$12.00

SSP FITTINGS CORP.

SSP Product Catalog
and Design Handbook

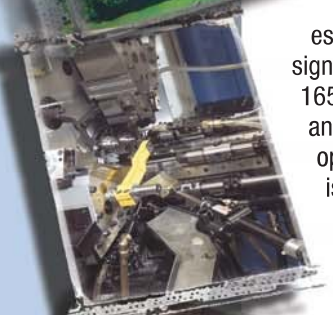
Engineered Fluid Connecting Solutions
for Tubing, Hose and Pipe

About SSP Fittings Corp

1926 SSP Fittings Corp. is founded in Cleveland, Ohio, U.S.A. SSP begins as a contract manufacturer of screw machine products in brass and carbon steel to general industry.

1940s World War II shifts the company's focus to production of fittings for tubing, pipe, and hose. Following the war, SSP's customers are able to satisfy their own requirements without relying on outside companies for production. SSP contracts.

1970s New Focus. By the early 1970s, SSP embarks on a market and manufacturing driven strategy of producing quality fittings from difficult-to-machine alloys. The performance requirements of customers utilizing these materials in industries as diverse as marine, defense, offshore oil, and aerospace, drive SSP to establish both conformance quality standards, and service levels, which are significantly ahead of general industry at the time.



1980s The "Works". Things are really happening for SSP. The company establishes a product line and distribution channel for hydraulic fittings, which require significant investments in a new, state-of-the-art facility south of Cleveland. SSP builds a 165,000 sq. ft. facility to house our vertically-integrated "Works," including, by now, tool and die design and production, custom closed-die forging, machining, finishing operations, assembly and test. With over 200 work centers, SSP's Twinsburg "Works" is one of the largest single-site facilities in the entire industry.

1990s Market Expansion. SSP's distribution network for high performance hydraulic fittings expands into some select global markets and new standards of performance are required of US-based distributors to meet the growing competitive challenge. Investments in design engineering usher in the introduction of SSP Instrumentation tube and pipe fittings for instrumentation and process markets. Finally, as has now come to be expected, SSP is one of the first companies in our market to earn ISO 9001:2000 certification.

2000 The New Force. SSP endorses select distributorships as Affiliated Distributors, signifying these companies' commitment to providing comprehensive technical support on SSP Fittings and other complementary fluid power products. Significant investments in information technology and modern production equipment prepare the company to leverage its reputation for product availability and speed, with the sizable market opportunities targeted through decades of deliberate investment in the sound fundamentals of quality, service, performance, and value.

Table of Contents

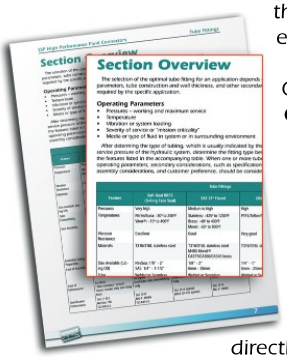
How to Use this Catalog

When SSP decided to revise, update, and expand our catalog, we knew we could make it more useful. To find out just how to accomplish this, we contacted engineers, users, and distributors throughout the United States. They took the time to let us know which features and content would make their lives easier.

This catalog is the result of learning from industry professionals who were kind enough to share their thoughts in surveys, phone conversations, and face-to-face discussions. Thanks to them, we know you'll find this new catalog both easy to use and informative. But it doesn't stop there! If you have ideas that will help us as we continue to refine this catalog, please let us know! We want to listen, learn, and improve with the help of those who use our products. Drop us a line or visit our web site at www.sspfittings.com.

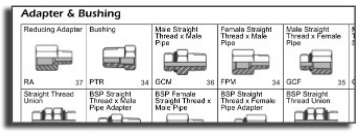
General Navigation:

On the "**Table of Contents**" page you'll find a top-level outline of catalog sections. Each section is assigned a color. Tube Fittings are blue; Hose Fittings are green; Pipe Fittings are red. To navigate to the Hose Fittings section, for instance, you can either turn to the numbered page, or you can simply flip to the section that has the matching green image on each page edge.

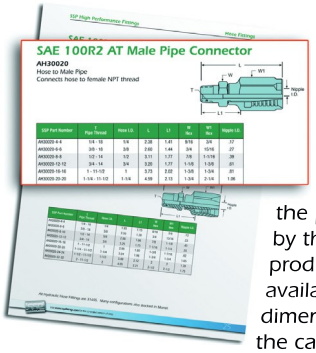


Once there, you can read the "**Section Overview**." SSP presents general information on all products contained in the section in an objective way, documenting performance differences between products in an easy-to-reference table.

Visual Index



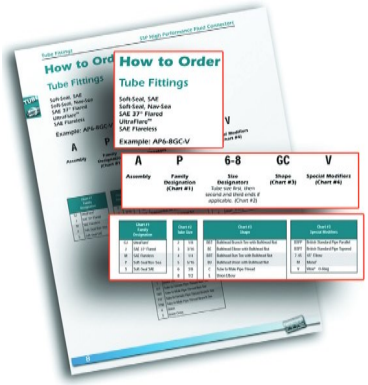
If you already know the specific type of Hose, Tube, or Pipe fitting you need, you can go directly to the "**Visual Index**" to find the configuration you need. Grouped by their shape or purpose (male connector, tube union, cap & plug etc.), each part has a thumbnail drawing, description, base part number, and page number that directs you to the Product Detail for that part.



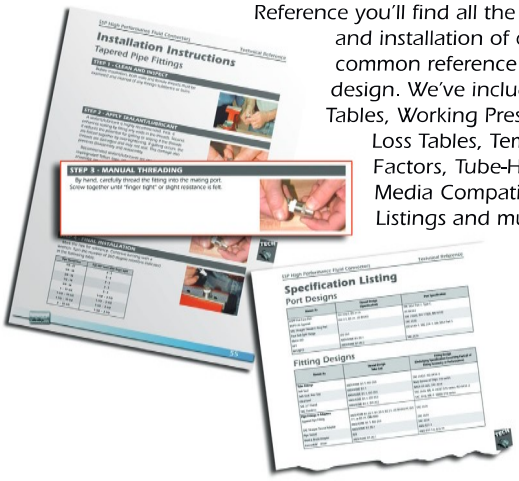
"**Product Detail**" pages follow. For each part you will see a dimensioned drawing and a table. The drawings have call-outs indicating various dimensional attributes for the part. Callouts are defined by the table on the right. The product detail table contains available part numbers, dimensions corresponding to the callouts, materials, and pressure ratings.

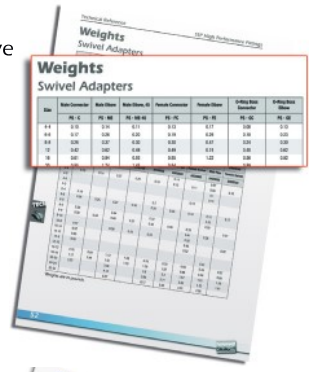
Drawing Callout Key	
Callout	**Description**
A	Turn Length (of Tube O.D.)
B	Socket Depth
C	Pipe Length
D	Through Hole (Drill Diameter)
E	Bulkhead Pilot Length
F	Face Diameter
H	Hex Diameter
I	Insertion Depth
L	Length of Fitting
LL	Length after Installation
PT	Pipe Thread
S	Shoulder
T	Thread
W	Wrench Flat OR Hex (Socket)
X	OD Dimension of socket (turn) End - Turn Diameter
Z	Bulkhead Pilot Diameter

The "**How to Order**" pages in each section show you how to create the order number for the parts you need. Most SSP part numbers are acronyms for easy recall (such as "J" for JIC, now known as SAE 37° Flared, or "ME" for male elbow), or the part numbers follow a consistent pattern. The How To Order tables give you the key to unlock the part numbering system.

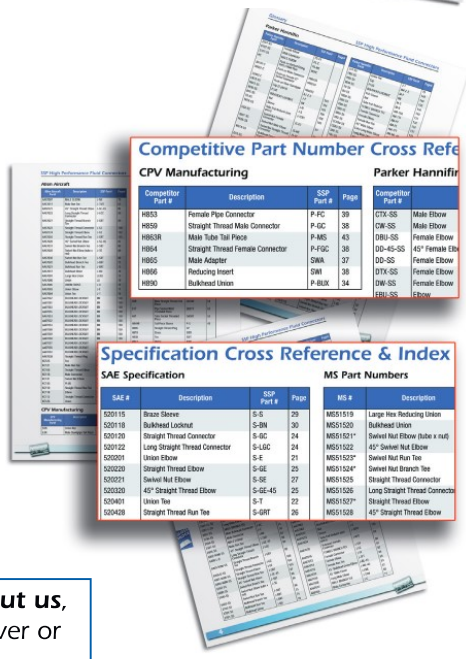


We have two special sections in the back of the design handbook - our "**Technical Reference**" section and the Index section. In Technical Reference you'll find all the information you need about the use and installation of our products along with common reference material for fluid piping design. We've included Product Comparative Tables, Working Pressure Tables, Pressure Loss Tables, Temperature De-rating Factors, Tube-Hose-Pipe equivalents, Media Compatibility, Specification Listings and much more.





The "**Index**" section of the catalog contains a Competitive Part Number Cross Reference, a Specification Cross Reference, and an SSP Part Number index. This way, you can find the right SSP part, and where it's located in the catalog, no matter what information you have.



If you would like to know more about us, please call the number on the back cover or visit **www.sspfittings.com**.
We'd love to hear from you.

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Tube Fittings

Section Overview

Tube Fittings

The selection of the optimal tube fitting for an application depends on the system operating parameters, tube construction and wall thickness, and other secondary considerations recommended or required by the specific application.

Operating Parameters

- Pressures – working and maximum service
- Temperature
- Vibration or system loading
- Severity of service or "mission criticality"
- Media or type of fluid in system or in surrounding environment

After determining the type of tubing, which is usually indicated by the working pressure & maximum service pressure of the hydraulic system, determining the fitting type best suited for the system based on the features listed in the accompanying table. When one or more tube fittings satisfy the system operating parameters, secondary considerations, such as specification conformance, existing practice, assembly considerations, and customer preference, should be considered.

Tube Fittings				
Feature	**Soft-Seal ORFS (O-Ring Face Seal)**	**SAE 37° Flared**	**UltraFlare**	**SAE Flareless**
Pressures	Very high	Medium to high	High	Medium
Temperatures	Nitrile/Buna: -30° to 250°F Viton: -15° to 400°F	Stainless: -425° to 1200°F Brass: -40° to 400°F Monel: -65° to 800°F	PTFE/Teflon: -100° to 450°F	Stainless: -425° to 1200°F Monel: -65° to 800°F
Vibration Resistance	Excellent	Good	Very good	Good
Materials	T316/316L stainless steel	T316/316L stainless steel M405 Monel CA377/CA360/CA345 brass	T316/316L stainless steel	T316/316L stainless steel (17-4 ph stainless for ferrule) M405 Monel
Size Available (tubing OD)	NavSea: 1/8" - 2" SAE: 1/4" - 1-1/2"	1/8" - 2" 6 mm - 38 mm	1/4" - 1" 6 mm - 25 mm	1/8" - 2"
Tube Compatibility	Welded or Seamless Inch or metric All thickness	Welded or Seamless Inch or metric Thin to medium thickness	Welded or Seamless Inch or metric Thin to medium thickness	Seamless only Inch only Medium to heavy thickness
Seal Reliability	Excellent Elastomeric seal High tolerance to minor surface imperfections and damage High tolerance to assembly variation	Good Metal-to-metal seal Low tolerance to minor surface imperfections and damage Low tolerance to assembly variation	Very good PTFE seal reinforces metal-to-metal seal Medium tolerance to surface imperfections Medium tolerance to assembly variation like under-flaring or torquing	Very good Metal to metal seal Sealing surfaces are less prone to damage Low tolerance to assembly variation
Assembly				
Tubing Preparation	Sleeve brazing or tube flanging	Tube flaring	Tube flaring	Ferrule presetting
Ease of Assembly	Excellent Minimal skill required once tailpiece/sleeve is affixed to tubing	Good Requires skill and trained personnel	Very Good Requires general knowledge of tube flaring & assembly, but forgiving of assembly variation	Good Requires skill and trained personnel
Ease of Maintenance	Excellent "Zero-clearance" system means no tube entry into fitting body	Very good Small tube entry around fitting body	Very good Small tube entry around fitting body	Good Large tube entry into fitting body
Specification Conformance	SAE J1453 NavSea 710 ISO 8434-2	SAE J514 MIL-F-18866 ISO 8434-3	SAE J514 (partial) NASA GP-425 (partial)	SAE J514 MIL-F-18866

Soft-Seal, O-Ring Face Seal (ORFS)

Appearance

Soft-Seal tube & pipe fittings seal fluids and gases at very high pressures and vacuum. Each features a high durometer o-ring held in a precision-machined groove in the fitting body. This elastomeric seal prevents fluids and gases from leaking.

The Soft-Seal fitting assembly consists of four parts: threaded fitting body with o-ring groove, o-ring, nut, and sleeve or tailpiece. Other o-rings have been tested and are available for special applications.

The fitting assembly seals when the bottom of the sleeve or tailpiece, which has been fixed to the tubing, compresses the o-ring in the face of the threaded fitting body as the fitting nut is threaded onto the external threads on the fitting body. The threading process draws the sleeve into full contact with the face of the fitting.

Sleeves or tailpieces can be secured to the tubing either by brazing, welding, or mechanically flanging the tubing.

Type 316 stainless steel is the standard material on all bodies and nuts. Type 316L (low carbon) is used for sleeves/tailpieces. Buna-N is the standard o-ring material for SAE and NavSea.

Suggested Applications

The Soft-Seal tube & pipe fitting is a very versatile fitting connector because it works exceptionally well on both fluids and gases. After securing the sleeve onto the tube or pipe, it is then extremely easy to install. The fitting is also a "zero clearance" system, meaning you don't need to spring or pull the tubing to seat the fitting, or purge the system. This tube fitting can be disassembled and reassembled many times. Simply replace the o-ring and tighten to recommended torque. The elastomer soft-seal conforms well to irregularities in the fitting face or sleeve. So, while proper technique and handling should be observed during assembly, the tube fitting is forgiving of assembly variation.

Soft-Seal tube & pipe fittings are highly recommended on high vibration systems because the soft-seal absorbs shock better than metal-to-metal sealing systems.

While the SAE Soft-Seal was originated for use in off-road construction machinery, it is gaining popularity in other transportation-related applications such as alternative fuel systems (CNG/LPG) for vehicles. It is endorsed by ISO Technical Committee 131 for all new hydraulic system design.

The NavSea Soft-Seal design is widely used in Naval and commercial ship building and repair. Other applications include test laboratories.

Characteristic	Soft-Seal (ORFS) Tube Fitting Performance
Pressures	Very high to 9200 psi
Temperature	Nitrile/Buna: -30° to 250°F Viton: -15° to 400°F
Vibration Resistance	Excellent
Materials Available	T316/316L stainless steel; M405 Monel
Size Available (nominal)	1/8" - 2"
Tube & Pipe Compatibility	Welded or Seamless All thickness/schedules
Seal Reliability	Excellent Elastomeric seal High tolerance to minor surface imperfections and damage High tolerance to assembly variation

SSP Design Standard

Recommended Torque Valves for Soft-Seal NavSea Fittings

Dash Size	Tube O.D.	Torque in Inch-Pounds
-4	1/4	20-40
-6	3/8	25-50
-8	1/2	40-75
-10	5/8	60-120
-12	3/4	110-220
-16	1	180-350
-20	1 1/4	265-530
-24	1 1/2	360-720
-32	2	750-1490

SAE 37° Flared

Appearance

The SAE 37° Flared tube fitting system (aka. "JIC") consists of three components to make a tubing assembly: body, nut, and sleeve.

The SAE flared tube fitting relies on metal-to-metal contact between the finished surface of the fitting nose and the inside diameter of the flared tubing to make a seal. SSP takes great care in the manufaturing process to produce a flared nose surface that far exceeds published specifications. This high finish reduces the likelihood of leakage due to irregularities in the flared tubing.

As the fitting nose and flared tubing are drawn together, they are supported by the fitting sleeve, which distributes the compressing load caused by the nut as it is threaded onto the fitting body during assembly.

SAE flared tube fittings are available for inch and metric tubing. Metric assemblies are constructed with standard inch bodies, and special nuts and sleeves designed for metric tubing.

Stainless steel SAE flared tube fitting are manufactured from Type 316/316L stainless steel. Brass SAE flared tube fittings are manufactured from CA377 forging brass, and CA360 & CA345 machining brass. Monel SAE flared tube fittings are manufactured from the 405 grade of this copper-nickel alloy.

An installed SAE flared tube fitting system is easy to identify. The sleeve protrudes out the back of the nut. This extension provides the tubing with additional support and lessens the longitudinal load on the fitting nose.

Suggested Applications

The SAE flared tube fitting is the most popular configuration of hydraulic fluid connector in North America. While the SAE system is often used for joining tubing in a hydraulic system, it is frequently also used on flexible plumbing systems (hose) as an end adapter for female SAE swivels, which is the most common – and affordable – end connection on hydraulic hose assemblies.

Until recently, the SAE flared tube fitting had a corresponding military specification, MIL-F-18866 which has now been superceded by SAE J514, but many ordinance system designs and designers still favor the SAE fitting out of convention and customer preference.

Characteristic	SAE 37° Flared Tube Fitting Performance
Pressure	Medium to High; to 7,700 psi
Temperature	Stainless: -425° to 1200°F Brass: -40° to 400°F Monel: -65° to 800°F
Vibration Resistance	Good
Materials Available	T316/316L stainless steel M405 Monel CA377/CA360/CA345 brass
Size Available (nominal)	1/8" – 2" 6mm – 38mm
Tube & Pipe Compatibility	Seamless or welded and drawn over a mandrel Inch or metric Thin to medium thickness
Seal Reliability	Good Metal-to-metal seal Low tolerance to minor surface imperfections and damage Low tolerance to assembly variation

UltraFlare®

Appearance

An enhanced version of the standard SAE 37° Flared tube fitting, UltraFlare features a Teflon seal in the flared fitting nose cone. The seal is extruded of virgin Teflon and machined to create an interference fit in the groove, or trepan, in the fitting nose. This trepan is machined parallel to the fitting centerline to eliminate the risk of twisting the Teflon seal out of its seat during assembly. In most other respects, the UltraFlare resembles the SAE flared tube fitting (see "SAE 37° Flared Tube Fittings/ Appearance" for additional details).

Type 316/316L stainless steel is the standard material on all bodies, nuts and sleeves. PTFE/Teflon is the standard seal material.

Suggested Applications

The UltraFlare is an extremely good choice in many cases for both new system design, and replacement of existing SAE flared tube fittings. For new system design, the UltraFlare offers a superior alternative to a standard SAE Flared fitting through its improved resistance to vibration and sealing reliability. The UltraFlare is also more forgiving of assembly irregularities in the shop or field, such as underflared tubing or under-torqued make-ups.

The UltraFlare uses standard SAE nuts & sleeves, and can be assembled following normal procedures and techniques for SAE flared tube fittings. As such, for companies with an investment in tube flaring equipment and training, the UltraFlare represents a superior performing fitting system without the need for new capital equipment or technician training.

In the field, or for system maintenance, UltraFlare tube fittings can be substituted for a standard SAE flared fitting for enhanced protection against leakage due to normal system vibration.

Characteristic	UltraFlare 37° Flared Tube Fitting
Pressures	To 9,600 psi
Temperature	PTFE/Teflon: -100° to 450°F
Vibration Resistance	Very good
Materials Available	T316/316L stainless steel
Size Available (tubing OD)	¼" – 2" 6mm – 25mm
Tube Compatibility	Seamless or welded and drawn over a mandrel Inch or metric Thin to medium thickness
Seal Reliability	Very good PTFE seal reinforces metal-to-metal seal High tolerance to surface imperfections High tolerance to assembly variation like under-flaring or torquing

SAE Flareless

Appearance

The SAE Flareless (aka. “bite type”) tube fitting is a three-piece system (nut, ferrule, and body) that works by forcing the ferrule cutting edge into the tubing wall to create a seal. The resulting spring-action joint offers a leak proof seal and resistance to vibration. Flareless fittings do not require a flaring operation and are used on medium to heavy walled tubing.

Standard material for the fitting body is Type 316 stainless steel for the body and nut, and Carpenter Custom 630 (17Cr - 4Ni) stainless steel for the ferrule. The ferrule is slightly discolored because it has been heat treated to give extra hardness for biting. The ferrule must be harder than the tubing to form the bite that seals the assembly.

The finish on SAE flareless fitting nuts is a dark graphite color due to lubricant coating. The fitting nut has a bonded dry film lubricant which aids in the installation process to reduce torque and prevent galling.

Suggested Applications

The SAE flareless tube fitting is an excellent fitting system for higher vibration hydraulic systems where a user does not wish to flare tubing.

On dynamic hydraulic systems, the SAE flareless tube fitting is recommended over other flareless tube fitting systems, specifically compression, or “instrumentation.” The design of the SAE flareless single biting ferrule holds the key to this superiority. The ferrule bows during assembly and “bites” into the tubing wall. The spring-action joint provides superior shock absorption and holding power. In addition, the bite and other visual cues, allow a user to inspect the assembly prior to system pressurization. With other flareless tube fitting systems, a user must rely on indirect verification of a positive seal through the use of gap gauges or by counting the number of hex flats torqued from a finger-tight position.

Like all metal-to-metal tube fitting systems, the SAE flareless is limited in the number of disassemblies and reassemblies the tubing can withstand as the ferrule bites deeper and deeper into the tubing wall with each reassembly.

SSP strongly discourages the intermixing of components from different manufacturers.

Characteristic	SAE Flareless Tube Fitting Performance
Pressures	Medium to 6,000 psi
Temperature	Stainless: -425° to 1200°F Monel: -65° to 800°F
Vibration Resistance	Good
Materials Available	T316/316L stainless steel (17-4 ph stainless for ferrule) M405 Monel
Size Available (tubing OD)	1/8” – 2”
Tube Compatibility	Seamless only Inch only Medium to heavy thickness
Seal Reliability	Very good Metal to metal seal Sealing surfaces are less prone to damage Low tolerance to assembly variation

How to Order

Tube Fittings

Soft-Seal, SAE
Soft-Seal, Nav-Sea
SAE 37° Flared
UltraFlare®
SAE Flareless

Example: AP6-8GC-V

A	P	6-8	GC	V
Assembly	**Family Designation** (Chart #1)	**Size Designators** Tube size first, then second and third ends if applicable. (Chart #2)	**Shape** (Chart #3)	**Special Modifiers** (Chart #4)

Chart #1 Family Designation	
GJ	UltraFlare
J	SAE 37° Flared
M	SAE Flareless
P	Soft-Seal Nav-Sea
S	Soft-Seal SAE

Chart #2 Tube Size	
2	1/8
3	3/16
4	1/4
5	5/16
6	3/8
8	1/2
10	5/8
12	3/4
14	7/8
16	1
20	1 1/4
24	1 1/2
32	2

Chart #3 Shape	
BBT	Bulkhead Branch Tee with Bulkhead Nut
BE	Bulkhead Elbow with Bulkhead Nut
BRT	Bulkhead Run Tee with Bulkhead Nut
BU	Bulkhead Union with Bulkhead Nut
C	Tube to Male Pipe Thread
E	Union Elbow
FC	Tube to Female Pipe Thread
GBT	SAE Straight Thread Branch Tee
GC	Tube to SAE Straight Thread
GE	Swivel Nut Straight Thread Elbow
GRT	SAE Straight Thread Run Tee
ME	Tube to Male Pipe Thread Elbow
SBT	Female Swivel Branch Tee
SC	Female Swivel Straight
SE	Female Swivel Elbow
SRT	Female Swivel Run Tee
T	Union Tee
TFT	Tube to Female Pipe Thread Run Tee
TMT	Tube to Male Pipe Thread Run Tee
TTF	Tube to Female Pipe Thread Branch Tee
TTM	Tube to Male Pipe Thread Branch Tee
U	Union
X	Union Cross

Chart #4 Special Modifiers	
BSPP	British Standard Pipe Parallel
BSPT	British Standard Pipe Tapered
45	45° Elbow
M	Monel
V	Viton O-Ring
B	Brass

How to Order

Tube Fittings

Soft-Seal, High Pressure Unions

Example: Q501T-4-L

Q	501	T	4	L
Family Designation	**Configuration** (Chart #1)	**Designation** (Chart # 2)	**Size** (Chart #3)	**Material** (Chart #4)

Chart #1 Configuration

500N	Union Nut
501	Pipe Socket
502	Pipe Socket Braze Groove
503	Female Pipe
504	Male Pipe
507	Reducing Insert
509	Male SAE Straight Thread
602	Male Pipe Weld
603	Male Tube Standpipe/Tube Stub
604	Female SAE Straight Thread
408	Tube Socket

Chart #2 Designation

R	Tail Piece
T	Threaded Piece

Chart #3 Size Designation

Size	Tube O.D. or Thread Size	Pipe Size
0	1/4	1/8
1	3/8	1/4
2	1/2	3/8
3	3/4	1/2
4	1	3/4
5	1 1/4	1
6	1 1/2	1 1/4
7	2	1 1/2
8	-	2

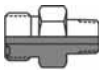
Chart #4 Material

L	T316L
M	Monel

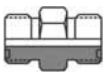
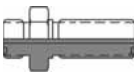
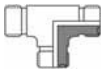
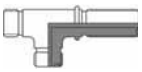
Visual Index

Soft-Seal, SAE

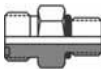
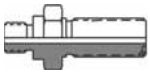
Tube to Male Pipe

Male Pipe Connector  S-C 20	Male Elbow  S-ME 20

Tube to Tube Union

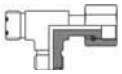
Union  S-U 21	Bulkhead Union  S-BUX 21	Union Elbow  S-E 21	Bulkhead Elbow  S-BEX 22
45° Bulkhead Elbow  S-BEX-45 22	Union Tee  S-T 22	Bulkhead Run Tee  S-BRTX 23	Union Cross  S-X 23

Tube to O-Ring Boss

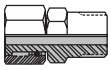
Straight Thread Connector  S-GC 24	Long Straight Thread Connector  S-LGC 24	Bulkhead Connector  S-BGCX 25	Straight Thread Elbow  S-GE 25
45° Straight Thread Elbow  S-GE-45 25	Straight Thread Run Tee  S-GRT 26	Straight Thread Branch Tee  S-GBT 26	

Our selection guide makes it easy to locate any fitting. Simply turn to the page designated in the lower right hand corner.

Tube to Swivel

Swivel Nut Elbow  S-SE 26	Swivel Nut Run Tee  S-SRT 27	Swivel Nut Branch Tee  S-SBT 27

Swivel Adapter

Swivel Nut Male Pipe Connector  SS-C 20	Swivel Nut Union  SS-U 23	Swivel Nut Straight Thread Elbow  SS-GE 26	Straight Thread Swivel Connector  SS-GC 27

Component

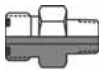
Tube Nut  S-N 27	Braze Sleeve  S-S 28	Flanged Sleeve  S-SM 28	Braze Connector  S-FBZ 28
Bulkhead Locknut  S-BN 29	Braze Ring  BR 29	SAE Face Seal O-Ring  S-R 29	Straight Thread Boss O-Ring  R 30

Cap & Plug

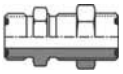
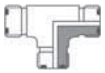
Plug  S-P 30	Cap  AS-Z-2 30

Soft-Seal, Nav-Sea

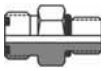
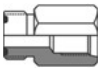
Tube to Male Pipe

Male Pipe Connector  P-C 31	Male Pipe Elbow  P-ME 31	Male Pipe Run Tee  P-TMT 31	Male Pipe Branch Tee  P-TTM 32

Tube to Tube Union

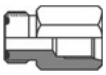
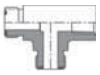
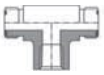
Union  P-U 32	Bulkhead Union  P-BU 32	Elbow  P-E 33	Tee  P-T 33	Cross  P-X 33

Tube to O-Ring Boss

Straight Thread Male Connector  P-GC 34	Straight Thread Female Connector  P-FGC 34	Straight Thread Elbow  P-GE 34	Male Straight Thread Run Tee  P-GRT 35	Male Straight Thread Branch Tee  P-GBT 35

Soft-Seal, Nav-Sea

Tube to Female Pipe

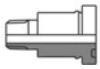
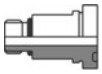
Female Pipe Connector  P-FC 35	Female Pipe Elbow  P-FE 36	Female Pipe Run Tee  P-TFT 36	Female Pipe Branch Tee  P-TTF 36

Component

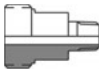
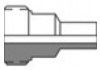
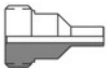
Tail Piece Sleeve  P-S 37	Nut  P-N 38	Blank Body  P-BB 38	Blank Tail Piece  P-BS 38
Male Tube Tail Piece  P-MS 39	Face Seal O-Ring  P-R 39	Straight Thread Boss O-Ring  R 39	Braze Ring  BR 40

Soft-Seal, High Pressure Union

Union, Tailpiece

Tube Socket Tail Piece  Q408R 40	Pipe Socket Weld Tail Piece  Q501R 41	Female Pipe Tail Piece  Q503R 42	Male Pipe Tail Piece  Q504R 42	Male Straight Thread Tail Piece  Q509R 43
Male Pipe Weld Tail Piece  Q602R 43	Female Straight Thread Tail Piece  Q604R 43	Male Standpipe Tail Piece  Q603R 44	Braze Groove Tail Piece  Q502R 44	

Union, Threaded Piece

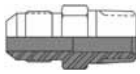
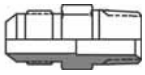
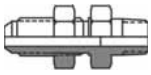
Tube Socket Threaded Piece  Q408T 45	Pipe Socket Weld Threaded Piece  Q501T 45	Female Pipe Threaded Piece  Q503T 46	Male Pipe Threaded Piece  Q504T 46	Male Straight Thread Threaded Piece  Q509T 47
Male Pipe Weld Threaded Piece  Q602T 47	Female Straight Thread Threaded Piece  Q604T 47	Male Standpipe Threaded Piece  Q603T 48	Braze Groove Threaded Piece  Q502T 48	

Component

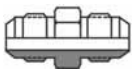
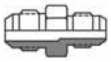
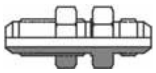
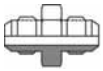
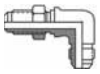
Reducing Insert  Q507R 48	Tube to Pipe Socket Coupling  Q1007 49	Union Nut  Q500N 49	Face Seal O-Ring  Q 50	Braze Ring  BR 50

SAE 37° Flared

Tube to Male Pipe

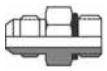
Male Connector  J-C 51	BSPT Male Connector  J-C-BSPT 52	Male Bulkhead Connector  J-BC 52	Male Elbow  J-ME 53	BSPT Male Elbow  J-ME-BSPT 53
45° Male Elbow  J-ME-45 54	Long Male Elbow  J-LME 54	Extra Long Male Elbow  J-LLME 55	Male Run Tee  J-TMT 55	Male Branch Tee  J-TTM 56

Tube to Tube Union

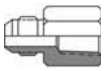
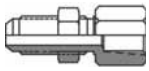
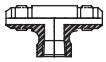
Union  JU 56	Reducing Union  J-U 57	Bulkhead Union  J-BU 57	Large Hex Union  JLHU 58	Large Hex Reducing Union  J-LHU 58
Union Elbow  J-E 59	45° Union Elbow  J-E-45 59	Bulkhead Union Elbow  J-BE 59	45° Bulkhead Union Elbow  J-BE-45 60	
Bulkhead Branch Tee  J-BBT 60	Bulkhead Run Tee  J-BRT 60	Union Tee  J-T 61	Union Cross  J-X 61	

SAE 37° Flared

Tube to O-Ring Boss

Straight Thread Connector  J-GC 62	BSPP Connector  J-GC-BSPP 63	Long Straight Thread Connector  J-LGC 63	Straight Thread Elbow  J-GE 64	BSPP Elbow  J-GE-BSPP 65
Long Straight Thread Elbow  J-LGE 65	45° Straight Thread Elbow  J-GE-45 65	Straight Thread Run Tee  J-GRT 66	Straight Thread Branch Tee  J-GBT 66	

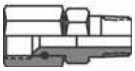
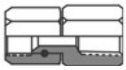
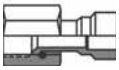
Tube to Female Pipe

Female Connector  J-FC 67	Bulkhead Female Connector  J-BFC 67	Female Elbow  J-FE 68	45° Female Elbow  J-FE-45 68	Female Run Tee  J-TFT 69	Female Branch Tee  J-TTF 69

Tube to Swivel

Swivel Nut Connector  J-SC 70	Swivel Nut Elbow  J-SE 70	45° Swivel Nut Elbow  J-SE-45 70	Swivel Nut Run Tee  J-SRT 71	Swivel Nut Branch Tee  J-SBT 71

Swivel Adapter

Swivel Nut Male Connector  JS-C 71	Swivel Nut Union  JS-U 72	Swivel Nut Straight Thread Connector  JS-GC 72	Swivel Nut Female Connector  JS-FC 72	Swivel Nut Female Port Connector  JS-FP 73	Swivel Nut Socket Connector  JS-SWS 73
Swivel Nut Male Elbow  JS-ME 73	Swivel Nut Straight Thread Elbow  JS-GE 74	Swivel Nut Elbow  JS-E 74	45° Swivel Nut Straight Thread Elbow  JS-GE-45 75	Swivel Nut Tee  JS-T 75	Swivel Nut Cross  JS-X 76

Cap & Plug

Cap (2-piece)  AJ-Z-2 76	Plug  J-P 77

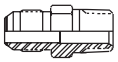
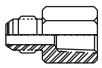
Component

Nut	Sleeve	Metric Sleeve	Tube End Reducer
			
J-N 77	J-S 77	CS 78	J-TER 78

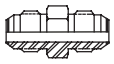
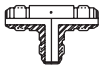
Tube End Reducer (one piece)	Bulkhead Locknut	Straight Thread Boss O-Ring
		
J-TER1 79	BN 79	R 79

UltraFlare

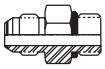
Tube to Pipe

Male Connector	Female Connector	Male Elbow	Male Run Tee
			
GJ-C 80	GJ-FC 80	GJ-ME 80	GJ-TMT 80

Tube to Tube Union

Union	Elbow	Tee
		
GJ-U 81	GJ-E 81	GJ-T 81

Tube to O-Ring Boss

Straight Thread Connector	Straight Thread Elbow	Straight Thread Run Tee
		
GJ-GC 81	GJ-GE 82	GJ-GRT 82

Tube to Swivel

Swivel Nut Elbow

GJ-SE 82

Cap & Plug

Plug

GJ-P 82

Component

Teflon Ring

GJ-TR 83