

RATERMANN MANUFACTURING, INC.

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Selecting the correct hose can improve your process

Selecting the correct hose for a particular application is one key element that is often overlooked. Many hose failures are attributed to a mismatch of hose and application. Armed with a little knowledge, it is not difficult to select the best hose for your customers industrial or specialty gas application.

Application Questions

To select the correct hose, make the following determinations:

- Gas or cryogenic
- Type of gas/grade (argon, helium, hydrogen, oxygen, etc.)
- Required maximum pressure (psig)
- Required maximum flow rate (CFH or CFM)
- Length of hose (give yourself extra length)
- Fitting configuration (1/4" NPT is standard; other fittings available)
- Armor casing (yes or no)
- Cleaned, capped and bagged (for oxygen service)
- Special configuration – CGA nut, hand tight, check valve, etc.

Hoses designed for specialty gas applications should not only provide pressure capacity, but also maintain the purity of gas delivered. For this reason, it is not recommended to use rubber type hoses to supply high purity gas.

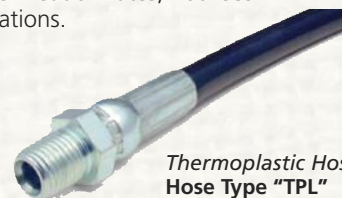
Permeation is the term used to describe how gas molecules pass through the pores of a hose. When gases escape out of a hose, this is called "effusion." If permeation levels are high, ambient gases can enter into the gas stream through "diffusion," thereby adding contaminants. To varying degrees, rubber, PTFE and ETFE hoses all permeate gases. The smaller the gas molecule, the higher the rate of permeation.

"All metal" hoses utilize a corrugated inner core that features "zero permeation." One might conclude that "all metal" hoses are the final answer; however, cost, velocity issues and the application will dictate the best choice. PTFE, PTFE hybrids such as "post sintered," and ETFE thermoplastic hoses maintain pressure capacity while dramatically reducing permeation. Their flexibility and durability are much more appealing than "all metal" hoses when outfitting a high capacity fill plant. It is important to evaluate the requirements of each application and then select the hose that best fits. Selecting the correct hose can maximize gas purity, reduce the risk of contamination and improve a customer's process.

There are several choices of materials to consider when selecting a hose:

Rubber – Inexpensive, high permeation rates, not recommended for high purity applications.

Thermoplastic – Ratermann Mfg. TPL Family of Hoses Durable, economical, flexible and features a low permeation rate. Not recommended for oxygen use.



Thermoplastic Hose Type "TPL"

PTFE – Ratermann Mfg. FP Family of Hoses The most popular high-pressure hose in use. Commonly found in fill plants across the country. Durable, flexible, and economically priced.



PTFE Hose Hose Type "FP" and "FPT"

PTFE "Post Sintered" – Ratermann Mfg. FPT Family of Hoses The "post sintered" process re-bakes the PTFE at a controlled time and temperature, increasing the wall thickness and tightening the molecular bond of the PTFE, which dramatically reduces effusion and diffusion. Economically priced, very flexible and works well with most gases.

Rigid Metal – Ratermann Mfg. PT Family of Rigid Hoses Economically priced, reduced flexibility, best suited for stationary applications. Rigid hoses will eventually crack as they are bent and flexed.

All Metal Corrugated Hose – Ratermann Mfg. FPS Family of Hoses All metal hoses utilize a metal corrugated inner core (typically 316 stainless steel or Monel). Metal hoses feature "zero permeation" or "no gas loss," which is very important in static gas applications. Metal hose is more costly, and is commonly used with helium and hydrogen. Monel inner core is available for corrosive type gases. Pay close attention to dynamic stress and velocity levels (flow rate) as there are limitations with a metal hose.



All Metal Hose Hose Type "FPS"

Call us to Help You with Your Gas Hose Needs!

High Pressure Pigtail Selection Guide		Compatibility	Excellent 5	Very Good 4	Good 3	Acceptable 2	Not Acceptable N
Ratermann Hose Style Working Pressure (MAWP)	FP / FPT 3000/3600 PSIG	FPT-60P 6000 PSIG	FPS 4250 PSIG	FPS-45P 4500 PSIG	FPS-C 4250 PSIG	TPL 3000 PSIG	
Core or Liner	PTFE	PTFE	316L S.S.	316L S.S.	Monel	Polyester	
Gas	Connection						
¹ Acetylene	510	4	5	3	3	3	2
Air	346	5	3	3	3	3	2
Argon	580	5	3	3	3	3	2
¹ Arsine	660	N	N	N	N	3	N
Carbon Dioxide	320	5	3	3	3	3	5
Carbon Monoxide	350	4	4	5	5	3	N
Chlorine	660	N	N	N	N	4	N
Fluorine	679	N	N	N	N	4	N
Freon 12	660	5	4	5	5	5	N
Helium	580	4	3	5	5	4	2
Hydrogen	350	3	3	4	4	3	N
Methane	350	5	4	5	5	5	N
Natural Gas	350	3	5	5	5	3	N
Nitrogen	580	5	5	3	3	3	2
Nitrous Oxide	326	5	3	3	3	3	N
Oxygen	540	5	3	3	3	4	N

Dynamic Stress and Velocity

Pressure flow characteristics are important factors when using an all metal hose. Dynamic stress is an important consideration when selecting an all metal hose. The hose must not be bent on more than one plane at a time or restricted (over-bent) in any way.

All metal Corrugated hoses are not designed to handle high velocity flow rates. Confirm the velocity rate of each application, and make certain that the flow rate is below the recommended threshold for a given size hose. If the velocity exceeds this threshold, it will establish a resonant frequency that will prematurely crack the hose.



TSC Hose Breakaway

When the velocity flow rate exceeds the recommended threshold, consider using a PTFE lined hose. Tube trailer transfer is one application that often exceeds the recommended threshold rate.

Medical Gases – It is very important that you select the correct hose for medical applications. One should consult an expert prior to installing pigtails. Care should be taken with Oxygen pigtails to the heat associated with “adiabatic compression.”



We highly recommend the use of an extended brass volume piece on oxygen manifold pig-tails. Oxygen charging manifolds should include flexible hoses with “heat sinks” installed near CGA connection. The heat sinks will help to absorb the potential heat from adiabatic compression. We highly recommend the use of heat sinks

Braiding – The stainless steel braid encases the inner core and gives the hose its strength to hold pressure. A high pressure hose can have from one (3,000 psig) to four braids (5,000 psig) depending on pressure requirements.

Armor Casing – Armor casing can easily be installed over the braided hose. It will prevent hose kinking and whipping in the event of a hose burst, and also protects the exterior of the hose.

Fittings – Swivel fittings, hand tights, 90 degree elbows and brass heat sinks for adiabatic compression are a few of the more popular fittings in use.

Selecting the Best Hose

In the specialty gases industry, there are several choices when considering a hose. Here are some of the basic factors that one should take into consideration.

Pressure – Make certain that the average working pressure of the hose is well above the required maximum pressure of the application.

Molecular Weight – Hydrogen and helium have the smallest molecular weight, and therefore present a higher risk of permeation loss.

Permeation – If permeation is a concern, consider using an all metal hose. Make certain that the flow rate is below the suggested threshold level. Other options would be an ETFE or PTFE post sintered type hose. These hoses will reduce effusion by approximately 75 percent.

Purity – Hoses that effuse gases can also diffuse gases. Diffusion can introduce contaminants that could effect the high purity gas stream. If this is a concern, consider using an all metal hose.

Static State – If a gas is used in a static state, there will be times when the gas is not being used (off hours, weekend). In this case, gases trapped inside the hose could effuse out. The amount lost is minimal, but over time this loss can add up.

Fill Manifolds – Hoses used on fill manifolds are typically cycled (attached and disconnected from the cylinder) several times a day. The hose is exposed to continual flexing, and then disconnected (hanging open to the air). As a result, permeation of a fill manifold is of minimal concern. PTFE hoses work well in this application.

Laser Cutting Systems – Using the wrong hose to supply a laser can be detrimental to the operating efficiency of the laser, depending on permeability of the hose, a high permeation hose will contribute contamination, resulting in increased downtime. Ultimately this will effect the quality of cut.

For Hose Maintenance information, see pages 20A 24-25

Ratermann Manufacturing, Inc.

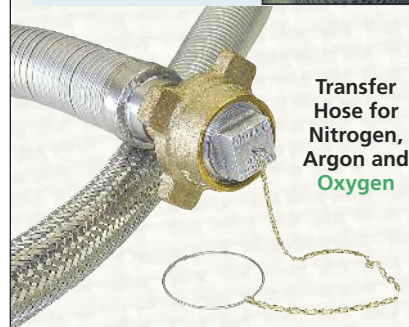
carries a tremendous range of hoses suited for all your **CRYOGENIC** needs.



Tube Trailer Hose Selection Guide

Compatibility Excellent 5 Very Good 4 Good 3 Acceptable 2 Not Acceptable N

Ratermann Hose Style Working Pressure (MAWP) Core or Liner	TT 5000 PSIG PTFE	TTS 3700 PSIG 316 SS	TTM 2500 PSIG Monel
Gas			
Air	4	3	4
Argon	4	3	4
Carbon Dioxide	4	5	2
Helium	3	5	4
Hydrogen	3	5	4
Natural Gas	4	3	3
Nitrogen	4	3	4
Nitrous Oxide	3	3	3
Oxygen	3	3	5



Transfer Hose for Nitrogen, Argon and Oxygen

Check Out the **Easy to Use Website**
 The **RIGHT HOSE** for the **RIGHT GAS**

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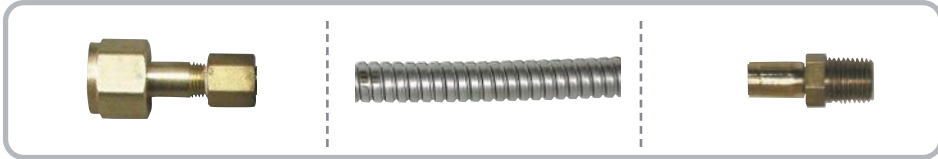


Hose Preview

Choose Your Inlet

Choose Your Hose

Choose Your Outlet



Build Your Hose

Instructions

Easy as 1, 2, 3! Choose your Hose Type, Inlet and Outlet Fitting and click on Build it!



Post Sintered Tethered PTFE Lined S.S. Braided Pigtails | 3,600 PSI

Hoses for the Following Gases



Ratermann Mfg. FPT Family of Hoses

Use tether to attach hose to manifold and equipment. You can order tethered hoses with and without armored casing, the armor casing protects the hose by providing abrasion and anti-kinking reduction.



Shows tether connection for the tube trailer hose.

OUTLET

INLET



1/4" NPT Female

1/4" NPT Female

Tethered Standard Hose without Armor Casing

Tethered With Armor Casing Anti-Kink, Anti-Whip

1/4" NPT Female x 1/4" NPT Female

Hose Length	Part #
24"	TE-FPT-24F14
36"	TE-FPT-36F14
48"	TE-FPT-48F14
72"	TE-FPT-72F14
10'	TE-FPT-120F14
20'	TE-FPT-240F14

Hose Length	Part #
24"	TE-FPTA-24F14
36"	TE-FPTA-36F14
48"	TE-FPTA-48F14
72"	TE-FPTA-72F14
10'	TE-FPTA-120F14
20'	TE-FPTA-240F14

STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 3,600 PSI.



SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)



OUTLET

INLET



1/4" NPT Female

1/4" NPT Male

1/4" NPT Female x 1/4" NPT Male

Hose Length	Part #
24"	TE-FPT-24F14M14
36"	TE-FPT-36F14M14
48"	TE-FPT-48F14M14
72"	TE-FPT-72F14M14
10'	TE-FPT-120F14M14
20'	TE-FPT-240F14M14

Hose Length	Part #
24"	TE-FPTA-24F14M14
36"	TE-FPTA-36F14M14
48"	TE-FPTA-48F14M14
72"	TE-FPTA-72F14M14
10'	TE-FPTA-120F14M14
20'	TE-FPTA-240F14M14

INLET

OUTLET



1/4" NPT Swivel Female

1/4" NPT Swivel Female

1/4" NPT Swivel Female x 1/4" NPT Swivel Female

Hose Length	Part #
24"	TE-FPT-24F14S
36"	TE-FPT-36F14S
48"	TE-FPT-48F14S

Hose Length	Part #
24"	TE-FPTA-24F14S
36"	TE-FPTA-36F14S
48"	TE-FPTA-48F14S

INLET

OUTLET



1/4" NPT Male Non-Swivel End

1/4" NPT Swivel Female

1/4" NPT Male Non-Swivel End x 1/4" NPT Swivel Female

Hose Length	Part #
24"	TE-FPT-24M14F14S
36"	TE-FPT-36M14F14S
48"	TE-FPT-48M14F14S

Hose Length	Part #
24"	TE-FPTA-24M14F14S
36"	TE-FPTA-36M14F14S
48"	TE-FPTA-48M14F14S

* Only Female NPT ends swivel. Male NPT ends do not rotate.

Custom Length Hoses – Post Sintered Tethered PTFE Lined S.S. Braided 3,600 PSI

All hoses are cleaned for Oxygen Service

ORDER CUSTOM LENGTH HOSE

Custom length hoses are not returnable for either credit or refund.

PTFE Hose **With or Without Armor Casing**

TE-FPT **Armor**
Pt # A

Non-Armor
(leave blank)

TE-FPT –

Length Hose

Inches

Pt # _____

INLET

Choose Your Hose End Pt #

1/4" NPT Male Pt # M14

1/4" NPT Female Pt # F14

1/4" NPT Pt # F14S

Swivel Female

OUTLET

Choose Your Hose End Pt #

1/4" NPT Male Pt # M14

1/4" NPT Female Pt # F14

1/4" NPT Pt # F14S

Swivel Female

Hoses for the Following Gases



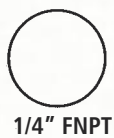
STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1-1/2 times working pressure of 3,000 PSI.



SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)

SIZE COMPARISON CHART



1/4" FNPT
For Fitting
Hose Size
1/4" NPT
Female



1/4" NPT
Male
Thread
Profile

PTFE Lined Stainless Steel Braided Pigtails | 3,000 PSI
Ratermann Mfg. FP Family of Hoses

Standard Hose without Armor Casing

With Armor Casing Anti-Kink, Anti-Whip

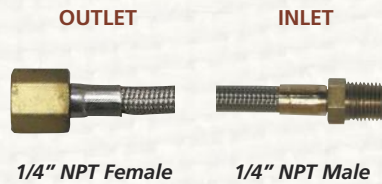
1/4" NPT Female x 1/4" NPT Female



Hose Length	Part #
24"	FP-24F14
36"	FP-36F14
48"	FP-48F14
72"	FP-72F14
10'	FP-120F14
20'	FP-240F14

Hose Length	Part #
24"	FP-A-24F14
36"	FP-A-36F14
48"	FP-A-48F14
72"	FP-A-72F14
10'	FP-A-120F14
20'	FP-A-240F14

1/4" NPT Female x 1/4" NPT Male



Hose Length	Part #
24"	FP-24F14M14
36"	FP-36F14M14
48"	FP-48F14M14
72"	FP-72F14M14
10'	FP-120F14M14
20'	FP-240F14M14

Hose Length	Part #
24"	FP-A-24F14M14
36"	FP-A-36F14M14
48"	FP-A-48F14M14
72"	FP-A-72F14M14
10'	FP-A-120F14M14
20'	FP-A-240F14M14

1/4" NPT Swivel Female x 1/4" NPT Swivel Female



Hose Length	Part #
24"	FP-24F14S
36"	FP-36F14S
48"	FP-48F14S

Hose Length	Part #
24"	FPA-24F14S
36"	FPA-36F14S
48"	FPA-48F14S

1/4" NPT Male Non-Swivel End x 1/4" NPT Swivel Female



Hose Length	Part #
24"	FP-24M14F14S
36"	FP-36M14F14S
48"	FP-48M14F14S

Hose Length	Part #
24"	FPA-24M14F14S
36"	FPA-36M14F14S
48"	FPA-48M14F14S

* Only Female NPT ends swivel. Male NPT ends do not rotate.

Custom Length Hoses – PTFE LINED 3,000 PSI

All hoses are cleaned for Oxygen Service

ORDER CUSTOM LENGTH HOSE for PTFE LINED SS BRAIDED PIGTAILS

Custom length hoses are not returnable for either credit or refund.

PTFE Hose FP	With or Without Armor Casing <input type="checkbox"/> Armor Pt # A <input type="checkbox"/> Non-Armor (leave blank)	Length Hose <input type="checkbox"/> Inches Pt # _____	INLET Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT..... Pt # F14S Swivel Female	OUTLET Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT..... Pt # F14S Swivel Female
	FP - <input type="text"/>	→ <input type="text"/>	→ <input type="text"/>	→ <input type="text"/>

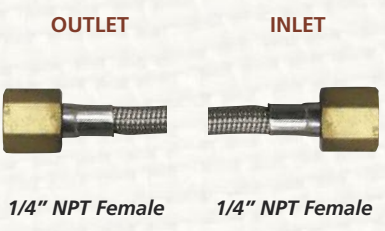
Hoses for the Following Gases



Post Sintered PTFE Lined S.S. Braided Pigtails | 3,600 PSI
Ratermann Mfg. FPT Family of Hoses

Post sintered is a process that tightens the molecular structure of the PTFE lined hose (increasing the wall thickness from 0.030" to 0.040"). Post sintered hoses dramatically reduces effusion or diffusion of all gases. Similar in construction of standard PTFE hoses (RMI "FP" Style) but with an extra braid of Stainless Steel for higher working Pressure.

Standard Hose without Armor Casing **With Armor Casing Anti-Kink, Anti-Whip**



1/4" NPT Female x 1/4" NPT Female		1/4" NPT Female x 1/4" NPT Female	
Hose Length	Part #	Hose Length	Part #
24"	FPT-24F14	24"	FPTA-24F14
36"	FPT-36F14	36"	FPTA-36F14
48"	FPT-48F14	48"	FPTA-48F14
72"	FPT-72F14	72"	FPTA-72F14
10'	FPT-120F14	10'	FPTA-120F14
20'	FPT-240F14	20'	FPTA-240F14



STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 3,600 PSI.

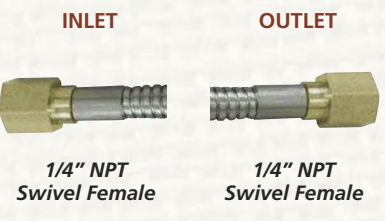


SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)



1/4" NPT Female x 1/4" NPT Male		1/4" NPT Female x 1/4" NPT Male	
Hose Length	Part #	Hose Length	Part #
24"	FPT-24F14M14	24"	FPTA-24F14M14
36"	FPT-36F14M14	36"	FPTA-36F14M14
48"	FPT-48F14M14	48"	FPTA-48F14M14
72"	FPT-72F14M14	72"	FPTA-72F14M14
10'	FPT-120F14M14	10'	FPTA-120F14M14
20'	FPT-240F14M14	20'	FPTA-240F14M14



1/4" NPT Swivel Female x 1/4" NPT Swivel Female		1/4" NPT Swivel Female x 1/4" NPT Swivel Female	
Hose Length	Part #	Hose Length	Part #
24"	FPT-24F14S	24"	FPTA-24F14S
36"	FPT-36F14S	36"	FPTA-36F14S
48"	FPT-48F14S	48"	FPTA-48F14S



1/4" NPT Male Non-Swivel End x 1/4" NPT Swivel Female		1/4" NPT Male Non-Swivel End x 1/4" NPT Swivel Female	
Hose Length	Part #	Hose Length	Part #
24"	FPT-24M14F14S	24"	FPTA-24M14F14S
36"	FPT-36M14F14S	36"	FPTA-36M14F14S
48"	FPT-48M14F14S	48"	FPTA-48M14F14S

** Only Female NPT ends swivel. Male NPT ends do not rotate.*



*Photo shown with optional valve sockets.

Custom Length Hoses – Post Sintered PTFE Lined S.S. Braided 3,600 PSI All hoses are cleaned for Oxygen Service

ORDER CUSTOM LENGTH HOSE for POST SINTERED PTFE LINED SS BRAIDED PIGTAILS

Custom length hoses are not returnable for either credit or refund.

PTFE Hose	With or Without Armor Casing	Length Hose	INLET	OUTLET
FPT	<input type="checkbox"/> Armor Pt # A	<input type="checkbox"/> Inches Pt # _____	Choose Your Hose End Pt #	Choose Your Hose End Pt #
	<input type="checkbox"/> Non-Armor (leave blank)		1/4" NPT Male Pt # M14	1/4" NPT Male Pt # M14
			1/4" NPT Female Pt # F14	1/4" NPT Female Pt # F14
			1/4" NPT..... Pt # F14S	1/4" NPT..... Pt # F14S
			Swivel Female	Swivel Female
FPT –				

Hoses for the Following Gases



Not Recommended for Helium



STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 3,000 PSI.



SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

PTFE Tape & Green Oxygen PTFE Thread Seal Tape

PTFE TAPE

Pt # Tape-1



GREEN PTFE TAPE

Pt # Tape-2-Green



First 1-2 Threads Should Be Exposed
With the threads facing toward you, the tape should be applied in a clockwise direction. With threads facing away from you, tape should be applied in a counter-clockwise direction. This will ensure the proper direction and that the tape will not loosen when threads are being tightened. Apply 1-1/2 to 2 turns of tape, making sure to leave first 1-2 threads bare, as not to accidentally introduce tape particles into your flow path.

PTFE Lined S.S. Braided Pigtails | Inert 580 3,000 PSI
Ratermann Mfg. FP Family of Hoses

For Custom Length Ordering see page 20A-26, or go to www.hosemanufacturing.com

Standard Hose without Armor Casing

With Armor Casing Anti-Kink, Anti-Whip

1/4" NPT Female x 1/4" NPT Female

Hose Length	Part #
24"	FP-24F14
36"	FP-36F14
48"	FP-48F14
72"	FP-72F14
10'	FP-120F14
20'	FP-240F14

Hose Length	Part #
24"	FP-A-24F14
36"	FP-A-36F14
48"	FP-A-48F14
72"	FP-A-72F14
10'	FP-A-120F14
20'	FP-A-240F14



1/4" NPT Female x 1/4" NPT Male

Hose Length	Part #
24"	FP-24F14M14
36"	FP-36F14M14
48"	FP-48F14M14
72"	FP-72F14M14
10'	FP-120F14M14
20'	FP-240F14M14

Hose Length	Part #
24"	FP-A-24F14M14
36"	FP-A-36F14M14
48"	FP-A-48F14M14
72"	FP-A-72F14M14
10'	FP-A-120F14M14
20'	FP-A-240F14M14

Swivel Fittings Available, see page 20A-6

CGA 580 Fittings x 1/4" NPT Female

Hose Length	Part #
24"	FP-24CGA580F14
36"	FP-36CGA580F14
48"	FP-48CGA580F14

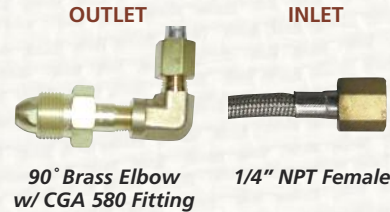
Hose Length	Part #
24"	FPA-24CGA580F14
36"	FPA-36CGA580F14
48"	FPA-48CGA580F14



90° Brass Elbow w/ CGA 580 Fitting x 1/4" NPT Female

Hose Length	Part #
24"	FP-24CGA580ELF14
36"	FP-36CGA580ELF14
48"	FP-48CGA580ELF14

Hose Length	Part #
24"	FPA-24CGA580ELF14
36"	FPA-36CGA580ELF14
48"	FPA-48CGA580ELF14



CGA 580 Plastic Hand Tight Nut x 1/4" NPT Female

Hose Length	Part #
24"	FP-24PHT580F14
36"	FP-36PHT580F14
48"	FP-48PHT580F14

Hose Length	Part #
24"	FPA-24PHT580F14
36"	FPA-36PHT580F14
48"	FPA-48PHT580F14



CGA 580 Brass Hand Tight Nut x 1/4" NPT Female

Hose Length	Part #
24"	FP-24HT580F14
36"	FP-36HT580F14
48"	FP-48HT580F14

Hose Length	Part #
24"	FPA-24HT580F14
36"	FPA-36HT580F14
48"	FPA-48HT580F14



Hoses for the Following Gases



Not Recommended for Helium

Post Sintered PTFE Lined S.S. Braided Pigtails | Inert 580 3,600 PSI Ratermann Mfg. FPT Family of Hoses

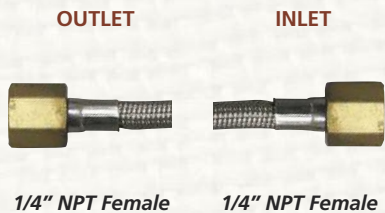
Post sintered is a process that tightens the molecular structure of the PTFE lined hose (increasing the wall thickness from 0.030" to 0.040"). Post sintered Hoses dramatically reduces effusion or diffusion of all gases. Similar in construction of standard PTFE hoses (RMI "FP" Style) but with an extra braid of Stainless Steel for higher working Pressure.

For Custom Length Ordering see page 20A-26, or go to www.hosemanufacturing.com

Standard Hose without Armor Casing

With Armor Casing Anti-Kink, Anti-Whip

1/4" NPT Female x 1/4" NPT Female



Hose Length	Part #
24"	FPT-24F14
36"	FPT-36F14
48"	FPT-48F14
72"	FPT-72F14
10'	FPT-120F14
20'	FPT-240F14

Hose Length	Part #
24"	FPTA-24F14
36"	FPTA-36F14
48"	FPTA-48F14
72"	FPTA-72F14
10'	FPTA-120F14
20'	FPTA-240F14

1/4" NPT Female x 1/4" NPT Male



Hose Length	Part #
24"	FPT-24F14M14
36"	FPT-36F14M14
48"	FPT-48F14M14
72"	FPT-72F14M14
10'	FPT-120F14M14
20'	FPT-240F14M14

Hose Length	Part #
24"	FPTA-24F14M14
36"	FPTA-36F14M14
48"	FPTA-48F14M14
72"	FPTA-72F14M14
10'	FPTA-120F14M14
20'	FPTA-240F14M14

Swivel Fittings Available, see page 20A-7

CGA 580 Fittings x 1/4" NPT Female



Hose Length	Part #
24"	FPT-24CGA580F14
36"	FPT-36CGA580F14
48"	FPT-48CGA580F14

Hose Length	Part #
24"	FPTA-24CGA580F14
36"	FPTA-36CGA580F14
48"	FPTA-48CGA580F14

90° Brass Elbow w/ CGA 580 Fitting x 1/4" NPT Female



Hose Length	Part #
24"	FPT-24CGA580ELF14
36"	FPT-36CGA580ELF14
48"	FPT-48CGA580ELF14

Hose Length	Part #
24"	FPTA-24CGA580ELF14
36"	FPTA-36CGA580ELF14
48"	FPTA-48CGA580ELF14

CGA 580 Plastic Hand Tight Nut x 1/4" NPT Female



Hose Length	Part #
24"	FPT-24PHT580F14
36"	FPT-36PHT580F14
48"	FPT-48PHT580F14

Hose Length	Part #
24"	FPTA-24PHT580F14
36"	FPTA-36PHT580F14
48"	FPTA-48PHT580F14

CGA 580 Brass Hand Tight Nut x 1/4" NPT Female



Hose Length	Part #
24"	FPT-24HT580F14
36"	FPT-36HT580F14
48"	FPT-48HT580F14

Hose Length	Part #
24"	FPTA-24HT580F14
36"	FPTA-36HT580F14
48"	FPTA-48HT580F14

STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 3,600 PSI.

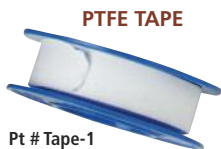


SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

PTFE Paste, Tape and Green Oxygen PTFE Thread Seal Tape



PTFE PASTE
Pt # Oxy-PTFE-8



PTFE TAPE
Pt # Tape-1



GREEN PTFE TAPE
Pt # Tape-2-Green

See page 33A-5 for more info

Hoses for the Following Gases



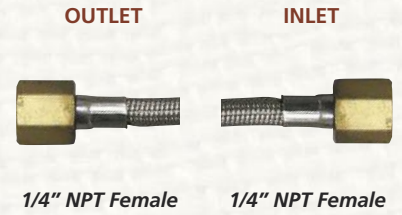
PTFE Lined Stainless Steel Braided Pigtails | Oxygen 540 3,000 PSI Ratermann Mfg. FP Family of Hoses

For Custom Length Ordering see page 20A-26, or go to www.hosemanufacturing.com

Standard Hose without Armor Casing

With Armor Casing Anti-Kink, Anti-Whip

1/4" NPT Female x 1/4" NPT Female



Hose Length	Part #
24"	FP-24F14
36"	FP-36F14
48"	FP-48F14
72"	FP-72F14
10'	FP-120F14
20'	FP-240F14

Hose Length	Part #
24"	FP-A-24F14
36"	FP-A-36F14
48"	FP-A-48F14
72"	FP-A-72F14
10'	FP-A-120F14
20'	FP-A-240F14



STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 3,000 PSI.



1/4" NPT Female x 1/4" NPT Male

Hose Length	Part #
24"	FP-24F14M14
36"	FP-36F14M14
48"	FP-48F14M14
72"	FP-72F14M14
10'	FP-120F14M14
20'	FP-240F14M14

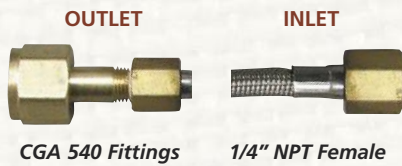
Hose Length	Part #
24"	FP-A-24F14M14
36"	FP-A-36F14M14
48"	FP-A-48F14M14
72"	FP-A-72F14M14
10'	FP-A-120F14M14
20'	FP-A-240F14M14

Swivel Fittings Available, see page 20A-6



SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)



CGA 540 Fittings x 1/4" NPT Female

Hose Length	Part #
24"	FP-24CGA540F14
36"	FP-36CGA540F14
48"	FP-48CGA540F14

Hose Length	Part #
24"	FPA-24CGA540F14
36"	FPA-36CGA540F14
48"	FPA-48CGA540F14



90° Brass Elbow with CGA 540 Fitting x 1/4" NPT Female

Hose Length	Part #
24"	FP-24CGA540ELF14
36"	FP-36CGA540ELF14
48"	FP-48CGA540ELF14

Hose Length	Part #
24"	FPA-24CGA540ELF14
36"	FPA-36CGA540ELF14
48"	FPA-48CGA540ELF14



CGA 540 Plastic Hand Tight Nut x 1/4" NPT Female

Hose Length	Part #
24"	FP-24PHT540F14
36"	FP-36PHT540F14
48"	FP-48PHT540F14

Hose Length	Part #
24"	FPA-24PHT540F14
36"	FPA-36PHT540F14
48"	FPA-48PHT540F14



CGA 540 Brass Hand Tight Nut x 1/4" NPT Female

Hose Length	Part #
24"	FP-24HT540F14
36"	FP-36HT540F14
48"	FP-48HT540F14

Hose Length	Part #
24"	FPA-24HT540F14
36"	FPA-36HT540F14
48"	FPA-48HT540F14

Ratermann's Oxygen Safe Valve Leak Check

Product to Help Maintain Your Valve Connections

Pt # LC-80Z

Part #	Description	Size
LC-80Z	Leak Check Squeeze Bottle	8 oz.
LC-1GAL	Leak Check – 4 to a case	1 Gallon

We recommend using Pipe Extension Heat Sink see page 20A-11 and 20A-26.



OPTIONAL Pipe Extension Heat Sink

Heat sinks are recommended on charging hoses used in oxygen service. The purpose of a "heat sink" is to absorb the heat generated by "adiabatic compression."

3" Length – Part # FIT-PEF14M14-3
6" Length – Part # FIT-PEF14M14-6

Hoses for the Following Gases



STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 3,600 PSI.



SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)

OPTIONAL Pipe Extension Heat Sink

- Comes in 3" or 6" length
- 3" Length – Part # FIT-PEF14M14-3
- 6" Length – Part # FIT-PEF14M14-6

Heat sinks are recommended on charging hoses used in oxygen service. The purpose of a "heat sink" is to absorb the heat generated by "adiabatic compression." Adiabatic compression is a phenomena that occurs when charging oxygen cylinders. If the oxygen charging pressure comes up against a dead leg, or closed valve, the charging pressure pushes against the back pressure creating intense energy in a small area (typically at or near the closed valve). In seconds, the energy quickly converts into heat (above 1000° F). The heat generated will rapidly increase beyond the melting point of the hose material and failure will occur. We recommend a 3" heat sink on hoses 24" and above.



Post Sintered PTFE Lined S.S. Braided Pigtails | Oxygen 540 3,600 PSI Ratermann Mfg. FPT Family of Hoses

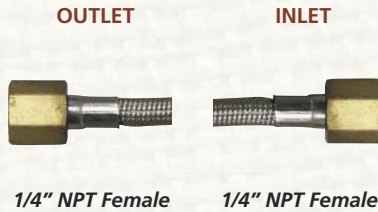
Post sintered is a process that tightens the molecular structure of the PTFE lined hose (increasing the wall thickness from 0.030" to 0.040"). Post sintered Hoses dramatically reduces effusion or diffusion of all gases. Similar in construction of standard PTFE hoses (RMI "FP" Style) but with an extra braid of Stainless Steel for higher working Pressure.

For Custom Length Ordering see page 20A-26, or go to www.hosemanufacturing.com

Standard Hose without Armor Casing

With Armor Casing Anti-Kink, Anti-Whip

1/4" NPT Female x 1/4" NPT Female



Hose Length	Part #
24"	FPT-24F14
36"	FPT-36F14
48"	FPT-48F14
72"	FPT-72F14
10'	FPT-120F14
20'	FPT-240F14

Hose Length	Part #
24"	FPTA-24F14
36"	FPTA-36F14
48"	FPTA-48F14
72"	FPTA-72F14
10'	FPTA-120F14
20'	FPTA-240F14



1/4" NPT Female x 1/4" NPT Male

Hose Length	Part #
24"	FPT-24F14M14
36"	FPT-36F14M14
48"	FPT-48F14M14
72"	FPT-72F14M14
10'	FPT-120F14M14
20'	FPT-240F14M14

Hose Length	Part #
24"	FPTA-24F14M14
36"	FPTA-36F14M14
48"	FPTA-48F14M14
72"	FPTA-72F14M14
10'	FPTA-120F14M14
20'	FPTA-240F14M14

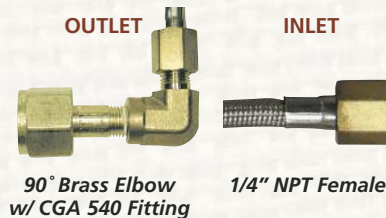
Swivel Fittings Available, see page 20A-7



CGA 540 Fittings x 1/4" NPT Female

Hose Length	Part #
24"	FPT-24CGA540F14
36"	FPT-36CGA540F14
48"	FPT-48CGA540F14

Hose Length	Part #
24"	FPTA-24CGA540F14
36"	FPTA-36CGA540F14
48"	FPTA-48CGA540F14



90° Brass Elbow with CGA 540 Fitting x 1/4" NPT Female

Hose Length	Part #
24"	FPT-24CGA540ELF14
36"	FPT-36CGA540ELF14
48"	FPT-48CGA540ELF14

Hose Length	Part #
24"	FPTA-24CGA540ELF14
36"	FPTA-36CGA540ELF14
48"	FPTA-48CGA540ELF14



CGA 540 Plastic Hand Tight Nut x 1/4" NPT Female

Hose Length	Part #
24"	FPT-24PHT540F14
36"	FPT-36PHT540F14
48"	FPT-48PHT540F14

Hose Length	Part #
24"	FPTA-24PHT540F14
36"	FPTA-36PHT540F14
48"	FPTA-48PHT540F14



CGA 540 Brass Hand Tight Nut x 1/4" NPT Female

Hose Length	Part #
24"	FPT-24HT540F14
36"	FPT-36HT540F14
48"	FPT-48HT540F14

Hose Length	Part #
24"	FPTA-24HT540F14
36"	FPTA-36HT540F14
48"	FPTA-48HT540F14

Hoses for the Following Gas



STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1-1/2 times working pressure of 3,000 PSI.



SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)

PTFE Lined Stainless Steel Braided Acetylene Pigtails with a Conductive Liner | 3,000 PSI

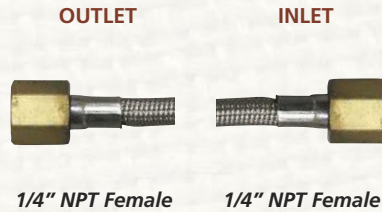
Ratermann Mfg. FPB Family of Hoses

Our Conductive Lined virgin PTFE tubing, over braided with stainless steel have a conductive inner line to dissipate static electrical charges. High resistivity fluids or gases at high velocity cause positive electrical charges to build on the inside of the PTFE liner. If not dissipated to the end of the hose, the charge will build until it arcs through the tube wall to braid, causing catastrophic hose failure.

Standard Hose without Armor Casing

With Armor Casing Anti-Kink, Anti-Whip

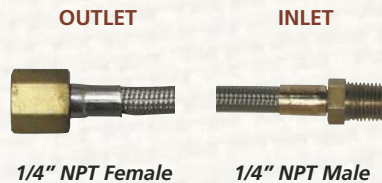
1/4" NPT Female x 1/4" NPT Female



Hose Length	Part #
24"	FPB-24F14
36"	FPB-36F14
48"	FPB-48F14
72"	FPB-72F14
10'	FPB-120F14
20'	FPB-240F14

Hose Length	Part #
24"	FPBA-24F14
36"	FPBA-36F14
48"	FPBA-48F14
72"	FPBA-72F14
10'	FPBA-120F14
20'	FPBA-240F14

1/4" NPT Female x 1/4" NPT Male



Hose Length	Part #
24"	FPB-24F14M14
36"	FPB-36F14M14
48"	FPB-48F14M14
72"	FPB-72F14M14
10'	FPB-120F14M14
20'	FPB-240F14M14

Hose Length	Part #
24"	FPBA-24F14M14
36"	FPBA-36F14M14
48"	FPBA-48F14M14
72"	FPBA-72F14M14
10'	FPBA-120F14M14
20'	FPBA-240F14M14

1/4" NPT Swivel Female x 1/4" NPT Swivel Female



Hose Length	Part #
24"	FPB-24F14S
36"	FPB-36F14S
48"	FPB-48F14S

Hose Length	Part #
24"	FPBA-24F14S
36"	FPBA-36F14S
48"	FPBA-48F14S

1/4" NPT Male Non-Swivel End x 1/4" NPT Swivel Female



Hose Length	Part #
24"	FPB-24M14F14S
36"	FPB-36M14F14S
48"	FPB-48M14F14S

Hose Length	Part #
24"	FPBA-24M14F14S
36"	FPBA-36M14F14S
48"	FPBA-48M14F14S

* Only Female NPT ends swivel. Male NPT ends do not rotate.

Custom Length Hoses – PTFE LINED 3,000 PSI

All hoses are cleaned for Oxygen Service

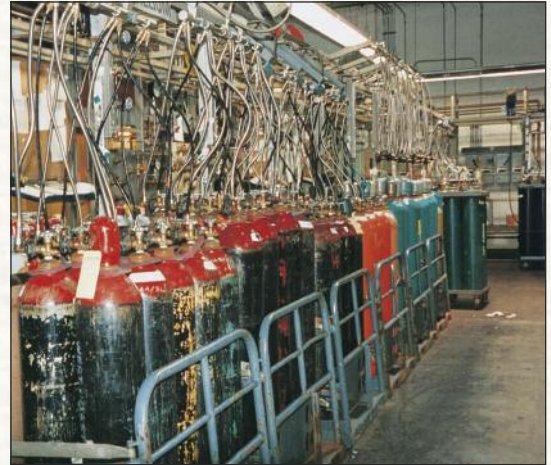
ORDER CUSTOM LENGTH HOSE for PTFE LINED SS BRAIDED ACETYLENE PIGTAILS

Custom length hoses are not returnable for either credit or refund.

PTFE Hose	With or Without Armor Casing	Length Hose	INLET	OUTLET
FPB	<input type="checkbox"/> Armor Pt # A <input type="checkbox"/> Non-Armor (leave blank)	<input type="checkbox"/> Inches Pt # _____	Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT..... Pt # F14S Swivel Female	Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT..... Pt # F14S Swivel Female
FPB –	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>



PTFE Lined Stainless Steel Braided Pigtail is designed for the most demanding of high pressure applications. This hose is constructed with a smooth bore PTFE inner core, four layers of stainless steel braid, and rated for 6000 psig MAWP. For added protection, an optional anti-kink "Safety Armor" hose whip reducer is available. Each hose is marked with an aluminum belly band noting the working pressure and date manufactured. All assemblies are pressure tested to 1 1/2 times the working pressure and have a minimum burst pressure rating 4 times the maximum working pressure.



STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 6,000 PSI.

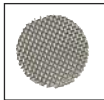
SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)

Acetylene Cylinder Replacement Felts & Screens



Sizes Available
 3/8" Felts & Screens
 3/4" Felts & Screens
 1" Felts & Screens



1" Screen



1" Felt

See page 2A-5 for more info on Felts and Screens for Acetylene

Standard Hose without Armor Casing

1/4" NPT Female x 1/4" NPT Female

Hose Length	Part #
24"	FPT-60P24F14
36"	FPT-60P36F14
48"	FPT-60P48F14
72"	FPT-60P72F14
120"	FPT-60P120F14

1/4" NPT Male x 1/4" NPT Female

Hose Length	Part #
24"	FPT-60P24F14M14
36"	FPT-60P36F14M14
48"	FPT-60P48F14M14
72"	FPT-60P72F14M14
120"	FPT-60P120F14M14

With Armor Casing Anti-Kink, Anti-Whip

1/4" NPT Female x 1/4" NPT Female

Hose Length	Part #
24"	FPT-A-60P24F14
36"	FPT-A-60P36F14
48"	FPT-A-60P48F14
72"	FPT-A-60P72F14
48"	FPT-A-60P120F14

1/4" NPT Male x 1/4" NPT Female





Hose Length	Part #
24"	FPT-A-60P24F14M14
36"	FPT-A-60P36F14M14
48"	FPT-A-60P48F14M14
72"	FPT-A-60P72F14M14
120"	FPT-A-60P120F14M14

Custom Length Hoses – Post Sintered PTFE Lined S.S. Braided 3,600 PSI

All hoses are cleaned for Oxygen Service

ORDER CUSTOM LENGTH HOSE for POST SINTERED PTFE LINED SS BRAIDED PIGTAILS

Custom length hoses are not returnable for either credit or refund.

PTFE Hose With or Without Armor Casing <input type="checkbox"/> Armor Pt # A <input type="checkbox"/> Non-Armor (leave blank)	Length Hose <input type="checkbox"/> Inches Pt # _____	INLET Choose Your Hose End Pt #		OUTLET Choose Your Hose End Pt #	
		1/4" NPT Male Pt # M14  1/4" NPT Female Pt # F14 	1/4" NPT Male Pt # M14  1/4" NPT Female Pt # F14 		
FPT-60P- <input type="text"/>		<input type="text"/>		<input type="text"/>	

Hoses for the Following Gases

TSCZEL ETFE Lined Stainless Steel Braided Pigtails | 3,000 PSI Ratermann Mfg. FPZ Family of Hoses



Manifold Hoses

Economical Low Effusion

Style TSCZEL Specifications

Not recommended for oxygen service

Liner: White ETFE

Reinforcement: Series 300 stainless steel exterior braid

Temperature: -100° F to +250° F

Branding: Manufacturer, materials of construction, pressure rating and date.

3000 PSIG MAWP Rated – Brass End Fittings

Permeation rate that is 75% lower than PTEE lined pigtails.



Style TSCZEL ETFE lined offers 75% less effusion than standard PTFE pigtails. Optional stainless steel armor casing provides additional life, safety and protection. Each assembly is tested to 1 1/2 times MAWP. Branded with MAWP, and month/year.

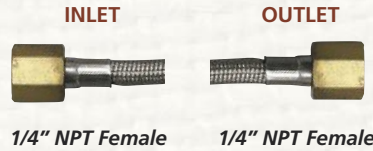
Standard Hose without Armor Casing

With Armor Casing Anti-Kink, Anti-Whip

1/4" NPT Female x 1/4" NPT Female

Hose Length	Part #
24"	FPZ-24F14
36"	FPZ-36F14
48"	FPZ-48F14
72"	FPZ-72F14

Hose Length	Part #
24"	FPZ-A-24F14
36"	FPZ-A-36F14
48"	FPZ-A-48F14
72"	FPZ-A-72F14



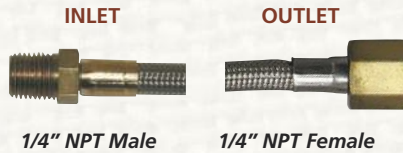
1/4" NPT Female

1/4" NPT Female

1/4" NPT Male x 1/4" NPT Female

Hose Length	Part #
24"	FPZ-24F14M14
36"	FPZ-36F14M14
48"	FPZ-48F14M14
72"	FPZ-72F14M14

Hose Length	Part #
24"	FPZ-A-24F14M14
36"	FPZ-A-36F14M14
48"	FPZ-A-48F14M14
72"	FPZ-A-72F14M14



1/4" NPT Male

1/4" NPT Female

1/4" NPT Male Non-Swivel End x 1/4" NPT Swivel Female

Hose Length	Part #
24"	FPZ-24M14F14S
36"	FPZ-36M14F14S
48"	FPZ-48M14F14S

Hose Length	Part #
24"	FPZA24M14F14S
36"	FPZA36M14F14S
48"	FPZA48M14F14S



1/4" NPT Male Non-Swivel End

1/4" NPT Swivel Female

* Only Female NPT ends swivel. Male NPT ends do not rotate.



Find your Leaks Fast

and Easily with the Extending Tube to Get in the Hard to Reach Areas.
Ratermann's Oxygen Safe



Pt # LC-80Z

Valve Leak Check

Part #	Description	Size
LC-80Z	Leak Check Squeeze Bottle	8 oz.
LC-1GAL	Leak Check – 4 to a case	1 Gallon

Made for the Gas Industry

Cylinder Valve Air Tools



see page 11A-7

*Photo shown with optional valve sockets.

Custom Length Hoses – TSCZEL ETFE Lined 3,000 PSI

Custom length hoses are not returnable for either credit or refund.

ORDER CUSTOM LENGTH HOSE for TSCZEL ETFE LINED SS BRAIDED PIGTAILS

PTFE Hose	With or Without Armor Casing	Length Hose	INLET	OUTLET
FPZ	<input type="checkbox"/> Armor Pt # A <input type="checkbox"/> Non-Armor (leave blank)	<input type="checkbox"/> Inches Pt # _____	Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT Swivel Female Pt # F14S	Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT Swivel Female Pt # F14S
FPZ –	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Hoses for the Following Gases



All Stainless Steel All Weld Pigtails | 3,850 PSI
Ratermann Mfg. FPS Family of Hoses

Standard Hose without Armor Casing

With Armor Casing Anti-Kink, Anti-Whip

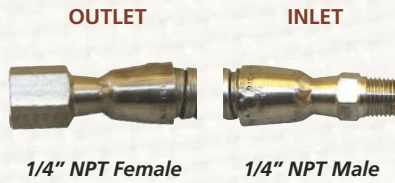
1/4" NPT Female x 1/4" NPT Female



Hose Length	Part #
24"	FPS-38P24F14
36"	FPS-38P36F14
48"	FPS-38P48F14
72"	FPS-38P72F14
10'	FPS-38P120F14
20'	FPS-38P240F14

Hose Length	Part #
24"	FPS-A-38P24F14
36"	FPS-A-38P36F14
48"	FPS-A-38P48F14
72"	FPS-A-38P72F14
10'	FPS-A-38P120F14
20'	FPS-A-38P240F14

1/4" NPT Female x 1/4" NPT Male



Hose Length	Part #
24"	FPS-38P24F14M14
36"	FPS-38P36F14M14
48"	FPS-38P48F14M14
72"	FPS-38P72F14M14
10'	FPS-38P120F14M14
20'	FPS-38P240F14M14

Hose Length	Part #
24"	FPS-A-38P24F14M14
36"	FPS-A-38P36F14M14
48"	FPS-A-38P48F14M14
72"	FPS-A-38P72F14M14
10'	FPS-A-38P120F14M14
20'	FPS-A-38P240F14M14

1/4" NPT Male x 1/4" NPT Male



Hose Length	Part #
24"	FPS-38P24M14
36"	FPS-38P36M14
48"	FPS-38P48M14
72"	FPS-38P72M14
10'	FPS-38P120M14
20'	FPS-38P240M14

Hose Length	Part #
24"	FPS-A-38P24M14
36"	FPS-A-38P36M14
48"	FPS-A-38P48M14
72"	FPS-A-38P72M14
10'	FPS-A-38P120M14
20'	FPS-A-38P240M14

1/4" NPT Male Non-Swivel End x 1/4" NPT Swivel Female



Hose Length	Part #
24"	FPS-38P24M14F14S
36"	FPS-38P36M14F14S
48"	FPS-38P48M14F14S

Hose Length	Part #
24"	FPS-A-38P24M14F14S
36"	FPS-A-38P36M14F14S
48"	FPS-A-38P48M14F14S

* Only Female NPT ends swivel. Male NPT ends do not rotate.



STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 3,850 PSI.



SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)

Custom Length Hoses – All Stainless Steel All Weld Pigtails 3,850 PSI

All hoses are cleaned for Oxygen Service

ORDER CUSTOM LENGTH HOSE for ALL S.S. ALL WELD PIGTAILS

Custom length hoses are not returnable for either credit or refund.

Hose	With or Without Armor Casing	Length Hose	INLET	OUTLET
FPS	<input type="checkbox"/> Armor Pt # A <input type="checkbox"/> Non-Armor (leave blank)	<input type="checkbox"/> Inches Pt # _____	Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT Swivel Female Pt # F14S	Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT Swivel Female Pt # F14S
FPS –	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Hoses for the Following Gases



Hydrogen, Helium & Specialty Gas Applications | 4,500 PSI

Ratermann Mfg. FPS-45P Family of Hoses

Hydrogen, Helium and Specialty Gas Application up to Working Pressure of 4,500 PSI

Ratermann's Type 316L stainless steel innercore, double braided hose is extremely flexible and durable. These all-stainless steel, all-welded constructed hoses are a zero permeation product making this hose ideal for Hydrogen and Helium. Extreme high pressure design. Stamped with 4,500 PSIG MAWP, and month/year of manufacturer.

These hoses are also available in 4250 PSI, and 6000 PSI – Please call for part numbers.



1/4" NPT Female to 1/4" NPT Female

Hose Length	Part #
24"	FPS-45P24F14
36"	FPS-45P36F14
48"	FPS-45P48F14
72"	FPS-45P72F14
10'	FPS-45P120F14

Hose Length	Part #
24"	FPS-A-45P24F14
36"	FPS-A-45P36F14
48"	FPS-A-45P48F14
72"	FPS-A-45P72F14
10'	FPS-A-45P120F14



1/4" NPT Male to 1/4" NPT Female

Hose Length	Part #
24"	FPS-45P24F14M14
36"	FPS-45P36F14M14
48"	FPS-45P48F14M14
72"	FPS-45P72F14M14
10'	FPS-45P120F14M14

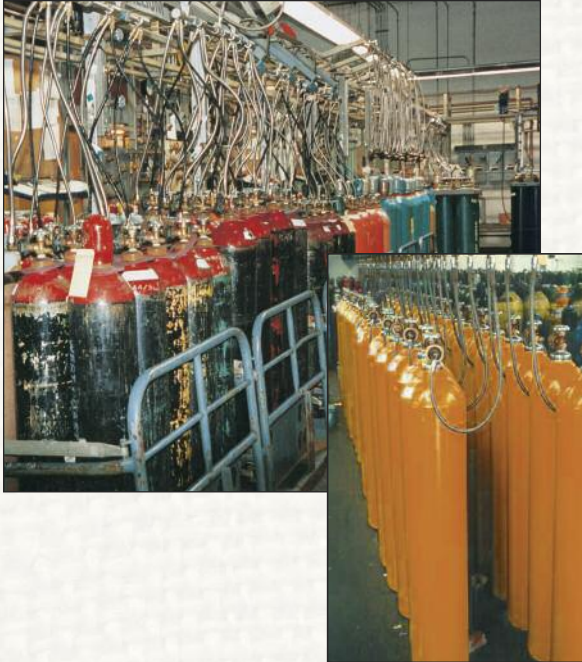
Hose Length	Part #
24"	FPS-A-45P24F14M14
36"	FPS-A-45P36F14M14
48"	FPS-A-45P48F14M14
72"	FPS-A-45P72F14M14
10'	FPS-A-45P120F14M14



1/4" Male NPT Non-Swivel End x 1/4" NPT Swivel Female

Hose Length	Part #
24"	FPS-45P24M14F14S
36"	FPS-45P36M14F14S
48"	FPS-45P48M14F14S
72"	FPS-45P72M14F14S
10'	FPS-45P120M14F14S

Hose Length	Part #
24"	FPS-A-45P24M14F14S
36"	FPS-A-45P36M14F14S
48"	FPS-A-45P48M14F14S
72"	FPS-A-45P72M14F14S
10'	FPS-A-45P120M14F14S



Manifold Hoses

Custom Length Hoses – 316L Stainless Steel Inner Core 4,500 PSI

All hoses are cleaned for Oxygen Service

ORDER CUSTOM LENGTH HOSE

Custom length hoses are not returnable for either credit or refund.

S.S. Hose FPS-45P With or Without Armor Casing <input type="checkbox"/> Armor Pt # A <input type="checkbox"/> Non-Armor (leave blank)	Length Hose <input type="checkbox"/> Inches Pt # _____	INLET Choose Your Hose End Pt #		OUTLET Choose Your Hose End Pt #	
		1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT Pt # F14S Swivel Female	1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14 1/4" NPT Pt # F14S Swivel Female		
FPS-45P <input type="text"/>		<input type="text"/>		<input type="text"/>	

Hoses for the Following Gases



Corrosive Gas Application up to Working Pressure of 4,250 PSI – Monel® Pigtails

STANDARD – These PTFE core pigtails surpass the requirements of CGA E.9. Each pigtail is pressure tested on 1 1/2 times working pressure of 6,000 PSI.

SAFETY PIGTAIL – The Stainless Steel Armor Casing allows free movement of the hose and protects the hose from damage. The Stainless Steel Armor Casing also provides anti-kink and hose whip reduction.

(Oxygen hoses are cleaned, capped, bagged, & certified clean for oxygen service per CGA G-4.1.)

Corrosive Gas Applications | 4,250 PSI
Ratermann Mfg. FPS-C Family of Hoses

1/4 inch I.D. Monel® corrugated inner core, stainless steel double braided, Monel® end fittings. Zero permeation, all welded construction ideal for corrosive gas applications. Stamped with 4,250 PSIG MAWP, and month/year of manufacturer.



1/4" NPT Female to 1/4" NPT Female

Hose Length	Part #
24"	FPS-C24F14
36"	FPS-C36F14
48"	FPS-C48F14
72"	FPS-C72F14

Hose Length	Part #
24"	FPS-A-C24F14
36"	FPS-A-C36F14
48"	FPS-A-C48F14
72"	FPS-A-C72F14



1/4" NPT Male to 1/4" NPT Female

Hose Length	Part #
24"	FPS-C24M14M14
36"	FPS-C36M14M14
48"	FPS-C48M14M14
72"	FPS-C72M14M14

Hose Length	Part #
24"	FPS-A-C24M14M14
36"	FPS-A-C36M14M14
48"	FPS-A-C48M14M14
72"	FPS-A-C72M14M14



1/4" NPT Male to 1/4" NPT Male

Hose Length	Part #
24"	FPS-C24M14
36"	FPS-C36M14
48"	FPS-C48M14
72"	FPS-C72M14

Hose Length	Part #
24"	FPS-A-C24M14
36"	FPS-A-C36M14
48"	FPS-A-C48M14
72"	FPS-A-C72M14

Cylinder Test Results Pouch
Heavy Duty Resealable Pouches

Our Most Popular Pouch

For more Test Pouches Available See page 9A 17-18

Top Sealing Pouch
 Pt # CP-3PK250



Custom Length Hoses – Monel® Inner Core 4,250 PSI

All hoses are cleaned for Oxygen Service

ORDER CUSTOM LENGTH HOSE

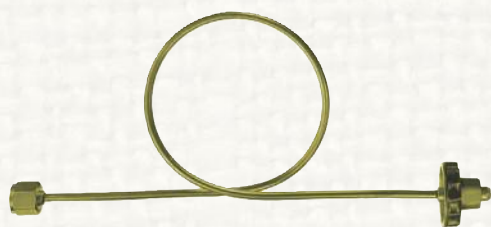
Custom length hoses are not returnable for either credit or refund.

Monel® Hose	With or Without Armor Casing	Length Hose	INLET	OUTLET
FPS-C	<input type="checkbox"/> Armor Pt # A <input type="checkbox"/> Non-Armor (leave blank)	<input type="text"/> Inches Pt # _____	Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14	Choose Your Hose End Pt # 1/4" NPT Male Pt # M14 1/4" NPT Female Pt # F14
FPS-C	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

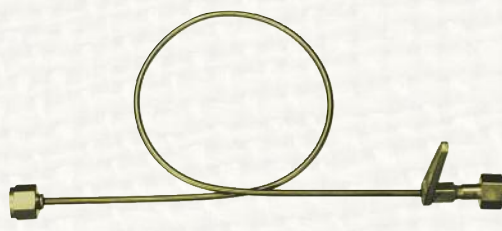
Brass and Copper Pigtail Assemblies

Rigid Pigtail Assemblies with Single 6-1/2" Loop

(Approximately 20" Overall Length)



Part # PTH-4540



Part # PTW-4320

CGA No.	Operating Pressure	Standard Pigtail	Plastic H.T. Nut-One End	Brass Handle-One End	S.S. Tube & S.S. Ends	S.S. Tube & Brass Ends
300	250 psig	PT-3300	PTH-3300	PTW-3300	N/A	PT-2300
320	3000 psig	PT-4320	PTH-4320	PTW-4320	PT-320SS	PT-2320
326	3000 psig	PT-4326	PTH-4326	PTW-4326	PT-326SS	PT-2326
346	3000 psig	PT-4346	PTH-4346	PTW-4346	PT-346SS	PT-2346
350	3000 psig	PT-4350	PTH-4350	PTW-4350	PT-350SS	PT-2350
510	500 psig	PT-4510	PTH-4510	PTW-4510	PT-510SS	PT-2510
510-90°	250 psig	PT-3510	PTH-3510	PTW-3510	N/A	N/A
540	3000 psig	PT-4540	PTH-4540	PTW-4540	PT-540SS	PT-2540
580	3000 psig	PT-4580	PTH-4580	PTW-4580	PT-580SS	PT-2580
590	3000 psig	PT-4590	PTH-4590	PTW-4590	PT-590SS	PT-2590

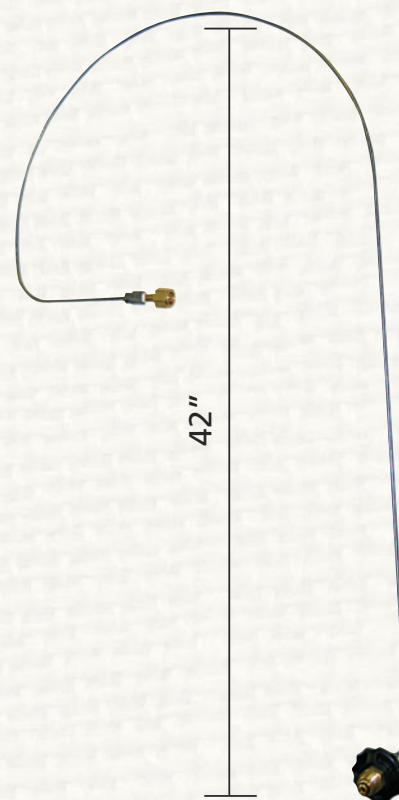
Rigid Stainless Steel Fill Plant Leads

These fill leads offer an alternative to flexible pigtails in your fill plant. They offer extra long service life and are a good choice for filling high purity cylinders. The stainless steel tubing & end fittings allow for zero diffusion of air, moisture or hydrocarbons maintaining the integrity of high purity gases.

Features

- Tig welded end connections
- Replaceable CGA ends
- Stainless steel tube & fittings
- Other CGA/gas services available

Gas Service	CGA	BFP Series
Commercial Acetylene	CGA 300	BFP-300H-80
Carbon Dioxide	CGA 320	BFP-320H-80
Nitrous Oxide	CGA 326	BFP-326H-80
Air	CGA 346	BFP-346H-80
Air (6000 PSI)	CGA 347	BFP-347H-80
Hydrogen	CGA 350	BFP-350H-80
Propane / Acetylene	CGA 510	BFP-510H-80
Oxygen	CGA 540	BFP-540H-80
Inert Gases	CGA 580	BFP-580H-80



Part # BFP-300H-80

Hoses for the Following Gases



CO2 Thermoplastic Low-Temp Pigtails | 3,000 PSI Ratermann Mfg. TPL Family of Hoses

3000 PSIG MAWP Rated – Plated Carbon Steel End Fittings

Standard Hose without Armor Casing

1/4" NPT Female x 1/4" NPT Female



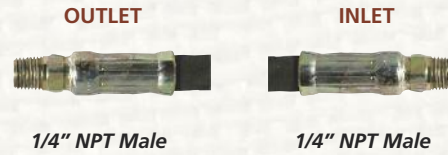
Hose Length	Part #
24"	TPL-24F14
36"	TPL-36F14
48"	TPL-48F14
72"	TPL-72F14

1/4" NPT Female x 1/4" NPT Male



Hose Length	Part #
24"	TPL-24F14M14
36"	TPL-36F14M14
48"	TPL-48F14M14
72"	TPL-72F14M14

1/4" NPT Male x 1/4" NPT Male



Hose Length	Part #
24"	TPL-24M14
36"	TPL-36M14
48"	TPL-48M14
72"	TPL-72M14

1/4" NPT Female x 1/4" NPT Female JIC 37 Swivel



Hose Length	Part #
24"	TPL-24F14FJIC14S
36"	TPL-36F14FJIC14S
48"	TPL-48F14FJIC14S
72"	TPL-72F14FJIC14S

1/4" NPT Male x 1/4" NPT Female JIC 37 Swivel

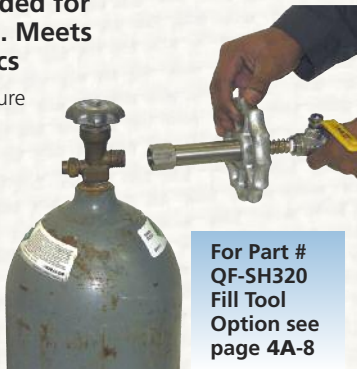


Hose Length	Part #
24"	TPL-24M14FJIC14S
36"	TPL-36M14FJIC14S
48"	TPL-48M14FJIC14S
72"	TPL-72M14FJIC14S

These pigtails are constructed with a Polyester low temperature tube and cover. Each assembly is tested to 1 1/2 times MAWP. Branded with part number, size and MAWP. Meets SAE 100R7 specifications.

Style Specifications
Not recommended for oxygen service. Meets SAE 100R7 specs

- Liner: Low temperature Polyester
- Reinforcement: Polyester braid
- Cover: Pin-pricked Polyester
- Temperature: -65° F to +212° F



Custom Length Hoses – Thermoplastic Low-Temp Pigtails 3,000 PSI

ORDER CUSTOM LENGTH HOSE

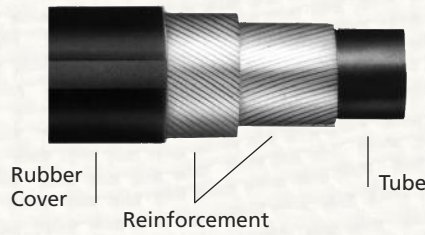
Custom length hoses are not returnable for either credit or refund.

<p>PTFE Hose</p> <p>TPL</p>	<p>Length Hose</p> <p><input type="checkbox"/> Inches</p> <p>Pt # _____</p>	<p>INLET</p> <p>Choose Your Hose End Pt #</p> <p>1/4" NPT Male Pt # M14</p> <p>1/4" NPT Female Pt # F14</p> <p>1/4" Female Pt # FJIC14S</p> <p>JIC 37 Swivel</p>	<p>OUTLET</p> <p>Choose Your Hose End Pt #</p> <p>1/4" NPT Male Pt # M14</p> <p>1/4" NPT Female Pt # F14</p> <p>1/4" Female Pt # FJIC14S</p> <p>JIC 37 Swivel</p>
	<p>TPL —</p> <p><input type="text"/></p>	<p><input type="text"/></p>	<p><input type="text"/></p>

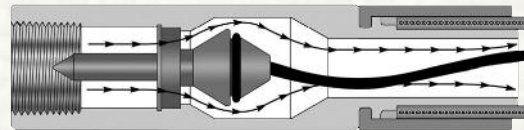
LPG Transfer Hose – UL® 21

The Smart-Hose Safety System is combined with a heavy duty LPG transfer hose designed to meet the most rugged applications found in the LPG industry. All hoses through 3" ID meet UL 21, 4" & 6" and are built to BS 4089:1989. To achieve lower operating cost, return used Smart-Hose couplings for attachment to new hose!

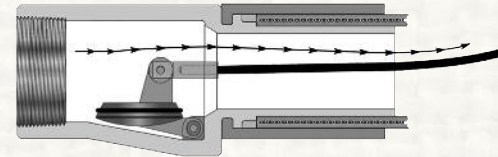
- Each hose is tested under water with dry air or nitrogen to Test Pressure.
- Each hose is serial numbered.
- Each hose comes with Test Certificate & Operating Booklet.
- 316 Stainless Steel couplings are designed for reuse on new hose.
- Hose can be made to meet DOT HM225/46CFR173.315
- Each hose meets NFPA 59
- Hose can be made to meet DOT - E 12325 – (Special rail car unloading exemption eliminates requirement for human monitoring during unloading procedure).



Product Flows through hose but if hose cable is broken the hose ends close stopping the flow of product.



Lifeline 1



Lifeline 3

Hose Data

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

Reinforcement Multiple layers of Polyester – min. burst 1750 psi

Tube Oil resistant – resistant to permeation of Butane/Propane

Branding LPG Hose MH12585 350 Max. WP, Quarterly/Year, Made in USA.

Temperature -40°F to 180°F

Maintenance See Smart-Hose Proper Use, Care, and Maintenance, Booklet Form #1999-1

Hose Length	Smart Hose Part Number	I.D.	WP psi	Hose Wt/Ft	Lifeline 1	Coupling Weight Lifeline 2	Lifeline 3	Coupling Length
15 ft.	SH-LPG1-180F12	1/2"	350	0.3 lb	.80 lb	na	na	2.40"
15 ft.	SH-LPG1-180F34	3/4"	350	0.43 lb	1.60 lb	na	na	3.60"
15 ft.	SH-LPG1-180F1	1"	350	0.58 lb	2.50 lb	na	na	4.40"
15 ft.	SH-LPG1-180F114	1 1/4"	350	0.92 lb	2.90 lb	na	na	5.42"
15 ft.	SH-LPG3-180F112	1 1/2"	350	1.03 lb	na	na	3.40 lb	4.47"
15 ft.	SH-LPG2-180F2	2"	350	1.67 lb	na	12.1 lb	na	5.50"
15 ft.	SH-LPG3-180F2	2"	350	1.67 lb	na	na	4.70 lb	5.36"
15 ft.	SH-LPG3-180F3	3"	350	2.34 lb	na	na	12.10 lb	8.21"
15 ft.	SH-LPG3-180F4	4"	350	3.35 lb	na	na	20.7 lb	13.25"
15 ft.	SH-LPG3-180F6	6"	350	8.23 lb	na	na	61.5 lb	26.3"

For other hose lengths, replace "180" in the part number with the length (in inches) you need.

**A SMART-HOSE
CAN HELP
YOU TO AVOID
THESE SITUATIONS!**



Tube Trailer Connections

Union Nut



Nipple Tail Piece



Adapter



Description	Part # for Union Nut	Part # for 1/2" Male NPT Tail Pieces	Part # for CGA X 1/2" Male NPT Adapter
CGA 1340 – Argon, Helium, Nitrogen	CGA-1340NUT	CGA-1340NIPPLE	CGA-1340M12
CGA 1350 – Hydrogen	CGA-1350NUT	CGA-1350NIPPLE	CGA-1350M12
CGA 1440 – Breathing Air	CGA-1440NUT	CGA-1440NIPPLE	CGA-1440M12
CGA 1450 – Air	CGA-1450NUT	CGA-1450NIPPLE	CGA-1450M12
CGA 1540 – Oxygen	CGA-1540NUT	CGA-1540NIPPLE	CGA-1540M12
CGA 1550 – Carbon Monoxide	CGA-1550NUT	CGA-1550NIPPLE	CGA-1550M12

Tube Trailer Hoses

Hoses for tube trailer applications must offer the features of high working pressures, durability, and ease of flexing.

PTFE and Stainless Steel Tube Trailers are designed to transfer gas such as helium and hydrogen from special high pressure delivery trailers. They have crimped or welded 316L stainless steel end fittings and the option of adding hose whip reduction and our anti-kink "Safety Armor." "Safety Armor" protects the exterior of the hose from abuse in operation for extended service life and to enhance whip protection in the event of accidental hose breakage. Each assembly is tested to 1-1/2 times the MAWP.



PTFE LINED TUBE TRAILER HOSE 5000 PSIG

Standard Hose
without Armor Casing

With
Armor Casing

1/2" Female NPT x 1/2" Female NPT

Hose Length	Part #
10'	TT-120F12
20'	TT-240F12

Hose Length	Part #
10'	TT-A-120F12
20'	TT-A-240F12

1/2" Female NPT x 1/2" Male NPT

Hose Length	Part #
10'	TT-120F12M12
20'	TT-240F12M12

Hose Length	Part #
10'	TT-A-120F12M12
20'	TT-A-240F12M12

1/2" Male NPT x 1/2" Male NPT

Hose Length	Part #
10'	TT-120M12
20'	TT-240M12

Hose Length	Part #
10'	TT-A-120M12
20'	TT-A-240M12



ALL STAINLESS STEEL TUBE TRAILER HOSE 3700 PSIG

Standard Hose
without Armor Casing

With
Armor Casing

1/2" Female NPT x 1/2" Female NPT

Hose Length	Part #
10'	TTS-120F12
20'	TTS-240F12

Hose Length	Part #
10'	TTS-A-120F12
20'	TTS-A-240F12

1/2" Female NPT x 1/2" Male NPT

Hose Length	Part #
10'	TTS-120F12M12
20'	TTS-240F12M12

Hose Length	Part #
10'	TTS-A-120F12M12
20'	TTS-A-240F12M12

1/2" Male NPT x 1/2" Male NPT

Hose Length	Part #
10'	TTS-120M12
20'	TTS-240M12

Hose Length	Part #
10'	TTS-A-120M12
20'	TTS-A-240M12

Monel Tube Trailer Hoses

Monel Tube Trailer hoses are designed for corrosive gas or oxygen applications. Rated for 2500 PSI MAWP. Optional armor casing is stainless steel. Each assembly is tested to 1-1/2 times the MAWP.

MONEL TUBE TRAILER HOSE 2500 PSIG

Standard Hose
without Armor Casing

With
Armor Casing

1/2" Female NPT x 1/2" Female NPT

Hose Length	Part #
10'	TTM-120F12
12'	TTM-144F12
20'	TTM-240F12

Hose Length	Part #
10'	TTM-A-120F12
12'	TTM-A-144F12
20'	TTM-A-240F12

Custom Length Hose – Tube Trailer Hose

*Custom length hoses are not returnable for either credit or refund.

ORDER CUSTOM LENGTH HOSE

Select Hose

- TT PTFE
- TTS Stainless Steel
- TTM Monel

With or Without Armor Casing

- Armor Pt # A
- Non-Armor (leave blank)

Length of
Hose in Inches

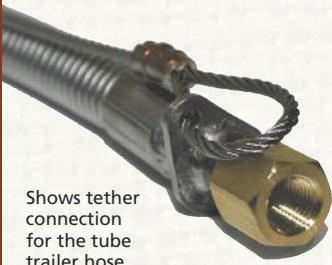
Pt # _____

Choose Your Hose Ends Pt #

- 1/2" FNPT x 1/2" FNPT Pt # F12
- 1/2" FNPT x 1/2" MNPT Pt # F12M12
- 1/2" MNPT x 1/2" MNPT Pt # M12

Tethered Tube Trailer Connections

Use tether to attach hose to manifold and equipment. You can order tethered hoses with or without armored casing. The armor casing provides protection against abrasion and kinking.



Shows tether connection for the tube trailer hose.



Tethered Tube Trailer Hoses

Hoses for tube trailer applications must offer the features of high working pressures, durability, and ease of flexing.

PTFE and Stainless Steel Tube Trailers are designed to transfer gas such as helium and hydrogen from special high pressure delivery trailers. They have crimped or welded 316L stainless steel end fittings and the option of adding hose whip reduction and our anti-kink "Safety Armor." "Safety Armor" protects the exterior of the hose from abuse in operation for extended service life and to enhance whip protection in the event of accidental hose breakage. Each assembly is tested to 1-1/2 times the MAWP.



TETHERED PTFE LINED TUBE TRAILER HOSE 5000 PSIG

Standard Hose without Armor Casing

With Armor Casing

1/2" Female NPT x 1/2" Female NPT

Hose Length	Part #
10'	TE-TT-120F12
20'	TE-TT-240F12

Hose Length	Part #
10'	TE-TT-A-120F12
20'	TE-TT-A-240F12

1/2" Female NPT x 1/2" Male NPT

Hose Length	Part #
10'	TE-TT-120F12M12
20'	TE-TT-240F12M12

Hose Length	Part #
10'	TE-TT-A-120F12M12
20'	TE-TT-A-240F12M12

1/2" Male NPT x 1/2" Male NPT

Hose Length	Part #
10'	TE-TT-120M12
20'	TE-TT-240M12

Hose Length	Part #
10'	TE-TT-A-120M12
20'	TE-TT-A-240M12

TETHERED ALL STAINLESS STEEL TUBE TRAILER HOSE 3700 PSIG

Standard Hose without Armor Casing

With Armor Casing

1/2" Female NPT x 1/2" Female NPT

Hose Length	Part #
10'	TE-TTS-120F12
20'	TE-TTS-240F12

Hose Length	Part #
10'	TE-TTS-A-120F12
20'	TE-TTS-A-240F12

1/2" Female NPT x 1/2" Male NPT

Hose Length	Part #
10'	TE-TTS-120F12M12
20'	TE-TTS-240F12M12

Hose Length	Part #
10'	TE-TTS-A-120F12M12
20'	TE-TTS-A-240F12M12

1/2" Male NPT x 1/2" Male NPT

Hose Length	Part #
10'	TE-TTS-120M12
20'	TE-TTS-240M12

Hose Length	Part #
10'	TE-TTS-A-120M12
20'	TE-TTS-A-240M12

Tethered Monel Tube Trailer Hoses

Monel Tube Trailer hoses are designed for corrosive gas or oxygen applications. Rated for 2500 PSI MAWP. Optional armor casing is stainless steel. Each assembly is tested to 1-1/2 times the MAWP.

TETHERED MONEL TUBE TRAILER HOSE 2500 PSIG

Standard Hose without Armor Casing

With Armor Casing

1/2" Female NPT x 1/2" Female NPT

Hose Length	Part #
10'	TE-TTM-120F12
12'	TE-TTM-144F12
20'	TE-TTM-240F12

Hose Length	Part #
10'	TE-TTM-A-120F12
12'	TE-TTM-A-144F12
20'	TE-TTM-A-240F12

Custom Length Hose – Tethered Tube Trailer Hose *Custom length hoses are not returnable for either credit or refund.

ORDER CUSTOM LENGTH HOSE

Select Hose

- TE-TT PTFE
- TE-TTS Stainless Steel
- TE-TTM Monel

With or Without Armor Casing

- Armor** Pt # A
- Non-Armor** (leave blank)

Length of Hose in Inches

Pt # _____

Choose Your Hose Ends Pt #

- 1/2" FNPT x 1/2" FNPT Pt # F12
- 1/2" FNPT x 1/2" MNPT Pt # F12M12
- 1/2" MNPT x 1/2" MNPT Pt # M12

Hoses for Fill Rack Manifolds



CONTACT US FOR ADDITIONAL LENGTHS AVAILABLE.

Part #	Description
SHP-24F14-1	24" x 1/4" NPT, SS braided with PTFE, 3000 PSI
SHP-36F14-1	36" x 1/4" NPT, SS braided with PTFE, 3000 PSI
SHP-48F14-1	48" x 1/4" NPT, SS braided with PTFE, 3000 PSI
SHP-60F14-1	60" x 1/4" NPT, SS braided with PTFE, 3000 PSI
SHP-72F14-1	72" x 1/4" NPT, SS braided with PTFE, 3000 PSI
SHP-120F12-1	10' x 1/2" NPT, SS braided with PTFE, 3000 PSI

Smart-Hose Hydrogen & Helium Hoses

Designed specifically for the ultra hazardous applications of high pressure hydrogen and helium gas transfer in tube trailers, facilities and cylinders. Whether you prefer metallic or TSCZEL, the Smart-Hose hydrogen hose is the Smart-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.



Smart-Hose Metallic Lined Stainless Steel Braided Hoses

Smart-Hose's metallic high pressure hose assemblies are specifically designed to transfer gaseous hydrogen to and from a bulk transport truck to the customer facility.

Part #	Metallic Hoses Description
SH-MHY-60F12	5' x 1/2" NPT, Stainless Steel Metal Lined, 3500PSI, 14000 BP
SH-MHY-120F12	10' x 1/2" NPT, Stainless Steel Metal Lined, 3500PSI, 14000 BP
SH-MHY-180F12	15' x 1/2" NPT, Stainless Steel Metal Lined, 3500PSI, 14000 BP
SH-MHY-240F12	20' x 1/2" NPT, Stainless Steel Metal Lined, 3500PSI, 14000 BP

Smart-Hose TSCZEL ETFE Lined Stainless Steel Braided Hoses

Smart-Hose's TSCZEL 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.

Part #	TSCZEL Hoses Description
SH-ZHY-72F12	6.0' x 1/2" NPT, TSCZEL Lined, 3500PSI, 14000 BP
SH-ZHY-120F12	10.0' x 1/2" NPT, TSCZEL SS Metal Lined, 3500PSI, 14000 BP
SH-ZHY-180F12	15.0' x 1/2" NPT, TSCZEL SS Metal Lined, 3500PSI, 14000 BP

Smart-Hose Fluid Systems

Engineering Data for the World's Safest Hose Assemblies!!

Protect against the hazardous effects due to hose rupture and tank pull away.

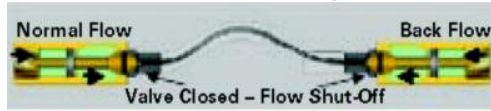
- Hose Whipping
- Loss of Product
- Personal Injury
- Property Damage



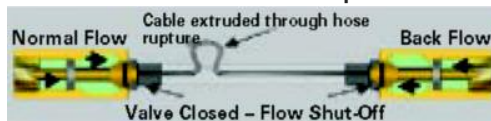
Hose Failure – Coupling Ejection



Hose Failure – Hose Separation



Hose Failure – Hose Rupture*



* Subject to certain conditions

A Flexible "Safety System" for use in the transfer of high pressure gases and liquids!

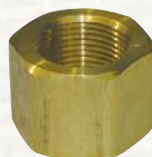
Smart-Hose shuts off the flow of product in both directions upon hose and coupling separation, hose separation and hose stretching.

Failure of flexible pigtails may be caused by fatigue, poor coupling attachment, abuse or age. This potential for hose failure creates an unsafe working environment. Foremost among these failures is hose whipping as the pressurized gas or liquid is discharged at high velocity. In the case of high pressure cylinders, this rapid discharge is sufficient to cause the cylinder to fall over or be propelled about. Not only can equipment be damaged, but severe injury or death can result from being struck by the whipping pigtail.

Finally, the continuous discharge of toxic, flammable or otherwise hazardous gas or liquid may lead to major consequences. Smart-Hose with its Lifeline ends is designed to significantly reduce the unsafe potential of this type of accident!

Note: All hoses come oxygen cleaned.

Tube Trailer Connections



Union Nut



Nipple Tail Piece



Adapter

Description	Part # for Union Nut	Part # for 1/2" Male NPT Tail Pieces	Part # for CGA X 1/2" Male NPT Adapter
CGA 1340 – Argon, Helium, Nitrogen	CGA-1340NUT	CGA-1340NIPPLE	CGA-1340M12
CGA 1350 – Hydrogen	CGA-1350NUT	CGA-1350NIPPLE	CGA-1350M12
CGA 1440 – Breathing Air	CGA-1440NUT	CGA-1440NIPPLE	CGA-1440M12
CGA 1450 – Air	CGA-1450NUT	CGA-1450NIPPLE	CGA-1450M12
CGA 1540 – Oxygen	CGA-1540NUT	CGA-1540NIPPLE	CGA-1540M12
CGA 1550 – Carbon Monoxide	CGA-1550NUT	CGA-1550NIPPLE	CGA-1550M12

Maintaining Your Hose

As a major manufacturer of hoses used in the Industrial, Medical and Specialty Gas industry, we highly recommend that you implement an ongoing inspection program for all compressed gas and cryogenic hoses. **Remember, it is better to be "Proactive vs. Reactive." The goal is to replace the hose before it fails.**

We care about this market, however, in the past two years we have witnessed "first hand" the negative effects of misused and abused hoses. In the interest of time, we will limit this discussion to PTFE, ETFE, and "all metal" hoses only. We have purposefully left out oxy-fuel hoses.

The following recommendations utilize some common safety practices. First of all, please understand that not all hoses are constructed in the same manner. Added to that, compressed gas and cryogenic hoses are used in many different ways. It is important that you identify and address your critical applications first. Critical applications will vary in each facility, however, a common guide would be as follows: high pressure fill manifolds, tube trailer transfill systems, and cryogenic transfer. There are a few basic "maintenance" steps that you can implement rather easily. In fact, a continual hose maintenance program will go a long way towards increasing the life of this important tool, while preventing the chance of serious injury or damage.

How do you begin your maintenance program?

1 Conduct a Visual Inspection

Probably the most important thing that an operator can do (as part of a maintenance program) is a visual inspection. This should be conducted on a regular basis (daily, weekly, or monthly) depending on the application, and the usage/cycle rate. A continual visual inspection is the best way to identify and prevent a potential problem.

What should you look for?

• Discolorations

Freckles, spotting, or other markings are an indication of a foreign matter coming in contact with the hose. Often, freckles can occur from the use of a "leak check" solution. Typically, this is not a problem. However, it is crucial that leak check solutions be mixed to the manufacturer's recommended proportions. If the proportions are not correct, braid damage can occur.

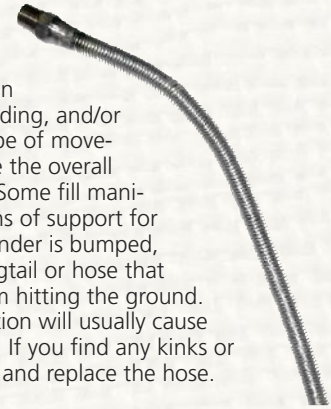
With ethylene glycol (a common substance used in oxygen free leak check), the wrong proportions can negatively affect the stainless steel braid.



The braid on this hose was chemically attacked by an improper mixture of leak check solution.

• Kinking

A kink in the hose is an indication of over bending, and/or over stressing. This type of movement can compromise the overall integrity of the hose. Some fill manifolds provide no means of support for the cylinder. If the cylinder is bumped, quite often it is the pigtail or hose that stops the cylinder from hitting the ground. Unfortunately, this action will usually cause damage to the pigtail. If you find any kinks or severe bends, remove and replace the hose.



• Braid Integrity

The stainless braid gives the inner core of the hose the ability to withstand pressure. There should not be breaks **anywhere** on the stainless steel braid. A single broken braid is the sign of a potential problem.

• Inspect the Fittings

A simple visual inspection of the threads will tell you much. Look to see that the threads are uniform, you should not see any metal shavings or cross threads. If any of these characteristics are found, remove and replace the hose. A bad thread will typically leak under pressure. Thread gauges can be purchased to ensure that fittings are within specification.



Thread checking tools are used to ensure fittings are in spec.

2 Pressure Test & Leak Check

Leak Check Hose

It is very important to leak check the hose and fittings under pressure for any signs of leakage. Leak check solutions are commonly available and work very well under pressure. It is crucial that you not only use the correct solution, but that you mix the solution to the manufacturer recommended proportions. Failure to do so can cause damage. Keep in mind, not all leak check solutions work for every gas service. Check with your supplier to make certain you are using the correct "leak check" product.

For Leak Check Products see page 9A-21

Pressure Test

It is very important to leak check hoses on a regular basis. Often, this test is conducted while the hose is attached to the fill manifold and under pressure. The best gas to use for a leak check (and most expensive) is helium. Helium works well because the helium molecule is very small. As a result, helium will find a leak better than most other gases. Keep in mind that this can get a little spendy, so other inert gases can be substituted. We do not recommend compressed air or any other gas that could contain impurities.

3 Replace Old Hoses

Remove and replace old hoses. All too often, hoses are overused. **Contrary to popular belief, hoses do not last forever!** Every high pressure hose has a life expectancy. This is typically based on the amount of service the hose has provided, and the manner in which it has been used. A good "rule of thumb" is a hose that see 18 cylinder changes per day, five days a week, will operate safely for approximately 18 months. At this rate, the hose will have been connected and disconnected 12,960 times. Provided that the hose has not been abused in any other way this is a good point of reference. *Please note reference guide below that will help to determine when a hose should be changed out.*

Keep in mind, hoses attached to a fill manifold can be connected and disconnected up to 20 times a day. This equates to 9600 changes per year. At an average cost of \$20.00 per pigtail, this tool is costing pennies per change-out.



Tube trailer hoses can get "banged around" and bent in a myriad of configurations. It is important to inspect all cryogenic hoses for leaks on a regular basis.

One of the most common problems associated with cryogenic hose is exceeding the recommended velocity. If you exceed the recommended velocity, damage will occur. If this is of interest, we would be happy to supply a velocity chart for our hoses.



Circumferential cracks on the convolution are typically caused by high velocity flow rates

All of our hoses include a band that states the date of manufacture, and MAWP.

Don't assume that just because a hose is being used for a particular application, that it is the correct hose. Call our Service Representative at 1-800-264-7793 to make certain that you are using the right hose for a particular application.

To sum it up, a regular "hose" maintenance program is a great idea. Simply conduct regular visual inspections of the hoses that you use. Also, perform pressure test to ensure the hose is in good condition. Any hoses that fail these two test should be removed and replaced. Track the cycle rate of your current hoses and replace as required. With these three simple steps, you can maximize the life of your high pressure and cryogenic hoses, while adding a new layer of safety for your employees and customers.

Handy chart to check when Hose Replacement is Recommended

High Pressure Hose Cycle/Use Replacement Chart

Cycles per Day	4	6	8	10	16	20
Equals # of Changeouts per Month	160	240	320	480	640	800
Equals # of Changeouts per Year	1,920	2,880	3,840	5,760	7,680	9,600
Expected Life* (months)	24	22	20	18	16	12

**This is an approximate life expectation based on normal use. These numbers are not intended to be used with other hose types.*

**Ratermann's
Oxygen Safe**

CGA & Valve Leak Check

Find your Leaks Fast and Easily with the Extending Tube to Get in the Hard to Reach Areas.

- Ready to Use – No Mixing


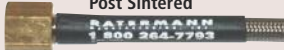



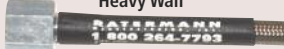



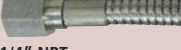




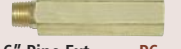




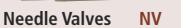







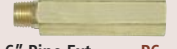




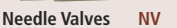
Part #	Description	Size
LC-8OZ	Leak Check Squeeze Bottle	8 oz.
LC-1GAL	Leak Check 4 to a case	1 Gallon

1 gal. size
Pt # LC-1GAL

8 oz. size
Pt # LC-8OZ

How to Order Custom Hoses

To order your custom hose please enter your Hose Type, Hose Length, Inlet Type, Outlet Type and any Optional Connection Accessories in the boxes below.

Hose Type	Length	Inlet	Optional Inlet Connection Accessories	Outlet	Optional Outlet Connection Accessories																																																																																																																
<p>Enter hose type in above column Example: FP or FPA</p> <p>PTFE Lined Stainless Steel Braided</p>  <p>Working Pressure: 3000 PSI No Armor Amored: FP, FPA</p> <p>PTFE Lined Stainless Steel Braided Post Sintered</p>  <p>Working Pressure: 3600 PSI No Armor Amored: FPT, FPTA</p> <p>PTFE Lined Stainless Steel Double Braided Post Sintered</p>  <p>Working Pressure: 6000 PSI No Armor Amored: FPT-60P, FPTA-60P</p> <p>TSCZEL EFTE-Lined Stainless Steel Braided</p>  <p>Working Pressure: 3000 PSI No Armor Amored: FPZ, FPZA</p> <p>Stainless Steel Metal Core</p>  <p>Working Pressure: 4250 PSI No Armor Amored: FPS, FPS-A</p> <p>Stainless Steel Metal Core Heavy Wall</p>  <p>Working Pressure: 4500 PSI No Armor Amored: FPS-45P, FPS-A-45P</p> <p>Monel® Core</p>  <p>Working Pressure: 4250 PSI No Armor Amored: FPS-C, FPS-A-C</p>	<p>Enter hose length in inches in column above Example: 33 or 48</p> <p>Some of the more common sizes are:</p> <p>3 Ft. = 36 In. 4 Ft. = 48 In. 5 Ft. = 60 In. 6 Ft. = 72 In. 7 Ft. = 84 In. 8 Ft. = 96 In. 9 Ft. = 108 In. 10 Ft. = 120 In. 11 Ft. = 132 In. 12 Ft. = 144 In.</p>	<p>Enter type of inlet in above column Example: M14 or F14</p> <p>1/4" NPT Male M14</p>  <p>1/4" NPT Female F14</p>  <p>1/4" NPT Female Swivel F14S</p>  <p>CGA Connections</p> <table border="0"> <tr><td>Air</td><td>CGA346</td></tr> <tr><td>CO2</td><td>CGA320</td></tr> <tr><td>Hydrogen</td><td>CGA350</td></tr> <tr><td>Oxygen</td><td>CGA540</td></tr> <tr><td>Helium</td><td>CGA580</td></tr> <tr><td>Argon</td><td>CGA580</td></tr> <tr><td>Nitrogen</td><td>CGA580</td></tr> </table> <p>Brass Hand Tight CGA</p>  <table border="0"> <tr><td>Air</td><td>HT346</td></tr> <tr><td>CO2</td><td>HT320</td></tr> <tr><td>Hydrogen</td><td>HT350</td></tr> <tr><td>Oxygen</td><td>HT540</td></tr> <tr><td>Helium</td><td>HT580</td></tr> <tr><td>Argon</td><td>HT580</td></tr> <tr><td>Nitrogen</td><td>HT580</td></tr> </table> <p>Plastic Hand Tight CGA</p>  <table border="0"> <tr><td>Air</td><td>PHT346</td></tr> <tr><td>CO2</td><td>PHT320</td></tr> <tr><td>Hydrogen</td><td>PHT350</td></tr> <tr><td>Oxygen</td><td>PHT540</td></tr> <tr><td>Helium</td><td>PHT580</td></tr> <tr><td>Argon</td><td>PHT580</td></tr> <tr><td>Nitrogen</td><td>PHT580</td></tr> </table> <p>Quick Fill CGA Connections</p>  <table border="0"> <tr><td>Air</td><td>QF346</td></tr> <tr><td>CO2</td><td>QF320</td></tr> <tr><td>Hydrogen</td><td>QF350</td></tr> <tr><td>Oxygen</td><td>QF540</td></tr> <tr><td>Helium</td><td>QF580</td></tr> <tr><td>Argon</td><td>QF580</td></tr> <tr><td>Nitrogen</td><td>QF580</td></tr> </table>	Air	CGA346	CO2	CGA320	Hydrogen	CGA350	Oxygen	CGA540	Helium	CGA580	Argon	CGA580	Nitrogen	CGA580	Air	HT346	CO2	HT320	Hydrogen	HT350	Oxygen	HT540	Helium	HT580	Argon	HT580	Nitrogen	HT580	Air	PHT346	CO2	PHT320	Hydrogen	PHT350	Oxygen	PHT540	Helium	PHT580	Argon	PHT580	Nitrogen	PHT580	Air	QF346	CO2	QF320	Hydrogen	QF350	Oxygen	QF540	Helium	QF580	Argon	QF580	Nitrogen	QF580	<p>Enter your optional inlet connection accessories in above column Example: PE or CV</p> <p>3" Pipe Ext. P3</p>  <p>6" Pipe Ext. P6</p>  <p>90° Brass Elbow PE</p>  <p>In-line Check Valves CV</p>  <p>In-line Check Valves CV</p>  <p>In-line Check Valves CV</p>  <p>Needle Valves NV</p> 	<p>Enter type of inlet in the above column Example: QF346</p> <p>1/4" NPT Male M14</p>  <p>1/4" NPT Female F14</p>  <p>1/4" NPT Female Swivel F14S</p>  <p>CGA Connections</p> <table border="0"> <tr><td>Air</td><td>CGA346</td></tr> <tr><td>CO2</td><td>CGA320</td></tr> <tr><td>Hydrogen</td><td>CGA350</td></tr> <tr><td>Oxygen</td><td>CGA540</td></tr> <tr><td>Helium</td><td>CGA580</td></tr> <tr><td>Argon</td><td>CGA580</td></tr> <tr><td>Nitrogen</td><td>CGA580</td></tr> </table> <p>Brass Hand Tight CGA</p>  <table border="0"> <tr><td>Air</td><td>HT346</td></tr> <tr><td>CO2</td><td>HT320</td></tr> <tr><td>Hydrogen</td><td>HT350</td></tr> <tr><td>Oxygen</td><td>HT540</td></tr> <tr><td>Helium</td><td>HT580</td></tr> <tr><td>Argon</td><td>HT580</td></tr> <tr><td>Nitrogen</td><td>HT580</td></tr> </table> <p>Plastic Hand Tight CGA</p>  <table border="0"> <tr><td>Air</td><td>PHT346</td></tr> <tr><td>CO2</td><td>PHT320</td></tr> <tr><td>Hydrogen</td><td>PHT350</td></tr> <tr><td>Oxygen</td><td>PHT540</td></tr> <tr><td>Helium</td><td>PHT580</td></tr> <tr><td>Argon</td><td>PHT580</td></tr> <tr><td>Nitrogen</td><td>PHT580</td></tr> </table> <p>Quick Fill CGA Connections</p>  <table border="0"> <tr><td>Air</td><td>QF346</td></tr> <tr><td>CO2</td><td>QF320</td></tr> <tr><td>Hydrogen</td><td>QF350</td></tr> <tr><td>Oxygen</td><td>QF540</td></tr> <tr><td>Helium</td><td>QF580</td></tr> <tr><td>Argon</td><td>QF580</td></tr> <tr><td>Nitrogen</td><td>QF580</td></tr> </table>	Air	CGA346	CO2	CGA320	Hydrogen	CGA350	Oxygen	CGA540	Helium	CGA580	Argon	CGA580	Nitrogen	CGA580	Air	HT346	CO2	HT320	Hydrogen	HT350	Oxygen	HT540	Helium	HT580	Argon	HT580	Nitrogen	HT580	Air	PHT346	CO2	PHT320	Hydrogen	PHT350	Oxygen	PHT540	Helium	PHT580	Argon	PHT580	Nitrogen	PHT580	Air	QF346	CO2	QF320	Hydrogen	QF350	Oxygen	QF540	Helium	QF580	Argon	QF580	Nitrogen	QF580	<p>Enter your optional outlet connection accessories in above column Example: EL or NV</p> <p>3" Pipe Ext. 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