



**FACE SEAL** *Fittings*



## Company Instruction

*Genstar Technologies Company Inc., a world-class manufacturer, provides high quality pressure regulators, fittings, valves, and various gas control and handling devices to various industries.*

*Founded in 1969, Genstar Technologies has emerged as a global company with distribution in over 40 countries. High quality products, and continual technological innovation have fueled Genstar's steady growth.*

*Genstar Technologies strengthens its commitment to meet increasing global demands by introducing its new line of GENTEC Ultra High Purity (UHP) products for the semiconductor industry. Its 3200 sq. ft. state-of-the-art Class 10, 100, and 1000 Cleanrooms are solely dedicated to designing and manufacturing high purity and ultra-high purity regulators, valves, fittings, and manifolds.*

*To ensure high quality and performance, all GENTEC products are manufactured using exquisite craftsmanship in conjunction with computerized automations, stringent quality control, and advanced test equipment. GENTEC UHP products provide the users great flexibility to design tubing or piping systems. With superior designs, GENTEC UHP products also provide leak tight performances and long cycle life.*



**ISO 9001 150,000 Square Foot Manufacturing Facility**

## FSR

### Face Seal Fittings

#### General Information

GENTEC specializes in design and manufacture of high quality, specially manufactured valves and fittings for High Purity and Ultra-High-Purity applications.

GENTEC FSR are made from 316/316L/316L VAR, are supplied in BA or EP, cleaned and individually bagged in clean room nylon bags and heat sealed. The inner bag is then placed in a polyethylene outer bag and heat sealed in class 100 clean room, to meet the severe demand of semi-conductor industries.



#### Materials of Construction

Material	Ordering Number Designator	Applicable Specification
<b>Glands, Bodies and Nuts</b>		
316 stainless steel	SS	Bar stock: ASME SA479, ASTM A276 Forged shapes: ASME SA182, ASTM A314
316L stainless steel	SL	Bar stock: ASME SA479, ASTM A276 Forged shapes: ASTM A182
316L VAR (Vacuum Arc Remelt) Stainless steel	SLV	Bar stock: ASME SA479, ASTM A276 Forged shapes: ASTM A182
<b>Gaskets</b>		
nickel	NI	ASTM B162
316 stainless steel	SS	ASTM A240, ASTM A167

#### Plating

The FSR female nuts are silver plated. Avoid chemical processes used for cleaning, electropolishing and passivation that will remove plating. If the plating is damaged or removed, thread galling will occur, damaging fitting components and preventing a proper seal.

#### Dimensions

\* Dimensions are in inches - for reference only, subject to change.

#### Pressure Ratings

- \* Ratings are based upon tests conducted using FSR assemblies.
- \* All ratings comply with calculations per ANSI Code for Pressure Piping B31.3.
- \* Working pressure ratings determined at room temperature. Allowable working pressure of elevated temperatures could be obtained by multiplying factor shown in the following table.

Temperature ( °F )	Factors
100	1.0
200	1.0
300	1.0
400	0.96
500	0.90
600	0.85
700	0.82
800	0.79
900	0.78
1000	0.76

# FSR

## Face Seal Fittings

### Temperature Ratings

Components	Material	Temperature	
		°F	°C
Fittings	316 stainless steel	1000	537
	316L stainless steel	1000	537
	316L VAR stainless steel	1000	537
Gaskets	316 stainless steel	1000	537
	nickel	600	315

### Testing

The FSR assembly has been helium leak tested to a rate of  $1 \times 10^{-9}$  std cc/sec without leakage.

### Ultra-High-Purity

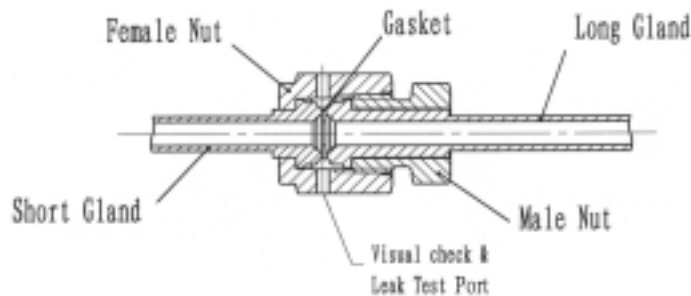
A variety of FSR face seal glands and bodies are available with controlled surface finishes, electropolished, and specially cleaned to meet Ultra-High-Purity system requirements.

### Ordering Information

To order EP fittings, use the following Designator code as a suffix to the Ordering Number. Example: SLV-VDS-FSR4-T4L7P

Surface Finish Grade	Designator	Surface Finish (Ra)
BA	-	10 $\mu\text{in.}$ (0.25 $\mu\text{m}$ )
EP	P	5 $\mu\text{in.}$ (0.13 $\mu\text{m}$ )

### Configuration



\* Female Nut: Female thread is silver-plated to prevent galling, ensure easy assembly and consistent make-up.

\* Visual check & Leak Test Port: Test port at two locations for easy leak testing.

### Heat code traceability

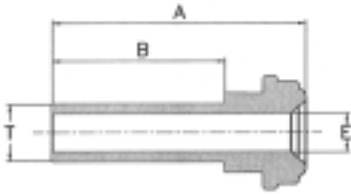
Material heat code is stamped on glands and all shapes to ensure raw material traceability.

# FSR

## Face Seal Fittings

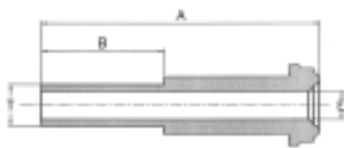
### Glands

#### Short tube butt weld



FSR Size	T Tube OD	Ordering Number	B	E	A	Normal Wall Thickness	Working Pressure (psig)
1/4"	1/4"	SL*-VDS-FSR4-T4L2	0.25	0.18	0.60	0.035	5100
1/4"	1/4"	SL*-VDS-FSR4-T4L7	0.75	0.18	1.10	0.035	5100
1/2"	3/8"	SL*-VDS-FSR8-T6L7	0.75	0.31	1.12	0.035	3300
1/2"	1/2"	SL*-VDS-FSR8-T8L2	0.25	0.40	0.62	0.049	3500
1/2"	1/2"	SL*-VDS-FSR8-T8L7	0.75	0.40	1.12	0.049	3500

#### Long tube butt weld

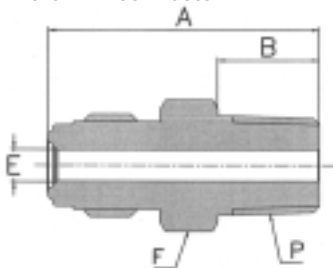


FSR Size	T Tube OD	Ordering Number	B	E	A	Normal Wall Thickness	Working Pressure (psig)
1/4"	1/4"	SL*-VD-FSR4-T4L2	0.25	0.18	1.20	0.035	5100
1/4"	1/4"	SL*-VD-FSR4-T4L7	0.75	0.18	1.70	0.035	5100
1/2"	3/8"	SL*-VD-FSR8-T6L7	0.75	0.31	1.79	0.035	3300
1/2"	1/2"	SL*-VD-FSR8-T8L2	0.25	0.40	1.29	0.049	3500
1/2"	1/2"	SL*-VD-FSR8-T8L7	0.75	0.40	1.79	0.049	3500
3/4"	3/4"	SL*-VD-FSR12-T12L7	0.75	0.65	2.03	0.049	2400

\* 316L VAR stainless steel is available, please replace **SL** with **SLV**.

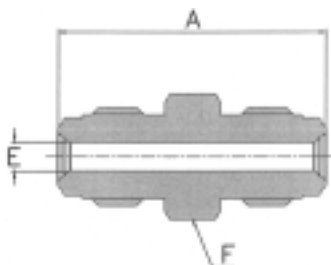
### Bodies

#### Male NPT connector



FSR Size	P Male NPT Size	Ordering Number	B	E	F Hex Flat	A	Working Pressure (psig)
1/4"	1/4"	SS-VMC-VM4-NT4	0.56	0.18	5/8	1.49	8000
1/2"	1/2"	SS-VMC-VM8-NT8	0.75	0.40	15/16	1.84	3500
3/4"	3/4"	SS-VMC-VM12-NT12	0.75	0.62	1- 5/16	2.19	3000

#### Double male union

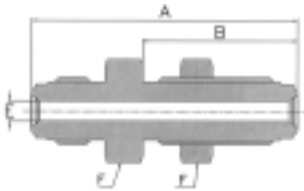


FSR Size	Ordering Number	E	F Hex Flat	A	Working Pressure (psig)
1/4"	SS-VU-VM4	0.18	5/8	1.55	8000
1/2"	SS-VU-VM8	0.40	15/16	1.84	3500
3/4"	SS-VU-VM12	0.62	1- 5/16	2.44	3000

# FSR

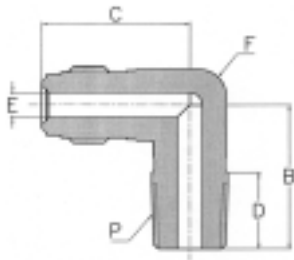
## Face Seal Fittings

### Bulkhead union



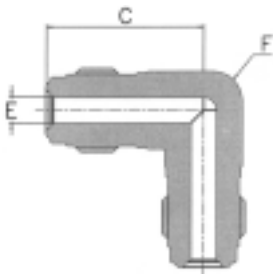
FSR Size	Ordering Number	B	E	F Hex Flat	A	Panel Hole Size	Max. Panel Thickness	Working Pressure (psig)
1/4"	SS-VBU-VM4	1.30	0.18	3/4	2.23	19/32	0.44	8000
1/2"	SS-VBU-VM8	1.48	0.40	1-1/16	2.57	29/32	0.50	3500

### FSR to male NPT elbow



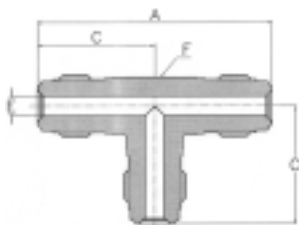
FSR Size	P Male NPT Size	Ordering Number	C	B	D	E	F Wrench Flat	Working Pressure (psig)
1/4"	1/4"	SS-VWE-VM8-NT4	1.07	1.05	0.56	0.18	1/2	8000
1/2"	1/2"	SS-VWE-VM8-NT8	1.45	1.45	0.75	0.40	13/16	3500

### Union elbow



FSR Size	Ordering Number	C	E	F Wrench Flat	Working Pressure (psig)
1/4"	SS-VUE-VM4	1.07	0.18	1/2	8000
1/2"	SS-VUE-VM8	1.45	0.40	13/16	3500
3/4"	SS-VUE-VM12	1.92	0.62	1-1/4	3000

### Union tee

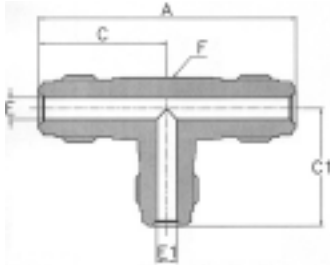


FSR Size	Ordering Number	C	E	A	F Wrench Flat	Working Pressure (psig)
1/4"	SS-VUT-VM4	1.07	0.18	2.14	1/2	8000
1/2"	SS-VUT-VM8	1.45	0.40	2.90	13/16	3500
3/4"	SS-VUT-VM12	1.92	0.62	3.84	1-1/4	3000

# FSR

## Face Seal Fittings

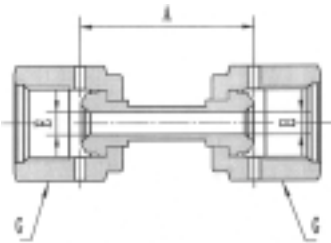
### Reducing tee



FSR Size	Ordering Number	C	C1	E	E1	A	F Wrench Flat	Working Pressure (psig)
1/2"x1/4"x1/2"	SS-VRUT-VM8-4-8	1.45	1.25	0.40	0.18	2.90	13/16	3500
3/4"x1/4"x3/4"	SS-VRUT-VM12-4-12	1.92	1.50	0.62	0.18	3.84	1-1/4	3000
3/4"x1/2"x3/4"	SS-VRUT-VM12-8-12	1.92	1.68	0.62	0.40	3.84	1-1/4	3000

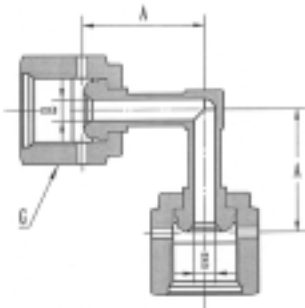
### Welded assemblies

#### Rotating female union



FSR Size	Ordering Number	E	G Hex Flat	A	Working Pressure (psig)
1/4"	SS-VSU-VSF4	0.18	3/4	1.71	8000
1/2"	SS-VSU-VSF8	0.40	1-1/16	1.84	3500

#### Female elbow



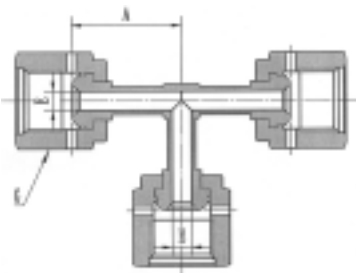
**Ordering Number: SLV-VSUE-VSF4**

**Female end: A=1.0**

**Male end: A=1.5**

Elbows are available with welded male and female ends. For more information, please contact factory.

#### Female tee



**Ordering Number: SLV-VSUT-VSF4**

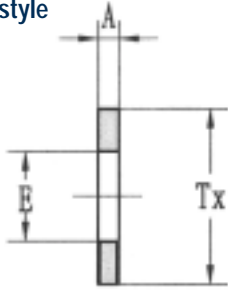
**Female end: A=1.0**

**Male end: A=1.5**

Tees are available with welded male and female ends. For more information, please contact factory.

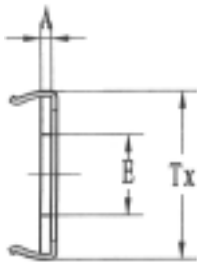
**GASKET**

**Silver Plated (Stainless Steel)  
Non-retained style**



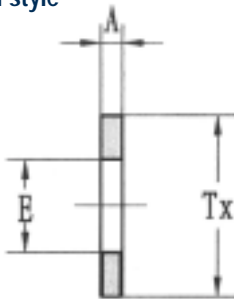
FSR Size	Ordering Number	E	A	Tx
1/4"	SS-VG-FSR4	0.22	0.026	0.47
1/2"	SS-VG-FSR8	0.44	0.026	0.78
3/4"	SS-VG-FSR12	0.66	0.026	1.14

**Silver Plated (Stainless Steel)  
Gasket retainer assembly**



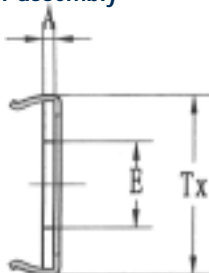
FSR Size	Ordering Number	E	A	Tx
1/4"	SS-VGR-FSR4	0.24	0.026	0.50
1/2"	SS-VGR-FSR8	0.44	0.026	0.79
3/4"	SS-VGR-FSR12	0.66	0.026	1.14

**Unplated (Nickel)  
Non-retained style**



FSR Size	Ordering Number	E	A	Tx
1/4"	NI-VGS-FSR4	0.22	0.028	0.47
1/2"	NI-VGS-FSR8	0.44	0.028	0.78
3/4"	NI-VGS-FSR12	0.66	0.028	1.14

**Unplated (Nickel)  
Gasket retainer assembly**

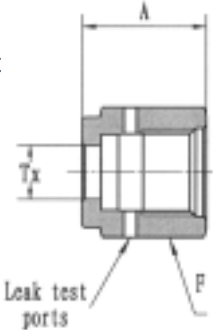
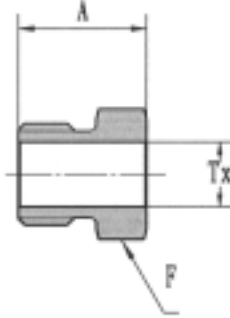
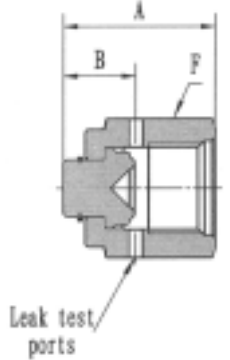
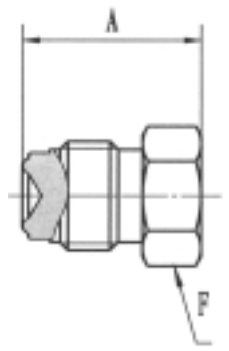


FSR Size	Ordering Number	E	A	Tx
1/4"	NI-VGRS-FSR4	0.24	0.028	0.50
1/2"	NI-VGRS-FSR8	0.44	0.028	0.79
3/4"	NI-VGRS-FSR12	0.66	0.028	1.14

# FSR

## Face Seal Fittings

### Nuts, Caps, Plugs

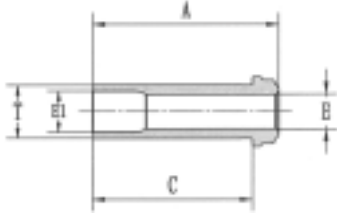
<p><b>Female Nut</b></p> 	<table border="1"> <thead> <tr> <th>FSR Size</th> <th>Ordering Number</th> <th>F Hex Flat</th> <th>A</th> <th>Tx</th> </tr> </thead> <tbody> <tr> <td>1/4"</td> <td>SS-VN-FSR4</td> <td>3/4</td> <td>0.81</td> <td>0.36</td> </tr> <tr> <td>1/2"</td> <td>SS-VN-FSR8</td> <td>1-1/16</td> <td>0.88</td> <td>0.61</td> </tr> <tr> <td>3/4"</td> <td>SS-VN-FSR12</td> <td>1-1/2</td> <td>1.12</td> <td>0.89</td> </tr> </tbody> </table>	FSR Size	Ordering Number	F Hex Flat	A	Tx	1/4"	SS-VN-FSR4	3/4	0.81	0.36	1/2"	SS-VN-FSR8	1-1/16	0.88	0.61	3/4"	SS-VN-FSR12	1-1/2	1.12	0.89
FSR Size	Ordering Number	F Hex Flat	A	Tx																	
1/4"	SS-VN-FSR4	3/4	0.81	0.36																	
1/2"	SS-VN-FSR8	1-1/16	0.88	0.61																	
3/4"	SS-VN-FSR12	1-1/2	1.12	0.89																	
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# FSR

## Face Seal Fittings

### High-Flow Connections

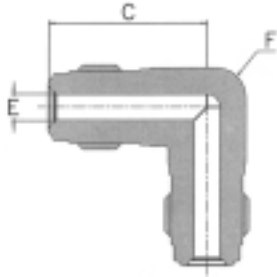
#### Glands



FSR Size	T Tube OD	Ordering Number	C	E	E1	A	Nominal Wall Thickness	Working Pressure (psig)
1/4"	3/8"	SL*-HVDS-FSR4-T6L2	0.41	0.25	0.31	0.60	0.035	3300
1/4"	3/8"	SL*-HVDS-FSR4-T6L7	1.12	0.25	0.31	1.31	0.035	3300

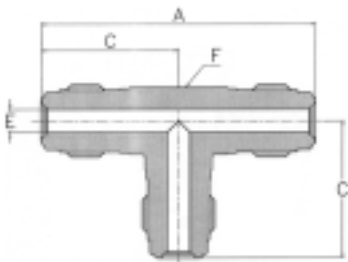
\* 316L VAR stainless steel is available, please replace **SL** with **SLV**.

#### Union elbow



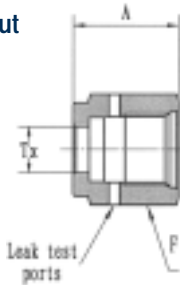
FSR Size	Ordering Number	C	E	F Wrench Flat	Working Pressure (psig)
1/4"	SS-HVUE-VM4	1.07	0.25	1/2	8000

#### Union tee



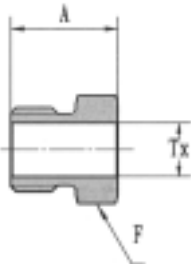
FSR Size	Ordering Number	C	E	A	F Wrench Flat	Working Pressure (psig)
1/4"	SS-HVUT-VM4	1.07	0.25	2.14	1/2	8000

#### Female Nut



FSR Size	Ordering Number	F Hex Flat	A	Tx
1/4"	SS-HVN-FSR4	3/4	0.81	0.39

#### Male Nut

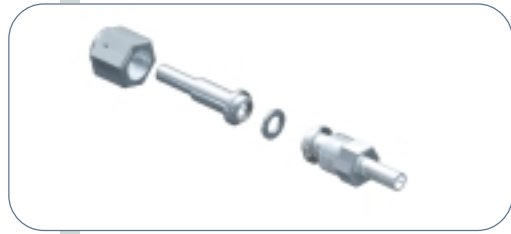


FSR Size	Ordering Number	F Hex Flat	A	Tx
1/4"	SS-HVMN-FSR4	5/8	0.71	0.39

## Assembly Instruction:

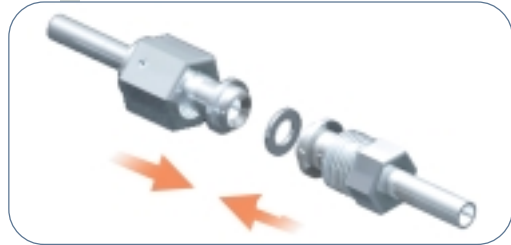
### Step 1

All face seal fittings should be protected until assembly and make up. Exercise great care that the sealing surface are not scratched, damaged or contaminated in any way during handling and assembly.



### Step 2

Insert gasket into female nut and make sure the gasket is correctly settled on proper position. Also make sure no damages on seal part while inserting gasket.



### Step 3

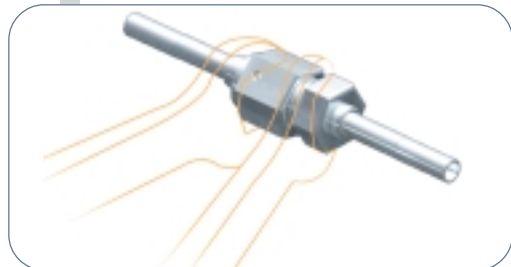
Finger tight until each component is contacted together. Make sure seal part and gasket are placed in proper position that could be easily inspected.



### Step 4

Final tightening shall be completed by assembly tool such as two spanners. Tighten the female nut  $1/8$ ~ $1/6$  turns with spanner by holding male nut or fitting body with the other spanner. Excessive over-tightening will damage the sealing beads and possibly cause system leakage.

Face seal connections can be remade several times, please use a new gasket upon each remake.



### Step 5

Make sure seal part and gasket is placed in proper position and the complete tightening in final.





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Catalog# FSR200501