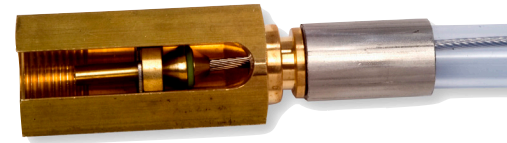


LIFEGUARD SAFETY SYSTEM

HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ High Pressure and Cryogenic Assemblies



LifeGuard CO2 Assemblies



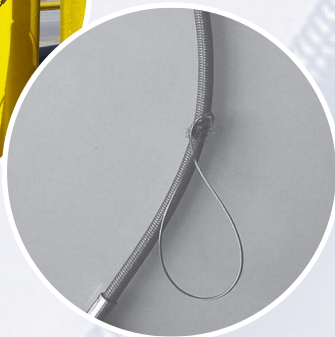
LifeGuard High Pressure PTFE Assemblies



LifeGuard Cryogenic Delivery Hose



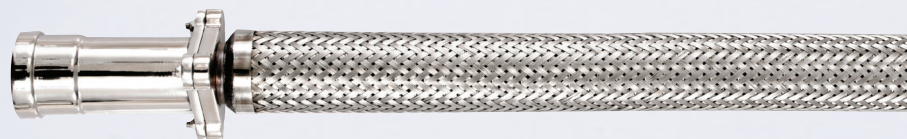
LifeGuard Hydrogen



LifeGuard Safety Hose in Action



LifeGuard Hydrogen



LIFEGUARD™ SAFETY SYSTEM

HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ Metal Pigtails The Next Generation in Safety-Hoses!!!



Open Flow (Valves Kept Open
by Internal Cable)



Coupling Failure (Valves are Closed by
Separation and/or Back Pressure)

WHAT IS LIFEGUARD™ ?

A Flexible “Safety System” for use in the transfer of high pressure gases and liquids. Protect against the hazardous effects of high pressure hose rupture, pull-apart and failure.

The LifeGuard™ design utilizes the unique, patent pending design that eliminates the potential for disaster through the use of an internal compression spring device connected to specially designed, normally unseated valves located on each end of the spring. In the event of hose separation, stretching to the point of an unsafe condition or coupling-to hose separation, the valves are released and instantly seat stopping the flow in both directions.

APPLICATION: For certain applications, customers choose a metal “bellows-type” pigtail which provides an all welded, zero permeation and flexible alternative to pipe and tubing, even at cryogenic temperatures. The metal lined pigtail is reinforced with two layers of type 304 stainless steel braid (Monel® braid is optional) and is designed to provide maximum flexibility. In cases where adiabatic compression in PTFE is a concern, LifeGuard Metallic Pigtails are an excellent solution.

CONSTRUCTION: All LifeGuard convoluted stainless steel inner core, double braided compressed gas hoses are tig welded and come in female NPT or BSP threads.

MAXIMUM WORKING PRESSURE:
¼” -½” ID-up to 3500 PSI at 70 F.

Part Number:	Standard Sizes
BH09-002-11-24-S	1/4" x 24" NPT, CONV.SS METAL LINED, 3500PSI
BH09-002-11-32-S	1/4" x 32" NPT, CONV. SS METAL LINED, 3500PSI
BH09-002-11-36-S	1/4" x 36" NPT, CONV. SS METAL LINED, 3500PSI
BH09-002-11-48-S	1/4" x 48" NPT, CONV. SS METAL LINED, 3500PSI
BH09-002-11-60-S	1/4" x 60" NPT, CONV. SS METAL LINED, 3500PSI
BH09-002-11-72-S	1/4" x 72" NPT, CONV. SS METAL LINED, 3500PSI
BH22-004-11-60-S	1/2" x 5' NPT, CONV. SS METAL LINED, 3500PSI
BH22-004-11-120-S	1/2" x 10' NPT, CONV. SS METAL LINED, 3500PSI
BH22-004-11-180-S	1/2" x 15' NPT, CONV. SS METAL LINED, 3500PSI
BH22-004-11-240-S	1/2" x 20' NPT, CONV. SS METAL LINED, 3500PSI



LIFEGUARD SAFETY SYSTEM

HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ Teflon vs. Metal Inner Hose

Gas and cryogenic hoses are available with either Teflon or Metal inner hoses. To ensure long life, it is very important that you select the correct material for each application.

Corrugated VS. Smooth Bore Inner Core : One of the most common causes of metal hose failure is “high velocity” gas flow. Because of the ribs on the corrugated type hose, high velocity flow (above recommended levels) can damage or crack a metal type hose. To avoid hose damage, it is important to know the velocity of gas flowing through the hose. We have provided charts that will help you determine velocity flow levels. If you find that a particular application requires a higher than recommended gas flow velocity, in this case we would suggest that you switch to a smooth bore PTFE or ETFE type hose (dependant on the gas). Smooth bore hose are designed to handle higher velocity gas flow requirements.

Effusion: Metal inner core hoses will not effuse or diffuse gas. i.e. they have zero permeation: this is why they are preferred for high purity and hazardous specialty gases, as well as hydrogen and helium when in a constant pressurized application. Pressurized gas will permeate or effuse through the wall of the PTFE hose at rates consistent with the gas molecule size and weight, and with atmospheric gases this effusion is hardly noticeable and minimal. For hydrogen and helium, the ETFE or hose has typically 1/3 the effusion rate of a PTFE hose, so ETFE (or “post sintered”) is the recommended inner core material for H2 and He cylinder filling applications.

Flexibility: Teflon hoses tend to be a bit more forgiving in terms of flexibility than all metallic hoses. If an application requires constant flexing, a PTFE or ETFE type hose will work best.

Trailer Transfill/Cylinder Filling, Cylinder Cradles - High velocity: The inside of a Teflon gas service hose is smooth bore, whereas a metal inner hose is convoluted (ribbed). In high velocity applications (tube trailer transfill, cylinder fill) a smooth surface will work best. A convoluted hose in a high pressure drop (high velocity up to critical velocity) can experience internal hose vibration and fatigue leading to cracking of the corrugated inner core.

Trailer Transfill Liquid - Low velocity : When hydrogen or helium tube trailers are being filled at the plant in a slow volume method such as with a pump or compressor, the volume flow through the hose is typically within the velocity limitations to allow the use of a metal inner core hose. Typically lower pressures and temperatures are used in the transfer of liquid cryogenics. A metal hose will perform this job much better than a Teflon hose. However, it is important to ensure that the hose is not bent in more than one plane at a time. Failure to do so will result in premature hose failure.

Static State: Static state would include applications where the gas remains in the hose over a long period of time. Polymer inner core hose will effuse gas. Whereas metal inner core hose has zero effusion. This becomes critical when the application involves smaller molecule gases, flammable, or toxic gases. Hydrogen, helium, and specialty gases are best delivered in a metal liner core hose. When delivering corrosive gases, Monel inner core hose is recommended.

Cryogenic Hose: The low temperature of cryogenic liquids requires the use of a stainless steel inner core type hose.

Metal Hose Limitations: It is important to ensure that the hose is not bent in more than one plane at a time. Such action will set up an inherent torque, which can contribute to premature hose failure when the hose is pressurized. When the hose is connected from one static point to another static point, it should make the bend easily without forcing the hose to arrive at its position to make the connection. Also as mentioned previously: Metal inner core hoses have a velocity limitation of 100 feet per second for a straight run, 50 fps for a 90degree bend, and 25 FPS for a 180 degree bend according to metal hose manufacturer’s rules of thumb. Calculations are available to project velocity data.

Metallic Hoses	
BH22-004-11-60	5' x 1/2" NPT, CONVOLUTED SS METAL LINED, 3500PSI, 14000 BP
BH22-004-11-120	10' x 1/2" NPT, CONVOLUTED SS METAL LINED, 3500PSI, 14000 BP
BH22-004-11-180	15' x 1/2" NPT, CONVOLUTED SS METAL LINED, 3500PSI, 14000 BP
BH22-004-11-240	20' x 1/2" NPT, CONVOLUTED SS METAL LINED, 3500PSI, 14000 BP

Tefzel Hoses	
TF51-004-17-6	6.0' X 1/2" NPT,TEFZEL LINED, 3500 PSI, 14000 BP
TF51-004-17-10	10.0' X 1/2" NPT,TEFZEL LINED, 3500 PSI, 14000 BP
TF51-004-17-15	15.0' X 1/2" NPT,TEFZEL LINED, 3500 PSI, 14000 BP



LIFEGUARD™ SAFETY SYSTEM

HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ PTFE High Pressure Hoses The Next Generation in Hose Safety!!!



Open Flow (Valves Kept Open
by Internal Cable)



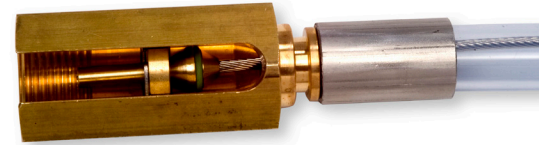
Coupling Failure (Valves are Closed by
Separation and/or Back Pressure)

WHAT IS LifeGuard™? A Flexible “SafetySystem” for use in the transfer of high pressure gases and liquids. Protect against the hazardous effects of high pressure hose rupture, pull-apart and failure. The LifeGuard™ design utilizes the unique, patent pending design that eliminates the potential for disaster through the use of an internal compression spring device connected to specially designed, normally unseated valves located on each end of the spring. In the event of hose separation, stretching to the point of an unsafe condition or coupling to-hose separation, the valves are released and instantly seat stopping the flow in both directions.



APPLICATION:

PTFE, Stainless Steel Braid is ideal for a wide range of industrial applications, PTFE is non-porous, chemically inert and requires zero maintenance. PTFE is an FDA approved material. When coupled with the LifeGuard Safety System fitting and cleaned for oxygen use, high temperature capabilities make PTFE the best choice for medical or industrial oxygen filling.



CONSTRUCTION: All LifeGuard convoluted stainless steel inner core, double braided compressed gas hoses are tig welded and come in female NPT or BSP threads.

MAXIMUM WORKING PRESSURE:

¼" - 1" 3000 PSI to 10,000 PSI.



LIFEGUARD SAFETY SYSTEM

HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

PTFE Pigtails

The Next Generation in Safety-Hoses!!!

LIFEGUARD™ SAFETY HOSE HIGH PRESSURE HOSE LIST

LGT PART NO	HIGH PRESSURE SAFETY HOSES/TEFLON AND TEFZEL	LGT PART NO	SPECIALTY GASES HIGH PRESSURE SAFETY HOSES/TEFLON AND TEFZEL
TF02-002-17-24	24" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS	TF02-002-19-24	24" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-17-24	24" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS	TF51-002-19-24	24" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-11-24	24" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS	TF51-002-18-24	24" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-12-24	24" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS	TF04-002-21-24	24" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF06-002-11-24	24" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS	TF06-002-18-24	24" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF07-002-11-24	24" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO)	TF07-002-19-24	24" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO) WITH HEAT DISSIPATERS E/E
TF02-002-17-36	36" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS	TF02-002-19-36	36" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF02-002-17-36-SBR	TEFLON HOSE, BRASS FITTINGS, FNPT, 1/4" X 36" 3500 PSI, W/BEND RESTRICTORS AND SAFETY LOOPS	TF02-002-19-36-SBR	TEFLON HOSE, BRASS HEATSINK FITTINGS, FNPT, 1/4" X 36" 3500 PSI W/BEND RESTRICTORS AND SAFETY LOOPS
TF51-002-17-36	36" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS	TF51-002-19-36	36" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-11-36	36" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS	TF51-002-18-36	36" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF51-002-11-36-SBR	TEFZEL HOSE, BRASS FITTINGS, FNPT, 1/4" X 36 INCHES, 3500 PSI W/BEND RESTRICTORS AND SAFETY LOOPS	TF04-002-21-36	36" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF04-002-12-36	36" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS	TF06-002-18-36	36" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF06-002-11-36	36" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS	TF07-002-19-36	36" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO) WITH HEAT DISSIPATERS E/E
TF51-002-17-36-SBR	36" X 1/4" NPT, TEFLON LINED, 3500 PSI-SS ENDS, CFOS, CAPPED AND BAGGED WITH BEND RESTRICTORS AND SAFETY LOOPS	TF02-002-19-48	48" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF07-002-11-36	36" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO)	TF51-002-19-48	48" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF02-002-17-48	48" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS	TF51-002-18-48	48" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF51-002-17-48	48" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS	TF04-002-21-48	48" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-11-48	48" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS	TF06-002-18-48	48" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-12-48	48" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS	TF07-002-19-48	48" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO) WITH HEAT DISSIPATERS E/E
TF06-002-11-48	48" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS	TF02-002-19-60	60" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF07-002-11-48-S*	48" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO)	TF51-002-18-60	60" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF02-002-17-60	60" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS	TF51-002-21-60	60" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF51-002-17-60	60" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS	TF04-002-18-60	60" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-11-60	60" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS	TF06-002-21-60	60" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-12-60	60" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS	TF02-002-19-72	72" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF06-002-11-60	60" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS	TF51-002-19-72	72" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF02-002-17-72	72" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS	TF51-002-18-72	72" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF51-002-17-72	72" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS	TF04-002-21-72	72" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-11-72	72" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS	TF06-002-18-72	72" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-12-72	72" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS		
TF06-002-11-72	72" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS		
TF03-003-11-24	24" X 3/8" NPT, TEFLON LINED, 4000 PSI-SS ENDS		
TF03-003-11-36	36" X 3/8" NPT, TEFLON LINED, 4000 PSI-SS ENDS		
TF03-003-11-48	48" X 3/8" NPT, TEFLON LINED, 4000 PSI-SS ENDS		
TF03-003-11-60	60" X 3/8" NPT, TEFLON LINED, 4000 PSI-SS ENDS		
METALLIC COMPRESSED GAS HOSES			
BH09-002-11-24	1/4" X 24" NPT, CONV.SS METAL LINED, 3500PSI		
BH09-002-11-32	1/4" X 32" NPT, CONV. SS METAL LINED, 3500PSI		
BH09-002-11-36	1/4" X 36" NPT, CONV. SS METAL LINED, 3500PSI		
BH09-002-11-48	1/4" X 48" NPT, CONV. SS METAL LINED, 3500PSI		
BH09-002-11-60	1/4" X 60" NPT, CONV. SS METAL LINED, 3500PSI		
BH09-002-11-72	1/4" X 72" NPT, CONV. SS METAL LINED, 3500PSI		
OTHER DIAMETERS, LENGTHS, AND OPTIONS AVAILABLE			
*Safety Loops			



LIFEGUARD SAFETY SYSTEM

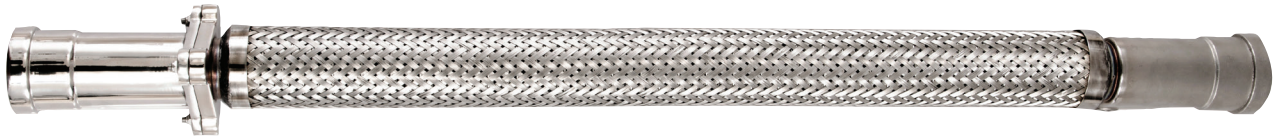
HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ Tri-Bolt Metallic Hose for Cryogenic and Co2 Service

The LifeGuard Safety System and Lifeguard Tri-Bolt Safety System are built into a metallic hose assembly that uses a 316L Stainless Steel Tube and 304 Stainless Steel Reinforced braid.

Designed specifically for the tough demands of bulk tank and trailer loading and unloading. The inner hose, braid, armor casing cuffs, weld ring, and ends are all stainless steel. Each finished assembly is hydrostatically or pneumatically tested to ensure it will withstand the application requirements.

- **FEATURES**-1-1/2" or 2" I.D. close pitch corrugated 304 stainless steel inner core.-Full coverage heavy-duty braid.-Heavy-duty fully machined female NPT end fittings.-18" armor casing cuffs (bend restrictors) each end.-Cryogenic to 1500 degrees F
- **STYLES** 1-1/2" I.D., 450 psi -2" I.D., 675 psi. Contact us for additional sizes available.
- **FITTINGS** Pipe Butt Weld, JIC Female Swivel Hex Male NPT Plain Male NPT Plain Female NPT Hex Female NPT Floating Flange Weld Neck Flange CGA 440 for O2 and 295 for AR and N2 Service



HOSE DATA

Construction:

- T321 and T316L stainless steel hose
- Series 300 stainless steel braid
- Direct braided 1/4" through 2" on reels
- Annular construction

Sizes: 1/4" through 3"

Maximum Working Pressure: Full vacuum up to 3190 psig depending on size and braid configuration

Temperature: Cryogenic to 1250°F
Model of Hose Material: UFBXO Unbraided/
UFBX1 One Braid/UFBX2 Two Braid

The UFBX product is designed and certified to ISO 10380 specifications.

LifeGuard LPG and NH3

GPS-AU-LP-32-18-F

2" x XXX Lifeguard Rubber Transport Hose, UL-21 LPG with Hi-break Tri-Bolt Breakaway (female) NPT Safety fitting X standard (female) NPT Safety fitting-350 PSI WP-1750 PSI burst-525 PSI test. Electrically conductive.



Tri-Bolt System



Lab Tested



Safety at the Highest Level

LIFEGUARD™ SAFETY SYSTEM

HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ LPG/CNG Autogas Hoses

The Next Generation in Hose Safety!!!



Open Flow (Valves Kept Open by Internal Cable)



Coupling Failure (Valves are closed by separation and/or back pressure)

according to regulation R. 110 – 00 Class 2 and R 67 – 01 Class 2. In order to ease installation in difficult conditions and with very low bending radius, the hose can be manufactured already curved preformed. To guarantee a perfect use the hose has to be installed using the curving from the concave part.

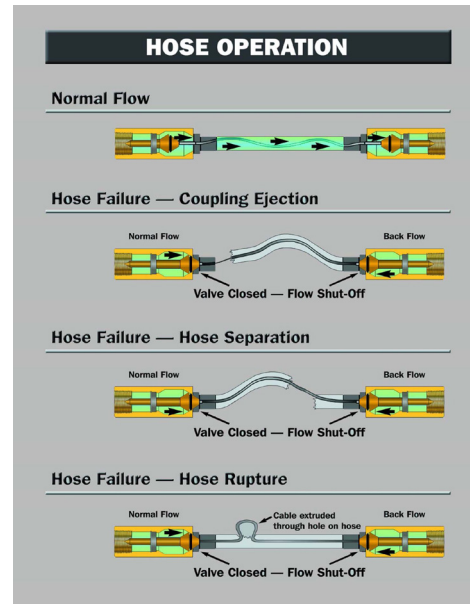


WHAT IS LifeGuard™?

A Flexible “Safety System” for use in the transfer of high pressure gases and liquids. Protect against the hazardous effects of hose rupture, pull-apart and failure.

All LifeGuard™ designs all utilize the unique, patented and patent pending design eliminates the potential for disaster through the use of an internal cable or engineered compression spring connected to specially designed, normally unseated valves located on each end of the cable or spring. In the event of hose separation, stretching to the point of an unsafe condition or coupling-to-hose separation, the valves are released and instantly seat stopping the flow in both directions.

Low pressure hose, long length, used in vehicles for methane gas CNG and LPG installations



Technical Characteristics	
Tube	Synthetic black rubber, not permeable, resistant to gases, heat and ageing
Reinforcement	High strength textile yarn
Cover	Black smooth rubber, resistant to heat, oil, fuel, lubricants, abrasion, ageing and weather. Pin pricked cover
Temperature	- 20 °C + 125 °C
Marking	ACCORDING NORM (in white letters)
Homologation:	E 13*110R-00 0017 / 67R-01 0145* CLASS 2

LIFEGUARD SAFETY SYSTEM

HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ PTFE Acetylene Hoses The Next Generation in Hose Safety!!!



WHAT IS LifeGuard™? A Flexible “Safety System” for use in the transfer of high pressure gases and liquids. Protect against the hazardous effects of hose rupture, pullapart and failure.

All LifeGuard™ designs all utilize the unique, patented and patent pending design eliminates the potential for disaster through the use of an internal cable or engineered compression spring connected to specially designed, normally unseated valves located on each end of the cable or spring. In the event of hose separation, stretching to the point of an unsafe condition or coupling-to-hose separation, the valves are released and instantly seat stopping the flow in both directions.



Open Flow (Valves Kept Open by Internal Cable)

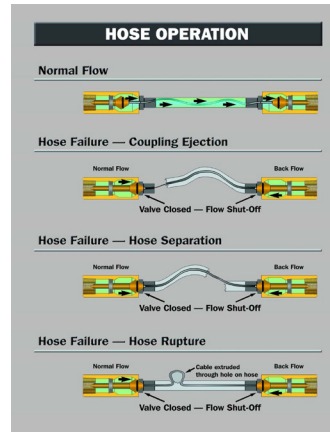


Coupling Failure (Valves are closed by separation and/or back pressure)

APPLICATION: PTFE, Stainless Steel Braid is ideal for a wide range of industrial applications, PTFE is non-porous, chemically inert and requires zero maintenance. PTFE is an FDA approved material. When coupled with the LifeGuard Safety System fitting and cleaned for oxygen use, high temperature capabilities make PTFE the best choice for medical or industrial oxygen filling.

CONSTRUCTION: All LifeGuard PTFE Acetylene Hoses are PTFE inner core, double braided compressed gas hoses and come in female NPT or BSP threads.

MAXIMUM WORKING PRESSURE:
1/4" - 1/2" ID-up to 3500 PSI at 70 F.



Part No.	ACETYLENE HOSES	APPLICATION
TF02-002-17-24-ACET	1/4" x 24"NPT, TEFLON LINED, SS SNAP RINGS, 3500 PSI-SS ENDS	Acetylene Compressed Gas Assemblies
TF02-002-17-36-ACET	1/4" x 36" NPT, TEFLON LINED, SS SNAP RINGS, 3500 PSI-SS ENDS	Acetylene Compressed Gas Assemblies
TF04-002-12-36-ACET	1/4" x 36" NPT, TEFLON LINED, SS SNAP RINGS, 4500 PSI-SS ENDS	Acetylene Compressed Gas Assemblies

LIFEGUARD SAFETY SYSTEM

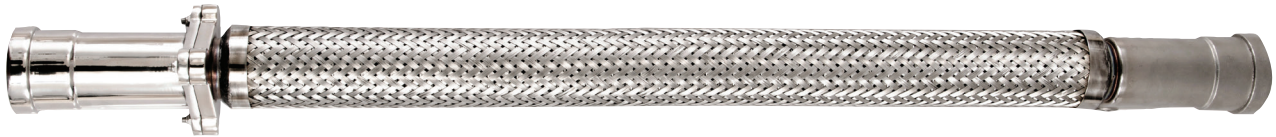
HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ Tri-Bolt Metallic Hose for Cryogenic and Co2 Service

The LifeGuard Safety System and Lifeguard Tri-Bolt Safety System are built into a metallic hose assembly that uses a 316L Stainless Steel Tube and 304 Stainless Steel Reinforced braid.

Designed specifically for the tough demands of bulk tank and trailer loading and unloading. The inner hose, braid, armor casing cuffs, weld ring, and ends are all stainless steel. Each finished assembly is hydrostatically or pneumatically tested to ensure it will withstand the application requirements.

- **FEATURES**-1-1/2" or 2" I.D. close pitch corrugated 304 stainless steel inner core.-Full coverage heavy-duty braid.-Heavy-duty fully machined female NPT end fittings.-18" armor casing cuffs (bend restrictors) each end.-Cryogenic to 1500 degrees F
- **STYLES** 1-1/2" I.D., 450 psi -2" I.D., 675 psi. Contact us for additional sizes available.
- **FITTINGS** Pipe Butt Weld, JIC Female Swivel Hex Male NPT Plain Male NPT Plain Female NPT Hex Female NPT Floating Flange Weld Neck Flange CGA 440 for O2 and 295 for AR and N2 Service



HOSE DATA

Construction:

- T321 and T316L stainless steel hose
- Series 300 stainless steel braid
- Direct braided 1/4" through 2" on reels
- Annular construction

Sizes: 1/4" through 3"

Maximum Working Pressure: Full vacuum up to 3190 psig depending on size and braid configuration

Temperature: Cryogenic to 1250°F
Model of Hose Material: UFBXO Unbraided/
UFBX1 One Braid/UFBX2 Two Braid

The UFBX product is designed and certified to ISO 10380 specifications.

LifeGuard LPG and NH3

GPS-AU-LP-32-18-F

2" x XXX Lifeguard Rubber Transport Hose, UL-21 LPG with Hi-break Tri-Bolt Breakaway (female) NPT Safety fitting X standard (female) NPT Safety fitting-350 PSI WP-1750 PSI burst-525 PSI test. Electrically conductive.



Tri-Bolt System



Lab Tested



Safety at the Highest Level

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LifeGuard™ Metal Pigtails The Next Generation in Safety-Hoses!!!



Open Flow (Valves Kept Open
by Internal Cable)



Coupling Failure (Valves are Closed by
Separation and/or Back Pressure)

WHAT IS LIFEGUARD™ ?

A Flexible “Safety System” for use in the transfer of high pressure gases and liquids. Protect against the hazardous effects of high pressure hose rupture, pull-apart and failure.

The LifeGuard™ design utilizes the unique, patent pending design that eliminates the potential for disaster through the use of an internal compression spring device connected to specially designed, normally unseated valves located on each end of the spring. In the event of hose separation, stretching to the point of an unsafe condition or coupling-to hose separation, the valves are released and instantly seat stopping the flow in both directions.

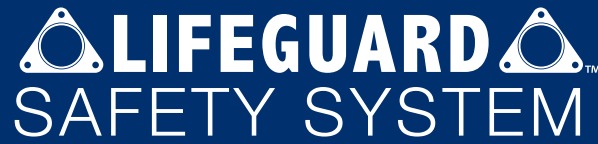
APPLICATION: For certain applications, customers choose a metal “bellows-type” pigtail which provides an all welded, zero permeation and flexible alternative to pipe and tubing, even at cryogenic temperatures. The metal lined pigtail is reinforced with two layers of type 304 stainless steel braid (Monel® braid is optional) and is designed to provide maximum flexibility. In cases where adiabatic compression in PTFE is a concern, LifeGuard Metallic Pigtails are an excellent solution.

CONSTRUCTION: All LifeGuard convoluted stainless steel inner core, double braided compressed gas hoses are tig welded and come in female NPT or BSP threads.

MAXIMUM WORKING PRESSURE:
1/4" -1/2" ID-up to 3500 PSI at 70 F.

Part Number:	Standard Sizes
BH09-002-11-24-S	1/4" x 24" NPT, CONV.SS METAL LINED, 3500PSI
BH09-002-11-32-S	1/4" x 32" NPT, CONV. SS METAL LINED, 3500PSI
BH09-002-11-36-S	1/4" x 36" NPT, CONV. SS METAL LINED, 3500PSI
BH09-002-11-48-S	1/4" x 48" NPT, CONV. SS METAL LINED, 3500PSI
BH09-002-11-60-S	1/4" x 60" NPT, CONV. SS METAL LINED, 3500PSI
BH09-002-11-72-S	1/4" x 72" NPT, CONV. SS METAL LINED, 3500PSI
BH22-004-11-60-S	1/2" x 5' NPT, CONV. SS METAL LINED, 3500PSI
BH22-004-11-120-S	1/2" x 10' NPT, CONV. SS METAL LINED, 3500PSI
BH22-004-11-180-S	1/2" x 15' NPT, CONV. SS METAL LINED, 3500PSI
BH22-004-11-240-S	1/2" x 20' NPT, CONV. SS METAL LINED, 3500PSI





LIFEGUARD SAFETY SYSTEM

HYDROGEN HOSES | CRYOGENIC LIQUID CYLINDER HOSES | METAL PIGTAILS | LIFEGUARD COMPRESSED GAS HOSES | CARBON DIOXIDE BULK LIQUID TRANSFER HOSES

LifeGuard™ Hose Material Specifications

NORMAL HOSE ID	HOSE TYPE	HOSE O.D.	WEIGHT PER FT	MIN LIV LENGTH FOR VIBRATION	MINIMUM BEND RADIUS		MAXIMUM WORKING PRESSURE	MAXIMUM TEST PRESSURE	NORMAL BURST PRESSURE
					STATIC BEND	INTER-MITTENT FLEXING			
	UFBX0	0.4	0.05	3	0.63	4.3	145	218	—
	UFBX1	0.45	0.11	3	1	4.3	2420	3630	968
1/4"	UFBX2	0.5	0.16	3	1	4.3	3190	4785	12760
	UFBX0	0.59	0.11	3.5	0.87	6	80	120	—
	UFBX1	0.64	0.18	3.5	1.5	6	1450	2175	5800
3/8"	UFBX2	0.69	0.25	3.5	1.5	6	2580	3870	10320
	UFBX0	0.77	0.11	4.25	0.94	6.5	80	120	—
	UFBX1	0.83	0.22	4.25	1.75	6.5	1075	1615	4300
1/2"	UFBX2	0.88	0.33	4.25	1.75	6.5	1500	2250	6000
	UFBX0	1.02	0.18	4.5	1.2	8	60	90	—
	UFBX1	1.08	0.27	4.5	2.75	8	950	1425	3800
3/4"	UFBX2	1.14	0.39	4.5	2.75	8	1250	1875	5000
	UFBX0	1.33	0.34	5.5	1.7	8	60	90	—
	UFBX1	1.41	0.6	5.5	3.5	8	725	1087	2900
1"	UFBX2	1.49	0.86	5.5	3.5	8	1110	1650	4470
	UFBX0	1.62	0.27	6	2.2	10	50	75	—
	UFBX1	1.7	0.57	6	4.5	10	563	845	2252
1 1/4"	UFBX2	1.78	0.93	6	4.5	10	825	1237	3300
	UFBX0	1.88	0.45	6.25	2.7	10	35	53	—
	UFBX1	1.95	0.8	6.25	5	10	500	750	2000
1 1/2"	UFBX2	2.05	1.1	6.25	5	10	800	1200	3200
	UFBX0	2.45	0.55	7.5	3.5	14	15	23	—
	UFBX1	2.53	1	7.5	7.63	14	478	717	1912
2"	UFBX2	2.61	1.5	7.5	7.63	14	638	957	2552
	UFBX0	3.01	1.3	7.5	4.5	16	15	23	—
	UFBX1	3.09	1.9	7.5	7.9	16	377	566	1508
2 1/2"	UFBX2	3.18	2.5	7.5	7.9	16	667	1001	2668
	UFBX0	3.54	1.5	8.75	5.1	18	15	23	—
	UFBX1	3.62	2.2	8.75	9	18	320	480	1280
3"	UFBX2	3.7	3	8.75	9	18	580	870	2320

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LifeGuard™ Hydrogen Hoses™ The Next Generation in Hose Safety!!!



Open Flow (Valves Kept Open by Internal Cable)



Coupling Failure (Valves are closed by separation and/or back pressure)

WHAT is LifeGuard™? A Flexible “Safety System” for use in the transfer of high pressure gases and liquids. Protect against the hazardous effects of hose rupture, pull-apart and failure.

The **LifeGuard™** design utilizes the unique, patent pending design that eliminates the potential for disaster through the use of an internal compression spring device connected to specially designed, normally unseated valves located on

each end of the spring. In the event of hose separation, stretching to the point of an unsafe condition or coupling-to-hose separation, the valves are released and instantly seat stopping the flow in both directions.



Designed specifically for the ultra hazardous applications of high pressure hydrogen gas transfer in tube trailers, facilities and cylinders. Whether you prefer metallic or Tefzel®, the LifeGuard hydrogen hose is the Safe-Choice.™ The inner hose, braid, armor casing cuffs, weld ring, and ends are all stainless steel. Each finished assembly is pneumatically tested to ensure it will withstand the application requirements.



• LifeGuard Tefzel® ETFE Lined Stainless Steel Braided Hoses

LifeGuard’s Tefzel® ETFE inner core has a permeation rate that is approximately 77% lower than PTFE inner core pigtails. This makes it an ideal choice for helium and hydrogen.

• LifeGuard Metallic Lined Stainless Steel Braided Hoses

LifeGuard’s metallic high pressure hose assemblies are specifically designed to transfer gaseous hydrogen to and from a bulk transport truck to the customer facility.



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LifeGuard™ Teflon vs. Metal Inner Hose

Gas and cryogenic hoses are available with either Teflon or Metal inner hoses. To ensure long life, it is very important that you select the correct material for each application.

Corrugated VS. Smooth Bore Inner Core : One of the most common causes of metal hose failure is “high velocity” gas flow. Because of the ribs on the corrugated type hose, high velocity flow (above recommended levels) can damage or crack a metal type hose. To avoid hose damage, it is important to know the velocity of gas flowing through the hose. We have provided charts that will help you determine velocity flow levels. If you find that a particular application requires a higher than recommended gas flow velocity, in this case we would suggest that you switch to a smooth bore PTFE or ETFE type hose (dependant on the gas). Smooth bore hose are designed to handle higher velocity gas flow requirements.

Effusion: Metal inner core hoses will not effuse or diffuse gas. i.e. they have zero permeation: this is why they are preferred for high purity and hazardous specialty gases, as well as hydrogen and helium when in a constant pressurized application. Pressurized gas will permeate or effuse through the wall of the PTFE hose at rates consistent with the gas molecule size and weight, and with atmospheric gases this effusion is hardly noticeable and minimal. For hydrogen and helium, the ETFE or hose has typically 1/3 the effusion rate of a PTFE hose, so ETFE (or “post sintered”) is the recommended inner core material for H2 and He cylinder filling applications.

Flexibility: Teflon hoses tend to be a bit more forgiving in terms of flexibility than all metallic hoses. If an application requires constant flexing, a PTFE or ETFE type hose will work best.

Trailer Transfill/Cylinder Filling, Cylinder Cradles - High velocity: The inside of a Teflon gas service hose is smooth bore, whereas a metal inner hose is convoluted (ribbed). In high velocity applications (tube trailer transfill, cylinder fill) a smooth surface will work best. A convoluted hose in a high pressure drop (high velocity up to critical velocity) can experience internal hose vibration and fatigue leading to cracking of the corrugated inner core.

Trailer Transfill Liquid - Low velocity : When hydrogen or helium tube trailers are being filled at the plant in a slow volume method such as with a pump or compressor, the volume flow through the hose is typically within the velocity limitations to allow the use of a metal inner core hose. Typically lower pressures and temperatures are used in the transfer of liquid cryogenics. A metal hose will perform this job much better than a Teflon hose. However, it is important to ensure that the hose is not bent in more than one plane at a time. Failure to do so will result in premature hose failure.

Static State: Static state would include applications where the gas remains in the hose over a long period of time. Polymer inner core hose will effuse gas. Whereas metal inner core hose has zero effusion. This becomes critical when the application involves smaller molecule gases, flammable, or toxic gases. Hydrogen, helium, and specialty gases are best delivered in a metal liner core hose. When delivering corrosive gases, Monel inner core hose is recommended.

Cryogenic Hose: The low temperature of cryogenic liquids requires the use of a stainless steel inner core type hose.

Metal Hose Limitations: It is important to ensure that the hose is not bent in more than one plane at a time. Such action will set up an inherent torque, which can contribute to premature hose failure when the hose is pressurized. When the hose is connected from one static point to another static point, it should make the bend easily without forcing the hose to arrive at its position to make the connection. Also as mentioned previously: Metal inner core hoses have a velocity limitation of 100 feet per second for a straight run, 50 fps for a 90degree bend, and 25 FPS for a 180 degree bend according to metal hose manufacturer’s rules of thumb. Calculations are available to project velocity data.

Metallic Hoses	
BH22-004-11-60	5' x 1/2" NPT, CONVOLUTED SS METAL LINED, 3500PSI, 14000 BP
BH22-004-11-120	10' x 1/2" NPT, CONVOLUTED SS METAL LINED, 3500PSI, 14000 BP
BH22-004-11-180	15' x 1/2" NPT, CONVOLUTED SS METAL LINED, 3500PSI, 14000 BP
BH22-004-11-240	20' x 1/2" NPT, CONVOLUTED SS METAL LINED, 3500PSI, 14000 BP

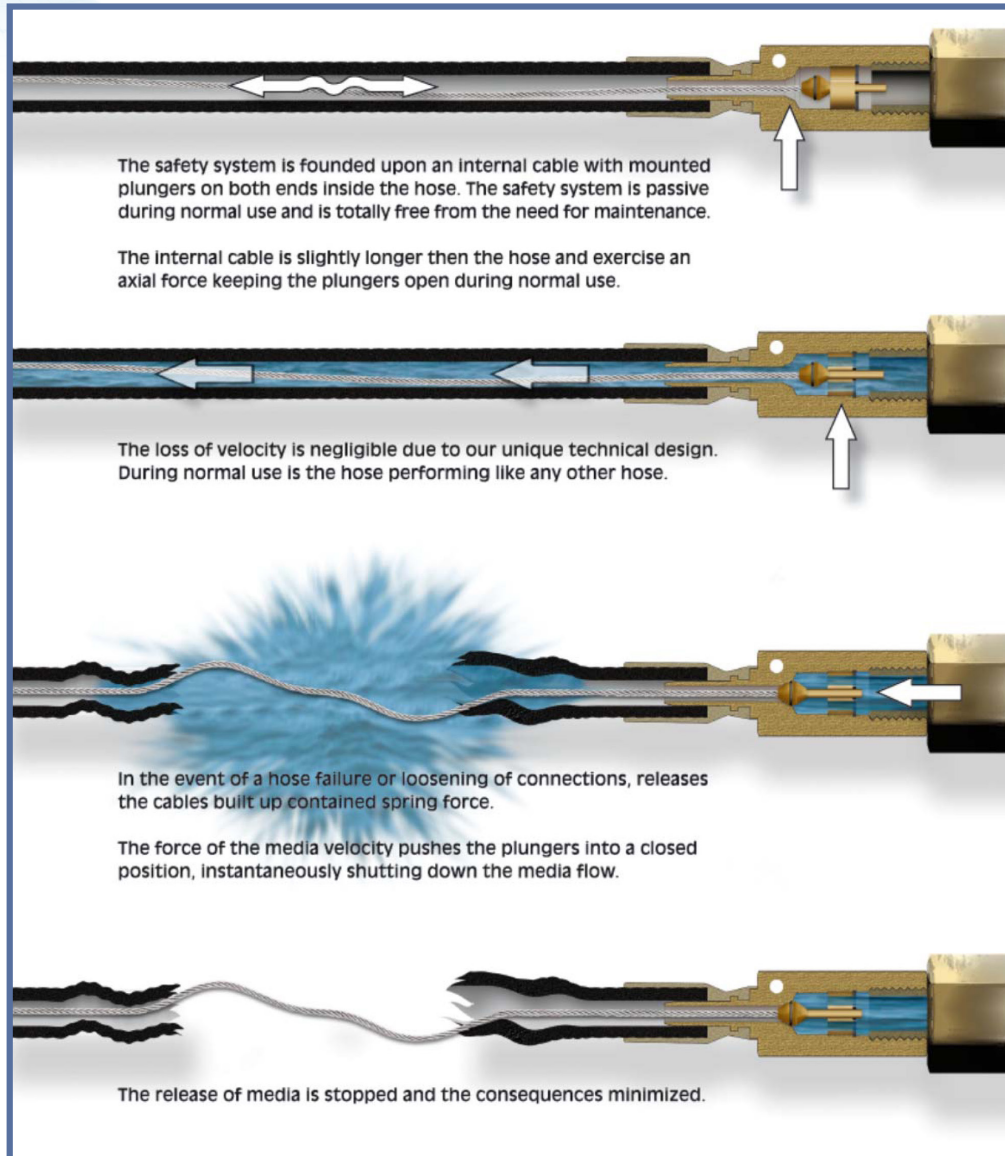
Tefzel Hoses	
TF51-004-17-6	6.0' X 1/2" NPT,TEFZEL LINED, 3500 PSI, 14000 BP
TF51-004-17-10	10.0' X 1/2" NPT,TEFZEL LINED, 3500 PSI, 14000 BP
TF51-004-17-15	15.0' X 1/2" NPT,TEFZEL LINED, 3500 PSI, 14000 BP



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The Function of the LifeGuard Safety Hose System:

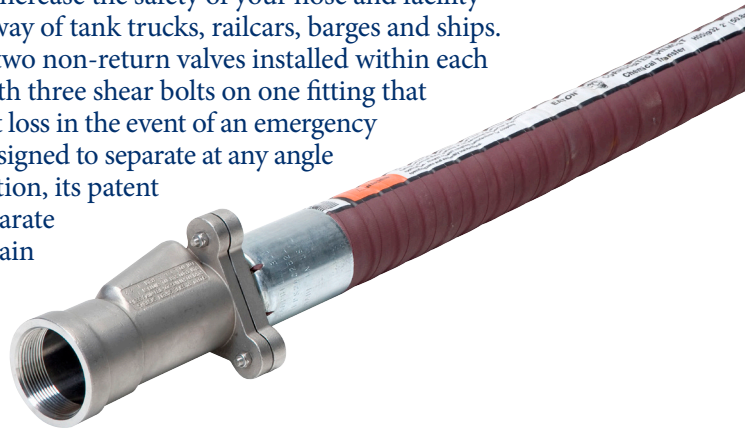


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LifeGuard™ Tri-Bolt Breakaway LPG Hoses conforms to Australian DR AS/NZS 1869

The **LifeGuard™ Tri-Bolt Breakaway Hose** is designed to increase the safety of your hose and facility by incorporating protection against the unintended pull-away of tank trucks, railcars, barges and ships. Utilizing a **Engineered Compression Spring** system with two non-return valves installed within each fitting, we have now included a **Tri-Bolt Flange System** with three shear bolts on one fitting that separates under a controlled condition and prevents product loss in the event of an emergency separation. The **LifeGuard™ Tri-Bolt Breakaway Hose** is designed to separate at any angle when subjected to a designated pull force. In case of separation, its patent pending design assures that not less than two bolts will separate causing the internal valves to engage and the piping to remain intact with flow stopped on both ends of the hose.



Cover Black: CR with Blue Longitudinal Stripe – abrasion & weather resistant

Reinforcement: Multiple layers of Polyester – min. burst 1750 psi

Tube: Oil resistant, **Plasticizer Free** – resistant to permeation of Butane/Propane

Branding: LPG Hose UL21 Max. WP, Quarterly/Year, Made in USA.

Temperature: -40°F to 180°F

Maintenance: See LifeGuard Safety-Hose Proper Use, Care, and Maintenance Booklet - 2009

LifeGuard LPG and NH3	
GPS-AU-LP-32-15-F	2" x 15' Lifeguard Rubber Transport Hose, UL-21 LPG with Hi-break Tri-Bolt Breakaway (female) Safety fitting X standard (female) NPT Safety fitting-350 PSI WP-1750 PSI burst-525 PSI test. Electrically conductive
GPS-AU-LP-32-18-F	2" x 18'6" Lifeguard Rubber Transport Hose, UL-21 LPG with Hi-break Tri-Bolt Breakaway (female) NPT Safety fitting X standard (female) NPT Safety fitting-350 PSI WP-1750 PSI burst-525 PSI test. Electrically conductive
GPS-LP-32-20-F	2" x 20' Lifeguard Rubber Transport Hose, UL-21 LPG with Hi-break Tri-Bolt Breakaway (female) NPT Safety fitting X standard (female) NPT Safety Fitting-350 PSI WP-1750 PSI burst-525 PSI test. Electrically conductive
GPS-LP-32-25-F	2" x 25' Lifeguard Rubber Transport Hose, UL-21 LPG with Hi-break Tri-Bolt Breakaway (female) NPT Safety fitting X standard (female) NPT Safety fitting-350 PSI WP-1750 PSI burst-525 psi test. electrically conductive
GPS-LP-32-30-F	2" x 30' Lifeguard Rubber Transport Hose, UL-21 LPG with Hi-break Tri-Bolt Breakaway (female) NPT safety fitting X standard (female) NPT Safety fitting-350 PSI WP-1750 PSI burst-525 PSI test. Electrically conductive

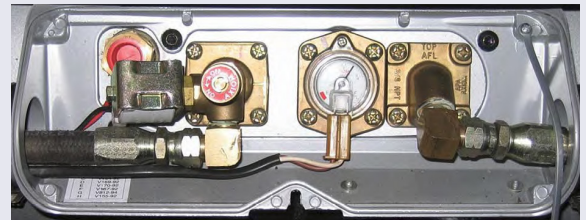


LIFEGUARD TECHNOLOGIES
The next generation in safety hoses

info@lifeguard-tech.com | www.thesafesthose.com | Toll Free 855-GPSS-USA | 855-477-7872

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Innendurchmesser Inner Diameter mm	Wanddicke Wall Thickness mm	Außendurchmesser Outside Diameter mm	Betriebsdruck Working Pressure bar	Soll-Platzdruck Nominal Burst Pressure bar	Gewicht Weight kg/m	Biegeradius Bending Radius mm
4	3	10	4,5	67	0,100	102
5	3	11	4,5	61	0,110	102
6	3,5	13	4,5	60	0,140	102
8	3,5	15	4,5	51	0,170	102
10	3,5	17	4,5	40	0,200	102
11	3,5	18	4,5	40	0,220	102
12	3,5	19	4,5	32	0,250	102
13	4,5	22	4,5	40	0,360	117
14	4	22	4,5	35	0,310	153
16	3,5	23	4,5	31	0,310	168
17	3,5	24	4,5	28	0,360	178
19	4	27	4,5	25	0,425	178

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LifeGuard™ Teflon Chlorine Transfer Hose



Construction

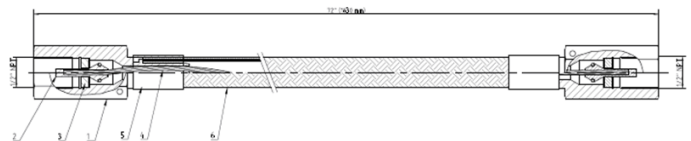
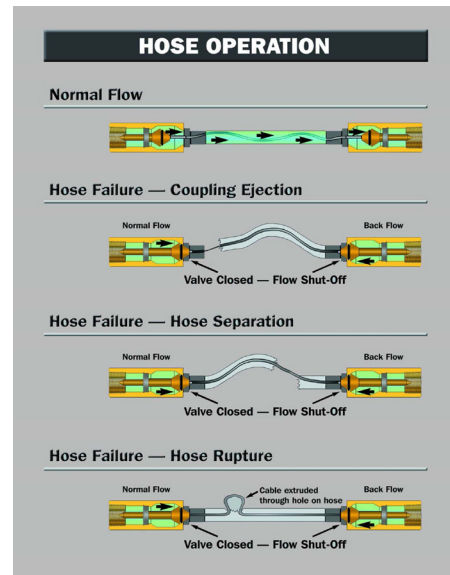
- Conductive, heavy wall Teflon® PTFE liner
- Self cleaning open pitch helical convolutions
- Seamless vacuum formed liner
- Hastelloy® C276 braid
- Monel NPT Fittings
- Flange and CGA 820 fitting options

Benefits

- Meets Chlorine Institute recommendations
- 5:1 safety factor for Burst Pressure
- Extreme inner and outer corrosion protection
- Very kink resistant
- light weight abrasion resistant armor guard

Applications

Specifically designed for manufacturing, transporting, and packaging of chlorine and bromine



Nominal Size		Hose ID		Hose OD		Bend Radius		Working Pressure @ 70°F		Burst Pressure @ 70°F	
INCH	DN	INCH	MM	INCH	MM	INCH	MM	PSI	BAR	PSI	BAR
1/2"	15	0.470	11.9	.0748	19.0	2	50.8	500	34.5	2500	172.4
1"	25	0.970	24.6	1.354	34.4	4	101.6	500	34.5	2500	172.4
1 1/2"	40	1.540	39.1	2.034	51.7	6	152.4	375	25.9	1875	129.3