



FRP DUCT

Fittings

Stacks

Specifications



VIRON[®]
INTERNATIONAL
CORPORATION

989-723-8255

**Complete System Solutions for
Moving Corrosive Air**

www.vironintl.com



VIRON® has grown to become a leader in designing and manufacturing Corrosion Resistant Air Scrubbers, Fans, and Exhaust Duct. Our personnel consists of a sales staff and application engineers who are well known and highly regarded in the industry. Many of our duct products hold manufacturing certificates, including low flame/smoke "Viro-Duc®" certified by Factory Mutual, a highly corrosion resistant duct certified by the ICBO, and a PVC fume exhaust duct "VI-A-DUC®" certified by Factory Mutual. When you buy from **VIRON®**, you are buying a proven, field tested product from a company with over thirty (30) years of manufacturing expertise.

VIRON® is sincerely interested in working with your engineers to solve your exhaust and scrubber corrosion problems.

CAPACITY - VIRON's 65,000 square feet Manufacturing Facility can produce over a million pounds of fiberglass duct and fittings annually. The company consistently fabricates duct and complete duct systems for many of the applications listed below where corrosion is a major problem.

EXPERIENCE - VIRON® has been in business for over thirty (30) years. All of this experience has been as manufacturers of Corrosion Resistant Thermosetting Plastic Duct. Our management team has over 160 years of combined experience working at **VIRON®** alone. Our experience is unparalleled in this industry, and that experience will pay dividends on your projects.

DESIGN - VIRON® utilizes Intergraph Computer Assisted Drafting and Design (CADD) equipment. This leading edge technology is compatible with most major engineering houses, where workstation machines are the standard. We can interface with our smallest client to our largest.

MANUFACTURING - VIRON® manufactures its duct to rigid quality standards. Through the use of our computer controlled filament winding machine, we can manufacture to exact material thicknesses and control the resin/glass ratio to your exact needs.

DELIVERY - Our customers are NUMBER ONE. We have made the commitment to react to every customer's delivery needs. This commitment has allowed **VIRON®** to maintain a constant flow of repeat business. Our customers know if they need the delivery, we will accommodate them.

QUALITY - Quality is the cornerstone of **VIRON's** philosophy. "FQ" *First Quality* is **VIRON's** commitment to our customers, which has led us into a dominant industry position today and into the 21st century.

TYPICAL VIRON® APPLICATIONS

Anodizing	Metal Recovery
Batteries	Metal Cleaning
Breweries	Municipal Waste Treatment
Chemical Filling Operatio	Petrochemical
Chemical Industries	Pharmaceuticals
Clean Rooms	Phosphating
Coatings	Photographic
Electro-Chemical Machin	Pickling
Emergency Chlorine	Plastics Manufacturing
Etching	Plating
Fish Processing	Printed Circuits
Food Processing	Pulp and Paper
Foundry	Refining
Glass	Semiconductors
Industrial Waste Treatme	Stripping
Laboratories	Tank Venting
Medical	Textiles



SELECTION GUIDE

VIRON® MODEL CODE

VFD — ST12 — 004

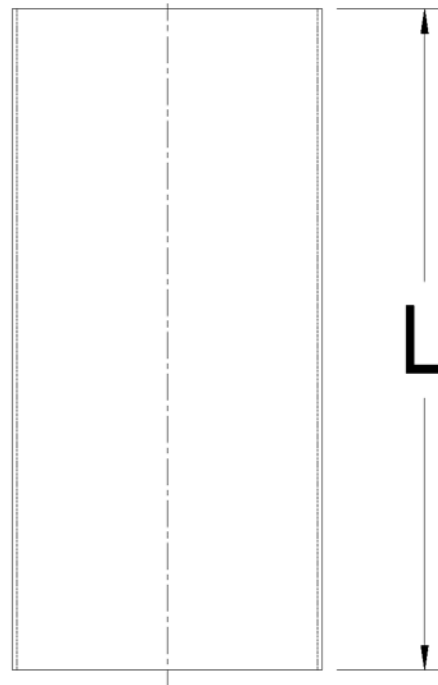
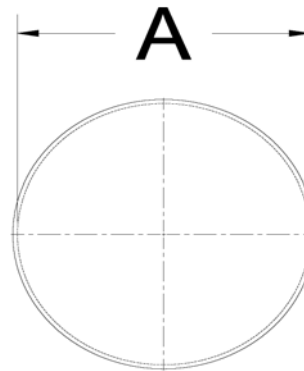
VIRON® FRP DUCT

DUCT OR FITTING MODEL

DUCT OR FITTING DIAMETER

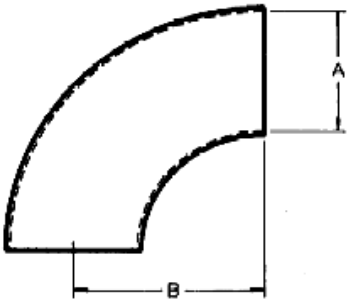
A DIAMETER	L DUCT LENGTH FEET	DUCT THICKNESS
4	12	0.125
6	12	0.125
8	20	0.125
10	20	0.125
12	20	0.125
14	20	0.125
16	20	0.125
18	20	0.125
20	20	0.125
22	20	0.125
24	20	0.187
26	20	0.187
28	20	0.187
30	20	0.187
32	20	0.187
34	20	0.187
36	20	0.187
38	20	0.187
40	20	0.187
42	20	0.250
48	20	0.250
54	20	0.250
60	20	0.250
66	20	0.250
72	20	0.312
78	20	0.312
84	20	0.312
96	20	0.375
108	20	0.375
120	20	0.375

STRAIGHT DUCT

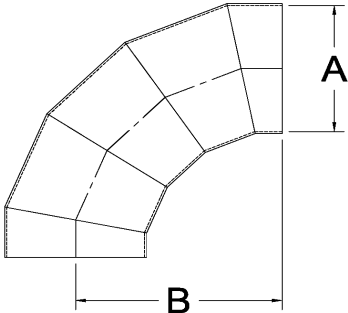


NOTE: VIRON® WILL MANUFACTURE THE FRP DUCT AND FITTINGS TO THE STANDARD THICKNESSES SEE PAGE 31 FOR DUCT VACUUM AND PRESSURE RATINGS. IF OTHER THAN STANDARD DESIGN RATINGS ARE REQUIRED, PLEASE CONSULT THE FACTORY.

90 DEGREE ELBOW



SMOOTH ELBOW (4" DIA. TO 36" DIA.)

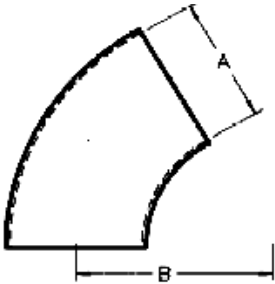


(5) GORE ELBOW
(38" DIA. TO 120" DIA.)

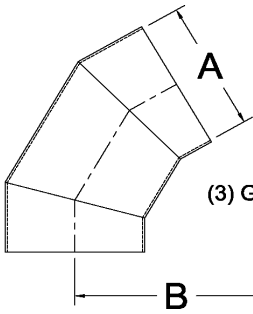
A DIAMETER	B RADIUS	DUCT THICKNESS
4	6	0.125
6	9	0.125
8	12	0.125
10	15	0.125
12	18	0.125
14	21	0.125
16	24	0.125
18	27	0.125
20	30	0.125
22	33	0.125
24	36	0.187
26	39	0.187
28	42	0.187
30	45	0.187
32	48	0.187
34	51	0.187
36	54	0.187
38	57	0.187
40	60	0.187
42	63	0.250
48	72	0.250
54	81	0.250
60	90	0.250
66	99	0.250
72	108	0.312
78	117	0.312
84	126	0.312
96	144	0.375
108	162	0.375
120	180	0.375

NOTE 1) STANDARD SIZE ELBOW RADIUS SHOWN ABOVE
2) VIRON CAN MANUFACTURE THE ELBOW FITTINGS TO ANY RADIUS LENGTH

60 DEGREE ELBOW



SMOOTH ELBOW (4" DIA. TO 36" DIA.)



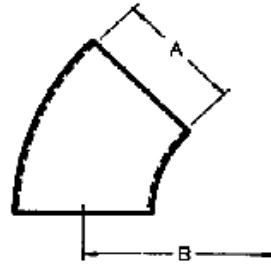
(3) GORE ELBOW
(38" DIA. TO 120" DIA.)

A DIAMETER	B RADIUS	DUCT THICKNESS
4	6	0.125
6	9	0.125
8	12	0.125
10	15	0.125
12	18	0.125
14	21	0.125
16	24	0.125
18	27	0.125
20	30	0.125
22	33	0.125
24	36	0.187
26	39	0.187
28	42	0.187
30	45	0.187
32	48	0.187
34	51	0.187
36	54	0.187
38	57	0.187
40	60	0.187
42	63	0.250
48	72	0.250
54	81	0.250
60	90	0.250
66	99	0.250
72	108	0.312
78	117	0.312
84	126	0.312
96	144	0.375
108	162	0.375
120	180	0.375

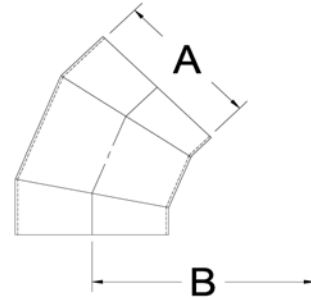
NOTE 1) STANDARD SIZE ELBOW RADIUS SHOWN ABOVE
2) VIRON CAN MANUFACTURE THE ELBOW FITTINGS TO ANY RADIUS LENGTH

A DIAMETER	B RADIUS	DUCT THICKNESS
4	6	0.125
6	9	0.125
8	12	0.125
10	15	0.125
12	18	0.125
14	21	0.125
16	24	0.125
18	27	0.125
20	30	0.125
22	33	0.125
24	36	0.187
26	39	0.187
28	42	0.187
30	45	0.187
32	48	0.187
34	51	0.187
36	54	0.187
38	57	0.187
40	60	0.187
42	63	0.250
44	72	0.250
46	81	0.250
48	90	0.250
50	99	0.250
52	108	0.312
54	117	0.312
56	126	0.312
58	144	0.375
60	162	0.375
72	180	0.375

45 DEGREE ELBOW



SMOOTH ELBOW (4" DIA. TO 36" DIA.)

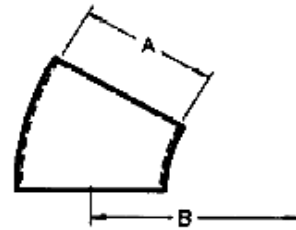


(3) GORE ELBOW
(38" DIA. TO 120" DIA.)

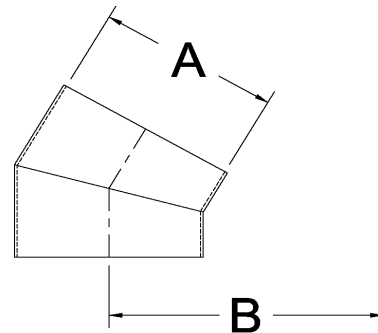
NOTE 1) STANDARD SIZE ELBOW RADIUS SHOWN ABOVE
2) VIRON CAN MANUFACTURE THE ELBOW FITTINGS TO ANY RADIUS LENGTH

A DIAMETER	B RADIUS	DUCT THICKNESS
4	6	0.125
6	9	0.125
8	12	0.125
10	15	0.125
12	18	0.125
14	21	0.125
16	24	0.125
18	27	0.125
20	30	0.125
22	33	0.125
24	36	0.187
26	39	0.187
28	42	0.187
30	45	0.187
32	48	0.187
34	51	0.187
36	54	0.187
38	57	0.187
40	60	0.187
42	63	0.250
48	72	0.250
54	81	0.250
60	90	0.250
66	99	0.250
72	108	0.312
78	117	0.312
84	126	0.312
96	144	0.375
108	162	0.375
120	180	0.375

30 DEGREE ELBOW



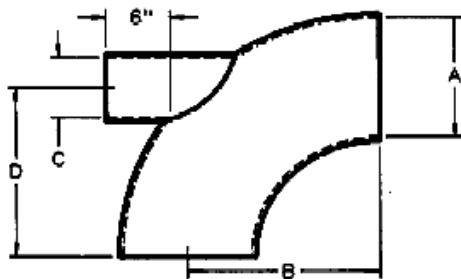
SMOOTH ELBOW (4" DIA. TO 36" DIA.)



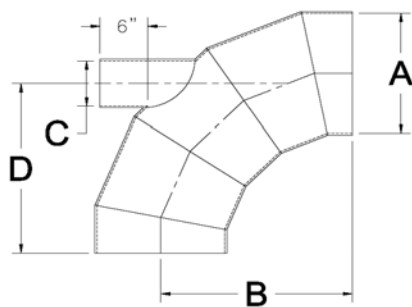
(2) GORE ELBOW
(38" DIA. TO 120" DIA.)

NOTE 1) STANDARD SIZE ELBOW RADIUS SHOWN ABOVE
2) VIRON CAN MANUFACTURE THE ELBOW FITTINGS TO ANY RADIUS LENGTH

90 DEGREE ELBOW WITH HEEL TAP



SMOOTH ELBOW (4" DIA. TO 36" DIA.)



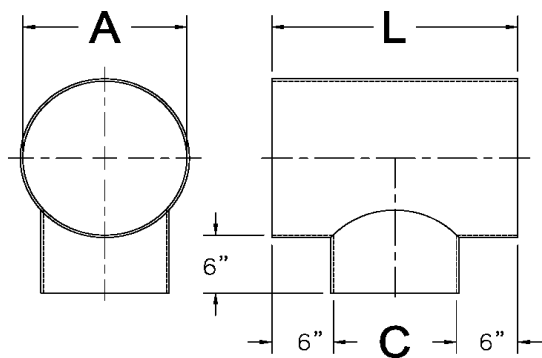
(5) GORE ELBOW
(38" DIA. TO 120" DIA.)

A DIAMETER	B RADIUS	C DIAMETER	D LENGTH	DUCT THICKNESS
4	6	A.S.	5.656	0.125
6	9	A.S.	8.484	0.125
8	12	A.S.	11.312	0.125
10	15	A.S.	14.140	0.125
12	18	A.S.	16.968	0.125
14	21	A.S.	19.796	0.125
16	24	A.S.	22.624	0.125
18	27	A.S.	25.452	0.125
20	30	A.S.	28.280	0.125
22	33	A.S.	31.108	0.125
24	36	A.S.	33.936	0.187
26	39	A.S.	36.764	0.187
28	42	A.S.	39.592	0.187
30	45	A.S.	42.420	0.187
32	48	A.S.	45.248	0.187
34	51	A.S.	48.076	0.187
36	54	A.S.	50.904	0.187
38	57	A.S.	53.732	0.187
40	60	A.S.	56.560	0.187
42	63	A.S.	59.388	0.250
48	72	A.S.	67.872	0.250
54	81	A.S.	76.356	0.250
60	90	A.S.	84.840	0.250
66	99	A.S.	93.324	0.250
72	108	A.S.	101.808	0.312
78	117	A.S.	110.292	0.312
84	126	A.S.	118.776	0.312
96	144	A.S.	135.744	0.375
108	162	A.S.	153.712	0.375
120	180	A.S.	169.680	0.375

NOTE

- 1) A.S. MEANS ANY SIZE EQUAL TO OR LESS THAN A
- 2) STANDARD SIZE ELBOW RADIUS SHOWN ABOVE
- 3) VIRON CAN MANUFACTURE THE ELBOW FITTINGS TO ANY RADIUS LENGTH

90 DEGREE TEE



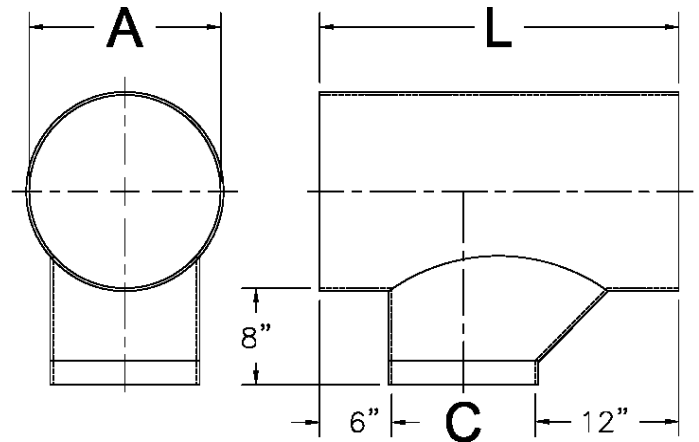
A DIAMETER	L LENGTH	C DIAMETER	DUCT THICKNESS
4	C + 12	A.S.	0.125
6	C + 12	A.S.	0.125
8	C + 12	A.S.	0.125
10	C + 12	A.S.	0.125
12	C + 12	A.S.	0.125
14	C + 12	A.S.	0.125
16	C + 12	A.S.	0.125
18	C + 12	A.S.	0.125
20	C + 12	A.S.	0.125
22	C + 12	A.S.	0.125
24	C + 12	A.S.	0.187
26	C + 12	A.S.	0.187
28	C + 12	A.S.	0.187
30	C + 12	A.S.	0.187
32	C + 12	A.S.	0.187
34	C + 12	A.S.	0.187
36	C + 12	A.S.	0.187
38	C + 12	A.S.	0.187
40	C + 12	A.S.	0.187
42	C + 12	A.S.	0.250
48	C + 12	A.S.	0.250
54	C + 12	A.S.	0.250
60	C + 12	A.S.	0.250
66	C + 12	A.S.	0.250
72	C + 12	A.S.	0.312
78	C + 12	A.S.	0.312
84	C + 12	A.S.	0.312
96	C + 12	A.S.	0.375
108	C + 12	A.S.	0.375
120	C + 12	A.S.	0.375

NOTE A.S. MEANS ANY SIZE EQUAL TO OR LESS THAN A

A DIAMETER	L LENGTH	C DIAMETER	DUCT THICKNESS
4	C + 18	A.S.	0.125
6	C + 18	A.S.	0.125
8	C + 18	A.S.	0.125
10	C + 18	A.S.	0.125
12	C + 18	A.S.	0.125
14	C + 18	A.S.	0.125
16	C + 18	A.S.	0.125
18	C + 18	A.S.	0.125
20	C + 18	A.S.	0.125
22	C + 18	A.S.	0.125
24	C + 18	A.S.	0.187
26	C + 18	A.S.	0.187
28	C + 18	A.S.	0.187
30	C + 18	A.S.	0.187
32	C + 18	A.S.	0.187
34	C + 18	A.S.	0.187
36	C + 18	A.S.	0.187
38	C + 18	A.S.	0.187
40	C + 18	A.S.	0.187
42	C + 18	A.S.	0.250
48	C + 18	A.S.	0.250
54	C + 18	A.S.	0.250
60	C + 18	A.S.	0.250
66	C + 18	A.S.	0.250
72	C + 18	A.S.	0.312
78	C + 18	A.S.	0.312
84	C + 18	A.S.	0.312
96	C + 18	A.S.	0.375
108	C + 18	A.S.	0.375
120	C + 18	A.S.	0.375

NOTE A.S. MEANS ANY SIZE LESS THAN A

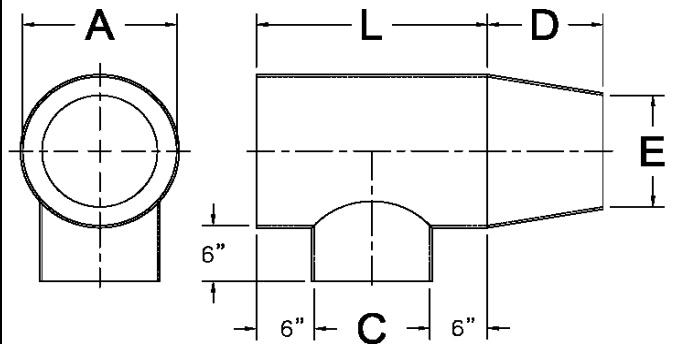
90 DEGREE BOOT TEE



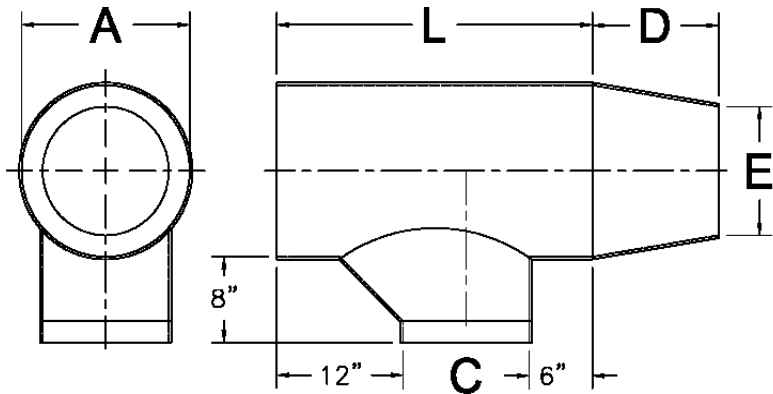
A DIAMETER	L LENGTH	C DIAMETER	D LENGTH	E DIAMETER	DUCT THICKNESS
4	C + 12	A.S.	(A-E)5	A.S.	0.125
6	C + 12	A.S.	(A-E)5	A.S.	0.125
8	C + 12	A.S.	(A-E)5	A.S.	0.125
10	C + 12	A.S.	(A-E)5	A.S.	0.125
12	C + 12	A.S.	(A-E)5	A.S.	0.125
14	C + 12	A.S.	(A-E)5	A.S.	0.125
16	C + 12	A.S.	(A-E)5	A.S.	0.125
18	C + 12	A.S.	(A-E)5	A.S.	0.125
20	C + 12	A.S.	(A-E)5	A.S.	0.125
22	C + 12	A.S.	(A-E)5	A.S.	0.125
24	C + 12	A.S.	(A-E)5	A.S.	0.187
26	C + 12	A.S.	(A-E)5	A.S.	0.187
28	C + 12	A.S.	(A-E)5	A.S.	0.187
30	C + 12	A.S.	(A-E)5	A.S.	0.187
32	C + 12	A.S.	(A-E)5	A.S.	0.187
34	C + 12	A.S.	(A-E)5	A.S.	0.187
36	C + 12	A.S.	(A-E)5	A.S.	0.187
38	C + 12	A.S.	(A-E)5	A.S.	0.187
40	C + 12	A.S.	(A-E)5	A.S.	0.187
42	C + 12	A.S.	(A-E)5	A.S.	0.250
48	C + 12	A.S.	(A-E)5	A.S.	0.250
54	C + 12	A.S.	(A-E)5	A.S.	0.250
60	C + 12	A.S.	(A-E)5	A.S.	0.250
66	C + 12	A.S.	(A-E)5	A.S.	0.250
72	C + 12	A.S.	(A-E)5	A.S.	0.312
78	C + 12	A.S.	(A-E)5	A.S.	0.312
84	C + 12	A.S.	(A-E)5	A.S.	0.312
96	C + 12	A.S.	(A-E)5	A.S.	0.375
108	C + 12	A.S.	(A-E)5	A.S.	0.375
120	C + 12	A.S.	(A-E)5	A.S.	0.375

NOTE A.S. MEANS ANY SIZE EQUAL TO OR LESS THAN A

90 DEGREE REDUCING TEE



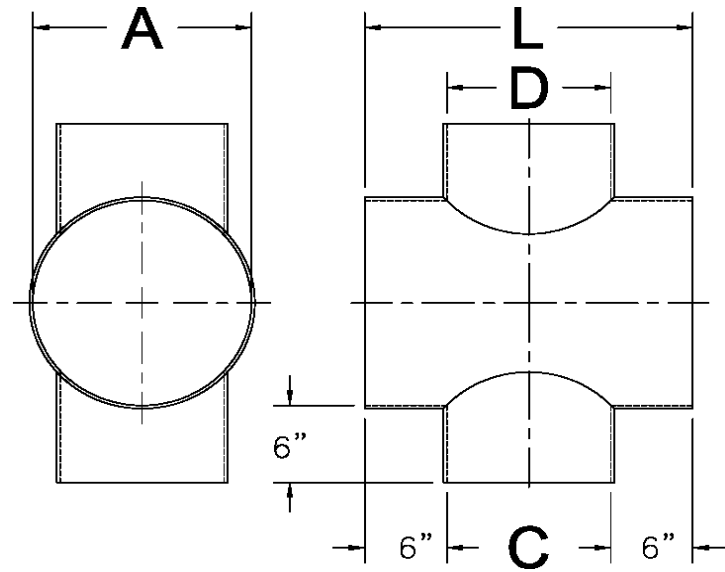
90 DEGREE BOOT TEE WITH REDUCER



A DIAMETER	L LENGTH	C DIAMETER	D LENGTH	E DIAMETER	DUCT THICKNESS
4	C + 18	A.S.	(A-E)5	A.S.	0.125
6	C + 18	A.S.	(A-E)5	A.S.	0.125
8	C + 18	A.S.	(A-E)5	A.S.	0.125
10	C + 18	A.S.	(A-E)5	A.S.	0.125
12	C + 18	A.S.	(A-E)5	A.S.	0.125
14	C + 18	A.S.	(A-E)5	A.S.	0.125
16	C + 18	A.S.	(A-E)5	A.S.	0.125
18	C + 18	A.S.	(A-E)5	A.S.	0.125
20	C + 18	A.S.	(A-E)5	A.S.	0.125
22	C + 18	A.S.	(A-E)5	A.S.	0.125
24	C + 18	A.S.	(A-E)5	A.S.	0.187
26	C + 18	A.S.	(A-E)5	A.S.	0.187
28	C + 18	A.S.	(A-E)5	A.S.	0.187
30	C + 18	A.S.	(A-E)5	A.S.	0.187
32	C + 18	A.S.	(A-E)5	A.S.	0.187
34	C + 18	A.S.	(A-E)5	A.S.	0.187
36	C + 18	A.S.	(A-E)5	A.S.	0.187
38	C + 18	A.S.	(A-E)5	A.S.	0.187
40	C + 18	A.S.	(A-E)5	A.S.	0.187
42	C + 18	A.S.	(A-E)5	A.S.	0.250
48	C + 18	A.S.	(A-E)5	A.S.	0.250
54	C + 18	A.S.	(A-E)5	A.S.	0.250
60	C + 18	A.S.	(A-E)5	A.S.	0.250
66	C + 18	A.S.	(A-E)5	A.S.	0.250
72	C + 18	A.S.	(A-E)5	A.S.	0.312
78	C + 18	A.S.	(A-E)5	A.S.	0.312
84	C + 18	A.S.	(A-E)5	A.S.	0.312
96	C + 18	A.S.	(A-E)5	A.S.	0.375
108	C + 18	A.S.	(A-E)5	A.S.	0.375
120	C + 18	A.S.	(A-E)5	A.S.	0.375

NOTE A.S. MEANS ANY SIZE LESS THAN A

180 DEGREE CROSS

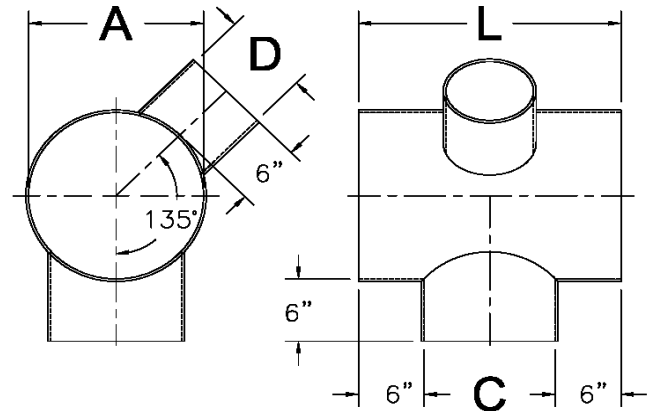


A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	DUCT THICKNESS
4	C + 12	A.S.	A.S.	0.125
6	C + 12	A.S.	A.S.	0.125
8	C + 12	A.S.	A.S.	0.125
10	C + 12	A.S.	A.S.	0.125
12	C + 12	A.S.	A.S.	0.125
14	C + 12	A.S.	A.S.	0.125
16	C + 12	A.S.	A.S.	0.125
18	C + 12	A.S.	A.S.	0.125
20	C + 12	A.S.	A.S.	0.125
22	C + 12	A.S.	A.S.	0.125
24	C + 12	A.S.	A.S.	0.187
26	C + 12	A.S.	A.S.	0.187
28	C + 12	A.S.	A.S.	0.187
30	C + 12	A.S.	A.S.	0.187
32	C + 12	A.S.	A.S.	0.187
34	C + 12	A.S.	A.S.	0.187
36	C + 12	A.S.	A.S.	0.187
38	C + 12	A.S.	A.S.	0.187
40	C + 12	A.S.	A.S.	0.187
42	C + 12	A.S.	A.S.	0.250
48	C + 12	A.S.	A.S.	0.250
54	C + 12	A.S.	A.S.	0.250
60	C + 12	A.S.	A.S.	0.250
66	C + 12	A.S.	A.S.	0.250
72	C + 12	A.S.	A.S.	0.312
78	C + 12	A.S.	A.S.	0.312
84	C + 12	A.S.	A.S.	0.312
96	C + 12	A.S.	A.S.	0.375
108	C + 12	A.S.	A.S.	0.375
120	C + 12	A.S.	A.S.	0.375

NOTE 1) A.S. MEANS ANY SIZE EQUAL TO OR LESS THAN A
2) C IS GREATER THAN, LESS THAN, OR EQUAL TO D

A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	DUCT THICKNESS
4	C + 12	A.S.	A.S.	0.125
6	C + 12	A.S.	A.S.	0.125
8	C + 12	A.S.	A.S.	0.125
10	C + 12	A.S.	A.S.	0.125
12	C + 12	A.S.	A.S.	0.125
14	C + 12	A.S.	A.S.	0.125
16	C + 12	A.S.	A.S.	0.125
18	C + 12	A.S.	A.S.	0.125
20	C + 12	A.S.	A.S.	0.125
22	C + 12	A.S.	A.S.	0.125
24	C + 12	A.S.	A.S.	0.187
26	C + 12	A.S.	A.S.	0.187
28	C + 12	A.S.	A.S.	0.187
30	C + 12	A.S.	A.S.	0.187
32	C + 12	A.S.	A.S.	0.187
34	C + 12	A.S.	A.S.	0.187
36	C + 12	A.S.	A.S.	0.187
38	C + 12	A.S.	A.S.	0.187
40	C + 12	A.S.	A.S.	0.187
42	C + 12	A.S.	A.S.	0.250
48	C + 12	A.S.	A.S.	0.250
54	C + 12	A.S.	A.S.	0.250
60	C + 12	A.S.	A.S.	0.250
66	C + 12	A.S.	A.S.	0.250
72	C + 12	A.S.	A.S.	0.312
78	C + 12	A.S.	A.S.	0.312
84	C + 12	A.S.	A.S.	0.312
96	C + 12	A.S.	A.S.	0.375
108	C + 12	A.S.	A.S.	0.375
120	C + 12	A.S.	A.S.	0.375

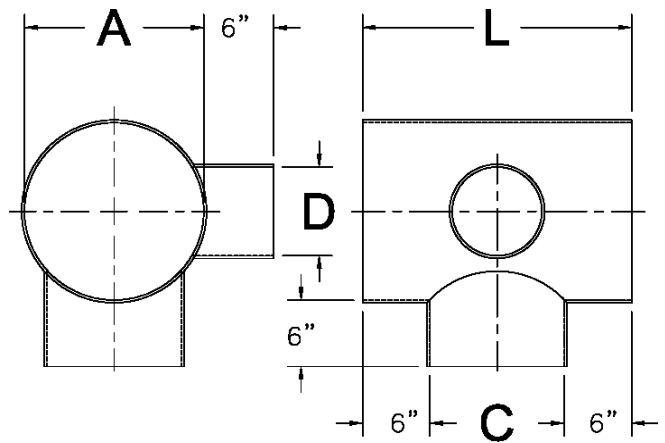
135 DEGREE CROSS



NOTE 1) A.S. MEANS ANY SIZE EQUAL TO OR LESS THAN A
2) C CAN BE GREATER THAN OR EQUAL TO D

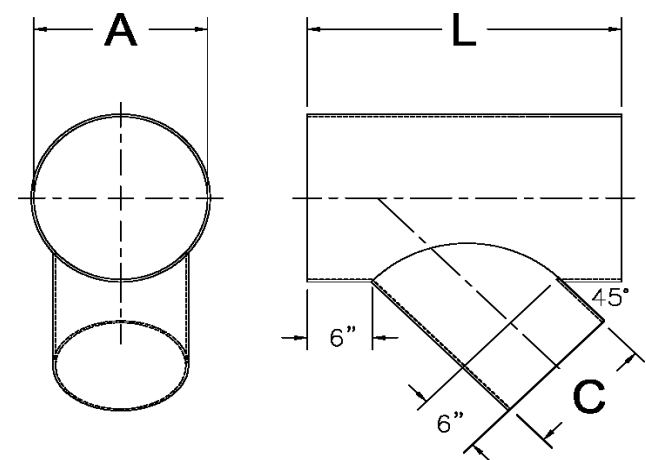
A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	DUCT THICKNESS
4	C + 12	A.S.	A.S.	0.125
6	C + 12	A.S.	A.S.	0.125
8	C + 12	A.S.	A.S.	0.125
10	C + 12	A.S.	A.S.	0.125
12	C + 12	A.S.	A.S.	0.125
14	C + 12	A.S.	A.S.	0.125
16	C + 12	A.S.	A.S.	0.125
18	C + 12	A.S.	A.S.	0.125
20	C + 12	A.S.	A.S.	0.125
22	C + 12	A.S.	A.S.	0.125
24	C + 12	A.S.	A.S.	0.187
26	C + 12	A.S.	A.S.	0.187
28	C + 12	A.S.	A.S.	0.187
30	C + 12	A.S.	A.S.	0.187
32	C + 12	A.S.	A.S.	0.187
34	C + 12	A.S.	A.S.	0.187
36	C + 12	A.S.	A.S.	0.187
38	C + 12	A.S.	A.S.	0.187
40	C + 12	A.S.	A.S.	0.187
42	C + 12	A.S.	A.S.	0.250
48	C + 12	A.S.	A.S.	0.250
54	C + 12	A.S.	A.S.	0.250
60	C + 12	A.S.	A.S.	0.250
66	C + 12	A.S.	A.S.	0.250
72	C + 12	A.S.	A.S.	0.312
78	C + 12	A.S.	A.S.	0.312
84	C + 12	A.S.	A.S.	0.312
96	C + 12	A.S.	A.S.	0.375
108	C + 12	A.S.	A.S.	0.375
120	C + 12	A.S.	A.S.	0.375

90 DEGREE CROSS



NOTE 1) A.S. MEANS ANY SIZE EQUAL TO OR LESS THAN A
2) C IS GREATER THAN OR EQUAL TO D

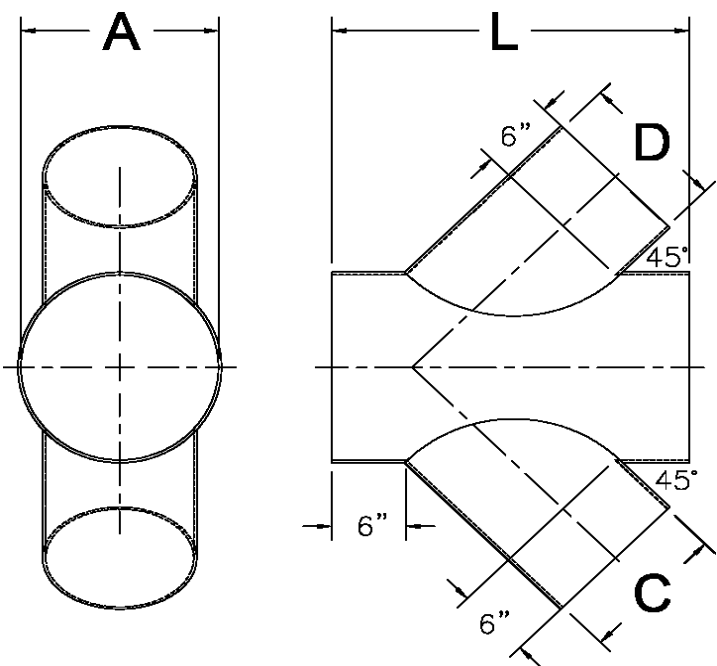
45 DEGREE WYE



A DIAMETER	C DIAMETER	L LENGTH	DUCT THICKNESS
4	1.414C + 12	A.S.	0.125
6	1.414C + 12	A.S.	0.125
8	1.414C + 12	A.S.	0.125
10	1.414C + 12	A.S.	0.125
12	1.414C + 12	A.S.	0.125
14	1.414C + 12	A.S.	0.125
16	1.414C + 12	A.S.	0.125
18	1.414C + 12	A.S.	0.125
20	1.414C + 12	A.S.	0.125
22	1.414C + 12	A.S.	0.125
24	1.414C + 12	A.S.	0.187
26	1.414C + 12	A.S.	0.187
28	1.414C + 12	A.S.	0.187
30	1.414C + 12	A.S.	0.187
32	1.414C + 12	A.S.	0.187
34	1.414C + 12	A.S.	0.187
36	1.414C + 12	A.S.	0.187
38	1.414C + 12	A.S.	0.187
40	1.414C + 12	A.S.	0.187
42	1.414C + 12	A.S.	0.250
48	1.414C + 12	A.S.	0.250
54	1.414C + 12	A.S.	0.250
60	1.414C + 12	A.S.	0.250
66	1.414C + 12	A.S.	0.250
72	1.414C + 12	A.S.	0.312
78	1.414C + 12	A.S.	0.312
84	1.414C + 12	A.S.	0.312
96	1.414C + 12	A.S.	0.375
108	1.414C + 12	A.S.	0.375
120	1.414C + 12	A.S.	0.375

NOTE A.S. MEANS ANY SIZE LESS THAN A

45 DEGREE DOUBLE WYE

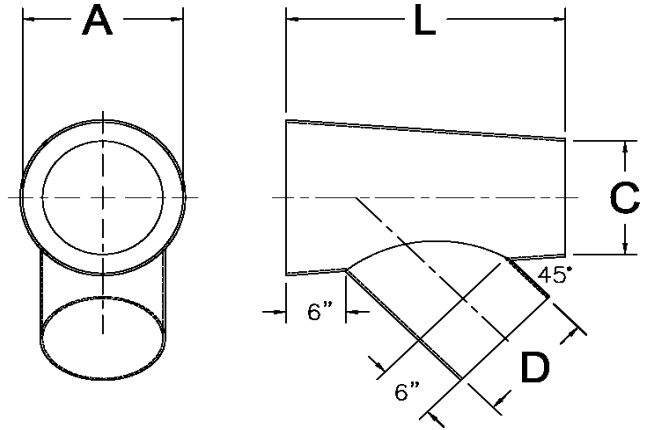


A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	DUCT THICKNESS
4	1.414C + 12	A.S.	A.S.	0.125
6	1.414C + 12	A.S.	A.S.	0.125
8	1.414C + 12	A.S.	A.S.	0.125
10	1.414C + 12	A.S.	A.S.	0.125
12	1.414C + 12	A.S.	A.S.	0.125
14	1.414C + 12	A.S.	A.S.	0.125
16	1.414C + 12	A.S.	A.S.	0.125
18	1.414C + 12	A.S.	A.S.	0.125
20	1.414C + 12	A.S.	A.S.	0.125
22	1.414C + 12	A.S.	A.S.	0.125
24	1.414C + 12	A.S.	A.S.	0.187
26	1.414C + 12	A.S.	A.S.	0.187
28	1.414C + 12	A.S.	A.S.	0.187
30	1.414C + 12	A.S.	A.S.	0.187
32	1.414C + 12	A.S.	A.S.	0.187
34	1.414C + 12	A.S.	A.S.	0.187
36	1.414C + 12	A.S.	A.S.	0.187
38	1.414C + 12	A.S.	A.S.	0.187
40	1.414C + 12	A.S.	A.S.	0.187
42	1.414C + 12	A.S.	A.S.	0.250
48	1.414C + 12	A.S.	A.S.	0.250
54	1.414C + 12	A.S.	A.S.	0.250
60	1.414C + 12	A.S.	A.S.	0.250
66	1.414C + 12	A.S.	A.S.	0.250
72	1.414C + 12	A.S.	A.S.	0.312
78	1.414C + 12	A.S.	A.S.	0.312
84	1.414C + 12	A.S.	A.S.	0.312
96	1.414C + 12	A.S.	A.S.	0.375
108	1.414C + 12	A.S.	A.S.	0.375
120	1.414C + 12	A.S.	A.S.	0.375

NOTE 1) A.S. MEANS ANY SIZE LESS THAN A
2) C IS GREATER THAN OR EQUAL TO D

A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	DUCT THICKNESS
4		A.S.	A.S.	0.125
6		A.S.	A.S.	0.125
8		A.S.	A.S.	0.125
10		A.S.	A.S.	0.125
12		A.S.	A.S.	0.125
14		A.S.	A.S.	0.125
16		A.S.	A.S.	0.125
18		A.S.	A.S.	0.125
20		A.S.	A.S.	0.125
22		A.S.	A.S.	0.125
24		A.S.	A.S.	0.187
26		A.S.	A.S.	0.187
28		A.S.	A.S.	0.187
30		A.S.	A.S.	0.187
32		A.S.	A.S.	0.187
34		A.S.	A.S.	0.187
36		A.S.	A.S.	0.187
38		A.S.	A.S.	0.187
40		A.S.	A.S.	0.187
42		A.S.	A.S.	0.250
48		A.S.	A.S.	0.250
54		A.S.	A.S.	0.250
60		A.S.	A.S.	0.250
66		A.S.	A.S.	0.250
72		A.S.	A.S.	0.312
78		A.S.	A.S.	0.312
84		A.S.	A.S.	0.312
96		A.S.	A.S.	0.375
108		A.S.	A.S.	0.375
120		A.S.	A.S.	0.375

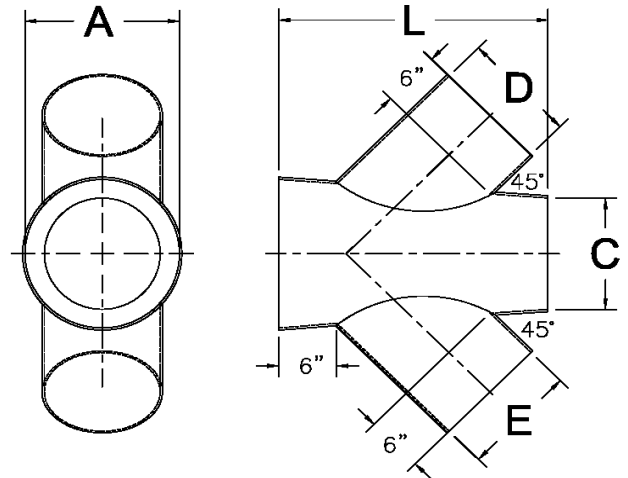
45 DEGREE REDUCING WYE



NOTE 1) A.S. MEANS ANY SIZE LESS THAN A
2) L EQUALS [5(A-C)] OR (1.414D + 12") WHICHEVER IS LONGER

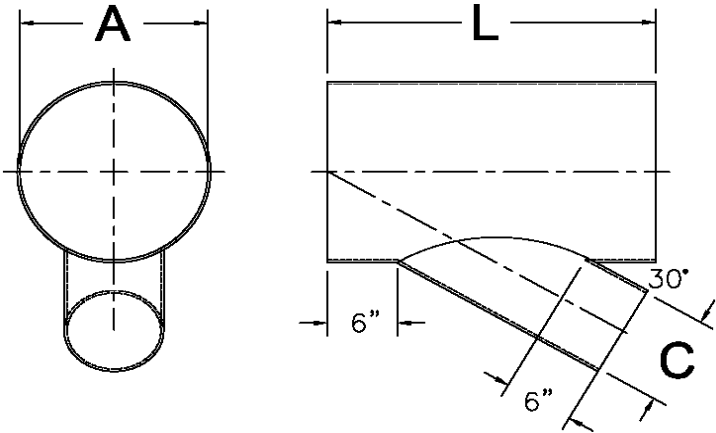
A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	E DIAMETER	DUCT THICKNESS
4		A.S.	A.S.	A.S.	0.125
6		A.S.	A.S.	A.S.	0.125
8		A.S.	A.S.	A.S.	0.125
10		A.S.	A.S.	A.S.	0.125
12		A.S.	A.S.	A.S.	0.125
14		A.S.	A.S.	A.S.	0.125
16		A.S.	A.S.	A.S.	0.125
18		A.S.	A.S.	A.S.	0.125
20		A.S.	A.S.	A.S.	0.125
22		A.S.	A.S.	A.S.	0.125
24		A.S.	A.S.	A.S.	0.187
26		A.S.	A.S.	A.S.	0.187
28		A.S.	A.S.	A.S.	0.187
30		A.S.	A.S.	A.S.	0.187
32		A.S.	A.S.	A.S.	0.187
34		A.S.	A.S.	A.S.	0.187
36		A.S.	A.S.	A.S.	0.187
38		A.S.	A.S.	A.S.	0.187
40		A.S.	A.S.	A.S.	0.187
42		A.S.	A.S.	A.S.	0.250
48		A.S.	A.S.	A.S.	0.250
54		A.S.	A.S.	A.S.	0.250
60		A.S.	A.S.	A.S.	0.250
66		A.S.	A.S.	A.S.	0.250
72		A.S.	A.S.	A.S.	0.312
78		A.S.	A.S.	A.S.	0.312
84		A.S.	A.S.	A.S.	0.312
96		A.S.	A.S.	A.S.	0.375
108		A.S.	A.S.	A.S.	0.375
120		A.S.	A.S.	A.S.	0.375

45 DEGREE DOUBLE REDUCING WYE



NOTE 1) A.S. MEANS ANY SIZE LESS THAN A
2) D IS GREATER THAN OR EQUAL TO E
3) L EQUALS [5(A-C)] OR (1.414D + 12") WHICHEVER IS LONGER

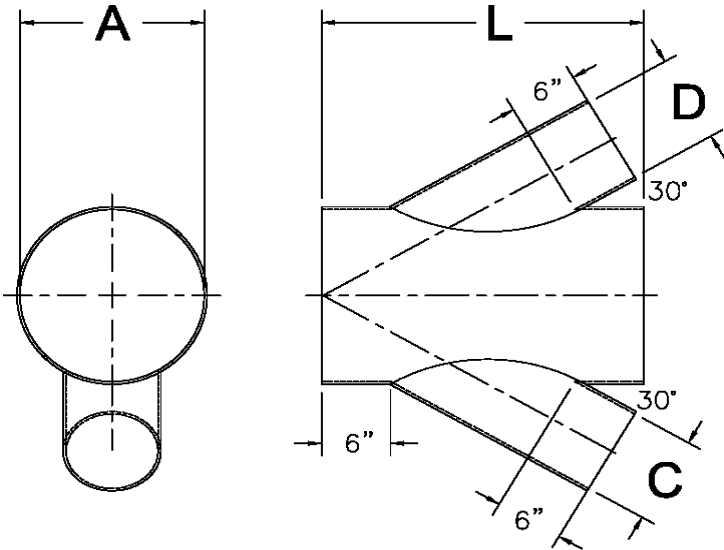
30 DEGREE WYE



A DIAMETER	L LENGTH	C DIAMETER	DUCT THICKNESS
4	2C + 12	A.S.	0.125
6	2C + 12	A.S.	0.125
8	2C + 12	A.S.	0.125
10	2C + 12	A.S.	0.125
12	2C + 12	A.S.	0.125
14	2C + 12	A.S.	0.125
16	2C + 12	A.S.	0.125
18	2C + 12	A.S.	0.125
20	2C + 12	A.S.	0.125
22	2C + 12	A.S.	0.125
24	2C + 12	A.S.	0.187
26	2C + 12	A.S.	0.187
28	2C + 12	A.S.	0.187
30	2C + 12	A.S.	0.187
32	2C + 12	A.S.	0.187
34	2C + 12	A.S.	0.187
36	2C + 12	A.S.	0.187
38	2C + 12	A.S.	0.187
40	2C + 12	A.S.	0.187
42	2C + 12	A.S.	0.250
48	2C + 12	A.S.	0.250
54	2C + 12	A.S.	0.250
60	2C + 12	A.S.	0.250
66	2C + 12	A.S.	0.250
72	2C + 12	A.S.	0.312
78	2C + 12	A.S.	0.312
84	2C + 12	A.S.	0.312
96	2C + 12	A.S.	0.375
108	2C + 12	A.S.	0.375
120	2C + 12	A.S.	0.375

NOTE A.S. MEANS ANY SIZE LESS THAN A

30 DEGREE DOUBLE WYE

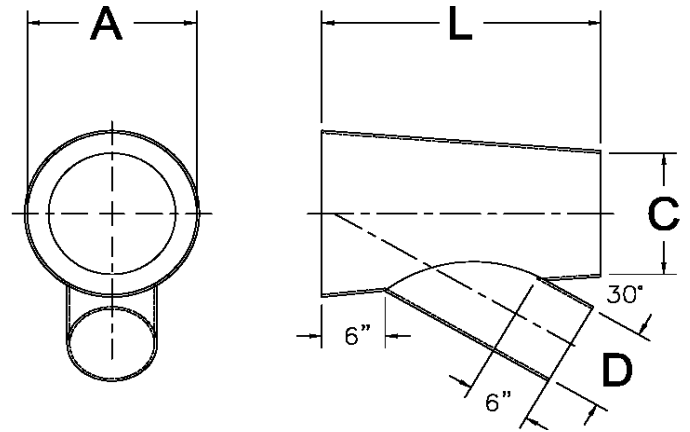


A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	DUCT THICKNESS
4	2C + 12	A.S.	A.S.	0.125
6	2C + 12	A.S.	A.S.	0.125
8	2C + 12	A.S.	A.S.	0.125
10	2C + 12	A.S.	A.S.	0.125
12	2C + 12	A.S.	A.S.	0.125
14	2C + 12	A.S.	A.S.	0.125
16	2C + 12	A.S.	A.S.	0.125
18	2C + 12	A.S.	A.S.	0.125
20	2C + 12	A.S.	A.S.	0.125
22	2C + 12	A.S.	A.S.	0.125
24	2C + 12	A.S.	A.S.	0.187
26	2C + 12	A.S.	A.S.	0.187
28	2C + 12	A.S.	A.S.	0.187
30	2C + 12	A.S.	A.S.	0.187
32	2C + 12	A.S.	A.S.	0.187
34	2C + 12	A.S.	A.S.	0.187
36	2C + 12	A.S.	A.S.	0.187
38	2C + 12	A.S.	A.S.	0.187
40	2C + 12	A.S.	A.S.	0.187
42	2C + 12	A.S.	A.S.	0.250
48	2C + 12	A.S.	A.S.	0.250
54	2C + 12	A.S.	A.S.	0.250
60	2C + 12	A.S.	A.S.	0.250
66	2C + 12	A.S.	A.S.	0.250
72	2C + 12	A.S.	A.S.	0.312
78	2C + 12	A.S.	A.S.	0.312
84	2C + 12	A.S.	A.S.	0.312
96	2C + 12	A.S.	A.S.	0.375
108	2C + 12	A.S.	A.S.	0.375
120	2C + 12	A.S.	A.S.	0.375

NOTE 1) A.S. MEANS ANY SIZE LESS THAN A
2) C IS GREATER THAN OR EQUAL TO D

A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	DUCT THICKNESS
4		A.S.	A.S.	0.125
6		A.S.	A.S.	0.125
8		A.S.	A.S.	0.125
10		A.S.	A.S.	0.125
12		A.S.	A.S.	0.125
14		A.S.	A.S.	0.125
16		A.S.	A.S.	0.125
18		A.S.	A.S.	0.125
20		A.S.	A.S.	0.125
22		A.S.	A.S.	0.125
24		A.S.	A.S.	0.187
26		A.S.	A.S.	0.187
28		A.S.	A.S.	0.187
30		A.S.	A.S.	0.187
32		A.S.	A.S.	0.187
34		A.S.	A.S.	0.187
36		A.S.	A.S.	0.187
38		A.S.	A.S.	0.187
40		A.S.	A.S.	0.187
42		A.S.	A.S.	0.250
48		A.S.	A.S.	0.250
54		A.S.	A.S.	0.250
60		A.S.	A.S.	0.250
66		A.S.	A.S.	0.250
72		A.S.	A.S.	0.312
78		A.S.	A.S.	0.312
84		A.S.	A.S.	0.312
96		A.S.	A.S.	0.375
108		A.S.	A.S.	0.375
120		A.S.	A.S.	0.375

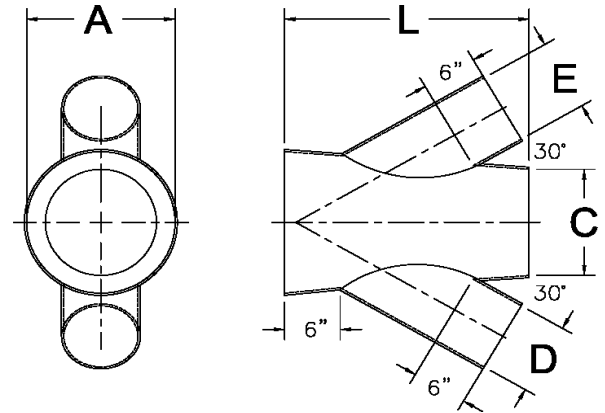
30 DEGREE REDUCING WYE



NOTE 1) A.S. MEANS ANY SIZE LESS THAN A
2) L EQUALS $[5(A-C)]$ OR $(2D + 12")$ WHICHEVER IS LONGER

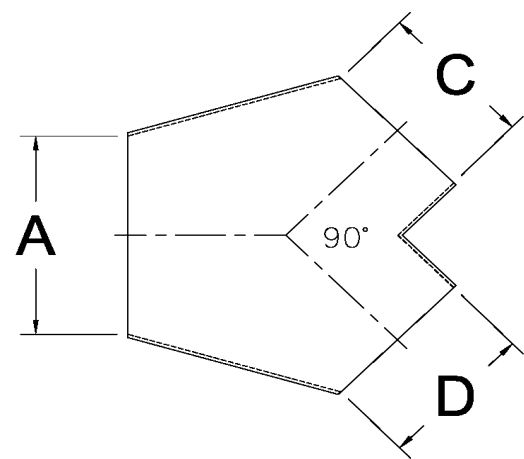
A DIAMETER	L LENGTH	C DIAMETER	D DIAMETER	E DIAMETER	DUCT THICKNESS
4		A.S.	A.S.	A.S.	0.125
6		A.S.	A.S.	A.S.	0.125
8		A.S.	A.S.	A.S.	0.125
10		A.S.	A.S.	A.S.	0.125
12		A.S.	A.S.	A.S.	0.125
14		A.S.	A.S.	A.S.	0.125
16		A.S.	A.S.	A.S.	0.125
18		A.S.	A.S.	A.S.	0.125
20		A.S.	A.S.	A.S.	0.125
22		A.S.	A.S.	A.S.	0.125
24		A.S.	A.S.	A.S.	0.187
26		A.S.	A.S.	A.S.	0.187
28		A.S.	A.S.	A.S.	0.187
30		A.S.	A.S.	A.S.	0.187
32		A.S.	A.S.	A.S.	0.187
34		A.S.	A.S.	A.S.	0.187
36		A.S.	A.S.	A.S.	0.187
38		A.S.	A.S.	A.S.	0.187
40		A.S.	A.S.	A.S.	0.187
42		A.S.	A.S.	A.S.	0.250
48		A.S.	A.S.	A.S.	0.250
54		A.S.	A.S.	A.S.	0.250
60		A.S.	A.S.	A.S.	0.250
66		A.S.	A.S.	A.S.	0.250
72		A.S.	A.S.	A.S.	0.312
78		A.S.	A.S.	A.S.	0.312
84		A.S.	A.S.	A.S.	0.312
96		A.S.	A.S.	A.S.	0.375
108		A.S.	A.S.	A.S.	0.375
120		A.S.	A.S.	A.S.	0.375

30 DEGREE DOUBLE REDUCING WYE



NOTE 1) A.S. MEANS ANY SIZE LESS THAN A
2) D IS GREATER THAN OR EQUAL TO E
3) L EQUALS $[5(A-C)]$ OR $(2D + 12")$ WHICHEVER IS LONGER

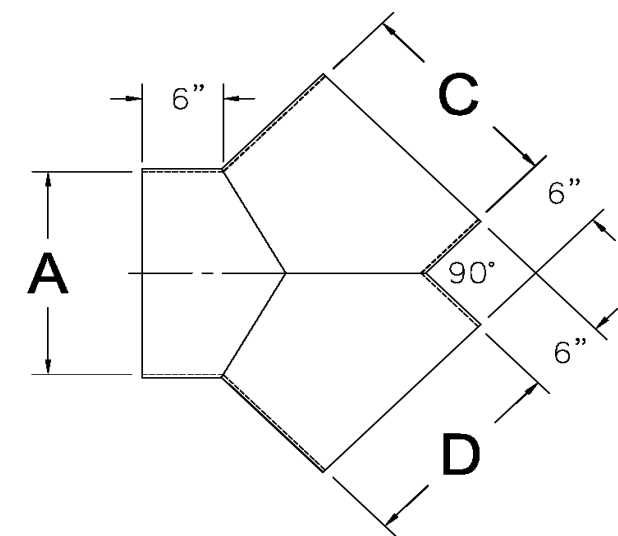
90 DEGREE REDUCING WYE



A DIAMETER	C DIAMETER	D DIAMETER	DUCT THICKNESS
4	A.S.	A.S.	0.125
6	A.S.	A.S.	0.125
8	A.S.	A.S.	0.125
10	A.S.	A.S.	0.125
12	A.S.	A.S.	0.125
14	A.S.	A.S.	0.125
16	A.S.	A.S.	0.125
18	A.S.	A.S.	0.125
20	A.S.	A.S.	0.125
22	A.S.	A.S.	0.125
24	A.S.	A.S.	0.187
26	A.S.	A.S.	0.187
28	A.S.	A.S.	0.187
30	A.S.	A.S.	0.187
32	A.S.	A.S.	0.187
34	A.S.	A.S.	0.187
36	A.S.	A.S.	0.187
38	A.S.	A.S.	0.187
40	A.S.	A.S.	0.187
42	A.S.	A.S.	0.250
48	A.S.	A.S.	0.250
54	A.S.	A.S.	0.250
60	A.S.	A.S.	0.250
66	A.S.	A.S.	0.250
72	A.S.	A.S.	0.312
78	A.S.	A.S.	0.312
84	A.S.	A.S.	0.312
96	A.S.	A.S.	0.375
108	A.S.	A.S.	0.375
120	A.S.	A.S.	0.375

NOTE A.S. MEANS ANY SIZE LESS THAN A

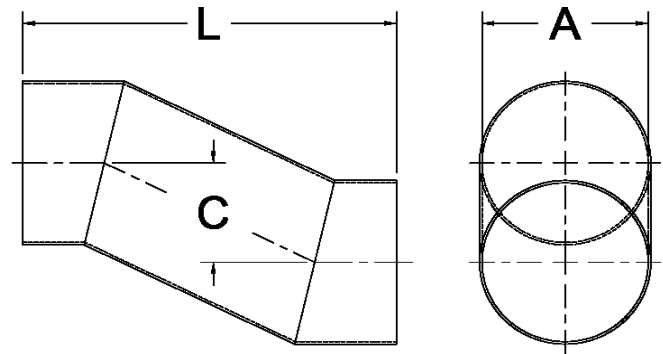
90 DEGREE WYE



A DIAMETER	C DIAMETER	D DIAMETER	DUCT THICKNESS
4	4	4	0.125
6	6	6	0.125
8	8	8	0.125
10	10	10	0.125
12	12	12	0.125
14	14	14	0.125
16	16	16	0.125
18	18	18	0.125
20	20	20	0.125
22	22	22	0.125
24	24	24	0.187
26	26	26	0.187
28	28	28	0.187
30	30	30	0.187
32	32	32	0.187
34	34	34	0.187
36	36	36	0.187
38	38	38	0.187
40	40	40	0.187
42	42	42	0.250
48	48	48	0.250
54	54	54	0.250
60	60	60	0.250
66	66	66	0.250
72	72	72	0.312
78	78	78	0.312
84	84	84	0.312
96	96	96	0.375
108	108	108	0.375
120	120	120	0.375

A DIAMETER	L LENGTH	C OFFSET	DUCT THICKNESS
4	A.S.	A.S.	0.125
6	A.S.	A.S.	0.125
8	A.S.	A.S.	0.125
10	A.S.	A.S.	0.125
12	A.S.	A.S.	0.125
14	A.S.	A.S.	0.125
16	A.S.	A.S.	0.125
18	A.S.	A.S.	0.125
20	A.S.	A.S.	0.125
22	A.S.	A.S.	0.125
24	A.S.	A.S.	0.187
26	A.S.	A.S.	0.187
28	A.S.	A.S.	0.187
30	A.S.	A.S.	0.187
32	A.S.	A.S.	0.187
34	A.S.	A.S.	0.187
36	A.S.	A.S.	0.187
38	A.S.	A.S.	0.187
40	A.S.	A.S.	0.187
42	A.S.	A.S.	0.250
48	A.S.	A.S.	0.250
54	A.S.	A.S.	0.250
60	A.S.	A.S.	0.250
66	A.S.	A.S.	0.250
72	A.S.	A.S.	0.312
78	A.S.	A.S.	0.312
84	A.S.	A.S.	0.312
96	A.S.	A.S.	0.375
108	A.S.	A.S.	0.375
120	A.S.	A.S.	0.375

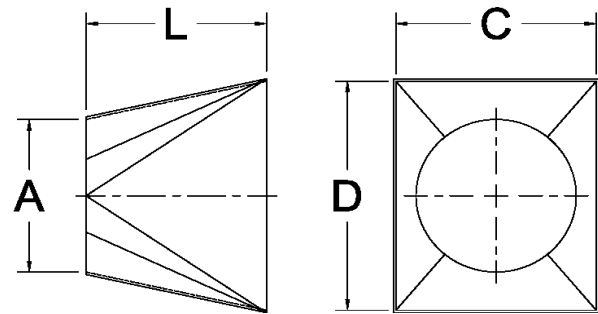
OFFSET



NOTE A.S. MEANS ANY SIZE

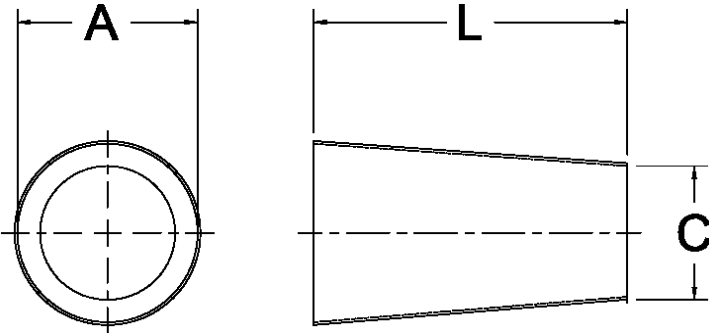
A DIAMETER	L LENGTH	C LENGTH	D LENGTH	DUCT THICKNESS
4	12	A.S.	A.S.	0.125
6	12	A.S.	A.S.	0.125
8	12	A.S.	A.S.	0.125
10	12	A.S.	A.S.	0.125
12	12	A.S.	A.S.	0.125
14	24	A.S.	A.S.	0.125
16	24	A.S.	A.S.	0.125
18	24	A.S.	A.S.	0.125
20	24	A.S.	A.S.	0.125
22	24	A.S.	A.S.	0.125
24	24	A.S.	A.S.	0.187
26	36	A.S.	A.S.	0.187
28	36	A.S.	A.S.	0.187
30	36	A.S.	A.S.	0.187
32	36	A.S.	A.S.	0.187
34	36	A.S.	A.S.	0.187
36	36	A.S.	A.S.	0.187
38	48	A.S.	A.S.	0.187
40	48	A.S.	A.S.	0.187
42	48	A.S.	A.S.	0.250
48	48	A.S.	A.S.	0.250
54	60	A.S.	A.S.	0.250
60	60	A.S.	A.S.	0.250
66	60	A.S.	A.S.	0.250
72	60	A.S.	A.S.	0.312
78	60	A.S.	A.S.	0.312
84	60	A.S.	A.S.	0.312
96	60	A.S.	A.S.	0.375
108	60	A.S.	A.S.	0.375
120	60	A.S.	A.S.	0.375

SQUARE TO ROUND TRANSITION



NOTE A.S. MEANS ANY SIZE

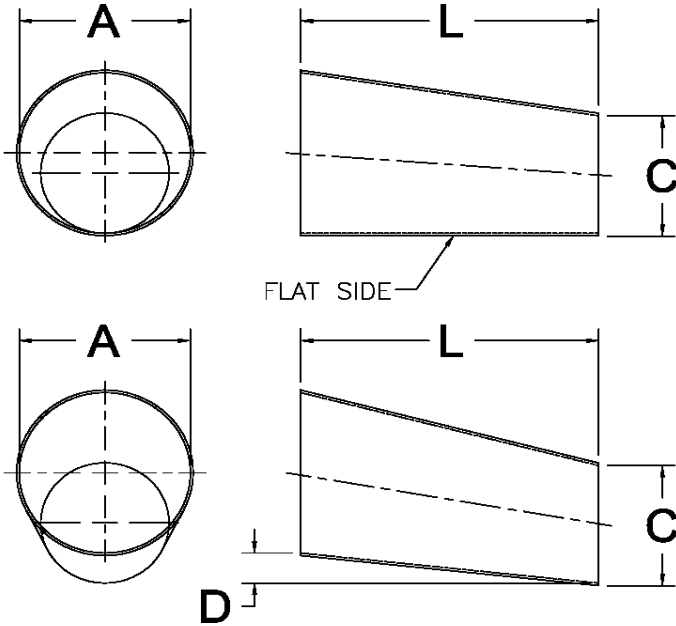
CONCENTRIC REDUCER



A DIAMETER	L LENGTH	C DIAMETER	DUCT THICKNESS
4	(A-C)5	A.S.	0.125
6	(A-C)5	A.S.	0.125
8	(A-C)5	A.S.	0.125
10	(A-C)5	A.S.	0.125
12	(A-C)5	A.S.	0.125
14	(A-C)5	A.S.	0.125
16	(A-C)5	A.S.	0.125
18	(A-C)5	A.S.	0.125
20	(A-C)5	A.S.	0.125
22	(A-C)5	A.S.	0.125
24	(A-C)5	A.S.	0.187
26	(A-C)5	A.S.	0.187
28	(A-C)5	A.S.	0.187
30	(A-C)5	A.S.	0.187
32	(A-C)5	A.S.	0.187
34	(A-C)5	A.S.	0.187
36	(A-C)5	A.S.	0.187
38	(A-C)5	A.S.	0.187
40	(A-C)5	A.S.	0.187
42	(A-C)5	A.S.	0.250
48	(A-C)5	A.S.	0.250
54	(A-C)5	A.S.	0.250
60	(A-C)5	A.S.	0.250
66	(A-C)5	A.S.	0.250
72	(A-C)5	A.S.	0.312
78	(A-C)5	A.S.	0.312
84	(A-C)5	A.S.	0.312
96	(A-C)5	A.S.	0.375
108	(A-C)5	A.S.	0.375
120	(A-C)5	A.S.	0.375

NOTE A.S. MEANS ANY SIZE LESS THAN A

ECCENTRIC REDUCER



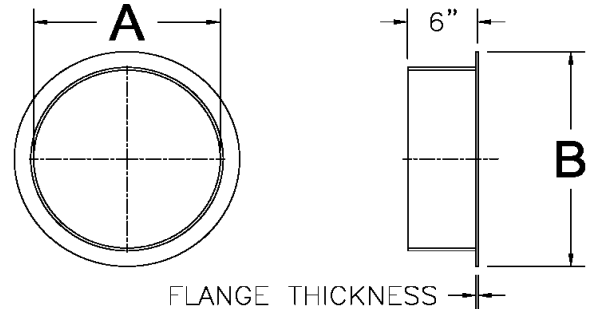
A DIAMETER	L LENGTH	C DIAMETER	D LENGTH	DUCT THICKNESS
4	(A-C)5	A.S.	A.S.	0.125
6	(A-C)5	A.S.	A.S.	0.125
8	(A-C)5	A.S.	A.S.	0.125
10	(A-C)5	A.S.	A.S.	0.125
12	(A-C)5	A.S.	A.S.	0.125
14	(A-C)5	A.S.	A.S.	0.125
16	(A-C)5	A.S.	A.S.	0.125
18	(A-C)5	A.S.	A.S.	0.125
20	(A-C)5	A.S.	A.S.	0.125
22	(A-C)5	A.S.	A.S.	0.125
24	(A-C)5	A.S.	A.S.	0.187
26	(A-C)5	A.S.	A.S.	0.187
28	(A-C)5	A.S.	A.S.	0.187
30	(A-C)5	A.S.	A.S.	0.187
32	(A-C)5	A.S.	A.S.	0.187
34	(A-C)5	A.S.	A.S.	0.187
36	(A-C)5	A.S.	A.S.	0.187
38	(A-C)5	A.S.	A.S.	0.187
40	(A-C)5	A.S.	A.S.	0.187
42	(A-C)5	A.S.	A.S.	0.250
48	(A-C)5	A.S.	A.S.	0.250
54	(A-C)5	A.S.	A.S.	0.250
60	(A-C)5	A.S.	A.S.	0.250
66	(A-C)5	A.S.	A.S.	0.250
72	(A-C)5	A.S.	A.S.	0.312
78	(A-C)5	A.S.	A.S.	0.312
84	(A-C)5	A.S.	A.S.	0.312
96	(A-C)5	A.S.	A.S.	0.375
108	(A-C)5	A.S.	A.S.	0.375
120	(A-C)5	A.S.	A.S.	0.375

NOTE A.S. MEANS ANY SIZE LESS THAN A

A DIAMETER	B FLANGE O.D.	FLANGE THICKNESS	DUCT THICKNESS
4	7.312	0.187	0.125
6	9.312	0.187	0.125
8	11.312	0.187	0.125
10	13.312	0.187	0.125
12	15.312	0.187	0.125
14	17.312	0.187	0.125
16	19.312	0.187	0.125
18	21.312	0.187	0.125
20	23.312	0.187	0.125
22	25.312	0.187	0.125
24	28.437	0.250	0.187
26	30.437	0.250	0.187
28	32.437	0.250	0.187
30	34.437	0.250	0.187
32	36.437	0.250	0.187
34	38.437	0.250	0.187
36	40.437	0.250	0.187
38	42.437	0.250	0.187
40	44.437	0.250	0.187
42	46.562	0.250	0.250
44	48.562	0.250	0.250
46	50.562	0.250	0.250
48	52.562	0.250	0.250
50	54.562	0.250	0.250
52	56.562	0.250	0.250
54	58.562	0.250	0.250
56	60.562	0.250	0.250
58	62.562	0.250	0.250
60	64.562	0.250	0.250
72	76.562	0.250	0.250

NOTE STANDARD FLANGES ARE SHIPPED UNDRILLED

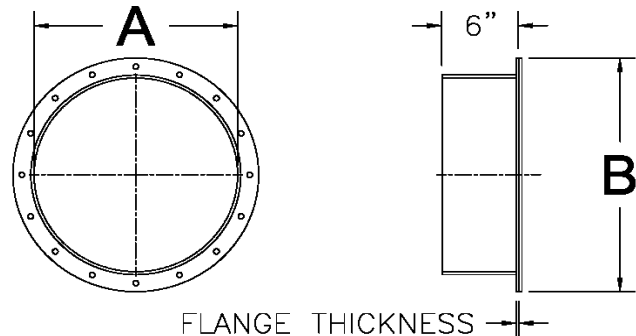
6" STUB FLANGE



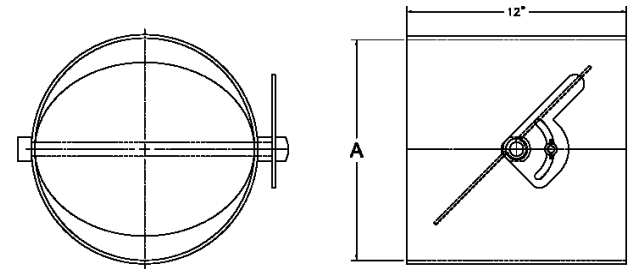
A DIAMETER	B FLANGE O.D.	FLANGE THICKNESS	DUCT THICKNESS
4	8.375	0.250	0.125
6	10.375	0.250	0.125
8	12.375	0.250	0.125
10	14.375	0.375	0.125
12	16.375	0.375	0.125
14	18.375	0.375	0.125
16	20.375	0.500	0.125
18	22.375	0.500	0.125
20	24.375	0.500	0.125
22	26.375	0.500	0.125
24	28.375	0.500	0.187
26	30.375	0.500	0.187
28	32.375	0.500	0.187
30	34.375	0.500	0.187
32	36.375	0.500	0.187
34	38.375	0.500	0.187
36	40.375	0.500	0.187
38	42.375	0.500	0.187
40	44.375	0.500	0.187
42	46.375	0.625	0.250
48	54.375	0.625	0.250
54	60.375	0.625	0.250
60	66.375	0.625	0.250
66	72.375	0.625	0.250
72	78.375	0.750	0.312
78	84.375	0.750	0.312
84	90.375	0.750	0.312
96	102.375	0.750	0.375
108	114.375	0.750	0.375
120	126.375	0.750	0.375

NOTE 1) STANDARD BLIND FLANGES USE DRILL PATTERNS FROM NBS PS15-69
2) STANDARD GASKET MATERIAL IS EITHER NEOPRENE OR CLOSED CELL PVC F

6" STUB WITH BLIND FLANGE

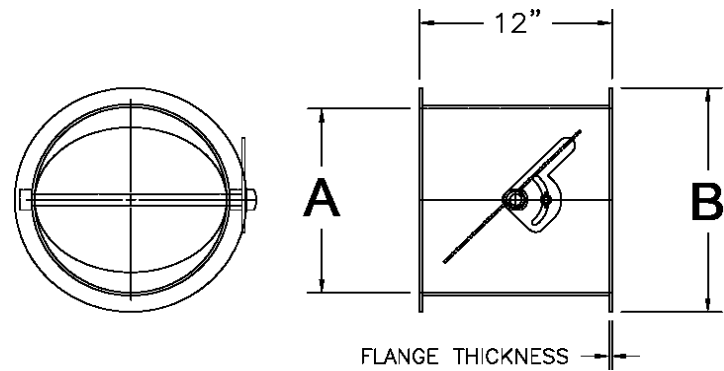


VOLUME DAMPER WITH PLAIN END



A DIAMETER	DUCT THICKNESS
4	0.125
6	0.125
8	0.125
10	0.125
12	0.125
14	0.125
16	0.125
18	0.125
20	0.125
22	0.125
24	0.187
26	0.187
28	0.187
30	0.187
32	0.187
34	0.187
36	0.187
38	0.187
40	0.187
42	0.250
48	0.250
54	0.250
60	0.250
66	0.250
72	0.312
78	0.312
84	0.312
96	0.375
108	0.375
120	0.375

VOLUME DAMPER WITH FLANGES

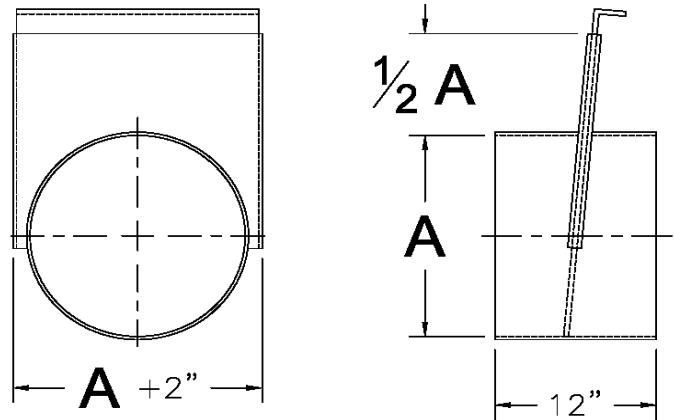


A DIAMETER	B FLANGE OD	FLANGE THICKNESS	DUCT THICKNESS
4	8.375	0.250	0.125
6	10.375	0.250	0.125
8	12.375	0.250	0.125
10	14.375	0.375	0.125
12	16.375	0.375	0.125
14	18.375	0.375	0.125
16	20.375	0.500	0.125
18	22.375	0.500	0.125
20	24.375	0.500	0.125
22	26.375	0.500	0.125
24	28.375	0.500	0.187
26	30.375	0.500	0.187
28	32.375	0.500	0.187
30	34.375	0.500	0.187
32	36.375	0.500	0.187
34	38.375	0.500	0.187
36	40.375	0.500	0.187
38	42.375	0.500	0.187
40	44.375	0.500	0.187
42	46.375	0.625	0.250
48	54.375	0.625	0.250
54	60.375	0.625	0.250
60	66.375	0.625	0.250
66	72.375	0.625	0.250
72	78.375	0.750	0.312
78	84.375	0.750	0.312
84	90.375	0.750	0.312
96	102.375	0.750	0.375
108	114.375	0.750	0.375
120	126.375	0.750	0.375

NOTE STANDARD VOLUME DAMPER FLANGES ARE SHIPPED UNDRILLED

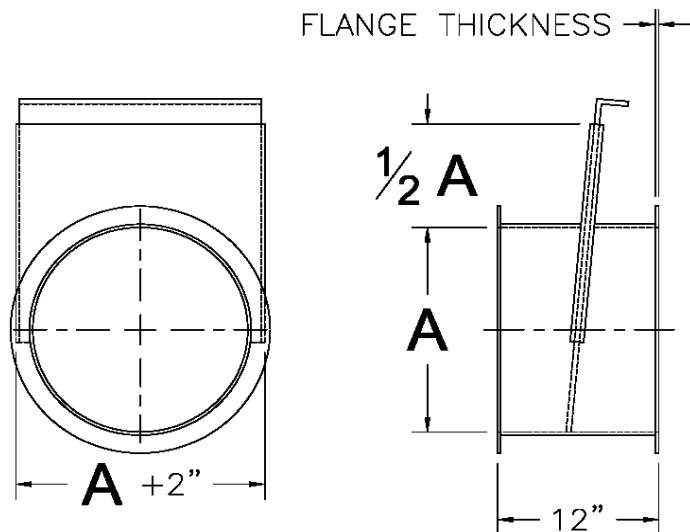
A DIAMETER	DUCT THICKNESS
4	0.125
6	0.125
8	0.125
10	0.125
12	0.125
14	0.125
16	0.125
18	0.125
20	0.125
22	0.125
24	0.187
26	0.187
28	0.187
30	0.187
32	0.187
34	0.187
36	0.187
38	0.187
40	0.187
42	0.250
48	0.250
54	0.250
60	0.250
66	0.250
72	0.312
78	0.312
84	0.312
96	0.375
108	0.375
120	0.375

BLASTGATE WITH PLAIN END



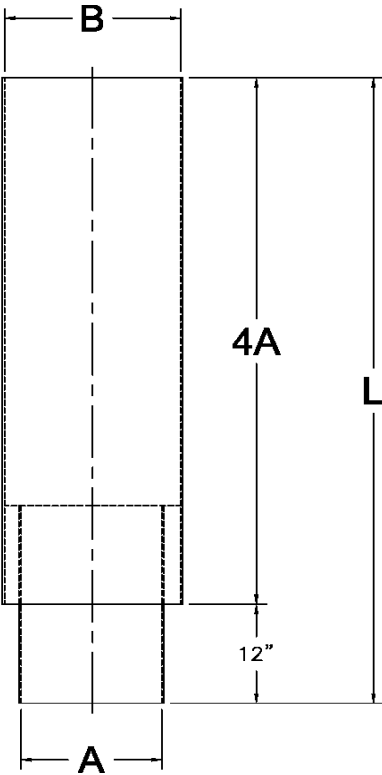
A DIAMETER	B FLANGE O.D.	FLANGE THICKNESS	DUCT THICKNESS
4	8.375	0.250	0.125
6	10.375	0.250	0.125
8	12.375	0.250	0.125
10	14.375	0.375	0.125
12	16.375	0.375	0.125
14	18.375	0.375	0.125
16	20.375	0.500	0.125
18	22.375	0.500	0.125
20	24.375	0.500	0.125
22	26.375	0.500	0.125
24	28.375	0.500	0.187
26	30.375	0.500	0.187
28	32.375	0.500	0.187
30	34.375	0.500	0.187
32	36.375	0.500	0.187
34	38.375	0.500	0.187
36	40.375	0.500	0.187
38	42.375	0.500	0.187
40	44.375	0.500	0.187
42	46.375	0.625	0.250
48	54.375	0.625	0.250
54	60.375	0.625	0.250
60	66.375	0.625	0.250
66	72.375	0.625	0.250
72	78.375	0.750	0.312
78	84.375	0.750	0.312
84	90.375	0.750	0.312
96	102.375	0.750	0.375
108	114.375	0.750	0.375
120	126.375	0.750	0.375

BLASTGATE WITH FLANGES



NOTE STANDARD BLASTGATE FLANGES ARE SHIPPED UNDRILLED

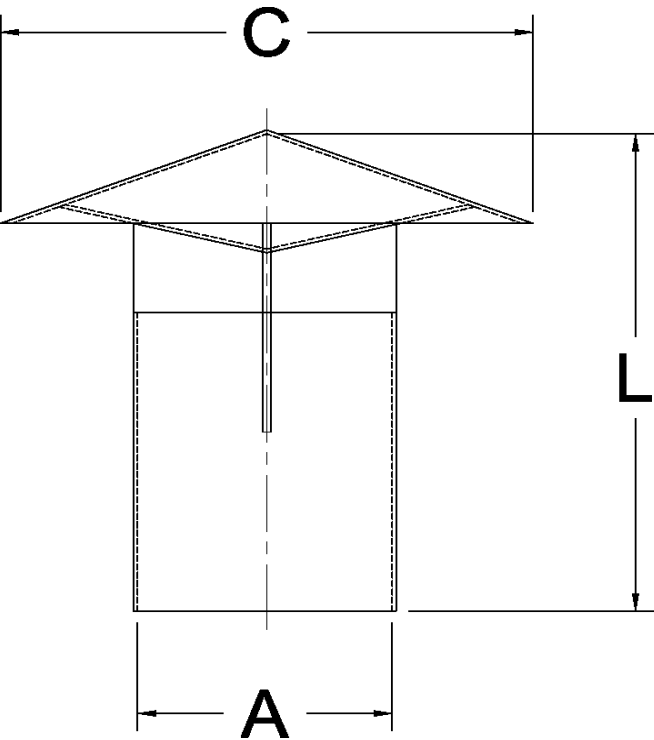
NO-LOSS STACK CAP



A DIAMETER	B DIAMETER	L LENGTH	DUCT THICKNESS
4	8	28	0.125
6	10	36	0.125
8	12	44	0.125
10	14	52	0.125
12	16	60	0.125
14	18	68	0.125
16	20	76	0.125
18	22	84	0.125
20	24	92	0.125
22	26	100	0.125
24	28	108	0.187
26	30	116	0.187
28	32	124	0.187
30	34	132	0.187
32	36	140	0.187
34	38	148	0.187
36	40	156	0.187
38	42	164	0.187
40	44	172	0.187
42	46	180	0.250
48	54	204	0.250
54	60	228	0.250
60	66	252	0.250
66	72	276	0.250
72	78	300	0.312
78	84	324	0.312
84	90	348	0.312
96	102	396	0.375
108	114	444	0.375
120	126	492	0.375

NOTE: FOR OTHER THAN STANDARD DESIGNS, CUSTOMER MUST PROVIDE WIND LOADS FOR VIRON TO DESIGN STACK

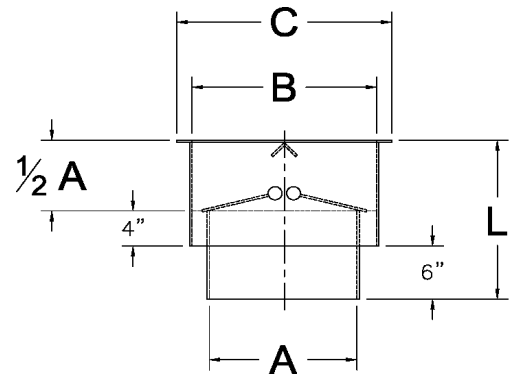
RAIN CAP



A DIAMETER	L LENGTH	C DIAMETER	DUCT THICKNESS
4	8	8	0.125
6	12	12	0.125
8	16	16	0.125
10	20	20	0.125
12	24	24	0.125
14	28	28	0.125
16	32	32	0.125
18	36	36	0.125
20	40	40	0.125
22	44	44	0.125
24	48	48	0.187
26	52	52	0.187
28	56	56	0.187
30	60	60	0.187
32	64	64	0.187
34	68	68	0.187
36	72	72	0.187
38	76	76	0.187
40	80	80	0.187
42	84	84	0.250
48	96	96	0.250
54	108	108	0.250
60	120	120	0.250
66	132	132	0.250
72	144	144	0.312
78	156	156	0.312
84	168	168	0.312
96	192	192	0.375
108	216	216	0.375
120	240	240	0.375

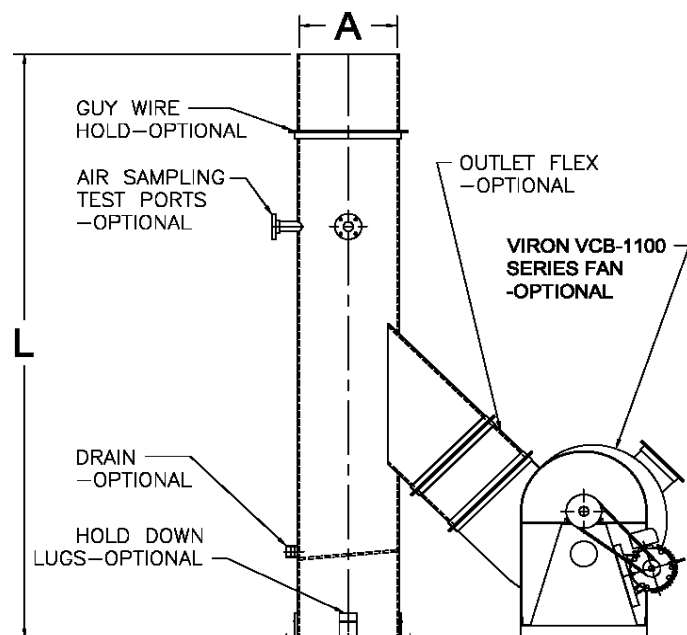
A DIAMETER	B DIAMETER	C DIAMETER	L LENGTH	E FLANGE THICKNESS	DUCT THICKNESS
4	8	12.375	12	0.250	0.125
6	10	14.375	13	0.250	0.125
8	12	16.375	14	0.250	0.125
10	14	18.375	15	0.375	0.125
12	16	20.375	16	0.375	0.125
14	18	22.375	17	0.375	0.125
16	20	24.375	18	0.500	0.125
18	22	26.375	19	0.500	0.125
20	24	28.375	20	0.500	0.125
22	26	30.375	21	0.500	0.125
24	28	32.375	22	0.500	0.187
26	30	34.375	23	0.500	0.187
28	32	36.375	24	0.500	0.187
30	34	38.375	25	0.500	0.187
32	36	40.375	26	0.500	0.187
34	38	42.375	27	0.500	0.187
36	40	44.375	28	0.500	0.187
38	42	46.375	29	0.500	0.187
40	44	48.375	30	0.500	0.187
42	46	50.375	31	0.625	0.250
48	54	60.375	34	0.625	0.250
54	60	66.375	37	0.625	0.250
60	66	72.375	40	0.625	0.250
66	72	78.375	43	0.625	0.250
72	78	84.375	46	0.750	0.312
78	84	90.375	49	0.750	0.312
84	90	96.375	52	0.750	0.312
96	102	108.375	58	0.750	0.375
108	114	120.375	64	0.750	0.375
120	126	132.375	70	0.750	0.375

BUTTERFLY STACK CAP



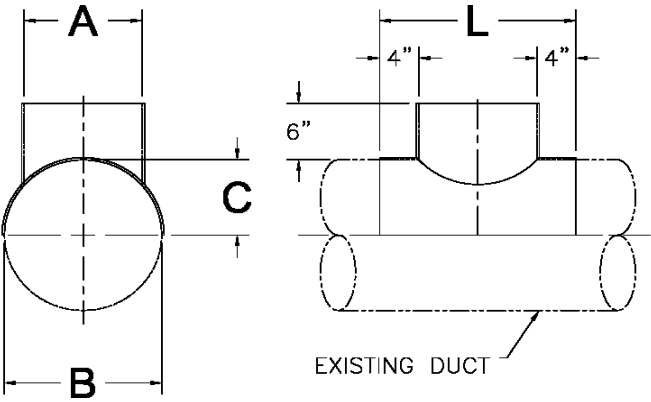
A DIAMETER	L HEIGHT	STACK THICKNESS
4	A.S.	C.F.
6	A.S.	C.F.
8	A.S.	C.F.
10	A.S.	C.F.
12	A.S.	C.F.
14	A.S.	C.F.
16	A.S.	C.F.
18	A.S.	C.F.
20	A.S.	C.F.
22	A.S.	C.F.
24	A.S.	C.F.
26	A.S.	C.F.
28	A.S.	C.F.
30	A.S.	C.F.
32	A.S.	C.F.
34	A.S.	C.F.
36	A.S.	C.F.
38	A.S.	C.F.
40	A.S.	C.F.
42	A.S.	C.F.
48	A.S.	C.F.
54	A.S.	C.F.
60	A.S.	C.F.
66	A.S.	C.F.
72	A.S.	C.F.
78	A.S.	C.F.
84	A.S.	C.F.
96	A.S.	C.F.
108	A.S.	C.F.
120	A.S.	C.F.

OFFSET STACK



- NOTE**
- 1) A.S. MEANS ANY SIZE
 - 2) C.F. MEANS CONSULT FACTORY
 - 3) ALL OFFSET STACKS ARE DESIGNED WITH GUY WIRES. FREE STANDING STACKS ARE AVAILABLE, CONSULT THE FACTORY

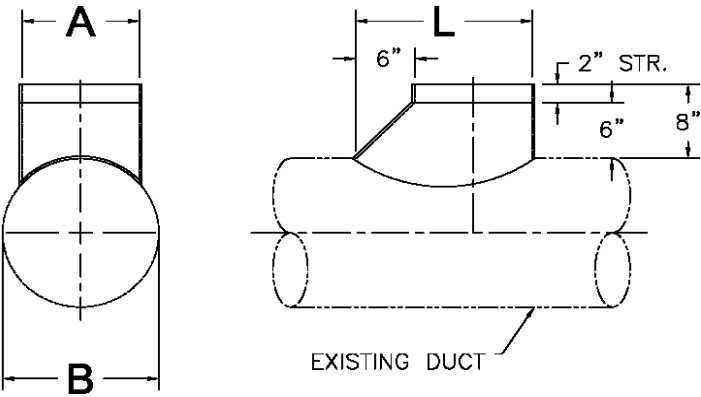
SADDLE TAP



A DIAMETER	B DIAMETER	C HEIGHT	L LENGTH	DUCT THICKNESS
4	A.S.	1/2 B	A + 8	0.125
6	A.S.	1/2 B	A + 8	0.125
8	A.S.	1/2 B	A + 8	0.125
10	A.S.	1/2 B	A + 8	0.125
12	A.S.	1/2 B	A + 8	0.125
14	A.S.	1/2 B	A + 8	0.125
16	A.S.	1/2 B	A + 8	0.125
18	A.S.	1/2 B	A + 8	0.125
20	A.S.	1/2 B	A + 8	0.125
22	A.S.	1/2 B	A + 8	0.125
24	A.S.	1/2 B	A + 8	0.187
26	A.S.	1/2 B	A + 8	0.187
28	A.S.	1/2 B	A + 8	0.187
30	A.S.	1/2 B	A + 8	0.187
32	A.S.	1/2 B	A + 8	0.187
34	A.S.	1/2 B	A + 8	0.187
36	A.S.	1/2 B	A + 8	0.187
38	A.S.	1/2 B	A + 8	0.187
40	A.S.	1/2 B	A + 8	0.187
42	A.S.	1/2 B	A + 8	0.250
48	A.S.	1/2 B	A + 8	0.250
54	A.S.	1/2 B	A + 8	0.250
60	A.S.	1/2 B	A + 8	0.250
66	A.S.	1/2 B	A + 8	0.250
72	A.S.	1/2 B	A + 8	0.312
78	A.S.	1/2 B	A + 8	0.312
84	A.S.	1/2 B	A + 8	0.312
96	A.S.	1/2 B	A + 8	0.375
108	A.S.	1/2 B	A + 8	0.375
120	A.S.	1/2 B	A + 8	0.375

NOTE: A.S. MEANS ANY SIZE GREATER THAN A

BOOT

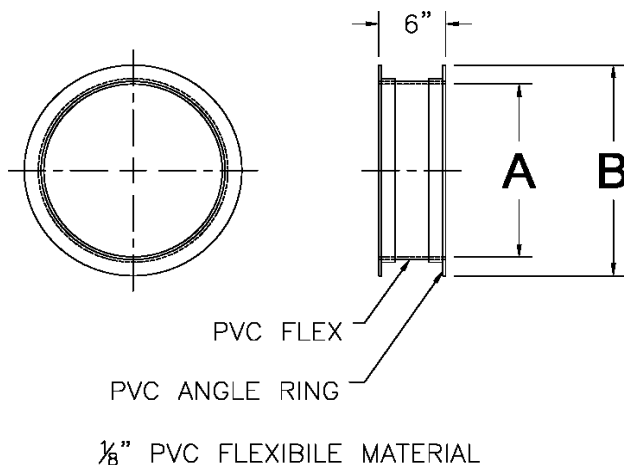


A DIAMETER	B DIAMETER	L LENGTH	DUCT THICKNESS
4	A.S.	A + 6	0.125
6	A.S.	A + 6	0.125
8	A.S.	A + 6	0.125
10	A.S.	A + 6	0.125
12	A.S.	A + 6	0.125
14	A.S.	A + 6	0.125
16	A.S.	A + 6	0.125
18	A.S.	A + 6	0.125
20	A.S.	A + 6	0.125
22	A.S.	A + 6	0.125
24	A.S.	A + 6	0.187
26	A.S.	A + 6	0.187
28	A.S.	A + 6	0.187
30	A.S.	A + 6	0.187
32	A.S.	A + 6	0.187
34	A.S.	A + 6	0.187
36	A.S.	A + 6	0.187
38	A.S.	A + 6	0.187
40	A.S.	A + 6	0.187
42	A.S.	A + 6	0.250
48	A.S.	A + 6	0.250
54	A.S.	A + 6	0.250
60	A.S.	A + 6	0.250
66	A.S.	A + 6	0.250
72	A.S.	A + 6	0.312
78	A.S.	A + 6	0.312
84	A.S.	A + 6	0.312
96	A.S.	A + 6	0.375
108	A.S.	A + 6	0.375
120	A.S.	A + 6	0.375

NOTE: A.S. MEANS ANY SIZE GREATER THAN A

A DIAMETER	B FLANGE O.D	FLANGE THICKNESS
4	8.375	0.250
6	10.375	0.250
8	12.375	0.250
10	14.375	0.375
12	16.375	0.375
14	18.375	0.375
16	20.375	0.500
18	22.375	0.500
20	24.375	0.500
22	26.375	0.500
24	28.375	0.500
26	30.375	0.500
28	32.375	0.500
30	34.375	0.500
32	36.375	0.500
34	38.375	0.500
36	40.375	0.500
38	42.375	0.500
40	44.375	0.500
42	46.375	0.625
48	54.375	0.625
54	60.375	0.625
60	66.375	0.625
66	72.375	0.625
72	78.375	0.750
78	84.375	0.750
84	90.375	0.750
96	102.375	0.750
108	114.375	0.750
120	126.375	0.750

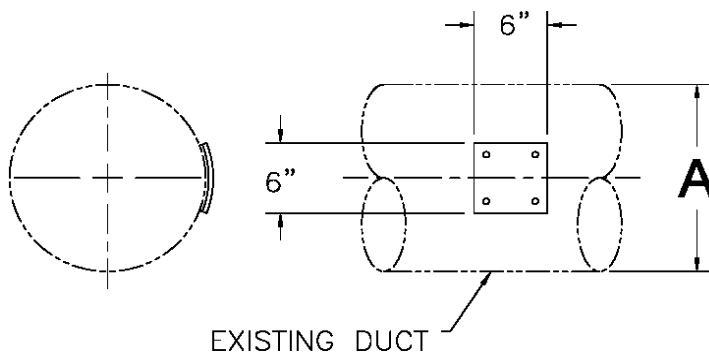
FLANGED CONNECTOR WITH PVC FLEX



NOTE: 1) PVC FLEX MATERIAL IS .125" THICK
2) STANDARD FLANGES ARE SHIPPED UNDRILLED

A DIAMETER
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
48
54
60
66
72
78
84
96
108
120

FIRE SPRINKLER ACCESS DOOR

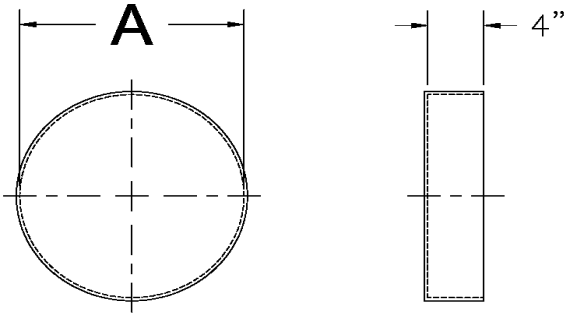


INCLUDES

1. FOUR(4) SST SCREWS
2. PVC FOAM GASKET
3. 6"x6"x $\frac{1}{8}$ " THICK DOOR

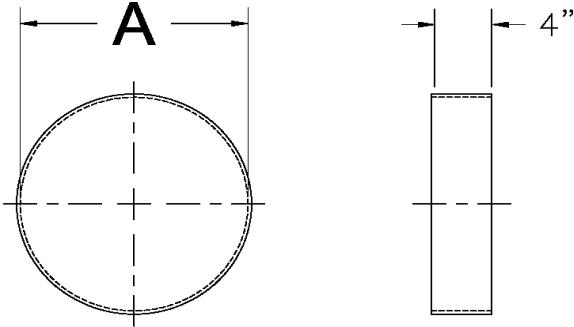
NOTE 1) A.S. MEANS ANY SIZE
2) C.F. MEANS CONSULT FACTORY
3) ALL OFFSET STACKS ARE DESIGNED WITH GUY WIRES. FREE STANDING STACKS ARE AVAILBLE, CONSULT THE FACTORY

END CAP



A DIAMETER	DUCT THICKNESS
4.375	0.125
6.375	0.125
8.375	0.125
10.375	0.125
12.375	0.125
14.375	0.125
16.375	0.125
18.375	0.125
20.375	0.125
22.375	0.125
24.561	0.187
26.561	0.187
28.561	0.187
30.561	0.187
32.561	0.187
34.561	0.187
36.561	0.187
38.561	0.187
40.561	0.187
42.750	0.250
48.750	0.250
54.750	0.250
60.750	0.250
66.750	0.250
72.936	0.312
78.936	0.312
84.936	0.312
97.125	0.375
109.125	0.375
121.125	0.375

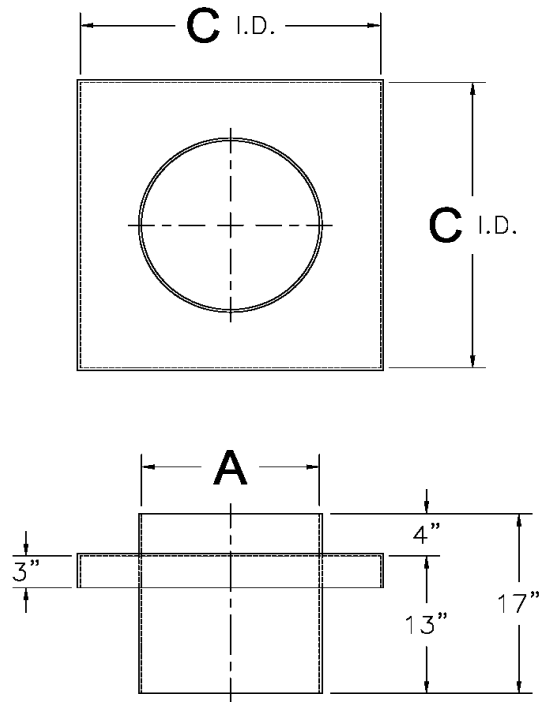
COUPLING



A DIAMETER	DUCT THICKNESS
4.375	0.125
6.375	0.125
8.375	0.125
10.375	0.125
12.375	0.125
14.375	0.125
16.375	0.125
18.375	0.125
20.375	0.125
22.375	0.125
24.561	0.187
26.561	0.187
28.561	0.187
30.561	0.187
32.561	0.187
34.561	0.187
36.561	0.187
38.561	0.187
40.561	0.187
42.750	0.250
48.750	0.250
54.750	0.250
60.750	0.250
66.750	0.250
72.936	0.312
78.936	0.312
84.936	0.312
97.125	0.375
109.125	0.375
121.125	0.375

A DIAMETER	C LENGTH	DUCT THICKNESS
4	15	0.125
6	17	0.125
8	19	0.125
10	21	0.125
12	23	0.125
14	25	0.125
16	27	0.125
18	29	0.125
20	31	0.125
22	33	0.125
24	35	0.187
26	37	0.187
28	39	0.187
30	41	0.187
32	43	0.187
34	45	0.187
36	47	0.187
38	49	0.187
40	51	0.187
42	53	0.250
48	59	0.250
54	65	0.250
60	71	0.250
66	77	0.250
72	83	0.312
78	89	0.312
84	95	0.312
96	107	0.375
108	119	0.375
120	131	0.375

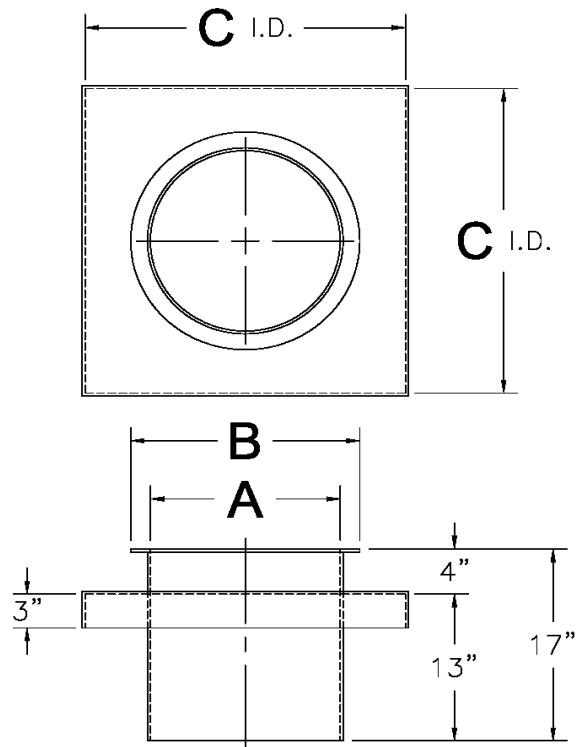
CURB CAP WITH PLAIN END DUCT



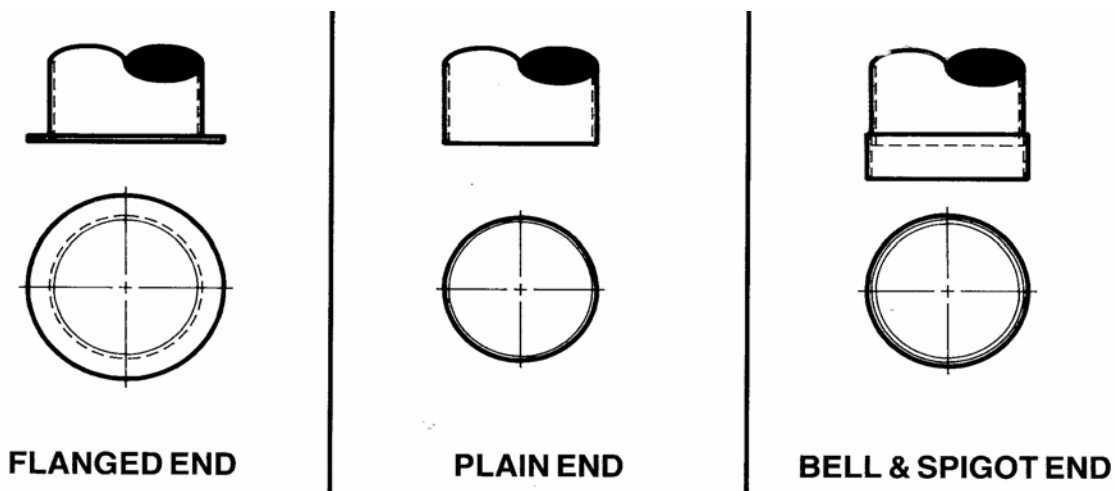
NOTE: VIRON CAN CUSTOM MANUFACTURE ANY CURB CAP TO FIT AN EXISTING ROOF CURB, CONSULT THE FACTORY

A DIAMETER	B DIAMETER	C LENGTH	D FLANGE THICKNESS	DUCT THICKNESS
4	8.375	15	0.250	0.125
6	10.375	17	0.250	0.125
8	12.375	19	0.250	0.125
10	14.375	21	0.375	0.125
12	16.375	23	0.375	0.125
14	18.375	25	0.375	0.125
16	20.375	27	0.500	0.125
18	22.375	29	0.500	0.125
20	24.375	31	0.500	0.125
22	26.375	33	0.500	0.125
24	28.375	35	0.500	0.187
26	30.375	37	0.500	0.187
28	32.375	39	0.500	0.187
30	34.375	41	0.500	0.187
32	36.375	43	0.500	0.187
34	38.375	45	0.500	0.187
36	40.375	47	0.500	0.187
38	42.375	49	0.500	0.187
40	44.375	51	0.500	0.187
42	46.375	53	0.625	0.250
48	54.375	59	0.625	0.250
54	60.375	65	0.625	0.250
60	66.375	71	0.625	0.250
66	72.375	77	0.625	0.250
72	78.375	83	0.750	0.312
78	84.375	89	0.750	0.312
84	90.375	95	0.750	0.312
96	102.375	107	0.750	0.375
108	114.375	119	0.750	0.375
120	126.375	131	0.750	0.375

CURB CAP WITH FLANGED DUCT



NOTE 1) VIRON CAN CUSTOM MANUFACTURE ANY CURB CAP TO FIT AN EXISTING ROOF CURB, CONSULT THE FACTORY
2) STANDARD FLANGES ARE SHIPPED UNDRILLED



VIRON® manufactures all PVC duct and fittings with plain ends as shown in the middle illustration above. Both flanged and bell and spigot ends are available upon request. Please consult your local representative for further details.

—GENERAL NOTES—

As in all catalogs, we are making certain assumptions in order to come up with standard fittings. Listed below are some notes which may help clarify some common misconceptions:

1. **VIRON®** can manufacture rectangular duct, see pages 32 through 35. Consult your local representative for pricing and availability.
2. Standard elbows are manufactured with a centerline radius 1.5 times the diameter. However, **VIRON®** can manufacture any radius length to meet your requirements. Consult your local representative.
3. Reducers are manufactured with a standard length (large diameter - small diameter) times (5). Custom lengths are available from the factory. Consult your local representative.
4. All **VIRON®** fiberglass duct is custom manufactured for each individual project. In order to maximize the corrosion resistance for these projects, VIRON offers a wide variety of resins, glass, and special additives. We can help you specify the right material for your application. Contact our application engineers for valuable input to your corrosion problems.
5. All **VIRON®** fiberglass duct is manufactured per NBS PS15-69. The pressure and vacuum ratings for this standard duct are shown on page 31. If your project requires an increase of either pressure or vacuum, **VIRON®** can design the duct and fittings to meet your requirements.
6. In addition to hand lay-up fabrication methods, **VIRON®** can also manufacture fiberglass duct utilizing computer controlled, filament winding machines. Similar in appearance to standard duct, this machines can increase the glass content and therefore optimize the physical strengths of the duct. Increased pressure or vacuum ratings can be designed simply and easily. Consult your local representative for further information.

SPECIFICATIONS FOR CONTACT MOLDED DUCTING

A. FEATURES

The following is a specification for contact molded glass fiber reinforced process ducting and fittings as developed and adhered to by **VIRON® INTERNATIONAL CORPORATION**. This specifications conforms with the National Bureau of Standard's Voluntary Product Standard PS 15-69 and covers construction, workmanship, test procedures, and auxiliaries for products intended for use in aggressive chemical environments. The product standard is based on existing technology and accepted industry practice. This standard is not intended to cover selection of the exact resin or reinforcement combination for use in specific chemical and structural conditions.

1. **Terminology** - Unless otherwise indicated, the plastics terminology used in this Standard shall be in accordance with the definitions given in American Society for Testing and Materials (ASTM) Designation D883-69, Standard Nomenclature Relating to Plastics.

B. MATERIALS

1. **Resin** - The resin used shall be of a commercial grade and shall either be evaluated as a laminate by test or determined by previous service to be acceptable for the environment.
2. **Reinforcing Material** - The reinforcing material shall be a commercial grade of glass fiber having a suitable bond between glass reinforcement and resin such as manufactured by Owens-Corning and Johns-Mansville, or equal.
3. **Fillers** - The resins used shall not contain fillers except as required for viscosity control or fire retardance. Up to 5 percent by weight of thixotropic agent which will not interfere with visual inspection may be added to the resin for viscosity control. Resins may contain pigments and dyes by agreement between fabricator and purchaser, recognizing that such additions may interfere with visual inspection of laminate quality. Antimony compounds or other fire retardant agents may be added as required for improved fire resistance.

C. PRODUCTS

1. **Laminate** - The laminate shall consist of an inner surface, a first and second interior layer, an exterior layer, and an exterior gel coat.
2. **Inner Surface** - The inner surface shall be free of cracks and crazing with a smooth finish, resin rich to avoid exposure of glass fibers. Some waviness is permissible as long as the surface is smooth and free of pits. Glass or synthetic veil shall be used on the inner surface to provide a .030" resin rich surface of 90% resin, 10% glass.
3. **First Interior Layer** - The first interior layer shall consist of 1½ ounce chopped strand mat, impregnated with resin, to a ratio of two-thirds resin to one-third glass fiber.
4. **Second Layer Interior** - The second interior layer shall consist of three ounce strand mat, impregnated with resin, to a ratio of two-thirds resin to one-third glass fiber.
5. **Exterior Layer** - The exterior layer of body of the laminate shall be of chemically resistant construction suitable for the service and providing the additional strength necessary to meet the tensile and flexural requirements. Where separate layers such as mat, cloth or woven roving are used, all layers shall be lapped a minimum of 1 inch. Laps shall be staggered as much as possible. If woven roving or cloth is used, a layer of chopped strand glass shall be placed as alternate layers. The exterior surface shall be relatively smooth with no exposed fibers or sharp projections. Hand work finish is acceptable, but enough resin shall be present to prevent fiber show. When the outer surface is subject to a corrosive environment, the exterior surface shall consist of a chopped strand glass over which shall be applied a resin rich coating. Other methods of surface protection may be used as agreed upon between buyer and seller.
6. **Exterior Gel Coat** - The gel coat shall be commercially available material, consisting of polyester resin, a pigment for color, and an ultra-violet light inhibitor.

SPECIFICATIONS FOR CONTACT MOLDED DUCTING (cont'd)

D. FINISH

1. **Appearance** - The finished laminate shall be as free as commercially practical from visual defects such as foreign inclusions, dry spots, air bubbles, pin holes, and delamination.
2. **Cut Edges** - All cut edges shall be coated with resin so that no glass fibers are exposed and all voids filled. Structural elements having edges exposed to the chemical environment shall be made with chopped strand glass reinforcement only.
3. **Joints** - Finished joints shall be built up in successive layers and be as strong as the pieces being joined and as crevice free as is commercially practicable. The width of the first layer shall be 2 inches minimum. Successive layers shall increase uniformly to provide the specified minimum total width of overlay which shall be centered on the joint. Crevices between jointed pieces shall be filled with resin or thixotropic resin paste, leaving a smooth inner surface. The interior of joints may also be sealed by covering with no less than 0.100 inch of reinforced resin rich surface.

E. DUCT SIZES AND TOLERANCES

1. **Round Ducting** - The size of round ducting shall be determined by the inside diameter in inches. The standard sizes shall be 4", 6", 8", 10", 12", 14", 16", 18", 20", 24", 30", 36", 42", 48", 54", and 60". Unless otherwise specified, the tolerance, including out-of-roundness, shall be $\pm 1/8$ inch for ducting up to and including 12 inch, and $\pm 1/4$ inch or $\pm 1\%$, whichever is greater, for ducting exceeding 12 inches.
2. **Rectangular Ducting** - The sizes of rectangular ducting shall be determined by the inside dimensions. There are no standard sizes for rectangular ducting. Unless otherwise specified, the tolerances on ordered sizes shall be $\pm 1/4$ inch for dimensions of 18 inch and under and $\pm 1\%$ on dimensions greater than 18 inches.
3. **Wall Thickness** - The minimum nominal wall thickness of round ducting shall be in accordance with Table I, for rectangular ducting, the minimum wall thickness shall be as specified in Table I, substituting the longer side for the diameter.
4. **Ells** - Standard ells shall have a centerline radius of one and one-half times the duct diameter.
5. **Laterals** - Standard laterals shall be 45 degrees.
6. **Eccentric or Concentric Reducers** - Length of standard reducers, unless otherwise specified, shall be three times the difference in diameters. Minimum wall thickness shall be that required for the larger diameter duct.
7. **Fittings** - Tolerances on angles shall be $\pm 1^\circ$ through 24 inches, $\pm 7/8^\circ$ for 30 inches, $\pm 3/4^\circ$ for 36 inches, $\pm 5/8^\circ$ for 42 inches, and $\pm 1/2^\circ$ for 48 inches and above. Wall thickness of the fittings shall be at least that of the ducting of equivalent size.

F. STRAIGHT CONNECTIONS

1. **Butt Joints** - Strength of the butt joint shall be at least equal to that of the duct. Total minimum width of the joint shall be 3 inches for 1/8 inch thickness, 4 inches for 3/16 inch thickness, and 6 inches for 1/4 inch thickness.
2. **Bell and Spigot Joints** - Straight duct shall be inserted into bell at least one-sixth of the duct perimeter or four inches, whichever is less, and overwrapped as to provide strength at least equal to that of the duct.

SPECIFICATIONS FOR CONTACT MOLDED DUCTING (cont'd)

G. FLANGES

1. **Flange Attachment** - Duct walls at hub of flange shall be at least one and one-half times the normal thickness of the duct and taper to normal thickness over a distance of the flange width.
2. **Face of Flange** - Face of flange shall have no projections or depressions and shall be perpendicular to the center line of the duct. A camber of 1/8 inch with respect to the center line, measured at the O. D. of the flange shall be allowable.
3. **Drilling** - Standard flanges shall be supplied undrilled unless drilling is specified by the customer.
4. **Flange Bolting** - The bolt holes shall straddle the centerline unless otherwise specified. The number of bolt holes and the size shall be as specified in Table I. Rectangular flange width and bolt spacing shall be the same as that for the diameters corresponding to the longer side.

H. RECOMMENDED INSTALLATION PRACTICE

1. **Duct Hanger and Spacing** - Hangers shall be band type hangers contacting 180% of the duct surface. The maximum duct hanger spacing shall be in accordance with Table I.
2. **Underground Installation** - Fiberglass duct as manufactured by VIRON® is not recommended for underground installation.
3. **Bolts, Nuts and Washers** - Bolts, nuts and washers shall be furnished by the customer unless otherwise specified. Metal washers shall be used under all nuts and bolt heads. All nuts, bolts and washers shall be of a material suitable for the exterior environment.
4. **Gaskets** - Gaskets shall be furnished by the customer unless otherwise specified. Gasketing material shall be at least 1/8 inch in thickness with a chemical resistance suitable for the environment. Gaskets should have a Shore A or Shore A2 hardness of 40-70.

I. RECOMMENDED PRACTICE FOR JOINING

1. **Preparation of Duct Surface** - Surface of the duct should be sanded or ground to a rough finish approximately 6 inches back from joint.
2. **Mixing of Bonding Material** - Polyester resin is mixed with MEKP just prior to bonding. The general mixture is 1-2% catalyst (MEKP) to resin. This will vary with temperature and humidity conditions.
3. **Glass Fiber Mat** - The glass fiber mat should be precut to the appropriate widths necessary to obtain the thickness desired.

J. INSPECTION AND TEST PROCEDURES

1. **Test** - Tests shall be performed by an independent testing laboratory at the option and expense of the customer.
2. **Specimens** - Tests shall be made on specimens cut from waste areas when possible; otherwise, the specimens shall be cut from flat laminates prepared in the same construction and by the same techniques as the process equipment. In all cases, the average value of the indicated number of specimens shall be used to determine conformance with detailed requirements.
3. **Conditioning** - The test specimens shall be conditioned in accordance with Procedure A of ASTM Designation D618-61, Standard Methods of Conditioning Plastics and Electrical Insulating Materials for Testing.

SPECIFICATIONS FOR CONTACT MOLDED DUCTING (cont'd)

K. TESTS

1. **Glass Content** - The glass content shall be determined in accordance with ASTM Designation D2584-67T. Tentative Method of Test for Ignition Loss or Cured Reinforced Resins, except that the specimens tested shall be approximately 1 square inch in area, and low temperature preignition prior to placement in muffle furnace is recommended. The average for five specimens shall be considered to be the glass content.
2. **Tensile Strength** - Tensile strength shall be determined in accordance with ASTM Designation D638-68, Standard Method of Test for Tensile Properties of Plastics, except that the specimens shall be the actual thickness of the fabricated article and the width of the reduced section shall be 1 inch. Other dimensions of specimens shall be as designated by the ASTM Standard for Type I specimens for material over 1/2 inch to 1 inch, inclusive. Specimens shall not be machined on the surface. Tensile strength shall be the average of five specimens tested at 0.20 to 0.25 in/min speeds.
3. **Flexural Strength** - Flexural strength shall be determined in accordance with Procedure A and Table II of ASTM Designation D790-66, Standard Method of Test for Flexural Properties of Plastics, except that the specimens shall be the actual thickness of fabricated item and the width shall be 1 inch. Other dimensions of specimens shall be as designated by the ASTM Standard. Specimens shall not be machined on the surface. Tests shall be made with the resin rich side in compression using five specimens.
4. **Flexural Modulus** - The tangent modulus of elasticity in flexure shall be determined by ASTM Method D790-66.
5. **Hardness** - The hardness shall be determined in accordance with ASTM Designation D2583-67, Standard Method of Test for Indentation Hardness of Plastics by Means of a Barcol Impressor. Calibration of the Barcol instrument shall be verified by comparing with blank specimens having known readings of 85 to 87 and 42 to 46. Ten readings on the clean resin rich surface shall be made. After eliminating two higher and two lower readings, the average of the remainder shall be the reported hardness reading.

Table I. Reinforced-polyester round duct dimensions.

I. D. Inches	Wall Thickness (Min. Inches)	Allowable vacuum inches of water	Allowable pressure inches of water	Flange diameter (O. D.) inches	Flange thickness inches	Bolt Circle diameter inches	Bolt hole diameter inches	No of bolt holes	Hanger Spacing
2	0.125	405	750	6-3/8	1/4	5	7/16	4	6.0
3	0.125	405	500	7-3/8	1/4	6	7/16	4	6.5
4	0.125	210	410	8-3/8	1/4	7	7/16	4	7.0
6	0.125	64	350	10-3/8	1/4	9	7/16	8	8.0
8	0.125	30	180	12-3/8	1/4	11	7/16	8	8.0
10	0.125	16	340	14-3/8	3/8	13	7/16	12	8.0
12	0.125	9	280	16-3/8	3/8	15	7/16	12	8.0
14	0.125	7	220	18-3/8	3/8	17	7/16	12	8.0
16	0.125	6	290	20-3/8	1/2	19	7/16	16	8.0
18	0.125	5	240	22-3/8	1/2	21	7/16	16	8.0
20	0.125	5	190	24-3/8	1/2	23	7/16	20	8.0
24	0.187	9	140	28-3/8	1/2	27	7/16	20	8.0
30	0.187	7	100	34-3/8	1/2	33	7/16	28	8.0
36	0.187	5	70	40-3/8	1/2	39	7/16	32	8.0
42	0.250	10	120	46-3/8	5/8	45	7/16	36	8.0
48	0.250	9	100	54-3/8	5/8	52	9/16	44	8.0
54	0.250	7	80	60-3/8	5/8	58	9/16	44	8.0
60	0.250	6	60	66-3/8	5/8	64	9/16	52	8.0

Table II. Requirements for properties of reinforced-polyester laminates.

Property at 73.4°F (23°C)	Thickness (inches)			
	1/8 to 3/16	1/4	5/16	3/8 and up
Ultimate tensile strength-minimum-	psi	psi	psi	psi
	9,000	12,000	13,500	15,000
Flexural strength -minimum-	16,000	19,000	20,000	22,000
Flexural modulus of elasticity (tangent) -minimum-	700,000	800,000	900,000	1,000,000

• LIMITED WARRANTY

VIRON® INTERNATIONAL warrants to the dealers and owners its VIRON® products and parts to be free from defects in workmanship and material under normal use and services for one (1) year after the date of shipment by VIRON to the first retail purchaser or first user: if and only if VIRON® is notified in writing of the defect within fourteen (14) days from date that the defect is discovered. Written notice of defects discovered within the final fourteen (14) days of the warranty period must be sent to VIRON® via facsimile or first class mail prior to the expiration of the warranty period otherwise this warranty shall be void. Our obligation under this warranty is expressly limited to repairing or replacing at our option, without cost at our factory any part or parts thereof which shall be returned to and received by VIRON® within such warranty period with transportation charges both to and from VIRON® prepaid, and which our examination shall disclose to our satisfaction to have been defective. In the event a defect is discovered within the final seven days of the warranty period, the returned goods must be received by VIRON® at VIRON®'s facility within seven days following expiration of the warranty period. Any request for repair or replacement should be directed to VIRON® INTERNATIONAL, Owosso, MI.

If examined equipment is found not to be defective or for some other reason not to be within the warranty coverage, seller's service time expended on and off location will be charged to the purchaser. This warranty gives you specific legal rights which vary from state to state. FAILURE TO PAY THE INVOICE IN FULL WILL RESULT IN VOIDING ANY AND ALL WARRANTIES.

• LIMITATION OF WARRANTY AND LIABILITY

This warranty does not apply to such VIRON® products and parts which in the sole judgment of VIRON® have failed as a result of faulty installation or abuse, or incorrect electrical connections or alterations, made by others, or use under abnormal operating conditions or misapplication of products and parts.

This warranty does not apply to damage resulting from shipment or storage of VIRON® products. Purchaser acknowledges that VIRON® products contain rotating parts that may be damaged by the forces of nature if not installed or put to their intended use within seven (7) days of delivery. **THIS WARRANTY DOES NOT COVER COMPONENT PARTS THAT CARRY A SEPARATE WARRANTY FROM THE MANUFACTURER OF THE COMPONENT PART.**

VIRON® will not approve for payment any repair made outside its factory without prior written consent of its Owosso, Michigan office. The foregoing shall constitute our sole and exclusive warranty and our sole and exclusive liability and is in lieu of all other warranties, whether written, oral, implied or statutory.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE PAGE HEREOF. SELLER DOES NOT WARRANT MERCHANTABILITY THAT SAID GOODS AND ARTICLES ARE OF MERCHANTABLE QUALITY, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE.

The liability of any seller on any claim of any kind, including contract, warranty, tort, or negligence, for any loss or damage arising out of or connected with or resulting from the sale and purchase of products and parts covered by any VIRON® proposal, acknowledgement, order, or from the performance or breach of any contract pertaining to such sale or purchase, or from the design, manufacture, sale, delivery, resale, installation, technical direction in installation, inspection, repair, operation or use of any products or parts covered by any VIRON® proposal, acknowledgement, order or furnished by seller, shall in no case exceed the price as paid by purchaser allocable to the products or parts thereof which give rise to the claim and shall terminate one year after shipment of said products and parts.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT, OR WARRANTY, OR TORT, OR ALLEGED NEGLIGENCE, DEFECTS, INCORRECT ADVICE OR OTHER CAUSES, SHALL SELLER BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, including but not limited to loss of profits or revenue, loss of use of the equipment or any associated equipment, cost of removal or reinstallation or any cost associated therewith, cost capital, cost of substitute equipment, facilities or services, down time cost, or claims of customers of the purchase of such damages.

VIRON® neither assumes nor authorizes any person to assume for it any other liability in connection with the sale of its products and parts. Some states do not allow the exclusion or limitation of incidental or consequential damages, so all of the above limitations or exclusions may not apply to you.



Centrifugal Fan
VCF-100



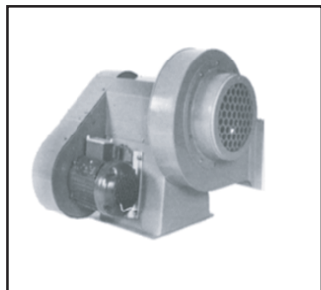
Inline Centrifugal Fan
VIF-200



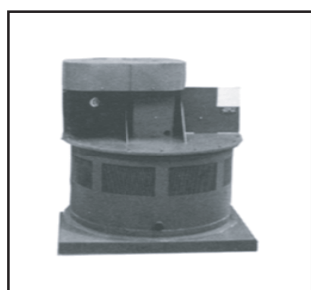
Radial Blower
VRB-600



Lab Blower
VLB-700



PushBlower
VPB-800



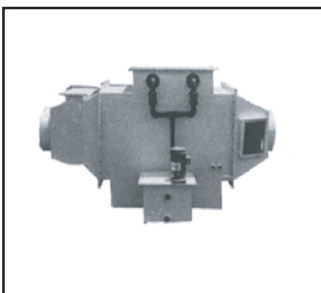
Roof Ventilator
VRV-900



Centrifugal Fan
VCB-1100



Gravity Relief Ventilator
VGR-1300



Horizontal Scrubber
VHS-Series



Vertical Scrubber
VVS-Series



Blower-Scrubber
VBS-Series



VIRO-CHROME 9000®
VCS-Series



VI-A-DUC®
FM Approved PVC Duct



VIRO-DUC®
FM Approved FRP Duct



SSTEELCOAT®
FM Approved Duct



FRP Duct
ICBO Approved



VI-A-TROL®
AMCA Approved Damper



PVC & FRP
Blastgates



FRP Parallel
Blade Damper



FRP Fixed Louver



VIRON® INTERNATIONAL CORP.

505 HINTZ ROAD
OWOSSO, MI 48867-9603
989-723-8255
FAX: 989-723-8417

EMAIL: info@vironintl.com
WEB: www.vironintl.com