CMSH Series

Multishield Liquid Helium Container

CRYOFAB

CMSH Series
Multishield Liquid Helium Containers

Model CMSH

The Cryofab CMSH helium dewar is designed for minimum loss storage, transportation and dispensing of liquid helium. The CMSH container employs state of the art vapor cooled multishield technology in conjunction with superinsulation to effect the lowest guaranteed loss rates in the industry on comparable units. The advanced insulation system results in quicker, more efficient cool down without the need of nitrogen pre-cooling. In addition the elimination of LN2 or helium gas circulation shielding means that the CMSH is virtually maintenance free.

These units have the same general areas of use as old-style, 4-wall helium containers but permit large storage capacities in small packages with lighter weight.

Construction Features

The helium reservoir and outer jacket are welded 304 stainless steel. Larger diameter necks accept standard helium transfer lines and eliminate thermal oscillations. This also allows for testing superconducting leads or other applications requiring dipping or immersion of components.

Standard equipment includes a removable halo ring providing protection for the manifold and components while allowing for easy access. Also a variety of handle configurations allow for easy pulling and securing.

The evacuation port is conveniently accessible for re-evacuation and serves as a vacuum space relief port.

All containers feature quick opening ball valves and quick couplings for easy insertion and pressure sealing of transfer lines with minimum loss of container pressure.

Features include:

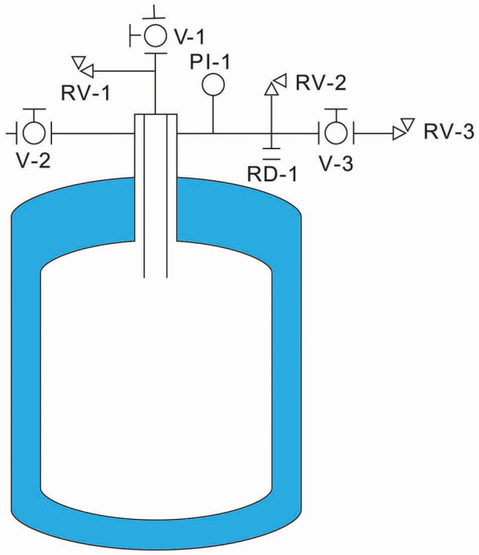
- No liquid nitrogen shielding or helium gas circulation required
- Lightweight but rugged construction stands up to trucking and everyday abuse
- Suitable for air transport
- All welded construction
- Lowest loss rates in the industry
- All units equipped with integral caster base
- Easily removable and interchangeable manifolds
- Suitable for neon and all other liquid gases (Lab use only, not for transport)
- Applications include Distribution, Research and Liquefaction
- Two-year warranty on vacuum

Smaller and Larger Volumes Available

5 liters to 25 liters
1500 liters to 7500 liters

CUSTOM CONFIGURATIONS ALSO AVAILABLE

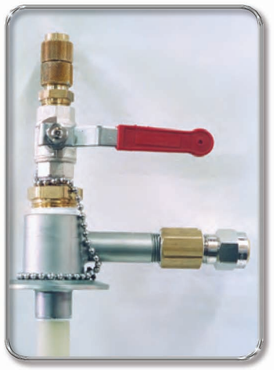
Piping Schematic



Symbol	Description
V-1	Liquid Valve
V-2	Vent Valve
V-3	Isolation Valve
RD-1	Rupture Disk*
RV-1	Relief Valve, 15 PSIG
RV-2	Relief Valve, 10 PSIG
RV-3	Pressure Control Valve, .5 PSIG
PI-1	Compound Pressure Gauge 30" Hg-0-15 PSIG

*Only on capacities 200 Liters and greater.

Standard Access Ports



Sizes 150 liters and less
1/2" to 3/8" access

Sizes 200 liters and up
3/4" to 1/2" access

Optional Equipment

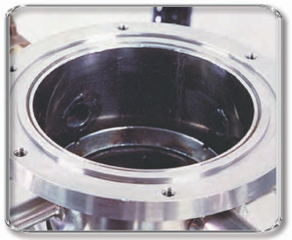
Differential Pressure
Liquid Level Gauges

Super Conducting
Liquid Level Systems

Flow Meters

Built-in Vacuum Jacketed
Withdrawal Valve

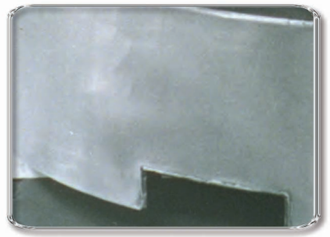
Absolute Relief Valve
For Air Transport



Larger Neck
Openings

Electric Pressure
Building Systems

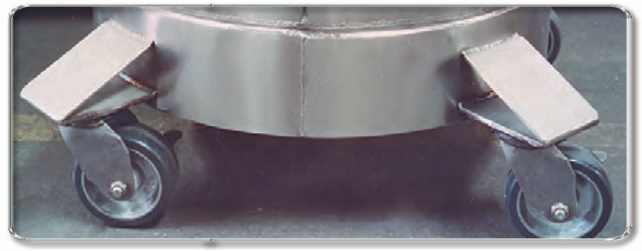
Pull Handles
Available on Sizes
100 lt thru 1000 lt



Fork Lift Provisions
Available on Sizes 500 lt and up

Removable Dollies
Sizes 30 lt to 100 lt

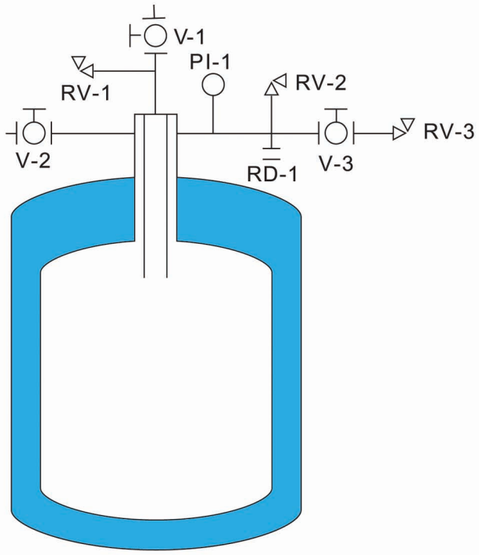
Locking Casters Wing Lock



Outboard Wheel Configuration Sizes 30 lt to 150 lt

Locking Casters Pedal Lock

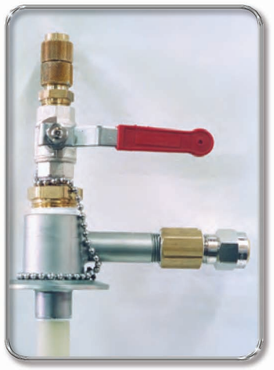
Piping Schematic



Symbol	Description
V-1	Liquid Valve
V-2	Vent Valve
V-3	Isolation Valve
RD-1	Rupture Disk*
RV-1	Relief Valve, 15 PSIG
RV-2	Relief Valve, 10 PSIG
RV-3	Pressure Control Valve, .5 PSIG
PI-1	Compound Pressure Gauge 30" Hg-0-15 PSIG

*Only on capacities 200 Liters and greater.

Standard Access Ports



Sizes 150 liters and less
1/2" to 3/8" access

Sizes 200 liters and up
3/4" to 1/2" access

Optional Equipment

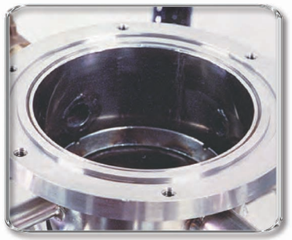
Differential Pressure
Liquid Level Gauges

Super Conducting
Liquid Level Systems

Flow Meters

Built-in Vacuum Jacketed
Withdrawal Valve

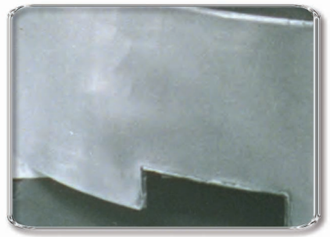
Absolute Relief Valve
For Air Transport



Larger Neck
Openings

Electric Pressure
Building Systems

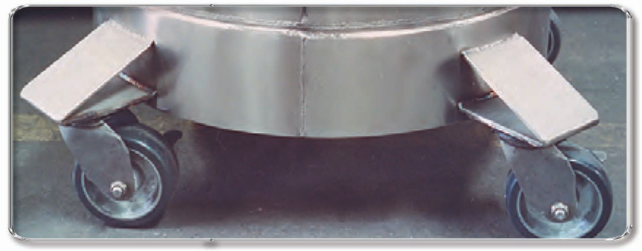
Pull Handles
Available on Sizes
100 lt thru 1000 lt



Fork Lift Provisions
Available on Sizes 500 lt and up

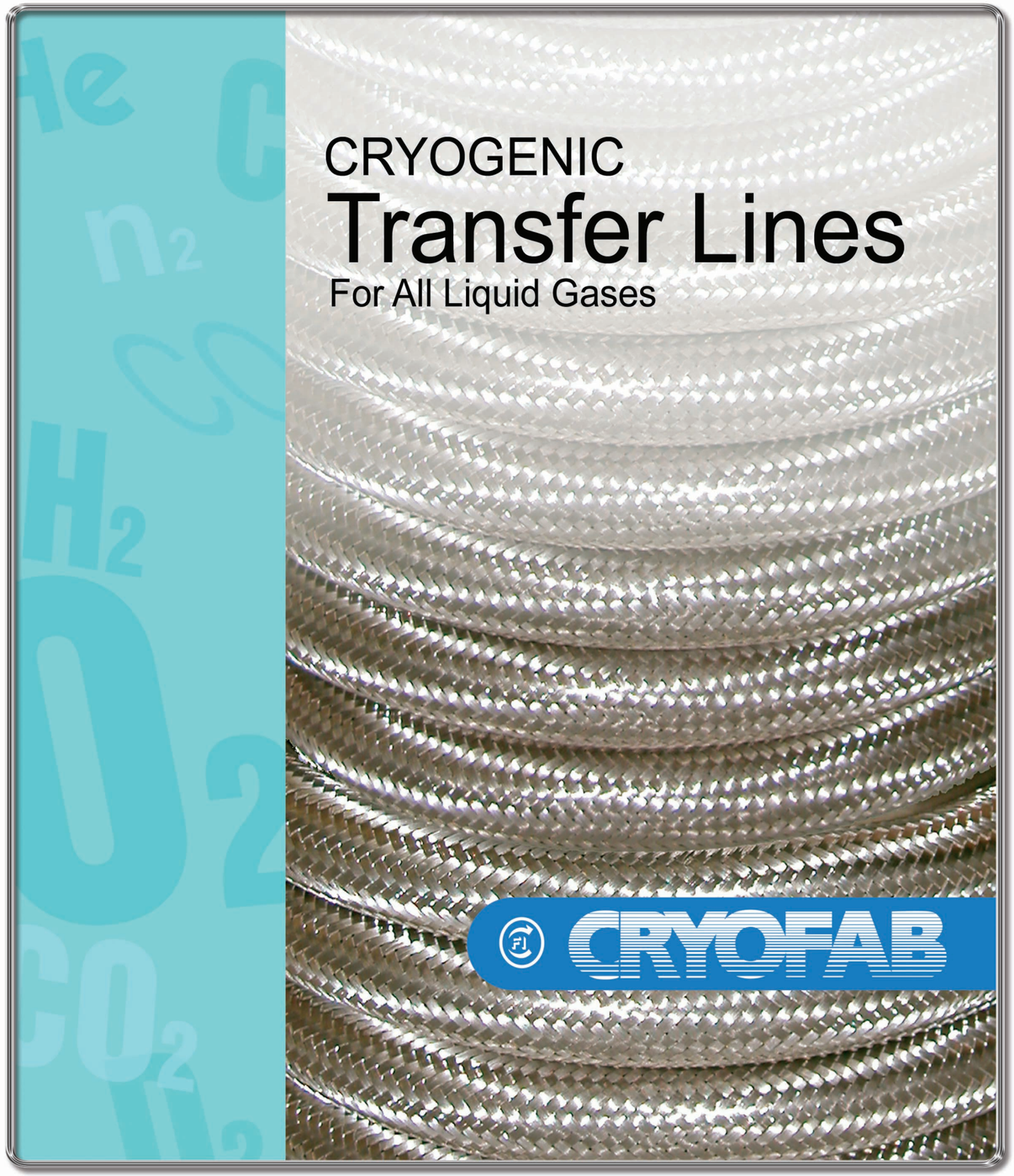
Removable Dollies
Sizes 30 lt to 100 lt

Locking Casters Wing Lock



Outboard Wheel Configuration Sizes 30 lt to 150 lt

Locking Casters Pedal Lock



Transfer Lines

Cryofab offers a number of different types of transfer lines. This particular piece of equipment is an indispensable accessory for the safe and efficient transfer of liquid cryogens. The product line ranges from the simplest non-jacketed flex line to the vacuum encased system necessary for transferring liquid helium. The materials of construction make these transfer systems useable in any type of work environment, whether it be a laboratory, industrial site or as an instrumentation accessory. Inside or outside, this product will perform optimally to deliver liquid cryogens trouble free.

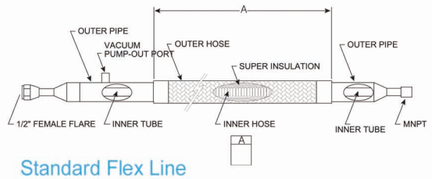
Why Cryofab?

Founded in 1971, Cryofab, Inc has weathered the test of time and flourished by keeping up to date on product changes, industry advancements, fabricating and procedural improvements. Maintaining state of the art techniques in welding, super insulation, materials and vacuum technology has been a key factor in our longevity. Customer service and the ability to deliver products, parts and service that meet the customer's individual requirements and expectations has enabled us to build an excellent reputation as a company that people freely recommend.

CFCL Series

The combination of vacuum and super insulation make this product the optimal efficient flexible transfer line. Built to order, lines can be fabricated to fit a multitude of requirements. Inner lines range from 1/8" o.d. to 4" i.d. and lengths from 1' to 100'. Bayonets, custom fittings, or standard pipe threads make for easy transition to existing and new applications. Lines are available with non-braided, braided, and armored outer jackets. This allows the end user to choose a flex line suitable to their environment. Unbraided transfer lines are more suited for laboratory use where the level of care is such that added protection may not be necessary. Braided and double-braided flex would be appropriate in an industrial setting where care of the line might be an issue. Armor casing provides the ultimate protection for lines exposed to extreme elements and abuse. Rigid pipe sections can be added for manifolding and tight corners.

I.D. Inner	O.D. Outer	Non-braided M.A.W.P. [1]	Braided M.A.W.P. [1]	Heat Leak	
.250"	1.15"	75 PSI	1750 PSI	.961 W/M	1.00 BTU/HR/FT
.375"	1.50"	120 PSI	1400 PSI	.74 W/M	.77 BTU/HR/FT
.5"	1.85"	90 PSI	1350 PSI	.86 W/M	.89 BTU/HR/FT
.75"	2.25"	15 PSI	800 PSI	.81 W/M	.84 BTU/HR/FT
1.0"	3.5"	14 PSI	550 PSI	1.02 W/M	1.06 BTU/HR/FT



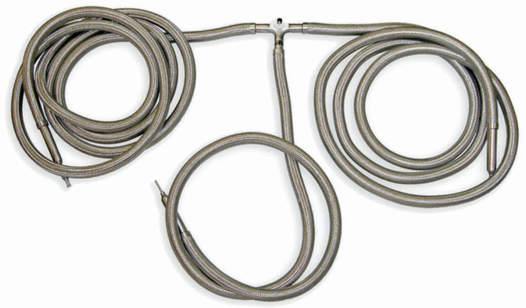
Standard Flex Line

3-Legged Line

"S" Curve Line

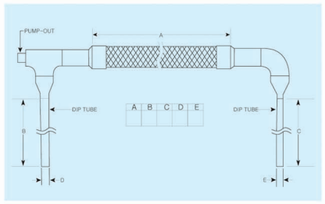
CFHT Series

The CFHT Series is the ultimate flexible system for the efficient transfer of liquid helium, neon and hydrogen. This product line offers multiple configurations to fit any application from laboratory and research, to industrial transfill and distribution. All lines are built to order so we can fabricate to any dimensional requirement. The “U” tube configuration is by far the most popular choice with many options available for added convenience. Sample configurations are shown below and to the right. Customers are not limited to items shown. Custom configurations are available upon request. Inner diameters can be supplied from 1/8" to 2" i.d. and lengths to 100'.

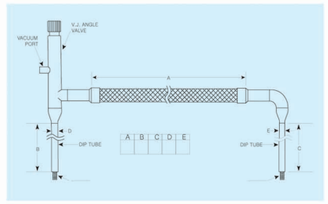


I.D. Inner	O.D. Outer	Non-braided Inner Hose M.A.W.P. [1]	Braided Inner Hose M.A.W.P. [1]		Heat Leak
.25" ID	1.5" OD	75 PSI	1750 PSI	.68 W/M	.71 BTU/HR/FT
.375" ID	1.8" OD	120 PSI	1450 PSI	.70 W/M	.73 BTU/HR/FT
.5" ID	2.25" OD	90 PSI	1350 PSI	.98 W/M	1.02 BTU/HR/FT
.75" ID	2.7" OD	15 PSI	800 PSI	1.07 W/M	1.11 BTU/HR/FT
1.0" ID	3.5" OD	14 PSI	550 PSI	1.36 W/M	1.41 BTU/HR/FT

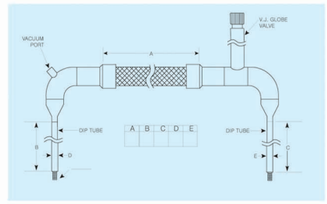
Note: Higher working pressure available with braided inner hose, consult factory



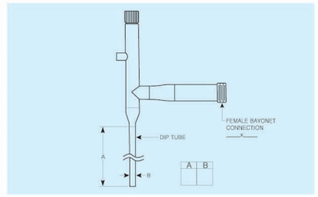
Flexible U Tube



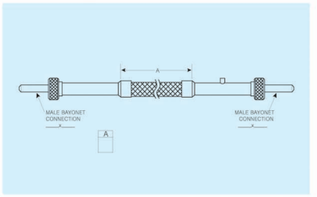
Flexible U Tube with Right Angle Shut Off Valve



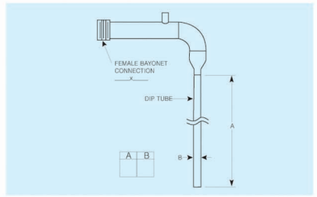
Flexible U Tube with Globe Shut Off Valve [2]



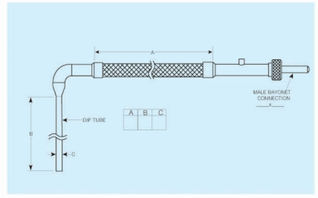
Withdrawal Lance with Right Angle Shut Off Valve



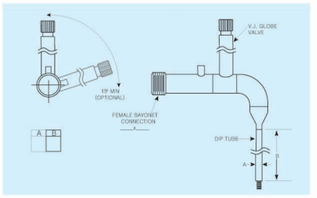
Extension Hose



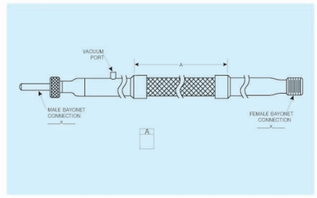
Fill Lance



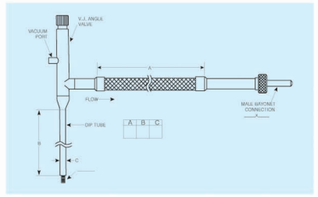
Fill Hose



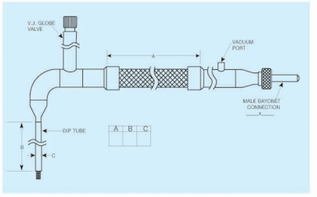
Fill/Withdrawal Lance with Globe Shut Off Valve [2]



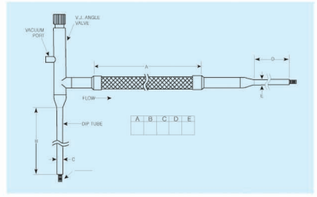
Extension Hose



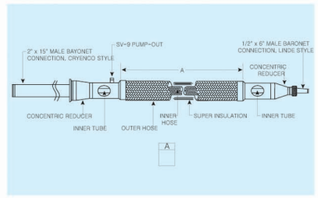
Withdrawal Hose with Right Angle Shut Off Valve



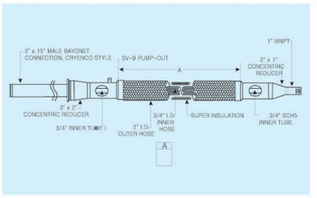
Withdrawal Hose with Globe Shut Off Valve [2]



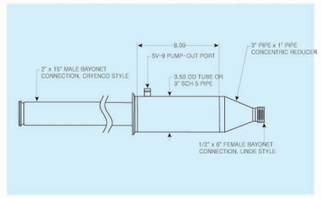
Fill Hose with Right Angle Shut Off Valve



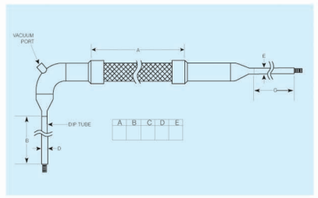
Trailer Liquid Hose



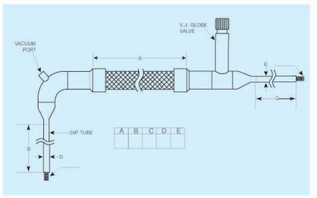
Trailer Gas Hose



Cryenco to Linde Bayonet Adapter



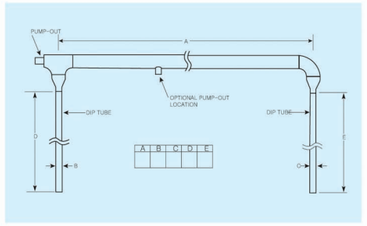
Fill Hose



Fill Hose with Globe Shut Off Valve [2]

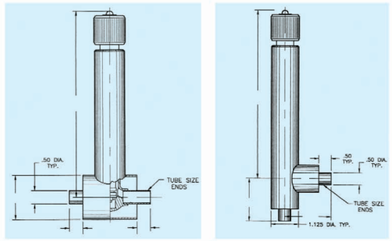
1. *In most cases terminal fittings or interface feed throughs will limit the working pressure of an assembly to 150 PSI or less.*
2. *Globe valve can be tilted to reduce height.*

CFRT Series

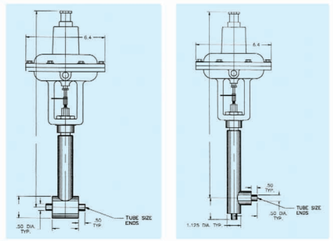


An old time liquid helium transfer staple, this line is completely rigid from tip to tip. The vacuum and super insulation make it an extremely efficient means of transfer. The most common configuration is the “U” Tube for transfers from a storage dewar to an experiment. The horizontal section has two legs that turn 90 degrees downward, upward, or straight for the withdrawal and filling process. Built to order, all dimensions can be supplied to fit requirements exactly. Options such as threaded tips, un-insulated extension tubes, VJ Shut Off Valves, and bayonet connections can be added for convenience.

Optional CFHT Accessories



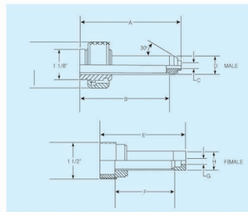
VJ Shut Off Valves



Actuated Valves

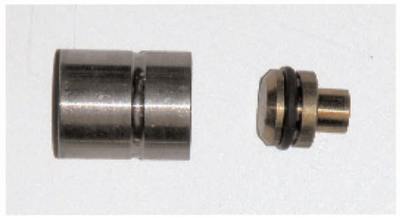
VJ Shut Off Valves are offered in laboratory style or industrial grade. Valves supply a means to interrupt or terminate the flow of liquid cryogens and maintain a minimal heat leak.
Actuated Valves allow for remote and unattended filling of cryostats when incorporated with a controller.

Bayonet Couplings are available as a set or individually as male and female. This option allows for easy disassembly of transfer equipment without removal of a section from an experiment or storage dewar. Bayonets transform single construction transfer lines into multiple parts for ease of use and flexibility in tight locations.



Approximate Steady State Heat Leak

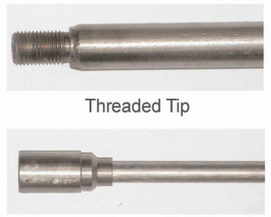
Description	LN2 (BTU/hr)	LHe (BTU/hr)
1/4" x 3"	7.38	8.12
1/4" x 6"	3.45	3.79
1/4" x 9"	2.30	2.53
1/2" x 3"	7.38	8.12
1/2" x 6"	3.45	3.79
1/2" x 9"	2.30	2.53
1/2" x 15"	1.20	1.52
3/4" x 9"	3.60	3.96



Standard Pump Out

Pump Out Operator

Bellows Valve



Threaded Tip

Extension Tube

Pump Out Operator gives end user the ability to re-evacuate on site with our standard pump out configuration.
Bellows Valve Evacuation Port allows the end user to re-evacuate a line without the use of an operator. Valves are supplied with 1/8" or 1/4" NPT ends for adaptation.
Threaded Tips & Extension Tubes allow for added length on transfer line fill and withdrawal legs. This adds flexibility in use of storage dewars & experiments. This option helps alleviate the problem of low ceiling heights and different dewar depths.

CFUL Series

END FITTINGS

Female Flare

Pipe Thread

EXTERIOR COVER OPTIONS

Armor

Tube

Compression Fitting

Braided

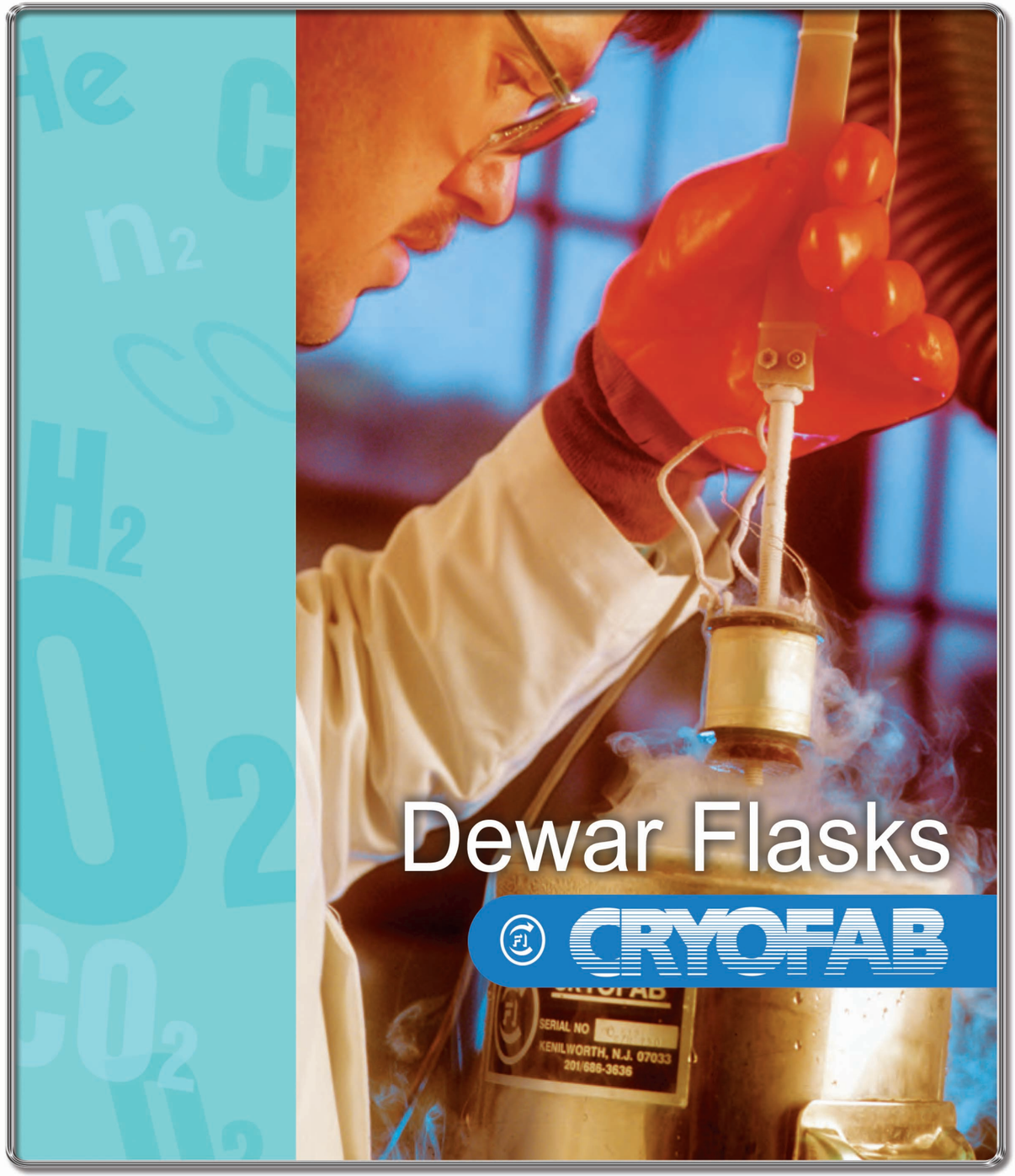
This is the simplest non-jacketed transfer line. Constructed of all stainless steel with a braided outer cover for protection, it can also withstand medium pressure applications. This product is most commonly used with LN2, LOX and LARG when dispensing from portable liquid storage cylinders. Available in any length with different combinations of end fittings, it can be ordered to meet a customer’s exact requirement. Because the line is un-insulated, frost and condensation will appear along the outer cover when a transfer is being done. CFUL can be purchased with standard braided outer or a S.S. armored casing for added protection. Inner diameters are available ranging from 1/4" i.d. to 2" i.d. The most common lengths are 4' and 6' but lines can be supplied to meet any requirement.

The most common end terminations are: female flares, pipe thread, tube or compression fitting.

CFFL Series

This assembly is for applications that require an upgrade from an un-insulated transfer line. The line has a neoprene foam insulation encasing the outer flex. End caps on each end keep the foam in place along with a mesh cover for added protection. For small, intermittent transfers, this line will deliver a frost-free and slightly improved efficient delivery of liquid. Liquid nitrogen is the most common cryogen used with this configuration. Because the line has ambient end connections, frost will appear at the inlets and outlets. Long transfers will freeze the foam to the point where it is no longer flexible. It becomes brittle and can crack. This line is designed for lower pressures up to 90PSI depending on the inner diameter. Inner diameters available are 1/4", 3/8" and 1/2". All lines are built to order and can be made to a specified length.

CFFL Exterior Cover



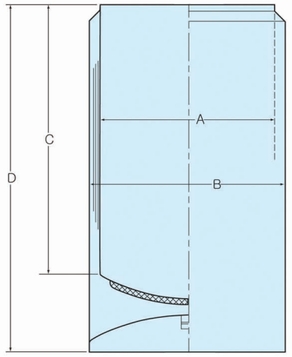
Dewar Flasks

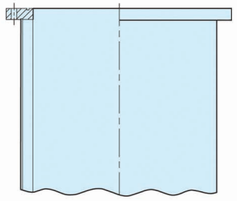
One word can be used to describe this product line… “flexible.” With the capability to fabricate sizes from 2.5" up to 96" I.D. and depths to 20 feet this product can fulfill many different applications. Historically dewar flasks have been a lab tool. Today this product has found its way into the outer reaches of industry. Old-fashioned quality coupled with the latest techniques in thermal efficiency is Cryofab’s claim for each dewar flask manufactured. Double-wall, all-stainless-steel construction along with multilayer insulation in a vacuum guarantees a durable, efficient product. Listed opposite are the many standard sizes to choose from. This does not begin to scratch the surface as to the many different configurations that have been fabricated over the years.

Options include:

- Foam insulated lids
- Flanged tops
- Metal or plastic cover plates
- Bottom drains
- Built-in fill and sensor ports
- Windows
- Lifting lugs
- Rigid welded handles
- Flap-down handles
- Caster-mounted, welded or removable dolly

See the back page of this brochure for examples.




Optional — Flanged Top

Specifications

Standard Flask

Model	"A" Inside Diameter (Inches)	"B" Outside Diameter (Inches)	"C" Inner Depth (Inches)	"D" Overall Height (Inches)	Gross Capacity (Liters)	Loss Rate (Liters/ Hr)	Liters/ Inch
CF310	2.96	3.57	10.0	13.0	1.126	.088	.112
CF3512	3.46	4.07	12.0	15.0	1.846	.082	.153
CF412	3.96	4.57	12.0	15.0	2.418	.094	.201
CF418	3.96	4.57	18.0	21.0	3.618	.075	.201
CF4515	4.46	5.07	15.0	18.0	3.834	.093	.255
CF4524	4.46	5.07	24.0	27.0	6.135	.074	.255
CF4536	4.46	5.07	36.0	39.0	9.180	.065	.255
CF612	5.96	6.60	12.0	16.0	5.478	.143	.456
CF618	5.96	6.60	18.0	22.0	8.217	.114	.456
CF624	5.96	6.60	24.0	28.0	10.956	.099	.456
CF636	5.96	6.60	36.0	40.0	16.434	.086	.456
CF7512	7.46	8.10	12.0	16.0	8.582	.178	.715
CF7518	7.46	8.10	18.0	22.0	12.874	.140	.715
CF7524	7.46	8.10	24.0	28.0	17.165	.125	.715
CF7536	7.46	8.10	36.0	40.0	25.748	.108	.715
CF8512	8.46	9.10	12.0	16.0	11.038	.205	.919
CF8518	8.46	9.10	18.0	22.0	16.557	.163	.919
CF8524	8.46	9.10	24.0	28.0	22.076	.142	.919
CF8536	8.46	9.10	36.0	40.0	33.114	.123	.919
CF9512	9.46	10.13	12.0	16.0	13.801	.230	1.150
CF9518	9.46	10.13	18.0	22.0	20.702	.183	1.150
CF9524	9.46	10.13	24.0	28.0	27.603	.160	1.150
CF9536	9.46	10.13	36.0	40.0	41.405	.138	1.150
CF10518	10.43	11.13	18.0	23.0	25.889	.200	1.438
CF10524	10.43	11.13	24.0	29.0	34.519	.176	1.438
CF10536	10.43	11.13	36.0	41.0	51.779	.153	1.438
CF12518	12.43	13.13	18.0	23.0	35.742	.242	1.985
CF12524	12.43	13.13	24.0	29.0	47.656	.211	1.985
CF12536	12.43	13.13	36.0	41.0	71.485	.183	1.985
CF1418	13.93	16.00	18.0	23.0	44.889	.420	2.493
CF1424	13.93	16.00	24.0	29.0	59.852	.340	2.493

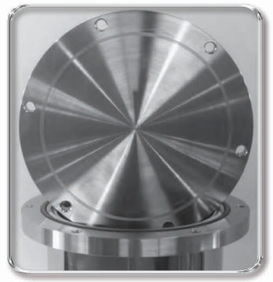
Model	"A" Inside Diameter (Inches)	"B" Outside Diameter (Inches)	"C" Inner Depth (Inches)	"D" Overall Height (Inches)	Gross Capacity (Liters)	Loss Rate (Liters/ Hr)	Liters/ Inch
CF1436	13.93	16.0	36.0	41.0	89.779	.265	2.493
CF1518	14.93	18.0	18.0	23.0	51.565	.450	2.864
CF1524	14.93	18.0	24.0	29.0	68.754	.370	2.864
CF1536	14.93	18.0	36.0	41.0	103.131	.284	2.864
CF1618	15.93	18.0	18.0	23.0	58.704	.478	3.261
CF1624	15.93	18.0	24.0	29.0	78.273	.394	3.261
CF1636	15.93	18.0	36.0	41.0	117.409	.30	3.261
CF1818	17.93	20.0	18.0	23.0	74.371	.420	4.131
CF1824	17.93	20.0	24.0	29.0	99.161	.353	4.131
CF1836	17.93	20.0	36.0	41.0	148.742	.278	4.131
CF2024	19.90	22.0	24.0	29.0	122.148	.392	5.089
CF2036	19.90	22.0	36.0	41.0	183.222	.310	5.089
CF2224	21.90	24.0	24.0	29.0	147.934	.432	6.163
CF2236	21.90	24.0	36.0	41.0	221.902	.341	6.163
CF2242	21.90	24.0	42.0	47.0	258.846	.313	6.163
CF2424	23.90	26.0	24.0	29.0	176.188	.472	7.341
CF2436	23.90	26.0	36.0	41.0	264.232	.372	7.341
CF2442	23.90	26.0	42.0	47.0	308.322	.342	7.341
CF2624	25.90	28.0	24.0	30.0	155.182	.861	8.621
CF2636	25.90	28.0	36.0	42.0	310.365	.562	8.621
CF2642	25.90	28.0	42.0	48.0	362.082	.514	8.621
CF2836	27.90	30.0	36.0	42.0	360.148	.610	10.004
CF2842	27.90	30.0	42.0	48.0	420.173	.554	10.004
CF3036	29.73	32.0	36.0	42.0	408.943	.650	11.359
CF3042	29.73	32.0	42.0	48.0	477.100	.593	11.359

NOTE:
1. Inner depth indicates the depth at full diameter; depth to center is slightly greater.
2. Loss rate is on average value assuming the dewar was run from full to empty with an insulated lid. Instantaneous values are dependent on liquid level.
3. When ordering, please specify whether for use with dry ice, liquid gas or high temperature.
4. Depths as well as diameters can be altered to individual requirements with corresponding price adjustments.

Dewar Flask Options


Flap-Down or Rigid Handles

Flanged Top


Cover Plate


Caster-Mounted

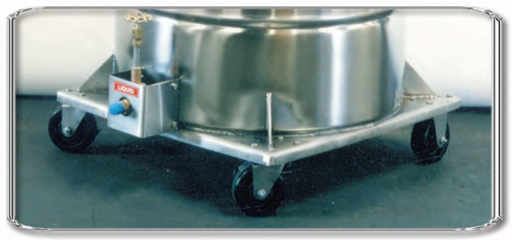

View Ports


Lifting Lug

Through customer requests and needs, a gamut of options are now available.

- Foam insulated lids
- Flanged tops to make this unit a closed system
- Metal or plastic cover plates
- Bottom drains allow vessels to be emptied without a pump
- Built-in fill and sensor ports inside the vacuum space for unobtrusive access and efficient autofill
- Windows for a bird's-eye view of your experiments
- Lifting lugs
- Rigid welded handles
- Flap-down handles
- Caster-mounted, welded or removable dolly


Foam Insulated Lids


Bottom Drain

Portable
Storage and Transport
Dewars

CFN 50

CFN/CFL Series

The absolute back-to-basics container without bells and whistles is a throwback to the days of simple fabrication and uncomplicated operation. Assembled using all steel materials, this container is a double-walled, vacuum insulated dewar. The design criteria for this product line is to supply a robust container for transportation and atmospheric storage of liquefied gases in smaller capacities. Sizes range from 25 liters to 200 liters.

CFN Model

A narrow neck opening helps to keep the loss rates to a minimum. The top neck termination is a KF flange for discharge device attachment for liquid disbursement. This container is not meant for long hold time storage but as an alternative to liquid supply in a lab or plant operation. Equipped with a discharge device and casters, liquid cryogens can be available on demand. Two stainless steel handles are welded to the top head for convenience and a dust cap is supplied for neck protection.

CFL Model

The CFL is a mirror image of the CFN with the added option of an increased neck diameter. The standard neck opening is 1.5" o.d. with a KF flange for discharge device attachment. The neck diameter for this model can be increased up to 8" for non-standard requirements. Common uses for this model are dipping and experimentation without the need to transfer liquids.

CFN Series - Optional Equipment

CMC Discharge Device
Simple in configuration, the standard device consists of a withdrawal valve, vent valve, pressure gauge and relief device. Attachment is with a flange assembly and clamp.

Flanged Neck Termination
Custom machined for experiments and application integration.

Outboard Casters
A removable dolly or welded casters can be supplied for ease of movement and portability.

Larger Necks
Allow for devices and experiments to be done inside the container without the need of liquid transfer.

	CFN/CFL 25	CFN/CFL 50	CFN/CFL 100	CFN/CFL 200
Net Capacity	25 liters	50 liters	100 liters	200 liters
Gross Capacity	28 liters	55 liters	110 liters	220 liters
Outer Diameter	406.4 mm	457.2 mm	508 mm	609.6 mm
Height	711.2 mm	838.2 mm	1092.2 mm	1219.2 mm
Neck Dia. CFN	19.05 mm	19.05 mm	25.4 mm	25.4 mm
Neck Dia. CFL	38.1 mm	38.1 mm	38.1 mm	38.1 mm
Weight (Empty)	16.36 kg	27.7 kg	55 kg	100 kg
Weight (Full)				
LN_2	36.8 kg	68.2 kg	135 kg	261.8 kg
LOX	45 kg	85 kg	169.5 kg	329.1 kg
Larg	50.5 kg	95.9 kg	191.4 kg	381.8 kg
Depth	546.1 mm	673.1 mm	901.7 kg	1079.5 mm
M.A.W.P.	10 PSIG	10 PSIG	10 PSIG	10 PSIG
Static Loss Rate CFN	.65 lt/day	.70 lt/day	1.2 lt/day	1.2 lt/day
Static Loss Rate CFL	.87 lt/day	1.2 lt/day	1.3 lt/day	1.35 lt/day