

## VCO® O-Ring Face Seal Fittings



- 1/8 to 1 in. sizes
- 316 or 316L stainless steel
- Tube, NPT, SAE thread, and weld connections

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## Technical Data

### Materials of Construction

| Component                    | Material                           |
|------------------------------|------------------------------------|
| Bodies, glands, nuts         | 316 SS                             |
| Automatic tube weld fittings | 316L SS                            |
| O-ring, VCO bodies           | Fluorocarbon FKM<br>(70 durometer) |
| O-ring, SAE/MS threads       | Fluorocarbon FKM<br>(90 durometer) |
| Lubricant                    | Silicone-based                     |

### O-Ring Uniform Size Number

| VCO Size<br>in. | O-Ring Uniform<br>Size Number |
|-----------------|-------------------------------|
| 1/8 and 1/4     | 010                           |
| 3/8 and 1/2     | 111                           |
| 3/4             | 116                           |
| 1               | 215                           |

| SAE/MS<br>Thread Size | O-Ring Uniform<br>Size Number |
|-----------------------|-------------------------------|
| 7/16-20               | -904                          |
| 9/16-18               | -906                          |
| 3/4-16                | -908                          |
| 1 1/16-12             | -912                          |
| 1 5/16-12             | -916                          |

### Pressure Ratings

All ratings comply with calculations in accordance with ASME Code for Pressure Piping B31.3, Process Piping, and ASME B31.1, Power Piping.

### Temperature Ratings

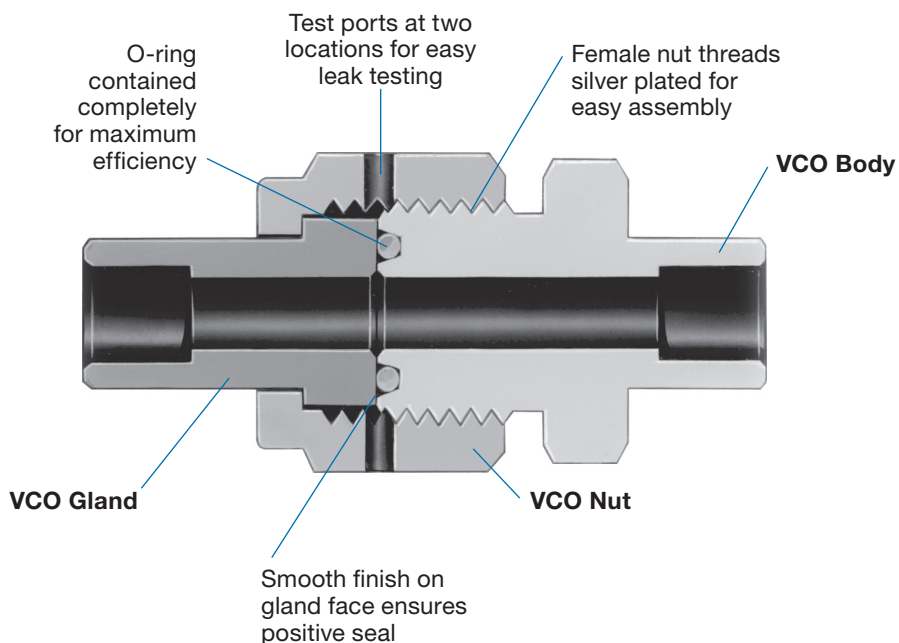
Temperature ratings for VCO fittings are determined by the O-ring materials.

| Material           | Temperature<br>Rating<br>°F (°C) |
|--------------------|----------------------------------|
| Fluorocarbon FKM   | 400 (204)                        |
| Buna N             | 250 (121)                        |
| PTFE               | 450 (232)                        |
| Ethylene propylene | 300 (148)                        |

## Features

Swagelok VCO O-ring face seal fittings are designed for rapid assembly in pipe, tube, and welded systems.

- Unique design allows easy installation where space is limited.
- No axial clearance is required.
- Sealing is accomplished with a captive O-ring in the body component.
- Assemblies can be used from high pressure to critical vacuum, within a wide range of temperatures.



## Testing

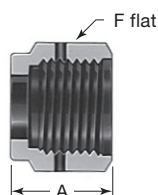
The VCO face seal fitting design has been helium leak tested to a maximum leak rate of  $4 \times 10^{-9}$  std cm<sup>3</sup>/s.

## Ordering Information and Dimensions

- Dimensions are for reference only and are subject to change.
- The E dimension refers to the smallest nominal inside diameter of the part.

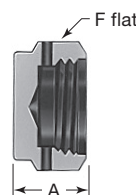
## Nuts

### Female



| VCO Size<br>in. | Ordering<br>Number | Dimensions, in. (mm) |       |
|-----------------|--------------------|----------------------|-------|
|                 |                    | A                    | F     |
| 1/8 and 1/4     | SS-4-VCO-4         | 0.66<br>(16.8)       | 11/16 |
| 3/8 and 1/2     | SS-8-VCO-4         | 0.69<br>(17.5)       | 1     |
| 3/4             | SS-12-VCO-4        | 0.81<br>(20.6)       | 1 1/2 |
| 1               | SS-16-VCO-4        | 0.81<br>(20.6)       | 1 3/4 |

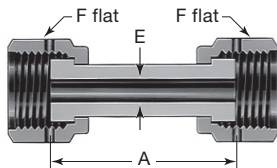
### Blind



| VCO Size<br>in. | Ordering<br>Number | Dimensions, in (mm) |       |
|-----------------|--------------------|---------------------|-------|
|                 |                    | A                   | F     |
| 1/8 and 1/4     | SS-4-VCO-4-BL      | 0.44<br>(11.2)      | 11/16 |
| 3/8 and 1/2     | SS-8-VCO-4-BL      | 0.56<br>(14.2)      | 1     |
| 3/4             | SS-12-VCO-4-BL     | 0.75<br>(19.1)      | 1 1/2 |
| 1               | SS-16-VCO-4-BL     | 0.81<br>(20.6)      | 1 3/4 |

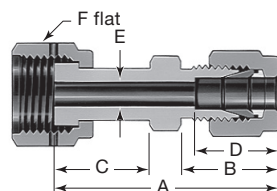
## Glands

### Union



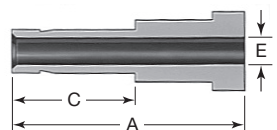
| VCO Size<br>in. | Ordering<br>Number | Dimensions, in. (mm) |                |       | Pressure<br>Rating<br>psig (bar) |
|-----------------|--------------------|----------------------|----------------|-------|----------------------------------|
|                 |                    | A                    | E              | F     |                                  |
| 1/4             | SS-4-WVCO-6-DF     | 1.42<br>(36.1)       | 0.18<br>(4.6)  | 11/16 | 10 200<br>(702)                  |
| 1/2             | SS-8-WVCO-6-DF     | 1.61<br>(40.9)       | 0.40<br>(10.2) | 1     | 5 800<br>(399)                   |

### Swagelok Tube Fitting Connector



| VCO Size<br>in. | Tube<br>OD<br>in. | Ordering<br>Number | Dimensions, in. (mm) |                |                |                |                |       | Pressure<br>Rating<br>psig (bar) |
|-----------------|-------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------|----------------------------------|
|                 |                   |                    | A                    | B              | C              | D              | E              | F     |                                  |
| 1/4             | 1/4               | SS-4-WVCO-6-400    | 1.74<br>(44.2)       | 0.70<br>(17.8) | 0.77<br>(19.6) | 0.60<br>(15.2) | 0.18<br>(4.6)  | 11/16 | 10 200<br>(702)                  |
| 1/2             | 3/8               | SS-8-WVCO-6-600    | 1.87<br>(47.5)       | 0.76<br>(19.3) | 0.81<br>(20.6) | 0.66<br>(16.8) | 0.28<br>(7.1)  | 1     | 5 800<br>(399)                   |
|                 | 1/2               | SS-8-WVCO-6-810    | 2.01<br>(51.1)       | 0.87<br>(22.1) |                | 0.90<br>(22.9) | 0.40<br>(10.2) |       |                                  |
| 3/4             | 3/4               | SS-12-WVCO-6-1210  | 2.14<br>(54.4)       | 0.87<br>(22.1) | 0.94<br>(23.9) | 0.96<br>(24.4) | 0.62<br>(15.7) | 1 1/2 | 4 000<br>(275)                   |
| 1               | 1                 | SS-16-WVCO-6-1610  | 2.45<br>(62.2)       | 1.04<br>(26.4) | 0.98<br>(24.9) | 1.23<br>(31.2) | 0.87<br>(22.1) | 1 3/4 | 3 000<br>(206)                   |

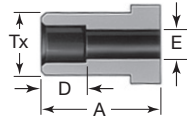
### Tube Adapter



| VCO Size<br>in. | Tube<br>OD<br>in. | Ordering<br>Number | Dimensions, in. (mm) |                |                | Pressure<br>Rating<br>psig (bar) |
|-----------------|-------------------|--------------------|----------------------|----------------|----------------|----------------------------------|
|                 |                   |                    | A                    | C              | E              |                                  |
| 1/4             | 1/4               | SS-4-VCO-3-4TA     | 1.31<br>(33.3)       | 0.64<br>(16.3) | 0.17<br>(4.3)  | 10 200<br>(702)                  |
| 1/2             | 3/8               | SS-8-VCO-3-6TA     | 1.38<br>(35.1)       | 0.70<br>(17.8) | 0.27<br>(6.8)  | 7 500<br>(517)                   |
|                 | 1/2               | SS-8-VCO-3-8TA     | 1.62<br>(41.1)       | 0.96<br>(24.4) | 0.37<br>(9.3)  | 6 700<br>(461)                   |
| 3/4             | 3/4               | SS-12-VCO-3-12TA   | 1.80<br>(45.7)       | 1.02<br>(25.9) | 0.58<br>(14.7) | 5 800<br>(399)                   |
| 1               | 1                 | SS-16-VCO-3-16TA   | 2.05<br>(52.1)       | 1.30<br>(33.0) | 0.80<br>(20.3) | 4 700<br>(323)                   |

## Glands

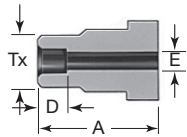
### Weld



### Tube Socket Weld

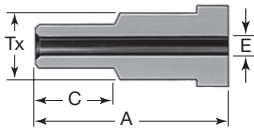
| VCO Size<br>in. | Tube<br>OD<br>in. | Ordering<br>Number | Dimensions, in. (mm) |                |                |                | Pressure<br>Rating<br>psig (bar) |
|-----------------|-------------------|--------------------|----------------------|----------------|----------------|----------------|----------------------------------|
|                 |                   |                    | A                    | D              | E              | Tx             |                                  |
| 1/8             | 1/8               | SS-2-VCO-3         | 0.77<br>(19.6)       | 0.10<br>(2.5)  | 0.09<br>(2.3)  | 0.38<br>(9.7)  | 15 400<br>(1061)                 |
| 1/4             | 1/4               | SS-4-VCO-3         | 0.77<br>(19.6)       | 0.28<br>(7.1)  | 0.18<br>(4.6)  | 0.38<br>(9.7)  | 6 800<br>(468)                   |
| 3/8             | 3/8               | SS-6-VCO-3         | 0.81<br>(20.6)       | 0.31<br>(7.9)  | 0.28<br>(7.1)  | 0.60<br>(15.2) | 8 100<br>(558)                   |
| 1/2             | 1/2               | SS-8-VCO-3         | 0.81<br>(20.6)       | 0.38<br>(9.7)  | 0.40<br>(10.2) | 0.60<br>(15.2) | 3 000<br>(206)                   |
| 3/4             | 3/4               | SS-12-VCO-3        | 0.94<br>(23.9)       | 0.44<br>(11.2) | 0.62<br>(15.7) | 0.92<br>(23.4) | 3 700<br>(255)                   |
| 1               | 1                 | SS-16-VCO-3        | 0.98<br>(24.9)       | 0.62<br>(15.7) | 0.87<br>(22.1) | 1.19<br>(30.2) | 3 000<br>(206)                   |

### Tube Socket Weld Reducing



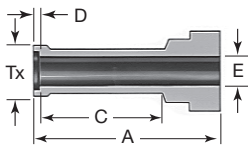
| VCO Size<br>in. | Tube<br>OD<br>in. | Ordering<br>Number | Dimensions, in. (mm) |               |               |                | Pressure<br>Rating<br>psig (bar) |
|-----------------|-------------------|--------------------|----------------------|---------------|---------------|----------------|----------------------------------|
|                 |                   |                    | A                    | D             | E             | Tx             |                                  |
| 1/4             | 1/8               | SS-4-VCO-3-2TSW    | 0.77<br>(19.6)       | 0.10<br>(2.5) | 0.09<br>(2.3) | 0.29<br>(7.4)  | 12 600<br>(868)                  |
| 1/2             | 1/4               | SS-8-VCO-3-4TSW    | 0.81<br>(20.6)       | 0.28<br>(7.1) | 0.18<br>(4.6) | 0.48<br>(12.2) | 10 700<br>(737)                  |

### Male Tube Weld



| VCO Size<br>in. | Tube<br>OD<br>in. | Ordering<br>Number | Dimensions, in. (mm) |                |               |                | Pressure<br>Rating<br>psig (bar) |
|-----------------|-------------------|--------------------|----------------------|----------------|---------------|----------------|----------------------------------|
|                 |                   |                    | A                    | C              | E             | Tx             |                                  |
| 1/4             | 1/8               | SS-4-VCO-3-2MTW    | 0.77<br>(19.6)       | 0.28<br>(7.1)  | 0.06<br>(1.5) | 0.38<br>(9.7)  | 11 200<br>(771)                  |
|                 | 1/4               | SS-4-VCO-3-4MTW    | 1.12<br>(28.4)       | 0.41<br>(10.4) | 0.12<br>(3.0) |                |                                  |
| 1/2             | 1/4               | SS-8-VCO-3-4MTW    | 0.91<br>(23.1)       | 0.41<br>(10.4) | 0.12<br>(3.0) | 0.60<br>(15.2) | 11 200<br>(771)                  |
|                 | 3/8               | SS-8-VCO-3-6MTW    | 0.84<br>(21.3)       |                | 0.23<br>(5.8) |                | 8 200<br>(564)                   |
|                 | 1/2               | SS-8-VCO-3-8MTW    | 1.06<br>(26.9)       | 0.50<br>(12.7) | 0.33<br>(8.4) |                | 7 500<br>(516)                   |

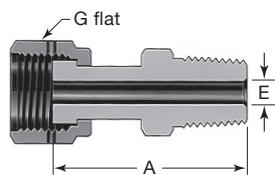
### Automatic Tube Weld



| VCO Size<br>in. | Tube<br>OD<br>in. | Ordering<br>Number | Dimensions, in. (mm) |                |                |                |                |                   | Pressure<br>Rating<br>psig (bar) |
|-----------------|-------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------|----------------------------------|
|                 |                   |                    | A                    | C              | D              | E              | Tx             | Wall<br>Thickness |                                  |
| 1/4             | 1/4               | 316L-4-VCO-3A      | 1.12<br>(28.4)       | 0.78<br>(19.8) | 0.02<br>(0.51) | 0.18<br>(4.6)  | 0.29<br>(7.4)  | 0.035             | 5100<br>(351)                    |
| 1/2             | 3/8               | 316L-8-VCO-3A6     | 1.13<br>(28.7)       | 0.79<br>(20.0) | 0.03<br>(0.76) | 0.31<br>(7.9)  | 0.41<br>(10.4) | 0.035             | 3300<br>(227)                    |
|                 | 1/2               | 316L-8-VCO-3A      | 1.14<br>(29.0)       | 0.80<br>(20.3) | 0.04<br>(1.0)  | 0.40<br>(10.2) | 0.55<br>(14.0) | 0.049             | 3500<br>(241)                    |
| 3/4             | 3/4               | 316L-12-VCO-3A     | 1.20<br>(30.5)       | 0.80<br>(20.3) | 0.04<br>(1.0)  | 0.65<br>(16.5) | 0.80<br>(20.3) | 0.049             | 2200<br>(151)                    |
| 1               | 1                 | 316L-16-VCO-3A     | 1.41<br>(35.8)       | 1.00<br>(25.4) | 0.04<br>(1.0)  | 0.87<br>(22.1) | 1.06<br>(26.9) | 0.065             | 2200<br>(151)                    |

## Glands

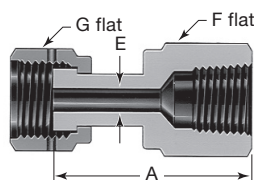
### NPT Connectors



#### Male

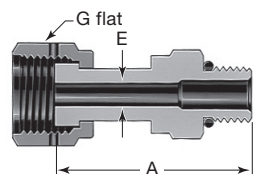
| VCO Size in. | NPT Size in. | Ordering Number | Dimensions, in. (mm) |                |       | Pressure Rating psig (bar) |
|--------------|--------------|-----------------|----------------------|----------------|-------|----------------------------|
|              |              |                 | A                    | E              | G     |                            |
| 1/4          | 1/4          | SS-4-WVCO-1-4   | 1.59<br>(40.4)       | 0.18<br>(4.6)  | 11/16 | 9800<br>(675)              |
| 1/2          | 3/8          | SS-8-WVCO-1-6   | 1.67<br>(42.4)       | 0.40<br>(10.2) | 1     | 5600<br>(385)              |
|              | 1/2          | SS-8-WVCO-1-8   | 1.87<br>(47.5)       |                |       |                            |
| 3/4          | 3/4          | SS-12-WVCO-1-12 | 2.03<br>(51.6)       | 0.62<br>(15.7) | 1 1/2 | 3900<br>(268)              |
| 1            | 1            | SS-16-WVCO-1-16 | 2.36<br>(59.9)       | 0.87<br>(22.1) | 1 3/4 | 2900<br>(199)              |

#### Female



| VCO Size in. | NPT Size in. | Ordering Number | Dimensions, in. (mm) |                |        |       | Pressure Rating psig (bar) |
|--------------|--------------|-----------------|----------------------|----------------|--------|-------|----------------------------|
|              |              |                 | A                    | E              | F      | G     |                            |
| 1/4          | 1/4          | SS-4-WVCO-7-4   | 1.57<br>(39.9)       | 0.18<br>(4.6)  | 3/4    | 11/16 | 6600<br>(454)              |
| 1/2          | 3/8          | SS-8-WVCO-7-6   | 1.73<br>(43.9)       | 0.40<br>(10.2) | 7/8    | 1     | 5300<br>(365)              |
|              | 1/2          | SS-8-WVCO-7-8   | 1.96<br>(49.8)       |                | 1 1/16 |       | 4900<br>(337)              |
| 3/4          | 3/4          | SS-12-WVCO-7-12 | 2.12<br>(53.8)       | 0.62<br>(15.7) | 1 5/16 | 1 1/2 | 4000<br>(275)              |
| 1            | 1            | SS-16-WVCO-7-16 | 2.29<br>(58.2)       | 0.87<br>(22.1) | 1 5/8  | 1 3/4 | 3000<br>(206)              |

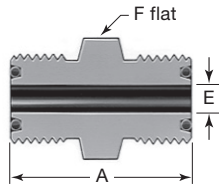
### Male SAE/MS Connector



| VCO Size in. | Straight Thread Size | Ordering Number   | Dimensions, in. (mm) |                |       | Pressure Rating psig (bar) |
|--------------|----------------------|-------------------|----------------------|----------------|-------|----------------------------|
|              |                      |                   | A                    | E              | G     |                            |
| 1/4          | 7/16-20              | SS-4-WVCO-1-4ST   | 1.54<br>(39.1)       | 0.18<br>(4.6)  | 11/16 | 4500<br>(310)              |
| 1/2          | 9/16-18              | SS-8-WVCO-1-6ST   | 1.64<br>(41.7)       | 0.40<br>(10.2) | 1     | 4500<br>(310)              |
|              | 3/4-16               | SS-8-WVCO-1-8ST   | 1.71<br>(43.4)       |                |       |                            |
| 3/4          | 1 1/16-12            | SS-12-WVCO-1-12ST | 2.07<br>(52.6)       | 0.62<br>(15.7) | 1 1/2 | 3600<br>(248)              |
| 1            | 1 5/16-12            | SS-16-WVCO-1-16ST | 2.17<br>(55.1)       | 0.87<br>(22.1) | 1 3/4 | 2900<br>(199)              |

## Bodies

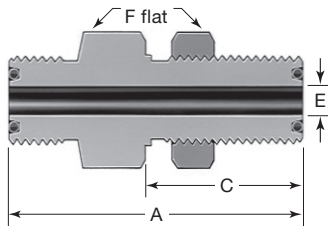
### Unions



### Union

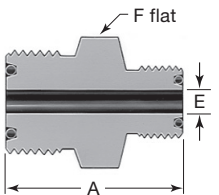
| VCO Size in. | Ordering Number | Dimensions, in. (mm) |             |       | Pressure Rating psig (bar) |
|--------------|-----------------|----------------------|-------------|-------|----------------------------|
|              |                 | A                    | E           | F     |                            |
| 1/4          | SS-4-VCO-6      | 1.25 (31.8)          | 0.18 (4.6)  | 5/8   | 14 300 (985)               |
| 1/2          | SS-8-VCO-6      | 1.50 (38.1)          | 0.40 (10.2) | 15/16 | 11 100 (764)               |

### Bulkhead



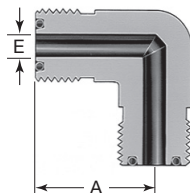
| VCO Size in. | Ordering Number | Dimensions, in. (mm) |             |             |        |                       |                     | Pressure Rating psig (bar) |
|--------------|-----------------|----------------------|-------------|-------------|--------|-----------------------|---------------------|----------------------------|
|              |                 | A                    | C           | E           | F      | Panel Hole Drill Size | Max Panel Thickness |                            |
| 1/4          | SS-4-VCO-61     | 1.88 (47.8)          | 1.06 (26.9) | 0.18 (4.6)  | 3/4    | 37/64                 | 0.36 (9.1)          | 14 300 (985)               |
| 1/2          | SS-8-VCO-61     | 2.09 (53.1)          | 1.19 (30.2) | 0.40 (10.2) | 1 1/16 | 57/64                 | 0.40 (10.2)         | 11 100 (764)               |

### Reducing



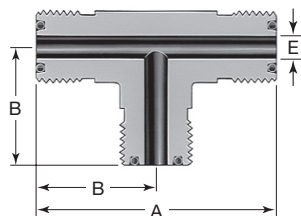
| VCO Size in. | VCO Size in. | Ordering Number | Dimensions, in. (mm) |            |       | Pressure Rating psig (bar) |
|--------------|--------------|-----------------|----------------------|------------|-------|----------------------------|
|              |              |                 | A                    | E          | F     |                            |
| 1/2          | 1/4          | SS-8-VCO-6-4    | 1.43 (36.3)          | 0.18 (4.6) | 15/16 | 11 100 (764)               |

### Elbow



| VCO Size in. | Ordering Number | Dimensions, in. (mm) |             | Pressure Rating psig (bar) |
|--------------|-----------------|----------------------|-------------|----------------------------|
|              |                 | A                    | E           |                            |
| 1/4          | SS-4-VCO-9      | 0.96 (24.4)          | 0.18 (4.6)  | 14 300 (985)               |
| 1/2          | SS-8-VCO-9      | 1.26 (32.0)          | 0.40 (10.2) | 11 100 (764)               |
| 3/4          | SS-12-VCO-9     | 1.48 (37.6)          | 0.62 (15.7) | 10 900 (751)               |
| 1            | SS-16-VCO-9     | 1.56 (39.6)          | 0.87 (22.1) | 8 800 (606)                |

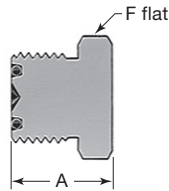
### Tee



| VCO Size in. | Ordering Number | Dimensions, in. (mm) |             |             | Pressure Rating psig (bar) |
|--------------|-----------------|----------------------|-------------|-------------|----------------------------|
|              |                 | A                    | B           | E           |                            |
| 1/4          | SS-4-VCO-T      | 1.92 (48.8)          | 0.96 (24.4) | 0.18 (4.6)  | 14 300 (985)               |
| 1/2          | SS-8-VCO-T      | 2.52 (64.0)          | 1.26 (32.0) | 0.40 (10.2) | 11 100 (764)               |
| 3/4          | SS-12-VCO-T     | 2.96 (75.2)          | 1.48 (37.6) | 0.62 (15.7) | 10 900 (751)               |
| 1            | SS-16-VCO-T     | 3.12 (79.2)          | 1.56 (39.6) | 0.87 (22.1) | 8 800 (606)                |

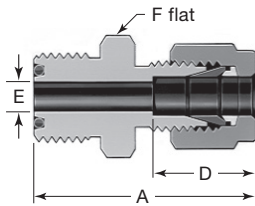
## Bodies

### Blind



| VCO Size in. | Ordering Number | Dimensions, in. (mm) |        |
|--------------|-----------------|----------------------|--------|
|              |                 | A                    | F      |
| 1/4          | SS-4-VCO-1-BL   | 0.77<br>(19.6)       | 5/8    |
| 1/2          | SS-8-VCO-1-BL   | 0.89<br>(22.6)       | 15/16  |
| 3/4          | SS-12-VCO-1-BL  | 0.99<br>(25.1)       | 1 5/16 |
| 1            | SS-16-VCO-1-BL  | 1.02<br>(25.9)       | 1 5/8  |

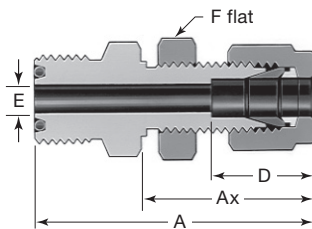
### Swagelok Tube Fitting Connectors



#### Swagelok Tube Fitting

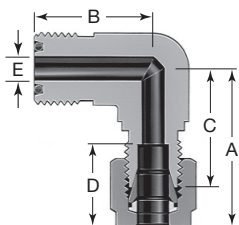
| VCO Size in. | Tube OD in. | Ordering Number  | Dimensions, in. (mm) |                |                |        | Pressure Rating psig (bar) |
|--------------|-------------|------------------|----------------------|----------------|----------------|--------|----------------------------|
|              |             |                  | A                    | D              | E              | F      |                            |
| 1/4          | 1/8         | SS-4-VCO-6-200   | 1.38<br>(35.1)       | 0.51<br>(13.0) | 0.09<br>(2.3)  | 5/8    | 10 900<br>(751)            |
|              | 1/4         | SS-4-VCO-6-400   | 1.47<br>(37.3)       | 0.60<br>(15.2) | 0.18<br>(4.6)  |        | 10 200<br>(702)            |
| 1/2          | 3/8         | SS-8-VCO-6-600   | 1.65<br>(41.9)       | 0.66<br>(16.8) | 0.28<br>(7.1)  | 15/16  | 7 500<br>(517)             |
|              | 1/2         | SS-8-VCO-6-810   | 1.78<br>(45.2)       | 0.90<br>(22.9) | 0.40<br>(10.2) |        | 6 700<br>(461)             |
| 3/4          | 3/4         | SS-12-VCO-6-1210 | 1.86<br>(47.2)       | 0.96<br>(24.4) | 0.62<br>(15.7) | 1 5/16 | 5 800<br>(399)             |
| 1            | 1           | SS-16-VCO-6-1610 | 2.06<br>(52.3)       | 1.23<br>(31.2) | 0.87<br>(22.1) | 1 5/8  | 4 700<br>(323)             |

### Bulkhead



| VCO Size in. | Tube OD in. | Ordering Number   | Dimensions, in. (mm) |                |                |                |        |                       |                     | Pressure Rating psig (bar) |
|--------------|-------------|-------------------|----------------------|----------------|----------------|----------------|--------|-----------------------|---------------------|----------------------------|
|              |             |                   | A                    | Ax             | D              | E              | F      | Panel Hole Drill Size | Max Panel Thickness |                            |
| 1/4          | 1/4         | SS-4-VCO-A1-400   | 2.10<br>(53.3)       | 1.32<br>(33.5) | 0.60<br>(15.2) | 0.18<br>(4.6)  | 5/8    | 29/64                 | 0.40<br>(10.2)      | 10 200<br>(702)            |
| 1/2          | 3/8         | SS-8-VCO-A1-600   | 2.34<br>(59.4)       | 1.45<br>(36.8) | 0.66<br>(16.8) | 0.28<br>(7.1)  | 15/16  | 37/64                 | 0.44<br>(11.2)      | 7 500<br>(517)             |
|              | 1/2         | SS-8-VCO-A1-810   | 2.55<br>(64.8)       | 1.65<br>(41.9) | 0.90<br>(22.9) | 0.40<br>(10.2) |        | 49/64                 | 0.50<br>(12.7)      | 6 700<br>(461)             |
| 3/4          | 3/4         | SS-12-VCO-A1-1210 | 2.86<br>(72.6)       | 1.87<br>(47.5) | 0.96<br>(24.4) | 0.62<br>(15.7) | 1 5/16 | 1 1/64                | 0.66<br>(16.8)      | 5 800<br>(399)             |
| 1            | 1           | SS-16-VCO-A1-1610 | 3.29<br>(83.6)       | 2.26<br>(57.4) | 1.23<br>(31.2) | 0.87<br>(22.1) | 1 5/8  | 1 21/64               | 0.75<br>(19.1)      | 4 700<br>(323)             |

### Swagelok Tube Fitting Elbow

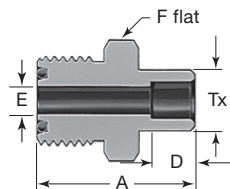


| VCO Size in. | Tube OD in. | Ordering Number  | Dimensions, in. (mm) |                |                |                |                | Pressure Rating psig (bar) |
|--------------|-------------|------------------|----------------------|----------------|----------------|----------------|----------------|----------------------------|
|              |             |                  | A                    | B              | C              | D              | E              |                            |
| 1/4          | 1/4         | SS-4-VCO-9-400   | 1.19<br>(30.2)       | 0.96<br>(24.4) | 0.90<br>(22.9) | 0.60<br>(15.2) | 0.18<br>(4.6)  | 10 200<br>(702)            |
| 1/2          | 3/8         | SS-8-VCO-9-600   | 1.39<br>(35.3)       | 1.26<br>(32.0) | 1.10<br>(27.9) | 0.66<br>(16.8) | 0.28<br>(7.1)  | 7 500<br>(517)             |
|              | 1/2         | SS-8-VCO-9-810   | 1.50<br>(38.1)       |                |                | 0.90<br>(22.9) | 0.40<br>(10.2) | 6 700<br>(461)             |
| 3/4          | 3/4         | SS-12-VCO-9-1210 | 1.80<br>(45.7)       | 1.48<br>(37.6) | 1.40<br>(35.6) | 0.96<br>(24.4) | 0.62<br>(15.7) | 5 800<br>(399)             |
| 1            | 1           | SS-16-VCO-9-1610 | 2.04<br>(51.8)       | 1.56<br>(39.6) | 1.56<br>(39.6) | 1.23<br>(31.2) | 0.87<br>(22.1) | 4 700<br>(323)             |



## Bodies

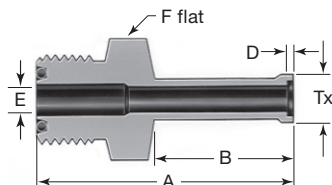
### Weld



### Tube Socket Weld

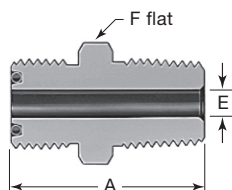
| VCO Size in. | Tube OD in. | Ordering Number | Dimensions, in. (mm) |                |                |        |                | Pressure Rating psig (bar) |
|--------------|-------------|-----------------|----------------------|----------------|----------------|--------|----------------|----------------------------|
|              |             |                 | A                    | D              | E              | F      | Tx             |                            |
| 1/8          | 1/8         | SS-2-VCO-1      | 0.88<br>(22.4)       | 0.10<br>(2.5)  | 0.09<br>(2.3)  | 5/8    | 0.29<br>(7.4)  | 12 600<br>(868)            |
| 1/4          | 1/4         | SS-4-VCO-1      | 1.09<br>(27.7)       | 0.28<br>(7.1)  | 0.18<br>(4.6)  | 5/8    | 0.38<br>(9.7)  | 6 800<br>(468)             |
| 3/8          | 3/8         | SS-6-VCO-1      | 1.28<br>(32.5)       | 0.31<br>(7.9)  | 0.28<br>(7.1)  | 15/16  | 0.60<br>(15.2) | 8 100<br>(558)             |
| 1/2          | 1/2         | SS-8-VCO-1      | 1.34<br>(34.0)       | 0.38<br>(9.7)  | 0.40<br>(10.2) | 15/16  | 0.60<br>(15.2) | 3 000<br>(206)             |
| 3/4          | 3/4         | SS-12-VCO-1     | 1.50<br>(38.1)       | 0.44<br>(11.2) | 0.62<br>(15.7) | 1 5/16 | 0.92<br>(23.4) | 3 700<br>(254)             |
| 1            | 1           | SS-16-VCO-1     | 1.72<br>(43.7)       | 0.62<br>(15.7) | 0.87<br>(22.1) | 1 5/8  | 1.19<br>(30.2) | 3 000<br>(206)             |

### Automatic Tube Weld



| VCO Size in. | Tube OD in. | Ordering Number | Dimensions, in. (mm) |                |               |                |        |                |       | Pressure Rating psig (bar) |
|--------------|-------------|-----------------|----------------------|----------------|---------------|----------------|--------|----------------|-------|----------------------------|
|              |             |                 | A                    | B              | D             | E              | F      | Tx             | Wall  |                            |
| 1/4          | 1/4         | 316L-4-VCO-1A   | 1.59<br>(40.4)       | 0.78<br>(19.8) | 0.02<br>(0.5) | 0.18<br>(4.6)  | 5/8    | 0.29<br>(7.4)  | 0.035 | 5100<br>(351)              |
| 1/2          | 3/8         | 316L-8-VCO-1A6  | 1.74<br>(44.2)       | 0.79<br>(20.0) | 0.03<br>(0.8) | 0.31<br>(7.9)  | 15/16  | 0.41<br>(10.4) | 0.035 | 3300<br>(227)              |
| 1/2          | 1/2         | 316L-8-VCO-1A   | 1.75<br>(44.4)       | 0.80<br>(20.3) | 0.04<br>(1.0) | 0.40<br>(10.2) | 15/16  | 0.55<br>(14.0) | 0.049 | 3500<br>(241)              |
| 3/4          | 3/4         | 316L-12-VCO-1A  | 1.78<br>(45.2)       | 0.80<br>(20.3) | 0.04<br>(1.0) | 0.65<br>(16.5) | 1 5/16 | 0.80<br>(20.3) | 0.049 | 2200<br>(151)              |
| 1            | 1           | 316L-16-VCO-1A  | 2.03<br>(51.6)       | 1.00<br>(25.4) | 0.04<br>(1.0) | 0.87<br>(22.1) | 1 5/8  | 1.06<br>(26.9) | 0.065 | 2200<br>(151)              |

### NPT Connectors

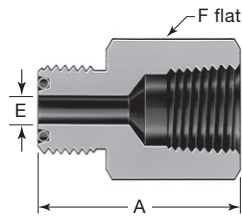


### Male

| VCO Size in. | NPT Size in. | Ordering Number | Dimensions, in. (mm) |                |        | Pressure Rating psig (bar) |
|--------------|--------------|-----------------|----------------------|----------------|--------|----------------------------|
|              |              |                 | A                    | E              | F      |                            |
| 1/4          | 1/8          | SS-4-VCO-1-2    | 1.16<br>(29.5)       | 0.18<br>(4.6)  | 5/8    | 10 000<br>(689)            |
|              | 1/4          | SS-4-VCO-1-4    | 1.34<br>(34.0)       |                |        | 13 400<br>(923)            |
| 1/2          | 3/8          | SS-8-VCO-1-6    | 1.46<br>(37.1)       | 0.38<br>(9.7)  | 15/16  | 7 800<br>(537)             |
|              | 1/2          | SS-8-VCO-1-8    | 1.65<br>(41.9)       | 0.40<br>(10.2) |        | 10 000<br>(689)            |
| 3/4          | 3/4          | SS-12-VCO-1-12  | 1.75<br>(44.4)       | 0.62<br>(15.7) | 1 5/16 | 7 300<br>(502)             |
| 1            | 1            | SS-16-VCO-1-16  | 1.97<br>(50.0)       | 0.87<br>(22.1) | 1 5/8  | 5 300<br>(365)             |

## Bodies

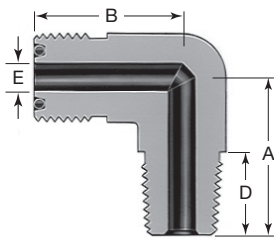
### NPT Connectors



#### Female

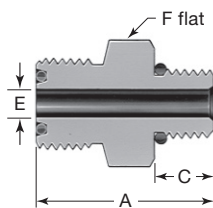
| VCO Size in. | NPT Size in. | Ordering Number | Dimensions, in. (mm) |                |        | Pressure Rating<br>psig (bar) |
|--------------|--------------|-----------------|----------------------|----------------|--------|-------------------------------|
|              |              |                 | A                    | E              | F      |                               |
| 1/4          | 1/8          | SS-4-VCO-7-2    | 1.25<br>(31.8)       | 0.18<br>(4.6)  | 5/8    | 8400<br>(578)                 |
|              | 1/4          | SS-4-VCO-7-4    | 1.39<br>(35.3)       |                | 3/4    | 6600<br>(454)                 |
| 1/2          | 3/8          | SS-8-VCO-7-6    | 1.57<br>(39.9)       | 0.40<br>(10.2) | 15/16  | 6600<br>(454)                 |
|              | 1/2          | SS-8-VCO-7-8    | 1.77<br>(45.0)       |                | 1 1/16 | 4900<br>(337)                 |
| 3/4          | 3/4          | SS-12-VCO-7-12  | 1.93<br>(49.0)       | 0.62<br>(15.7) | 1 5/16 | 4600<br>(316)                 |
| 1            | 1            | SS-16-VCO-7-16  | 2.02<br>(51.3)       | 0.87<br>(22.1) | 1 5/8  | 4400<br>(303)                 |

#### Male Elbow



| VCO Size in. | NPT Size in. | Ordering Number | Dimensions, in. (mm) |                |                |                | Pressure Rating<br>psig (bar) |
|--------------|--------------|-----------------|----------------------|----------------|----------------|----------------|-------------------------------|
|              |              |                 | A                    | B              | D              | E              |                               |
| 1/4          | 1/8          | SS-4-VCO-2-2    | 0.87<br>(22.1)       | 0.96<br>(24.4) | 0.38<br>(9.7)  | 0.18<br>(4.6)  | 10 000<br>(689)               |
|              | 1/4          | SS-4-VCO-2-4    | 1.05<br>(26.7)       |                | 0.56<br>(14.2) |                | 8 000<br>(551)                |
| 1/2          | 3/8          | SS-8-VCO-2-6    | 1.26<br>(32.0)       | 1.26<br>(32.0) | 0.56<br>(14.2) | 0.38<br>(9.7)  | 7 800<br>(537)                |
|              | 1/2          | SS-8-VCO-2-8    | 1.45<br>(36.8)       |                | 0.75<br>(19.1) | 0.40<br>(10.2) | 7 700<br>(530)                |
| 3/4          | 3/4          | SS-12-VCO-2-12  | 1.67<br>(42.4)       | 1.48<br>(37.6) | 0.75<br>(19.1) | 0.62<br>(15.7) | 7 300<br>(502)                |
| 1            | 1            | SS-16-VCO-2-16  | 1.94<br>(49.3)       | 1.56<br>(39.6) | 0.94<br>(23.9) | 0.87<br>(22.0) | 5 300<br>(365)                |

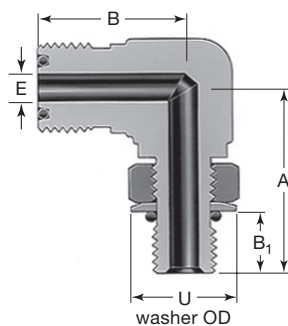
### Male SAE/MS Connector



| VCO Size in. | Straight Thread Size | Ordering Number  | Dimensions, in. (mm) |                |                |       | Pressure Ratings<br>psig (bar) |
|--------------|----------------------|------------------|----------------------|----------------|----------------|-------|--------------------------------|
|              |                      |                  | A                    | C              | E              | F     |                                |
| 1/4          | 7/16-20              | SS-4-VCO-1-4ST   | 1.24<br>(31.5)       | 0.36<br>(9.1)  | 0.18<br>(4.6)  | 11/16 | 4500<br>(310)                  |
|              | 9/16-18              | SS-4-VCO-1-6ST   | 1.17<br>(29.7)       | 0.39<br>(9.9)  |                |       |                                |
| 1/2          | 7/16-20              | SS-8-VCO-1-4ST   | 1.36<br>(34.5)       | 0.36<br>(9.1)  | 0.18<br>(4.6)  | 15/16 | 4500<br>(310)                  |
|              | 9/16-18              | SS-8-VCO-1-6ST   | 1.39<br>(35.3)       | 0.39<br>(9.9)  | 0.30<br>(7.6)  |       |                                |
|              | 3/4-16               | SS-8-VCO-1-8ST   | 1.47<br>(37.3)       | 0.44<br>(11.2) | 0.40<br>(10.2) | 1     |                                |
| 3/4          | 1 1/16-12            | SS-12-VCO-1-12ST | 1.73<br>(43.9)       | 0.59<br>(15.0) | 0.62<br>(15.7) | 1 3/8 | 3600<br>(248)                  |
| 1            | 1 5/16-12            | SS-16-VCO-1-16ST | 1.79<br>(45.5)       | 0.59<br>(15.0) | 0.85<br>(21.6) | 1 5/8 | 2900<br>(199)                  |

## Bodies

### Male SAE/MS Positionable Elbow



| VCO Size in. | Straight Thread Size | Ordering Number   | Dimensions, in. (mm) |                |                |                |                | Pressure Rating<br>psig (bar) |
|--------------|----------------------|-------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------------|
|              |                      |                   | A                    | B              | B <sub>1</sub> | E              | U              |                               |
| 1/4          | 7/16-20              | SS-4-VCO-9P-4ST   | 1.19<br>(30.2)       | 0.96<br>(24.4) | 0.39<br>(9.9)  | 0.19<br>(4.6)  | 0.65<br>(16.5) | 4500<br>(310)                 |
| 1/2          | 9/16-18              | SS-8-VCO-9P-6ST   | 1.54<br>(39.1)       | 1.33<br>(33.8) | 0.44<br>(11.2) | 0.30<br>(7.6)  | 0.79<br>(20.1) | 3600<br>(248)                 |
|              | 3/4-16               | SS-8-VCO-9P-8ST   | 1.65<br>(41.9)       |                | 0.50<br>(12.7) | 0.40<br>(10.2) | 1.01<br>(25.7) |                               |
| 3/4          | 1 1/16-12            | SS-12-VCO-9P-12ST | 2.13<br>(54.1)       | 1.53<br>(38.9) | 0.66<br>(16.8) | 0.62<br>(15.7) | 1.44<br>(36.6) | 2900<br>(199)                 |
| 1            | 1 5/16-12            | SS-16-VCO-9P-16ST | 2.31<br>(58.7)       | 1.72<br>(43.7) | 0.66<br>(16.8) | 0.87<br>(22.1) | 1.73<br>(43.9) | 2300<br>(158)                 |

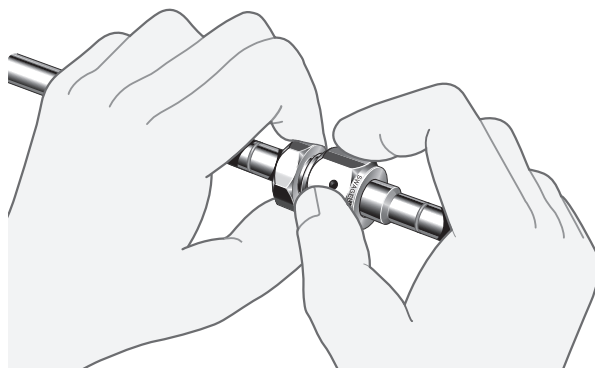
## Options and Accessories

### O-Ring Materials

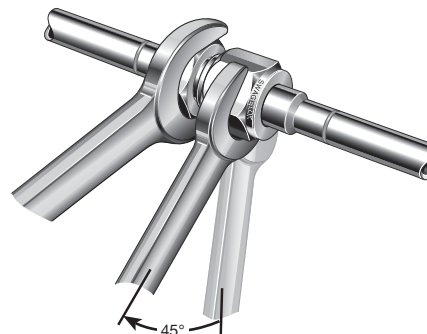
Perfluoroelastomer, Buna N, PTFE, and ethylene propylene O-rings are available for special applications. Contact your authorized Swagelok sales and service representative for information.

## VCO Fitting Installation Instructions

### 1 Finger-tight



### 2



#### Safe Product Selection

**When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

#### Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit [swagelok.com](https://www.swagelok.com) or contact your authorized Swagelok representative.

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November 2008  
MS-01-28, RevK, September 2024