ Product Features

→ In order to enable utilization of LNG in remote areas with no pipelines installed, we can construct an LNG satellite base (a facility for storing, vaporization, and delivery), which can be directly connected with LNG containers, providing stable gas supply. In addition to enabling reduction of the space by 80%, shortening of the construction period by about 65%, and significant reduction of both maintenance period and costs compared to traditional facilities, no permission is required for Class 1 Manufacturing Equipment based on the High Pressure Gas Safety Act.

→ Specifications

	Traditional LNG satellite facilities	V Satellite
Main unit dimensions	-	3.5×4.5×20m
Installation space	18×10m	6×5m
Construction period	10 ~ 14 day	3 ~ 5 day
Safety inspection, etc.	Annual safety inspection (subject to the High Pressure Gas Safety Act)	Regular self-inspection only
Selection of safety inspection personnel	Required	Not Required

※ Safety inspection personnel based on the High Pressure Gas Safety Act

→ Applications

Natural gas supply for boilers, industrial furnaces, and plant generating equipment

→ Product Name

Marine LNG supply

12



→ Product Features

→ LNG supply facilities for shipping fuel, which are called Fuel Gas Supply Systems (FGSS), are facilities to supply gas fuel for engines of LNG fuel ships.

→ Specifications

- Component equipment
- LNG fuel tanks (Type-C)
 - Evaporators (for gas delivery)
 - Pressurized evaporators (for pressure adjustment)
 - Buffer tanks
 - Bunkering unit

→ Applications

Our FGSS can stably supply gas according to various bunkering systems.

→ Product Name

LNG Vertical High Pressure Pump

13



→ Product Features

- Quick start support
- Reduced evaporation loss with a vacuum jacket
 - Works with a wide range of flow rates with a V belt
 - Inverter drive available
 - Passed the test performed under the High Pressure Gas Safety Act
 - Equipped with an explosion-proof motor

→ Specifications

Model	VP100L
Suction pressure (MPa)	0.01 ~ 0.99 (0.1 ~ 9.9 bar)
Discharge pressure (MPa)	30 (300 bar)
Capacity (L/h)	200 ~ 600
Design temperature (°C)	-196 ~ +40
NPSHR (m)	3,000
Motor power (kW)	3.7 ~ 15
Weight (kg)	about 300
Power supply voltage	3-phase AC 200/220V or 400/440V

→ Applications

Used at natural gas fueling stations
Filling cylinders
Transferring cryogenic liquefied gases

Products available

→ Product Name Large capital construction engineering

14



→ Product Features

→ Integrated installations engineered for various gases and gas supply piping for steel mills, gasification, manufacturers of liquid crystals, plasma displays, semiconductors, solar batteries, steel, chemicals and special gases.

→ Applications

Equipment & machinery for the supply of various gases and gas piping construction associated with new plant construction and expansion of existing plants

→ Specifications

Comprehensive engineering of gas supply piping and gas production plants is carried out to the full satisfaction of our customers.

→ Product Name DO Clamp

16



→ Product Features

→ DO clamps are fittings consisting of clumps and hubs. Compared to flange joints, DO clamps provide a wider service range of temperature and pressure that better meet requirements from various industries and facilities. The superior tight-sealing property and 1/20 the weight of a JIS flange allows simplified and easier on-site work.

→ Applications

Various jointing valves
Max. Loading pressure: 30 MPa

→ Specifications

Pipe sizes range from 15A-100A and are customized to meet customer specifications.

→ Product Name MIX Master

15



→ Product Features

→ Gas mixing unit (dual-component type) using a pressure control system that is more economical than the conventional flow control system. By mixing two fluids using a pressure equalizing valve, the concentration is determined by the ratio of gases passing area of the loaded filter. A pressure-equalizing valve regulates the pressure regardless of the fluctuation of flow of fluid, enabling the mixed gas to be supplied at a fixed concentration.

→ Applications

Shielding gas for welding and mixed gas for foods

→ Specifications

Gas	Flow range(Nm ³ /hr)	Mixing Conc(%)	Max. Operating Pressure
Based on Customer's Spec	30 ~ 200	5 ~ 40%	0.95

→ Product Name VSU:High-efficiency Air Separator

17



→ Product Features

→ High-efficiency air separation unit that con-currently produces liquefied nitrogen and liquefied oxygen. Our decentralized, regional industrial gas supply network of the VSUs has been installed nation-wide at major bases, enabling CO2 reduction through the reduction of tank lorry transportation. The unique process has greatly reduced electric power consumption rate. The integrated storage tank has a large, space-saving structure in which multiple numbers of independent storage tanks are provided in the outer tank that has vacuum thermal insulation.

→ Applications

Regional industrial gas supply for the manufacture of liquid crystals, plasma displays, semiconductors, solar batteries, steel, chemicals, glass, and more

→ Specifications

Model	Capacity(Nm ³ /hr)	Purity(%)
Liquefied oxygen	500 ~ 700	99.8
Liquefied nitrogen	700 ~ 1600	99.999

→ Product Name
V1:Nitrogen Gas Generator

18



→ Product Features

→High purity nitrogen gas generator with a non-turbine design aimed at saving energy and non-CFC, with a focus on cost effectiveness, stability, and environmental ly-friendly operation. Combined low cost and high efficiency is achieved through the use of packing column with low pressure loss and high performance, reduced material processing, an integrated booster-compressor unit and a highly efficient main heat exchanger.

→ Applications

On-site gas supply for the manufacture of, liquid crystals, plasma displays, semiconductors, and solar cells, etc.

→ Specifications

Model	Capacity(Nm ³ /hr)	Purity(%)
Nitrogen gas V1E	2800 ~ 3600	99.999
Nitrogen gas V1D	4000 ~ 35000	99.999

→ Product Name
V2:Oxygen Gas Generator
V3:Oxygen Gas & Nitrogen Gas Co-Generator

20



→ Product Features

→ Non-turbine cryogenic air separation plant based on the V1 features.
V2: Produces Oxygen gas
V3: Produces both Oxygen and Nitrogen gas

→ Applications

On-site gas supply for steel mills, gasification, and the manufacture of liquid crystals, plasma displays, semiconductors, solar cells, glass, and more

→ Specifications

Model	Capacity(Nm ³ /hr)	Purity(%)
Oxygen gas	300 ~ 5000	93 ~ 99.8
Nitrogen gas	300 ~ 12500	99.999

→ Product Name
V1X:Compact Nitrogen Gas Generator

19



→ Product Features

→High purity nitrogen gas generator with a compact non-turbine design complying with non-CFC and having an integral mechanical room unit with a distillation column, condenser, heat exchanger and CE (cold evaporator) installed in the outer tank.

→ Applications

On-site gas supply for the manufacture of, liquid crystals, plasma displays, semiconductors, and solar cells, etc.

→ Specifications

Model	Capacity(Nm ³ /hr)	Purity(%)
Nitrogen gas	150 ~ 2350	99.999

→ Product Name
VP:Oxygen Gas Generator

21



→ Product Features

→ Oxygen gas generators produce oxygen from air by separation at a normal temperature using an adsorbent. The adsorbent is packed in the adsorption tower and selectively adsorbs more nitrogen than oxygen, resulting in a high concentration of oxygen. Advantages of this unit include reduced gas cost, optional work sharing with cryogenic separation units, ease of operation, and automatic intermittent running.

→ Applications

On-site gas supply to electric furnaces, manufacturers of chemicals and glass, paper mills, etc.

→ Specifications

Model	Capacity (Nm ³ /hr)	Purity(%)	Model	Capacity (Nm ³ /hr)	Purity(%)
VPS-25	25	90.0 or more	VPS-150 ~ 5000	150 ~ 5000	93.0
VPS-50	50				
VPS-100	100				

→Product Name

VHR:Hydrogen Gas Generator

22

→Product Features

→Hydrogen gas generators using an innovative thermal neutralization process. Unlike the conventional external heat supply process, oxygen is added to the raw material and the steam reforming from both exothermic oxidative reaction and endothermic reaction carried out on the same catalyst. With the vacuum-type PSA process, the hydrogen recovery rate is more than 90%. The elimination of large-scale heating furnaces reduces green house gas emissions.

→Applications

On-site gas supply to manufacturers of optical fibers, steel, solar batteries cells, etc.

→Specifications

Capacity(Nm ³ /h)	Purity(%)
40~500 ※Please contact us for the amount generated	99.999% more

→Product Name

Large scale ASU

24

→Product Features

→ We have more than 80 years of ASU production experience. We have delivered more than 450 ASUs in Japan and overseas, including Japan's largest 60,000 Nm3/h. ASU continues to evolve into a plant with higher reliability and operability by feeding back the data and know-how gained from gas production and supply experience at the large oxygen plant operated by Air Water to the design.

→Applications

On-site supply to steelworks, chemicals and petrochemical plants, and sales of large ASUs

→Specifications

We design customized plant to meet customer's requirements.
Oxygen gas up to 60,000 Nm3/h (for reference)
※Please contact us for your required gas volume.

→Product Name

Hydrogen gas/CO gas generator

23

→Product Features

→Long term stable operation using in-house developed catalyst and original process.
Purification processes for high carbon monoxide recovery rate.
It is possible to reuse carbon dioxide and hydrogen biproducts.

→Applications

Chemical raw materials, reducing agents, heat treatment of metals, etc.

→Specifications

Capacity(Nm ³ /hr)	Purity(%)
※Please contact us for your required gas volume.	~ 99%



MAINTENANCE POLICY

Our mission is to guarantee a stable supply and quality of gas, from the launch of plants to the operation and maintenance of facilities as well as support in emergency; that is, not to stop gas supply under any circumstances, implementing the following measures so that our customers can always rely on us and our products:

1 Regular repair and checks (preventive maintenance)

We check operation situations of the plants on a timely basis, providing scheduled maintenance services.

2 Proposal-based maintenance (predictive maintenance, corrective maintenance)

We can propose precise and accurate maintenance plans based on the accumulation of data related to gas supply and facilities, offering proposal-based maintenance for minimizing risks and maximizing facility operating time.

3 Emergency troubleshooting support (breakdown maintenance)

For possible operational risks, such as facility stoppage and quality anomaly of supplied gases caused by unexpected problems, we have made an emergency troubleshooting manual for quick resumption of stable operations. We are striving to improve the quality of our technologies through quick response in emergencies and sharing of support know-how for each facility. In addition, in cooperation with a remote surveillance and support center, we have established a system offering around-the-clock support for problems at plants, ensuring a stable gas supply and emergency support to our customers.

4 Improving awareness and skills

We provide necessary education and training to every employee to improve their awareness and skills related to maintenance. As a result, each and every employee carries out their own everyday tasks with pride and responsibility for their duties.

COMPANY information

Company Name ——— AIR WATER ENGINEERING INC.

Representative ——— Toshihiro Mitsuhashi(President and Representative Director)

Establishment ——— September 25th, 1981

Main Banks ——— Sumitomo Mitsui Banking Corporation, Sumitomo Mitsui Trust and Banking Co., Ltd

Headquarters ——— 2-6-40 Chikko-Shinmachi, Nishi-ku, Sakai-shi, Osaka 592-8331

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HISTORY

July 2001	Following the consolidation of the plant and engineering department of AIR WATER INC. with Kyoseck Inc., the corporate name became "AIR WATER PLANT & ENGINEERING INC."
July 2001	Recognized by the Industrial Economic Minister as a supplier of high-pressure gas equipment.
August 2001	Acquired ISO9001, the international standard for quality assurance status, accreditation.
February 2002	Began domestic production and miniaturization of cord blood preservation apparatus.
May 2002	Began domestic production of units for treatment of waste sterilizing gas for medical use.
October 2003	Began production of the VSU series.
October 2005	Merged with AIR WATER ENGINEERING INC.
July 2008	Began producing LNG monocoque lorries.
August 2010	The LNG shipboard container acquired formal approval of the Ministry of Land, Infrastructure, Transport and Tourism.
July 2011	Consolidated the business of the Engineering Division of Air Water Inc.
October 2011	The capital was increased to 300 million yen.
April 2016	Merger with AIR WATER PLANT & ENGINEERING INC. and AIR WATER MAINTENANCE INC & AIR WATER INDUSTRY.
April 2017	Company spin-off of the production division into AIR WATER MANUFACTURING INC.
January 2018	Integration of the low-temperature equipment business of Daiho Sangyo Inc.
October 2019	Transfer of the air separation unit business to Air Water Cryoplant Ltd.
January 2022	Merged with Air Water Cryoplant, Ltd. & AIR WATER MANUFACTURING INC.
April 2023	Following the consolidation of the plant and engineering department of the corporate name became "AIR WATER ENGINEERING INC."