

## Single-Wall, Flat Oval Duct and Fittings Dimensions

**Table 1** - Single-wall, Flat Oval Duct - Available Materials and Thicknesses<sup>1</sup>

Construction	Lengths <sup>2</sup>	Materials <sup>3</sup>	Thicknesses <sup>6</sup>
UNI-SEAL™ Duct (spiral lockseam)	1-12 feet	Galvanized Steel	26-18 gauge
		Stainless Steel	26-20 gauge
		Aluminum	0.025-0.063 inch <sup>4</sup>
Longitudinal Seam Duct (solid welded)	1-6 feet	Galvanized Steel	20-10 gauge
		Stainless Steel	22-10 gauge
		Aluminum	0.040-0.090 inch <sup>4</sup>

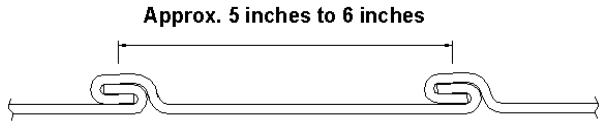
**Table 2** - Single-wall, Flat Oval Fittings- Available Materials and Thicknesses<sup>1</sup>

Construction	Materials <sup>3</sup>	Thicknesses
UNI-SEAL Fittings <sup>5</sup> (spot welded and bonded, or standing seam)	Galvanized Steel	26-10 gauge
	Stainless Steel	26-10 gauge
	Aluminum	0.032-0.090 inch <sup>4</sup>

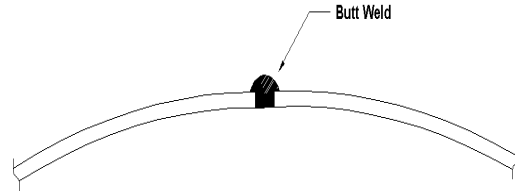
1. Standard McGill AirFlow single-wall flat oval duct and fittings are available in the dimensions shown in Table 5.
2. Some standard lengths of UNI-SEAL, flat oval duct are only available in 6-foot lengths; longer lengths are available on special order. Standard lengths of longitudinal seam duct are 5 and 6 feet.
3. Single-wall flat oval duct and fittings are also available in carbon steel, paintable galvanized steel, and aluminized steel.
4. Aluminum single-wall flat oval duct and fittings are available in larger sizes and greater metal thicknesses on special order.
5. Fittings 16 gauge (Aluminum - 0.090 inch) or heavier are fully welded.
6. See Table 3 for a full range of available spiral flat oval sizes by gauge.

# Duct Construction

## Spiral Lockseam



## Longitudinal Seam



**Table 3 - Available Range of Spiral Duct Basic Round Diameter Used to Fabricate Spiral Flat Oval Duct by Thickness<sup>1</sup>**

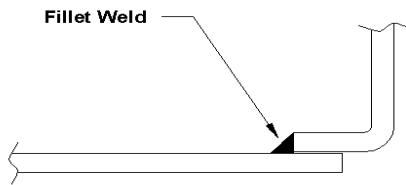
Gauge	Galvanized Steel, Aluminized Steel and Nongalvanized Carbon Steel	Stainless Steel (304, 304L, 316 and 316L)	Aluminum <sup>2</sup>	
	Spiral Lockseam Basic Round Diameter (inches)	Spiral Lockseam Basic Round Diameter (inches)	Thickness (inches)	Spiral Lockseam Basic Round Diameter (inches)
28	6 - 14 1/2	N/A	0.040	6 - 60
26	6 - 26	N/A	0.050	6 - 60
24	6 - 36	6 - 50	0.063	6 - 60
22	6 - 50	6 - 60		
20	6 - 60	6 - 64		
18	6 - 64	N/A		

<sup>1</sup> Thicker material may be available in some basic round diameter ranges; check with your local sales office.

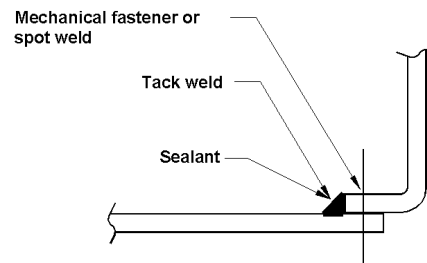
<sup>2</sup> Aluminum single-wall, round, spiral duct is available in larger basic round diameters on special order.

## Fitting Construction

### Solid Welded

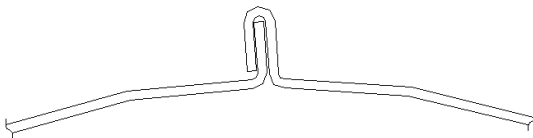


### Spot Welded, Tack Welded or Mechanical Fastened



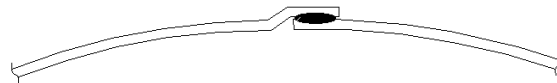
Sealed with United Duct Sealer™ (Water Based) or UNI-WELD™ weld sealant

### Standing Seam



Sealed with United Duct Sealer (Water Based) or UNI-WELD weld sealant

### Resistance Seam Welded



Sealed with United Duct Sealer (Water Based) or UNI-WELD weld sealant

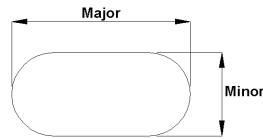
## Dimensioning

(All alphanumeric dimensions are in inches, all angles are in degrees)

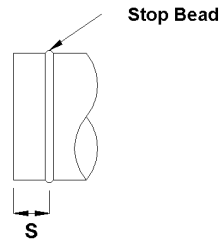
<b>A</b>	-	Main barrel inlet major axis
<b>a</b>	-	Main barrel inlet minor axis
<b>B</b>	-	Main barrel outlet major axis
<b>b</b>	-	Main barrel outlet minor axis
<b>C or D</b>	-	Branch tap major axis (Note: On tee and lateral fittings with two taps, C is the branch closest to the inlet of the fitting. On cross fittings, C is the larger of the two taps.)
<b>c or d</b>	-	Branch tap minor axis
<b>t</b>	-	Insulation/liner thickness
<b>R</b>	-	Centerline radius
<b>S</b>	-	Slip-fit dimension of a fitting
<b>F, H, J, L, Q, V, Z, m, α</b>	-	Miscellaneous dimensions (refer to specific drawings)
<b>θ or φ</b>	-	Angular measurements (refer to specific drawings)
<b>#</b>	-	Number of elbow gores

**General Notes:**

- Dimensions other than minor and major axes are held within a ¼ inch tolerance.
- The major axis is the greater dimension; the minor axis is the smaller dimension.

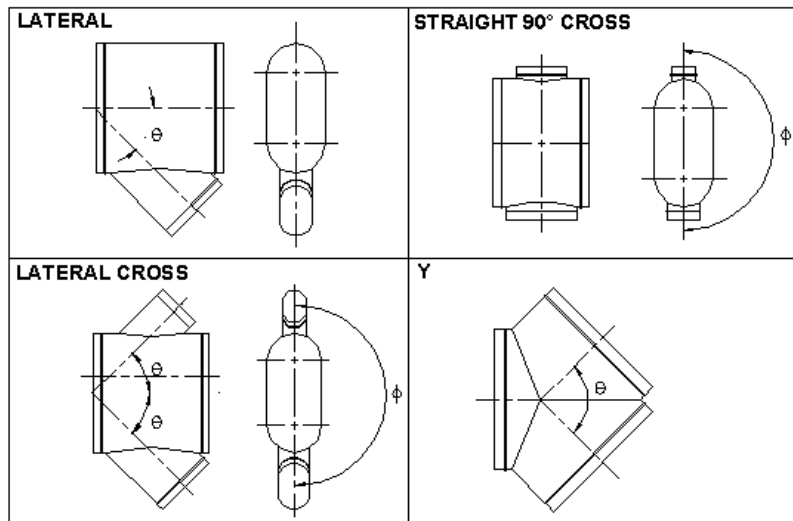


- Unless ordered otherwise, single-wall, flat oval fittings are sized to slip fit into single-wall, flat oval duct.
- Single-wall fittings ordered for 2-inch slip-fit assembly have a slip-fit section as shown in the following drawing:



**Where: S = 2 inches**

- Single-wall duct and fittings can be ordered with Van Stone or applied connectors. Van Stone and applied connectors change the makeup dimensions of standard slip-fit dimension ends. Refer to the details on page 46 for further information.
- Unless ordered otherwise, the branch taps of laterals, crosses, lateral crosses, and Y-fittings are installed at standard angles to the fittings' bodies and to each other, as shown in the following drawings:



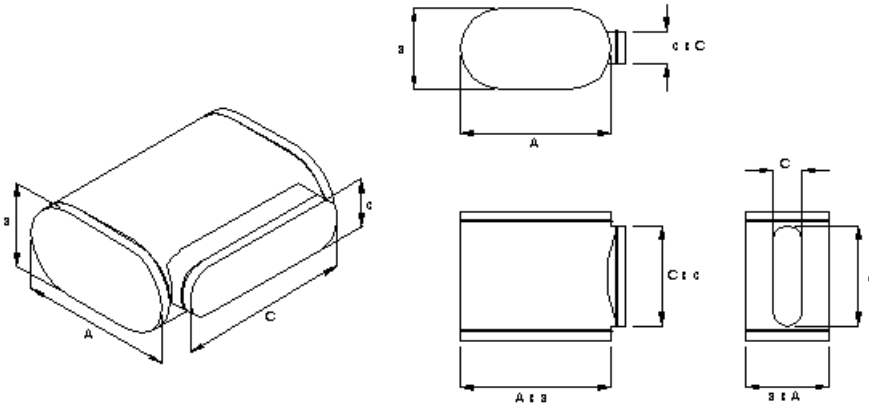
**For all:**

- Laterals,  $\theta$  standard = 45°
- Crosses,  $\theta$  standard = 90°,  $\phi$  standard = 180°
- Lateral Crosses,  $\theta$  standard = 45°,  $\phi$  standard = 180°
- Y-Fittings,  $\theta$  standard = 90°

**Note:**  $\phi$  is the included angle between taps as viewed in cross section (standard is 180°). When ordering fittings of nonstandard  $\phi$ , please include an end view.

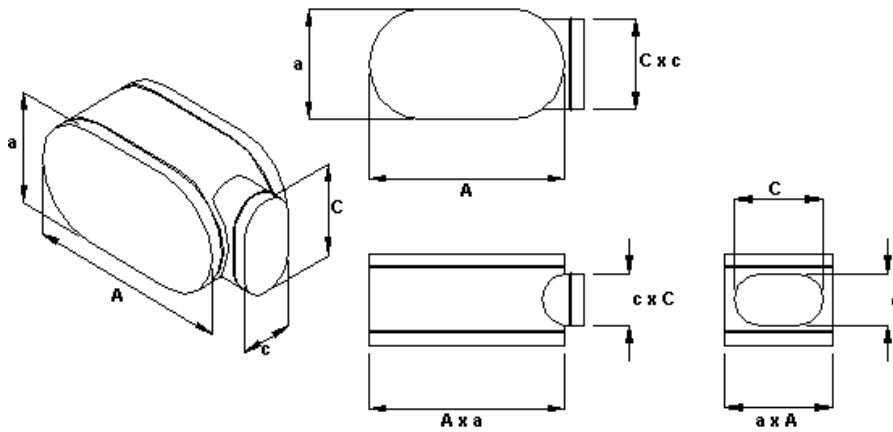
**General Notes:**

- When ordering fittings of a nonstandard shape (such as one of those shown in the following examples), please include a drawing with all necessary dimensions:



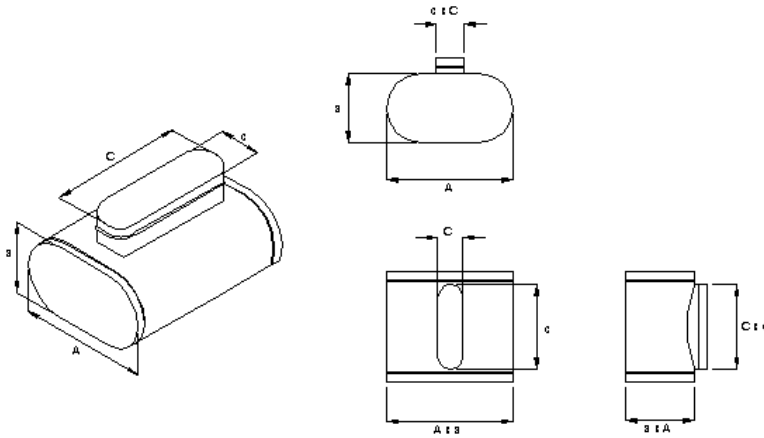
**Example 1 (default)**

Tap is centered off the minor and the major dimension of tap is along the fitting body (mina)



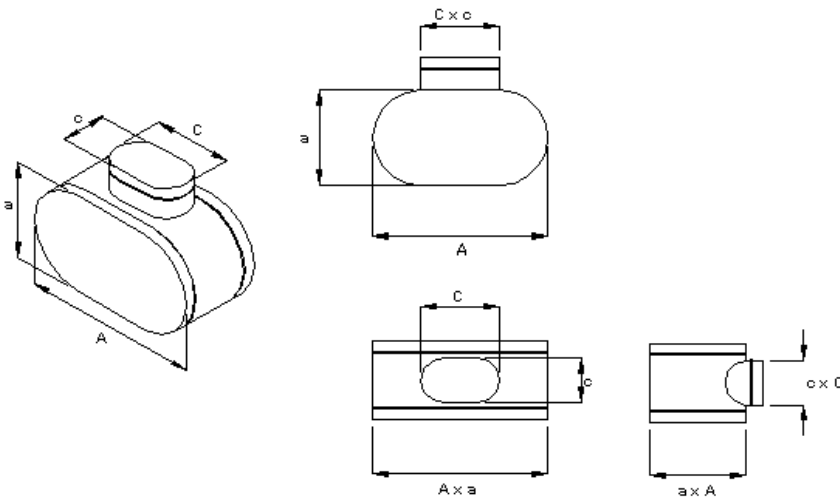
**Example 2**

Tap is centered off the minor and the minor dimension of tap is along the fitting body (minx)



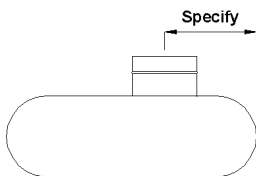
**Example 3**

Tap is centered off the major and the major dimension of tap is along the fitting body (maja)



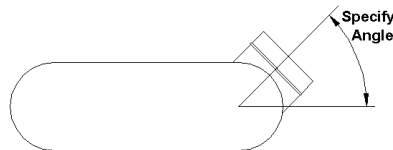
**Example 4**

Tap is centered off the major and the minor dimension of tap is along the fitting body (majx)



**Example 5**

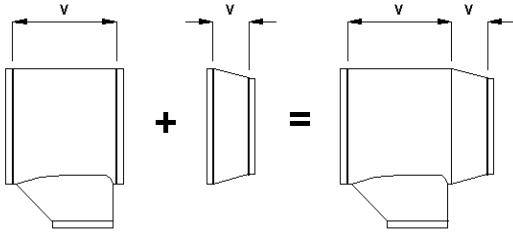
Tap is not centered on the major axis; specify dimension shown



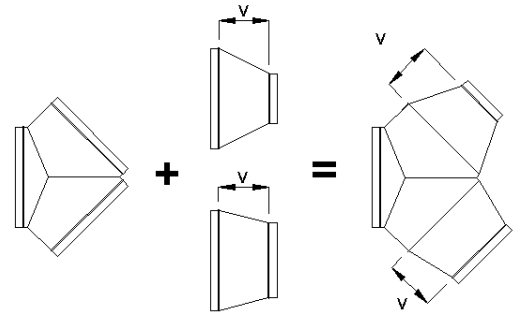
**Example 6**

Tap is not centered on the minor axis; specify dimension shown

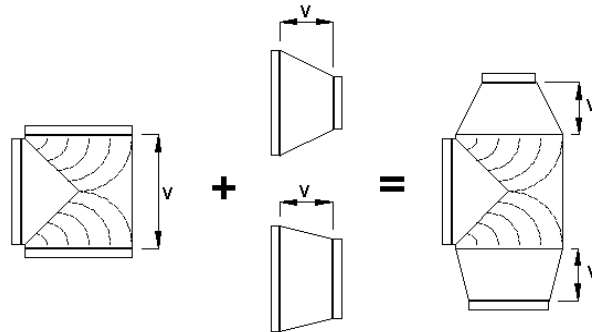
- Reducing fitting dimensions are determined by combining the nonreducing fitting body with the appropriate reducer eliminating the S dimension on the downstream section of the fitting and the upstream section of the reducer. Examples are shown below:



**Example 1: Reducing LO-LOSS™ Tee**



**Example 2: Reducing Y**



**Example 3: Reducing Bullhead Tee with Turning Vanes**

- If reducers are not concentric, please include an end view.
- For installation information, refer to McGill AirFlow's brochure *Installation of Single-wall Duct and Fittings*.
- Round and rectangular taps are available in lieu of flat oval. Specify dimensions.
- The Q dimension of laterals and lateral crosses may be less than, equal to, or greater than the V dimension of these fittings.

## Designations:

McGill AirFlow uses a designation system that simplifies product nomenclature. Most of our products can be accurately identified using a concise alphanumeric designator. Each character in the designation defines a characteristic of the product.

Example: SOST refers to a single-wall (S), oval (O), standard gauge (S), straight tee (T).

### 1<sup>st</sup> Character: **Wall Configuration - SOST**

- S** = Single-wall
- K** = k27 Double-wall

### 2<sup>nd</sup> Character: **Shape - SOST**

- R** = Round
- O** = Oval

### 3<sup>rd</sup> Character: **Product Line - SOST**

- S** = Standard gauge of product type
- N** = Nonstandard gauge (user specified)

**Notes:** 1. When ordering duct or fittings, specify S or N in the \* position of the designation.

### 4<sup>th</sup> and Subsequent Characters: **Product Type - SOST**

- T** = Straight Tee (90° branch fitting)



**Table 4 - Thickness/Weight Relationships of Standard Materials**

Gauge	Galvanized and Paintable Galvanized Steel			Nongalvanized Carbon Steel			Stainless Steel (304 or 316)		
	Minimum Thickness (inches)	Nominal Thickness (inches)	Nominal Weight (lb/sq ft)	Minimum Thickness (inches)	Nominal Thickness (inches)	Nominal Weight (lb/sq ft)	Minimum Thickness (inches)	Nominal Thickness (inches)	Nominal Weight (lb/sq ft)
28	0.0157	0.0187	0.781	0.0129	0.0149	0.625	0.0136	0.0156	0.656
26	0.0187	0.0217	0.906	0.0159	0.0179	0.750	0.0158	0.0188	0.788
24	0.0236	0.0276	1.156	0.0209	0.0239	1.000	0.0220	0.0250	1.050
22	0.0296	0.0336	1.406	0.0269	0.0299	1.250	0.0273	0.0313	1.313
20	0.0356	0.0396	1.656	0.0329	0.0359	1.500	0.0335	0.0375	1.575
18	0.0466	0.0516	2.156	0.0438	0.0478	2.000	0.0450	0.0500	2.100
16	0.0575	0.0635	2.656	0.0548	0.0598	2.500	0.0565	0.0625	2.625
14	0.0705	0.0785	3.281	0.0697	0.0747	3.125	0.0711	0.0781	3.281
12	0.0994	0.1084	4.531	0.0986	0.1046	4.375	0.1000	0.1094	4.594
10	0.1292	0.1382	5.781	0.1285	0.1345	5.625	0.1286	0.1406	5.906

Aluminum 3003-H14		
Minimum Thickness (inches)	Nominal Thickness (inches)	Nominal Weight (lb/sq ft)
0.0230	0.025	0.356
0.0295	0.032	0.456
0.0365	0.040	0.570
0.0465	0.050	0.713
0.0595	0.063	0.898
0.0755	0.080	1.140
0.0855	0.090	1.283
0.0945	0.100	1.426
0.1195	0.125	1.782

**Table 5 - Single-wall, Flat Oval, Duct and Fittings - Available Dimensions**

Minor Axis (inches)	Major Axis (inches)		
	Minimum	Maximum Spiral Lockseam	Maximum Longitudinal Seam or Fitting Size
3	8	22	30
4	7	21	40
5	8	21	46
6	8	59	59
7	10	21	62
8	10	77	77
9	12	23	89
10	12	79	99
11	14	25	109
12	14	81	119
14	20	80	139
16	22	79	143
18	23	81	134
20	26	80	140
22	35	82	134
24	37	81	141
26	29	not available	137
28	31	not available	144
30	43	83	141
32	35	not available	139
34	37	not available	138
36	39	not available	136
38	41	not available	136
40	43	not available	143

**Table 6 - Material Specifications**

Standard Material	Type	ASTM Number
Galvanized Steel	--	A653, A924
Stainless Steel	304, 304L, 316, 316L	A167, A480
Nongalvanized Carbon Steel	18 - 28 gauge	A366, A568, A569
Aluminum	3003-H14	B209
Aluminized	Type 1	A463

Other types of material are available on special order.

**Table 7 - McGill AirFlow Standard Construction Methods**

Product	Construction
UNI-SEAL Duct	Spiral lockseam
Longitudinal Seam Duct	Rolled and butt welded
UNI-SEAL Fittings	Standard: Spot or tack welded. Available fully welded.

**Table 8** - Single-wall, Flat Oval, Spiral Duct and Fittings: standard major axis/thickness relationships of duct and fittings fabricated from galvanized, paintable galvanized, or nongalvanized carbon steel.<sup>2</sup>

Major Axis (inches)	Duct Thickness (gauge)		Fitting Thickness (gauge)
	SOSSD	SOSLD	SOS__
7 - 8	24	20	20
9 - 24	24	20	20
25 - 30	22	20	20
31 - 36	22	20	20
37 - 42	22	18	18
43 - 48	22	18	18
49	20	18	18
50 - 60	20	18	18
61 - 68	20	16	16
69 - 70	20	16	16
71 - 83	18	16	16
84 - 120	na	16	16

**Table 9** - Single-wall, Flat Oval, Spiral Duct and Fittings: standard major axis/thickness relationships of duct and fittings fabricated from type 304 or 316 stainless steel.<sup>1,2</sup>

Major Axis (inches)	Duct Thickness (inches)		Fitting Thickness (inches)
	SOSSD	SOSLD	SOS__
8 - 24	24	20	20
25 - 36	22	20	20
37 - 48	22	18	18
49 - 60	20	18	18
61 - 70	20	16	16
71 - 120	na	16	16

**Table 10** - Single-wall, Flat Oval, Spiral Duct and Fittings: standard major axis/thickness relationships of duct and fittings fabricated from type 3003-H14 aluminum.<sup>1,3</sup>

Major Axis (inches)	Duct Thickness (inches)		Fitting Thickness (gauge)
	SOSSD	SOSLD	SOS__
7 - 8	0.040	0.063	0.063
9 - 24	0.040	0.063	0.063
25 - 36	0.050	0.063	0.063
37 - 42	0.050	0.080	0.080
43 - 48	0.050	0.080	0.080
49 - 60	0.063	0.080	0.080
61 - 70	0.063	na	na

**Notes for Tables 8 through 10:**

- <sup>1</sup> Note: na = not available
- <sup>2</sup> McGill AirFlow does not have standard material major axis/thickness relationships for major axes greater than 120 inches. Please specify the required material thickness when ordering.
- <sup>3</sup> Aluminum thickness for SOSSD duct, and SOS\_\_ fittings is based on approximately 1.5 times galvanized steel thickness standards in these product lines, for equal strength and stiffness.
- <sup>4</sup> Contact McGill AirFlow for assistance in designing flat oval duct systems in negative pressure applications exceeding -2 in wg
- <sup>5</sup> All gauges listed in Tables 8 through 10 are good for operating pressures up to + 10 in wg.

## UNI-SEAL FLAT OVAL DUCT

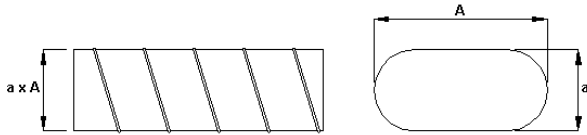
(Spiral lockseam)

**DESIGNATION:**

SO(\*)SD

**DIMENSIONS:**

(See Tables 5 and 11)



## LONGITUDINAL SEAM FLAT OVAL DUCT

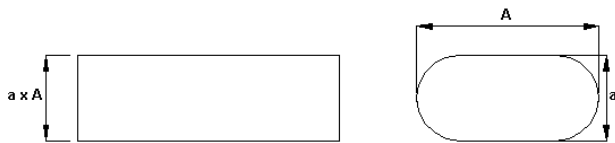
(Fully welded longitudinal seam)

**DESIGNATION:**

SO(\*)LD

**DIMENSIONS:**

(See Table 5)



**Table 11- Dimensions and Properties**

Nominal Size (INCHES)	Approximate Equivalent Rectangular (INCHES)	**Equivalent Round (INCHES)	GAUGE	Cross Sectional Area (ft <sup>2</sup> )	Surface Area Per Lineal Foot (ft <sup>2</sup> /ft)	Weight Per Lineal Foot (lbs/ft)
3 x 8*	3 x 8	5.1	24	0.15	1.57	2.09
3 x 9*	3 x 9	5.6	24	0.19	1.83	2.44
3 x 11*	3 x 11	6.0	24	0.22	2.09	2.78
3 x 12*	3 x 12	6.4	24	0.25	2.36	3.13
3 x 14*	3 x 14	6.7	24	0.29	2.62	3.48
3 x 17*	3 x 17	7.3	24	0.36	3.14	4.18
3 x 19*	3 x 19	7.6	24	0.39	3.40	4.52
3 x 22*	3 x 22	8.1	24	0.46	3.93	5.22
4 x 7*	4 x 7	5.6	24	0.18	1.57	2.09
4 x 9*	4 x 8	6.2	24	0.22	1.83	2.44
4 x 10*	4 x 10	6.7	24	0.26	2.10	2.78
4 x 12*	4 x 12	7.2	24	0.31	2.36	3.13
4 x 13*	4 x 13	7.6	24	0.35	2.62	3.48
4 x 15*	4 x 15	8.0	24	0.39	2.88	3.83
4 x 17*	4 x 16	8.3	24	0.44	3.14	4.18
4 x 18*	4 x 18	8.7	24	0.48	3.41	4.52
4 x 20*	4 x 20	9.0	24	0.53	3.67	4.87
4 x 21*	4 x 21	9.3	24	0.57	3.93	5.22
5 x 8*	5 x 8	6.6	24	0.25	1.83	2.44
5 x 10*	5 x 9	7.3	24	0.30	2.09	2.78
5 x 11*	5 x 11	7.9	24	0.35	2.36	3.13
5 x 13*	5 x 13	8.4	24	0.41	2.62	3.48
5 x 14*	5 x 14	8.8	24	0.46	2.88	3.83
5 x 16*	5 x 16	9.3	24	0.52	3.14	4.18
5 x 18*	5 x 17	9.7	24	0.57	3.40	4.52
5 x 19*	5 x 19	10.0	24	0.63	3.67	4.87
5 x 21*	5 x 21	10.4	24	0.68	3.93	5.22
6 x 8*	6 x 8	6.9	24	0.26	1.83	2.44
6 x 9*	6 x 9	7.7	24	0.33	2.09	2.78
6 x 11*	6 x 10	8.4	24	0.39	2.35	3.13
6 x 12*	6 x 12	9.0	24	0.46	2.62	3.48

**Table 11- Dimensions and Properties**

<b>Nominal Size (INCHES)</b>	<b>Approximate Equivalent Rectangular (INCHES)</b>	<b>**Equivalent Round (INCHES)</b>	<b>GAUGE</b>	<b>Cross Sectional Area (ft<sup>2</sup>)</b>	<b>Surface Area Per Lineal Foot (ft<sup>2</sup>/ft)</b>	<b>Weight Per Lineal Foot (lbs/ft)</b>
6 x 14*	6 x 13	9.5	24	0.52	2.88	3.83
6 x 15*	6 x 15	10.0	24	0.59	3.14	4.18
6 x 17*	6 x 17	10.5	24	0.65	3.40	4.52
6 x 19*	6 x 18	10.9	24	0.72	3.66	4.87
6 x 20*	6 x 20	11.3	24	0.78	3.93	5.22
6 x 22	6 x 21	11.7	24	0.85	4.19	5.57
6 x 23	6 x 23	12.1	24	0.91	4.45	5.92
6 x 25	6 x 25	12.5	22	0.98	4.71	7.62
6 x 26	6 x 26	12.8	22	1.04	4.97	8.04
6 x 28	6 x 28	13.1	22	1.11	5.23	8.46
6 x 30	6 x 29	13.4	22	1.18	5.50	8.89
6 x 31	6 x 31	13.7	22	1.24	5.76	9.31
6 x 33	6 x 33	14.0	22	1.31	6.02	9.73
6 x 34	6 x 34	14.3	22	1.37	6.28	10.16
6 x 36	6 x 36	14.6	22	1.44	6.54	10.58
6 x 37	6 x 37	14.8	22	1.50	6.81	11.00
6 x 41	6 x 40	15.4	22	1.63	7.33	11.85
6 x 44	6 x 44	15.8	22	1.76	7.85	12.70
6 x 47	6 x 47	16.3	22	1.89	8.38	13.54
6 x 50	6 x 50	16.7	20	2.02	8.90	16.95
6 x 53	6 x 53	17.2	20	2.15	9.42	17.95
6 x 56	6 x 56	17.6	20	2.29	9.95	18.94
6 x 59	6 x 60	17.9	20	2.42	10.47	19.94
7 x 10*	7 x 9	8.7	24	0.42	2.36	3.13
7 x 12*	7 x 11	9.4	24	0.50	2.62	3.48
7 x 13*	7 x 13	10.1	24	0.57	2.88	3.83
7 x 15*	7 x 14	10.7	24	0.65	3.14	4.18
7 x 16*	7 x 16	11.2	24	0.73	3.40	4.52
7 x 18*	7 x 17	11.7	24	0.80	3.67	4.87
7 x 20*	7 x 19	12.2	24	0.88	3.93	5.22
7 x 21*	7 x 21	12.6	24	0.96	4.19	5.57
8 x 10*	8 x 9	8.9	24	0.44	2.36	3.13

**Table 11- Dimensions and Properties**

<b>Nominal Size (INCHES)</b>	<b>Approximate Equivalent Rectangular (INCHES)</b>	<b>**Equivalent Round (INCHES)</b>	<b>GAUGE</b>	<b>Cross Sectional Area (ft<sup>2</sup>)</b>	<b>Surface Area Per Lineal Foot (ft<sup>2</sup>/ft)</b>	<b>Weight Per Lineal Foot (lbs/ft)</b>
8 x 11*	8 x 10	9.8	24	0.52	2.62	3.48
8 x 13*	8 x 12	10.5	24	0.61	2.88	3.83
8 x 14*	8 x 13	11.2	24	0.70	3.14	4.18
8 x 16*	8 x 15	11.8	24	0.78	3.40	4.52
8 x 17*	8 x 17	12.3	24	0.87	3.66	4.87
8 x 19*	8 x 18	12.9	24	0.96	3.93	5.22
8 x 21	8 x 20	13.4	24	1.05	4.19	5.57
8 x 22	8 x 22	13.9	24	1.13	4.45	5.92
8 x 24	8 x 23	14.3	24	1.22	4.71	6.26
8 x 25	8 x 25	14.7	22	1.31	4.97	8.04
8 x 27	8 x 26	15.1	22	1.40	5.24	8.46
8 x 30	8 x 30	15.9	22	1.57	5.76	9.31
8 x 32	8 x 31	16.3	22	1.66	6.02	9.73
8 x 33	8 x 33	16.6	22	1.74	6.28	10.16
8 x 35	8 x 34	17.0	22	1.83	6.54	10.58
8 x 36	8 x 36	17.3	22	1.92	6.81	11.00
8 x 38	8 x 37	17.6	22	2.01	7.07	11.43
8 x 39	8 x 39	17.9	22	2.09	7.33	11.85
8 x 43	8 x 42	18.5	22	2.27	7.85	12.70
8 x 46	8 x 45	19.1	22	2.44	8.38	13.54
8 x 49	8 x 49	19.6	20	2.62	8.90	16.95
8 x 52	8 x 52	20.2	20	2.79	9.42	17.95
8 x 55	8 x 55	20.7	20	2.96	9.95	18.94
8 x 58	8 x 58	21.1	20	3.14	10.47	19.94
8 x 61	8 x 61	21.6	20	3.31	11.00	20.94
8 x 65	8 x 64	22.0	20	3.49	11.52	21.94
8 x 68	8 x 68	22.5	20	3.66	12.04	22.93
8 x 71	8 x 71	22.9	18	3.84	12.57	31.15
8 x 74	8 x 74	23.3	18	4.01	13.09	32.45
8 x 77	8 x 77	23.7	18	4.19	13.61	33.75
9 x 12*	9 x 11	10.8	24	0.64	2.88	3.83
9 x 14*	9 x 13	11.5	34	0.74	3.14	4.18

**Table 11- Dimensions and Properties**

Nominal Size (INCHES)	Approximate Equivalent Rectangular (INCHES)	**Equivalent Round (INCHES)	GAUGE	Cross Sectional Area (ft <sup>2</sup> )	Surface Area Per Lineal Foot (ft <sup>2</sup> /ft)	Weight Per Lineal Foot (lbs/ft)
9 x 15*	9 x 14	12.2	24	0.84	3.40	4.52
9 x 17*	9 x 16	12.9	24	0.93	3.67	4.87
9 x 18*	9 x 18	13.5	24	1.03	3.93	5.22
9 x 20*	9 x 19	14.0	24	1.13	4.19	5.57
9 x 22*	9 x 21	14.6	24	1.23	4.45	5.92
9 x 23*	9 x 22	15.1	24	1.33	4.71	6.26
10 x 12*	10 x 10	11.0	24	0.65	2.88	3.83
10 x 13*	10 x 12	11.8	24	0.76	3.14	4.18
10 x 15*	10 x 14	12.6	24	0.87	3.40	4.52
10 x 16*	10 x 15	13.3	24	0.98	3.66	4.87
10 x 18*	10 x 17	13.9	24	1.09	3.93	5.22
10 x 19*	10 x 18	14.6	24	1.20	4.19	5.57
10 x 21*	10 x 20	15.2	24	1.31	4.45	5.92
10 x 23	10 x 22	15.7	24	1.42	4.71	6.26
10 x 24	10 x 23	16.2	24	1.53	4.97	6.61
10 x 26	10 x 25	16.7	22	1.64	5.24	8.46
10 x 27	10 x 26	17.2	22	1.75	5.50	8.89
10 x 29	10 x 28	17.7	22	1.85	5.76	9.31
10 x 30	10 x 30	18.1	22	1.96	6.02	9.73
10 x 32	10 x 31	18.5	22	2.07	6.28	10.16
10 x 34	10 x 33	18.9	22	2.18	6.54	10.58
10 x 35	10 x 34	19.3	22	2.29	6.81	11.00
10 x 37	10 x 36	19.7	22	2.40	7.07	11.43
10 x 38	10 x 38	20.1	22	2.51	7.33	11.85
10 x 40	10 x 39	20.4	22	2.62	7.59	12.28
10 x 41	10 x 41	20.8	22	2.73	7.85	12.70
10 x 45	10 x 44	21.5	22	2.95	8.38	13.54
10 x 48	10 x 47	22.1	22	3.16	8.90	14.39
10 x 51	10 x 50	22.7	20	3.38	9.42	17.95
10 x 54	10 x 54	23.3	20	3.60	9.95	18.94
10 x 57	10 x 57	23.9	20	3.82	10.47	19.94



**Table 11- Dimensions and Properties**

Nominal Size (INCHES)	Approximate Equivalent Rectangular (INCHES)	**Equivalent Round (INCHES)	GAUGE	Cross Sectional Area (ft <sup>2</sup> )	Surface Area Per Lineal Foot (ft <sup>2</sup> /ft)	Weight Per Lineal Foot (lbs/ft)
10 x 60	10 x 60	24.4	20	4.04	11.00	20.94
10 x 63	10 x 63	25.0	20	4.25	11.52	21.94
10 x 67	10 x 66	25.5	20	4.47	12.04	22.93
10 x 70	10 x 69	26.0	20	4.69	12.57	23.93
10 x 73	10 x 73	26.4	18	4.91	13.09	32.45
10 x 76	10 x 76	26.9	18	5.13	13.61	33.75
10 x 79	10 x 79	27.3	18	5.35	14.14	35.05
11 x 14*	11 x 13	12.8	24	0.90	3.40	4.52
11 x 16*	11 x 14	13.6	24	1.02	3.66	4.87
11 x 17*	11 x 16	14.3	24	1.14	3.92	5.22
11 x 19*	11 x 18	15.0	24	1.26	4.19	5.57
11 x 20*	11 x 19	15.6	24	1.38	4.45	5.92
11 x 22*	11 x 21	16.3	24	1.50	4.71	6.26
11 x 24*	11 x 22	16.8	24	1.62	4.97	6.61
11 x 25*	11 x 24	17.4	22	1.74	5.23	8.46
12 x 14*	12 x 12	13.0	24	0.92	3.40	4.52
12 x 15*	12 x 14	13.8	24	1.05	3.67	4.87
12 x 17*	12 x 15	14.6	24	1.18	3.93	5.22
12 x 18*	12 x 17	15.4	24	1.31	4.19	5.57
12 x 20*	12 x 18	16.1	24	1.44	4.45	5.92
12 x 21*	12 x 20	16.7	24	1.57	4.71	6.26
12 x 23*	12 x 22	17.4	24	1.70	4.98	6.61
12 x 25	12 x 23	18.0	22	1.83	5.24	8.46
12 x 26	12 x 25	18.5	22	1.96	5.50	8.89
12 x 28	12 x 27	19.1	22	2.10	5.76	9.31
12 x 29	12 x 28	19.6	22	2.23	6.02	9.73
12 x 31	12 x 30	20.1	22	2.36	6.28	10.16
12 x 32	12 x 31	20.6	22	2.49	6.55	10.58
12 x 34	12 x 33	21.0	22	2.62	6.81	11.01
12 x 36	12 x 35	21.5	22	2.75	7.07	11.43
12 x 37	12 x 36	21.9	22	2.88	7.33	11.85

**Table 11- Dimensions and Properties**

Nominal Size (INCHES)	Approximate Equivalent Rectangular (INCHES)	**Equivalent Round (INCHES)	GAUGE	Cross Sectional Area (ft <sup>2</sup> )	Surface Area Per Lineal Foot (ft <sup>2</sup> /ft)	Weight Per Lineal Foot (lbs/ft)
12 x 39	12 x 38	22.3	22	3.01	7.59	12.28
12 x 40	12 x 39	22.7	22	3.14	7.85	12.70
12 x 43	12 x 43	23.5	22	3.41	8.38	13.54
12 x 47	12 x 46	24.3	22	3.67	8.90	14.39
12 x 50	12 x 49	25.0	20	3.93	9.43	17.95
12 x 53	12 x 52	25.6	20	4.19	9.95	18.94
12 x 56	12 x 55	26.3	20	4.45	10.47	19.94
12 x 59	12 x 58	26.9	20	4.72	11.00	20.94
12 x 62	12 x 62	27.5	20	4.98	11.52	21.94
12 x 65	12 x 65	28.1	20	5.24	12.04	22.94
12 x 69	12 x 68	28.7	20	5.50	12.57	23.93
12 x 72	12 x 71	29.2	18	5.76	13.09	32.45
12 x 75	12 x 74	29.8	18	6.03	13.61	33.75
12 x 78	12 x 78	30.3	18	6.29	14.14	35.05
12 x 81	12 x 81	30.8	18	6.55	14.66	36.35
14 x 20	14 x 19	17.5	24	1.68	4.71	6.26
14 x 22	14 x 20	18.2	24	1.83	4.98	6.61
14 x 23	14 x 22	18.9	24	1.99	5.24	6.96
14 x 25	14 x 23	19.5	22	2.14	5.50	8.89
14 x 27	14 x 25	20.2	22	2.29	5.76	9.31
14 x 28	14 x 27	20.8	22	2.45	6.02	9.73
14 x 30	14 x 28	21.3	22	2.60	6.29	10.16
14 x 31	14 x 30	21.9	22	2.75	6.55	10.58
14 x 33	14 x 31	22.4	22	2.90	6.81	11.00
14 x 34	14 x 33	22.9	22	3.06	7.07	11.43
14 x 36	14 x 35	23.4	22	3.21	7.33	11.85
14 x 39	14 x 38	24.4	22	3.52	7.86	12.70
14 x 42	14 x 41	25.3	22	3.82	8.38	13.54
14 x 45	14 x 44	26.1	22	4.13	8.90	14.39
14 x 49	14 x 47	26.9	20	4.43	9.43	17.95
14 x 52	14 x 51	27.7	20	4.74	9.95	18.94

**Table 11- Dimensions and Properties**

Nominal Size (INCHES)	Approximate Equivalent Rectangular (INCHES)	**Equivalent Round (INCHES)	GAUGE	Cross Sectional Area (ft <sup>2</sup> )	Surface Area Per Lineal Foot (ft <sup>2</sup> /ft)	Weight Per Lineal Foot (lbs/ft)
14 x 55	14 x 54	28.4	20	5.04	10.47	19.94
14 x 58	14 x 57	29.1	20	5.35	11.00	20.94
14 x 61	14 x 60	29.8	20	5.66	11.52	21.94
14 x 64	14 x 63	30.5	20	5.96	12.05	22.94
14 x 67	14 x 67	31.1	20	6.27	12.57	23.94
14 x 71	14 x 70	31.7	18	6.57	13.09	32.45
14 x 74	14 x 73	32.3	18	6.88	13.62	33.75
14 x 77	14 x 76	32.9	18	7.19	14.14	35.05
14 x 80	14 x 79	33.5	18	7.49	14.66	36.35
16 x 22	16 x 20	19.5	24	2.09	5.23	6.96
16 x 24	16 x 22	20.3	24	2.27	5.50	7.31
16 x 25	16 x 23	21.0	22	2.44	5.76	9.31
16 x 27	16 x 25	21.7	22	2.62	6.02	9.73
16 x 29	16 x 27	22.3	22	2.79	6.28	10.16
16 x 30	16 x 28	22.9	22	2.96	6.54	10.58
16 x 32	16 x 30	23.5	22	3.14	6.81	11.00
16 x 33	16 x 32	24.1	22	3.31	7.07	11.43
16 x 35	16 x 33	24.7	22	3.49	7.33	11.85
16 x 38	16 x 36	25.7	22	3.84	7.85	12.70
16 x 41	16 x 40	26.7	22	4.18	8.38	13.54
16 x 44	16 x 43	27.7	22	4.53	8.90	14.39
16 x 47	16 x 46	28.6	22	4.88	9.42	15.24
16 x 51	16 x 49	29.5	20	5.23	9.95	18.94
16 x 54	16 x 53	30.3	20	5.58	10.47	19.94
16 x 57	16 x 56	31.1	20	5.93	10.99	20.94
16 x 60	16 x 59	31.8	20	6.28	11.52	21.94
16 x 63	16 x 62	32.6	20	6.63	12.04	22.93
16 x 66	16 x 65	33.3	20	6.98	12.57	23.93
16 x 69	16 x 68	33.9	20	7.32	13.09	24.93
16 x 73	16 x 72	34.6	18	7.67	13.61	33.75
16 x 76	16 x 75	35.2	18	8.02	14.14	35.05

**Table 11- Dimensions and Properties**

Nominal Size (INCHES)	Approximate Equivalent Rectangular (INCHES)	**Equivalent Round (INCHES)	GAUGE	Cross Sectional Area (ft <sup>2</sup> )	Surface Area Per Lineal Foot (ft <sup>2</sup> /ft)	Weight Per Lineal Foot (lbs/ft)
16 x 79	16 x 78	35.9	18	8.37	14.66	36.35
18 x 23	18 x 20	20.7	24	2.36	5.50	7.31
18 x 24	18 x 22	21.6	24	2.55	5.76	7.66
18 x 26	18 x 24	22.3	22	2.75	6.02	9.73
18 x 27	18 x 25	23.1	22	2.94	6.28	10.16
18 x 29	18 x 27	23.8	22	3.14	6.54	10.58
18 x 31	18 x 28	24.5	22	3.34	6.81	11.00
18 x 32	18 x 30	25.1	22	3.53	7.07	11.43
18 x 34	18 x 32	25.7	22	3.73	7.33	11.85
18 x 35	18 x 33	26.3	22	3.92	7.59	12.27
18 x 37	18 x 35	26.9	22	4.12	7.85	12.70
18 x 40	18 x 38	28.0	22	4.51	8.38	13.54
18 x 43	18 x 41	29.1	22	4.91	8.90	14.39
18 x 46	18 x 45	30.1	22	5.30	9.42	15.24
18 x 49	18 x 48	31.1	20	5.69	9.95	18.94
18 x 53	18 x 51	31.4	20	5.83	10.14	19.31
18 x 56	18 x 54	32.8	20	6.48	10.99	20.94
18 x 59	18 x 57	33.7	20	6.87	11.52	21.94
18 x 62	18 x 61	34.5	20	7.26	12.04	22.93
18 x 65	18 x 64	35.2	20	7.65	12.56	23.93
18 x 68	18 x 67	36.0	20	8.05	13.09	24.93
18 x 71	18 x 70	36.7	18	8.44	13.61	33.75
18 x 75	18 x 73	37.4	18	8.83	14.14	35.05
18 x 78	18 x 76	38.1	18	9.22	14.66	36.35
18 x 81	18 x 80	38.8	18	9.62	15.18	37.65
20 x 26	20 x 24	23.6	22	3.05	6.28	10.16
20 x 28	20 x 25	24.4	22	3.27	6.54	10.58
20 x 29	20 x 27	25.2	22	3.49	6.81	11.00
20 x 31	20 x 28	25.9	22	3.71	7.07	11.43
20 x 33	20 x 30	26.6	22	3.93	7.33	11.85
20 x 36	20 x 33	27.9	22	4.36	7.85	12.70

**Table 11- Dimensions and Properties**

Nominal Size (INCHES)	Approximate Equivalent Rectangular (INCHES)	**Equivalent Round (INCHES)	GAUGE	Cross Sectional Area (ft <sup>2</sup> )	Surface Area Per Lineal Foot (ft <sup>2</sup> /ft)	Weight Per Lineal Foot (lbs/ft)
20 x 39	20 x 37	29.1	22	4.80	8.38	13.54
20 x 42	20 x 40	30.3	22	5.24	8.90	14.39
20 x 45	20 x 43	31.4	22	5.67	9.42	15.24
20 x 48	20 x 46	32.5	22	6.11	9.95	16.08
20 x 51	20 x 49	33.5	20	6.55	10.47	19.94
20 x 55	20 x 53	34.4	20	6.98	11.00	20.94
20 x 58	20 x 56	35.3	20	7.42	11.52	21.94
20 x 61	20 x 59	36.2	20	7.85	12.04	22.93
20 x 64	20 x 62	37.1	20	8.29	12.57	23.93
20 x 67	20 x 65	37.9	20	8.73	13.09	24.93
20 x 70	20 x 69	38.7	20	9.16	13.61	25.93
20 x 73	20 x 72	39.4	18	9.60	14.14	35.05
20 x 77	20 x 75	40.2	18	10.04	14.66	36.35
20 x 80	20 x 78	40.9	18	10.47	15.18	37.65
22 x 35	22 x 32	28.7	22	4.56	7.86	12.70
22 x 38	22 x 35	30.0	22	5.04	8.38	13.54
22 x 41	22 x 38	31.3	22	5.52	8.90	14.39
22 x 44	22 x 41	32.5	22	6.00	9.43	15.24
22 x 47	22 x 45	33.7	22	6.48	9.95	16.08
22 x 50	22 x 48	34.8	20	6.96	10.47	19.94
22 x 53	22 x 51	35.8	20	7.44	11.00	20.94
22 x 57	22 x 54	36.8	20	7.92	11.52	21.94
22 x 60	22 x 58	37.8	20	8.40	12.04	22.93
22 x 63	22 x 61	38.7	20	8.88	12.57	23.93
22 x 66	22 x 64	39.6	20	9.36	13.09	24.93
22 x 69	22 x 67	40.4	20	9.84	13.61	25.93
22 x 72	22 x 70	41.3	18	10.32	14.14	35.05
22 x 75	22 x 74	42.1	18	10.80	14.66	36.35
22 x 79	22 x 77	42.8	18	11.28	15.19	37.65
22 x 82	22 x 80	43.6	18	11.76	15.71	38.95
24 x 37	24 x 33	30.8	22	5.24	8.38	13.54

**Table 11- Dimensions and Properties**

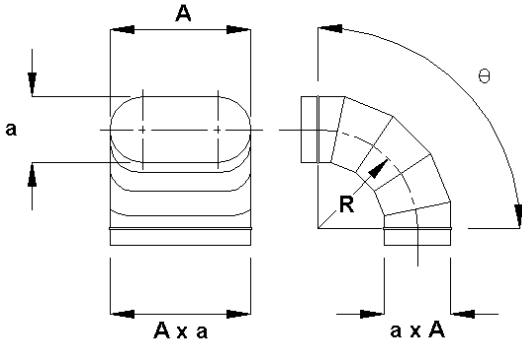
Nominal Size (INCHES)	Approximate Equivalent Rectangular (INCHES)	**Equivalent Round (INCHES)	GAUGE	Cross Sectional Area (ft <sup>2</sup> )	Surface Area Per Lineal Foot (ft <sup>2</sup> /ft)	Weight Per Lineal Foot (lbs/ft)
24 x 40	24 x 37	32.2	22	5.76	8.90	14.39
24 x 43	24 x 40	33.5	22	6.29	9.43	15.24
24 x 46	24 x 43	34.7	22	6.81	9.95	16.08
24 x 49	24 x 46	35.9	20	7.33	10.47	19.94
24 x 52	24 x 50	37.0	20	7.86	11.00	20.94
24 x 55	24 x 53	38.1	20	8.38	11.52	21.94
24 x 59	24 x 56	39.2	20	8.91	12.04	22.93
24 x 62	24 x 59	40.2	20	9.43	12.57	23.93
24 x 65	24 x 62	41.1	20	9.95	13.09	24.93
24 x 68	24 x 66	42.0	20	10.48	13.61	25.93
24 x 71	24 x 69	42.9	18	11.00	14.14	35.05
24 x 74	24 x 72	43.8	18	11.53	14.66	36.35
24 x 77	24 x 75	44.6	18	12.05	15.19	37.65
24 x 81	24 x 78	45.5	18	12.57	15.71	38.95
30 x 43	30 x 38	37.0	22	7.53	9.95	16.08
30 x 46	30 x 42	38.5	22	8.18	10.47	16.93
30 x 49	30 x 45	39.9	20	8.84	11.00	20.94
30 x 52	30 x 48	41.2	20	9.49	11.52	21.94
30 x 55	30 x 51	42.5	20	10.14	12.04	22.93
30 x 58	30 x 54	43.7	20	10.80	12.57	23.93
30 x 61	30 x 57	44.9	20	11.45	13.09	24.93
30 x 65	30 x 62	46.0	20	12.11	13.61	25.93
30 x 68	30 x 64	47.1	20	12.76	14.14	26.92
30 x 71	30 x 67	48.2	18	13.42	14.66	36.35
30 x 74	30 x 70	49.2	18	14.07	15.18	37.65
30 x 77	30 x 73	50.2	18	14.73	15.71	38.95
30 x 80	30 x 76	51.1	18	15.38	16.23	40.25
30 x 83	30 x 80	52.1	18	16.04	16.76	41.54

Equivalent rectangular size shown for a given flat oval size is the size of a rectangular duct that has the same friction loss per unit length as the flat oval.

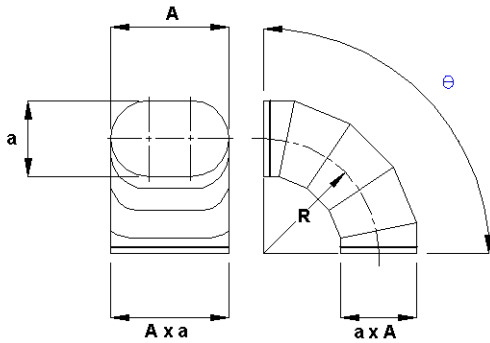
Notes: \*\* = size listed is the diameter of round duct that has same friction loss per unit length.  
\* = 6-foot standard length.

# EASY BEND GORED ELBOWS

## GORED ELBOW EASY BEND



$a \leq 22$  inches



$a > 22$  inches

**DESIGNATION:**  
SO(\*)EE#-θ

Where:

θ	Number of gores
0 - 35°	2
36 - 71°	3
72 - 90°	5

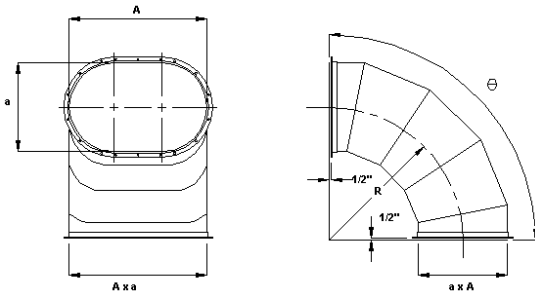
For elbows where θ exceeds 90°, add one gore for each additional 18° or fraction thereof.

**DIMENSIONS:**

$R = 1.5a$

## GORED ELBOW EASY BEND

(With Van Stone connector ends)



$a > 22$  inches

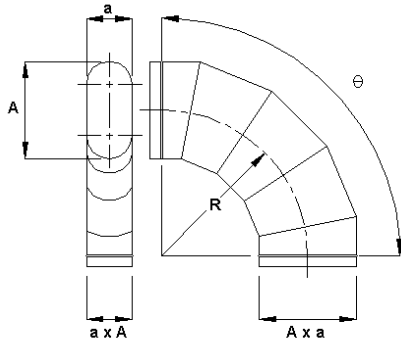
**Note:** End gores are turned up 1/2 inch to create the Van Stone connector flange. For minor axis dimensions that are 22 inches or smaller, see the applied connector/Van Stone connector detail on page 46.

**DIMENSIONS:**

$R = 1.5a$

# HARD BEND GORED ELBOWS

## GORED ELBOW HARD BEND



$A \leq 22$  inches

**Designation:**  
SO(\*)EH#-θ

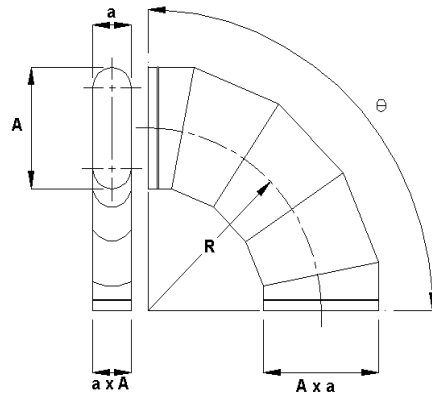
Where:

θ	Number of gores
0 - 35°	2
36 - 71°	3
72 - 90°	5

For elbows where θ exceeds 90°, add one gore for each additional 18° or fraction thereof.

**DIMENSIONS:**

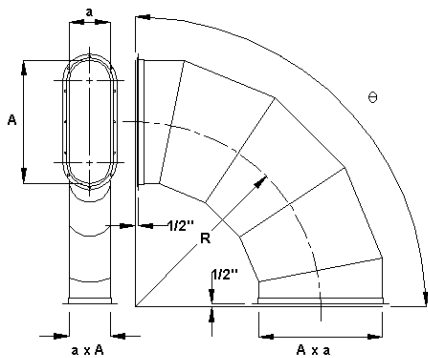
$$R = 1.5A$$



$A > 22$  inches

## GORED ELBOW HARD BEND

(With Van Stone connector ends)



$A > 22$  inches

**Note:** End gores are turned up and out 1/2 inch to create the Van Stone connector flange. For major axis dimensions that are 22 inches in diameter or smaller, see the applied connector/Van Stone connector detail on page 46.

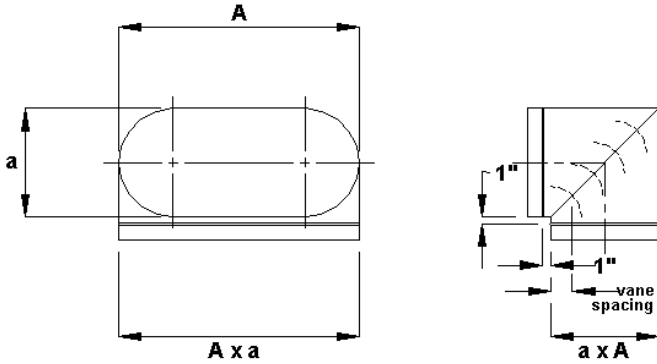
**DIMENSIONS:**

$$R = 1.5A$$



# MITERED ELBOWS

## MITERED 90° ELBOW EASY BEND



### DESIGNATION:

**SO(\*)EMVE-90**

with turning vanes  
(shown)

**SO(\*)EME-90**

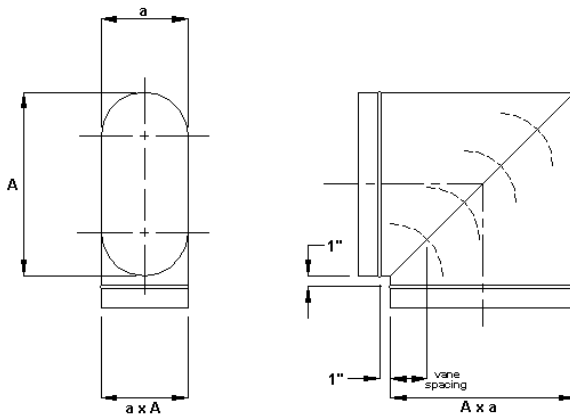
without turning vanes  
(not shown)

### DIMENSIONS:

a (inches)	Number of Vanes
3 - 9 ½	2
10 - 14 ½	3
15 - 19	4
20 - 60	5
over 60	12-inch maximum spacing

**Note:** Mitered 45° elbows (two gores) are also available. Designation is SO(\*)EME-45.

## MITERED 90° ELBOW HARD BEND



### DESIGNATION:

**SO(\*)EMVH-90**

with turning vanes  
(shown)

**SO(\*)EMH-90**

without turning vanes  
(not shown)

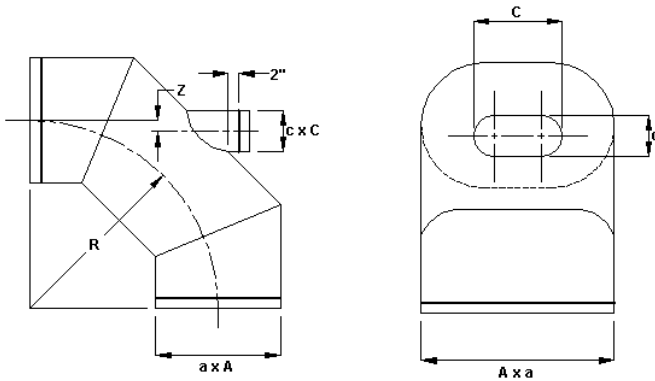
### DIMENSIONS:

A (inches)	Number of Vanes
3 - 9 ½	2
10 - 14 ½	3
15 - 19	4
20 - 60	5
over 60	12-inch maximum spacing

**Note:** Mitered 45° elbows (two gores) are also available. Designation is SO(\*)EMH-45.

# EASY BEND HEEL-TAPPED ELBOWS

## HEEL-TAPPED 90° ELBOW



## EASY BEND

**DESIGNATION:**  
SO(\*)ETE3-90

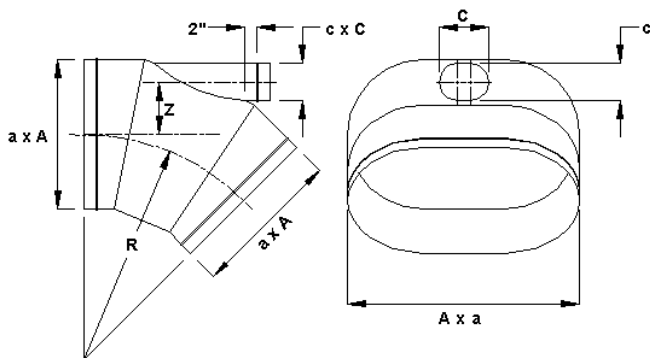
**DIMENSIONS:**  
 $R = 1.5a$   
 $Z = 0.086a$

Maximum  $c = a$   
 Maximum  $C = A$

Tap may be round (  $C = c$  )

## HEEL-TAPPED

## 45° ELBOW EASY BEND



**DESIGNATION:**  
SO(\*)ETE3-45

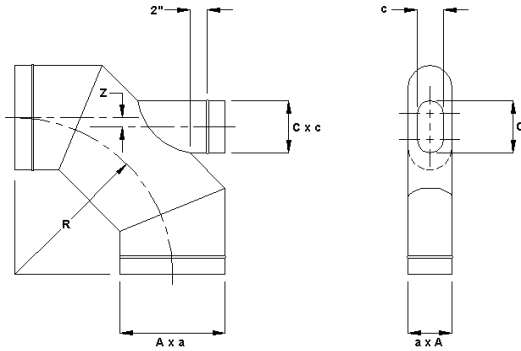
**DIMENSIONS:**  
 $R = 1.5a$   
 $Z = 0.348a$

Maximum  $c = 0.3a$   
 Maximum  $C = A$

Tap may be round (  $C = c$  )

# HARD BEND HEEL-TAPPED ELBOWS

## HEEL-TAPPED 90° ELBOW HARD BEND



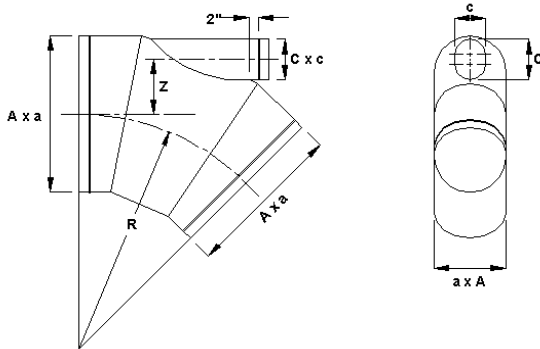
**DESIGNATION:**  
SO(\*)ETH3-90

**DIMENSIONS:**  
 $R = 1.5A$   
 $Z = 0.086A$

Maximum  $C = A$   
Maximum  $c = a$

Tap may be round ( $c = C$ )

## HEEL-TAPPED 45° ELBOW HARD BEND



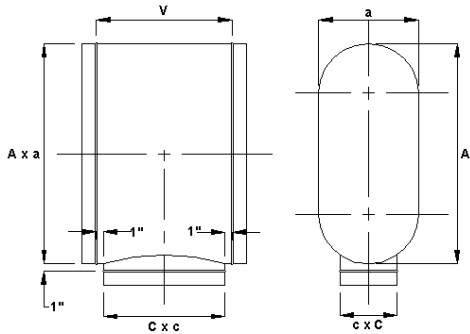
**DESIGNATION:**  
SO(\*)ETH3-45

**DIMENSIONS:**  
 $R = 1.5A$   
 $Z = 0.348A$

Maximum  $C = 0.3A$   
Maximum  $c = a$

Tap may be round ( $c = C$ )

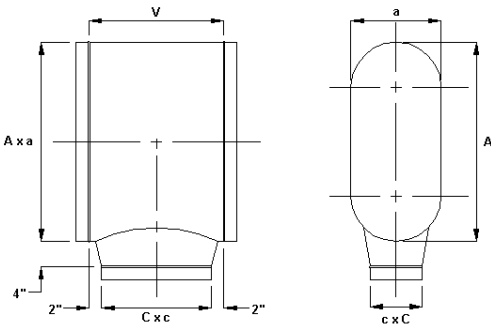
## STRAIGHT TEE



**DESIGNATION:**  
SO(\*)T

**DIMENSIONS:**  
 $V = C + 2$   
 Maximum  $C = A$   
 Maximum  $c = a$

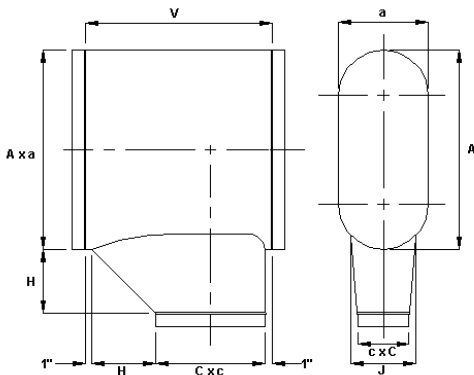
## CONICAL TEE



**DESIGNATION:**  
SO(\*)TC

**DIMENSIONS:**  
 $V = C + 4$   
 Maximum  $C = A - 2$   
 Maximum  $c = a - 2$

## LO-LOSS TEE

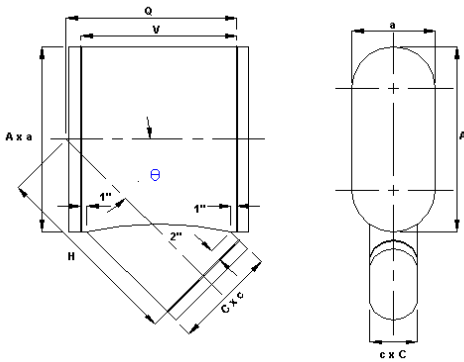


**DESIGNATION:**  
SO(\*)TL

**DIMENSIONS:**  
 $V = C + H + 2$   
 $J = c + 2$  (for  $c \leq a - 2$ )  
 $J = c$  (for  $c > a - 2$ )  
 Maximum  $C = A$   
 Maximum  $c = a$

C (inches)	H (inches)
3 - 8	4
8 ½ - 14	7
14 ½ - 26	10
27 or larger	13

## STRAIGHT LATERAL



**DESIGNATION:**  
SO(\*)L  
(-θ if θ ≠ 45°)

**DIMENSIONS:**

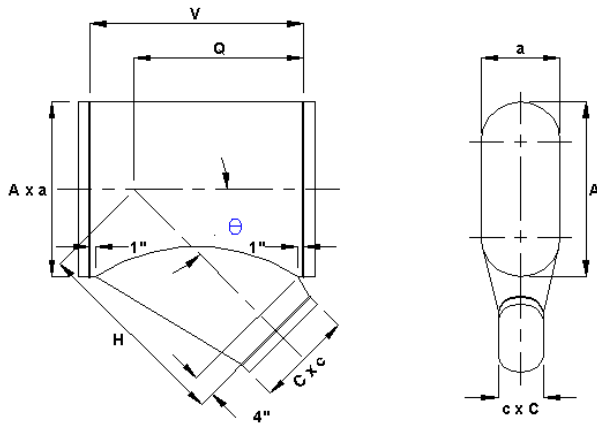
$$V = \frac{C}{\sin \theta} + 2$$

$$Q = \frac{A}{2 \tan \theta} + \frac{C}{2 \sin \theta} + 1$$

$$H = \frac{A}{2 \sin \theta} + \frac{C}{2 \tan \theta} + 2$$

Maximum C = A and c = a

## CONICAL LATERAL



**DESIGNATION:**  
SO(\*)LC  
(-θ if θ ≠ 45°)  
(for θ ≥ 30°)

**DIMENSIONS:**

$$V = \frac{(C + 2)}{\sin \theta} + 2$$

$$Q = \frac{A}{2 \tan \theta} + \frac{C + 2\alpha}{2 \sin \theta} + 1$$

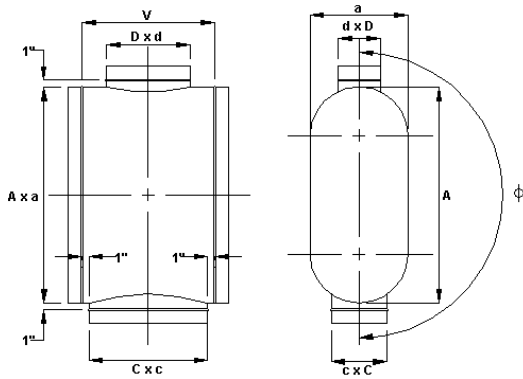
$$H = \frac{A}{2 \sin \theta} + \frac{C + 2\alpha}{2 \tan \theta} + 4$$

$$\alpha = \frac{2}{\frac{(C + 2)}{4 \tan \theta} + 2}$$

Maximum C = A-3 for A ≤ 10  
A-4 for A ≤ 42  
A-5 for A > 42

Maximum c = A-2

## STRAIGHT 90° CROSS



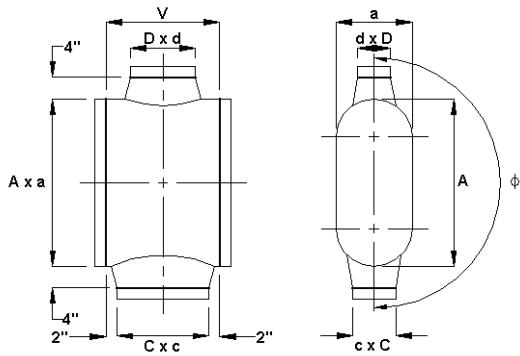
**DESIGNATION:**  
SO(\*)TX  
(-phi if phi ≠ 180°)

**DIMENSIONS:**  
 $V = C + 2$

Maximum C or D = A  
Maximum c or d = a

Either tap may be round (  $c = C$  or  $d = D$  )

## CONICAL 90° CROSS



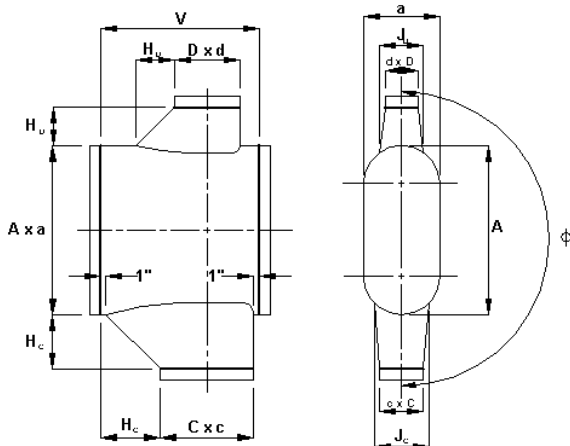
**DESIGNATION:**  
SO(\*)TXC  
(-phi if phi ≠ 180°)

**DIMENSIONS:**  
 $V = C + 4$

Maximum C or D = A - 2  
Maximum c or d = a - 2

Either tap may be round (  $c = C$  or  $d = D$  )

## LO-LOSS 90° CROSS



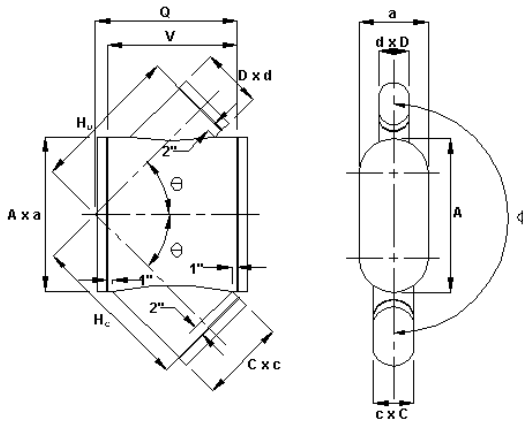
**DESIGNATION:**  
SO(\*)TXL  
(-phi if phi ≠ 180°)

**DIMENSIONS:**  
 $V = C + H_c + 2$

**Note:** To determine  $J_c + J_b$  dimension and maximum C, D, c, or d, refer to the LO-LOSS tee drawing.

C or D (inches)	H <sub>c</sub> or H <sub>b</sub> (inches)
3 - 8	4
9 - 14	7
15 - 26	10
27 or larger	13

## LATERAL CROSS



Either tap may be round (  $c = C$  or  $d = D$  )

### DESIGNATION:

SO(\*)LX

(- $\phi$  if  $\phi \neq 180^\circ$ ,

- $\theta$  if  $\theta \neq 45^\circ$ )

$$V = \frac{C}{\sin \theta} + 2$$

$$Q = \frac{A}{2 \tan \theta} + \frac{C}{2 \sin \theta} + 1$$

$$H_c = \frac{A}{2 \sin \theta} + \frac{C}{2 \tan \theta} + 2$$

$$H_D = \frac{A}{2 \sin \theta} + \frac{D}{2 \tan \theta} + 2$$

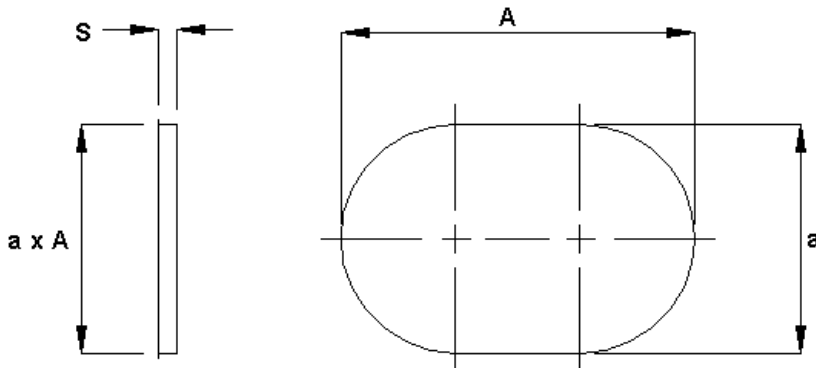
Maximum C or D = A  
Maximum c or d = a

## END CAP

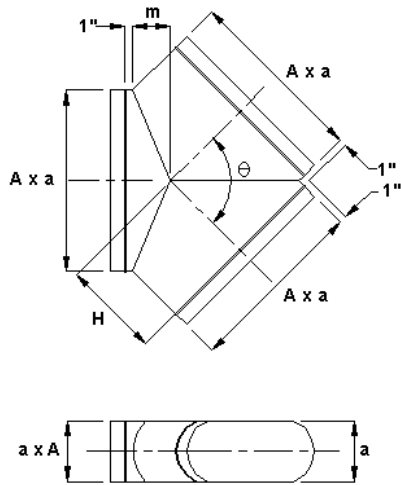
### DESIGNATION:

SO(\*)EC (for duct)

SO(\*)ECF (for fittings)



## Y-BRANCH, HARD BEND



**DESIGNATION:**

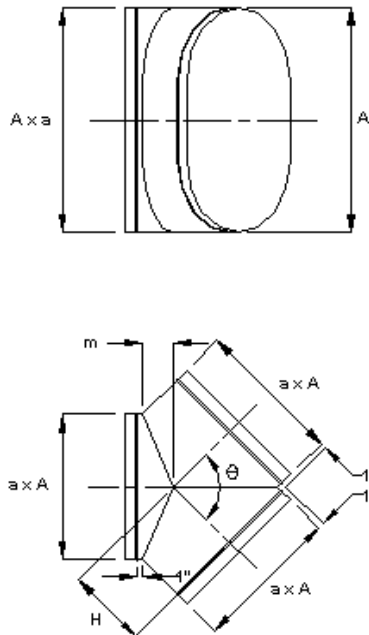
SO(\*)YH  
(-theta if theta ≠ 90°)

**DIMENSIONS:**

$$H = \frac{A}{2 \tan(\theta / 2)} + 1$$

$$m = \frac{A}{2} \tan(\theta / 4)$$

## Y-BRANCH, EASY BEND



**DESIGNATION:**

SO(\*)YE  
(-theta if theta ≠ 90°)

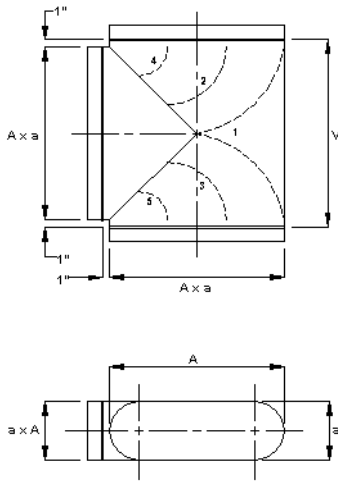
**MENSIONS:**

$$H = \frac{a}{2 \tan(\theta / 2)} + 1$$

$$m = \frac{a}{2} \tan(\theta / 4)$$



## BULLHEAD TEE, HARD BEND



### DESIGNATION:

**SO(\*)TBVH**

with turning vanes  
(shown)

**SO(\*)TBH**

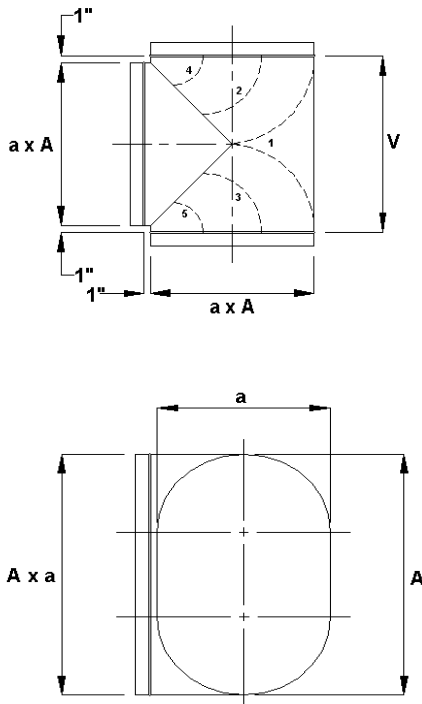
without turning vanes  
(not shown)

### DIMENSIONS:

$$V = A + 2$$

A (inches)	Number of Vanes
7 - 9	3
10 - 60	5
over 60	12-inch maximum spacing

## BULLHEAD TEE, EASY BEND



### DESIGNATION:

**SO(\*)TBVE**

with turning vanes  
(shown)

**SO(\*)TBE**

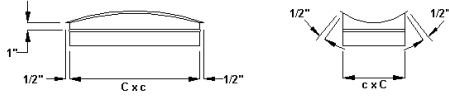
without turning vanes  
(not shown)

### DIMENSIONS:

$$V = a + 2$$

a (inches)	Number of Vanes
3 - 6	1
7 - 9	3
10 - 60	5
over 60	12-inch maximum spacing

## CONTOURED FLANGED STRAIGHT TEE TAP

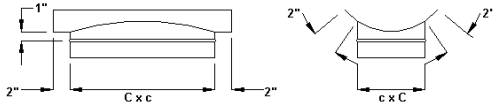


**DESIGNATION:**  
SO(\*)PT

**DIMENSIONS:**  
Specify duct size to which tap will be attached as a x A (if round body, specify A only).

Maximum C = A  
Maximum c = a

## SADDLED STRAIGHT TEE TAP

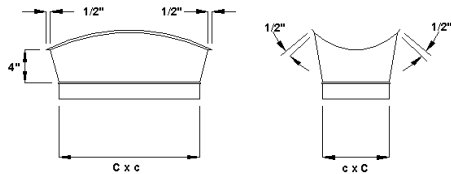


**DESIGNATION:**  
SO(\*)PTS

**DIMENSIONS:**  
Specify duct size to which tap will be attached as a x A (if round body, specify A only).

Maximum C = A  
Maximum c = a

## CONTOURED FLANGED CONICAL TEE TAP

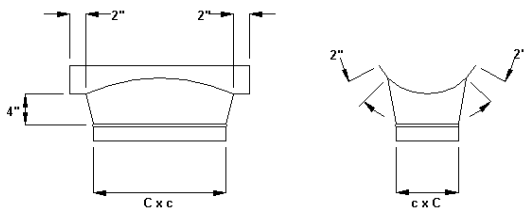


**DESIGNATION:**  
SO(\*)PTC

**DIMENSIONS:**  
Specify duct size to which tap will be attached as a x A (if round body, specify A only).

Maximum C = A - 2  
Maximum c = a - 2

## SADDLE CONICAL TEE TAP

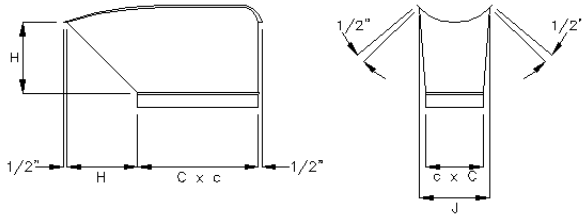


**DESIGNATION:**  
SO(\*)PTCS

**DIMENSIONS:**  
Specify duct size to which tap will be attached as a x A (if round body, specify A only).

Maximum C = A - 2  
Maximum c = a - 2

## CONTOURED FLANGED LO-LOSS TEE TAP



**DESIGNATION:**  
SO(\*)PTL

**DIMENSIONS:**  
Specify duct size to which tap will be attached as a x A (if round body, specify A only).

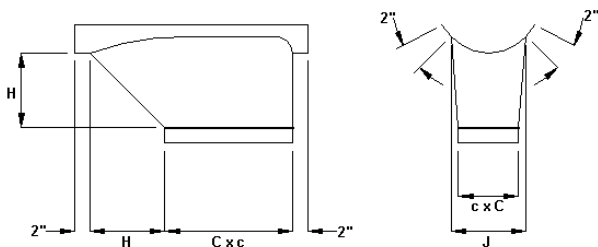
$$J = c + 2 \quad (\text{for } c \leq a - 2)$$

$$J = c \quad (\text{for } c > a - 2)$$

Maximum C = A  
Maximum c = a

C (inches)	H (inches)
3 - 8	4
9 - 14	7
15 - 26	10
27 or larger	13

## SADDLE LO-LOSS TEE TAP



**DESIGNATION:**  
SO(\*)PTLS

**DIMENSIONS:**  
Specify duct size to which tap will be attached as a x A (if round body, specify A only).

$$J = c + 2 \quad (\text{for } c \leq a - 2)$$

$$J = c \quad (\text{for } c > a - 2)$$

Maximum C = A  
Maximum c = a

C (inches)	H (inches)
3 - 8	4
9 - 14	7
15 - 26	10
27 or larger	13

## CONTOURED FLANGED LATERAL TAP

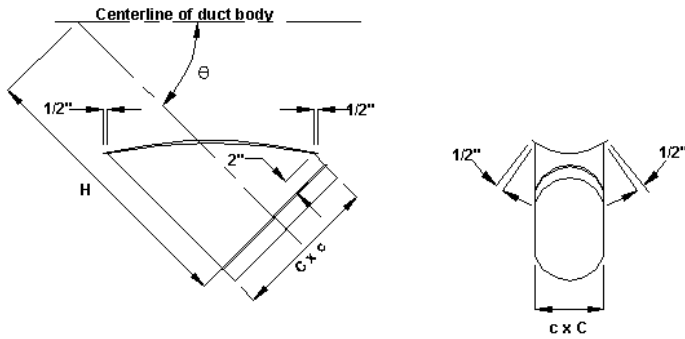
**DESIGNATION:**  
SO(\*)PL

**DIMENSIONS:**

Specify duct size to which tap will be attached as a x A (if round body, specify A only).

Maximum C = A  
Maximum c = a

$$H = \frac{A}{2\sin\theta} + \frac{C}{2\tan\theta} + 2$$



## SADDLE LATERAL TAP

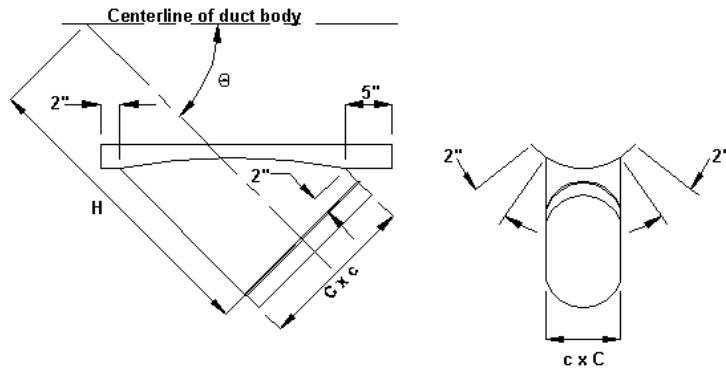
**DESIGNATION:**  
SO(\*)PLS  
(-θ if θ ≠ 45°)

**DIMENSIONS:**

Specify duct size to which tap will be attached as a x A (if round body, specify A only).

Maximum C = A  
Maximum c = a

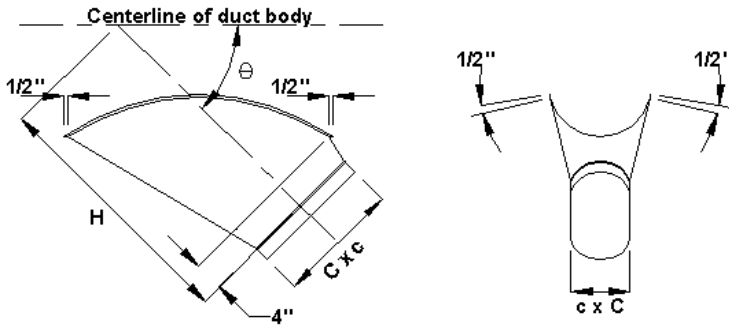
$$H = \frac{A}{2\sin\theta} + \frac{C}{2\tan\theta} + 2$$



## CONTOURED FLANGED CONICAL LATERAL TAP

### DESIGNATION:

SO(\*)PLC  
 (-θ if θ ≠ 45°)  
 (for θ ≥ 30°)



### DIMENSIONS:

Specify duct size to which tap will be attached as a x A (if round body, specify A only).

$$H = \frac{A}{2\sin\theta} + \frac{C + 2\alpha}{2\tan\theta} + 4$$

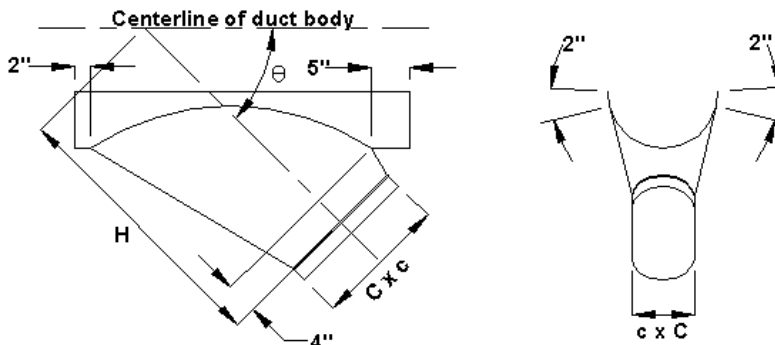
$$\alpha = \frac{2}{\frac{(C + 2)}{4\tan\theta} + 2}$$

Maximum c = A-3 for A ≤ 10  
 A-4 for A ≤ 42  
 A-5 for A > 42

## SADDLE CONICAL LATERAL TAP

### DESIGNATION:

SO(\*)PLCS  
 (-θ if θ ≠ 45°)  
 (for θ ≥ 30°)



### DIMENSIONS:

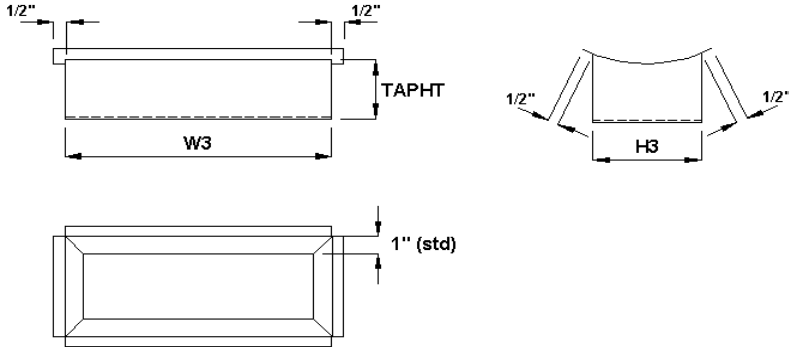
Specify duct size to which tap will be attached as a x A (if round body, specify a only).

$$H = \frac{A}{2\sin\theta} + \frac{C + 2\alpha}{2\tan\theta} + 4$$

$$\alpha = \frac{2}{\frac{(C + 2)}{4\tan\theta} + 2}$$

Maximum c = A-3 for A ≤ 10  
 A-4 for A ≤ 42  
 A-5 for A > 42

## RECTANGULAR TAP



### DESIGNATION:

**SO(\*)PTA**

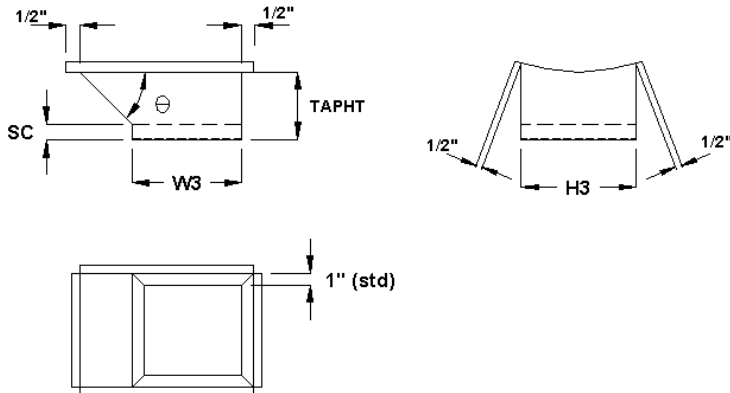
(Flange-in shown)

### DIMENSIONS:

Specify tap size ( W3 x H3 ) and duct size ( A x a ) that tap will be attached to and indicate end detail, i.e., flange-in, flange-out, or raw. Provide sketch of orientation if different than noted.

Default: TAPHT = 3 inches

## RECTANGULAR LO-LOSS TAP



### DESIGNATION:

**SO(\*)PTLA**

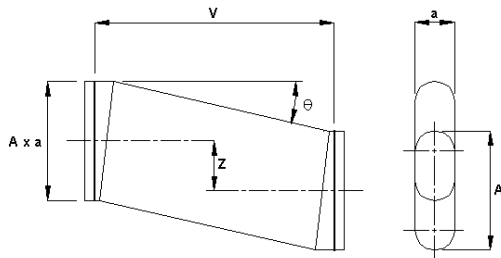
(Flange-in shown)

### DIMENSIONS:

Specify tap size ( W3 x H3 ) and duct size ( A x a ) that tap will be attached to and indicate end detail, i.e., flange-in, flange-out, or raw. Provide sketch of orientation if different than noted.

Default: TAPHT = 6 inches  
 SC = 2 inches  
 $\theta$  = 45 inches

## OFFSET, HARD BEND



**DESIGNATION:**  
SO(\*)ZH

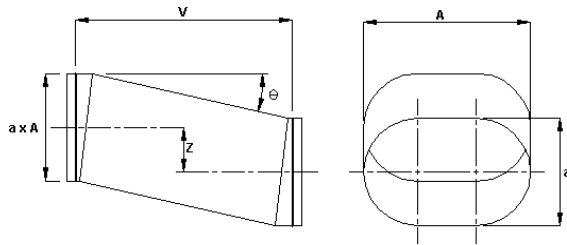
**DIMENSIONS:**

$$V = 2A$$

Z = Must be specified

Note: Z should not exceed  $0.75A$  or  $\theta > 60^\circ$ . If larger, use fabricated elbows and a straight length of duct.

## OFFSET, EASY BEND



**DESIGNATION:**  
SO(\*)ZE

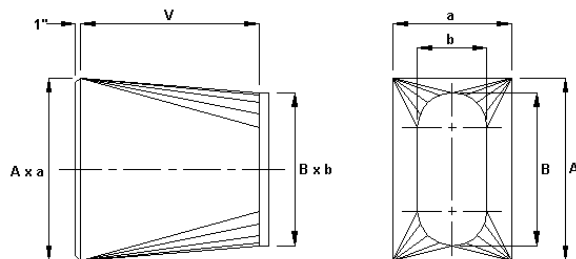
**DIMENSIONS:**

$$V = 2a$$

Z = Must be specified

Note: Z should not exceed  $0.75a$  or  $\theta > 60^\circ$ . If larger, use fabricated elbows and a straight length of duct.

## SQUARE-TO-FLAT OVAL



**DESIGNATION:**  
SO(\*)QR

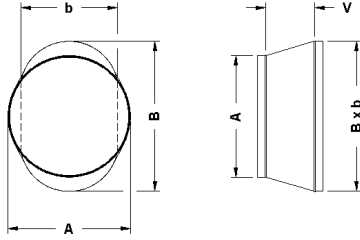
**DIMENSIONS:**

$$V = 12, 24, 36, \text{ or } 48 \text{ inches}$$

A = Major axis of rectangular side  
a = Minor axis of rectangular side

## CONCENTRIC TRANSITION

(Round-to-flat oval)



**DESIGNATION:**  
SO(\*)R-10

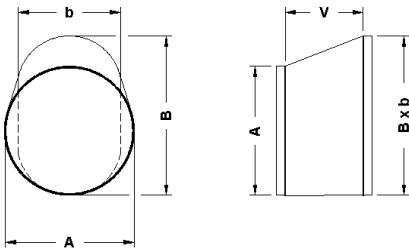
**DIMENSIONS:**

$V = 12$  if greater of  
 $(B-A)$  or  $(b-A) \leq 16$

$V = 24$  if greater of  
 $(B-A)$  or  $(b-A) > 16$

## ECCENTRIC TRANSITION

(Round-to-flat oval: minor axis tangent to round)



**DESIGNATION:**  
SO(\*)R-11

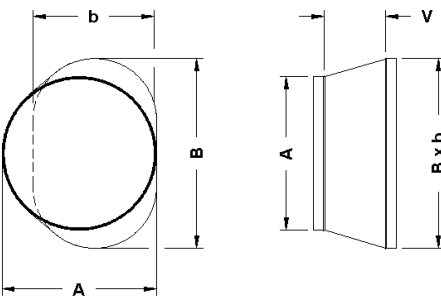
**DIMENSIONS:**

$V = 18$  if greater of  
 $(B-A)$  or  $(b-A) \leq 24$

$V = 36$  if greater of  
 $(B-A)$  or  $(b-A) > 24$

## ECCENTRIC TRANSITION

(Round-to-flat oval: major axis tangent to round)



**DESIGNATION:**  
SO(\*)R-12

**DIMENSIONS:**

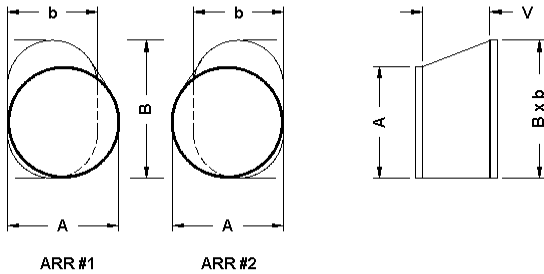
$V = 12$  if greater of  
 $(B-A)$  or  $(b-A) \leq 16$

$V = 24$  if greater of  
 $(B-A)$  or  $(b-A) > 16$



## ECCENTRIC TRANSITION

(Round-to-flat oval: two adjacent sides tangent)



### DESIGNATION:

**SO(\*)R-131**

(ARR #1)

**SO(\*)R-132**

(ARR #2)

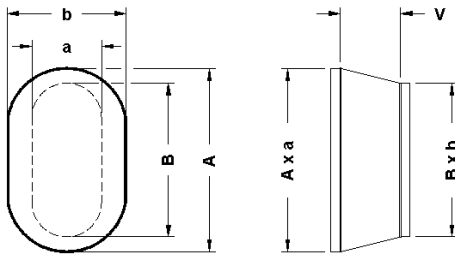
### DIMENSIONS:

$V = 18$  if greater of  $(B-A)$  or  $(b-A) \leq 24$

$V = 36$  if greater of  $(B-A)$  or  $(b-A) > 24$

## CONCENTRIC TRANSITION

(Flat oval-to-flat oval: parallel axis)



### DESIGNATION:

**SO(\*)R-30**

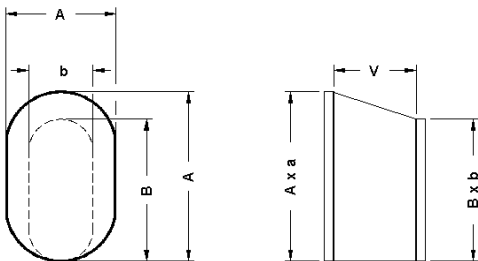
### DIMENSIONS:

$V = 12$  if greater of  $(A-B)$  or  $(a-b) \leq 16$

$V = 24$  if greater of  $(A-B)$  or  $(a-b) > 16$

## ECCENTRIC TRANSITION

(Flat oval-to-flat oval: parallel axis, minor axis sides tangent)



### DESIGNATION:

**SO(\*)R-31**

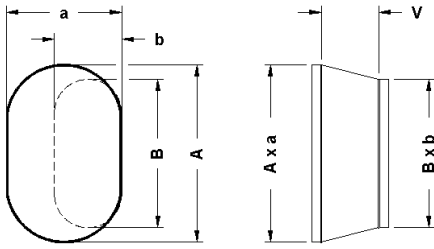
### DIMENSIONS:

$V = 18$  if greater of  $(A-B)$  or  $(a-b) \leq 24$

$V = 36$  if greater of  $(A-B)$  or  $(a-b) > 24$

## ECCENTRIC TRANSITION

(Flat oval-to-flat oval: parallel axis, major axis sides tangent)



**DESIGNATION:**  
**SO(\*)R-32**

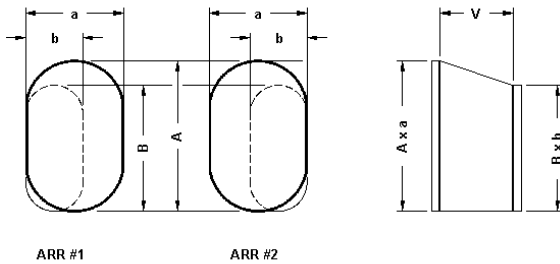
**DIMENSIONS:**

$V = 12$  if greater of  $(A-B)$  or  $(a-b) \leq 16$

$V = 24$  if greater of  $(A-B)$  or  $(a-b) > 16$

## ECCENTRIC TRANSITION

(Flat oval-to-flat oval: parallel axis, two adjacent sides tangent)



**DESIGNATION:**  
**SO(\*)R-331**  
(ARR #1)  
**SO(\*)R-332**  
(ARR #2)

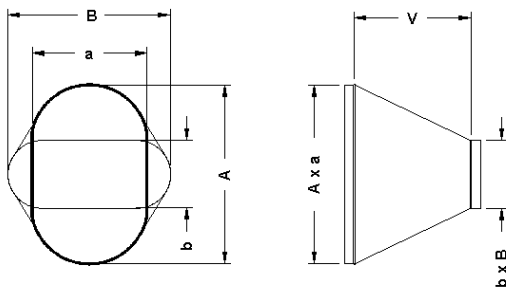
**DIMENSIONS:**

$V = 18$  if greater of  $(A-B)$  or  $(a-b) \leq 24$

$V = 36$  if greater of  $(A-B)$  or  $(a-b) > 24$

## CONCENTRIC TRANSITION

(Flat oval-to-flat oval: rotated axis)



**DESIGNATION:**  
**SO(\*)R-40**

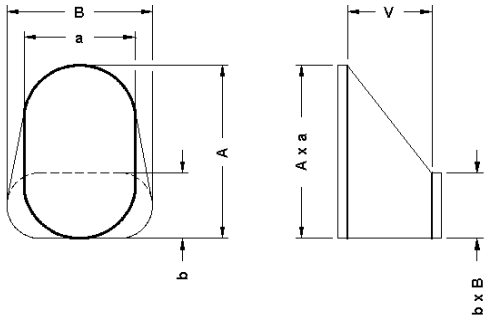
**DIMENSIONS:**

$V = 12$  if greater of  $(A-b)$  or  $(a-B) \leq 16$

$V = 24$  if greater of  $(A-b)$  or  $(a-B) > 16$

## ECCENTRIC TRANSITION

(Flat oval-to-flat oval: rotated axis, tangent to air entering side minor axis)



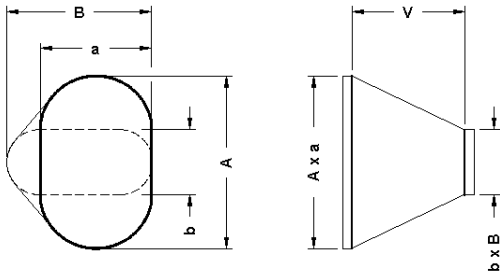
**DESIGNATION:**  
SO(\*)R-41

**DIMENSIONS:**  
V=18 if greater of  
(A-b) or (a-B) ≤ 24

V = 36 if greater of  
(A-b) or (a-B) > 24

## ECCENTRIC TRANSITION

(Flat oval-to-flat oval: rotated axis, tangent to air entering side major axis)



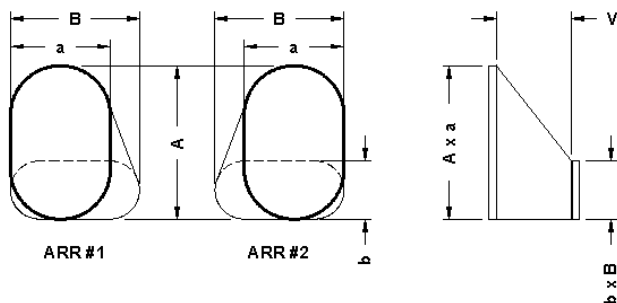
**DESIGNATION:**  
SO(\*)R-42

**DIMENSIONS:**  
V = 12 if greater of  
(A-b) or (a-B) ≤ 16

V = 24 if greater of  
(A-b) or (a-B) > 16

## ECCENTRIC TRANSITION

(Flat oval-to-flat oval: rotated axis, two adjacent sides tangent)

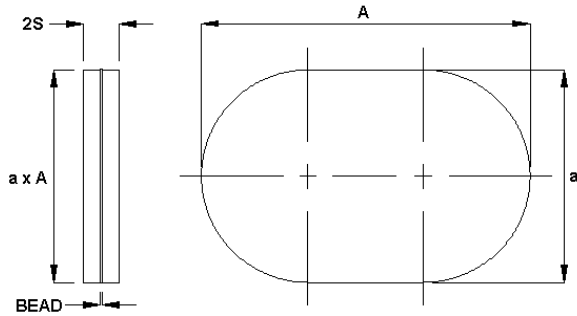


**DESIGNATION:**  
SO(\*)R-431  
(ARR #1)  
SO(\*)R-432  
(ARR #2)

**DIMENSIONS:**  
V = 18 if greater of  
(A-b) or (a-B) ≤ 24

V = 36 if greater of  
(A-b) or (a-B) > 24

## DUCT-TO-DUCT COUPLING

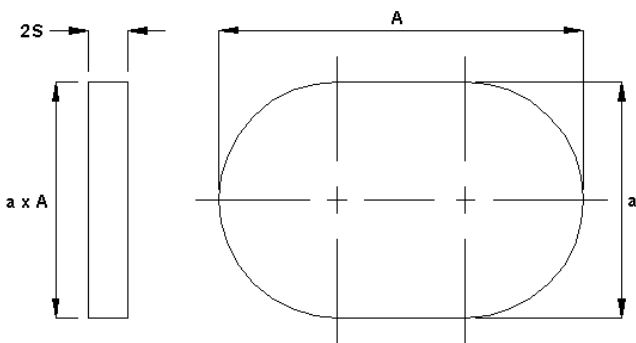


DESIGNATION:  
SO(\*)C

DIMENSIONS:

a (inches)	Bead (inches)
7 - 23 over 23	1/4 5/8

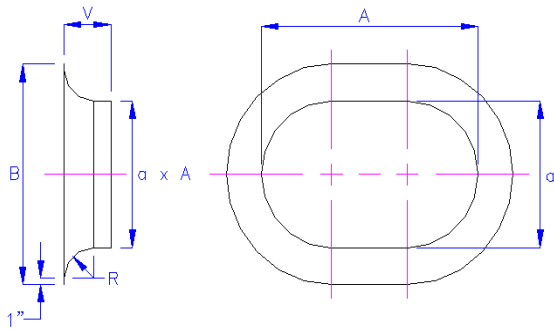
## FITTING-TO-FITTING COUPLING



DESIGNATION:  
SO(\*)CF

# BELLMOUTH

## BELLMOUTH



### DESIGNATION:

SFOBM\*\*\*

\*\* = major axis (e.g. 06,14, etc.)

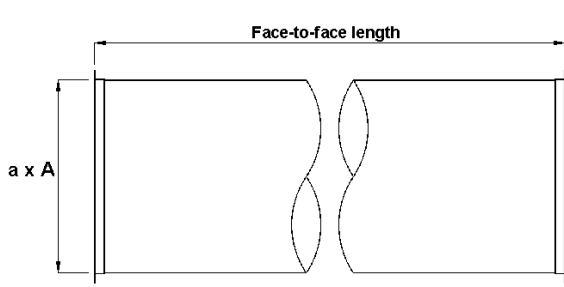
## = minor axis (e.g. 06,14, etc.)

For example, a 24 x 8 bellmouth has a designation of SFOBM2408.

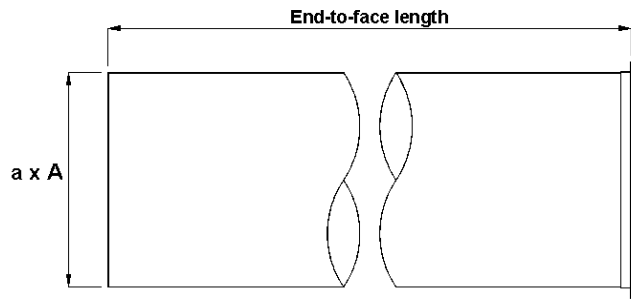
### DIMENSIONS:

a (inches)	B (inches)	V (inches)	R (inches)
4	9	2 ½	1 ½
5	10	2 ½	1 ½
6	12	3	2
7	13	3	2
8	14	3	2
9	15	3	2
10	16	3	2
11	19	4	3
12	20	4	3
13	21	4	3
14	22	4	3
15	23	4	3
16	26	5	4
17	27	5	4
18	28	5	4
19	29	5	4
20	30	5	4
21	31	5	4
22	34	6	5
23	35	6	5
24	36	6	5
26	40	7	6
28	42	7	6
30	44	7	6
32	48	8	7
34	50	8	7
36	52	8	7
38	54	8	7
40	58	9	8
42	60	9	8
44	62	9	8
46	64	9	8
48	66	9	8
50	56	3	3
52	58	3	3
54	60	3	3
56	62	3	3
58	64	3	3
60	66	3	3

## APPLIED DUCT CONNECTOR



Applied Connector at Both Ends

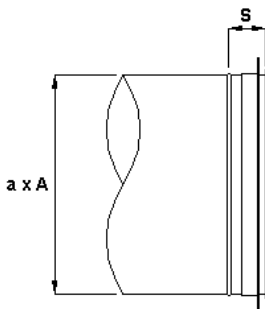


Applied Connector at One End

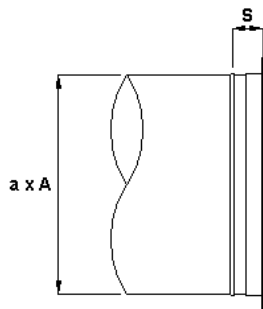
**Note:** Customer-specified duct length shall be the face-to-face or end-to-face dimension. Standard coil widths are 60 and 72-inch. When either of these lengths are requested on longitudinal seam duct with an angle ring, the ring is pulled ½ inch for welding, and the overall length will finish ½ inch longer. For example, a 60-inch length of longitudinal seam duct will finish 61-inches if iron angle rings are welded onto both ends. On all other applied connectors, the overall length does not change.

## APPLIED AND VAN STONE FITTINGS CONNECTORS

Type of Connector	a (inches)	S (inches)
Van Stone	5 - 9	1 ½
Van Stone	9 ½ - 72	3 ½
Applied	5 - 72	2 ¼



Van Stone Connector on Fitting End

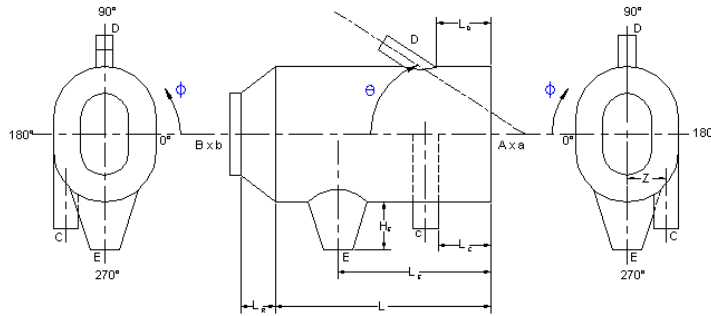


Applied Connector on Fitting End

**Notes:**

1. Customer to specify face-to-face dimensions for nonstandard fittings construction (i.e., nonstandard centerline radius on elbow or tap and body extensions on divided-flow fittings).
2. The bead is shown for reference only. Fittings requiring connectors are pipe sized and do not require a bead.
3. For gored elbows, refer to pages 23 and 24.

## STANDARD ASSEMBLY DRAWING



### Looking through B:

$A \times a$  = Dimension of large end (major x minor)  
 $B \times b$  = Dimension of small end if reducing (major x minor)  
 $C$  = Dimension of first tap  
 $D$  = Dimension of second tap  
 $E$  = Dimension of third tap

$H_E$  = Tap height of third tap (only when nonstandard height)

$L$  = Length of duct  
 $L_C$  = Dimension to first tap  
 $L_D$  = Dimension to second tap  
 $L_E$  = Dimension to third tap  
 $L_R$  = Reducer length

$Z_C$  = Offset position of first tap  
 $Z_D$  = Offset position of second tap  
 $Z_E$  = Offset position of third tap

$\theta$  = Location (in degrees) of lateral tap

$\phi_C$  = Location (in degrees) of first tap  
 $\phi_D$  = Location (in degrees) of second tap  
 $\phi_E$  = Location (in degrees) of third tap

### Looking through A:

$\phi_C$  = 270°       $Z_C$  = X, -X  
 $\phi_D$  = 90°       $Z_D$  = 0  
 $\phi_E$  = 270°       $Z_E$  = 0

### Notes:

1. X = specified distance
2. The end view is located to the right of the plan view if looking through the A end.
3. The end view is located to the left of the plan view if looking through the B end.
4. All taps, except for conical taps, are measured from the right hand side to the first end of the tap. Conical taps are measured from the right hand side (e.g.  $L_E$ ) from the centerline of the tap.
5. Refer to the examples at the front of this booklet for instructions about changing the orientation of the taps in relationship to the duct section (e.g.,  $maja$ ,  $minx$ ).

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Founded in 1951

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