

Group 6

10K

High Pressure Fittings

Tubing

Nipples

Adaptors



FLUID CONTROL[®]

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We have certified industrial plumbers with offshore certificates.

Ask us about pipe work.

We are certified and have experience in:

Metric DIN Fittings (standard DIN fittings), Flare Fittings, A-lok and High Pressure Couplings.

We also have equipment and machinery for hire.



On our website you will find the complete High Pressure Couplings catalogue.

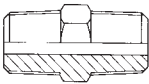

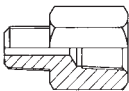
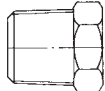
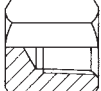
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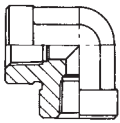
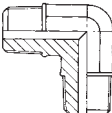
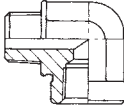
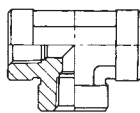
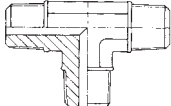
AISI 316 stainless steel.

Material certificate according to DIN 500049. 3.1.B.

Other material qualities available on request.

STAINLESS STEEL STEEL

NPT - NPT						
Thread 1	Thread 2	Nipple	Socket	Nipple Socket	Plug	Cap
1/8	1/8	HN10K-0202	HC10K-0202	FMA10K-0202	HP10K-02	PC10K-02
1/8	1/4	HN10K-0204	HC10K-0204	FMA10K-0204		
1/4	1/8			FMA10K-0402		
1/4	1/4	HN10K-0404	HC10K-0404	FMA10K-0404	HP10K-04	PC10K-04
1/4	3/8	HN10K-0406	HC10K-0406	FMA10K-0406		
1/4	1/2	HN10K-0408	HC10K-0408	FMA10K-0408		
3/8	1/4			FMA10K-0604		
3/8	3/8	HN10K-0606	HC10K-0606	FMA10K-0606	HP10K-06	PC10K-06
3/8	1/2	HN10K-0608	HC10K-0608	FMA10K-0608		
1/2	1/4			FMA10K-0804		
1/2	3/8			FMA10K-0806		
1/2	1/2	HN10K-0808	HC10K-0808	FMA10K-0808	HP10K-08	PC10K-08
1/2	3/4	HN10K-0812	HC10K-0812	FMA10K-0812		
1/2	1	HN10K-0816	HC10K-0816	FMA10K-0816		
3/4	1/2			FMA10K-1208		
3/4	3/4	HN10K-1212	HC10K-1212	FMA10K-1212	HP10K-12	PC10K-12
3/4	1	HN10K-1216	HC10K-1216	FMA10K-1216		
1	1/2			FMA10K-1608		
1	3/4			FMA10K-1612		
1	1	HN10K-1616	HC10K-1616	FMA10K-1616	HP10K-16	PC10K-16

NPT - NPT						
Thread 1	Thread 2	Elbow 90° Female	Elbow 90° Male	Elbow 90° Male/Female	Tee Female	Tee Male
1/8	1/8	FE10K-0202	ME10K-0202	FME10K-0202	FT10K-02	MT10K-02
1/4	1/4	FE10K-0404	ME10K-0404	FME10K-0404	FT10K-04	MT10K-04
3/8	3/8	FE10K-0606	ME10K-0606	FME10K-0606	FT10K-06	MT10K-06
1/2	1/2	FE10K-0808	ME10K-0808	FME10K-0808	FT10K-08	MT10K-08

Safety factor: 4:1

JIC - JIC

Thread 1	Thread 2	Nipple	Elbow 90° Male	Cap	Plug	
7/16-20	7/16-20	JHN10K-0404	JME10K-0404	JPC10K-0404	JHP10K-0404	JFFS10K-0404
7/16-20	9/16-18					JFFS10K-0406
7/16-20	3/4-16					JFFS10K-0408
1/2-20	1/2-20	JHN10K-0505	JME10K-0505	JPC10K-0505	JHP10K-0505	JFFS10K-0505
9/16-18	9/16-18	JHN10K-0606	JME10K-0606	JPC10K-0606	JHP10K-0606	JFFS10K-0606
9/16-18	3/4-16					JFFS10K-0608
9/16-18	7/8-14					JFFS10K-0610
9/16-18	1.1/16-12					JFFS10K-0612
3/4-16	3/4-16	JHN10K-0808	JME10K-0808	JPC10K-0808	JHP10K-0808	JFFS10K-0808
7/8-14	7/8-14	JHN10K-1010	JME10K-1010	JPC10K-1010	JHP10K-1010	
1.1/16-12	1.1/16-12	JHN10K-1212	JME10K-1212	JPC10K-1212	JHP10K-1212	
1.5/16-12	1.5/16-12	JHN10K-1616	JME10K-1616	JPC10K-1616	JHP10K-1616	

JIC - NPT

Thread 1	Thread 2	Nipple	Elbow 90° Male	Swivel Nipple
7/16-20	1/8	NJHN10K-0402	NJME10K-0402	NJMFS10K-0402
7/16-20	1/4	NJHN10K-0404	NJME10K-0404	NJMFS10K-0404
7/16-20	3/8	NJHN10K-0406	NJME10K-0406	NJMFS10K-0406
1/2-20	1/4	NJHN10K-0504	NJME10K-0504	NJMFS10K-0504
9/16-18	1/4	NJHN10K-0604	NJME10K-0604	NJMFS10K-0604
9/16-18	3/8	NJHN10K-0606	NJME10K-0606	NJMFS10K-0606
9/16-18	1/2	NJHN10K-0608	NJME10K-0608	NJMFS10K-0608
3/4-16	3/8	NJHN10K-0806	NJME10K-0806	NJMFS10K-0806
3/4-16	1/2	NJHN10K-0808	NJME10K-0808	NJMFS10K-0808
3/4-16	3/4	NJHN10K-0812	NJME10K-0812	NJMFS10K-0812
7/8-14	1/2	NJHN10K-1008	NJME10K-1008	NJMFS10K-1008
7/8-14	3/4	NJHN10K-1012	NJME10K-1012	NJMFS10K-1012

X-OVERS - HP FITTINGS / MALE THREADS

Thread 1 High Pressure Couplings	Thread 2 (See article description)	Part No.	Special Transition Nipples
1/4"	7/16"	ASB-1244	Medium Pressure High Pressure Couplings x JIC male / male adapter
1/4"	9/16"	ASB-1246	Medium Pressure High Pressure Couplings x JIC male / male adapter
3/8"	7/16"	ASB-1264	Medium Pressure High Pressure Couplings x JIC male / male adapter
3/8"	9/16"	ASB-1266	Medium Pressure High Pressure Couplings x JIC male / male adapter
9/16"	7/16"	ASB-1294	Medium Pressure High Pressure Couplings x JIC male / male adapter
9/16"	9/16"	ASB-1296	Medium Pressure High Pressure Couplings x JIC male / male adapter
1/4"	1/4"	ASB-1344	Medium Pressure High Pressure Couplings x BSP male / male adapter
1/4"	3/8"	ASB-1346	Medium Pressure High Pressure Couplings x BSP male / male adapter
3/8"	1/4"	ASB-1364	Medium Pressure High Pressure Couplings x BSP male / male adapter
3/8"	3/8"	ASB-1366	Medium Pressure High Pressure Couplings x BSP male / male adapter
9/16"	1/4"	ASB-1394	Medium Pressure High Pressure Couplings x BSP male / male adapter
9/16"	3/8"	ASB-1396	Medium Pressure High Pressure Couplings x BSP male / male adapter
1/4"	1/4"	ASB-1444	Medium Pressure High Pressure Couplings x NPT male / male adapter
1/4"	3/8"	ASB-1446	Medium Pressure High Pressure Couplings x NPT male / male adapter
3/8"	1/4"	ASB-1464	Medium Pressure High Pressure Couplings x NPT male / male adapter
3/8"	3/8"	ASB-1466	Medium Pressure High Pressure Couplings x NPT male / male adapter
9/16"	1/4"	ASB-1494	Medium Pressure High Pressure Couplings x NPT male / male adapter
9/16"	3/8"	ASB-1496	Medium Pressure High Pressure Couplings x NPT male / male adapter
1/4"	7/16"	ASB-9244	High pressure High Pressure Couplings x JIC male / male adapter
3/8"	7/16"	ASB-9264	High pressure High Pressure Couplings x JIC male / male adapter
3/8"	9/16"	ASB-9266	High pressure High Pressure Couplings x JIC male / male adapter
1/4"	1/4"	ASB-9344	High pressure High Pressure Couplings x BSP male / male adapter
3/8"	1/4"	ASB-9364	High pressure High Pressure Couplings x BSP male / male adapter

Other dimensions and thread types on request.

HIGH PRESSURE FITTINGS AND TUBING

LOW PRESSURE

Pressures to 15,000 psi (1034 bar)

Since 1945 Autoclave Engineers has designed and built premium quality valves, fittings and tubing. This commitment to engineering and manufacturing excellence has earned Autoclave a reputation for reliable, efficient product performance. Autoclave Engineers has long been established as the world leader in high pressure fluid handling components for the chemical/petrochemical, research, and oil and gas industries.

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LOW PRESSURE FITTINGS AND TUBING FEATURES:

- Single-ferrule compression sleeve.
- Fast easy make-up of connection.
- Available sizes are 1/16", 1/8", 1/4", 3/8", & 1/2".
- Fittings manufactured from cold worked 316 stainless steel.
- Tubing is manufactured from dual rated 316/316L and 304/304L annealed stainless steel.
- All items available in special materials.
- Operating temperatures from -100°F (-73°C) to 650°F (343°C).
- Molybdenum disulfide-coated gland nuts to prevent galling.

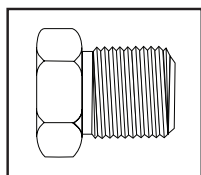
The Low Pressure Series uses Autoclave's SpeedBite connection. This single-ferrule compression sleeve connection delivers fast, easy make-up and reliable bubble-tight performance, in liquid or gas service.

Autoclave Engineers Low Pressure Fittings are designed for use with low pressure valves and tubing. These fittings feature improved SpeedBite compression connections with larger orifices for excellent flow capabilities. Autoclave fittings and components are manufactured of cold-worked type 316 stainless steel. Optional materials are available upon request.

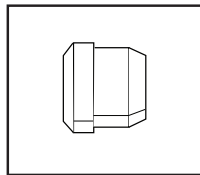


Connection Components

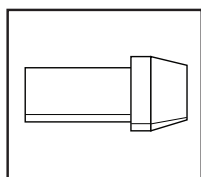
All valves and fittings are supplied complete with appropriate glands and compression sleeves. To order these components separately, use order numbers listed. When using plug, sleeve is not required.



Gland
SMN ()



Sleeve
SSL ()



Plug
SP ()

Add tube size ()
1/8" - 20
1/4" - 40
3/8" - 60
1/2" - 80

Example: 1/4" Gland - SMN 40

Note: Special material glands may be supplied with four flats in place of standard hex.

† When ordering glands separately for 10V Series 1/4" and 3/8" valves, substitute 10N for SMN.

1/16" tubing system components are available in the mini-fitting series. 1/16" tubing components can be used in 10V Series valves and fittings if required. Consult factory for information on 1/16" tubing assembly in 1/8" tubing components.

To ensure proper fit use Autoclave Engineers tubing. For mounting hole option add suffix PM to catalog number. Consult factory for mounting hole dimensions.

Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)						G Thickness	Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F			
SL2200	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	1.00 (25.40)	1.50 (38.10)	0.31 (7.87)	0.38 (9.53)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Fig. 1
SL4400	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	1.38 (35.05)	2.00 (50.80)	0.44 (11.18)	0.63 (15.88)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
SL6600	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	1.38 (35.05)	2.00 (50.80)	0.53 (13.46)	0.75 (19.05)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
SL8800	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	1.75 (44.45)	2.50 (63.50)	0.53 (13.46)	0.93 (23.62)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	

Elbow

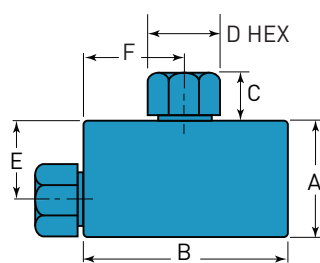
Tee

ST2220	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	1.00 (25.40)	1.50 (38.10)	0.31 (7.87)	0.38 (9.53)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Fig. 2
ST4440	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	1.38 (35.05)	2.00 (50.80)	0.44 (11.18)	0.63 (15.88)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
ST6660	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	1.38 (35.05)	2.00 (50.80)	0.53 (13.46)	0.75 (19.05)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
ST8880	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	1.75 (44.45)	2.50 (63.50)	0.53 (13.46)	0.93 (23.62)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	

Cross

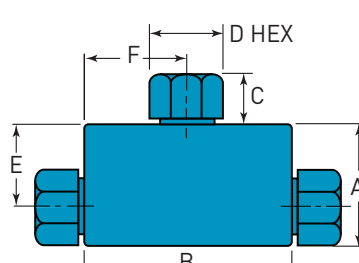
SX2222	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	1.50 (38.10)	1.50 (38.10)	0.31 (7.87)	0.38 (9.53)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Fig. 3
SX4444	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	2.00 (50.80)	2.00 (50.80)	0.44 (11.18)	0.63 (15.88)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
SX6666	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	2.00 (50.80)	2.00 (50.80)	0.53 (13.46)	0.75 (19.05)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
SX8888	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	2.50 (63.50)	2.50 (63.50)	0.53 (13.46)	0.93 (23.62)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	

Figure 1



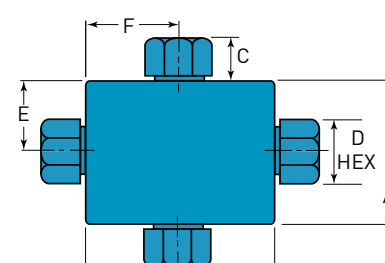
Elbow

Figure 2



Tee

Figure 3



Cross

*Maximum pressure rating is based on the lowest rating of any component.

Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change.
For prompt service, Autoclave stocks select products.
Consult your local representative.

All general terms and conditions of sale, including limitations of our liability, apply to all products and services sold.

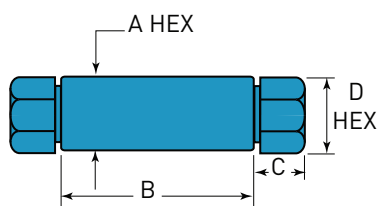
Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)							G Thickness	Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F				
15F2211	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	0.50 (12.70)	1.25 (31.75)	0.31 (7.87)	0.38 (9.53)						See Fig. 4
6F4422	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	0.62 (15.75)	1.62 (50.80)	0.44 (11.18)	0.63 (15.88)						
6F6622	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	0.75 (19.05)	1.75 (44.45)	0.53 (13.46)	0.75 (19.05)						
4F8822	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	1.00 (25.40)	2.00 (50.80)	0.53 (13.46)	0.93 (23.62)						

Straight Coupling

Bulkhead Coupling

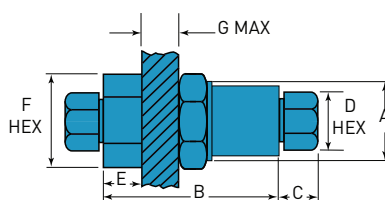
15BF2211	W125	1/8 (3.18)	15,000 (1034.19)	0.094 (2.39)	0.690 (17.53)	1.75 (44.45)	0.31 (7.87)	0.38 (9.53)	0.38 (9.53)	0.75 (19.05)	0.38 (9.53)		See Fig. 5
6BF4422	SW250	1/4 (6.35)	15,000 (1034.19)	0.188 (4.78)	0.940 (23.88)	1.88 (47.75)	0.44 (11.18)	0.63 (15.88)	0.50 (12.70)	1.00 (25.40)	0.38 (9.53)		
6BF6622	SW375	3/8 (9.53)	15,000 (1034.19)	0.250 (6.35)	0.940 (23.88)	1.88 (47.75)	0.53 (13.46)	0.75 (19.05)	0.50 (12.70)	1.00 (25.40)	0.38 (9.53)		
4BF8822	SW500	1/2 (12.70)	10,000 (689.46)	0.375 (9.53)	1.120 (28.45)	2.38 (60.45)	0.53 (13.46)	0.93 (23.62)	0.78 (19.81)	1.38 (35.05)	0.38 (9.53)		

Figure 4



Straight Coupling

Figure 5



(A=Panel hole drill size)

Bulkhead Coupling

*Maximum pressure rating is based on the lowest rating of any component.

Actual working pressure may be determined by tubing pressure rating, if lower.

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FITTINGS AND TUBING LOW PRESSURE TUBING

Pressures to 15,000 psi (1034 bar)

Autoclave Engineers offers a complete selection of annealed, seamless stainless steel tubing designed to match the performance standards of Autoclave low pressure valves and fittings. Autoclave low pressure tubing is furnished in random lengths between 20 feet (6 meters) and 26.5 feet (8.0 meters). The average is 24 feet (7.3 meters). The tubing is available in five sizes and a variety of materials. In order to ensure proper sleeve "bite" into tubing, Autoclave Engineers specifies and controls the strength levels of both the tube and sleeve materials.

INSPECTION AND TESTING

Autoclave Engineers low pressure tubing is inspected for compliance with specified defect restrictions as well as carburization or intergranular carbide precipitation. The tubing outside diameter and wall thickness is controlled within close tolerance to assure proper fit. Sample pieces of tube (for each lot) are tested to confirm mechanical properties for proper compression sleeve "bite" and pressure capability. Furthermore, the sample tubes are pressure tested as a final check.

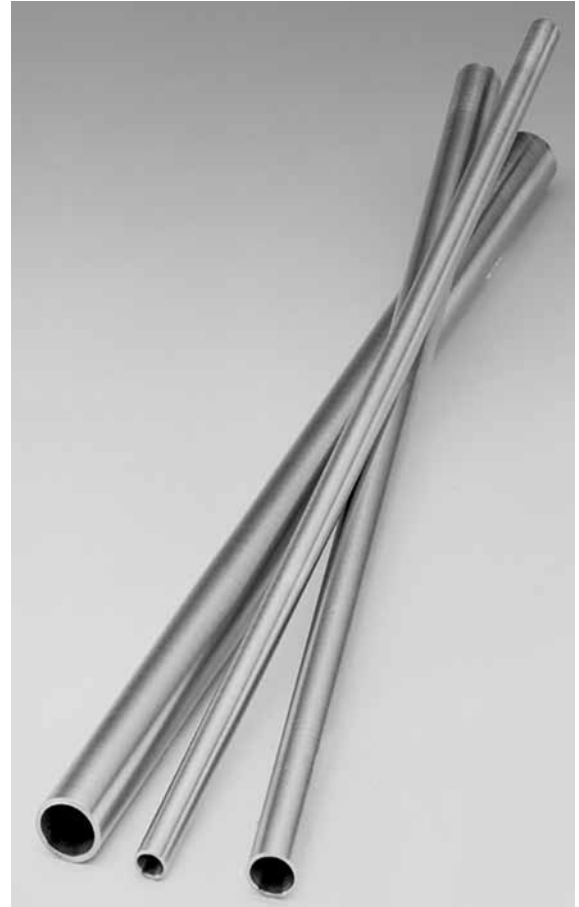
SPECIAL MATERIALS

In addition to the type 316/316L and 304/304L stainless steel tubing listed in this section, Autoclave has a limited stock of hard-to-obtain shorter lengths of the following tubing materials:
Monel 400*, Inconel 600*, Titanium Grade 2*, Nickel 200*, Hastelloy C276* - (* Trademark names)

Please consult factory for stock availability.

TUBING TOLERANCE

Nominal Tubing Size inches (mm)	Tolerance/Outside Diameter inches (mm)
1/16 (1.59)	.064/.062 (1.62/1.57)
1/8 (3.18)	.128/.125 (3.25/3.18)
1/4 (6.35)	.254/.250 (6.45/6.35)
3/8 (9.53)	.379/.375 (9.74/9.53)
1/2 (12.70)	.505/.500 (12.83/12.70)



Catalog Number	Tube Materials	Fits Connection Type	Tube Size Inches (mm)			Flow Area in. ² (mm ²)	Working Pressure psi (bar)*				
			Outside Diameter	Inside Diameter	Wall Thickness		0 - 100°F -17.8 to 37.8°C	200°F 93°C	400°F 204°C	600°F 316°C	650°F 343°C
MS15-070	316SS	W062	1/16 (1.59)	0.026 (0.66)	0.018 (0.46)	0.0005 (0.32)	15,000 (1034.20)	15,000 (1034.20)	14,400 (992.83)	13,600 (937.67)	12,600 (868.73)
MS15-200	316SS	W125		0.052 (1.32)	0.036 (0.91)	0.002 (1.29)	15,000 (1034.20)	15,000 (1034.20)	14,400 (992.83)	13,600 (937.67)	12,600 (868.73)
MS15-166**	304SS			0.069 (1.75)	0.028 (0.71)	0.004 (2.58)	9,950 (686.02)	9,400 (648.10)	8,550 (589.49)	8,450 (582.60)	8,000 (551.57)
MS15-203	316SS	W250 or SW250	1/4 (6.35)	0.084 (2.13)	0.083 (2.11)	0.029 (18.71)	15,000 (1034.16)	15,000 (1034.16)	14,400 (992.83)	13,600 (937.67)	12,600 (868.73)
MS15-055	316SS			0.125 (3.18)	0.062 (1.57)	0.012 (7.74)	11,650 (803.23)	11,650 (761.86)	11,250 (775.65)	10,600 (730.83)	9,850 (679.12)
MS15-161**	304SS			0.180 (4.57)	0.035 (0.89)	0.026 (16.77)	5,450 (375.76)	5,150 (355.07)	4,700 (324.05)	4,600 (317.15)	4,400 (303.36)
MS15-069	316SS			0.180 (4.57)	0.035 (0.89)	0.026 (16.77)	5,450 (375.76)	5,450 (375.76)	5,250 (361.97)	4,950 (341.29)	4,600 (317.15)
MS15-158**	304SS			0.194 (4.93)	0.028 (0.71)	0.029 (18.71)	4,600 (317.15)	4,350 (299.92)	3,950 (272.34)	3,900 (272.34)	3,700 (255.10)
MS15-204	316SS	W375 or SW375	3/8 (9.53)	0.139 (3.53)	0.118 (3.00)	0.015 (9.79)	15,000 (1034.16)	15,000 (1034.16)	14,400 (992.83)	13,600 (937.67)	12,600 (868.73)
MS15-184	304SS			0.195 (4.95)	0.090 (2.29)	0.030 (19.35)	10,000 (689.46)	9,400 (648.10)	8,600 (592.94)	8,500 (586.05)	8,450 (582.60)
MS15-084	316SS			0.195 (4.95)	0.090 (2.29)	0.030 (19.35)	10,000 (689.46)	10,000 (689.46)	9,650 (665.33)	9,000 (620.52)	8,400 (579.15)
MS15-155**	304SS			0.250 (6.35)	0.062 (1.57)	0.049 (31.61)	7,500 (517.10)	7,100 (489.52)	6,450 (444.70)	6,350 (437.81)	6,050 (417.13)
MS15-062	316SS			0.250 (6.35)	0.062 (1.57)	0.049 (31.61)	7,500 (517.10)	7,500 (517.10)	7,200 (496.41)	6,800 (468.84)	6,300 (434.36)
MS15-162**	304SS			0.305 (7.75)	0.035 (0.89)	0.073 (47.10)	3,800 (262.00)	3,550 (244.76)	3,250 (224.08)	3,200 (220.63)	3,050 (210.29)
MS15-205	316SS	W500 or SW500	1/2 (12.70)	0.270 (6.86)	0.118 (3.00)	0.055 (35.48)	10,000 (689.46)	10,000 (689.46)	9,650 (665.33)	9,000 (620.52)	8,400 (579.15)
MS15-208**	304SS			0.270 (6.86)	0.118 (3.00)	0.055 (35.48)	10,000 (689.46)	9,400 (648.10)	8,600 (592.94)	8,500 (586.05)	8,450 (582.60)
MS15-065	316SS			0.375 (9.53)	0.062 (1.57)	0.110 (70.97)	5,500 (379.21)	5,500 (379.21)	5,250 (361.97)	4,950 (341.29)	4,600 (317.15)
MS15-165**	304SS			0.402 (10.21)	0.048 (1.22)	0.127 (81.94)	4,000 (275.79)	3,750 (258.55)	3,400 (234.42)	3,400 (234.42)	3,200 (220.63)

*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change.
For prompt service, Autoclave stocks select products. Consult your local representative.

**Items are being discontinued. Contact the factory for available stock

HIGH PRESSURE FITTINGS AND TUBING MEDIUM PRESSURE

Pressures to 20,000 psi (1379 bar)

Since 1945 Autoclave Engineers has designed and built premium quality valves, fittings and tubing. This commitment to engineering and manufacturing excellence has earned Autoclave a reputation for reliable, efficient product performance. Autoclave Engineers has long been established as the world leader in high pressure fluid handling components for the chemical/petrochemical, research, and oil and gas industries.

MEDIUM PRESSURE FITTINGS, TUBING AND NIPPLES FEATURES:

- Coned-and-Threaded Connection.
- Available sizes are 1/4", 3/8", 9/16", 3/4", 1" and 1-1/2".
- Fittings manufactured from cold worked 316 stainless steel.
- Tubing is manufactured from dual rated 316/316L and 304/304L cold worked stainless steel.
- Operating Temperatures from -423°F (-252°C) to 1200°F (649°C).
- Anti-vibration connection components available.
- All items available in special material.

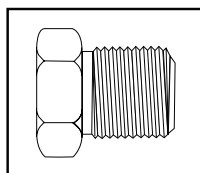
The medium pressure series uses Autoclave's medium pressure connection. This coned-and-threaded connection features orifice sizes to match the high flow characteristics of this series.

Autoclave Engineers medium pressure fittings, Series SF, are designed for use with Series 20SM medium pressure valves and Autoclave medium pressure tubing. They incorporate medium pressure coned-and-threaded connections with orifices sized to match the high-flow Series 20SC valves.

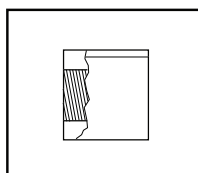


Connection Components

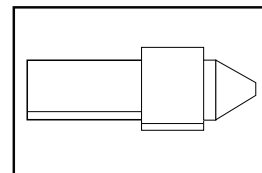
All Autoclave valves and fittings are supplied complete with appropriate glands and collars. To order these components separately, use order numbers listed. When using plug, collar is not required.



Gland
CGLX ()



Collar
CCLX ()



Plug
CPX ()

Add tube size ()

- 1/4" - 40
- 3/8" - 60
- 9/16" - 90
- 3/4" - 120
- 1" - 160
- 1-1/2" - 240

Example:

1/4" Gland - CGLX 40

To ensure proper fit use Autoclave Engineers tubing.

Note: Special material glands may be supplied with four flats in place of standard hex.

Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)						G Thickness	Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F			

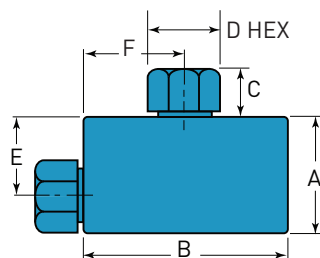
Elbow

CLX4400	SF250CX	1/4 (6.35)	20,000 (1378.93)	0.125 (3.18)	1.12 (28.45)	1.50 (38.10)	0.38 (9.53)	0.50 (12.70)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Fig. 1
CLX6600	SF375CX	3/8 (9.53)	20,000 (1378.93)	0.219 (5.56)	1.38 (35.05)	2.00 (50.80)	0.44 (11.10)	0.62 (15.75)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
CLX9900	SF562CX	9/16 (14.29)	20,000 (1378.93)	0.359 (9.12)	1.75 (44.45)	2.50 (63.50)	0.53 (13.46)	0.94 (23.88)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	
CLX12	SF750CX	3/4 (19.05)	20,000 (1378.93)	0.516 (13.11)	2.25 (57.15)	3.00 (76.20)	0.62 (15.75)	1.19 (30.23)	1.50 (38.10)	1.50 (38.10)		1.38 (34.93)	
CLX16	SF1000CX	1 (25.40)	20,000 (1378.93)	0.688 (17.48)	3.00 (76.20)	4.12 (104.65)	0.72 (18.29)	1.38 (35.05)	2.06 (52.32)	2.06 (52.32)		1.75 (44.45)	
CLX24	SF1500CX	1-1/2 (38.10)	15,000 (1034.20)	0.94 (23.80)	4.00 (101.60)	5.75 (146.05)	1.12 (28.45)	1.88 (47.63)	2.88 (73.03)	2.88 (73.03)		2.25 (57.15)	

Tee

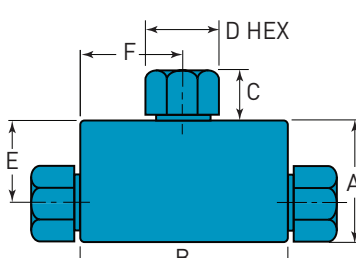
CTX4440	SF250CX	1/4 (6.35)	20,000 (1378.93)	0.125 (3.18)	1.12 (28.45)	1.50 (38.10)	0.38 (9.53)	0.50 (12.70)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Fig. 1
CTX6660	SF375CX	3/8 (9.53)	20,000 (1378.93)	0.219 (5.56)	1.38 (35.05)	2.00 (50.80)	0.44 (11.10)	0.62 (15.75)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
CTX9990	SF562CX	9/16 (14.29)	20,000 (1378.93)	0.359 (9.12)	1.75 (44.45)	2.50 (63.50)	0.53 (13.46)	0.94 (23.88)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	
CTX12	SF750CX	3/4 (19.05)	20,000 (1378.93)	0.516 (13.11)	2.25 (57.15)	3.00 (76.20)	0.62 (15.75)	1.19 (30.23)	1.50 (38.10)	1.50 (38.10)		1.38 (34.93)	
CTX16	SF1000CX	1 (25.40)	20,000 (1378.93)	0.688 (17.48)	3.00 (76.20)	4.12 (104.65)	0.72 (18.29)	1.38 (35.05)	2.06 (52.32)	2.06 (52.32)		1.75 (44.45)	
CTX24	SF1500CX	1-1/2 (38.10)	15,000 (1034.20)	0.94 (23.80)	4.00 (101.60)	5.75 (146.05)	1.12 (28.45)	1.88 (47.63)	2.88 (73.03)	2.88 (73.03)		2.25 (57.15)	

Figure 1



Elbow

Figure 2



Tee

*Maximum pressure rating is based on the lowest rating of any component.

Actual working pressure may be determined by tubing pressure rating, if lower.

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For mounting hole option add suffix PM to catalog number.
Consult factory for mounting hole dimensions.

Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)						G Thickness	Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F			

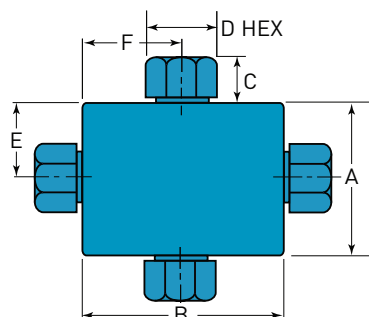
Cross

CXX4444	SF250CX	1/4 (6.35)	20,000 (1378.93)	0.125 (3.18)	1.50 (38.10)	1.50 (38.10)	0.38 (9.53)	0.50 (12.70)	0.75 (19.05)	0.75 (19.05)		0.62 (15.75)	See Fig. 3
CXX6666	SF375CX	3/8 (9.53)	20,000 (1378.93)	0.219 (5.56)	2.00 (50.80)	2.00 (50.80)	0.44 (11.10)	0.62 (15.75)	1.00 (25.40)	1.00 (25.40)		0.75 (19.05)	
CXX9999	SF562CX	9/16 (14.29)	20,000 (1378.93)	0.359 (9.12)	2.50 (63.50)	2.50 (63.50)	0.53 (13.46)	0.94 (23.88)	1.25 (31.75)	1.25 (31.75)		1.00 (25.40)	
CXX12	SF750CX	3/4 (19.05)	20,000 (1378.93)	0.516 (13.11)	3.00 (76.20)	3.00 (76.20)	0.62 (15.75)	1.19 (30.23)	1.50 (38.10)	1.50 (38.10)		1.38 (34.93)	
CXX16	SF1000CX	1 (25.40)	20,000 (1378.93)	0.688 (17.48)	4.12 (104.65)	4.12 (104.65)	0.72 (18.29)	1.38 (35.05)	2.06 (52.32)	2.06 (52.32)		1.75 (44.45)	
CXX24	SF1500CX	1-1/2 (38.10)	15,000 (1034.20)	0.94 (23.80)	5.75 (146.05)	5.75 (146.05)	1.12 (28.45)	1.88 (47.63)	2.88 (73.03)	2.88 (73.03)		2.25 (57.15)	

Straight Coupling / Union Coupling

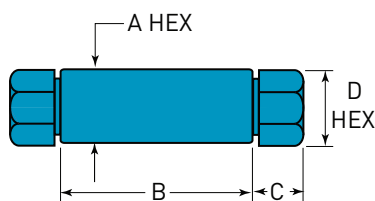
20FX4466 20UF4466	SF250CX	1/4 (6.35)	20,000 (1378.93)	0.125 (3.18)	0.62 (15.75)	1.62 (41.15)	0.38 (9.53)	0.50 (12.70)			Straight Union	See Fig. 4
20FX6666 20UF6666	SF375CX	3/8 (9.53)	20,000 (1378.93)	0.219 (5.56)	0.75 (19.05)	1.75 (44.45)	0.44 (11.10)	0.62 (15.75)			Straight Union	
20FX9966 20UF9966	SF562CX	9/16 (14.29)	20,000 (1378.93)	0.359 (9.12)	1.00 (25.40)	2.12 (53.85)	0.53 (13.46)	0.94 (23.88)			Straight Union	
20FX12 20UF12	SF750CX	3/4 (19.05)	20,000 (1378.93)	0.516 (13.11)	1.38 (35.05)	2.50 (63.50)	0.62 (15.75)	1.19 (30.23)			Straight Union	
20FX16 20UF16	SF1000CX	1 (25.40)	20,000 (1378.93)	0.688 (17.48)	1.75 (44.45)	3.50 (88.90)	0.72 (18.29)	1.38 (35.05)			Straight Union	
15FX24 15UF24	SF1500CX	1-1/2 (38.10)	15,000 (1034.20)	0.94 (23.80)	2.25 (25.15)	5.00 (127.00)	1.12 (28.45)	1.88 (47.63)			Straight Union	

Figure 3



Cross

Figure 4



Straight Coupling / Union Coupling

*Maximum pressure rating is based on the lowest rating of any component.

Actual working pressure may be determined by tubing pressure rating, if lower.

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Consult your local representative.

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For mounting hole option add suffix PM to catalog number.
Consult factory for mounting hole dimensions.

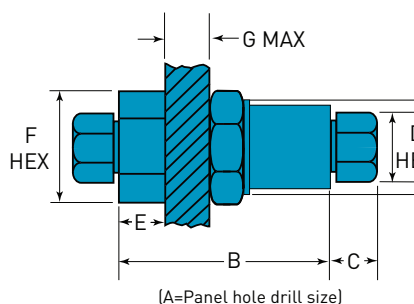
Union Couplings are designed with a removable seat insert allowing disassembly and tubing removal without the necessity of loosening other items in a line.

Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)							G Thickness	Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F				

Bulkhead Coupling

20BFX4466	SF250CX	1/4 (6.35)	20,000 (1378.93)	0.125 (3.18)	0.81 (20.57)	1.88 (47.75)	0.38 (9.53)	0.50 (12.70)	0.53 (13.46)	1.00 (25.40)	0.38 (9.53)			See Fig. 5
20BFX6666	SF375CX	3/8 (9.53)	20,000 (1378.93)	0.219 (5.56)	0.94 (23.88)	2.00 (50.80)	0.44 (11.10)	0.62 (15.75)	0.62 (15.75)	1.00 (25.40)	0.38 (9.53)			
20BFX9966	SF562CX	9/16 (14.29)	20,000 (1378.93)	0.359 (9.12)	1.12 (28.45)	2.38 (60.45)	0.53 (13.46)	0.94 (23.88)	0.78 (19.81)	1.38 (35.05)	0.38 (9.53)			
20BFX12	SF750CX	3/4 (19.05)	20,000 (1378.93)	0.516 (13.11)	1.69 (42.93)	2.62 (66.55)	0.62 (15.75)	1.19 (30.23)	0.91 (23.11)	1.88 (47.75)	0.38 (9.53)			
20BFX16	SF1000CX	1 (25.40)	20,000 (1378.93)	0.688 (17.48)	1.94 (49.28)	3.50 (88.90)	0.72 (18.29)	1.38 (35.05)	1.50 (38.10)	1.88+ (47.75)	0.38 (9.53)			
15BFX24	SF1500CX	1-1/2 (38.10)	15,000 (1034.20)	0.94 (23.80)	2.44 (61.85)	5.00 (127.00)	1.12 (28.45)	1.88 (47.63)	2.00 (50.80)	2.50+ (63.50)	0.38 (9.53)			

Figure 5



Bulkhead Coupling

*Maximum pressure rating is based on the lowest rating of any component. Actual working pressure may be determined by tubing pressure rating, if lower.

+ distance across flats

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For mounting hole option add suffix PM to catalog number. Consult factory for mounting hole dimensions.

FITTINGS, TUBING AND NIPPLES

MEDIUM PRESSURE TUBING

Pressures to 20,000 psi (1379 bar)

Autoclave Engineers offers a complete selection of austenetic, cold drawn stainless steel tubing designed to match the performance standards of Autoclave valves and fittings. Autoclave medium pressure tubing is manufactured specifically for high pressure applications requiring both strength and corrosion resistance. The tubing is furnished in random lengths between 20 feet (6 meters) and 26.5 feet (8.0 meters). The average is 24 feet (7.3 meters). Medium Pressure Tubing is available in six sizes and a variety of materials.

INSPECTION AND TESTING

Autoclave Engineer's medium pressure tubing is inspected to assure freedom from seams, laps, fissures or other flaws, as well as carburization or intergranular carbide precipitation. The outside and inside diameters of the tubing are subject to special inspection and are controlled within close tolerances to assure proper fit. Sample pieces of tube for each lot are tested to confirm mechanical properties. Hydrostatic testing is also performed on a statistical basis and is conducted at the working pressure of the tube. Autoclave will perform 100% hydrostatic testing at additional cost if desired.

SPECIAL MATERIALS

In addition to the type 316/316L and 304/304L stainless steel tubing listed in this section, Autoclave has limited stock of hard-to-obtain special tubing materials:

Monel 400*, Inconel 600*, Inconel 625*, Duplex, Super Duplex, Titanium Grade 2*, Nickel 200*, Hastelloy C276*
 (*Trademark names)

Some are available in shorter lengths only.
 Please consult factory for stock availability.

TUBING TOLERANCE

Nominal Tubing Size inches (mm)	Tolerance/Outside Diameter inches (mm)
1/4 (6.35)	.248/.243 (6.30/6.17)
3/8 (9.53)	.370/.365 (9.40/9.27)
9/16 (14.27)	.557/.552 (14.15/14.02)
3/4 (19.05)	.745/.740 (18.92/18.80)
1 (25.40)	.995/.990 (25.27/25.14)
1-1/2 (38.10)	1.495/1.490 (37.98/37.85)



Catalog Number	Tube Materials	Fits Connection Type	Tube Size Inches (mm)			Flow Area in. ² (mm ²)	Working Pressure psi (bar)*				
			Outside Diameter	Inside Diameter	Wall Thickness		-423 to 100°F -252 to 37.8°C	200°F 93°C	400°F 204°C	600°F 316°C	800°F 427°C
MS15-092	316SS	SF250CX	1/4 (6.35)	0.109 (2.77)	0.070 (1.78)	0.009 (5.81)	20,000 (1378.93)	20,000 (1378.93)	19,250 (1327.22)	18,050 (1244.48)	16,800 (1158.30)
MS15-192	304SS						20,000 (1378.93)	18,950 (1306.54)	17,200 (1185.88)	17,000 (1172.09)	16,150 (1113.49)
MS15-093	316SS	SF375CX	3/8 (9.53)	0.203 (5.16)	0.086 (2.18)	0.032 (20.65)	20,000 (1378.93)	20,000 (1378.93)	19,250 (1327.22)	18,050 (1244.48)	16,800 (1158.30)
MS15-193	304SS						20,000 (1378.93)	20,000 (1378.93)	19,250 (1327.22)	18,050 (1244.48)	16,800 (1158.30)
MS15-085	316SS	SF562CX	9/16 (14.29)	0.312 (7.92)	0.125 (3.18)	0.076 (49.03)	20,000 (1378.93)	20,000 (1378.93)	19,250 (1327.22)	18,050 (1244.48)	16,800 (1158.30)
MS15-187	304SS						20,000 (1378.93)	20,000 (1378.93)	19,250 (1327.22)	18,050 (1244.48)	16,800 (1158.30)
MS15-097	316SS	SF562CX	9/16 (14.29)	0.359 (9.12)	0.101 (2.57)	0.101 (65.16)	15,000 (1034.16)	15,000 (1034.16)	14,400 (992.83)	13,650 (941.12)	12,670 (873.55)
MS15-194	304SS						15,000 (1034.16)	14,170 (976.97)	12,900 (889.41)	12,750 (879.07)	12,670 (873.55)
MS15-095	316SS	SF750CX	3/4 (19.05)	0.438 (11.13)	0.156 (3.96)	0.151 (97.42)	20,000 (1378.93)	20,000 (1378.93)	19,250 (1327.22)	18,050 (1244.48)	16,800 (1158.30)
MS15-098	316SS						15,000 (1034.16)	15,000 (1034.16)	14,400 (992.83)	13,650 (941.12)	12,670 (873.55)
MS15-096	316SS	SF1000CX	1 (25.40)	0.562 (14.27)	0.219 (5.56)	0.248 (160.00)	20,000 (1378.93)	20,000 (1378.93)	19,250 (1327.22)	18,050 (1244.48)	16,800 (1158.30)
MS15-099	316SS						15,000 (1034.16)	15,000 (1034.16)	14,400 (992.83)	13,650 (941.12)	12,670 (873.55)
13041	316SS	SF1500CX	1-1/2 (38.10)	0.937 (23.80)	0.281 (7.15)	0.589 (444.88)	15,000 (1034.16)	15,000 (1034.16)	14,430 (994.90)	13,530 (932.85)	12,600 (868.73)

Note: Caution should be exercised in proper selection of Medium Pressure Tubing based on actual operating conditions. Two series available: 15,000 psi (1034 bar) and 20,000 psi (1379 bar).

*Maximum pressure rating is based on the lowest rating of any component. Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change. For prompt service, Autoclave stocks select products. Consult your local representative.

All general terms and conditions of sale, including limitations of our liability, apply to all products and services sold.

FITTINGS, TUBING AND NIPPLES MEDIUM PRESSURE CONED-AND-THREADED NIPPLES

Pressures to 20,000 psi (1379 bar)

For rapid system make-up, Autoclave Engineers supplies pre-cut, coned-and-threaded nipples in various sizes and lengths for Autoclave medium pressure valves and fittings.

SPECIAL LENGTHS

In addition to the standard lengths listed in the table below, nipples are available in any custom length. Consult factory.

MATERIALS**

Catalog numbers in table refer to Type 316 Stainless steel.
Optional materials available. Consult factory.



Catalog Number							Fits Connection Type	Tube Size inches (mm)		Working Pressure at 100°F psi (bar)*
Nipple Length In (mm)								O.D.	I.D.	
2.75" (69.85)	3.00" (76.20)	4.00" (101.60)	6.00" (152.40)	8.00" (203.20)	10.00" (254.00)	12.00" (304.80)				
CNX4402-316	CNX4403-316	CNX4404-316	CNX4406-316	CNX4408-316	CNX44010-316	CNX44012-316	SF250CX	1/4 (6.35)	0.109 (2.77)	20,000 (1378.93)
	CNX6603-316	CNX6604-316	CNX6606-316	CNX6608-316	CNX66010-316	CNX66012-316	SF375CX	3/8 (9.53)	0.203 (5.16)	20,000 (1378.93)
		CNX9904-316	CNX9906-316	CNX9908-316	CNX99010-316	CNX99012-316	SF562CX	9/16 (14.29)	0.312 (7.92)	20,000 (1378.93)
		CNLX9904-316	CNLX9906-316	CNLX9908-316	CNLX99010-316	CNLX99012-316	SF562CX	9/16 (14.29)	0.359 (9.12)	15,000 (1034.16)
		CNLX1204-316	CNLX1206-316	CNLX1208-316	CNLX12010-316	CNLX12012-316	SF750CX	3/4 (19.05)	0.438 (11.13)	20,000 (1378.93)
		CNLX1204-316	CNLX1206-316	CNLX1208-316	CNLX12010-316	CNLX12012-316	SF750CX	3/4 (19.05)	0.516 (13.11)	15,000 (1034.16)
			CNX1606-316	CNX1608-316	CNX16010-316	CNX16012-316	SF1000CX	1 (25.40)	0.562 (14.27)	20,000 (1378.93)
			CNLX1606-316	CNLX1608-316	CNLX16010-316	CNLX16012-316	SF1000CX	1 (25.40)	0.688 (17.48)	15,000 (1034.16)
			CNLX2406-316	CNLX2408-316	CNLX24010-316	CNLX24012-316	SF1500CX	1-1/2 (38.10)	0.937 (23.79)	15,000 (1034.16)

Note: Caution should be exercised when selecting medium pressure nipples since two series are available: 15,000 psi (1034.16 bar) and 20,000 psi (1379 bar)

See medium pressure tubing section for pressures at various temperatures.

*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

**Type 304 Stainless Steel nipples available.

All dimensions for reference only and subject to change.

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HIGH PRESSURE FITTINGS AND TUBING

HIGH PRESSURE

Pressures to 150,000 psi (10342 bar)

Since 1945 Autoclave Engineers has designed and built premium quality valves, fittings and tubing. This commitment to engineering and manufacturing excellence has earned Autoclave a reputation for reliable, efficient product performance. Autoclave Engineers has long been established as the world leader in high pressure fluid handling components for the chemical/petrochemical, research, and oil and gas, waterjet, and waterblast industries.

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HIGH PRESSURE FITTINGS, TUBING AND NIPPLES FEATURES:

- Coned-and-Threaded Connection.
- Available sizes are 1/4, 5/16, 3/8, 9/16, and 1".
- Fittings manufactured from 316 cold worked or high strength stainless steel.
- Tubing is manufactured from dual rated 316/316L and 304/304L cold worked stainless steel.
- Operating Temperatures from -423°F (-252°C) to 1200°F (649°C).
- Anti-vibration connection components available.
- Ultra-high pressure components.
- Autofrettaged tubing.
- High pressure high cycle tubing.

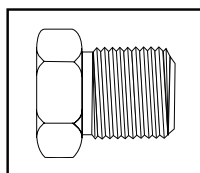
The high and ultra-high pressure series uses Autoclave's high pressure connector. This coned-and-threaded connection provides dependable performance in gas or liquid service.



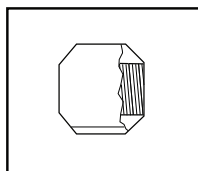
SF are the industry standard for pressures to 150,000 psi (10342 bar). Utilizing Autoclave Engineers high pressure coned-and-threaded connections, these fittings are correlated with Series 30SC, 43SC, 30VM, 40VM, 60VM, 100VM, and 150V valves and Autoclave Engineers high pressure tubing.

Connection Components

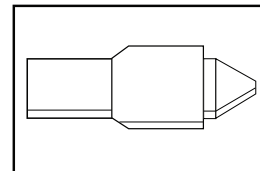
All Autoclave Engineers valves and fittings are supplied complete with appropriate glands and collars. To order these components separately, use order numbers listed. When using plug, collar is not required.



Gland
AGL ()



Collar
ACL ()



Plug
AP ()

Add tube size ()

1/4" - 40
5/16" - 50
3/8" - 60
9/16" - 90
1" - 160

Example:

9/16" Gland - AGL (90)

To ensure proper fit use Autoclave Engineers tubing.

Note: Special material glands may be supplied with four flats in place of standard hex.

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Connection Type	Gland	Collar	Plug	Connection Components (Industry Standard)
F250C F375C F562C	AGL ()	ACL ()	AP ()	Autoclave Engineer's high pressure fittings 1/4, 3/8 and 9/16 Autoclave Engineer's high pressure fittings 1/4, 3/8 and 9/16 connection components to 60,000 psi (4137 bar). For use with 30VM, 40VM, 60VM valves and fittings.
F1000C43	CGLX160	CCLX160	43CP160	Autoclave Engineer's high pressure 1" connection components to 43,000 psi (2965 bar) for use with 30SC, 43Y valves, and fittings.
F312C150	CGL50	CCL50	CP50	Autoclave Engineer's ultra high pressure 5/16 connection components to 150,000 psi (10342 bar) for use with 100VM and 150V valve and fittings.
	100CGL40 100CGL60	100CCL40 100CCL60	100CP40 100CP60	Autoclave Engineer's 100,000 psi (6895 bar) connection components utilize our 5/16" connection for 1/4" and 3/8" tubing. (See Note*)

Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)						G Thickness	Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F			

Elbow

CL4400	F250C	1/4 (6.35)	60,000 (4136.79)	0.094 (2.39)	1.00 (25.40)	1.50 (38.10)	0.50 (12.70)	0.63 (15.88)	0.62 (15.75)	0.88 (22.35)		0.75 (19.05)	
100CL4400	F312C150	1/4 (6.35)	100,000 (6894.65)	0.094 (2.39)	2.12 (53.85)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CL5500	F312C150	5/16 (7.94)	150,000 (10341.97)	0.094 (2.39)	2.12 (53.85)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CL6600	F375C	3/8 (9.53)	60,000 (4136.79)	0.125 (3.18)	1.50 (38.10)	2.00 (50.80)	0.52 (13.21)	0.81 (20.62)	1.00 (25.40)	1.25 (31.75)		1.00 (25.40)	
100CL6600	F312C150	3/8 (9.53)	100,000 (6894.65)	0.094 (2.39)	2.12 (53.85)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CL9900	F562C	9/16 (14.29)	60,000 (4136.79)	0.188 (4.78)	1.88 (47.75)	2.62 (66.55)	0.81 (20.57)	1.19 (30.23)	1.12 (28.45)	1.88 (47.75)		1.50 (38.10)	
40CL9900	F562C40	9/16 (14.29)	40,000 (2757.86)	0.250 (6.35)	1.88 (47.75)	2.62 (66.55)	0.81 (20.57)	1.19 (30.23)	1.12 (28.45)	1.88 (47.75)		1.50 (38.10)	
43CL16	F1000C43	1 (25.40)	43,000 (2964.70)	0.438 (11.13)	3.00 (76.20)	4.12 (104.65)	0.72 (18.29)	1.38 (35.05)	2.06 (52.32)	2.06 (52.32)		1.75 (44.45)	

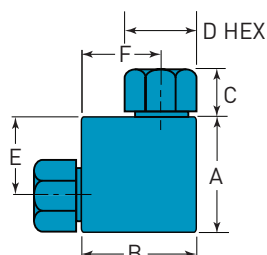
See Fig. 1

Tee

CT4440	F250C	1/4 (6.35)	60,000 (4136.79)	0.094 (2.39)	1.25 (31.75)	2.00 (50.80)	0.50 (12.70)	0.63 (15.88)	0.88 (22.35)	1.00 (25.40)		1.00 (25.40)	
100CT4440	F312C150	1/4 (6.35)	100,000 (6894.65)	0.094 (2.39)	2.12 (53.85)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CT5550	F312C150	5/16 (7.94)	150,000 (10341.97)	0.094 (2.39)	2.12 (53.85)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CT6660	F375C	3/8 (9.53)	60,000 (4136.79)	0.125 (3.18)	1.56 (39.62)	2.00 (50.80)	0.52 (13.21)	0.81 (20.62)	1.06 (26.92)	1.00 (25.40)		1.00 (25.40)	
100CT6660	F312C150	3/8 (9.53)	100,000 (6894.65)	0.094 (2.39)	2.12 (53.85)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CT9990	F562C	9/16 (14.29)	60,000 (4136.79)	0.188 (4.78)	2.12 (53.85)	2.62 (66.55)	0.81 (20.57)	1.19 (30.23)	1.38 (35.05)	1.31 (47.75)		1.50 (38.10)	
40CT9990	F562C40	9/16 (14.29)	40,000 (2757.86)	0.250 (6.35)	2.12 (53.85)	2.62 (66.55)	0.81 (20.57)	1.19 (30.23)	1.38 (35.05)	1.88 (33.27)		1.50 (38.10)	
43CT16	F1000C43	1 (25.40)	43,000 (2964.70)	0.438 (11.13)	3.00 (76.20)	4.12 (104.65)	0.72 (18.29)	1.38 (35.05)	2.06 (52.32)	2.06 (52.32)		1.75 (44.45)	

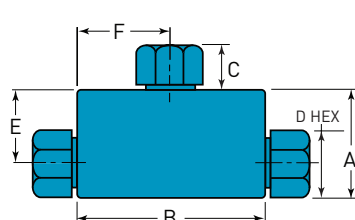
See Fig. 2

Figure 1



Elbow

Figure 2



Tee

*Maximum pressure rating is based on the lowest rating of any component. Actual working pressure may be determined by tubing pressure rating, if lower.

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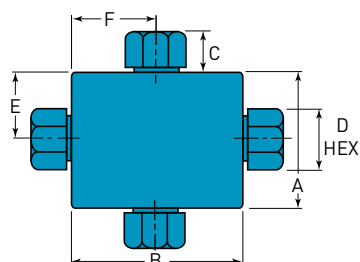
Note: Fittings such as 45° elbows, reducer elbows, and reducer 45° elbows are available upon request. For mounting hole option add suffix PM to catalog number; consult factory for mounting hole dimensions. Contact your local sales representative for additional information.

Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)						G Thickness	Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F			
CX4444	F250C	1/4 (6.35)	60,000 (4136.79)	0.094 (2.39)	1.25 (31.75)	2.00 (50.80)	0.50 (12.70)	0.63 (15.88)	0.62 (15.75)	1.00 (25.40)		1.00 (25.40)	
100CX4444	F312C150	1/4 (6.35)	100,000 (6894.65)	0.094 (2.39)	3.00 (76.20)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CX5555	F312C150	5/16 (7.94)	150,000 (10341.97)	0.094 (2.39)	3.00 (76.20)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CX6666	F375C	3/8 (9.53)	60,000 (4136.79)	0.125 (3.18)	2.12 (53.85)	2.00 (50.80)	0.52 (13.21)	0.81 (20.62)	1.06 (26.92)	1.00 (25.40)		1.00 (25.40)	
100CX6666	F312C150	3/8 (9.53)	100,000 (6894.65)	0.094 (2.39)	2.12 (76.20)	3.00 (76.20)	0.52 (13.21)	0.75 (19.05)	1.50 (38.10)	1.50 (38.10)		1.38 (35.05)	
CX9999	F562C	9/16 (14.29)	60,000 (4136.79)	0.188 (4.78)	2.75 (69.85)	2.62 (66.55)	0.81 (20.57)	1.19 (30.23)	1.38 (35.05)	1.31 (33.27)		1.50 (38.10)	
40CX9999	F562C40	9/16 (14.29)	40,000 (2757.86)	0.250 (6.35)	2.75 (69.85)	2.62 (66.55)	0.81 (20.57)	1.19 (30.23)	1.38 (35.05)	1.31 (33.27)		1.50 (38.10)	
43CX16	F1000C43	1 (25.40)	43,000 (2964.70)	0.438 (11.13)	4.12 (104.65)	4.12 (104.65)	0.72 (18.29)	1.38 (35.05)	2.06 (52.32)	2.06 (52.32)		1.75 (44.45)	

See
Fig. 3

6

Figure 3



Cross

*Maximum pressure rating is based on the lowest rating of any component. Actual working pressure may be determined by tubing pressure rating, if lower.

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Note: Fittings such as 45° elbows, reducer elbows, and reducer 45° elbows are available upon request. For mounting hole option add suffix PM to catalog number; consult factory for mounting hole dimensions. Contact your local sales representative for additional information.

Catalog Number	Connection Type	Outside Diameter Tube	Pressure Rating psi (bar)*	Minimum Opening	Dimensions - inches (mm)							G Thickness	Block Thickness	Fitting Pattern
					A	B	C	D Typical	E	F				

Straight Coupling/Union Coupling

60F4433	F250C	1/4	60,000	0.094	0.75	1.38	0.50	0.63						Straight Union
60UF4433		(6.35)	(4136.79)	(2.39)	(19.05)	(35.05)	(12.70)	(15.88)						
100F4433	F312C150	1/4	100,000	0.094	1.12	2.62	0.52	0.75						Straight Union
100UF4433		(7.94)	(10341.97)	(2.39)	(28.45)	(66.55)	(13.21)	(19.05)						
150F5533	F312C150	5/16	150,000	0.094	1.12	2.62	0.52	0.75						Straight Union
150UF5533		(7.94)	(10341.97)	(2.39)	(28.45)	(66.55)	(13.21)	(19.05)						
60F6633	F375C	3/8	60,000	0.125	1.00	1.75	0.53	0.81						Straight Union
60UF6633		(9.53)	(4136.79)	(3.18)	(25.40)	(44.45)	(13.46)	(20.62)						
100F6633	F312C150	3/8	100,000	0.094	1.12	2.62	0.52	0.75						Straight Union
100UF6633		(9.53)	(6894.65)	(2.39)	(28.45)	(66.55)	(13.21)	(19.05)						
60F9933	F562C	9/16	60,000	0.188	1.38	2.19	0.81	1.19						Straight Union
60UF9933		(14.29)	(4136.79)	(4.78)	(35.05)	(55.63)	(20.57)	(30.23)						
40F9933	F562C40	9/16	40,000	0.250	1.38	2.19	0.81	1.19						Straight Union
40UF9933		(14.29)	(2757.86)	(6.35)	(35.05)	(55.63)	(20.57)	(30.23)						
43F16	F1000C43	1	43,000	0.438	1.75	3.50	0.72	1.38						Straight Union
43UF16		(25.40)	(2964.70)	(11.13)	(44.45)	(88.90)	(18.29)	(35.05)						

See Fig. 4

Bulkhead Coupling

60BF4433	F250C	1/4	60,000	0.094	0.94	1.88	0.50	0.63	0.50	1.00	0.38			
		(6.35)	(4136.79)	(2.39)	(23.88)	(47.75)	(12.70)	(15.88)	(12.70)	(25.40)	(9.65)			
100BF4433	F312C150	1/4	100,000	0.094	2.12	3.25	0.52	0.75	1.38	2.00	0.38			
		(6.35)	(6894.65)	(2.39)	(53.85)	(82.55)	(13.21)	(19.05)	(35.05)	(50.80)	(9.65)			
150BF5533	F312C150	5/16	150,000	0.094	2.12	3.25	0.52	0.75	1.38	2.00	0.38			
		(7.94)	(10341.97)	(2.39)	(53.85)	(82.55)	(13.21)	(19.05)	(35.05)	(50.80)	(9.65)			
60BF6633	F375C	3/8	60,000	0.125	1.12	2.38	0.53	0.81	0.78	1.38	0.38			
		(9.53)	(4136.79)	(3.18)	(28.45)	(60.45)	(13.46)	(20.62)	(19.81)	(35.05)	(9.65)			
100BF6633	F312C150	3/8	100,000	0.094	2.12	3.25	0.52	0.75	1.38	2.00	0.38			
		(9.53)	(6894.65)	(2.39)	(53.85)	(82.55)	(13.21)	(19.05)	(35.05)	(50.80)	(9.65)			
60BF9933	F562C	9/16	60,000	0.188	1.69	2.75	0.81	1.19	1.00	1.88	0.38			
		(14.29)	(4136.79)	(4.78)	(42.93)	(69.85)	(20.57)	(30.23)	(25.40)	(47.75)	(9.65)			
40BF9933	F562C40	9/16	40,000	0.250	1.69	2.75	0.81	1.19	1.00	1.88	0.38			
		(14.29)	(2757.86)	(6.35)	(42.93)	(69.85)	(20.57)	(30.23)	(25.40)	(47.75)	(9.65)			
43BF16	F1000C43	1	43,000	0.438	1.94	3.50	0.72	1.38	1.50	2.13	0.50			
		(25.40)	(2964.70)	(11.13)	(49.28)	(88.90)	(18.29)	(35.05)	(38.10)	(54.10)	(12.70)			

See Fig. 5

Figure 4

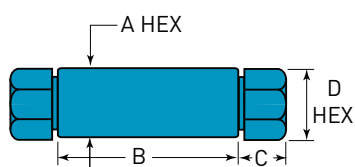
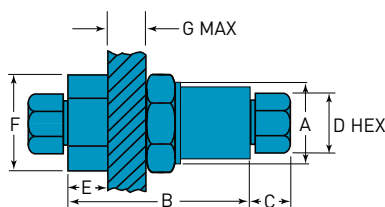


Figure 5



[A=Panel hole drill size]

Straight Coupling / Union Coupling

*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

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Bulkhead Coupling

Union Couplings are designed with a removable seat insert allowing disassembly and tubing removal without the necessity of loosening other items in a line.

FITTINGS, TUBING AND NIPPLES HIGH PRESSURE TUBING

Pressures to 150,000 psi (10342 bar)

Autoclave Engineers offers a complete selection of austenetic, cold drawn stainless steel tubing designed to match the performance standards of Autoclave valves and fittings. Autoclave high pressure tubing is manufactured specifically for high pressure applications requiring both strength and corrosion resistance. The tubing is furnished in random lengths between 20 feet (6 meters) and 26.5 feet (8.0 meters). The average is 24 feet (7.3 meters). High pressure tubing is available in five sizes and a variety of materials. Special longer lengths are available. Consult factory.

INSPECTION AND TESTING

Autoclave Engineer's high pressure tubing is inspected to assure freedom from seams, laps, fissures or other flaws, as well as carburization or intergranular carbide precipitation. The outside and inside diameters of the tubing are controlled within close tolerances. Sample pieces of tubing for each lot are tested to confirm mechanical properties. Hydrostatic testing is also performed on a statistical basis and is conducted at the working pressure of the tube. Autoclave will perform 100% hydrostatic testing at additional cost if desired.

SPECIAL MATERIALS

In addition to the type 316/316L and 304/304L stainless steel tubing listed in this section, Autoclave has limited stock of hard-to-obtain shorter lengths of the following tubing materials in some sizes:

Monel 400*, Inconel 600*, Inconel 625*, Duplex, Super Duplex, Titanium Grade 2*, Nickel 200*, Hastelloy C276*
(*Trademark names)

Some are available in shorter lengths only. Please consult factory for stock availability.

TUBING TOLERANCE

Nominal Tubing Size inches (mm)	Tolerance/Outside Diameter inches (mm)
1/4 (6.35)	.248/.243 (6.30/6.17)
5/16 (7.94)	.310/.306 (7.87/7.77)
3/8 (9.53)	.370/.365 (9.40/9.27)
9/16 (14.29)	.557/.552 (14.15/14.02)
1 (25.40)	.995/.990 (25.27/25.14)



Catalog Number	Tube Materials	Fits Connection Type	Tube Size Inches (mm)			Flow Area in. ² (mm ²)	Working Pressure psi (bar)*				
			Outside Diameter	Inside Diameter	Wall Thickness		-423 to 100°F -252 to 37.8°C	200°F 93°C	400°F 204°C	600°F 316°C	800°F 427°C
MS15-202	Stainless	[See note 3]					100,000 (6894.64)	100,000 (6894.64)	96,210 (6633.24)	90,368 (6230.55)	84,420 (5820.46)
MS15-081	316SS	F250C	1/4 (6.35)	0.083 (2.11)	0.083 (2.11)	0.005 (3.23)	60,000 (4136.79)	60,000 (4136.79)	57,750 (3981.66)	54,250 (3740.35)	50,700 (3495.59)
MS15-182	304SS						60,000 (4136.79)	56,800 (3916.16)	51,650 (3561.09)	50,700 (3495.59)	48,450 (3340.46)
MS15-082	316SS	F312C150	5/16 (7.94)	0.062 (1.57)	0.125 (3.18)	0.033 (1.94)	150,000 (10341.97)	150,000 (10341.97)	144,400 (9955.87)	136,350 (9400.85)	126,750 (8738.97)
MS15-201	Stainless	[See note 3]					100,000 (6894.64)	100,000 (6894.64)	96,210 (6633.24)	90,368 (6230.55)	84,420 (5820.46)
MS15-087	316SS	F375C	3/8 (9.53)	0.125 (3.18)	0.125 (3.18)	0.012 (7.74)	60,000 (4136.79)	60,000 (4136.79)	57,750 (3981.66)	54,250 (3740.35)	50,700 (3495.59)
MS15-183	304SS						60,000 (4136.79)	56,800 (3916.16)	51,650 (3561.09)	50,700 (3495.59)	48,450 (3340.46)
MS15-210	Stainless						100,000 (6894.64)	100,000 (6894.64)	96,210 (6633.24)	90,368 (6230.55)	84,420 (5820.46)
MS15-083	316SS	F562C	9/16 (14.29)	0.188 (4.78)	0.187 (4.75)	0.028 (18.06)	60,000 (4136.79)	60,000 (4136.79)	57,750 (3981.66)	54,250 (3740.35)	50,700 (3495.59)
MS15-185	304SS						60,000 (4136.79)	56,800 (3916.16)	51,650 (3561.09)	50,700 (3495.59)	48,450 (3340.46)
MS15-090	316SS	F562C40	9/16 (14.29)	0.250 (6.35)	0.156 (3.96)	0.048 (30.97)	40,000 (2757.86)	40,000 (2757.86)	38,500 (2654.44)	36,100 (2488.96)	33,800 (2330.39)
MS15-209	Stainless	F562C40-312	9/16 (14.29)	0.312 (7.92)	0.125 (3.18)	0.076 (49.03)	40,000 (2757.86)	40,000 (2757.86)	38,500 (2654.44)	36,100 (2488.96)	33,800 (2330.39)
MS15-211	316SS	F1000C43	1 (25.40)	0.438 (11.13)	0.281 (7.14)	0.151 (97.42)	43,000 (2964.70)	43,000 (2964.70)	43,000 (2964.70)	41,380 (2853.01)	36,330 (2504.83)
MS15-199	304SS	F1000C43	1 (25.40)	0.438 (11.13)	0.281 (7.14)	0.151 (97.42)	43,000 (2964.70)	40,600 (2799.23)	36,900 (2544.13)	36,300 (2502.76)	34,700 (2392.44)

NOTE:

- Autofrettagged tubing available (see technical Information section: Pressure Cycling for Autofrettage information)
- For High Pressure, High Cycle (HPHC) tubing, MS15-201, MS15-202, MS15-209, and MS15-210 are available. [See Technical Information section: Pressure Cycling for additional information]
- For 100,000 psi rating use F312C150 connection

*Maximum pressure rating is based on the lowest rating of any component. Actual working pressure may be determined by tubing pressure rating, if lower. All dimensions for reference only and subject to change. For prompt service, Autoclave stocks select products. Consult your local representative.

All general terms and conditions of sale, including limitations of our liability, apply to all products and services sold.

FITTINGS, TUBING AND NIPPLES HIGH PRESSURE CONED-AND-THREADED NIPPLES

Pressures to 150,000 psi (10342 bar)

For rapid system make-up, Autoclave Engineers supplies pre-cut, coned-and-threaded nipples in various sizes and lengths for Autoclave medium pressure valves and fittings.

SPECIAL LENGTHS

In addition to the standard lengths listed in the table below, nipples are available in any custom length. Consult factory.

MATERIALS**

Catalog numbers in table refer to Type 316 Stainless steel.

Note: Most items available in 304SS. Consult factory for availability.



Catalog Number							Fits Connection Type	Tube Size inches (mm)		Working Pressure* at 100°F (37.8°) psi (bar)*
Nipple Length In (mm)								O.D. (mm)	I.D. (mm)	
2.75" (69.85)	3.00" (76.20)	4.00" (101.60)	6.00" (152.40)	8.00" (203.20)	10.00" (254.00)	12.00" (304.80)				
CN4402-316	CN4403-316	CN4404-316	CN4406-316	CN4408-316	CN44010-316	CN44012-316	F250C	1/4 (6.35)	0.109 (2.77)	20,000 (1378.93)
		CN5504-316	CN5506-316	CN5508-316	CN55010-316	CN55012-316	F312C150	3/8 (9.53)	0.203 (5.16)	20,000 (1378.93)
	CN6603-316	CN6604-316	CN6606-316	CN6608-316	CN66010-316	CN66012-316	F375C	9/16 (14.29)	0.312 (7.92)	20,000 (1378.93)
		CN9904-316	CN9906-316	CN9908-316	CN99010-316	CN99012-316	F562C	9/16 (14.29)	0.359 (9.12)	15,000 (1034.16)
		40CN9904-316	40CN9906-316	40CN9908-316	40CN99010-316	40CN99012-316	F562C40	3/4 (19.05)	0.438 (11.13)	20,000 (1378.93)
			43CN1606-316	43CN1608-316	43CN16010-316	43CN16012-316	F1000C43	3/4 (19.05)	0.516 (13.11)	15,000 (1034.16)

NOTE:

See High pressure tubing section for pressure ratings at various temperatures.

Material in table is 316 Stainless steel

*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

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