CryoVation is a custom manufacturer and installer of innovative cryogenic liquid and industrial gas cylinder filling and distribution systems.

We are committed to improving the safety and efficiency of systems that transfer and package these resources. CryoVation’s 20,000 + square-feet-center provides the resources to supply innovative products, featuring an expanded pump fabrication and repair department, new customer training center and high purity lab.

Contact Us:

CryoVation.com or TheCryoShop.com

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CryoVation specializes in customized fill plant systems, handling all your needs from layout and design to installation and training. CryoVation also provides service, consulting and on-going technical support.

Our Sales and Engineering team can help to provide the most efficient layout and size your equipment to handle current and future volumes.

“What I liked best about CryoVation is, they didn’t push me to what they made, they helped me get what was best for my company”
As fill plant technology continues to advance, CryoVation makes sure we are not only part of the team making those advancements; we also design and build it here in the USA.
Cylinder Filling Systems

Palletized or Linear, Traversing or Fixed, Automated or Manual; CryoVation can help!

“Our approach has always been to provide a customized solution for the customer. “

“Each customer has some unique market requirements with associated volumes along with facilities that are always different “

“We provide several layout designs along with a customized equipment offering that we feel will best suit their current and future needs. “ Ric Boyd, President
Custom Equipment

Building your fill plant is a process that can take some time, CryoVation makes it easy. Our in-house engineers and sales team work with you to go over each detail and help you find what will work for your company.
Pumps

The CryoVation CV40 Cryogenic Pump is designed with industry standard main components which are proven to provide maximum performance and long service life with minimum maintenance and easy service.

Features & Benefits:

- Heavier, moisture-sealed drive-end bearing
- All bearings are retained in split/bolted housing for easy replacement
- Replaceable crosshead wear band eliminates excessive wear and frequent replacement of crosshead piston. The wear band can be changed quickly and easily
- Longer connecting rod for reduced crosshead loading
- Self-adjusting, spring-energized pushrod shaft seal contained in simple cartridge housing for easy replacement through hand-access opening
- Superinsulated vacuum sump
- Vertical pump design eliminates gravitational loading on the piston, which extends seal ring life

Applications:

- Heavy Duty Cylinder Filling
- Boosting of storage cylinders in unattended automated systems (SureGas)
- Large Fill Plants

The CryoVation CV22 Cryogenic Filling Pump – to deliver up to 2.2 GPM (8.3 LPM), and up to 4000 PSI (275 BAR) or 6000 PSI (400 BAR) MAWP.

- Includes a 10 HP Energy Efficient TEFC motor
- Vacuum jacketed Cold End
- Surge chamber and pressure relief valve.
- Heavy Steel Skid and Stainless-Steel Belt Guard
- Oxygen Cleaned

MADE IN THE USA
Pump Exchange Program

Available for most makes and sizes

We manufacture and stock parts for all major makes and models, including:

- CryoVation - CV, WCP, W50 P1600, P1700, P1800, P1100
- WDPD, NDPD, P2K, SPD
- SDPD, PD3000, LXR
- Cardox CFU CO2 Pump

Pumps (NON - Cryogenic)

The CryoVation W50 is a liquid transfer pump fitted with operating controls. The unit is designed to receive liquid carbon dioxide (CO2) or nitrous oxide (N20) at an inlet pressure of about 300 PSIG (17.6 kg/cm²) and deliver it into portable cylinders at a regulated pressure ranging from about 400 PSIG (28.2 kg/cm²) to 1,000 PSIG (63.3 kg/cm²).

The CryoVation W50 CO2 Pump to provide 50 lbs. per minute at 1500 psi maximum working pressure. Includes:

- Safety by-pass valve set at 1000 PSI
- All stainless steel or brass pumping components
- Easy access packing adjustment
- Splash lubricated drive adjustment
- Liquid filled pressure gauge
- Oil level sight glass
- 7.5 HP, TEFC motor
- Large volume surge chamber with pressure relief valve, safety bypass valve and cool down valve
- Stainless Steel Belt Guard and Galvanized Skid
- VFD option available
SuperPro™ Pump Protection

Let the CryoVation SuperPro™ Automatic Cryogenic Pump Protection System keep an eye on your pump(s). The PLC driven SuperPro can look for and monitor for any potential pump problems and alert you before any damage is done.

The monitoring system also allows the operator to remotely cool down, start and stop a pump as well as monitor the pump for a proper prime, to ensure effective performance and help reduce unnecessary wear and maintenance. The goal is to try to double the life of the pump between repairs, saving both money and time.

1. **Pump Prime Protection (Cavitation)**, to monitor pump discharge temperature. This assures proper prime, if proper prime is not achieved and held for 45 seconds, an interrupt happens and the pump will be shut off. Pump operation will also be shut down if the discharge temperature rises above the temperature set point.

2. **Liquid Saver**, automatically controls liquid flow to the cryogenic pump. Liquid Saver will automatically shut off liquid to the pump after a preset time duration of non-use, thereby reducing the potential for pressure building in the liquid vessel and excessive frosting of the pump.

3. **Pump Packing Blow-By Protection (Seal Leak)**, preventing drive end freezing up from cold gas or liquid leaking past the pushrod gas seals.

4. **Pump Unloader Kit**, to automatically unload excessive high-pressure present in the discharge line of the pump prior to start-up, thereby reducing undue wear and stress on the pump.

5. **VFD, Variable Frequency Drive**, speed up and slow down the pump for fine accuracy of filling large and small cylinders by varying the frequency supplied to the electric motor of the pump.
Vacuum Pumps

CryoVation sells you a full line of single and 2-stage rotary vacuum pumps for all industrial and specialty gas applications. Optional accessories include Cold Trap, Vacuum Stands, Motor Starters, Inert and O2 compatible lubricants and Safety Devices.

High Vacuum Models
Leybold D25B Trivac is a durable vacuum pump with a superior vapor handling capability. This dual stage rotary vane mechanical vacuum pump offers an excellent ultimate pressure of 1x10^{-4} Torr. The Leybold D25 vacuum pumps have a pumping speed displacement of 20.9 CFM.

High Flow Models
Leybold Sogevac SV65 single stage oil sealed vacuum pump is designed for continuous operation over the working pressure range from atmosphere to less than 1 Torr. It consists of the pump body oil casing and drive cooling system. The Leybold Sogevac SV65 has built in exhaust filters, gas ballast valve, and an automatic oil return system. It is low noise, compact, low vibration, and easy to operate. This Leybold Sogevac SV65 is also easy to maintain, service and repair. Pumping Speed 46 CFM.

Dry Vacuum Pumps and other brands or models available.
Vaporizers (Ambient – High Pressure/Low Pressure)

Manufactured in a wide range of sizes and working pressures, CryoVation can build-to-suit your needs:

- High Pressure: anything over > 500 psi
- Low Pressure: anything at or below < 500 psi
- Size – calculated based upon fluid, duty cycle, climate and pressure
- Tubing & Connections (AL, SS, SS6, BR, MO & MO6)
  - High Pressure (Greater than 500 psi)
    - SS 1/2” x .065 wall 304 ½” FPT connection (4000 psi)
    - SS 5/8” x .065 wall 304 ½” FPT connection (4000 psi)*
    - BR 5/8” x .095 wall Admiralty Brass ½” FPT connection (3600 psi)
  - Low Pressure (Max of 500 psi)
    - AL 1” x .083 wall 6063 ¾” MPT connection (500 psi)
- * High Pressure Vaporizers over 15k SCFH should be 5/8” Tubing or Dual configuration
- Customizing available!

To double your SCFH, try our Ambient Fan! Increases your vaporizer by 2X
SOS Vaporizers (Ambient – Low Pressure)

A NEW, higher capacity gas-use vaporizer for liquid cylinders!

The model SOS-500, SOS-1000 & VD1000, working in parallel with the liquid cylinder’s internal gas use line, is capable of a total output of 500 or 1000 scfh in LOX/LIN/LAR service. CO2 service extends the liquid cylinder an additional 500 SCFH above the liquid cylinder rating.

The SOS-500 (25 Lbs) & 1000 (49 Lbs) are still very light and compact while providing a maximum working pressure of 500 PSI. Available for use in oxygen, inert and CO2 services and comes complete with all necessary fittings. Installation time is less than a minute.

- Low Pressure – < 500 psi or less
- Tubing & Connections
  - AL 1” x .083 wall - 1/2” FPT Connection (500 psi)
- Comes with
  - Brass cross, containing:
    - Safety PRV (350 psi)
    - Liquid hose ½” flared ends
    - CGA outlet on cross
    - Teflon pigtail for gas use connection
- Customizing available!

Typical Operating Instructions:

- Hook vaporizer onto top protection ring of liquid container
- Connect largest hose to liquid withdrawal connection
- Connect smaller hose to gas use connection
- Connect customer supplied regulator or hose to vaporizer outlet

The vaporizer is now installed in parallel with the liquid container internal vaporizer.

To order these and many other parts & accessories, visit thecryoshop.com

VD1000 Shown
Welcome to the next generation of vaporization! CryoVation’s Waterbath is the standard for LCO₂ vaporization.

“I really like your Waterbath LCO₂ Vaporizer. It is a great design and we never have to worry about it working properly. It is far better than other systems from the past for many reasons. It is robust, efficient, durable and low maintenance.

What more could you want for a production operation? We forget it’s even there, because it never causes us any problems.”

John Gabris, Lab Manager

Water Bath Vaporizer System (energy efficient) for CO₂ service, and includes the following:

- **Energy efficient** submerged heating system (15 KW or dual 30 KW)
- Immersed parallel SS coil (304 SS)
- Adjustable Thermostat
- NEMA 4 Electrical enclosure with contact, overloads, status indicator lights, temperature controller (adjustable), over-temperature safety switch and associated control components
- 150-gallon water & glycol mix tight tank with liquid level switch
- Low AMP draw
  - 240 V
    - 15 Kw = 36 amps
    - 30 Kw = 72 amps
  - 480 V
    - 15 Kw = 18 amps
    - 30 Kw = 36 amps
- 7 Day Programmable Timer
Semi-Automated “Fill-Free”

1.x Series
Single Product (Pure Oxygen) Semi Automated System – Pressure / Tempurature
This will sense and compute temperature/pressure calculation notifying the filler when the cylinder is full and shutting off pump. Freeing your filler to tend to other tasks while the fill process is cycling. Our System is PLC controlled and includes a color touchscreen control screen.

2.x Series
Mix Gas (Inert) Semi Automated System – Pressure / Tempurature
Same as above but with larger PLC to handle additional recipes.

3.x Series
Mix Gas (Inert) Semi Automated System – Gravimetric (Fill by gram weight)
This system will include all the benefits in Fill-Free 2 + a gravimetric fill enclosure, reference cylinder(s) and scales for high accuracy mixes.
Fully Automated “Fill-Free”

4.x Series
Fully Automated Pure Oxygen Fill System
Custom programmed, recipe based filling, pressure/temperature, large color touchscreen HMI

5.x Series
Fully Automatic Mix Gas Cylinder Filling Control System
5 gas mixture capability, to provide completely automatic, unattended, gravimetric filling
Manual Control Panels

CryoVation Control Panels can be used for manual, semi-automated or automated solutions.

5 Gas Mix Panel
Semi-Automated
Operation

5 Gas Mix Panel
Manual Operation

Custom, Block & Bleed Mix Panel
Automated Operation
CO2 Dual Switchover System

Allows for automatic switching between scales upon “full” sensing of either cylinder. Includes the following:

- Control panel with necessary relays, “Ready” push-buttons, and status indicator lights
- Solenoid Valves, Scales, Fill hoses, gauges, safety relief valves and support stand

Liquid Fill – Automatic Fill System

Includes all necessary manual and or automatic solenoid valve, hoses, pressure gauges, safeties, digital scale and support stand. Can include all your products, LOX, LIN, LAr & LCO2
SequeFill – Automated CO2 Cylinder Filling System

Provides sequential, unattended filling of palletized cylinders, liquid cylinders or manifoldsed “packs.”

QUAD Fill – Fast, Accurate and Diverse CO2 Filling

Provides fast, accurate and independent filling of CO2 or N2O cylinders, on 4 scales. Includes:

- PLC, touchscreen HMI, safeties and emergency stop
- (4) Scales with high accuracy
- PC Computer with ethernet module for remote connectivity
CryoVation’s MasterSense System is designed to detect residual moisture in carbon dioxide cylinders. This unit was developed primarily for the beverage industry but is applicable to all CO2 cylinder re-filling.

MasterSense detects residual moisture in an empty cylinder within 20 seconds. This system may be provided as a stand-alone pre-fill testing system or incorporated into one of CryoVation’s CO2 manual, semi-automatic or automated filling systems (Pallet-configuration SequeFill, QuadFill or Dual Auto Switchover).

Features:
- Single or Dual Cylinder testing
- Includes vacuum pump and Operator Interface LCD Screen with PLC control
- Easy calibration to ensure accuracy

Benefits:
- Ensures the safe filling of CO2 cylinders by detecting the presence of a possible corrosion-causing residual liquid
- Reduces labor by eliminating the need for cylinder inversion
Helium Cascade

The Helium Zone Management System is designed to efficiently manage filling of helium cylinders. The act of "cascade" filling involves the filling of cylinders in steps of pressure. Most commonly, tube trailers are used as the gas source. Starting from the “low” tube, pressure is “cascaded” into the receiving cylinders. Tubes are opened sequentially until a target pressure has been reached and closed.

The Helium Zone Management System, used in conjunction with a filling panel, gives an operator the ability to open and close appropriate zones [tubes] through an HMI digital touch panel display. The pressure of each zone is closely monitored by a pressure transducer allowing for fast, accurate data at the control panel.

"This is the first time we have ever done anything automated or semi-automated"

"It has been a real nice addition and so far, everything has been working great!"

Jered Ruyle – Tyler Group

Helium Pump – Helio Surge

The CryoVation Helio Surge replaces your old and energy sucking booster pumps!

The Helio Surge is an electrically driven, positive piston pump designed to allow the user to easily boost Helium Gas to pressures up to 6000 psi (400 BAR). This pump uses liquid nitrogen (LN2) to lower the temperature of gaseous helium, allowing it to effectively boost pressures in your ground storage or tubes; reducing fill time at lower temperatures.

The Helio Surge can be connected to a LN2 bulk tank or a dewar; which gives this pump the ability to be mobile.

Features:

- Portable design can be pad mounted or mobile using a cryogenic dewar
- Liquid solenoid valve automatically controls the flow of coolant into the pump
- Zero impurities imparted to gas product
- Proven pump platform with over 40 years of performance
Purifiers

The CryoVation Grade 6.0 Helium Purification System is designed to purify inert gases utilizing three unique Purifiers either individually or in series. The Purifier System is comprised of the following:

**DeOxo** 2.0 Purifier, Trace Oxygen Removal, 15,000 scfh inert gas capacity at 3000 PSI maximum working pressure. Includes the following: but is recommended to be downstream of the Moisture Purifier. Includes the following:

- Coiled Catalyst Chamber, SS
- Back-pressure Regulator (N2 and Ar only)
- Control Valves (CPV) – Inlet, Outlet and Bypass
- Pressure Gauge
- Regeneration Kit installed (regeneration requires 2 separate 20 amp / 120V circuits and regeneration gas of 10% CO / in N2)

**DeHydro** 2.0 Purifier, Trace Moisture Removal, 15,000 scfh inert gas capacity at 3000 PSI MAWP. Includes the following:

- Coiled Chamber with Molecular Sieve
- Back-pressure Regulator (N2 and Ar only)
- Control Valves (CPV) – Inlet, Outlet and Bypass
- Pressure Gauge – 2-1/2", 4000 PSI
- Regeneration Kit installed (regeneration requires 2 separate 20 amp / 120V circuits)

**Cryogenic Purifier, Helium Purifier System**, improving purity on a scale of 10 to 1, will turn grade 5 into grade 6 helium, 3000 PSI, skid mounted, with the following major components. Includes the following:

- Liquid nitrogen with internal purifying coil assembly and regeneration kit
- 5000 scfh flow
- Full Cylinder Pressure, 3000 psi
- Isolation valves
- Inter-connecting piping (1/2" tube)
- Sample Ports, (3) each, with packless valves and 1/8” tube connection to analyzers
- Line Heater – purifier outlet gas
- Skid with all inter-connecting piping, fittings and supports
- Vacuum pump for regeneration of cryo and DeHydro purifiers
Purifiers

Argon Purifier System – Ar6, Grade 6+ Argon

- Heated Getter based technology
- Service pressure 2900 @ 900°F
- Flow rate 5 SCFM
- Stainless Steel construction
- Purifier cartridge exchange program – Cartridge life approx. 150,000 SCF

Features:

- Small footprint 32” W X 72” H X 48” L
- Inline installation to existing high purity manifold
- Built in Purifier bypass for easy user interface when Grade 6 is not required
- Power requirements 240 Volt, 3 Phase, 30 AMPs (5 SCFM Model)
- Inlet / outlet fittings 1/4” MVCR
- Vessel meets ASME standards
- Solid state temperature controlled with independent over-temp protection
Specialty Gas Blending Control Center

**Fusion-10™ Gravimetric 10 Gas Specialty Gas Blending Control Center with Interactive HMI to Facilitate Safe and Accurate PPM Filling of Pure and Inert Mix Gases.** The Fusion-10™ system allows you to bring together Inert, Flammable and Oxidizing Gases safely into a common cylinder filling system. Includes the following:

- **10-Gas Mix Panel with Dual Manifold Control**
- **Advanced Control Interface** – Class 1 Div. 1 rated
- **Sartorius Cabinet** custom sized with clear Plexiglas access door that opens wide
- **Radial Fill Manifold(s)** – 12 cylinders each, with the following features:
  - **Vacuum Pump**
Custom analyzer cabinets are built to suit the customers requirement. Includes support gas and sample inputs. Each analyzer control has a bypass flow meter, purge and sample needle valves and sample source 5-way valve. The package has two sample headers.

Support gas connections include all zero and span gases and fuel and air for the HC analyzer.

Specialty & Protocol Gas Training

CryoVation can help you achieve your Specialty Gas or Protocol Gas desires come true. Our team and partners can conduct training in one of our facilities or yours. We will work with you from the start, helping your decisions with our years of experience.
Bakeout

Cylinder Bake-Out Systems, 12, 16, 21 and 24 cylinder capacity. Includes:

All aluminum, double-wall insulated enclosure with convective heating system, thermostatic control and over-temperature safety switch.

- PLC controlled cycle operation
- Digital touchscreen interface
- High Vacuum Meter, micron range
- Stainless Steel Vacuum Header with purge valve, Vacuum Pump Isolation Valve, Vacuum Gauge (reference), Vacuum Probe (for high vacuum meter) and flexible SS high-pressure hoses with 1/4” FNPT connections.
- Hinged loading door with power-interrupt safety switch.
- Removable Lids
- Custom shelves for smaller cylinders
- Purge Cycle built into the program - 3 inert gas ports with diaphragm isolation valves.

Inverter/Roller

Cylinder Gas Mixing Rollers, 4 & 6 cylinder capacity, including:

- Air actuated cylinder tilt rack.
- Electrical control system to provide automatic, time delayed reversal of rolling direction.
- Cylinder Rollers, non-marring
- Safety Bar
- Loading Ramp

Cylinder Inverter, 4 & 6 cylinder capacity, including:

- Pneumatic tilt arms
- Individual cylinder clamping
- Non-marring cylinder contact
- Custom electrically programmed tilt cycles
- Manual override
Portable Pumping Skid - Oxygen

If you or one of your customers are looking to fill their own medical tanks or similar small cylinders with a pure gas or mixture, the CryoVation PPS system may be the best solution for you. Although not typically used in a portable setting, this PPS can be moved to its power source along with manifold(s) for an easy solution for your filling needs.

Features of the CryoVation PPS-5000 (other sizes available):

- Flow rate of 5000 SCFH (equals a fill time of 30 minutes for 100 "E" cylinders).
- Draws liquid from a standard liquid cylinder (45-gallon, 250 PSI; or larger)
- This system is available with our semi-automated “Fill-Free” control console that will sense temperature, pressure and vacuum and allow you interface with a color touchscreen. See Fill-Free information sheets
- Pump is standard design with over 30 years of production.
- Built-in safety features include over-pressure and under-temperature shut-off switches, high pressure safety relief valve and over-psi vacuum line safety relief.
- Fills all size medical cylinders (manifolds are sold separately)
- Includes a liquid oxygen pump and a vacuum pump
- Powered from a standard 240-volt power source (or 3 Phase hard wire)
Medical Oxygen Equipment – Racks & Manifolds

Starboard Racks from CryoVation ensure that your cylinders will not get scratched from contact with the rack. The Starboard HDPE material is light and durable, made from a continuous extrusion; therefore, it is guaranteed not to delaminate during service-life, it also meets FDA approval for direct food contact.

The Benefits of CryoVation Starboard Racks over others:
- Won’t scratch your cylinders during normal filling process
- Minimal show of any wear, dirt and scratches
- Waterproof
- Easy to clean
- Fills all portable oxygen cylinders (E, D and M6)
SureGas™ System

SureGas™ System, to provide automatic pumping to maintain a steady supply of gas at the desired pressure’s; complete with the following major components:

- **CV Cryogenic Pump(s)** to deliver a fixed flow rate of gas at a max of 6000 PSI
- SureGas Pump Automatic Control System (PAC-1) with SuperPro Pump Protection. Provides for completely unattended operation of Cryogenic pump.
- **Ambient Air Vaporizer** to match the flow of the cryogenic pump(s)
- **Skid Assembly** to mount above components. Includes an all-steel frame with top plate and lifting lugs.
Manifolds

CryoVation has several manifold options to choose from:

**Linear – Fixed**, available in a wide variety of size, pressures and gas types. Include:
- Cap tray
- Pigtails in a variety of lengths and types, including safety line with quick connect upgrade available
- Heavy Duty steel construction & powder painted
- Individual station valves with burst disc

**Linear – Traversing**, Maximize the use of floor space while minimizing cylinder handling. Cylinders are stored and filled in the same location, and the manifolds are moved on a track to the cylinders to be filled. Include:
- Cap tray or hooks
- Pigtails in a variety of lengths and types, including safety line
- Heavy Duty steel construction & powder painted
- Individual station valves with burst disc
- Light indicator when it includes our Fill-Free Automation
- Small cylinder tray available

**Palletized (Retracto) – Fixed or Traversing**, Designs range from single-sided stationary fill heads to double-sided traversing fill heads. Our fill islands have a control center for either manual or automated filling. Along with your customized fill island, we can design and manufacture a matching cylinder prep-and-sort island. Include:
- Cap hooks
- Pigtails in a variety of lengths and types, including safety line
- Individual station valves with burst disc
- 15, 16, 18 or 21 cylinder designs
- Removable side panels for easy access
- 360° swivel and quick connect upgrade available
Quality Control

CryoVation has made quality control and safety our #1 priority. We are investing the time and have developed the procedures to ensure that the products that leave our dock each day have been thoroughly checked and cleared by the following departments.

Oxygen Cleaning  Repairs  Inspection

Parts

[Image of thecryoshop.com website]
Continuously Reinventing Fill Plant Capabilities