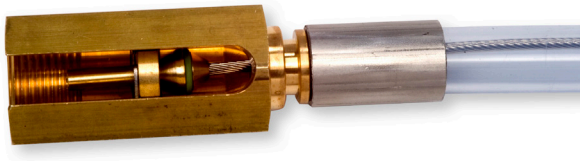
LIFEGUARD™ SAFETY SYSTEM

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

LifeGuard™ PTFE and Metallic High Pressure Bundle Filling Hoses

The Next Generation in Hose Safety!!!



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

Open Flow (Valves Kept Open by Internal Cable)

LIFEGUARD TECHNOLOGIES
The next generation in safety hoses

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

LIFEGUARD™
SAFETY SYSTEM

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LifeGuard™ PTFE High Pressure and Metal Pigtail Hoses

The Next Generation in Hose Safety!!!

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.

PTFE HIGH PRESSURE HOSES

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 WORKI NG PRESSURE:
¼″-1″ 3000 PSI to 10,000 PSI.

METAL PIGTAIL HOSES

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.

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LIFEGUARD™
SAFETY SYSTEM

High Pressure Hoses

PTFE, STAINLESS STEEL BRAID

LifeGuard Safety PTFE Safety Hoses are ideal for a wide range of compressed gas and industrial applications. PTFE is non-porous, chemically inert and requires zero maintenance. PTFE is an FDA approved material. All LifeGuard Safety Hoses are cleaned for oxygen use, have high temperature capabilities and our internal Monel cable which acts as a heat dissipater make PTFE an approved choice for medical or industrial oxygen filling. LifeGuard Safety Hoses use Konigsberg PTFE which has been tested and approved by Air Liquide and Praxair greater flexibility, kink resistance, longer life and less permeation.

To obtain maximum quality control of the manufactured applications, we burst pressure tests every batch of hose brought into stock. The results are archived for minimum 10 years. Our pressure test certificate of the manufactured batch is sent together with goods. To ensure the purity of the high pressure products sent out, we clean the hoses internally, cap the fittings and pack them individually in plastic bags. We also label all products with a batch number to ensure traceability.

- **PTFE Core, Double SS Braid**. ¼" and ½"NPT, Teflon Lined, 3500 Psi-Brass Ends
  - ¼" - Part Number TF02-002-17-XX-S-XX
  - ½" - Part Number TF02-004-17-XX-S-XX

- **PTFE CORE DOUBLE SS BRAID.** ¼" and ½" NPT, Teflon Lined, 4500 PSI-Brass Or SS Ends
  - ¼" - Part Number TF04-002-17-XX-S-XX
  - ½" - Part Number TF04-004-17-XX-S-XX

- **PTFE Core, Double SS Braid, Double SS Spiral Wrap.** ¼" and ½" NPT, Teflon Lined, 6000 PSI-SS Ends
  - ¼" - Part Number TF06-002-17-XX-S-XX
  - ½" - Part Number TF06-004-11-XX-S-XX

ETFE TEFZEL® CORE, STAINLESS STEEL BRAID

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.

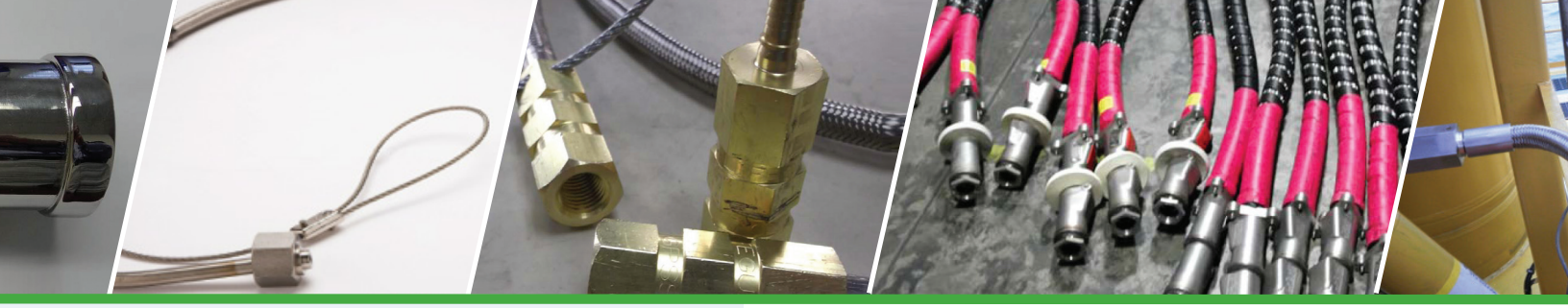
LifeGuard Tefzel® ETFE Lined Stainless Steel Braided Hoses
LifeGuard's Tefzel® ETFE inner core has a permeation rate that is approximately 77% lower than PTFE inner core pigtails. This makes it an ideal choice for helium and hydrogen.

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.

- **ETFE Core, Double SS Braid.** ¼" and ½"NPT, Teflon Lined, 3500 PSI-Brass Ends
  - ¼" - Part Number TF51-002-17-XX-S-XX
  - ½" - Part Number TF51-004-17-XX-S-XX

- **ETFE Core, Single SS Braid.** ¼" and ½"NPT, Teflon Lined, 4500 Psi-Brass Ends
  - ¼" - Part Number TF51-002-12-XX-S-XX
  - ½" - Part Number TF51-004-12-XX-S-XX

Think smarter . . . Think safer!



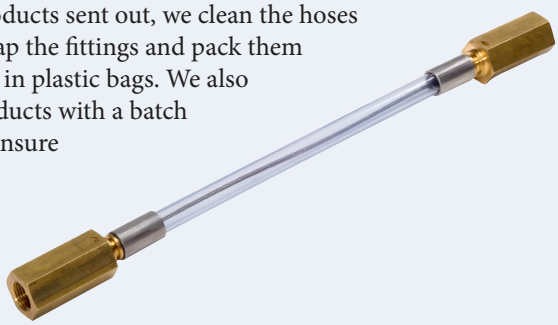
METALLIC CORE PIGTAILS

Many applications require a metal "bellows" type hose which provides an all welded, flexible alternative to rigid pipe and tubing with zero permeation even at high pressures and cryogenic temperatures. A variety of alloys, safety features and options are available so that an assembly matching your precise needs can be provided. All hose assemblies are constructed with heavy-gauge end fittings. Maximum allowable working pressure and date of manufacture are permanently marked on each assembly. 316 SS pigtails are designed for strong, safe and flexible operation in demanding specialty gas environments. Zero permeation characteristics do not allow gas or atmosphere to pass through its wall in either pressure or vacuum applications. Ideal for flammable, toxic, high purity and small molecule gases.

- **SS Core, Double SS Braid.** ¼" and ½"NPT, Teflon Lined, 3600 PSI-SS Ends
  - ¼" - Part Number BH09-002-11-XX-S-XX
  - ½" - Part Number BH22-004-11-36 -XX-S

The convoluted inner tube is made in stainless steel, material grade AISI 316L, and the braid in stainless steel, material grade AISI 304. The convoluted profile makes the hose flexible even under high pressure. The braid is closely wrought over the tube, making the high pressure hose sutible for very high pressures. The stainless steel alternative is often used when the demands are high regarding purity, because of the fact that the stainless steel high pressure hose is 100% free from permeation.

To obtain maximum quality control of the manufactured applications, we burst pressure tests every batch of hose brought into stock. The results are archived for minimum 10 years. Our pressure test certificate of the manufactured batch is sent together with goods. To ensure the purity of the high pressure products sent out, we clean the hoses internally, cap the fittings and pack them individually in plastic bags. We also label all products with a batch number to ensure traceability.



SPECIFICATIONS – PTFE AND ETFE

Hose Style	Size ID (in)	Size OD w/o Armor (in)	Size OD w/ Armor (in)	Inner Core Wall Thick	MAWP (PSIG)	Min Bur Pressur (PSIG)
TF02	0.250	0.375	0.560	0.040	3500	14500
TF04	0.250	0.400	0.625	0.040	4500	18000
TF06	0.220	0.500	0.725	0.040	6000	24600
TF51	0.250	0.375	0.560	0.030	3500	13500

MATERIAL PREFERENCES – PTFE AND ETFE VS

Teflon vs. Metal inner hose: gas and cryogenic hoses are available with either teflon of 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 (dependent 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 leading to cracking of the corrugated inner core.

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PTFE and Metallic Pigtails

The Next Generation in Safety-Hoses!!!

LIFEGUARD™ SAFETY HOSE HIGH PRESSURE HOSE LIST

LGT PART NO	HIGH PRESSURE SAFETY HOSES/TEFLON AND TEFZEL
TF02-002-17-24	24" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS
TF51-002-17-24	24" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS
TF51-002-11-24	24" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS
TF04-002-12-24	24" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS
TF06-002-11-24	24" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS
TF07-002-11-24	24" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO)
TF02-002-17-36	36" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS
TF02-002-17-36-SBR	TEFLON HOSE, BRASS 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
TF51-002-11-36	36" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS
TF51-002-11-36-SBR	TEFZEL HOSE, BRASS FITTINGS, FNPT, 1/4" 36 INCHES, 3500 PSI W/BEND RESTRICTORS AND SAFETY LOOPS
TF04-002-12-36	36" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS
TF06-002-11-36	36" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS
TF51-002-17-36-SBR	36"X1/4"NPT,TEFLON LINED,3500PSI-SS ENDS, CFOS, CAPPED AND BAGGED WITH BEND RESTRICTORS AND SAFETY LOOPS
TF07-002-11-36	36" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO)
TF02-002-17-48	48" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS
TF51-002-17-48	48" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS
TF51-002-11-48	48" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS
TF04-002-12-48	48" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS
TF06-002-11-48	48" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS
TF07-002-11-48-S*	48" X 1/4" NPT, TEFLON LINED, 7500 PSI-SS ENDS (3/1 WP/BURST RATIO)
TF02-002-17-60	60" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS
TF51-002-17-60	60" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS
TF51-002-11-60	60" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS
TF04-002-12-60	60" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS
TF06-002-11-60	60" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS
TF02-002-17-72	72" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS
TF51-002-17-72	72" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS
TF51-002-11-72	72" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS
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 including 1/2," 3/4," and 1" are available

- **Other lengths – 24"-15'**
- **Other options – European, metric, CGA, end connections available**
- **Safety Loops**

	SPECIALTY GASES
LGT PART NO	HIGH PRESSURE SAFETY HOSES/TEFLON AND TEFZEL
TF02-002-19-24	24" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-19-24	24" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-18-24	24" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-21-24	24" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF06-002-18-24	24" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
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
TF02-002-19-36	36" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF02-002-19-36-SBR	TEFLON HOSE , BRASS HEATSINK FITTINGS, FNPT, 1/4" X 36" 3500 PSI W/BEND RESTRICTORS AND SAFETY LOOPS
TF51-002-19-36	36" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-18-36	36" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-21-36	36" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF06-002-18-36	36" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
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
TF02-002-19-48	48" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-19-48	48" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-18-48	48" X 1/4" NPT, TEFZEL LINED,3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-21-48	48" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF06-002-18-48	48" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
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
TF02-002-19-60	60" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-18-60	60" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-21-60	60" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-18-60	60" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF06-002-21-60	60" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF02-002-19-72	72" X 1/4" NPT, TEFLON LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-19-72	72" X 1/4" NPT, TEFZEL LINED, 3500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF51-002-18-72	72" X 1/4" NPT, TEFZEL LINED, 3500 PSI-SS ENDS WITH HEAT DISSIPATERS E/E
TF04-002-21-72	72" X 1/4" NPT, TEFLON LINED, 4500 PSI-BR ENDS WITH HEAT DISSIPATERS E/E
TF06-002-18-72	72" X 1/4" NPT, TEFLON LINED, 6000 PSI-SS ENDS WITH HEAT DISSIPATERS E/E