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### Silencer Back Pressure Calculation

COEFFICIENT	SILENCER MODEL	NAME OF MODEL	COEFFICIENT	SILENCER MODEL	NAME OF MODEL
4.8	SFH	Super Critical Grade	4	RFH	Residential Grade
6	LPRS	Super Critical Grade	3.2	RSL	Residential Grade
4	SCSC	Super Critical Grade	2.4	IRTS	Residential Grade
4	VCS	Super Critical Grade	4	SASR	Residential Grade Spark Arrestor
3.6	VRS	Critical Grade	3.2	RSL	Residential Grade Spark Arrestor
4.2	CFHI	Critical Grade	3.6	VRSA	Critical Grade Spark Arrestor
4	CSCS	Critical Grade	4	VCSA	Super Critical Grade Spark Arrestor
4	CFH	Critical Grade	2.6	M	Industrial Grade

Choose Silencer Model  
 Introduce Exhaust CFM  
 Introduce Diameter of Outlet (in)  
 Introduce Temp. (F)  
 Introduce Max. BP of Engine


Introduce Lbs/Hr  
 or Kg/s  
 Introduce Temp. (C)  
 Introduce BP of Piping & Elbows


$$ACFM = \frac{\text{Exhaust Temp.} + 460}{2275} \times \frac{\text{Lbs}}{\text{Hr}}$$

$$\text{TempF} = 9 \times \frac{\text{C}}{5} + 32$$

$$1 \frac{\text{Lbs}}{\text{Hr}} = 7936.56 \times 1 \frac{\text{Kg}}{\text{Second}}$$

**Calculate Outlet Flow Area**

Flow Area = .005454 x (Diameter)<sup>2</sup>

Outlet Flow Area	0.000
Temp (F)	32
CFM	0

**Calculate Velocity ft/min (V)**

$$V = \frac{\text{Exhaust CFM}}{\text{Silencer Flow Area}} = \text{[ ]}$$

**Calculate Back Pressure (in H2O)**

$$P = cx \frac{V^2}{4005^2} \times \frac{530}{(T + 460)} = \text{[ ]}$$

**NOTE:** Exhaust Velocity should not exceed 9,000 ft/min on all Critical and Super Critical applications and velocity should not exceed 12,000 ft/min for the rest of the applications

- VRS & VCS Series Features:**
- Noise reduction is accomplished by a combination of absorption and annulling of noise waves
  - Exhaust gases flow through the silencer in a vortex motion which is created by a centrifugal diffuser
  - VCS Attenuation 30 to 40 dBA
  - VRS Attenuation 19 to 32 dBA
  - The rotation of the exhaust gas allows for a clean transition through the silencer with limited pressure loss
  - This type of design allows for a change in the noise frequency to a higher band, the results are a much simpler sound to attenuate
  - This is accomplished by the annulling of the noise by a series of chamber with acoustical packing
  - The multi-chambered design also allows us to attenuate the lower frequency bands present in the exhaust
  - A side branch designed chamber provides the last step to de-energize the noise. The external shell temperature is greatly reduced by the chambers with internal packing

## Example of Calculation of Back Pressure and Velocity

In our example we have used a CAT 3516 Engine that has the following characteristics:

- Exhaust Flow = 15757 CFM
- Max. Back Pressure 27 in H2O
  - Exhaust Temp 945°F
- Exhaust Mass Flow 25480 lbs/Hr
- Exhaust Outlet Diameter 8" 2 Ports

In this formula we've chosen a Super Critical Grade Low Profile SFH 20" OUTLET with 4.8 coefficient of Pressure Drop.

### 1. Calculate Area Flow

Diameter of Outlet Pipe (in) = 20"  
From Page F Log Data Choose Area Flow  
For 20" Diameter = 2.182 (ft)<sup>2</sup> Area Flow

### 2. Transform Temp C to F (if needed)

$$\text{Formula: Temp(F)} = 9 \times \frac{\text{C}}{5} + 32$$

### 3. Calculate Lbs / Hr from Kg / Second (if needed)

$$\text{Formula: } 1 \frac{\text{Lbs}}{\text{Hr}} = 7936.56 \times 1 \frac{\text{Kg}}{\text{Second}}$$

### 4. Calculate ACFM (if needed)

$$\text{Formula: ACFM} = \frac{\text{Exhaust Temp} + 460}{2275} \times \frac{\text{Lbs}}{\text{Hr}}$$

$$\text{ACFM} = \frac{946 + 460}{2275} \times 25480 = 15747.2 \text{ (CFM)}$$

### 5. Calculate Velocity FPM

$$\text{Formula: } V = \frac{\text{Exhaust ACFM}}{\text{Flow Area}}$$

$$V = \frac{15747}{2.182} = 7216.7 \text{ FPM}$$

### 6. Calculate Back Pressure

$$\text{Formula: } P = c \times \frac{v^2}{4005^2} \times \frac{530}{(T + 460)}$$

For SFH Super Critical Grade c = 4.8

$$P = 4.8 \times \frac{7217^2}{4005^2} \times \frac{530}{(946 + 460)} = 4.8 \times 3.24719 \times 0.3769 = 5.9 \text{ in H2O}$$

**NOTE:** Velocity should not exceed 12,000 ft/min regardless of allowable Back Pressure Limitations

**Exhaust Piping  
 Pressure Drop Chart**

I.D. SIZE D (in)	LENGTH L (ft)	TEMP L (F)	CFM	PER FOOT P ("H2O)
1.5	1	1000	150	0.45" H2O
2.0	1	1000	190	0.17" H2O
2.5	1	1000	275	0.12" H2O
3.0	1	1000	710	0.31" H2O
3.5	1	1000	710	0.14" H2O
3.5	1	1000	1028	0.30" H2O
4	1	1000	880	0.11" H2O
4	1	1000	1175	0.20" H2O
5	1	1000	2190	0.23" H2O
5	1	1000	2656	0.34" H2O
6	1	1000	2656	0.14" H2O
6	1	1000	2900	0.16" H2O
6	1	1000	3200	0.20" H2O
8	1	1000	3860	0.07" H2O
8	1	1000	4600	0.10" H2O
10	1	1000	8850	0.12" H2O
10	1	1000	9100	0.12" H2O
12	1	1000	13025	0.10" H2O
12	1	1000	20000	0.24" H2O
14	1	1000	14500	0.06" H2O
14	1	1000	15500	0.07" H2O
16	1	1000	15500	0.03" H2O
16	1	1000	16500	0.04" H2O
16	1	1000	25000	0.09" H2O
18	1	1000	18800	0.03" H2O
18	1	1000	20500	0.03" H2O
20	1	1000	22800	0.02" H2O
22	1	1000	22800	0.02" H2O
22	1	1000	25000	0.02" H2O
24	1	1000	23000	0.01" H2O
24	1	1000	25000	0.01" H2O
24	1	1000	30000	0.02" H2O
24	1	1000	65000	0.08" H2O
26	1	1000	31700	0.01" H2O
28	1	1000	33500	0.01" H2O
30	1	1000	60000	0.02" H2O
32	1	1000	80000	0.03" H2O

Formula for Pressure Drop

$$P = \frac{.22 \times L \times Q^2}{D^5(460 + T)}$$

Where:

- P = Pressure drop inches H2O
- L = Total length in feet of pipe
- Q = Gas flow in cu. Ft. per min.
- D = I.D. of pipe in inches
- T = Exhaust temperatures F

Table to fifth power

1.5	=	7.6
2	=	32.0
2.5	=	97.7
3	=	243.0
3.5	=	525.2
4	=	1024.0
5	=	3125.0
6	=	7776.0
<b>8</b>	=	<b>32768.0</b>
10	=	100000.0
12	=	248832.0
14	=	537824.0
16	=	1048576.0
18	=	1889568.0
20	=	3200000.0
22	=	5153632.0
24	=	7962624.0
26	=	11881376.0
28	=	17210368.0
30	=	24300000.0
32	=	33554432.0

**NOTE:**

Data based on exhaust temperature of 1000°F and the length of 1 ft.

Example: For D = 8", CFM = 4600, T = 1000°F, L = 1 ft.

$$P = \frac{.22 \times 1 \text{ft} \times 4600^2}{32768 \times (460 + T)} = \frac{.22 \times 21160000}{32768 \times (460 + 1000)} = \frac{4655200}{32768 \times 1460} = 0.1" \text{ H}_2\text{O} \quad P = 0.1" \text{ H}_2\text{O}$$

**Back Pressure Elbow, Flex & Pipe**

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**Calculation of Back Pressure on Elbows, Flex Connectors and Pipes**

Introduce CFM  
 Introduce Temp. (F)  
 Introduce Diameter (in)  
 Introduce Length of Pipe (ft)  
 Introduce Length of Flex Pipe (ft)


Introduce # Short Radius Elbow  
 Introduce # Long Radius Elbow  
 Introduce # 45 Elbow  
 Introduce # 90 Square Elbow


To obtain equivalent length of exhaust pipe (ft):

For Short Radius Elbow (R = D):  $L_1 = 2.75xD$

For Long Radius Elbow (R > 1.5xD):  $L_2 = 1.67xD$

For 45° Elbow:  $L_3 = 1.25xD$

For 90° Square Elbow:  $L_4 = 5.5xD$

For Flex Pipe:  $L_5 = 2x$  (Flex Length)

Length of Pipe

Total Length

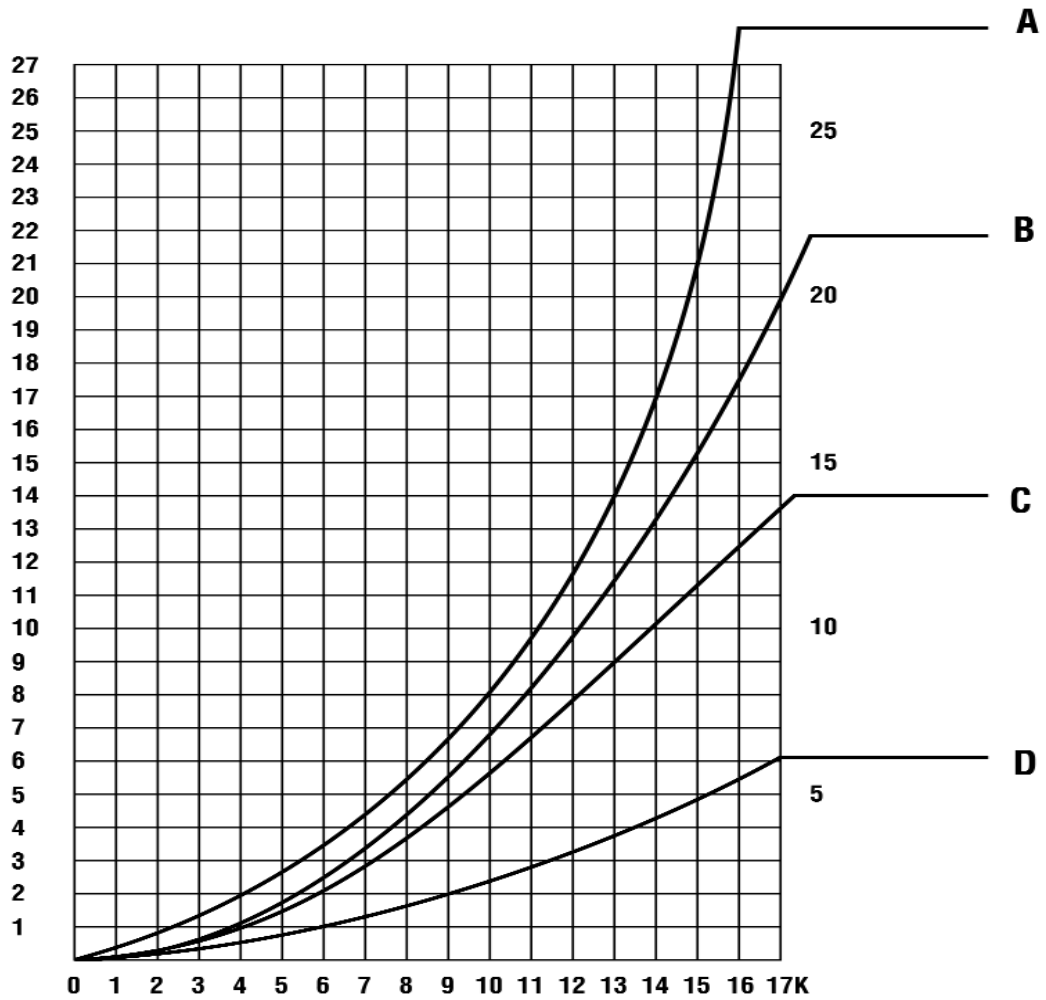
$L = \Sigma (L_1 + L_2 + L_3 + L_4 + L_5 + L_6)$

**Calculate Back Pressure**

$$P = \frac{.22xLxQ^2}{D^5(460 + T)}$$

Where:  
 P = Pressure drop inches H2O  
 L = Total length in feet of pipe  
 Q = Gas flow in cu. Ft. per min.  
 D = I.D. of pipe in inches  
 T = Exhaust temperatures F

**Exhaust Velocity  
 Pressure Loss Sizing Chart**



A = VRS, SCSC, VCS, CSCS  
 B = SFH, CFH, RFH, VRS, RSL, SASR, VMS, VCSA, LPRS  
 C = M, SAM  
 D = IRTS, VCTS  
 NOTE: Exhaust gas velocity feet per minute at 900°F

**NOTE: On A and B Velocity  
 should not exceed 9000 ft/min**

## Method for Sizing HAPCO Engine Exhaust Silencers

**Series: VCS, VRS, SFH, CFH, LPRS, SCSC, CSCS, M RFH, RLS,  
SAM, SASR VCSA, VCTS, VMS & Spark Arrestor**

INLET DIAMETER	INLET AREA (FT) <sup>2</sup>
1.25	0.0085
1.5	0.0123
2.0	0.0218
2.5	0.0341
3.0	0.0491
3.5	0.0668
4.0	0.0873
5.0	0.1364
6.0	0.1963
8.0	0.3491
10.0	0.5454
12.0	0.7854
14.0	1.069
16.0	1.396
18.0	1.767
20.0	2.182
22.0	2.640

INLET DIAMETER	INLET AREA (FT) <sup>2</sup>
24.0	3.142
26.0	3.687
28.0	4.276
30.0	4.909
32.0	5.585
34.0	6.305
36.0	7.069
38.0	7.876
40.0	8.727
42.0	9.621
44.0	10.559
46.0	11.541
48.0	12.566
54.0	15.904
56.0	17.104
58.0	18.348
60.0	19.635

**REQUIRED DATA:**

- Engine Exhaust CFM
- Exhaust Temperature
- Allowable Pressure Drop
- Grade of Silencer

**PROCEDURE:**

It is necessary to convert CFM to Velocity (FPM) Divided CFM by Inlet Area (See Chart)

*Example:* 6" Inlet with 2600CFM (2600 Divided by .1964 = 13238) FPM

**NOTE:**

Velocity is extremely important when sizing exhaust systems. The following silencers design flow must not exceed 9000 FPM:  
VCS, VCSA, VRS, SFH, CFH, RFH AND Rectangle Type Silencers (LPRS)



**HAPCO**  
**Steel Exhaust Pipe Dimensions**  
**and Thermal Pipe Expansion Formula**

SIZE	Schedule 40			
	O.D.	WALL THICKNESS	I.D.	WEIGHT LB./FT
1.5	1.9	0.145	1.61	2.72
2.0	2.375	0.154	2.067	3.653
2.5	2.875	0.203	2.459	5.793
3.0	3.5	0.216	3.068	7.58
3.5	4.0	0.226	3.548	9.109
4.0	4.5	0.237	4.026	10.79
5.0	5.563	0.258	5.047	14.62
6.0	6.625	0.28	6.065	18.97
8.0	8.625	0.322	7.981	28.55
10.0	10.75	0.365	10.02	40.48
12.0	12.75	0.406	11.938	53.56
14.0	14.0	0.438	13.124	63.37
16.0	16.0	0.5	15.0	82.77
18.0	18.0	0.562	16.876	104.76
20.0	20.0	0.594	18.812	123.06
24.0	24.0	0.688	22.624	171.17

SIZE	Schedule 10			
	O.D.	WALL THICKNESS	I.D.	WEIGHT LB./FT
1.5	1.9	0.109	1.682	2.09
2.0	2.375	0.109	2.157	2.64
2.5	2.875	0.12	2.635	3.53
3.0	3.5	0.12	3.26	4.33
3.5	4.0	0.12	3.76	4.97
4.0	4.5	0.12	4.26	5.61
5.0	5.563	0.134	5.295	7.77
6.0	6.625	0.134	6.357	9.29
8.0	8.625	N/A	N/A	N/A
10.0	10.75	N/A	N/A	N/A
12.0	12.75	N/A	N/A	N/A
14.0	14.0	0.25	13.5	36.71
16.0	16.0	0.25	15.5	42.05
18.0	18.0	0.25	17.5	47.39
20.0	20.0	0.25	19.5	52.73
24.0	24.0	0.25	23.5	63.42

Steel pipe expansion data from ambient temperature steel exhaust pipe is rated at .00076 per ft for each 100°F rise in temperature.

T = Temperature of exhaust  
 L = Length of pipe  
 AT = Ambient temperature  
 G = Growth

**Equation growth of Steel Pipe**

$$G = 0.0076 \times L \times \frac{(T - AT)}{100} \text{ (in)}$$

To offset expansion on piping be sure there is ample length of stainless flex between two fixed points.

*Example of calculation:*

Exhaust Temperature is t = 900°F  
 Ambient Temperature is AT = 60°F  
 Length of Pipe is L = 10ft  
 Growth of Pipe is

$$G = 0.0076 \times 10 \times \frac{(900 - 60)}{100} = 0.076 \times 8.4 = 0.6384 \text{ (in)}$$

The result is that a 10ft length of pipe at an ambient of 60°F, and an exhaust temperature of 900°F will increase in length to 0.6384".

The exhaust pipe must be isolated from the engine with flexible connection. They should be installed as close to the engine's exhaust outlet as possible. A flexible connection has three primary functions:

1. To isolate the weight of the exhaust pipe from the engine.
2. To relieve exhaust components of excessive vibration fatigue stresses.
3. To allow for relative shifting between reference points on engine exhaust components.

**NOTE:** Outlet of exhaust silencer must also include a flexible section if exhaust pipe is fixed or welded solid.

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**Exhaust Flow at Maximum Ratings  
Cubic Feet per Minute for 4 Cycle Carbureted Engine  
Volumetric Efficiency 80% - Exhaust Temperature 1200°F**

ENGINE DISPLACEMENT C.C.	REVOLUTIONS PER MINUTE																					
	C. IN.	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	5000	6000	7000	8000	9000	10000	12000	14000
20	1.22	1.3	1.5	1.7	1.8	2.0	2.2	2.3	2.5	2.6	2.8	3.0	3.2	3.4	4.2	5.0	5.9	6.8	7.5	8.4	10.0	11.8
40	2.44	2.7	3.0	3.4	3.7	4.0	4.3	4.7	5.0	5.4	5.7	6.0	6.4	6.8	8.4	10.0	11.8	13.6	15.0	16.8	20.0	23.6
60	3.66	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0	30.0	35.0
80	4.88	5.3	6.0	6.7	7.3	8.0	8.7	9.3	10.0	10.6	11.3	12.0	12.7	13.4	16.7	20.0	23.4	26.8	30.0	33.4	40.0	46.8
100	6.10	6.7	7.5	8.4	9.2	10.0	10.9	11.7	12.5	13.4	14.2	15.0	15.9	16.8	20.9	25.0	29.3	33.6	37.5	41.8	50.0	58.6
120	7.32	8.0	9.0	10.1	11.0	12.0	13.0	14.0	15.0	13.0	17.0	18.0	19.1	20.2	25.1	30.0	35.2	40.4	45.0	50.2	60.0	70.4
140	8.54	9.4	10.6	11.7	12.9	14.1	15.2	16.4	17.6	18.8	20.0	21.2	22.3	23.4	29.3	35.2	41.0	46.8	52.8	58.6	70.4	82.0
160	9.76	10.7	12.1	13.4	14.7	16.1	17.4	18.7	20.1	21.4	22.8	24.2	25.5	26.8	33.5	40.2	46.6	53.6	60.3	67.0	80.4	93.8
180	10.98	12.0	13.6	15.1	16.5	18.1	19.6	21.0	22.6	24.0	25.6	27.2	28.7	30.2	37.7	45.2	52.8	60.4	67.8	75.4	90.4	106
200	12.20	13.4	15.1	16.8	18.4	20.1	21.7	23.4	25.1	26.8	28.5	30.2	31.9	33.6	41.9	50.2	58.7	67.2	75.3	83.8	100	117
220	13.42	14.7	16.6	18.5	20.2	22.1	23.9	25.7	27.6	29.4	31.3	33.2	35.1	37.0	46.1	55.2	64.6	74.0	82.8	92.2	110	129
240	14.65	16.0	18.1	20.1	22.0	24.1	26.1	28.0	30.1	32.0	34.1	36.2	38.2	40.2	50.2	60.2	70.3	80.4	90.3	100	120	141
260	15.87	17.4	19.6	21.8	23.9	26.1	28.2	30.4	32.6	34.8	37.0	39.2	41.4	43.6	54.4	65.2	76.2	87.2	97.8	109	130	152
280	17.09	18.7	21.1	23.5	25.7	28.1	30.4	32.7	35.1	37.4	39.8	42.2	44.6	47.0	58.6	70.2	82.1	94.0	105	117	140	164
300	18.31	20.2	22.6	25.2	27.6	30.1	32.6	35.1	37.6	40.0	42.6	45.2	47.8	50.4	62.8	75.2	88.1	101	113	126	150	176
320	19.53	21.4	24.1	26.8	29.4	32.1	34.8	37.4	40.1	42.8	45.5	48.2	50.9	53.6	66.9	80.2	93.6	107	120	134	160	187
340	20.75	22.7	25.6	28.5	31.2	34.1	36.9	39.7	42.6	45.4	48.3	51.2	54.1	57.0	71.1	85.2	99.6	114	128	142	170	199
360	21.97	24.1	27.1	30.2	33.1	36.1	39.1	42.1	45.1	48.2	51.2	54.2	57.3	60.4	75.3	90.2	106	121	135	151	180	212
380	23.19	25.4	28.6	31.9	34.9	38.1	41.3	44.4	47.7	50.8	54.0	57.2	60.5	63.8	79.6	95.4	112	128	143	159	191	224
400	24.41	26.7	30.1	33.6	36.7	40.2	43.4	46.7	50.2	53.4	56.8	60.2	63.7	67.2	83.6	100	117	134	151	167	200	234
500	30.51	33.4	37.7	42.0	48.9	50.2	54.3	58.4	62.7	66.8	71.1	75.4	79.7	84.0	105	125	147	168	188	210	250	294
600	36.61	40.1	45.2	50.3	55.1	60.2	65.2	70.1	75.2	80.2	85.3	90.4	95.7	101	126	150	176	202	226	252	300	352
700	42.71	46.8	52.8	58.7	64.3	70.3	76.0	81.8	87.8	93.6	99.8	106	112	117	147	176	205	234	263	284	352	410

2 Cycle Engines, Multiply above values by 2.

All figures proportional, that is, 800 CC engine will have double the flow of 400 CC engine with all other factors equal. Double RPM will double the flow, etc.

**Exhaust Flow (CFM)**  
**4 Cycle Carbureted Engines**  
**(Volumetric Efficiency - 80% Exhaust Temp - 1200°F)**

ENGINE DISPLACEMENT (Cu. In.)	REVOLUTIONS PER MINUTE										
	800	1000	1200	1400	1600	1800	2000	2400	2800	3200	3600
200	110	137	164	182	219	247	274	329	384	438	493
240	132	164	197	230	263	296	329	395	460	526	592
280	153	192	230	269	307	345	384	460	537	614	690
320	175	219	263	307	351	395	438	526	614	701	789
360	197	247	296	345	395	444	493	592	690	789	888
400	219	274	329	384	438	493	548	658	767	877	987
440	241	301	362	422	482	543	603	723	844	964	1085
480	263	329	395	460	526	592	658	789	921	1052	1184
520	285	356	427	499	570	641	712	855	997	1140	1282
600	329	411	493	575	658	740	822	986	1150	1315	1480
680	373	466	559	652	745	838	932	1118	1304	1491	1677
760	416	521	625	729	833	937	1041	1249	1458	1666	1874
840	460	575	690	806	921	1035	1151	1381	1611	1841	2071
920	504	630	756	882	1008	1134	1260	1512	1765	2017	2269
1080	592	740	888	1036	1184	1332	1480	1776	2071	2367	2663
1160	636	795	954	1112	1271	1430	1589	1907	2225	2543	2861
1320	723	904	1085	1266	1447	1628	1808	2170	2532	2893	3255
1480	811	1014	1217	1419	1622	1825	2028	2433	2839	3244	3650
1660	910	1137	1365	1592	1820	2047	2274	2729	3184	3639	4094
1820	997	1247	1496	1745	1995	2244	2493	2992	3491	3989	4488
1980	1085	1356	1628	1899	2170	2441	2713	3255	3798	4340	4883
2140	1173	1466	1759	2052	2345	2639	2932	3518	4150	4691	5277

(For other RPM or displacement, values may be increased or decreased in direct proportion.)

**NOTE:**

1. Figures given represent C.F.M. at maximum ratings.
2. For 4 cycle turbo-charged engines, multiply above values by 1.40.



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[www.harcomanufacturing.com](http://www.harcomanufacturing.com)

## GENERAL TERMS AND CONDITIONS OF SALE

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1. **Taxes:** Prices on the specified goods are exclusive of all city, state and federal excise taxes, including, without limitation, taxes on manufacture, sales, receipts, gross income, occupation, use and similar taxes. Whenever applicable, any tax or taxes will be added to the invoice as a separate charge to be paid by the Buyer
2. **Payment Terms:** Invoices are payable within thirty (30) days of date. Invoices will be dated on the earlier of the date of shipment or in cases where Buyer has requested a delay in shipment, the date that Seller is prepared to ship the goods. Invoices paid and received within (10) days will be allowed a 1% discount or costs of goods, only. There will be a finance charge of 1.5% of the total amount due for each thirty (30) day period that payment is in arrears. Seller's acceptance of this finance charge shall not be deemed a waiver of any rights Seller may have by reason of Buyer's nonpayment.
3. **Method of Transportation:** Buyer shall designate the method by which the goods are to be transported. All costs of transportation shall be the responsibility of Buyer. If Buyer fails to designate a mode of transportation, the mode of transportation shall be selected by Seller at Buyer's expense. Freight will ship Collect unless other arrangements are made. If Buyer requests Prepaid Freight a 20% or \$50.00 (whichever is lower) handling fee will be added to the freight charges.
4. **Delivery:** All deliveries shall be made F.O.B. Sellers facility, with bills of lading addressed as directed by Buyer.
5. **Change Orders:** Seller shall be entitled to impose additional charges if Buyer requests changes in the specifications for the goods: (1) which materially alter the cost of production or (2) are received by Seller within three (3) weeks prior to the date Seller has scheduled to commence fabrication.
6. **Cancellations:** If Buyer notifies Seller that Buyer is canceling this Sales Agreement, Buyer shall pay Seller as of the date Seller is notified of cancellation, for all material specially assembled by Seller to fabricate the goods and all labor costs incurred by Seller in connection with fabrication of the goods.
7. **Storage Charges:** Seller shall be entitled to charge a reasonable fee for any completed goods which are, at Buyer's request, not shipped upon completion of fabrication.
8. **Delays:** Seller will not be liable for any delay in the performance of orders or contracts, or in the delivery or shipment of goods, or for any damages suffered by Buyer by reason of such delay, if such delay is, directly or indirectly, caused by, or in any manner arises from fires, floods, accidents, civil unrest, acts of God, war, governmental interference or embargoes, strikes, Labor difficulties, shortages of labor, fuel, power, materials or supplies, transportation delays, or any other cause or causes (whether or not similar in nature to any of these hereinabove specified) beyond Seller's control.
9. **Warranty:** Seller warrants that the goods will conform to the description and specifications and be free from defects in materials or workmanship for a period of one year from delivery or three years from delivery for Engine Exhaust Silencers and Spark Arresting Engine Exhaust Silencers constructed of heavy-duty materials 14 gauge or heavier excluding severe duty salt water and chemical applications. Seller does not warrant any painted surfaces as the very nature of the use of seller's products prevents warranty against cosmetic appearance defects such as paint burning or surface rust. Seller does not warrant that spark arrestors will totally eliminate all sparks generated by engines to which spark arrestors are attached. THE WARRANTY DESCRIBED IN THIS PARAGRAPH IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE
10. **Limitation of Buyer's Remedies:** Buyer's exclusive remedy against Seller for breach of warranty or Seller's failure to perform any obligation hereunder shall be for a refund of the purchase price of the goods, or, at Seller's election, the repair or replacement of the goods. No other remedy (including but not limited to incidental or consequential damages for lost profits, lost sales, injury to person or property or any other incidental or consequential loss) shall be available to Buyer.  
Buyer shall not be authorized to return any product claimed to be defective without Seller's prior authorization.
11. **Merge, Clause, All Prior Statements Not Binding:** Seller's sales representatives may have made oral statements about the goods, which are the subject of this contract. Those statements are not warranties, should not be relied upon by the Buyer, and are not part of the contract for sale. The entire contract is embodied in this writing. This writing constitutes the final expression of the parties' agreement, and a complete and exclusive statement of the terms of that agreement.
12. **Amendment:** This agreement can only be modified in a writing signed by the parties or their duly authorized agents.
13. **Applicable Law:** This agreement shall be governed by the Uniform Commercial Code as adopted in the State of Oregon and effective on the date of this agreement.
14. **Acceptance Conditioned On Assent:** Acceptance of this offer is expressly limited to the exact terms contained herein and any attempt to alter or omit any of such terms shall be deemed a rejection and a counter-offer.
15. **Copies of Signatures To Be Treated As Originals:** Copies of signatures on documents transmitted by one party to the other by facsimile or in photocopy form shall be treated as the delivery of original documents. At the request of either party, the parties shall confirm copies of transmitted signatures by signing and exchanging original documents.
16. **Attorney's Fees:** If any suit or action is instituted to interpret or enforce the provisions of this Sales Agreement, to rescind this sales Agreement, otherwise, with respect to the subject matter of this Sales Agreement, the prevailing party on an issue shall be entitled to recover with respect to such issue, in addition to costs, reasonable attorney fees incurred in preparation or prosecution or defense of such suit or action as determined by the trial court, and if any appeal is taken from such decision, reasonable attorney fees as determined on appeal.

**HAPCO**  
**Extreme Series**

SIZE MODEL	A	B	C OAL-1	D OAL-2	E MIN	F MAX	G	WT (Lbs.)
16EXT-4	4	16	84	81	8	23	12	220
20EXT-5	5	20	105	101	10	29	14	310
24EXT-6	6	24	105	102	10	29	16	400
26EXT-8	8	26	106	102	10	28	17	500
30EXT-10	10	30	161	158	12	46	19	1025
36EXT-12	12	36	163	160	14	46	22	1500
42EXT-14	14	42	190	186	16	46	25	2255
45EXT-16	16	45	202	198	18	57	27	2525
48EXT-18	18	48	228	224	20	57	29	3300
54EXT-20	20	54	230	227	21	57	32	3750
60EXT-22	22	60	244	240	24	57	35	5125
62EXT-24	24	62	244	240	26	55	36	5350

\*For price information see Section 2 Page 8

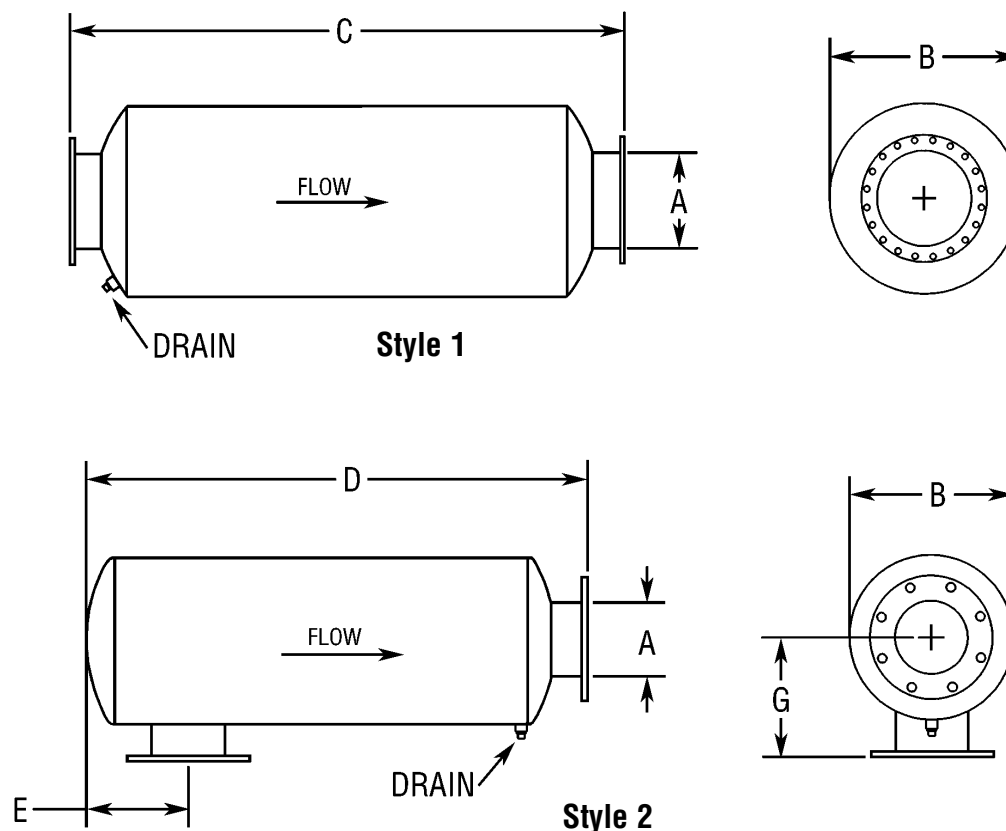
\*Note Estimated weight only

**Recommended Applications:**

- Hospitals
- Tug and Fishing Boats
- Where the surrounding noise level is low

**Features:**

- Attenuation 45-52 dBA
- Listed sound data is based on average sound curves and is not to be used as absolute
- Noise reduction is accomplished by a combination of absorption and annulling of noise waves

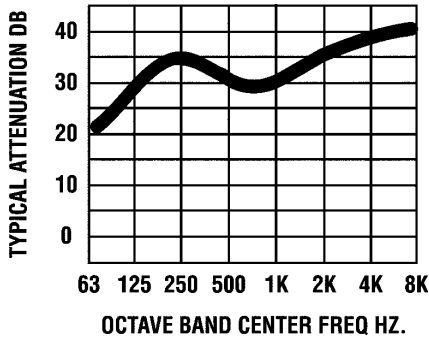


**HAPCO**  
**Super Critical Grade VCS Series**  
**End Inlet - End Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	WT (Lbs.)
610VCS1	100A-1	1	1	6	10	14	0.5	1.5	11.5
612VCS1-4	101A-1	1.25	1.25	6	12	16	0.5	1.5	12
717VCS1-8	102A-1	1.5	1.5	7	17	22	0.5	2	15
7518VCS2	103A-1	2	2	7.5	18	24	0.5	2.5	19
924VCS2-8	104A-1	2.5	2.5	9	24	31.5	0.75	3	31
924VCS3	105A-1	3	3	9	24	31.5	0.75	3	37
1130VCS3-8	106A-1	3.5	3.5	11	30	37.5	0.75	3	53
1242VCS4	107A-1	4	4	12	42	51.5	0.75	4	100
1448VCS5	108A-1	5	5	14	48	57.5	0.75	4	123
1864VCS6	109A-1	6	6	18	64	77.5	2.75	4	249
2272VCS8	110A-1	8	8	22	72	86	3	4	340
2284VCS10	111A-1	10	10	28	84	99.5	3.75	4	670
3096VCS12	112A-1	12	12	30	96	114.5	4.25	5	812
36114VCS14	113A-1	14	14	36	114	133	4.5	5	1313
38124VCS16	114A-1	16	16	38	124	144	5	5	1400
42126VCS18	115A-1	18	18	42	126	148	6	5	2000
48130VCS20	116A-1	20	20	48	130	154	7	5	2508
48138VCS22	117A-1	22	22	48	138	162	7	5	2850
54148VCS24	118A-1	24	24	54	148	174	8	5	2910
54152VCS26	119A-1	26	26	54	152	182	9	6	3300
60160VCS28	120A-1	28	28	60	160	192	10	6	5400
66196VCS30	121A-1	30	30	66	196	229	10.5	6	7000
72242VCS32	122A-1	32	32	72	242	275	10.5	6	9500
74242VCS36	123A-1	36	36	74	242	275	10.5	6	11000

\*For price information see Section 2 Page 6

\*Note Estimated weight only



**Recommended Applications:**

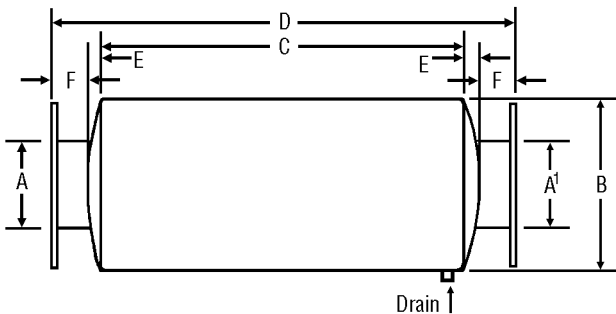
- Hospitals
- Ships, Tug and Fishing Boats
- Waste Water Plants
- Schools
- And other environmental impact areas

**Features:**

- Typical Attenuation 30-42 dBA
- Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
- Optional stainless steel construction or zinc based high heat and high corrosion resistant paint

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts



## HAPCO Super Critical Grade VCS Series Side Inlet - End Outlet

INLET SIZE MODEL	DWG #	A	B	C	D	E	F	G	H	I	WT (Lbs.)
614VCS1SI	200A-1	1	6	14	16.5	0.5	2	1.75	1.5	14.75	13
616VCS1-4SI	201A-1	1.25	6	16	18.5	0.5	2	2	1.5	16.5	14.5
722VCS1-8SI	202A-1	1.5	7	22	25	0.5	2.5	2.25	2	22.75	23
7522VCS2SI	203A-1	2	7.5	22	25	0.5	2.5	2.25	2.5	22.75	26
926VCS2-8SI	204A-1	2.5	9	26	30.25	0.875	3.375	3	2.5	27.25	35
1036VCS3SI	205A-1	3	10	36	40.25	0.875	3.625	3	2.5	37.25	52
1238VCS3-8SI	206A-1	3.5	12	38	42.5	0.875	4.375	4.5	2.5	38	80
1248VCS4SI	207A-1	4	12	48	53.25	0.875	4.375	4.75	3	48.5	103
1658VCS5SI	208A-1	5	16	58	63.75	0.875	4.875	5.25	4	58.5	188
1872VCS6SI	209A-1	6	18	72	82	3	7	8	4	74	260
2284VCS8SI	211A-1	8	22	84	95	3.5	8	10	4	85	600
2896VCS10SI	212A-1	10	28	96	108.75	4.375	8.375	12.5	4	96.25	696
30110VCS12SI	213A-1	12	30	110	123	4.5	8.5	14	4	109	1075
36132VCS14SI	214A-1	14	36	132	146	5.25	8.75	16.5	5	129.5	1872
38144VCS16SI	215A-1	16	38	144	160	6	10	17	5	143	1920
42144VCS18SI	216A-1	18	42	144	162.25	6.625	11.63	19	5	143.25	2386
48160VCS20SI	217A-1	20	48	160	181	8	13	22	5	159	2550
48172VCS22SI	218A-1	22	48	172	193	8	13	23	5	170	2765
54185VCS24SI	219A-1	24	54	185	209	9	15	25	4.5	184	3539
54192VCS26SI	220A-1	26	54	192	216	9	15	26	5	190	3826
60204VCS28SI	221A-1	28	60	204	230	10	16	28	5	202	6000
66214VCS30SI	222A-1	30	66	214	241	10.5	16.5	29.5	5	211.5	7300
72230VCS32SI	223A-1	32	72	230	257	10.5	16.5	30.5	6	226.5	9200
74230VCS36SI	224A-1	36	74	230	257	10.5	16.5	30.5	6	226.5	11400

\*For price information see Section 2 Page 7

\*Note Estimated weight only

### Features:

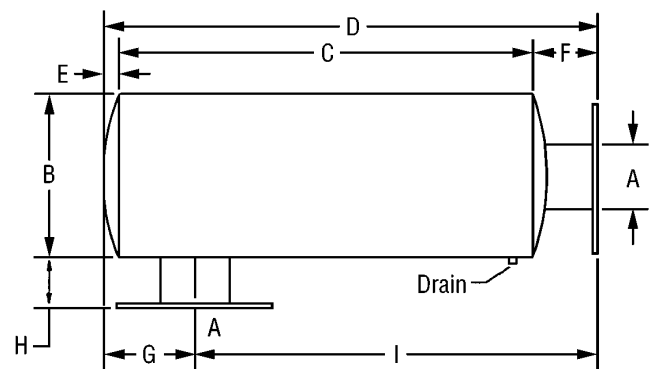
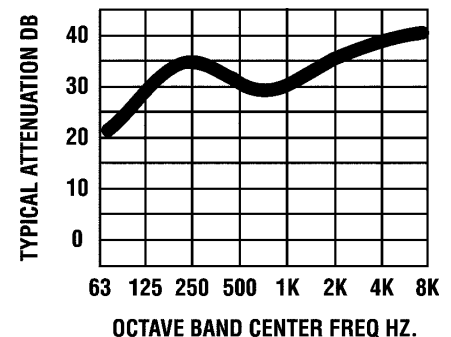
- Typical Attenuation 30-42 dBA
  - Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
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### Accessories:

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- Support Legs for Vertical Mounting
- Rain Caps
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- Backfire Relief Vents
- Flanges of all types
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- Gaskets - Hi Temp
- Nuts & Bolts

### Recommended Applications:

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- Ships, Tug and Fishing Boats
- Waste Water Plants
- Schools
- And other environmental impact areas

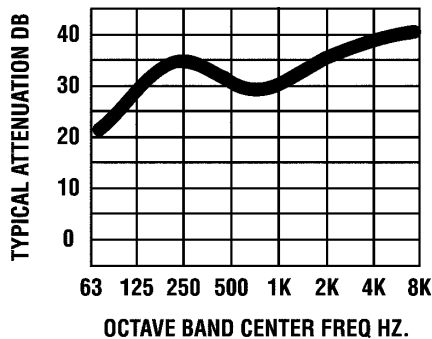


**HAPCO**  
**Super Critical Grade VCS Series**  
**Side Inlet - Side Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
1038VCS3SI-SO	300A-1	3	3	10	38	39.25	0.625	3	3	3	33.25	55
1240VCS3-8SI-SO	301A-1	3.5	3.5	12	40	41.5	0.75	3	3.5	3.5	34.5	95
1448VCS4SI-SO	302A-1	4	4	14	48	49.5	0.75	3	4	4	41.5	130
1660VCS5SI-SO	303A-1	5	5	16	60	61.75	0.875	3.5	5.25	5.25	51.25	197
2268VCS6SI-SO	304A-1	6	6	22	68	75	3.5	4	10.5	10.5	54	340
2480VCS8SI-SO	305A-1	8	8	24	80	87.5	3.75	4	11.25	11.25	65	460
2896VCS10SI-SO	306A-1	10	10	28	96	104.75	4.375	4	13	13	78.75	715
38140VCS12SI-SO	307A-1	12	12	30	116	125	4.5	4	14.375	14.375	96.25	1275
38140VCS14SI-SO	308A-1	14	14	38	140	152	6	5	17	17	118	1975
42154VCS16SI-SO	309A-1	16	16	42	154	167.25	6.625	5	18.625	18.625	130	2595
42168VCS18SI-SO	310A-1	18	18	42	168	181.25	6.625	5	19.625	19.625	142	2890
48180VCS20SI-SO	311A-1	20	20	48	180	196.5	8.25	5	22.25	22.25	152	2899
54196VCS22SI-SO	312A-1	22	22	54	196	212.5	8.25	5	23.25	23.25	166	3900
54209VCS24SI-SO	313A-1	24	24	54	209	225.5	8.25	5	24.25	24.25	177	4200
60212VCS26SI-SO	314A-1	26	26	60	212	232	10	6	27	27	178	6300
60232VCS28SI-SO	315A-1	28	28	60	232	252	10	6	27	27	198	6600
72232VCS30SI-SO	316A-1	30	30	72	232	252	10	6	27	27	198	9300

\*For price information see Section 2 Page 7

\*Note Estimated weight only



**Recommended Applications:**

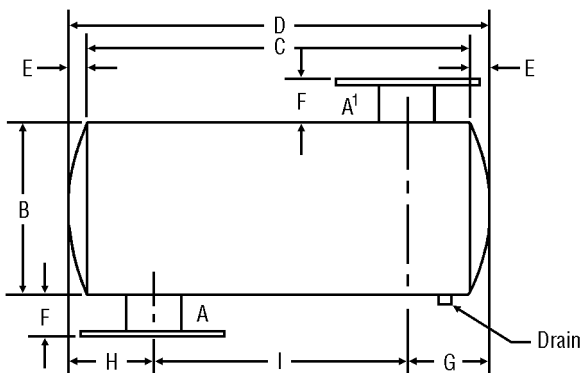
- Hospitals
- Waste Water Plants
- Tug and Fishing Boats
- And other environmental impact areas

**Features:**

- Attenuation 30-42 dBA
- Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
- Optional stainless steel construction or zinc based high heat and high corrosion resistant paint
- Inlet size 3" MPT - larger size flanged

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts





**HAPCO**  
**Super Critical Grade SCSC Series**  
**Center Side Inlet - End Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
1140SCSC2-8	400A-1	2.5	2.5	11	40	44.75	0.875	3.875	24	3	20.5	90
1248SCSC3	401A-1	3	3	12	48	53	0.875	4.375	28.25	5	24.75	120
1460SCSC3-8	402A-1	3.5	3.5	14	60	65.25	0.875	4.375	34.375	5	30.875	160
1664SCSC4	403A-1	4	4	16	64	69.25	0.875	4.375	36.375	5	32.875	210
1870SCSC5	404A-1	5	5	18	70	79.5	3	6.5	41.5	5	38	270
2078SCSC6	405A-1	6	6	20	78	88	3.25	6.75	45.75	5	42.25	328
2688SCSC8	406A-1	8	8	26	88	99.5	4	7.5	51.5	5	48	400
3098SCSC10	407A-1	10	10	30	98	111	4.5	8.5	57.5	5	53.5	875
38124SCSC12	408A-1	12	12	38	124	140	6	10	72	6	68	1550
42146SCSC14	409A-1	14	14	42	146	163.25	6.625	10.625	83.625	6	79.625	2450
48160SCSC16	410A-1	16	16	48	160	180.5	8.25	12.25	92.25	6	88.25	2600
54182SCSC18	411A-1	18	18	54	182	205	9	14	105	6	100	3400
60182SCSC20	412A-1	20	20	60	182	205	9	14	105	6	100	7500

\*For price information see Section 2 Page 8

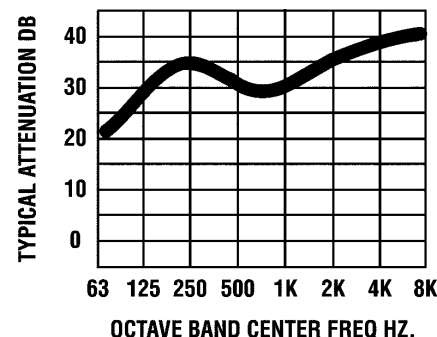
\*Note Estimated weight only

**Features:**

- Attenuation 30-42 dBA
- Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
- Optional stainless steel construction or zinc based high heat and high corrosion resistant paint
- Optional dual side inlets available
- 4" and above are flanged
- Condensation drain included

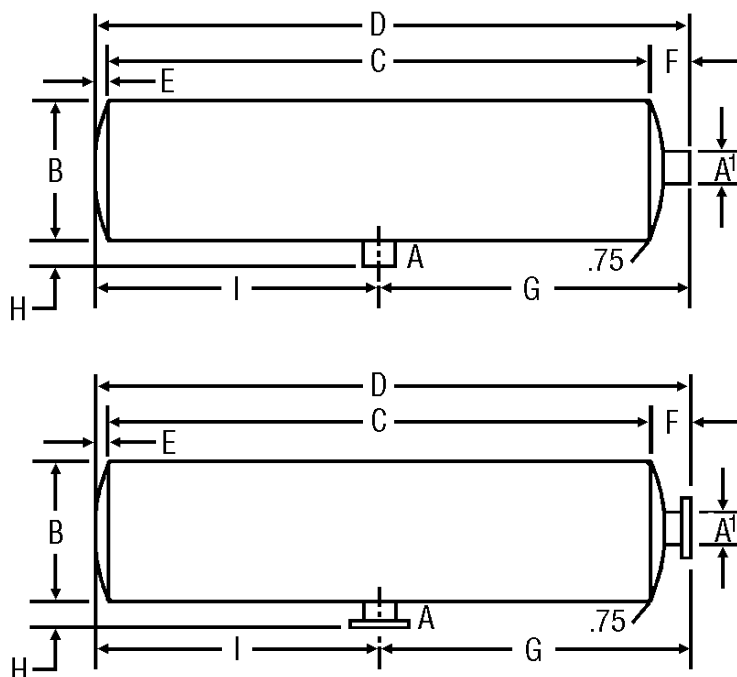
**Recommended Applications:**

- Hospitals
- Tug and Fishing Boats
- And where the surrounding noise level is low



**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts

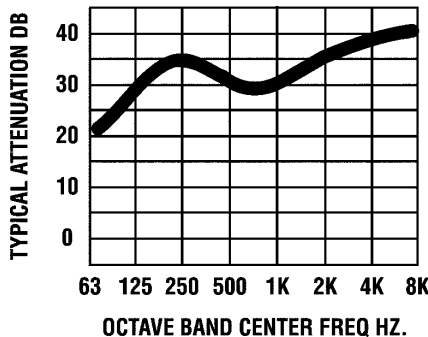


**HAPCO**  
**Super Critical Grade VCS Series**  
**Dual Side Inlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	J	K	L	M	N	WT (Lbs.)
1252VCS2-8X2-8X4	500A-1	2.5	4	12	52	57	0.75	4.25	6	4	51	0.75	40	6	*	14.75	130
1669VCS3X3X5	501A-1	3	5	16	69	74.5	0.75	4.75	8	4	66.5	0.75	57	6	*	19	265
2472VCS4X4X6	502A-1	4	6	24	72	83.5	3.75	7.75	8	4	75.5	0.75	56	8	*	27.5	478
2888VCS5X5X8	503A-1	5	8	28	88	100.75	4.37	8.375	8	4	92.75	0.75	72	8	*	31.5	684
30102VCS6X6X10	504A-1	6	10	30	102	115	4.5	8.5	10	6	105	0.75	86	8	*	33.5	1045
36136VCS8X8X12	505A-1	8	12	36	136	150.5	5.25	9.25	11.75	6	138.75	0.75	112	12	*	39.5	1682
38142VCS8X8X14	506A-1	8	14	38	142	158	6	10	13.25	6	144.75	1	118	12	*	39.5	1767
42150VCS10X10X16	507A-1	10	16	42	150	167.25	6.625	10.62	15.625	8	151.625	1	126	12	*	45	2150
48162VCS12X12X18	508A-1	12	18	48	162	183.5	8.25	13.25	15	8	168.5	1	130	16	*	52	2596
54184VCS12X12X20	509A-1	12	20	54	184	205.5	8.25	13.25	18	8	187.5	1	152	16	*	58.5	3233
72196VCS18X18X30	510A-1	18	30	72	196	222.5	10.5	16	24	8	198.5	1	164	16	*	76.5	5497
84252VCS20X20X36	511A-1	20	36	84	252	282.5	12.5	18	26	8	256.5	1	216	16	*	90	7879

\*For price information see Section 2 Page 6

\*Note Estimated weight only

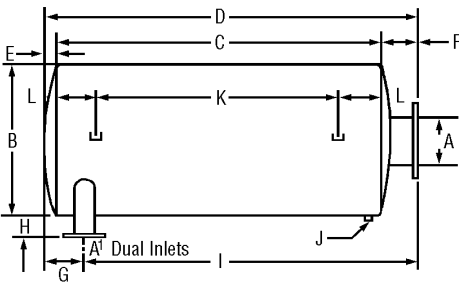


**Recommended Applications:**

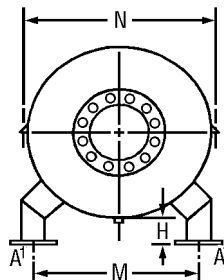
- Hospitals
- Waste Water Plants
- High Tech Industries
- Where the surrounding noise level is low

**Features:**

- Attenuation 30 to 40 dBA
- The rotation of the exhaust gas allows for a clean transition through the silencer with limited pressure loss
- This type of design allows for a change in the noise frequency to a higher band, the results are a much simpler sound to attenuate
- This is accomplished by the annulling of the noise by a series of chambers with acoustical packing
- The multi-chambered design also allows us to attenuate the lower frequency bands present in the exhaust
- A side branch designed chamber provides the last step to de-energize the noise. The external shell temperature is greatly reduced by the chambers with internal packing
- Hanger brackets and condensation drain included
- Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
- Optional stainless steel construction or zinc based high heat and high corrosion resistant paint



**NOTE: DUAL END INLETS ALSO AVAILABLE**



**NOTE:**  
M (\*) DETERMINED BY ENGINE EXHAUST PIPING

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts

# HAPCO

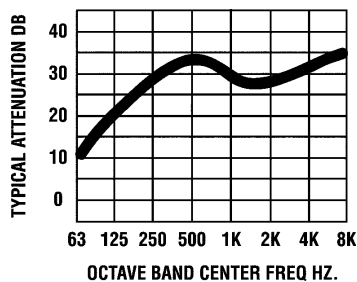
## Critical Grade VRS Series

### End Inlet - End Outlet

SIZE MODEL	DWG #	A	B	C	D	E	F	WT (Lbs.)
58VRS1	800A-1	1	5	8	13	0.5	2	10
58VRS1-4	801A-1	1.25	5	8	13	0.5	2	10
68VRS1-8	802A-1	1.5	6	8	13	0.5	2	12
712VRS2	803A-1	2	7	12	18	0.5	2.5	15
822VRS2-8	804A-1	2.5	8	22	28.75	0.875	2.5	25
824VRS3	805A-1	3	8	24	30.75	0.875	2.5	27
924VRS3-8	806A-1	3.5	9	24	31.75	0.875	3	35
1030VRS4	806B-1	4	10	30	37.5	0.625	3.125	45
1220VRS4	807A-1	4	12	20	28.5	0.75	3.5	43
1224VRS5	808A-1	5	12	24	32.5	0.75	3.5	45
1236VRS5	809A-1	5	12	36	45.5	0.75	4	58
1438VRS6	810A-1	6	14	38	47.5	0.75	4	81
1442VRS6	811A-1	6	14	42	51.5	0.75	4	85
1648VRS6	812A-1	6	16	48	57.5	0.75	4	160
1844VRS8	813A-1	8	18	44	56	3	3	222
2248VRS8	814A-1	8	22	48	63.5	3.5	4	365
2458VRS10	815A-1	10	24	58	73.5	3.75	4	401
2468VRS12	816A-1	12	24	68	85.5	3.75	5	460
2874VRS12	817A-1	12	28	74	92.75	4.375	5	516
3080VRS14	818A-1	14	30	80	99	4.5	5	791
3690VRS16	819A-1	16	36	90	110.5	5.25	5	932
36102VRS18	820A-1	18	36	102	122.5	5.25	5	1275
4296VRS20	821A-1	20	42	96	121.25	6.625	6	1390
42104VRS22	822A-1	22	42	104	129.25	6.625	6	1840
48112VRS24	823A-1	24	48	112	140.5	8.25	6	2192
54126VRS26	824A-1	26	54	126	154.5	8.25	6	2489
54140VRS28	825A-1	28	54	140	168.5	8.25	6	2822
60160VRS30	826A-1	30	60	160	188.5	8.25	6	3561
66180VRS32	827A-1	32	66	180	214	11	6	4484
72242VRS34	828A-1	34	72	242	278	12	6	6500
74242VRS36	829A-1	36	74	242	278	12	6	7500

\*For price information see Section 2 Page 4

\*Note Estimated weight only



#### Recommended Applications:

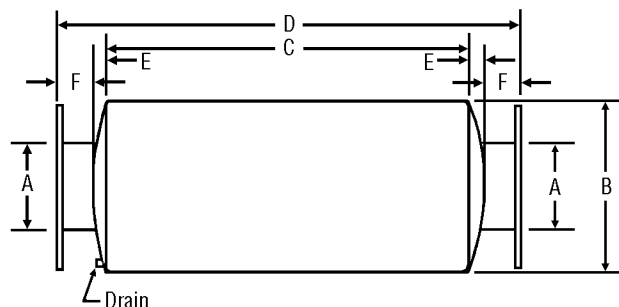
- Hospitals
- Ships, Tug and Fishing Boats
- Waste Water Plants
- Schools
- High Tech Industries
- And other environmental impact areas

#### Features:

- Attenuation 18-32 dBA
- Listed sound data is based on average sound curves and is not to be used as absolute
- Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
- Optional stainless steel construction or zinc based high heat and high corrosion resistant paint
- Inlet sizes 1" - 3.50" are MPT

#### Accessories:

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- Rain Caps



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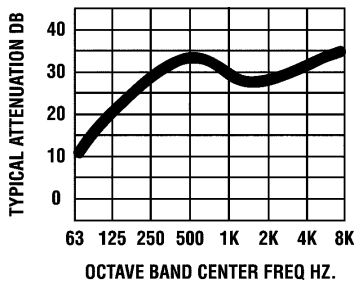
E-mail: sales@harcomanufacturing.com • www.harcomanufacturing.com

**HAPCO**  
**Critical Grade VRS Series**  
**Side Inlet**

MODEL INLET SIZE	DWG #	A	B	C	D	E	F	G	H	I	WT (Lbs.)
514VRS1SI	900A-1	1	5	14	16.5	0.5	2	1.75	1.5	14.75	9
516VRS1-4SI	901A-1	1.25	5	16	18.5	0.5	2	2	2	16.5	10
620VRS1-8SI	902A-1	1.5	6	20	22.5	0.5	2	2.5	2.5	20	14
720VRS2SI	903A-1	2	7	20	24.25	0.875	3.375	2.5	2.5	21.75	15
824VRS2-8SI	904A-1	2.5	8	24	28.75	0.875	3.875	3	2.5	25.75	28
827VRS3SI	905A-1	3	8	27	31.75	0.875	3.875	3	2.5	28.75	33
926VRS3-8SI	906A-1	3.5	9	26	30.75	0.875	3.875	4	3	26.75	41
1036VRS4SI	907A-1	4	10	36	40.75	0.875	3.875	4	4	36.75	70
1230VRS4SI	908A-1	4	12	30	34.75	0.875	3.875	4.5	4	30.25	83
1236VRS5SI	909A-1	5	12	36	40.75	0.875	3.875	5	4	35.75	101
1439VRS5SI	910A-1	5	14	39	43.75	0.875	3.875	5	4	38.75	125
1448VRS6SI	911A-1	6	14	48	52.75	0.875	3.875	6	4	46.75	161
1644VRS6SI	912A-1	6	16	44	49.25	0.875	4.375	6	4	43.25	186
1860VRS8SI	913A-1	8	18	60	69.5	3	6.5	11	4	58.5	265
2268VRS10SI	914A-1	10	22	68	79	3.5	7.5	10.75	4	68.25	361
2676VRS12SI	915A-1	12	26	76	88	4	8	12.5	4	75.5	473
3096VRS14SI	916A-1	14	30	96	109.5	4.5	9	15.5	4	94	744
36103VRS16SI	917A-1	16	36	103	117.75	5.25	9.5	16.75	4	101	950
36112VRS18SI	918A-1	18	36	112	127	5.25	9.75	19	5	108	1472
42120VRS20SI	919A-1	20	42	120	137	6.25	10.75	20.5	5	116.5	1626
42129VRS22SI	920A-1	22	42	129	146.5	6.25	11.25	22.5	5	124	1988
48136VRS24SI	921A-1	24	48	136	157.5	8.25	13.25	23	5	134.5	2375
54146VRS26SI	922A-1	26	54	146	167.5	8.25	13.25	25.25	5	142.25	2890
60160VRS28SI	923A-1	28	60	160	185	10	15	28	5	157	3487
60176VRS30SI	924A-1	30	60	176	201	10	15	29	5	172	4110
66218VRS32SI	925A-1	32	66	218	245	11	16	28	6	217	5375
72296VRS34SI	926A-1	34	72	296	323	11	16	30	6	293	7000
74296VRS36SI	926A-1	36	74	296	323	11	16	30	6	293	8000

\*For price information see Section 2 Page 4

\*Note Estimated weight only



**Recommended Applications:**

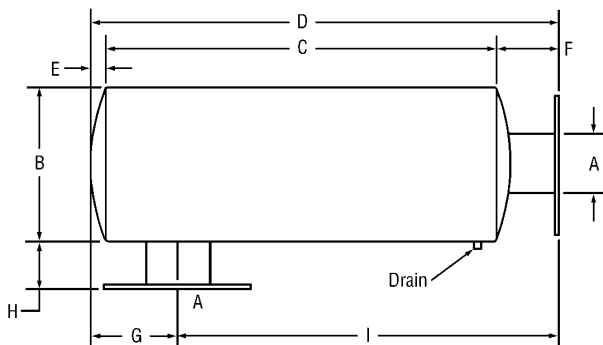
- Hospitals
- Ships, Tug and Fishing Boats
- Waste Water Plants
- Schools
- High Tech Industries
- And other environmental impact areas

**Features:**

- Typical Attenuation 18-32 dBA
- Listed sound data is based on average sound curves and is not to be used as absolute
- Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
- Optional stainless steel construction or zinc based high heat and high corrosion resistant paint
- Drain included
- Inlet size 4" and up flanged, smaller size MPT

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- Rain Caps
- High Temp Exhaust Blankets

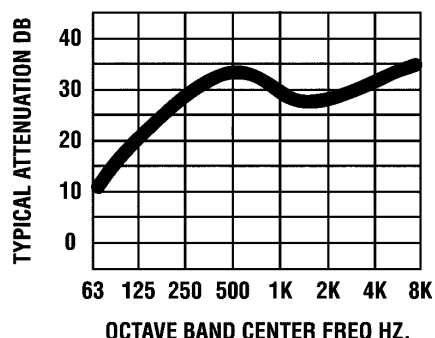


**HAPCO**  
**Critical Grade VRS Series**  
**Side Inlet - Side Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
926VRS3SI-SO	1000A-1	3	3	9	26	27.75	0.875	3	3.5	3.5	20.75	42
1029VRS3-8SI-SO	1001A-1	3.5	3.5	10	29	30.75	0.875	3	4	4	23.25	55
1236VRS4SI-SO	1002A-1	4	4	12	36	37.75	0.875	3	4	4	29.75	102
1442VRS5SI-SO	1003A-1	5	5	14	42	43.75	0.875	3.5	4.5	4.5	34.75	132
1648VRS6SI-SO	1004A-1	6	6	16	48	49.75	0.875	4	5.625	5.625	38.5	195
2068VRS8SI-SO	1005A-1	8	8	20	68	74.5	3.25	4	10.75	10.75	53	380
2678VRS10SI-SO	1006A-1	10	10	26	78	86	4	4	13	13	60	460
2888VRS12SI-SO	1007A-1	12	12	28	88	96.75	4.375	4	14.375	14.375	68	525
3098VRS14SI-SO	1008A-1	14	14	30	98	107	4.5	5	15.5	15.5	76	750
36118VRS16SI-SO	1009A-1	16	16	36	118	128.5	5.25	5	17.25	17.25	94	1200
38124VRS18SI-SO	1010A-1	18	18	38	124	136	6	5	18.25	18.25	99.5	1600
42130VRS20SI-SO	1011A-1	20	20	42	130	143.25	6.625	5	21.25	21.25	100.75	2100
48136VRS22SI-SO	1012A-1	22	22	48	136	152.5	8.25	5	23.25	23.25	106	2400
54156VRS24SI-SO	1013A-1	24	24	54	156	172.5	8.25	5	23	23	128	2900
60156VRS26SI-SO	1014A-1	26	26	60	156	172.5	8.25	5	23	23	128	3900

\*For price information see Section 2 Page 4

\*Note Estimated weight only



**Recommended Applications:**

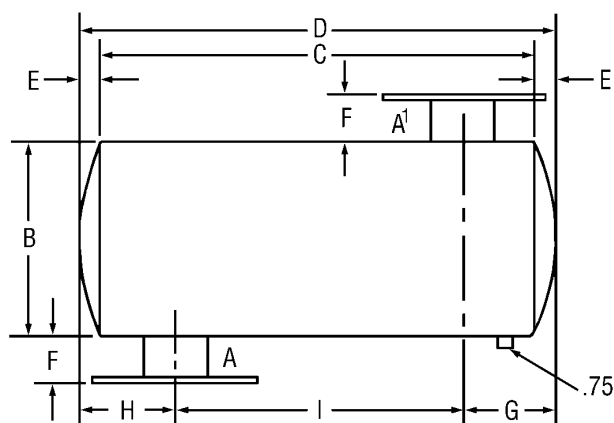
- Hospitals
- Ships, Tug and Fishing Boats
- Waste Water Plants
- Schools
- High Tech Industries
- And other environmental impact areas

**Features:**

- Attenuation 18-32 dBA
- Listed sound data is based on average sound curves and is not to be used as absolute
- Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
- Optional stainless steel construction or zinc based high heat and high corrosion resistant paint

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts



SIZE MODEL	DWG #	A1	A	B	C	D	E	F	G	H	I	J	K	L	M	N	WT (Lbs.)
1034VRS2-8x2-8x4	1100A-1	2.5	4	10	34	39	0.75	4.25	5.5	4	33.5	0.75	28	3	‡	13.25	65
1236VRS3x3x5	1101A-1	3	5	12	36	41.5	0.75	4.75	5.5	4	36	0.75	30	3	‡	14.75	145
1648VRS4x4x6	1102A-1	4	6	16	48	53.5	0.75	4.75	5.5	4	48	0.75	42	3	‡	19	168
2060VRS5x5x8	1103A-1	5	8	20	60	70.5	3.25	7.25	9.75	4	60.75	0.75	52	4	‡	27.5	395
2468VRS6x6x10	1104A-1	6	10	24	68	79.5	3.75	7.75	11	6	68.5	0.75	60	4	‡	31.5	596
2878VRS8x8x12	1105A-1	8	12	28	78	90.5	4.25	8.25	12.5	6	79	0.75	62	8	‡	30.75	835
30108VRS8x8x14	1106A-1	8	14	30	108	121	4.5	8.5	12.5	6	108.5	1	92	8	‡	33.5	1255
36120VRS10x10x16	1107A-1	10	16	36	120	134.5	5.25	9.25	13.25	8	121.25	1	104	8	‡	39.5	1417
42138VRS12x12x18	1108A-1	12	18	42	138	155	5	10	15.25	8	139.75	1	118	10	‡	45.5	1985
54150VRS12x12x20	1109A-1	12	20	54	150	171.5	8.25	13.25	18.25	8	153.25	1	130	10	‡	58.5	2679
60180VRS18x18x30	1110A-1	18	30	60	180	205	9.75	15.25	21.75	8	183.25	1	148	16	‡	64.5	3566
72218VRS20x20x36	1111A-1	20	36	72	218	234	11.25	16.75	24.25	8	209.75	1	186	16	‡	76.5	5897

\*For price information see Section 2 Page 5

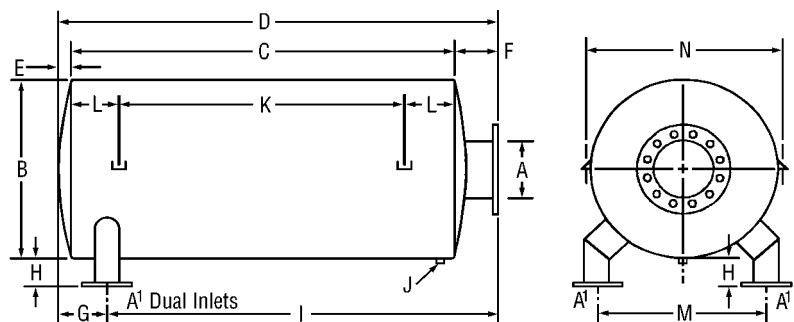
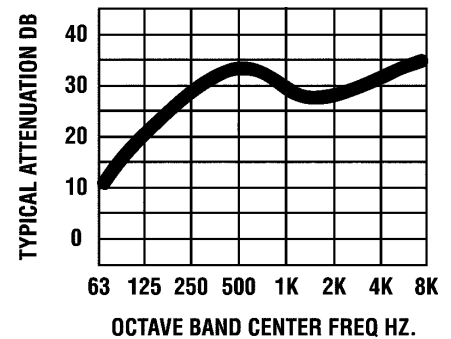
\*Note Estimated weight only

**Features:**

- Attenuation 19-32 dBA
  - The rotation of exhaust gas allows for a clean transition through the silencer with limited pressure loss
  - This type of design allows for a change in the noise frequency to a higher band, the results are a much simpler sound to attenuate
  - This is accomplished by the absorbing and annulling of the noise by a series of chambers with acoustical packing.
  - The multi-chambered design also allows us to attenuate the lower frequency bands present in the exhaust
  - A side branch designed chamber provides the last step to de-energize the noise
  - Hanger brackets and condensation drain included
  - Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
  - Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
  - Standard heavy duty all welded steel construction with high temperature primer and black paint
  - Optional stainless steel construction or zinc based high heat and high corrosion resistant paint
- ‡ Call for price on wide spread inlets

**Recommended Applications:**

- Hospitals
- Ships, Tug and Fishing Boats
- Waste Water Plants
- Schools
- High Tech Industries
- And other environmental impact areas



**Accessories:**

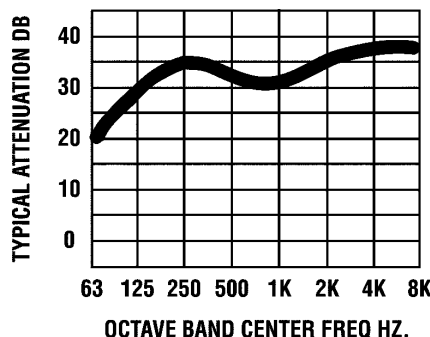
- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts

**HAPCO**  
**Critical Grade CSCS - Exhaust Silencer**  
**Center Side Inlet - End Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
938CSCS2-8	1200A-1	2.5	2.5	9	38	42.25	0.625	3.625	21.25	3	21	51
1040CSCS3	1201A-1	3	3	10	40	44.75	0.625	4.125	23.5	3.5	21.25	75
1246CSCS3-8	1202A-1	3.5	3.5	12	46	51.5	0.75	4.75	26.75	4	24.75	90
1246CSCS4	1203A-1	4	4	12	46	51.5	0.75	4.75	26.75	4	24.75	145
1648CSCS5	1204A-1	5	5	16	48	54	1	5	29	4	25	145
1854CSCS6	1205A-1	6	6	18	54	64	3	7	34	4	30	210
2460CSCS8	1206A-1	8	8	24	60	71.5	3.75	7.75	37.75	4	33.75	395
2676CSCS10	1207A-1	10	10	26	76	88	4	8	46	4	42	486
2880CSCS12	1208A-1	12	12	28	80	94.75	4.375	10.375	50.5	4	44.25	543
3698CSCS14	1209A-1	14	14	36	98	114.5	5.25	11.25	60.25	4	54.25	1400
42116CSCS16	1210A-1	16	16	42	116	135.25	6.625	12.625	72.25	4.5	63	1900
48130CSCS18	1211A-1	18	18	48	130	152.5	8.25	14.25	80.5	4.5	72	2400

\*For price information see Section 2 Page 6

\*Note Estimated weight only



**Recommended Applications:**

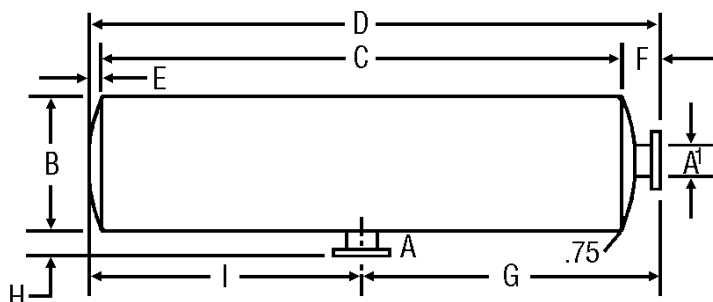
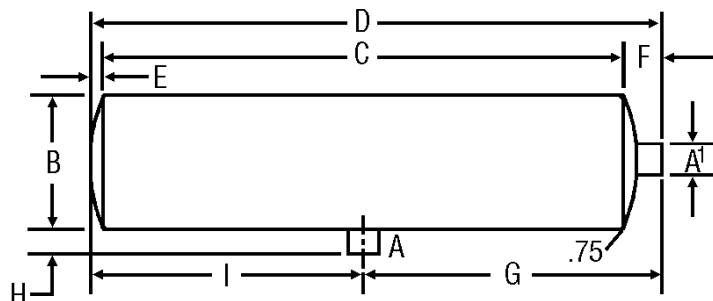
- Hospitals
- Ships, Tug and Fishing Boats
- Waste Water Plants
- Schools
- High Tech Industries
- And other environmental impact areas

**Features:**

- Attenuation 20-32 dBA
- See engineering section for proper sizing
- Exhaust gases flow through the silencer in a vortex motion and noise reduction is accomplished by a combination of absorption & annulling of noise waves resulting in reduced silencer diameters
- Sound data is based on **Flow Velocity Not To Exceed 9000 FPM**, see engineering section chart
- Standard heavy duty all welded steel construction with high temperature primer and black paint
- Optional stainless steel construction or zinc based high heat and high corrosion resistant paint
- Condensation drain
- 3" and larger flanged
- Optional dual inlets available - Call for quote on changes

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts



**HAPCO**  
**Critical Grade - VWT Exhaust Heat Recovery Silencer**  
**Note: End Inlet - End Outlet Only**

SIZE MODEL	DRAWING	A	B	B1	C	D	E	F
1038VWT-2	1300A-1	2	10	12	38	45	0.5	3
1648VWT3-8	1301A-1	3.5	16	18	48	55	0.75	2.75
1872VWT5	1302A-1	5	18	20	72	84	3	3
2080VWT6	1303A-1	6	20	22	80	92	3	3
2486VWT8	1304A-1	8	24	26	86	99.5	3.75	3
28110VWT10	1305A-1	10	28	30	110	123.5	3.75	3
30114VWT14x12	1306A-1	12	30	32	114	128.5	4.25	3
30120VWT12	1307A-1	12	30	32	120	134.5	4.25	3
36142VWT12	1308A-1	12	36	38	142	160	5	4
36132VWT14	1309A-1	14	36	38	132	150	5	4
38144VWT16	1310A-1	16	38	40	144	164	5	5
42160VWT18	1311A-1	18	42	44	160	183	5.5	6

\*For price information see Section 2 Page 6

\*Note Estimated weight only

**Ordering Information:**

- Sizing data needed when placing a request for quotation:
  - Exhaust Temp:
  - Exhaust CFM:
  - Type of Engine or Heat Source:
  - Water Temp. from engine to heat recovery system:
  - G.P.M. of water:
  - PSI of water:
  - Type of use for heated water:
  - Heated water temp. requirement:
  - GPM of heated water needed:

**Recommended Applications:**

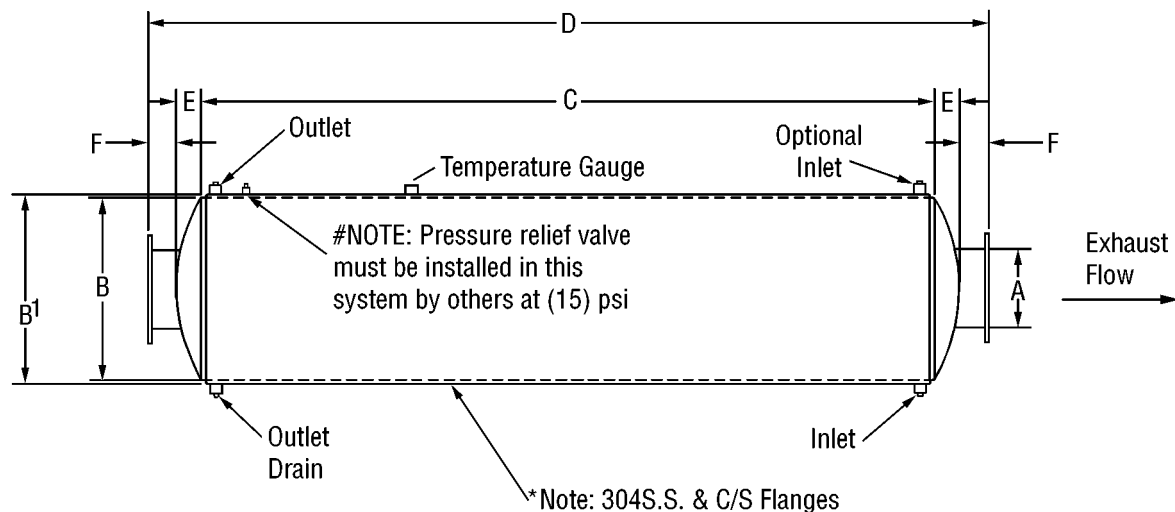
- Oil Drill Rigs
- Remote Cabins
- Motor Vessel Heating
- Heating of fluids such as paint with hot water

**Features:**

- Water jacket type design for heating water with engine exhaust or cooling engine exhaust on oil drill rigs
- Stainless Steel Construction

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts

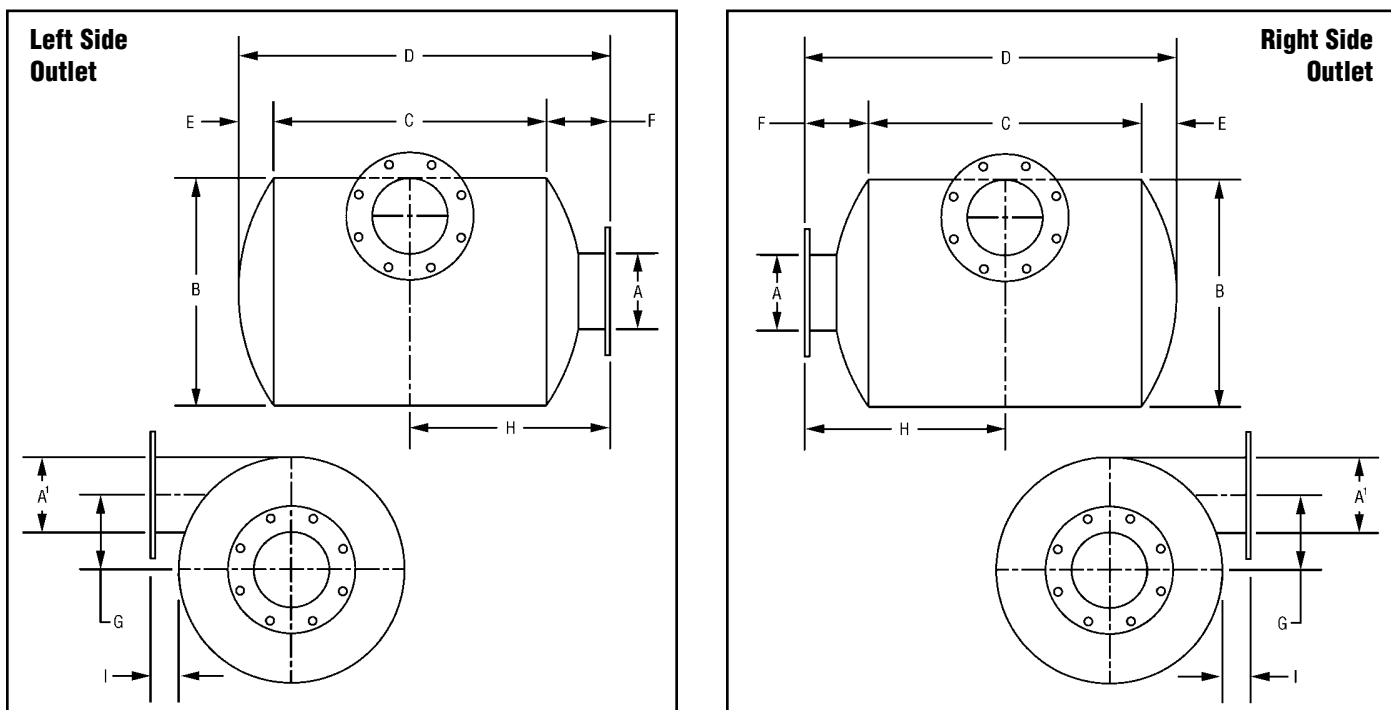




**HAPCO**  
**HCY Impacter Series**  
**Critical Grade Exhaust Silencer**

MODEL	A	A1	B	C	D	E	F	G	H	I
1214HCY3	3.0	3.0	12.0	14.0	17.875	.875	3.0	4.5	9.5	2.75
1416HCY3-8	3.5	3.5	14.0	16.0	19.875	.875	3.0	5.25	10.75	3.0
1417HCY4	4.0	4.0	14.0	17.0	21.375	.875	3.5	5.0	11.5	3.25
1824HCY5	5.0	5.0	18.0	24.0	31.0	3.0	4.0	6.5	16.0	3.5
2024HCY6	6.0	6.0	20.0	24.0	32.75	3.25	5.5	7.0	17.0	3.75
2428HCY8	8.0	8.0	24.0	28.0	37.75	3.75	6.0	8.0	20.0	4.0

\*For price information see Section 2 Page 3



**Recommended Applications:**

- All applications where space is limited

**Ordering Information:**

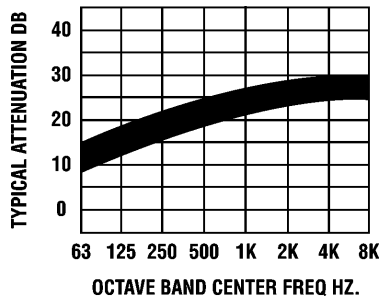
• **Specify Right or Left side outlet**

- Engine:
- CFM:
- FPM:
- KW:
- WT:
- Pressure Drop H2O:
- Exhaust Pipe Size:
- Manufacturers recommended Max. Pressure Loss:

**Features:**

- Compact Design
- Low Pressure Drop
- Flange Connections
- Aluminized Steel Construction
- ABS Certified Welding
- Sound Impingement Design
- High temperature primer and paint

- Average dba at 7 meters = 70 dba
- Average pressure loss 9 - 10" H2O
- *Sample Specification:* The silencer is to be a HCY Impacter Series constructed of aluminized steel (26" body diameter and smaller) or mild steel/aluminized steel combination



**Accessories:**

- Flexible Connectors
- Mounting Bands
- Saddle Supports
- Wye Connectors
- Wall and Roof Thimbles
- High Temp Exhaust Blankets
- Exhaust Stack Rain Guard
- Rain Caps
- Exhaust Pipe Spools
- Elbows
- Flanges of all types
- Clean Outs or Inspection Ports
- Gaskets - Hi Temp
- Nuts & Bolts

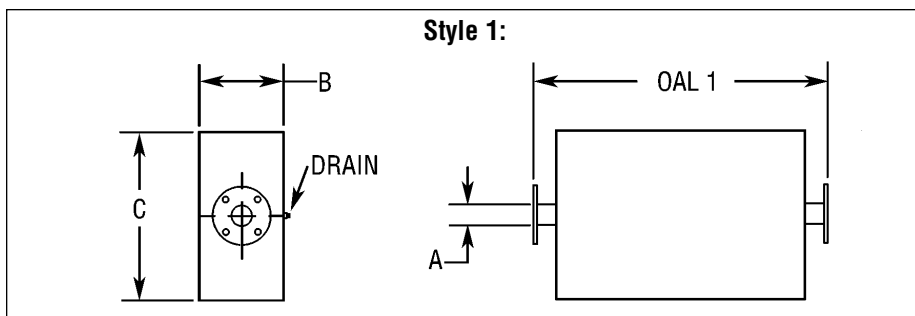
**HAPCO**  
**LPRS Extreme**

SIZE MODEL	A SIZE	B HGT	C WIDTH	1 OAL	2 OAL	3 OAL	F MIN	F MAX	G HGT	WT (Lbs.)
36x60x10EXT	4	10	36	68	64	60	6	18	14	384
38x60x11EXT	5	11	38	68	64	60	8	18	16	414
40x72x12EXT	6	12	40	80	76	72	8	22	16	575
60x96x14EXT	8	14	60	104	100	96	9	31	18	1146
68x102x16EXT	10	16	68	110	106	102	10	32	20	1350
72x114x20EXT	12	20	72	122	118	114	11	36	24	1669
76x114x26EXT	14	26	76	122	118	114	12	35	30	1870
80x120x30EXT	16	30	80	1310	125	120	13	36	34	2119
90x144x30EXT	18	30	90	154	149	144	14	45	34	2765
96x144x30EXT	20	30	96	154	149	144	15	44	36	3000

\*For price information see Section 2 Page 9

\*Note Estimated weight only

Larger size must use our low profile rectangular style silencer. Reference Section 5 Page 10.



**Recommended Applications:**

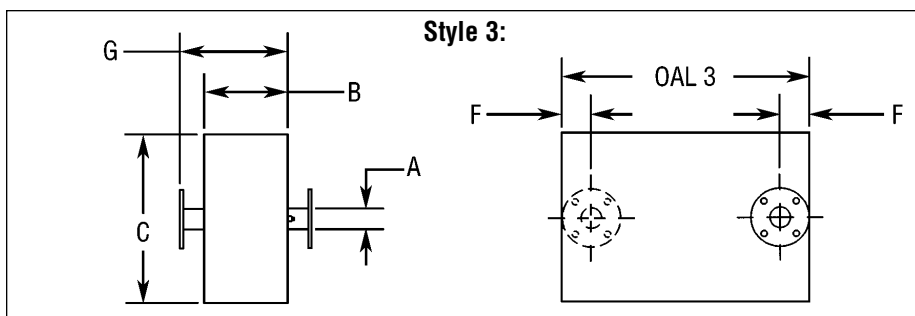
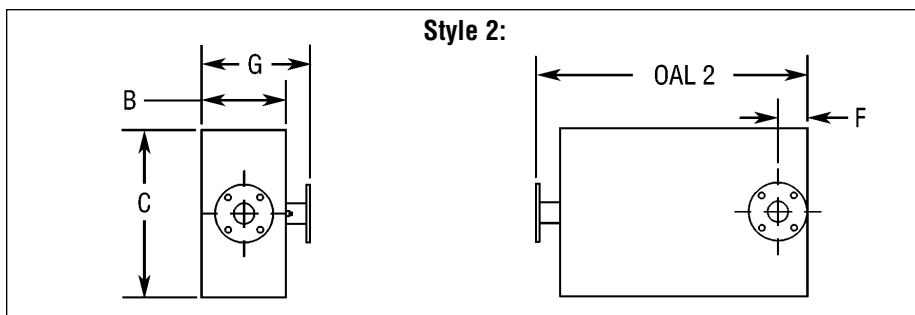
- Hospitals
- Tug and Fishing Boats
- Areas where the surrounding noise level is low

**Features:**

- Attenuation 39 - 47 dBA
- Listed sound data is based on average sound curves and is not to be used as absolute
- Noise reduction is accomplished by a combination of absorption and annulling of noise waves

**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- Gaskets HiTemp
- Nuts & Bolts
- Wye Connectors
- Wall & Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean outs or Inspection Ports



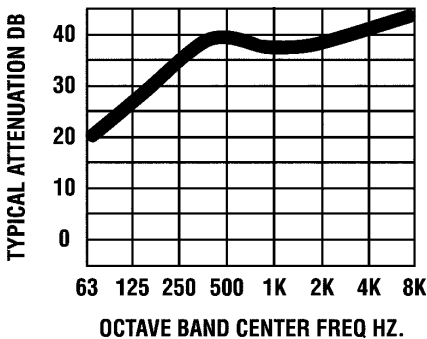
**HAPCO**  
**Super Critical Grade SFH Low Profile (Hockey Puck Profile)**  
**Flush Bottom Inlet**

SIZE MODEL	DWG #	A	A1	B DIA	C	D	E	F	G	H	I	WT (Lbs.)
124SFH1	1400A-1	1	1	12	4	14	2	0.8125	6	8	MPT	17
145SFH1-8	1401A-1	1.5	1.5	14	5	16	2	2.5	7	9	MPT	19
166SFH2	1402A-1	2	2	16	6	18.5	2.5	1	8	10.5	MPT	42
207SFH2-8	1403A-1	2.5	2.5	20	7	23	3	1	10	13	7.5	92
268SFH3	1404A-1	3	3	26	8	29	3	1	13	16	7.5	97
289SFH3-8	1405A-1	3.5	3.5	28	9	31	3	1	14	17	8.5	141
329SFH4	1406A-1	4	4	32	9	35	3	1	16	19	9	185
3410SFH5	1407A-1	5	5	34	10	37	3	1.125	17	20	10	265
4212SFH6	1408A-1	6	6	42	12	45	3	1.125	21	24	11	391
5214SFH8	1409A-1	8	8	52	14	55	3	1.125	26	29	13.5	710
6416SFH10	1410A-1	10	10	64	16	67	3	1.25	32	35	16	865
7020SFH12	1411A-1	12	12	70	20	73	3	1.25	35	38	19	1112
7624SFH14	1412A-1	14	14	76	24	79	3	1.375	38	41	21	1781
822SFH14x16	1413A-1	14	16	82	26	85	3	1.375	41	44	23.5	2091
8826SFH16	1414A-1	16	16	88	26	91	3	1.625	44	47	23.5	2280
9428SFH18	1415A-1	18	18	94	28	98	4	1.75	47	51	25	2530
9833SFH20	1416A-1	20	20	98	33	102	4	1.75	49	53	27.5	3396

\*For price information see Section 2 Page 6

\*Note Estimated weight only

Larger size must use our low profile rectangular style silencer. Reference Section 5 Page 10.



**Recommended Applications:**

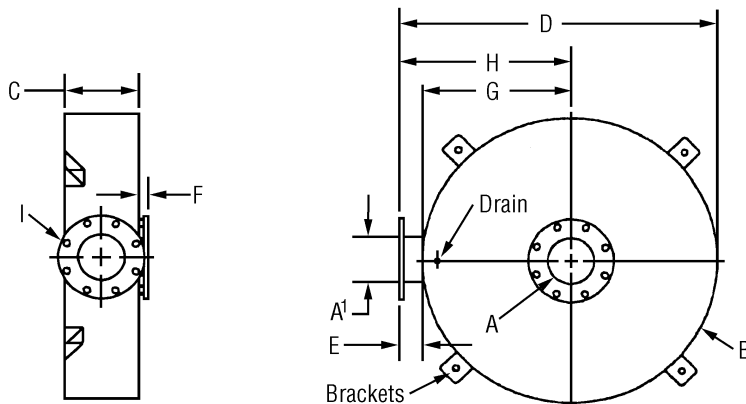
- Engine generator exhaust system for attenuated enclosures
- Marine engine exhaust systems
- ISO containers for emergency power
- Military exhaust systems
- Generator exhaust system in buildings with low overhead such as parking lot facilities
- Waste water plants

**Features:**

- US Patent No. 5, 670, 757
- Low profile, low back pressure, fully insulated top, sides and bottom
- Full insulated internal surfaces greatly reduce radiant heat and shell surface noise
- Mounting brackets included
- Threaded flush mounted flanges for lower profile and greater strength, allows the elimination of insulated wrap for the pipe stubs
- Heavy duty all welded steel or stainless steel
- Attenuation 30-45 dbased upon **velocity not to exceed 9000 FPM**
- Optional inlet and outlet locations
- Optional rectangular outlets for additional space saving

**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- Gaskets HiTemp
- Nuts & Bolts
- Wye Connectors
- Wall & Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean outs or Inspection Ports



**HAPCO**  
**Super Critical Grade SFH Series Low Profile**  
**Dual Inlet**

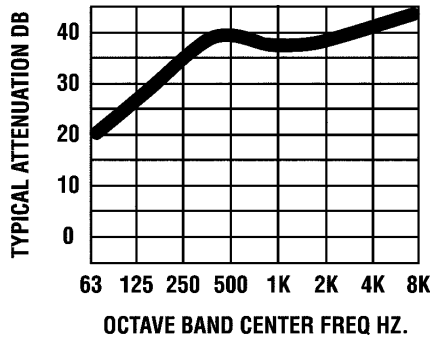
SIZE MODEL	DWG #	A	A1	B DIA	C	D	E	F	G	H	I	WT (Lbs.)
3610SFH3x3x5	1500A-1	3x3	5	36	10	45	3	6	‡	4.5	5.5	216
4010SFH3-8x3-8x5	1501A-1	3.5x3.5	5	40	10	49	3	6	‡	4.75	5.25	302
5011SFH4x4x6	1502A-1	4x4	6	50	11	59	3	6	‡	4.75	6.25	731
5814SFH5x5x8	1503A-1	5x5	8	58	14.5	68	4	6	‡	5.25	9.25	786
6616SFH6x6x10	1504A-1	6x6	10	66	16	76	4	6	‡	5.75	10.25	1050
7624SFH8x8x12	1505A-1	8x8	12	76	24	86	4	6	‡	7.25	16.75	1534
7824SFH10x10x14	1506A-1	10x10	14	78	24	88	4	6	‡	8.25	15.75	1780
9026SFH10x10x16	1507A-1	10x10	16	90	26	100	4	6	‡	8.25	17.75	1896
9428SFH12x12x18	1508A-1	12x12	18	94	28	104	4	6	‡	8.25	19.75	1988
9628SFH12x12x18	1509A-1	12x12	18	96	28	106	4	6	‡	12.25	15.75	2410

\*For price information see Section 2 Page 8

\*Note Estimated weight only

\*\* Larger size must use our low profile rectangular style silencer. Reference Section 5 Page 10

**NOTE:** (G) Dimension determined by engine exhaust size. Threaded flush mounted exhaust inlet flanges. Option inlet and Outlet locations



**Recommended Applications:**

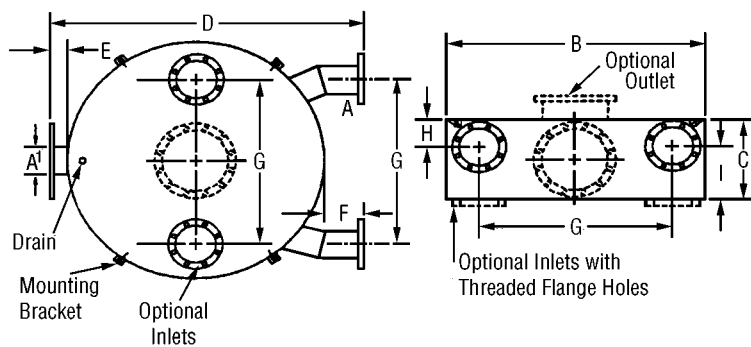
- Engine generator exhaust system for attenuated enclosures
- Marine engine exhaust system
- ISO containers for emergency power
- Military exhaust system
- Generator exhaust system in buildings with low overhead such as parking lot facilities
- Waste water plants

**Features:**

- Attenuation 30-40 dBA based upon exhaust velocity 9000 FPM
- US Patent No. 5, 670, 757
- Low profile dual inlet, low back pressure, low radiant heat
- Insulated top, sides and bottom
- The fully insulated internal shell greatly reduces radiant heat and sound transmission noise through the shell
- All welded steel or stainless steel
- High temperature primer and paint
- Hanger brackets included
- Condensation drain included
- 3" Inlet and above flanged
- Call for quote on optional inlet and outlet locations. Optional rectangular outlets for additional space savings

**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- Gaskets HiTemp
- Nuts & Bolts
- Wye Connectors
- Wall & Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean outs or Inspection Ports



Bottom View

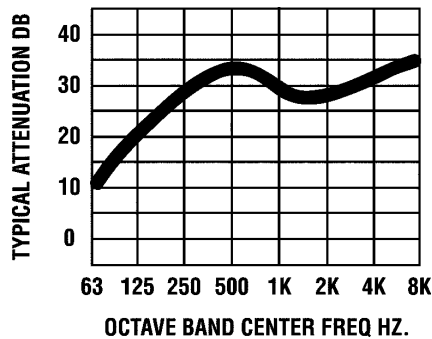
**HAPCO**  
**Critical Grade CFH Series Low Profile**  
**Bottom Inlet**

SIZE MODEL	DWG #	A	A1	B DIA	C	D	E	F	G	H	I	WT (Lbs.)
82CFH1	1600A-1	1	1	8	2	10.5	2.5	3	4	6.5	MPT	8
123CFH1-8	1601A-1	1.5	1.5	12	3	14.5	2.5	3	6	8.5	MPT	16
143CFH2	1602A-1	2	2	14	3	16.5	2.5	3	7	9.5	6	24
184CFH2-8	1603A-1	2.5	2.5	18	4	20.5	2.5	3	9	11.5	7	48
245CFH3	1604A-1	3	3	24	5.5	27	3	1	12	15	7.5	81
266CFH3-8	1605A-1	3.5	3.5	26	6	29	3	1	13	16	8.5	118
307CFH4	1606A-1	4	4	30	7	33	3	1	15	18	9	160
339CFH5	1607A-1	5	5	33	9	36	3	1.125	16.5	19.5	10	218
389CFH6	1608A-1	6	6	38	9.5	41	3	1.125	19	22	11	302
4811CFH8	1609A-1	8	8	48	11	51	3	1.125	24	27	13.5	524
5814CFH10	1610A-1	10	10	58	14	61	3	1.25	29	32	16	805
6017CFH12	1611A-1	12	12	60	17	63	3	1.25	30	33	19	860
7222CFH14	1612A-1	14	14	72	22	75	3	1.375	36	39	21	1500
7424CFH14x16	1613A-1	14	16	74	24	77	3	1.375	37	40	23.5	1696
7826CFH16	1614A-1	16	16	78	26	81	3	1.625	39	42	23.5	1954
8828CFH18	1615A-1	18	18	88	28	92	4	1.75	44	48	25	2100
9432CFH20	1616A-1	20	20	94	32	98	4	1.75	47	51	27.5	
9832CFH20	1617A-1	20	20	98	32	102	4	1.75	49	53	27.5	

\*For price information see Section 2 Page 3

\*Note Estimated weight only

\*\* Larger size must use our low profile rectangular style silencer. Reference Section 5 Page 10



**Recommended Applications:**

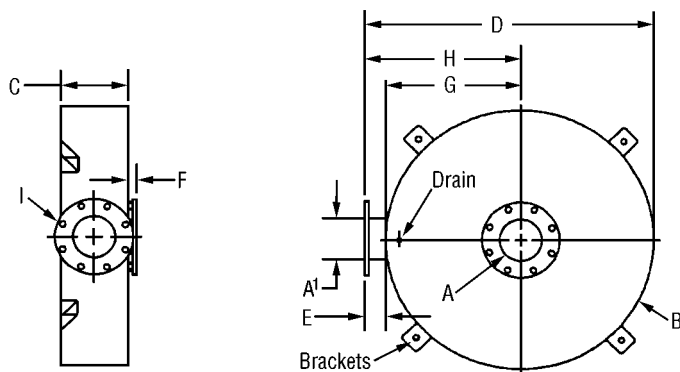
- Engine generator exhaust system for attenuated enclosures
- Marine engine exhaust system
- ISO containers for emergency power
- Military exhaust system
- Generator exhaust system in buildings with low overhead such as parking lot facilities
- Waste water plants

**Features:**

- Attenuation 28-40 dBA based upon velocity not to exceed 9000 FPM
- Low profile, low back pressure
- Internally insulated top and sides for less radiant heat
- Optional bottom internal insulation
- High temperature primer and paint
- Hanger brackets included
- Condensation drain included
- Heavy duty all welded steel or optional stainless steel
- Weld nut threaded flush mount flanges for lower profile and greater strength, allows the elimination of insulated wrap for the pipe stubs
- Call for quote on optional inlet and outlet locations. Optional rectangular outlets for additional space savings

**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- Gaskets HiTemp
- Nuts & Bolts
- Wye Connectors
- Wall & Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean outs or Inspection Ports



**HAPCO**  
**Critical Grade CFH Series**  
**Dual Inlet**

SIZE MODEL	DWG #	A	A1	B DIA	C	D	E	F	G	H	I	WT (Lbs.)
338CFH3x3x5	1700A-1	3x3	5	33	8	42	3	6	*	3.5	4.5	206
369CFH3.5x3.5x5	1701A-1	3.5x3.5	5	36	9.5	45	3	6	*	4	5.5	255
4210CFH4x4x6	1702A-1	4x4	6	42	10	51	3	6	*	4.5	5.5	433
5211CFH5x5x8	1703A-1	5x5	8	52	11.5	62	4	6	*	4.5	8	685
6014CFH6x6x10	1704A-1	6x6	10	60	14.5	70	4	6	*	4.75	10.75	955
6818CFH8x8x12	1705A-1	8x8	12	68	18	78	4	6	*	5.5	14.5	1167
7224CFH10x10x14	1706A-1	10x10	14	72	24	82	4	6	*	6.75	17.25	1565
8024CFH10x10x16	1707A-1	10x10	16	80	24	90	4	6	*	6.75	19.25	1970
8824CFH10x10x18	1708A-1	10x10	18	88	24	98	4	6	*	6.75	19.25	2267
9028CFH12x12x18	1709A-1	12x12	18	90	28	100	4	6	*	7.5	20.5	2384
9432CFH14x14x20	1710A-1	14x14	20	94	32	106	4	8	*	8.75	21.25	2892
9634CFH14x14x22	1711A-1	14x14	22	96	34	108	4	8	*	8.75	24.25	3085

\*For price information see Section 2 Page 4

\*Note Estimated weight only

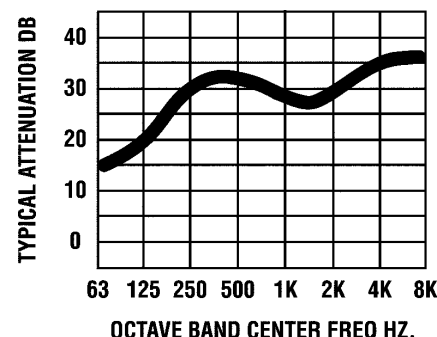
\*\* Larger size must use our low profile rectangular style silencer. Reference Section 5 Page 10

**Features:**

- Attenuation 28-43 dBA based upon **exhaust velocity 9000 FPM**
- Low profile, low back pressure, low radiant heat
- Internally insulated top and sides
- High temperature primer and paint
- Mounting brackets included
- Threaded flush mounted exhaust flange
- Optional inlet and outlet locations
- Optional internal insulation available for bottom
- Optional rectangular outlets for additional space savings

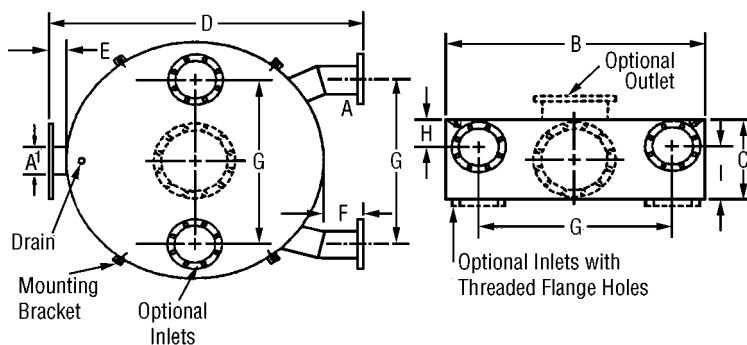
**Recommended Applications:**

- Engine generator exhaust system for attenuated enclosures
- Marine engine exhaust system
- ISO containers for emergency power
- Military exhaust system
- Generator exhaust system in buildings with low overhead such as parking lot facilities
- Waste water plants



**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- Gaskets HiTemp
- Nuts & Bolts
- Wye Connectors
- Wall & Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean outs or Inspection Ports



Bottom View

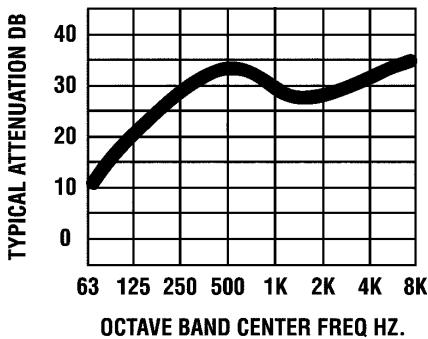
**Critical Grade CFHI Series Insulated Top, Side & Bottom  
Low Profile - Bottom Inlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
185CFHI2-8	1800A-1	2.5	2.5	18	5	20.5	2.5	3	9	11.5	7	57
246CFHI3	1801A-1	3	3	24	6.5	27	3	1	12	15	7.5	105
267CFHI3-8	1802A-1	3.5	3.5	26	7	29	3	1	13	16	8.5	146
308CFHI4	1803A-1	4	4	30	8	33	3	1	15	18	9	198
331OCFHI5	1804A-1	5	5	33	10	36	3	1.125	16.5	19.5	10	263
381OCFHI6	1805A-1	6	6	38	10.5	41	3	1.125	19	22	11	362
4812CFHI8	1806A-1	8	8	48	12	51	3	1.125	24	27	13.5	652
5815CFHI10	1807A-1	10	10	58	15	61	3	1.25	29	32	16	992
6018CFHI12	1808A-1	12	12	60	18	63	3	1.25	30	33	19	1060
7222CFHI14	1809A-1	14	14	72	22	75	3	1.375	36	39	21	1788
7424CFHI14x16	1810A-1	14	16	74	24	77	3	1.375	37	40	23.5	1804
7826CFHI16	1811A-1	16	16	78	26	81	3	1.625	39	42	23.5	2292
8828CFHI18	1812A-1	18	18	88	28	92	4	1.75	44	48	25	2530
9432CFHI20	1813A-1	20	20	94	32	98	4	1.75	47	51	27.5	
9832CFHI20	1814A-1	20	20	98	32	102	4	1.75	49	53	27.5	

\*For price information see Section 2 Page 3

\*Note Estimated weight only

\*\* Larger size must use our low profile rectangular style silencer. Reference Section 5 Page 10



**Recommended Applications:**

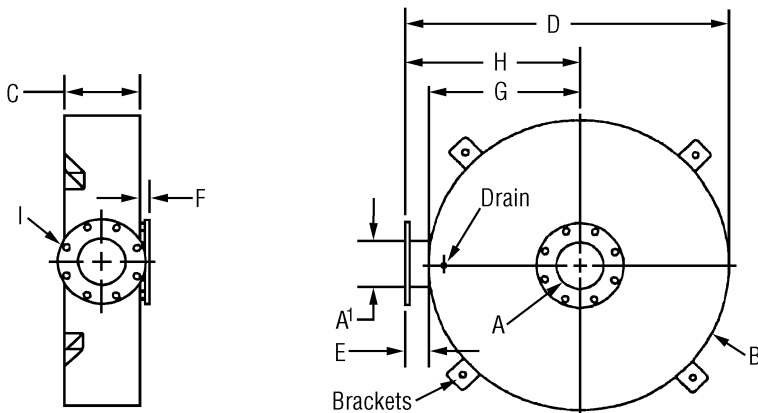
- Engine generator exhaust system for attenuated enclosures
- Marine engine exhaust system
- ISO containers for emergency power
- Military exhaust system
- Generator exhaust system in buildings with low overhead such as parking lot facilities
- Waste water plants

**Features:**

- Attenuation 28-40 dBA based upon velocity **not to exceed 9000 FPM**
- Low profile, low back pressure
- Internally insulated top, sides and bottom for less radiant heat
- High temperature primer and paint
- Hanger brackets included
- Condensation drain included
- Heavy duty all welded steel or optional stainless steel
- Weld nut threaded flush mount flanges for lower profile and greater strength, allows the elimination of insulated wrap for the pipe stubs
- Call for quote on optional inlet and outlet locations
- Optional rectangular outlets for additional space savings

**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- Gaskets HiTemp
- Nuts & Bolts
- Wye Connectors
- Wall & Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean outs or Inspection Ports



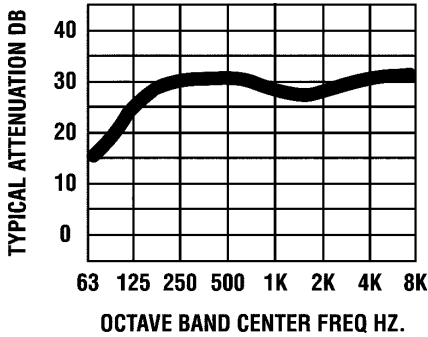
**HAPCO**  
**Residential Grade - RFH Series Low Profile**  
**Bottom Inlet**

SIZE MODEL	DWG #	A	A1	B DIA	C	D	E	F	G	H	I	WT (Lbs.)
62RFH1	1900A-1	1	1	6	2.5	8	2	3	3	5	MPT	3
103RFH1-8	1901A-1	1.5	1.5	10	3	12	2	3	5	7	MPT	8
123RFH2	1902A-1	2	2	12	3.5	14.5	2	3	6	8.5	MPT	17
164RFH2-8	1903A-1	2.5	2.5	16	4.5	18.5	2	3	8	10	MPT	34
204RFH3	1904A-1	3	3	20	4.5	23	3	1	10	13	7.5	47
245RFH3-8	1904A-1	3.5	3.5	24	5	27	3	1	10	15	8.5	52
286RFH4	1906A-1	4	4	28	6	31	3	1	14	17	9	147
307RFH5	1907A-1	5	5	30	7	33	3	1.125	15	18	10	209
368RFH6	1908A-1	6	6	36	8	39	3	1.125	18	21	11	261
4010RFH8	1909A-1	8	8	40	10	43	3	1.125	20	23	13.5	340
5012RFH10	1910A-1	10	10	50	12	53	3	1.25	25	28	16	594
5814RFH12	1911A-1	12	12	58	14	61	3	1.25	29	32	19	812
6416RFH14	1912A-1	14	14	64	16	68	4	1.375	32	36	21	1315
6818RFH14x16	1913A-1	14	16	68	18	72	4	1.375	34	38	21	1191
7218RFH16	1914A-1	16	16	72	18	76	4	1.625	36	40	23.5	1327
7818RFH16	1915A-1	16	16	78	18	82	4	1.625	39	43	23.5	1650
8020RFH18	1916A-1	18	18	80	20	84	4	1.75	40	44	25	1956
8822RFH20	1917A-1	20	20	88	22	92	4	1.75	44	48	27.5	2260
9428RFH22	1918A-1	22	22	94	28	98	4	1.812	47	51	29.5	2475
9832RFH24	1919A-1	24	24	98	32	102	4	1.812	49	53	32	

\*For price information see Section 2 Page 1

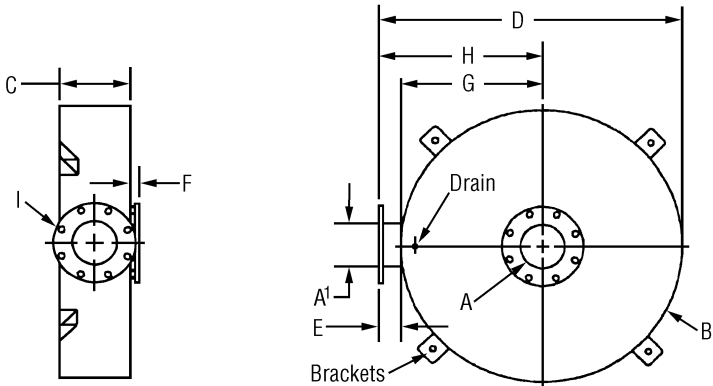
\*Note Estimated weight only

\*\* Larger size must use our low profile rectangular style silencer. Reference Section 5 Page 10



- Recommended Applications:**
- Engine generator exhaust system for attenuated enclosures
  - Marine engine exhaust system
  - ISO containers for emergency power
  - Military exhaust system
  - Generator exhaust system in buildings with low overhead such as parking lot facilities
  - Waste water plants

- Features:**
- Attenuation 18-30 dBA
  - Low profile, low back pressure
  - Internally insulated top and sides for less radiant heat
  - Heavy duty all welded steel
  - High temperature primer and paint
  - Hanger brackets included
  - Condensation drain included
  - Threaded flush mounted flanges
  - Call for quote on optional inlet or outlet locations
  - Optional rectangular outlets for additional space savings



- Accessories:**
- Flexible Connectors
  - Hanger Brackets
  - Mounting Bands
  - Gaskets HiTemp
  - Nuts & Bolts
  - Wye Connectors
  - Wall & Roof Thimbles
  - High Temp Exhaust Blankets
  - Support Legs for Vertical Mounting
  - Rain Caps
  - Exhaust Pipe Spools
  - Backfire Relief Vents
  - Flanges of all types
  - Clean outs or Inspection Ports



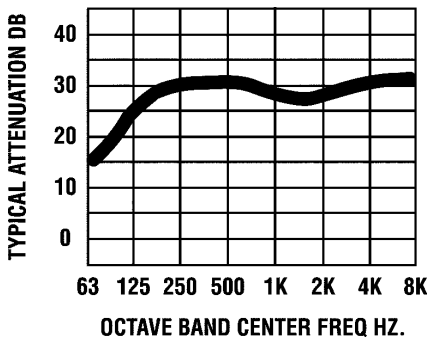
**HAPCO**  
**Residential Grade - RFH Series Low Profile**  
**Dual Inlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	J	WT (Lbs.)
307RFH3x3x5	2000A-1	3x3	5	30	7	39	3	6	*	3.5	3.5	1.5	173
337RFH3.5x3.5x5	2001A-1	3.5x3.5	5	33	7	42	3	6	*	4	4	1.5	210
368RFH4x4x6	2002A-1	4x4	6	36	8	45	3	6	*	4.5	4	1.5	227
4011RFH5x5x8	2003A-1	5x5	8	40	11	50	4	6	*	4.5	6.5	1.5	277
5013RFH6x6x10	2004A-1	6x6	10	50	13	60	4	6	*	5.5	8.5	1.5	628
5815RFH8x8x12	2005A-1	8x8	12	58	15	78	4	6	*	6.75	9.25	1.5	1167
6417RFH10x10x14	2006A-1	10x10	14	64	17	74	4	6	*	6.75	11.25	1.5	1344
7219RFH12x12x16	2007A-1	12x12	16	72	19	82	4	6	*	6.75	13.25	1.5	1620
7621RFH10x10x18	2008A-1	10x10	18	76	21	86	4	6	*	6.75	15.25	1.5	1795
8021RFH12x12x18	2009A-1	12x12	18	80	21	90	4	6	*	7.5	16.5	1.5	1971
8824RFH14x14x20	2010A-1	14x14	20	88	24	100	4	8	*	8.75	17.25	1.5	2198
9026RFH14x14x22	2011A-1	14x14	22	90	26	102	4	8	*	8.75	23.25	1.5	2716
9830RFH16x16x24	2012A-1	16x16	24	98	30	110	4	8	*	9.75	24.25	1.5	3280

\*For price information see Section 2 Page 1

\*Note Estimated weight only

\*\* Larger size must use our low profile rectangular style silencer. Reference Section 5 Page 10

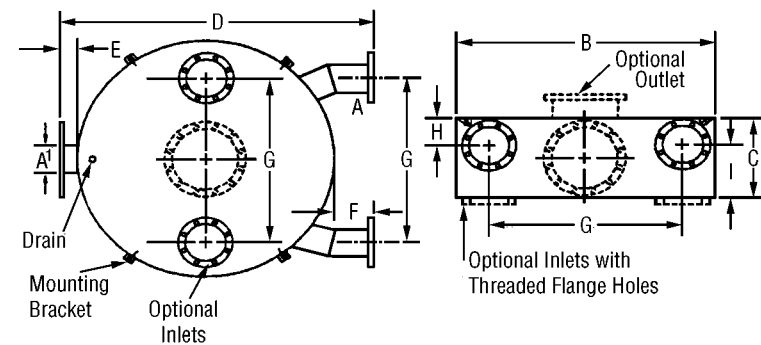


**Recommended Applications:**

- Engine generator exhaust system for attenuated enclosures
- Marine engine exhaust system
- ISO containers for emergency power
- Military exhaust system
- Generator exhaust system in buildings with low overhead such as parking lot facilities
- Waste water plants

**Features:**

- Attenuation 18-30 dBA
- Dual inlet - low profile design
- Low back pressure
- Insulated top for low radiant heat
- Versatile optional inlets and outlets
- 3" and larger flanged
- Condensation drain included
- All welded steel or stainless steel construction
- Note (G) dimension determined by engine exhaust dimension
- Threaded flush mounted flanges
- Optional rectangular outlets for additional space savings

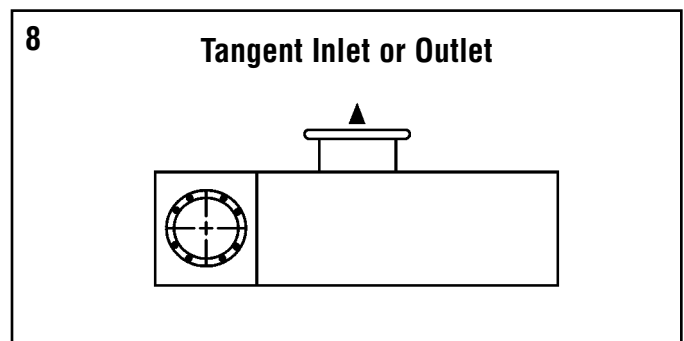
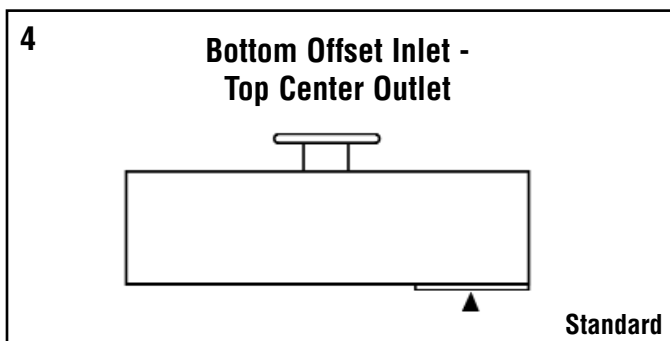
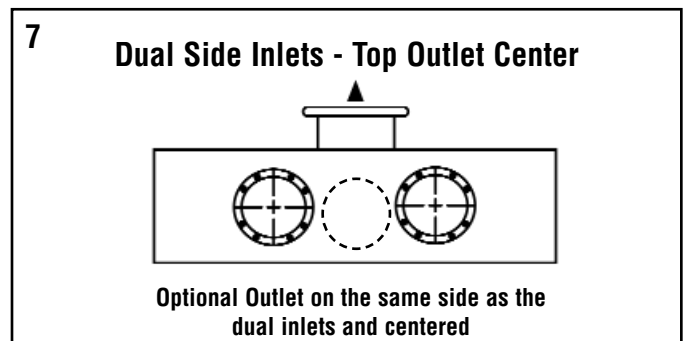
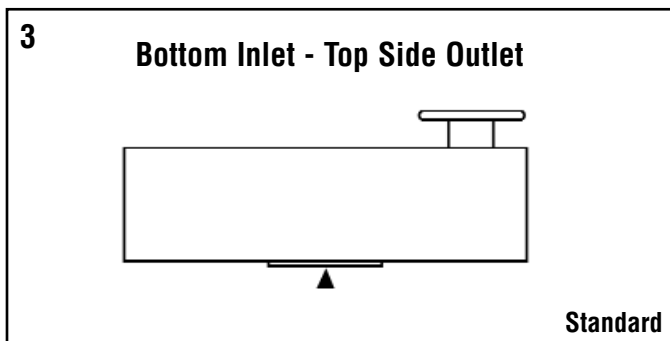
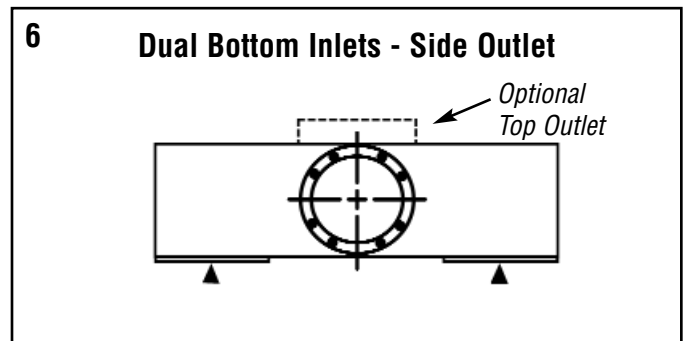
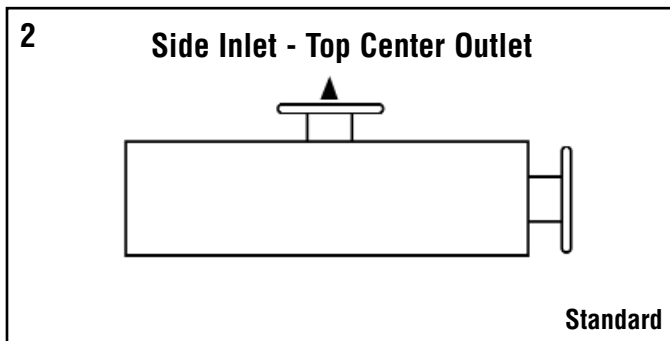
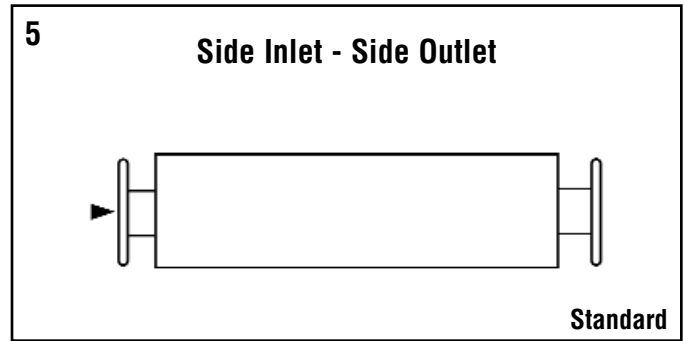
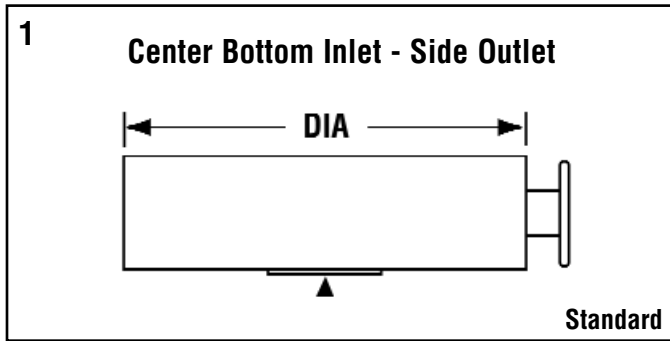


**Bottom View**

**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- Gaskets HiTemp
- Nuts & Bolts
- Wye Connectors
- Wall & Roof Thimbles
- High Temp Exhaust Blankets
- Support Legs for Vertical Mounting
- Rain Caps
- Exhaust Pipe Spools
- Backfire Relief Vents
- Flanges of all types
- Clean outs or Inspection Ports

**HAPCO**  
**Low Profile Design RFH, CFH and SFH Series**  
**Sample Mounting Options**

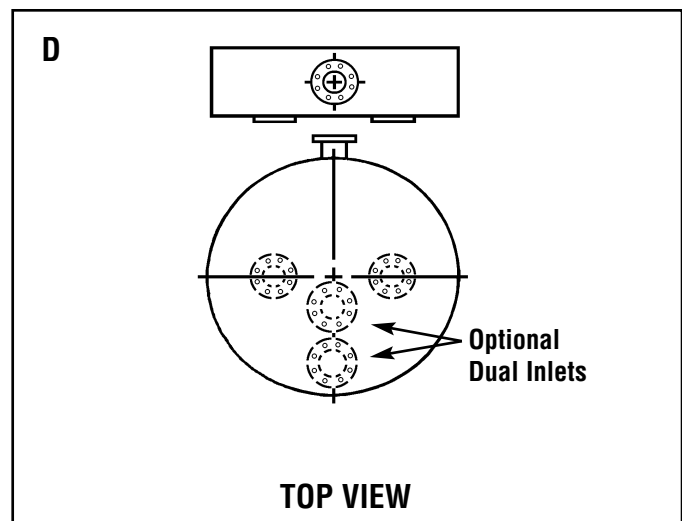
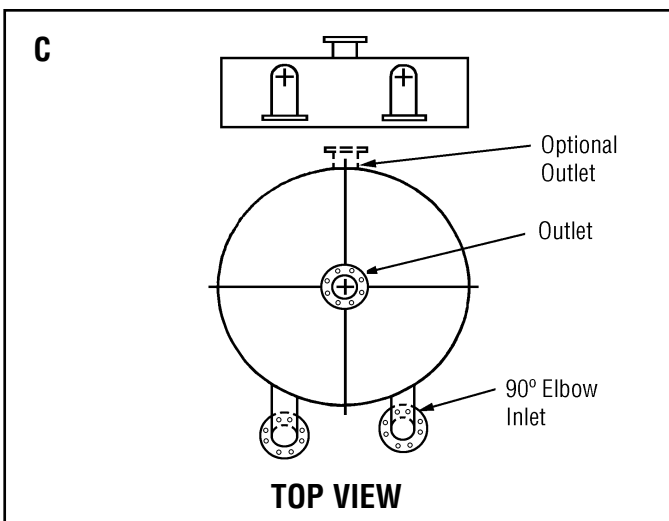
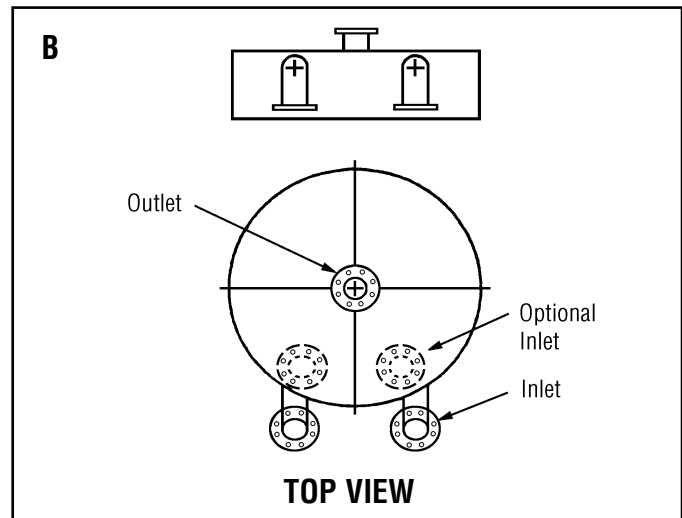
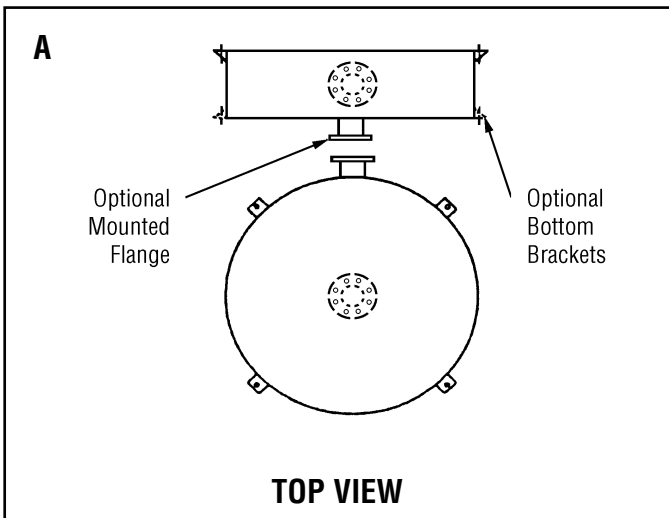


**NOTE:**  
 Dual inlets and rectangular outlets are available as an option for additional space savings.  
 Rectangular piping, gaskets and rain caps are available where required

**NOTE:**  
 #6 - #8 Additional Cost

**HAPCO  
Low Profile  
Silencer Options**

HANGER BRACKETS SET	DUAL INLETS SIDE IN WITH PIPE ELBOWS	DUAL INLETS OUTLET OPTIONS	DUAL INLETS BOTTOM INLET WITH WELD NUTS
OPTION A	OPTION B	OPTION C	OPTION D
OUTLET SIZE	INLET SIZE	INLET SIZE	OUTLET SIZE
2.5" - 3"	5" - 6"	5" - 6"	5" - 6"
3.5" - 4"	8" - 10"	8" - 10"	8" - 10"
5" - 6"	12" - 14"	12" - 14"	12" - 14"
8" - 10"	16" - 18"	16" - 18"	16" - 18"
12" - 14"	20" - 24"	20" - 24"	20" - 24"
16" - 20"			



**HAPCO**  
**LPRS Series**  
**Rectangular Low Profile**

## LPRS Series

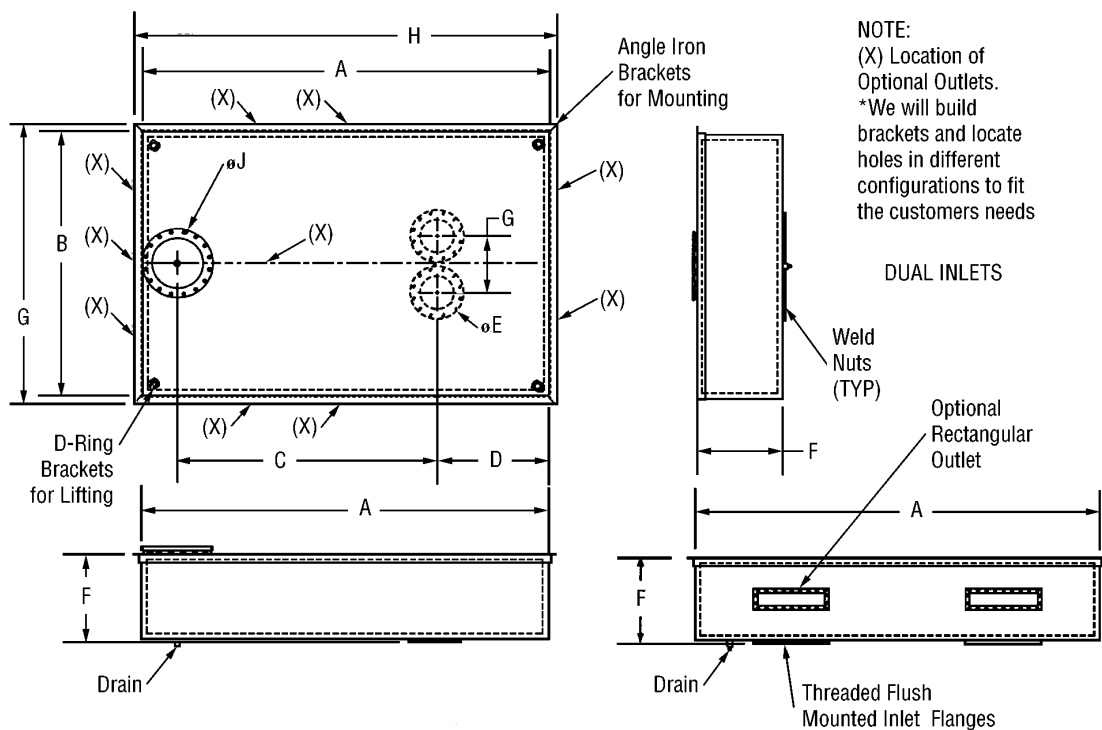
The HAPCO Low Profile engine exhaust silencer is designed in a rectangular format to be used as part of the roof structure on generator enclosures and where the silencer envelope is limited.

### Features:

- Rectangular silencers are available for all engines. Call for prices, sizes and availability
- Recommended for Critical Grade and Super Critical applications
- Insulated internally
- A particulate trap can be designed into the silencer with access doors

### Information needed when ordering:

- Engine type
- CFM
- Exhaust temperature of engine
- Maximum back pressure allowed by manufacturer
- What type of structure the silencer will be installed into
- The envelope or space that is available for the silencer
- Noise specification required at a prescribed distance



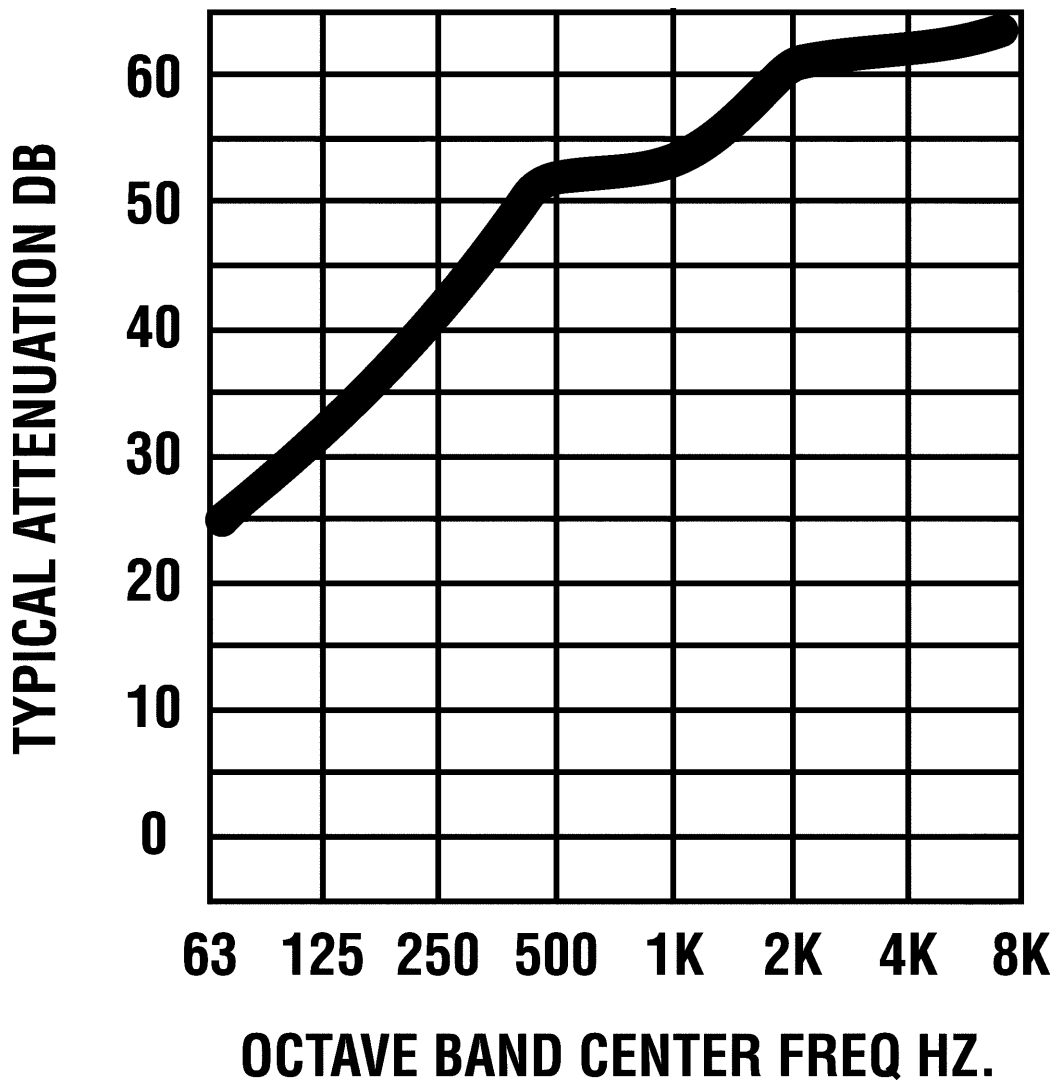
All the dimension letters necessary to identify the size of the silencer. Please refer to this page when placing an order. INLETS or OUTLETS can have different locations, depending on the engine and other elements.

***When ordering a silencer with rectangular Inlet or Outlet ducts, please contact HARCO Manufacturing's Engineering Department for duct size and components. Components consist of rectangular 90 degree elbows, gaskets, insulated flange ducting and weather stop.***

**HAPCO**  
**Low Profile Series Dual CFH Silencer in Tandem**  
**Test Chart**

**Test distance:** 6 feet from exhaust outlet  
**Pressure drop:** 10" to 12" H<sub>2</sub>O

**Velocity:** 7000FPM  
**Engine:** Cat 3516B

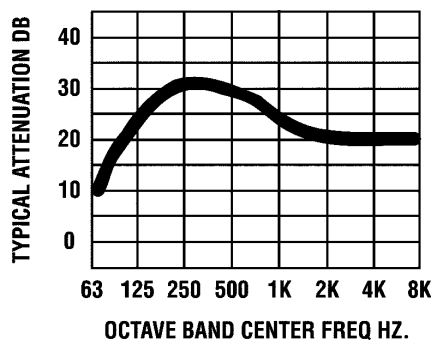


**HAPCO**  
**Residential Grade - RSL Series**  
**End Inlet - End Outlet**

SIZE INLET MODEL	DWG #	A	A1	B	C	D	E	F	WT (Lbs.)
624RSL1-4	2200A-1	1.25	1.25	6	24	29	0.5	2	13
724RSL1-8	2201A-1	1.5	1.5	7	24	30	0.5	2.5	15
7524RSL2	2202A-1	2	2	7.5	24	30	0.5	2.5	18
826RSL2-8	2203A-1	2.5	2.5	8	26	32.75	0.875	2.5	31
930RSL3	2204A-1	3	3	9	30	36.5	0.75	2.5	52.5
1030RSL3-8	2205A-1	3.5	3.5	10	30	36.25	0.625	2.5	52.5
1136RSL4	2206A-1	4	4	11	36	44.75	0.875	3.5	80
1242RSL5	2207A-1	5	5	12	42	50.75	0.875	3.5	88
1448RSL6	2208A-1	6	6	14	48	56.75	0.875	3.5	141
2052RSL8	2209A-1	8	8	20	52	65.5	3.25	3.5	285
2472RSL10	2210A-1	10	10	24	72	88	4	4	419
2872RSL12	2211A-1	12	12	28	72	86.25	3.125	4	498
3080RSL14	2212A-1	14	14	30	80	94.75	3.375	4	726
3688RSL16	2213A-1	16	16	36	88	104.75	4.375	4	898
3898RSL18	2214A-1	18	18	38	98	114.75	4.375	4	980
42130RSL20	2215A-1	20	20	42	130	152	5	6	1700
48142RSL22	2216A-1	22	22	48	142	170.5	8.25	6	2200
48152RSL24	2217A-1	24	24	48	152	180.5	8.25	6	2400
54168RSL26	2218A-1	26	26	54	168	196.5	8.25	6	3300
60177RSL28	2219A-1	28	28	60	177	205.5	8.25	6	5400
66185RSL30	2220A-1	30	30	66	185	216	9.5	6	6500
72185RSL36	2221A-1	36	36	72	185	216	9.5	6	8200

\*For price information see Section 2 Page 2

\*Note Estimated weight only



**Recommended Applications:**

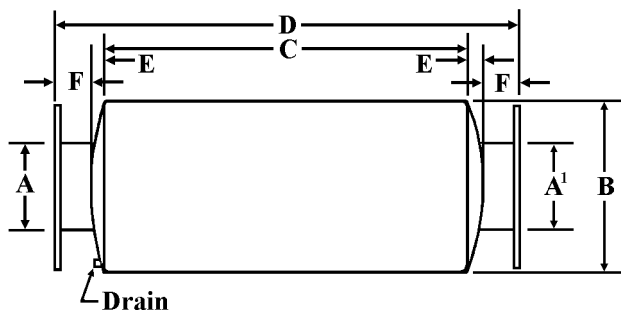
- Emergency Diesel Generator Sets
- Mobile Equipment
- Air intake silencer on diesel engines
- Other types of applications where the surrounding noise level is medium
- Marine
- Oil Field Equipment
- Railroad Rightaway Equipment
- Airport Equipment
- Logging & Construction
- Military Equipment

**Features:**

- Attenuation 18 - 23 dBA
- All welded heavy steel construction

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Gaskets HiTemp
- Nuts & Bolts
- Flanges
- Wye Connectors
- Optional materials available like Corten and Stainless Steel
- Explosion Relief Vents
- Inspection Ports
- Wall & Roof Thimbles
- Insulated Blankets
- Mitered Exhaust Pipe Extension with Bird Screen
- Rain Caps
- Flanged Spools

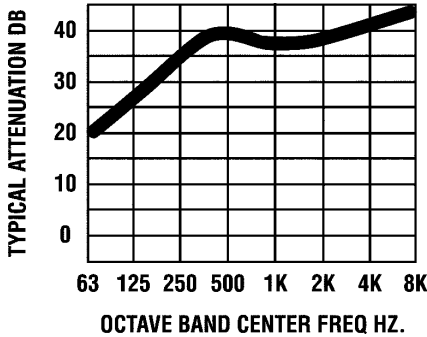


**HAPCO**  
**Residential Grade - RSL Series**  
**Side Inlet - End Outlet**

SIZE INLET MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
624RSL1-4 SI	2300A-1	1.25	1.25	6	24	27.5	0.5	2.25	3	2	24.5	15
726RSL1-8 SI	2300A-5	1.5	1.5	7	26	28.75	0.5	2.25	3	2	25.75	20
7528RSL2 SI	2300A-7	2	2	7.5	28	30.75	0.5	2.25	3	2	27.75	20
832RSL2-8 SI	2301A-1	2.5	2.5	8	32	36.25	0.875	3.375	3.25	2.5	33	22
932RSL3 SI	2302A-1	3	3	9	32	36	0.875	3.375	3.5	2.5	32.5	40
1036RSL3-8 SI	2303A-1	3.5	3.5	10	36	40	0.875	3.125	4	2.5	36	63
1138RSL4 SI	2304A-1	4	4	11	38	43.25	0.875	4.375	4.25	3.5	39	68
1248RSL5 SI	2305A-1	5	5	12	48	53.25	0.875	4.375	4.75	3.5	48.5	86
1458RSL6 SI	2306A-1	6	6	14	58	63.25	0.875	4.375	5.5	3.5	57.5	113
2064RSL8 SI	2307A-1	8	8	20	64	77.5	3.25	6.75	10.75	4	68.5	270
2286RSL10 SI	2308A-1	10	10	22	86	97	3.5	7.5	10.75	4	86.25	475
2690RSL12 SI	2309A-1	12	12	26	90	102	4	8	12.5	4	89.5	575
3094RSL14 SI	2310A-1	14	14	30	94	107	4.5	8.5	15.5	4	91.5	850
3610RSL16 SI	2311A-1	16	16	36	106	120.5	5.25	9.25	17.25	4	103.25	975
38112RSL18 SI	2312A-1	18	18	38	112	127.8	6	10	19	4	109	1170
42130RSL20 SI	2313A-1	20	20	42	130	146.5	6.25	10.25	20.25	4	126.25	1570
42148RSL22 SI	2314A-1	22	22	42	148	165.25	6.62	10.62	22.25	4	143	1750
48176RSL24 SI	2315A-1	24	24	48	176	202	8.25	14.25	24.25	5	177.75	2600
54194RSL26SI	2316A-1	26	26	54	194	222.5	8.25	14.25	25.25	5	197.25	3700
60202RSL28 SI	2317A-1	28	28	60	202	230.5	10	16	28	5	202.5	5800
66224RSL30 SI	2318A-1	30	30	66	224	245	11	17	30	5	215	7200
72224RSL36 SI	2319A-1	36	36	72	224	245	11	17	30	5	215	8400

\*For price information see Section 2 Page 2

\*Note Estimated weight only



**Recommended Applications:**

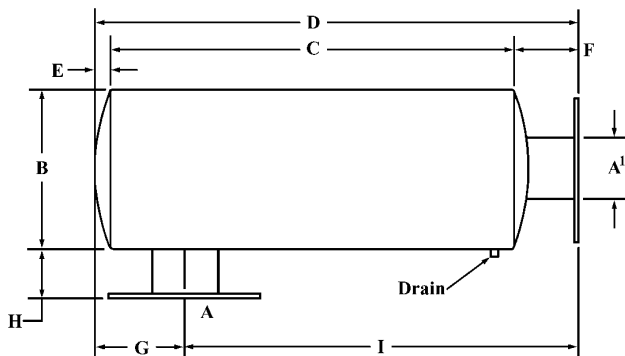
- Emergency Diesel Generator Sets
- Mobile Equipment
- Air intake silencer on diesel engines
- Other types of applications where the surrounding noise level is medium
- Marine
- Oil Field Equipment
- Railroad Rightaway Equipment
- Airport Equipment
- Logging & Construction
- Military Equipment

**Features:**

- Attenuation 18 - 23 dBA
- Heavy duty all welded steel construction
- High temperature primer and paint
- Condensation drain included
- 3" inlet size and larger flanged

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Gaskets HiTemp
- Nuts & Bolts
- Flanges
- Wye Connectors
- Optional materials available like Corten and Stainless Steel
- Explosion Relief Vents
- Inspection Ports
- Wall & Roof Thimbles
- Insulated Blankets
- Mitered Exhaust Pipe Extension with Bird Screen
- Rain Caps
- Flanged Spools

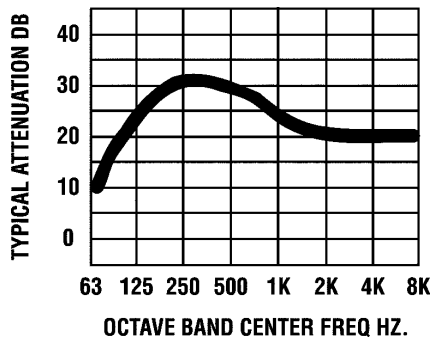


**HAPCO**  
**Residential Grade Marine VMS Series**  
**Compact Design - End Inlet - End Outlet**

MODEL INLET SIZE	DWG #	A	A1	B	C	D	E	F	WT (Lbs.)
528VMS2	2400A-1	2	2	5	28	35	0.5	3	19
635VMS2-8	2401A-1	2.5	2.5	6	35	43	0.5	3.5	39
740VMS3	2402A-1	3	3	7	40	48	0.5	3.5	56
848VMS3-8	2403A-1	3.5	3.5	8	48	56.75	0.875	3.5	62
948VMS4	2404A-1	4	4	9	48	56.75	0.875	3.5	87
1148VMS5	2405A-1	5	5	11	48	56.75	0.875	3.5	110
1154VMS6	2406A-1	6	6	11	54	63.75	0.875	4	148
1457VMS8	2407A-1	8	8	14	57	66.75	0.875	4	208
1874VMS10	2408A-1	10	10	18	74	88	3	4	345
2280VMS12	2409A-1	12	12	22	80	93	3.5	4	485
2490VMS14	2410A-1	14	14	24	90	103.5	3.75	4	630
2896VMS16	2411A-1	16	16	28	96	112	4	4	760

\*For price information see Section 2 Page 2

\*Note Estimated weight only



**Recommended Applications:**

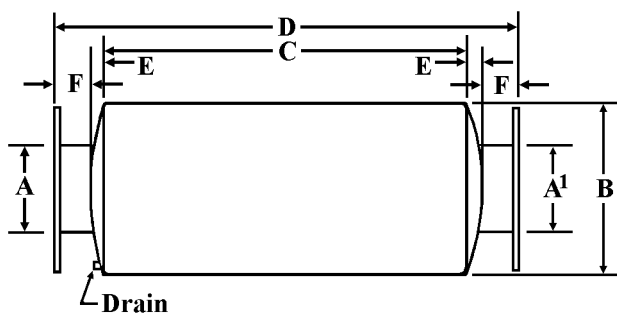
- Diesel exhaust on Marine applications where the silencer exhaust diameter is limited

**Features:**

- Attenuation 18 - 26 dBA
- All welded steel or optional stainless steel
- High temperature primer and paint
- Flanged connections

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Gaskets HiTemp
- Nuts & Bolts
- Flanges
- Wye Connectors
- Optional materials available like Corten and Stainless Steel
- Explosion Relief Vents
- Inspection Ports
- Wall & Roof Thimbles
- Insulated Blankets
- Mitered Exhaust Pipe Extension with Bird Screen
- Rain Caps
- Flanged Spools





**HAPCO**  
**Semi - Residential Grade IRTS Series**  
**End Inlet - End Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	WT (Lbs.)
1024IRTS3-8	2500A-1	3.5	3.5	10	24	32.75	0.875	3.5	40
1130IRTS4	2501A-1	4	4	11	30	38.75	0.875	3.5	65
1230IRTS5	2502A-1	5	5	12	30	38.75	0.875	3.5	70
1248IRTS6	2503A-1	6	6	12	48	56.75	0.875	3.5	98
1658IRTS8	2504A-1	8	8	16	58	68	1	4	170
1860IRTS10	2505A-1	10	10	18	60	74	3	4	250
2467IRTS12	2506A-1	12	12	24	67	82	3.75	4	300
2674IRTS14	2507A-1	14	14	26	74	90	4	4	320
2890IRTS16	2508A-1	16	16	28	90	106.75	4.375	4	550
30103IRTS18	2509A-1	18	18	30	103	120	4.5	4	670
36123IRTS20	2510A-1	20	20	36	123	143.5	5.25	5	985
42132IRTS22	2511A-1	22	22	42	132	155.25	6.625	5	1310
42156IRTS24	2512A-1	24	24	42	156	179.25	6.625	5	1600
48169IRTS26	2513A-1	26	26	48	169	195.5	8.25	5	2100
48193IRTS28	2514A-1	28	28	48	193	219.5	8.25	5	2600
54233IRTS30	2515A-1	30	30	54	233	259.5	8.25	5	3000

\*For price information see Section 2 Page 3

\*Note Estimated weight only

**Features:**

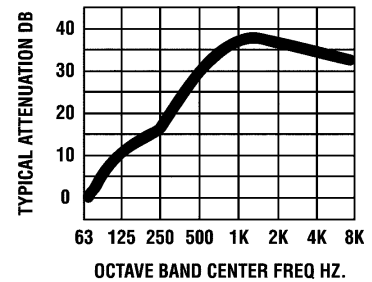
- Attenuation 22-27dBA for low pressure drop applications
- All welded steel or optional stainless steel
- High temperature primer and paint
- Flanged connections

**Recommended Applications:**

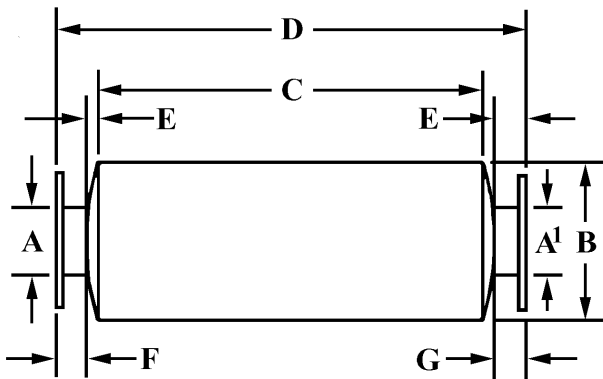
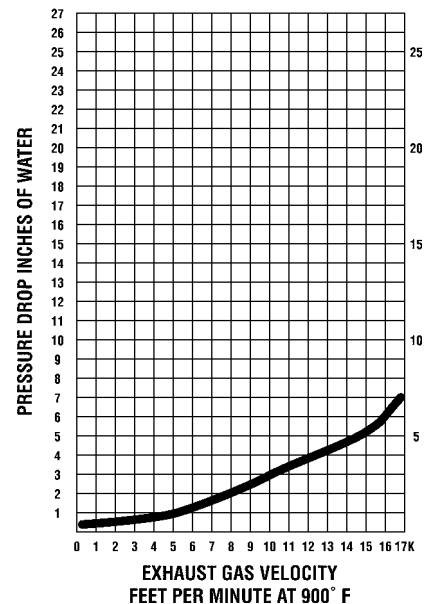
- Absorptive type design
- Designed for high frequency noise commonly found in:
  - Gas Turbine
  - Vacuum Pump Discharge
  - Centrifugal Compressors
  - Blower Discharge
  - Some Diesel Exhaust Systems

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Gaskets HiTemp
- Nuts & Bolts
- Flanges
- Wye Connectors
- Optional materials available like Corten and Stainless Steel
- Explosion Relief Vents
- Inspection Ports
- Wall & Roof Thimbles
- Insulated Blankets
- Mitered Exhaust Pipe Extension with Bird Screen
- Rain Caps
- Flanged Spools



**EXHAUST VELOCITY PRESSURE LOSS SIZING CHART**

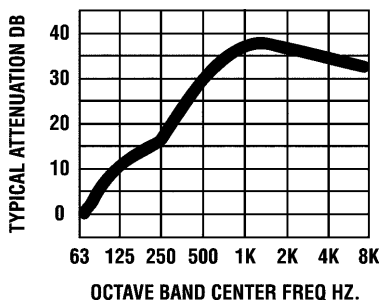


**HAPCO**  
**SEMI - Residential Grade IRTS Series**  
**Side Inlet - End Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
1029IRTS3-8SI	2600A-1	3.5	3.5	10	29	34.25	0.875	4.375	3.5	3.5	30.75	48
1137IRTS4SI	2601A-1	4	4	11	37	42.25	0.875	4.375	3.75	3.5	38.5	61
1242IRTS5SI	2602A-1	5	5	12	42	47.25	0.875	4.375	4.5	3.5	42.75	73
1248IRTS6SI	2603A-1	6	6	12	48	53.25	0.875	4.375	5	3.5	48.25	85
1660IRTS8SI	2604A-1	8	8	16	60	66	1	5	6	4	60	196
1866IRTS10SI	2605A-1	10	10	18	66	76	3	7	10.25	4	65.75	272
2478IRTS12SI	2606A-1	12	12	24	78	88	3	7	10.5	4	77.5	455
2688IRTS14SI	2607A-1	14	14	26	88	98.25	3.125	7.125	11.5	4	86.75	560
2896IRTS16SI	2608A-1	16	16	28	96	106.125	3.125	7	13.5	4	92.75	620
30105IRTS18SI	2609A-1	18	18	30	105	115.75	3.375	7.375	16	4	99.75	795
36124IRTS20SI	2610A-1	20	20	36	124	137.75	4.375	9.375	17	5	120.75	1182
42143IRTS22SI	2611A-1	22	22	42	143.5	140.75	5.75	10.5	19	5	141	1500
42198IRTS24SI	2612A-1	24	24	42	198.5	215	5.75	10.75	21.5	5	193.5	1710
48212IRTS26SI	2613A-1	26	26	48	212	232	7	13	22	5	209	2400
48225IRTS28SI	2614A-1	28	28	48	225	245	7.5	13.5	23.5	5	221.5	3240
54253IRTS30SI	2615A-1	30	30	54	253.5	275	8.25	13.25	24.5	5	250.5	3992
60274IRTS36SI	2616A-1	36	36	60	274.5	296	8.25	13.25	29	5	267	4906

\*For price information see Section 2 Page 3

\*Note Estimated weight only



**Recommended Applications:**

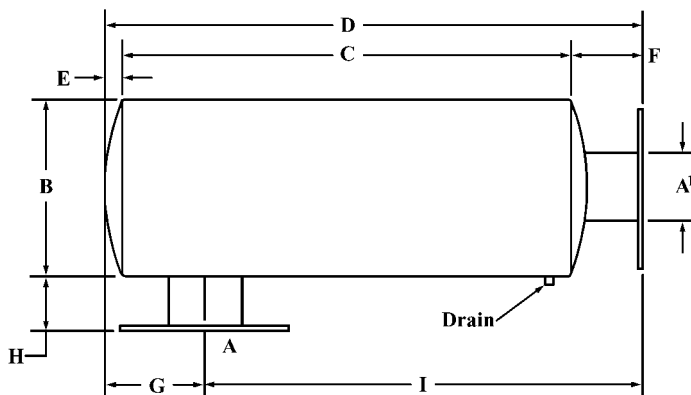
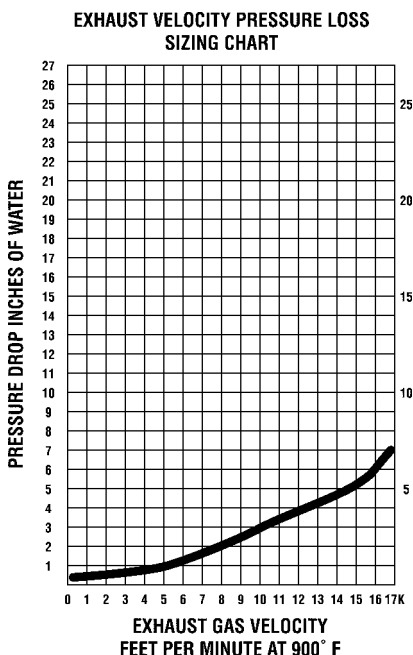
- Absorptive type design
- Designed for high frequency noise commonly found in:
  - Gas Turbine
  - Vacuum Pump Discharge
  - Centrifugal Compressors
  - Blower Discharge
  - Some Diesel Exhaust Systems

**Features:**

- Attenuation 22-27dBA for low pressure drop applications
- All welded steel or optional stainless steel
- High temperature primer and paint
- Condensation drain included
- Flanged connections

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Gaskets HiTemp
- Nuts & Bolts
- Flanges
- Wye Connectors
- Optional materials available like Corten and Stainless Steel
- Explosion Relief Vents
- Inspection Ports
- Wall & Roof Thimbles
- Insulated Blankets
- Mitered Exhaust Pipe Extension with Bird Screen
- Rain Caps
- Flanged Spools

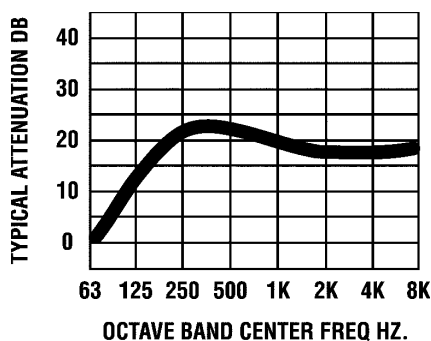


**HAPCO**  
**Industrial Grade - M Series**  
**End Inlet - End Outlet**

INLET SIZE MODEL	DWG #	A	A1	B	C	D	E	F	WT (Lbs.)
M512-1-4	2700A-1	1.25	1.25	5	12	17.5	0.5	2.25	5
M612-1-8	2701A-1	1.5	1.5	6	12	17.5	0.5	2.25	9
M712-2	2702A-1	2	2	7	12	17.5	0.5	2.25	11.5
M715-2-8	2703A-1	2.5	2.5	7	15	21	0.5	2.5	14
M822-3	2704A-1	3	3	8	22	28.75	0.875	2.5	18
M924-3-8	2705A-1	3.5	3.5	9	24	31.75	0.875	3	37
M926-4	2706A-1	4	4	9	26	33.75	0.875	3	40
M1030-5	2707A-1	5	5	10	30	37.65	0.875	3	47
M1030-5-8	2708A-1	5.5	5.5	10	30	37.65	0.825	3	48
M1236-6	2709A-1	6	6	12	36	45.65	0.825	4	86
M1852-8	2710A-1	8	8	18	52	66	3	4	176
M2060-10	2711A-1	10	10	20	60	74.5	3.25	4	242
M2468-12	2712A-1	12	12	24	68	82	3	4	380
M2872-14	2713A-1	14	14	28	72	88.75	4.375	4	470
M3074-16	2714A-1	16	16	30	74	91	4.5	4	640
M3676-18	2715A-1	18	18	36	76	96.5	5.25	5	700
M4278-20	2716A-1	20	20	42	78	101.25	6.625	5	760
M4280-22	2717A-1	22	22	42	80	103.25	6.625	5	820
M4885-24	2718A-1	24	24	48	85.5	112	8.25	5	960
M5495-26	2719A-1	26	26	54	95.5	124	8.25	6	1100

\*For price information see Section 2 Page 1

\*Note Estimated weight only



**Recommended Applications:**

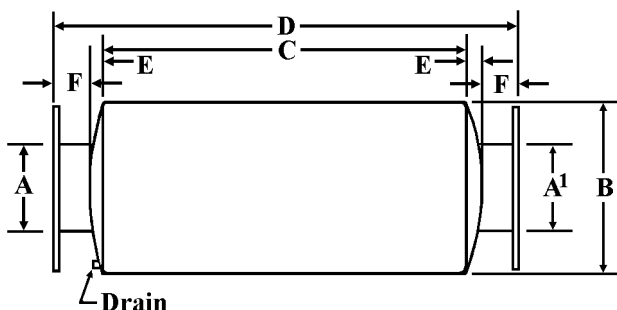
- Construction
- Logging
- Oil Fields
- Irrigation Pumps
- Other industrial applications where background noise is relatively high
- Rock Crusher Facilities
- Mining Type Industries

**Features:**

- Attenuation 15 - 22 dBA
- Heavy duty all welded steel construction
- Inlet size 1.25" through 3.0" threaded or slip fit, larger size slip fit or flanged

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Gaskets HiTemp
- Nuts & Bolts
- Flanges
- Wye Connectors
- Optional materials available like Corten and Stainless Steel
- Explosion Relief Vents
- Inspection Ports
- Wall & Roof Thimbles
- Insulated Blankets
- Mitered Exhaust Pipe Extension with Bird Screen
- Rain Caps
- Flanged Spools

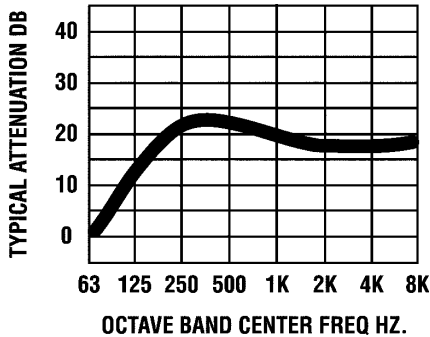


**HAPCO**  
**Industrial Grade - M Series**  
**Side Inlet**

SIZE INLET MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
M612-1-8 SI	2800A-1	1.5	1.5	6	12	15.25	0.5	2.75	2	2.5	13.25	11.5
M716-2 SI	2805A-1	2	2	7	16	19	0.5	2.5	2.5	2.5	16.5	18
M720-2-8 SI	2801A-1	2.5	2.5	7	20	23	0.5	2.5	3	2.5	20	20
M822-3 SI	2802A-1	3	3	8	22	25.875	0.875	3	3.5	3	22.375	29
M928-3-8 SI	2803A-1	3.5	3.5	9	28	31.875	0.875	3	4	3	27.87	37
M1028-4 SI	2804A-1	4	4	10	28	32.375	0.875	3.5	4	4	28.375	60
M1130-5 SI	2805A-1	5	5	11	30	34.375	0.875	3.5	6	4	28.375	75
M1236-6 SI	2806A-1	6	6	12	36	41.75	0.875	4.875	6	4	35.75	86
M2054-8 SI	2807A-1	8	8	20	54	64.5	3.25	7.25	11.25	4	53.25	190
M2464-10 SI	2808A-1	10	10	24	64	75.5	3.75	7.75	12.75	4	61.75	369
M2872-12 SI	2809A-1	12	12	28	72	84.75	4.375	8.375	14.5	4	70.25	455
M3080-14 SI	2810A-1	14	14	30	80	93	4.5	8.5	15.5	4	77.5	685
M36106-16 SI	2811A-1	16	16	36	106	120.5	5.25	9.25	17.25	5	103.25	1031
M38116-18 SI	2812A-1	18	18	38	116	132	6	10	19	5	113	1264
M42104-20 SI	2813A-1	20	20	42	104	121.25	6.625	10.625	26.125	5	95.125	1400
M42112-22 SI	2814A-1	22	22	42	112	129.25	6.625	10.625	27	5	102.25	1450
M48122-24 SI	2815A-1	24	24	48	122	142.5	8.25	12.25	29.75	5	112.75	1600
M54126-26 SI	2816A-1	26	26	54	126	146.5	8.25	12.25	30.75	5	115.75	1800

\*For price information see Section 2 Page 1

\*Note Estimated weight only



**Recommended Applications:**

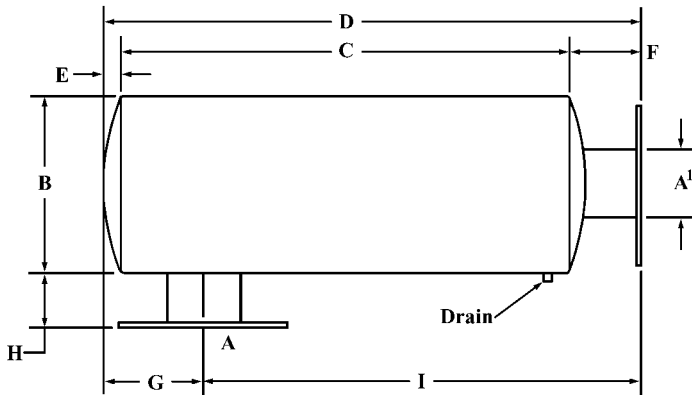
- Construction
- Logging
- Oil Fields
- Irrigation Pumps
- Other industrial applications where background noise is relatively high
- Rock Crusher Facilities
- Mining Industries

**Features:**

- Attenuation 15 - 22 dBA
- Heavy duty all welded steel construction
- Inlet size 1.25" through 3.0" threaded or slip fit, larger size slip fit or flanged

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Gaskets HiTemp
- Nuts & Bolts
- Flanges
- Wye Connectors
- Optional materials available like Corten and Stainless Steel
- Explosion Relief Vents
- Inspection Ports
- Wall & Roof Thimbles
- Insulated Blankets
- Mitered Exhaust Pipe Extension with Bird Screen
- Rain Caps
- Flanged Spools



## HAPCO

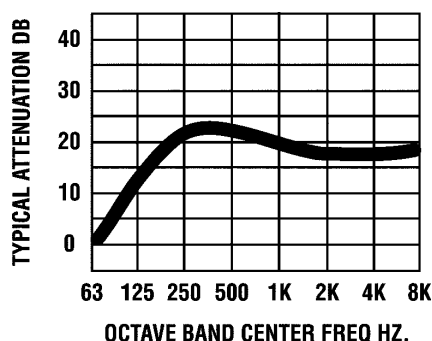
### Industrial Grade - M Series Exhaust Silencer

#### Side Inlet - End Outlet

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	J	WT (Lbs.)
M720-2-8 SI	2900A-1	2.5	2.5	7	20	27.5	0.5	7	3	4	17	24.5	18
M824-3 SI	2901A-1	3	3	8	24	32	0.875	7	3.5	4	20.5	28.5	30
M928-3-8 SI	2902A-1	3.5	3.5	9	28	37.875	0.875	9	4	4	24	34	37
M1028-4 SI	2903A-1	4	4	10	28	39	0.875	10	4	4	24	35	50
M1130-5 SI	2904A-1	5	5	11	30	43	0.875	12	6	4	24	37	77
M1236-6 SI	2905A-1	6	6	12	36	53	0.875	16	6	4	30	47	83
M2054-8 SI	2906A-1	8	8	20	54	75.25	3.25	18	11.25	6	42.75	64	237
M2464-10 SI	2907A-1	10	10	24	64	85.75	3.75	18	12.75	6	51.25	73	369
M2872-12	2908A-1	12	12	28	72	96.375	4.375	20	14.5	6	57.5	81.875	548
M3080-14 SI	2909A-1	14	14	30	80	108.5	4.5	24	15.5	6	64.5	93	797
M3690-16 SI	2910A-1	16	16	36	90	119.25	5.25	24	17.25	6	72.75	102	985
M3896-18 SI	2911A-1	18	18	38	96	130	6	28	19	6	77	111	1150

\*For price information see Section 2 Page 1

\*Note Estimated weight only



#### Recommended Applications:

- Construction
- Logging
- Oil Fields
- Irrigation Pumps
- Areas where background noise is relatively high

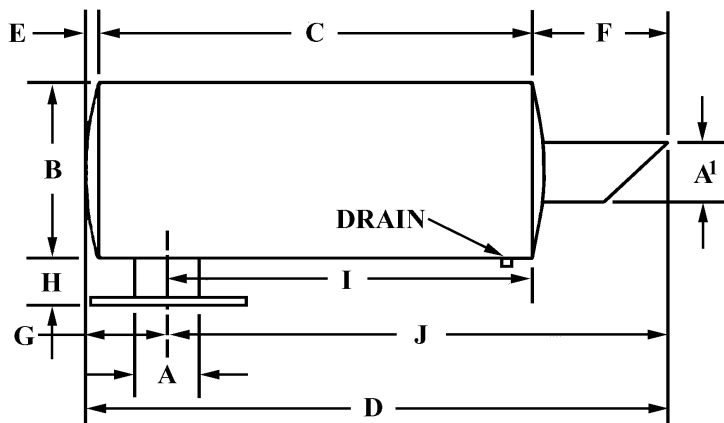
#### Features:

- Attenuation 15 - 22 dBA
- Bird screen on outlet end included
- Heavy duty welded
- High temperature primer and paint
- Inlet connections pipe thread to 3.5", larger sizes flanged
- NOTE: OEM units may be manufactured with slip fit inlets on all sizes
- Dimension "J" may be changed to conform with engine specifications

#### Accessories:

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- Gaskets HiTemp
- Nuts & Bolts
- Flanges
- Wye Connectors
- Optional materials available like Corten and Stainless Steel
- Explosion Relief Vents
- Inspection Ports
- Wall & Roof Thimbles
- Insulated Blankets
- Mitered Exhaust Pipe Extension with Bird Screen
- Rain Caps
- Flanged Spools

\*NOTE: BIRD SCREEN ON OUTLET END



**Spark Arresting Silencers  
 Spark Arresting Muffler (SAM)  
 Industrial Grade**

*U.S.F.S. qualified under Std. 5100-1 and Dept. of Defense spec. MIL A-27302A.*

SIZE MODEL	DWG #	CFM (MAX.)	DIA.	LENGTH	I.D. (INLET)	O.D. (OUTLET)	WT (Lbs.)
SAM 13	3200A-1	96	3.50	10	.5 - 1	1.25	4
SAM 24	3201A-1	167	4.50	12	1.25 - 1.75	1.75	6
SAM 36	3202A-1	205	6.00	19	1.75 - 2.5	2.50	10
SAM 48	3203A-1	485	7.50	22	2.5 - 3	3.00	14
SAM 59	3204A-1	705	8.25	24	3 - 3.75	4.00	19
SAM 69	3205A-1	1168	8.25	29	3.5 - 5	5.00	23

*Meets or exceeds U.S.F.S. Std. 5100-1 and Dept. of Defense spec. MIL A-237302A.*

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	WT (Lbs.)
SAM 13	3200A-1	.5 - 1	.5 - 1	3.50	6	10	.375	1.625	4
SAM 24	3201A-1	1.25 - 1.75	1.25 - 1.75	4.50	8.25	12	.375	1.5	6
SAM 36	3202A-1	1.75 - 2.5	1.75 - 2.5	6.00	14	19	.5	2	10
SAM 48	3203A-1	2.5 - 3	2.5 - 3	7.50	14.75	22	.5	3.125	14
SAM 59	3204A-1	3 - 3.75	3 - 3.75	8.25	20	24	.75	1.25	19
SAM 69	3205A-1	3.5 - 5	3.5 - 5	8.25	22	29	.75	2.625	23
SAM 712	3206A-1	4 - 6	4 - 6	10.00	24	32	.875	3.125	42
SAM 817	3207A-1	6 - 8.5	6 - 8.5	17.00	27	38	1	1	125
SAM 1024	3208A-1	8 - 12	8 - 12	24.00	36.5	50	3.75	3	195
SAM 1228	3209A-1	12 - 14	12 - 14	28.00	60	75.75	4.375	3.5	240

*\*For price information see Section 2 Page 2*

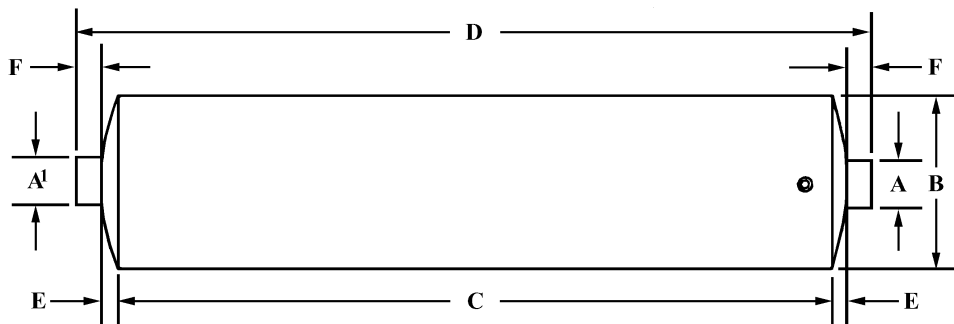
*\*Note Estimated weight only*

**Features:**

- Attenuation 8 - 19 dBA
- U.S.F.S. approved most sizes - *if required please specify when ordering*
- When ordering specify vertical or horizontal installation
- Optional side inlets and outlets, pipe threads, flanges and rain caps available, call for quote on sizes

**Accessories:**

- Rain cap
- Exhaust Elbows
- Mounting Bands
- Flange & Gasket Kits
- High Temp Blankets



**HAPCO**  
**Spark Arresting Silencer (SASR)**  
**Residential Grade**

*U.S.F.S. qualified under Std. 5100-1 and Dept. of Defense spec. MIL A-27302A.*

SIZE MODEL	DWG #	CFM (MAX.)	DIA.	LENGTH	I.D. (INLET)	O.D. (OUTLET)	WT (Lbs.)
SASR 13	3210A-1	96	3.5	13	.5 - 1.25	1.25	6
SASR 24	3211A-1	167	4.5	15	1.25 - 1.75	1.75	7
SASR 36	3212A-1	205	6	22	1.75 - 2.5	2.50	12
SASR 48	3213A-1	485	7.5	26	2.5 - 3	3.00	17
SASR 59	3214A-1	705	8.25	30	3 - 3.5	4.00	25
SASR 69	3215A-1	1168	8.25	36	3.5 - 5	5.00	27

*Meets or exceeds U.S.F.S. Std. 5100-1 and Dept. of Defense spec. MIL A-27302A.*

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	WT (Lbs.)
SASR 13	3210A-1	.5 - 1.25	.5 - 1.25	3.5	10	13	.375	1.125	6
SASR 24	3211A-1	1.25 - 1.75	1.25 - 1.75	4.5	11	15	.375	1.25	7
SASR 36	3212A-1	1.75 - 2.5	1.75 - 2.5	6	18	22	.5	1.5	12
SASR 48	3213A-1	2.5 - 3	2.5 - 3	7.5	22	26	.5		17
SASR 59	3214A-1	3 - 3.5	3 - 3.5	8.25	23	30	.75	2.75	25
SASR 69	3215A-1	3.5 - 5	3.5 - 5	8.25	29	36	.75	2.75	27
SASR 712	3216A-1	4 - 6	4 - 6	10		48	.875	4.125	50
SASR 817	3217A-1	6 - 8.5	6 - 8.5	17		48	1	5	165
SASR 1024	3218A-1	8 - 12	8 - 12	24		68	3.75		325
SASR 1228	3219A-1	12 - 14	12 - 14	28		72	4.375		450

*\*For price information see Section 2 Page 2*

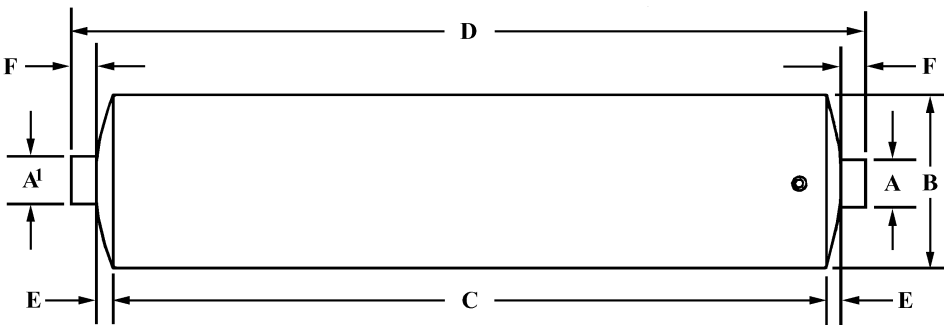
*\*Note Estimated weight only*

**Features:**

- Attenuation 8 - 19 dBA
- U.S.F.S. approved most sizes
- When ordering specify vertical or horizontal installation
- Optional side inlets and outlets, pipe threads, flanges and rain caps available, call for quote on sizes

**Accessories:**

- Rain cap
- Exhaust Elbows
- Mounting Bands
- Flange & Gasket Kits
- High Temp Blankets

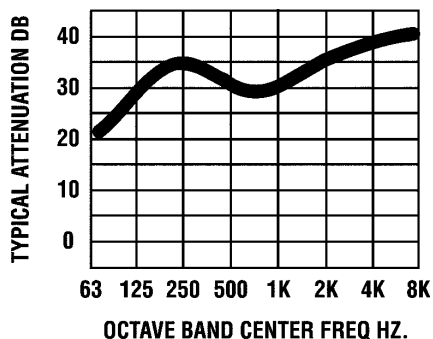


**HAPCO**  
**Super Critical Grade - Spark Arresting Silencer**  
**Side Inlet - End Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	G	H	I	WT (Lbs.)
930VCSA3 SI		3	3	9	30	34.75	0.875	3.875	3.5	3	31.25	48
1139VCSA3-8 SI		3.5	3.5	11	39	43.75	0.875	3.875	3.5	3.5	40.25	73
1254VCSA4 SI		4	4	12	54	58.75	0.875	3.875	4	3.5	54.75	98
1460VCSA5 SI		5	5	14	60	64.75	0.875	3.875	5	3.5	59.75	197
2064VCSA6 SI		6	6	20	64	74	3.25	6.75	8	5	66	321
2470VCSA8 SI		8	8	24	70	81	3.75	7.25	9	4	72	435
2680VCSA10 SI		10	10	26	80	92	4	8	11	4	81	612
2892VCSA12 SI		12	12	28	92	104.75	4.375	8.375	13	4	91.75	760
30102VCSA14 SI		14	14	30	102	115	4.5	8.5	13	4	102	995
36118VCSA16 SI		16	16	36	118	132.5	5.25	9.25	14	5	118.5	1327
42120VCSA18 SI		18	18	42	120	137.25	6.625	10.625	16.75	5	120.5	2075
42130VCSA20 SI		20	20	42	130	148.25	6.625	11.625	18.625	5	129.625	2300
42140VCSA22 SI		22	22	42	140	158.25	6.625	11.625	19.625	5	138.625	2500
48154VCSA24 SI		24	24	48	154	175.5	8.25	13.255	22.25	5	153.25	3100
54174VCSA26 SI		26	26	54	174	197	9	14	23.25	5	173.75	3700
60202VCSA28 SI		28	28	60	202	227	10	15	26	6	203	6200
66218VCSA30 SI		30	30	66	218	244	10.5	15.5	28	6	216.5	7600
72246VCSA32 SI		32	32	72	246	274.5	11.25	17.25	30	6	245	10000

\*For price information see Section 2 Page 7

\*Note Estimated weight only



**Recommended Applications:**

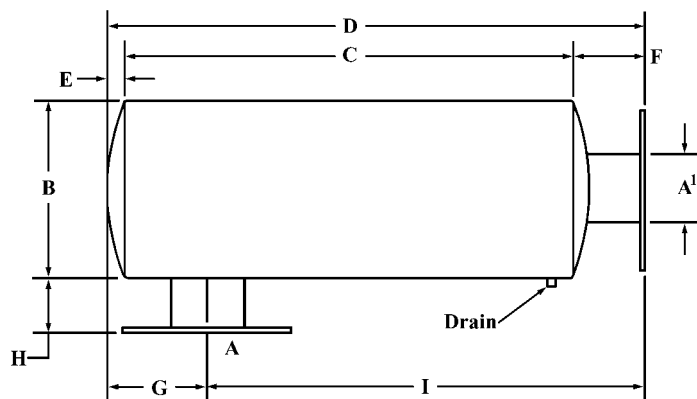
- Suitable for Diesel or N.G. Engine Power Systems

**Features:**

- Attenuation 30 - 42 dBA - 95 to 99% efficiency
- All welded steel construction
- High heat primer and paint
- Available in stainless steel
- Internally insulated for low shell temperature
- Noise reduction is accomplished by a combination of absorption and annulling of noise waves
- Exhaust gases flow through the silencer in a vortex motion
- This design allows for a reduction in silencer diameter
- Refer to Section 2 Page 4 for mounting brackets

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- High Temp Blankets





**Super Critical Grade - Spark Arresting Silencer  
End Inlet - End Outlet**

SIZE MODEL	DWG #	A	A1	B	C	D	E	F	WT (Lbs.)
7520VCSA2		2	2	7.5	20	26	0.5	2.5	22
924VCSA2-8		2.5	2.5	9	24	30.75	0.875	2.5	41
928VCSA3		3	3	9	28	34.75	0.875	2.5	46
1138VCSA3-8		3.5	3.5	11	38	45.75	0.875	3	76
1248VCSA4		4	4	12	48	55.75	0.875	3	107
1454VCSA5		5	5	14	54	61.75	0.875	3	138
2052VCSA6		6	6	20	52	65.5	3.25	3.5	299
2472VCSA8		8	8	24	72	85.5	3.75	3	420
2678VCSA10		10	10	26	78	94	4	4	531
2882VCSA12		12	12	28	82	98.75	4.375	4	712
3088VCSA14		14	14	30	88	105	4.5	4	887
3698VCSA16		16	16	36	98	118.5	5.25	5	1281
4298VCSA18		18	18	42	98	121.25	6.625	5	1789
42106VCSA20		20	20	42	106	129.25	6.625	5	1920
48118VCSA22		22	22	48	118	144.5	8.25	5	2410
48130VCSA24		24	24	48	130	156.5	8.25	5	2600
54152VCSA26		26	26	54	152	182	10	5	3500
60172VCSA28		28	28	60	172	202	10	5	5500
66198VCSA30		30	30	66	198	229	10.5	5	7000
72256VCSA32		32	32	72	256	290.5	11.25	6	11500

\*For price information see Section 2 Page 7

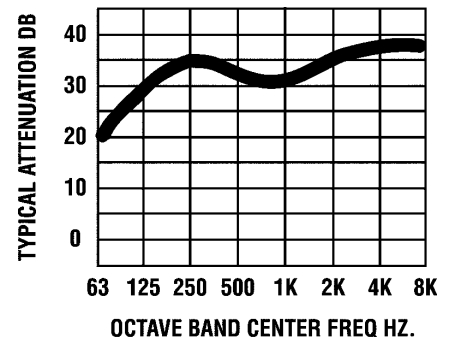
\*Note Estimated weight only

**Features:**

- Attenuation 30-42 dBA velocity not to exceed 9000 FPM
- Spark Arrestor 95 to 99% efficient
- All welded steel construction
- High heat primer and paint
- Available in stainless steel
- Internally insulated for low and annulling of noise waves
- Exhaust gases flow through the silencer in a vortex motion, this design allows for a reduction in silencer diameter

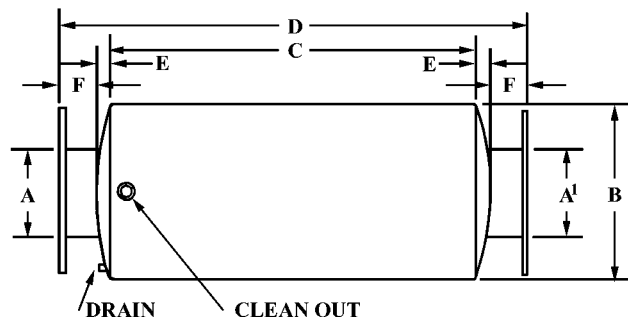
**Recommended Applications:**

- Suitable for Diesel or N. G. Engine Power Systems



**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- High Temp Blankets



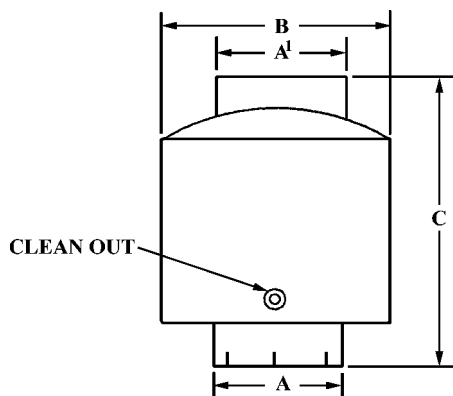
**HAPCO**  
**Spark Arrestor**

SIZE MODEL	DWG #	A INLET	A1 OUTLET	B	C	WT (Lbs.)	CFM MAX.
1AA	3300A-1	.75 - 1.5 ID	1.75 OD	3.5	6	3	96
1AAXH	3301A-1	.75 - 1.5 ID	1.25 OD	3.5	6	3	76
2AA	3302A-1	1.0 - 1.75 ID	2 OD	4.5	6.5	3	167
2AAH	3303A-1	1.0 - 1.75 ID	1.75 OD	4.5	6	3	112
3AA	3304A-1	1.50 - 2.5 ID	2.5 OD	6	9.5	5	265
3AAXH	3305A-1	1.50 - 2.5 ID	2.5 OD	6	9	5	258
4AA	3306A-1	1.75 - 3 ID	3 OD	7	11.5	8	485
4AAH	3307A-1	1.75 - 2.625 ID	3 OD	7	11	8	417
5AA	3308A-1	2.50 - 4 ID	4 OD	9.25	12	10.5	705
5AAH	3309A-1	2.50 - 4 ID	4 OD	9.25	11.5	11	620
6AA	3310A-1	3.50 - 4.5 ID	4 OD	9.25	14	12	717
6AAH	3311A-1	3.50 - 4.5 ID	4 OD	9.25	14	12	848
6AB	3312A-1	3.50 - 5 ID	5 OD	9.25	14	13	1168
7AC1	3313A-1	4.0 - 6.75 ID	6 OD	10	12.5	26	1555
8AC *	3314A-1	6 - 8 ID	8 OD	16	16	42	2930
10AC *	3315A-1	8 - 12 ID	12 OD	18	14	89	5000
12AC	3316A-1	12 - 16 ID	14 OD	20	15	131	8000

\*For price information see Section 2 Page 9

\*Note Estimated weight only

**\*Tested At The Factory Only**



**Recommended Applications:**

- All models listed are rated and qualified by U.S. Forest Service Test Center under STD. 5100-1 and Department of Defense SPEC. MIL. A-27302A

**Features:**

- Attenuation 6 - 10 dBA
- All sizes with (H) indicates horizontal position except for 7AC, this model is qualified in vertical and horizontal position
- All sizes are available in 304 / 316 S.S.
- Available in pipe thread, slip fit and flanged connections
- Clamp included
- Outlet can be reduced to match inlet

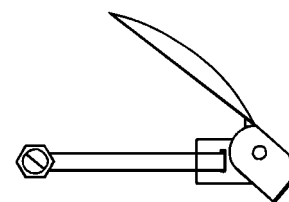
**Accessories:**

- Weather Stops

**OPTIONAL WEATHER STOPS**

WEATHER STOP PART#	STACK SIZE	SPARK ARRESTOR SIZE
#32	UP TO 2-1/2	1AA - 2AA
#44	2-9/16 TO 3-1/8	3AA - 4AA
#64	3-3/16 TO 4-3/4	5AA
#80	4-7/8 TO 5-1/2	6AB
#96	5-5/8 TO 6-1/2	7AC1
#104	6-5/8 TO 7	
#120	7-1/8 TO 7-7/8	
#132	8 TO 8-3/4	

- Stainless Steel Clamp
- Aluminized Steel Cap
- Brass Bushing Hinge
- Adjustable Clamp
- Lightweight
- Adjustable Sizes



\*For price information see Section 2 Page 9

**HAPCO**  
**Locomotive Spark Arrestor**

MODEL	# CYL	# STACK	CID	PART CFM	NUMBER
EMD SW-1	6	1	3402	5500	10AC8 (1)
EMD NW-2	12	2	6804	11000	10AC10 (2)
EMD NW-5	12	2	6804	11000	10AC10 (2)
EMD SW-8	8	1	4540	8250	10AC12 (2)
EMD SW7/9	12	2	6804	11000	10AC10 (2)
EMD SW-900	8	1	4540	8250	10AC12LP (1)
EMD SW-1200	12	2	6810	12000	10AC12LP (2)
EMD SD-7	16	2	9080	16000	12AC12LP (2)
EMD SD-9	16	2	9080	16000	12AC12LP (2)
EMD E-7	24	2	13620	22000	12AC12LP (2)
EMD E-8	24	2	13620	22000	12AC12LP (2)
EMD E-9	24	2	13620	24000	12AC12LP (2)
EMD GP7	16	2	9080	14800	12AC12LP (2)
EMD GP9	16	2	9080	16000	12AC12LP (2)
EMD GP10	16	4	9080	16000	10AC10 (4)
EMD GP18	16	2	10320	19600	12AC12LP (2)
EMD GP28	16	2	10320	19600	12AC12LP (2)
EMD GP38	16	2	10320	19600	12AC12LP (2)

*\*For price information see Section 2 Page 9*

**Features:**

- LP represents low profile design for under hood applications
- All sizes available in T304 and T316 stainless steel
- Prices include mating flange & gasket
- When ordering or requesting a quote indicate: make, model number, size of stacks, diameter & height
- For larger size engine requirements consult the factory

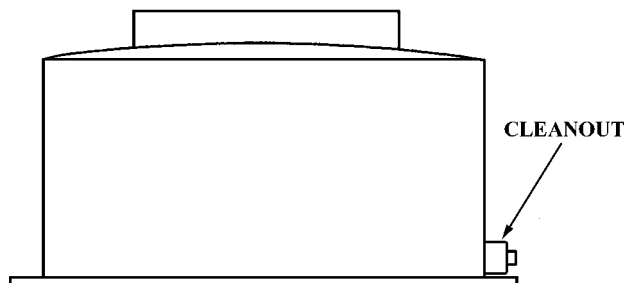
**Recommended Applications:**

- For ALCO or Baldwin Locomotives that require spark arrestors

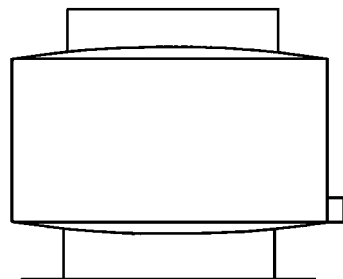
**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets

**12AC 12 LP**



**10AC 10**

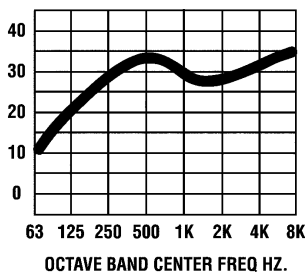


**HAPCO**  
**Critical Grade - Spark Arresting Silencer**  
**End Inlet - End Outlet**

SIZE MODEL	DWG #	A	B	C	D	E	F	WT (Lbs.)
58VRSA-1		1	5	8	13	0.5	2	10
58VRSA1-4		1.25	5	8	13	0.5	2	10
68VRSA1-8		1.5	6	8	13	0.5	2	12
712VRSA2		2	7	12	18	0.5	2.5	15
822VRSA2-8		2.5	8	22	28.75	0.875	2.5	25
824VRSA3		3	8	24	30.75	0.875	2.5	27
924VRSA3-8		3.5	9	24	31.75	0.875	3	35
1030VRSA4		4	10	30	37.5	0.625	3.125	45
1220VRSA4		4	12	20	28.5	0.75	3.5	43
1224VRSA5		5	12	24	32.5	0.75	3.5	45
1236VRSA5		5	12	36	45.5	0.75	4	58
1438VRSA6		6	14	38	47.5	0.75	4	81
1442VRSA6		6	14	42	51.5	0.75	4	85
1648VRSA6		6	16	48	57.5	0.75	4	160
1844VRSA8		8	18	44	56	3	3	222
2248VRSA8		8	22	48	63.5	3.75	4	365
2458VRSA10		10	24	58	73.5	3.75	4	401
2468VRSA12		12	24	68	85.5	3.75	5	460
2874VRSA12		12	28	74	92.75	4.375	5	516
3080VRSA14		14	30	80	99	4.5	5	791
3690VRSA16		16	36	90	110.5	5.25	5	932
36102VRSA18		18	36	102	122.5	5.25	5	1275
7296VRSA20		20	42	96	121.25	6.625	6	1390
42104VRSA22		22	42	104	129.25	6.625	6	1840
48112VRSA24		24	48	112	140.5	8.25	6	2192
54126VRSA26		26	54	126	154.5	8.25	6	2489
54140VRSA28		28	54	140	168.5	8.25	6	2822
60160VRSA30		30	60	160	188.5	8.25	6	3561
66180VRSA32		32	66	180	214	11	6	4484
72242VRSA34		34	72	242	278	12	6	6500
74242VRSA36		36	74	242	278	12	6	7500

\*For price information see Section 2 Page 5

\*Note Estimated weight only



**Recommended Applications:**

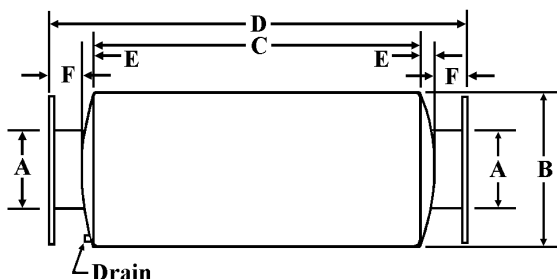
- Hospitals
- Tug and Fishing Boats
- Where the surrounding noise level is low

**Features:**

- Attenuation 18 - 32 dBA
- Listed sound data is based on average sound curves and is not to be used as absolute
- Noise reduction is accomplished by a combination of absorption and annulling of noise waves
- Exhaust gases flow through the silencer in a vortex motion
- This design allows for a reduction in silencer diameter
- Heavy duty all welded steel or stainless steel
- Inlet size 1" - 3.50" MPT
- 95 to 99% efficiency
- Sizes 1" to 10" Alum Steel Wrapper

**Accessories:**

- Flexible Connectors
- Hanger Brackets
- Mounting Bands
- High Temp Blankets



**HARCO Manufacturing Co.** • 7700 SW 69th Avenue • Portland OR 97223 • USA  
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E-mail: sales@harcomanufacturing.com • www.harcomanufacturing.com

**HAPCO**  
**Critical Grade - Spark Arresting Silencer**  
**Side Inlet**

SIZE MODEL	DWG #	A	B	C	D	E	F	G	H	I	WT (Lbs.)
514VRSA1-SI		1	5	14	16.5	0.5	2	1.75	1.5	14.75	9
516VRSA1-4SI		1.25	5	16	18.5	0.5	2	2	2	16.5	10
620VRSA1-8SI		1.5	6	20	22.5	0.5	2	2.5	2.5	20	14
720VRSA2-SI		2	7	20	24.25	0.875	3.375	2.5	2.5	21.75	15
824VRSA2-8SI		2.5	8	24	28.75	0.875	3.875	3	2.5	25.75	28
827VRSA3-SI		3	8	27	31.75	0.875	3.875	3	2.5	28.75	33
926VRSA3-8SI		3.5	9	26	30.75	0.875	3.875	4	3	26.75	41
1036VRSA4-SI		4	10	36	40.75	0.875	3.875	4	4	36.75	70
1230VRSA4-SI		4	12	30	34.75	0.875	3.875	4.5	4	30.25	83
1236VRSA5-SI		5	12	36	40.75	0.875	3.875	5	4	35.75	101
1439VRSA5-SI		5	14	39	43.75	0.875	3.875	5	4	38.75	125
1448VRSA6-SI		6	14	48	52.75	0.875	3.875	6	4	46.75	161
1644VRSA6-SI		6	16	44	49.25	0.875	4.375	6	4	43.25	186
1860VRSA8-SI		8	18	60	69.5	3	6.5	11	4	58.5	265
2268VRSA10-SI		10	22	68	79	3.5	7.5	10.75	4	68.25	361
2676VRSA12-SI		12	26	76	88	4	8	12.5	4	75.5	473
3096VRSA16-SI		14	30	96	109.5	4.5	9	15.5	4	94	744
36103VRSA16-SI		16	36	103	117.75	5.25	9.5	16.75	4	101	950
36112VRSA18-SI		18	36	112	127	5.25	9.75	19	5	108	1472
42120VRSA20-SI		20	42	120	137	6.25	10.75	20.5	5	116.5	1626
42129VRSA22-SI		22	42	129	146.5	6.25	11.25	22.5	5	124	1988
48136VRSA24-SI		24	48	136	157.5	8.25	13.25	23	5	134.5	2375
54146VRSA26-SI		26	54	146	167.5	8.25	13.25	25.25	5	142.25	2890
60160VRSA28-SI		28	60	160	185	10	15	28	5	157	3487
60176VRSA30-SI		30	60	176	201	10	15	29	5	172	4110
66218VRSA32-SI		32	66	218	245	11	16	28	6	217	5375
72296VRSA34-SI		34	72	296	323	11	16	30	6	293	7000
74296VRSA36-SI		36	74	296	323	11	16	30	6	293	8000

*\*For price information see Section 2 Page 5*

*\*Note Estimated weight only*

**Features:**

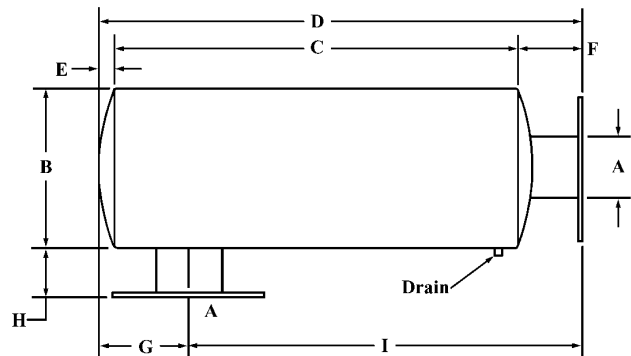
- Attenuation 30-42 dBA **velocity not to exceed 9000 FPM**
- Spark Arrestor 95 to 99% efficient
- All welded steel construction
- High heat primer and paint
- Available in stainless steel
- Internally insulated for low and annulling of noise waves
- Exhaust gases flow through the silencer in a vortex motion, this design allows for a reduction in silencer diameter

**Recommended Applications:**

- Suitable for Diesel or N. G. Engine Power Systems

**Accessories:**

- Flexible Connectors
- Mounting Bands
- Hanger Brackets
- High Temp Blankets

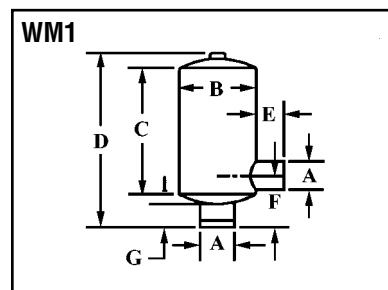


**HAPCO**  
**Wet Exhaust Type**  
**Marine Silencers**

**WM1 (316L)** For use where the engine is below water line.

*Note: This model is an excellent choice for sailboats*

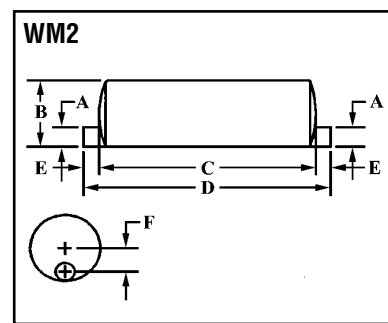
SIZE MODEL	DWG #	A	B	C	D	E	F	G
1.5	3400A-1	1.5	5	14	18.5	4.25	3.5	0.5
2	3401A-1	2	7	18	23	4.625	3.875	0.5
2.5	3402A-1	2.5	8	23	28.5	4.875	3.875	0.75
3	3403A-1	3	10	24.5	30	5.25	4.375	0.75
3.5	3404A-1	3.5	10	26	32.25	6	5.125	1
4	3405A-1	4	11	28	35.25	6.5	5.375	1.25
5	3406A-1	5	12	28	35.5	7	6	1.5



*\*For price information see Section 2 Page 9*

**WM2 (316L)**

SIZE MODEL	DWG #	A	B	C	D	E	F
1.5	3407A-1	1.5	3	9	15	2.5	0.562
2	6408A-1	2	4	12	18	2.5	0.812
2.5	3409A-1	2.5	5	15	21	2.5	0.9375
3	3410A-1	3	6	18	24	2.5	1.25
3.5	3411A-1	3.5	7	21	27	2.5	1
4	3412A-1	4	8	24	32	3.125	1.375
5	3413A-1	5	10	30	38	3.375	1.625
6	3414A-1	6	12	36	43	3.25	2



*\*For price information see Section 2 Page 9*

**VWS Wet Exhaust Silencer, For Use Requiring Low Exhaust Temperature**

SIZE INLET MODEL	DWG #	A	A1	B	C	D	E	F	G	H
812VWS3	3502A-1	3	4	8	12	18.5	0.5	1.5	2.5	3
820VWS3-8	3503A-1	3.5	4	8	20	27.25	0.875	1.5	2.5	3
924VWS4x5	3504A-1	4	5	9	24	31.25	0.875	1.5	2.5	3
226VWS5x6	3505A-1	5	6	12	26	34.5	0.75	2	3	4
1626VWS6x8	3506A-1	6	8	16	26	34	1	2.5	3	4
2038VWS8x10	3507A-1	8	10	20	38	48.75	2.625	2.5	3	4
2438VWS10x12	3508A-1	10	12	24	38	51.5	3	2.5	3.5	4
2438VWS12x14	3509A-1	12	14	24	38	51.5	3	2.5	3.5	4
2852VWS14x16	3510A-1	14	16	28	52	66.25	3.125	3	4	4
3060VWS16x18	3511A-1	16	18	30	60	74.75	3.375	3	4	4

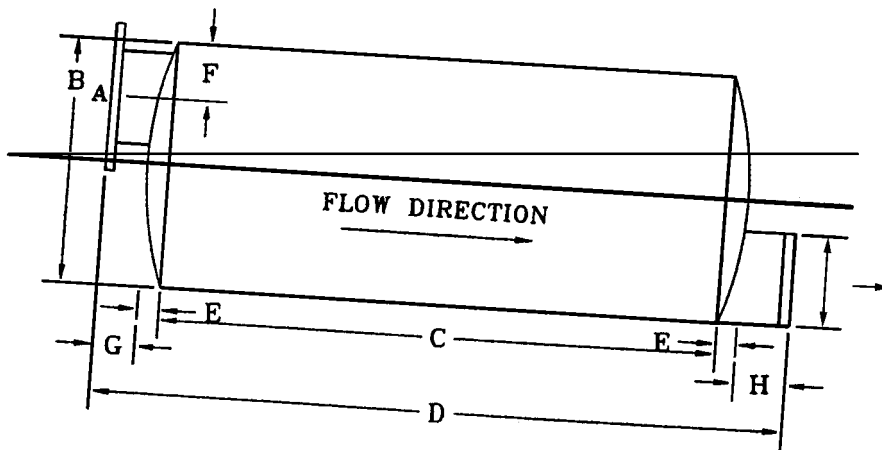
\*For price information see Section 2 Page 9

**Features:**

- Low back pressure
- Stainless steel 316L
- NOTE: 8" and above are flanged inlet
- Heavy duty construction

**Accessories:**

- Rain cap
- High Temp Gaskets
- Nuts & Bolts
- Clamps
- Hose
- Brackets



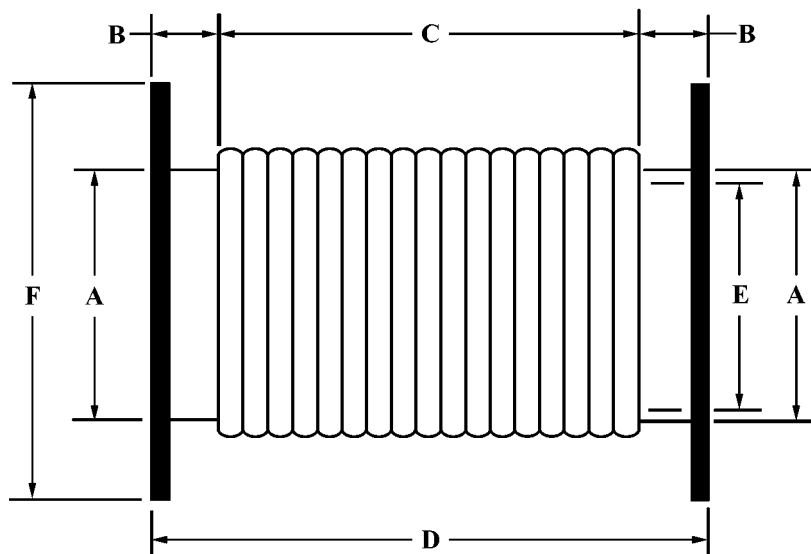
# HAPCO

## Flex Connectors

### Flanged X Flanged

PART NUMBER	DWG #	SIZE	A PIPE SIZE (O.D.)	B	C	D	E (I.D.)	F
HSPF	3600A-1	1.5	1.5	1.5	15	18	1.375	5
HSPF	3601A-1	2	2	1.5	15	18	1.875	6
HSPF	3602A-1	2.5	2.5	1.5	15	18	2.375	7
HSPF	3603A-1	3	3.5	1.5	15	18	3	7.5
HSPF	3604A-1	3.5	4	1.5	15	18	3.5	8.5
HSPF	3605A-1	4	4.5	1.5	15	18	4	9
HSPF	3606A-1	5	5.563	1.5	15	18	5	10
HSPF	3607A-1	6	6.625	1.5	15	18	6	11
HSPF	3608A-1	8	8.625	1.5	15	18	8	13.5
HSPF	3609A-1	10	10.75	1.5	15	18	10	16
HSPF	3610A-1	12	12.75	1.5	15	18	12	19
HSPF	3611A-1	14	14	1.5	15	18	13.25	21
HSPF	3612A-1	16	16	1.75	14.5	18	15.25	23.5
HSPF	3613A-1	18	18	1.75	14.5	18	17.25	25
HSPF	3614A-1	20	20	1.75	14.5	18	19.25	27.5
HSPF	3615A-1	22	22	2.5	13	18	21.25	29.5
HSPF	3616A-1	24	24	2.5	13	18	23.25	32
HSPF	3617A-1	26	26	2.5	13	18	25.25	34.25
HSPF	3618A-1	28	28	2.5	13	18	27.25	36.5

\*For price information see Section 2 Page 10



#### Features:

- For each additional inch multiply list X 3%
- Single-ply T 321 stainless steel flex
- Stubs and flanges are carbon steel
- Optional features available:
  - Floating flanges
  - Stainless steel liners

#### Accessories:

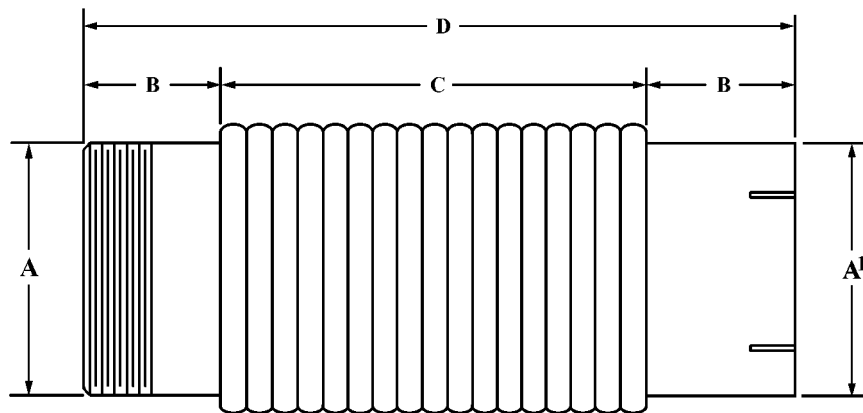
- Gaskets
- Fasteners
- High Temp Blankets
- Nuts & Bolts



**HAPCO**  
**Exhaust Connector**  
**Male Pipe Thread x Slip Fit**

<b>PART NUMBER</b>	<b>DWG #</b>	<b>SIZE</b>	<b>A</b>	<b>A1</b>	<b>B</b>	<b>C</b>	<b>D</b>
HSMPTXSF	3700A-1	1.5	1.50 MPT	1.50 ID	3	12	18
HSMPTXSF	3701A-1	2.0	2.00 MPT	2.00 ID	3	12	18
HSMPTXSF	3702A-1	2.5	2.50 MPT	2.50 ID	3	12	18
HSMPTXSF	3703A-1	3.0	3.00 MPT	3.00 ID	3	12	18
HSMPTXSF	3704A-1	3.5	3.50 MPT	3.50 ID	3	12	18
HSMPTXSF	3705A-1	4.0	4.00 MPT	4.00 ID	3	12	18
HSMPTXSF	3706A-1	5.0	5.00 MPT	5.00 ID	3	12	18
HSMPTXSF	3707A-1	6.0	6.00 MPT	6.00 ID	3	12	18

*\*For price information see Section 2 Page 10*



**Features:**

- For each additional inch multiply list X 3%
- Single-ply T 321 stainless steel flex
- Pipe fittings are steel
- Optional features available:
  - All stainless steel fittings and liners

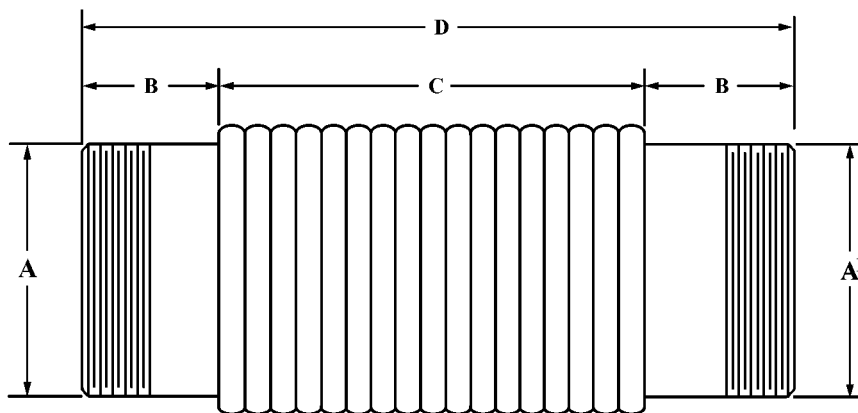
**Accessories:**

- U-Bolt Clamps
- High Temp Blankets

**HAPCO**  
**Exhaust Connector**  
**Male Pipe Thread x Male Pipe Thread**

PART NUMBER	DWG #	SIZE	A	A1	B	C	D
HSMPT	3800A-1	1.5	1.50 MPT	1.50 MPT	3	12	18
HSMPT	3801A-1	2.0	2.00 MPT	2.00 MPT	3	12	18
HSMPT	3802A-1	2.5	2.50 MPT	2.50 MPT	3	12	18
HSMPT	3803A-1	3.0	3.00 MPT	3.00 MPT	3	12	18
HSMPT	3804A-1	3.5	3.50 MPT	3.50 MPT	3	12	18
HSMPT	3805A-1	4.0	4.00 MPT	4.00 MPT	3	12	18
HSMPT	3806A-1	5.0	5.00 MPT	5.00 MPT	3	12	18
HSMPT	3807A-1	6.0	6.00 MPT	6.00 MPT	3	12	18

*\*For price information see Section 2 Page 10*



**Features:**

- For each additional inch multiply list X 3%
- Single-ply T 321 stainless steel flex
- Pipe fittings are steel
- Optional features available:
  - All stainless steel fittings and liners

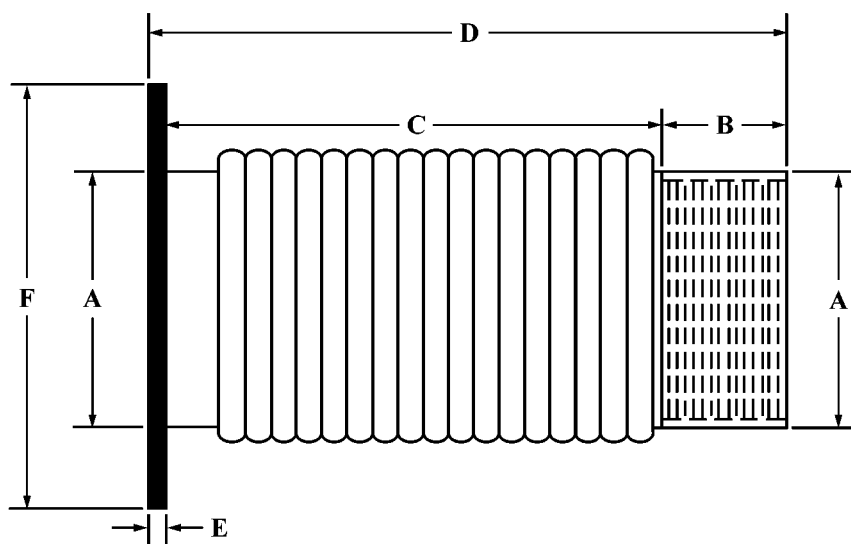
**Accessories:**

- High Temp Blankets

**HAPCO**  
**Exhaust Connector**  
**Pipe Coupler x Flange (125#)**

PART NUMBER	DWG #	SIZE	A	B	C	D	E	F
HSFPT-F	3900A-1	1.5	1.5	2.0	15.5	18	0.5	5
HSFPT-F	3901A-1	2.0	2.0	2.0	15.5	18	0.5	6
HSFPT-F	3902A-1	2.5	2.5	1.5	16	18	0.5	7
HSFPT-F	3903A-1	3.0	3.0	1.5	16	18	0.5	7.5
HSFPT-F	3904A-1	3.5	3.5	1.5	16	18	0.5	8.5
HSFPT-F	3905A-1	4.0	4.0	1.75	15.75	18	0.5	9
HSFPT-F	3906A-1	5.0	5.0	1.875	15.625	18	0.5	10
HSFPT-F	3907A-1	6.0	6.0	2.0	15.5	18	0.5	11

\*For price information see Section 2 Page 10



**Features:**

- For each additional inch multiply list X 3%
- Single-ply T 321 stainless steel flex
- Pipe and flange are carbon steel
- Optional features available:
  - All stainless steel fittings and liner

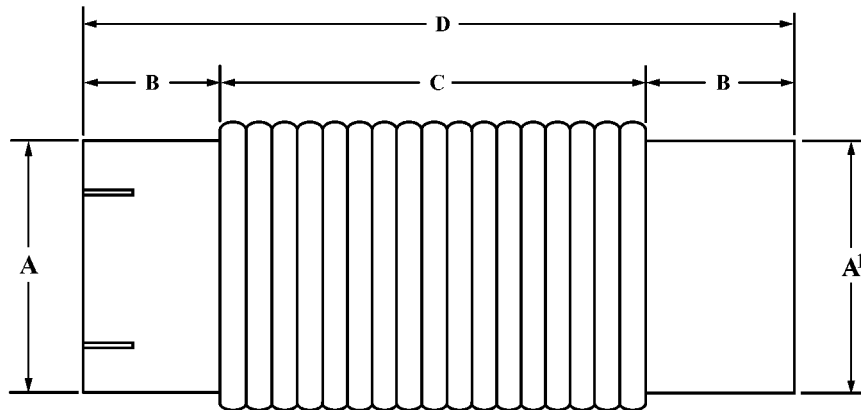
**Accessories:**

- High Temp Blankets

**HAPCO**  
**Exhaust Connector**  
**Slip Fit x Tube (O.D.)**

PART NUMBER	DWG #	SIZE	A (I.D.)	A1 (O.D.)	B	C	D
HSSF	4000A-1	1.5	1.5	1.5	3	12	18
HSSF	4001A-1	2.0	2.0	2.0	3	12	18
HSSF	4002A-1	2.5	2.5	2.5	3	12	18
HSSF	4003A-1	3.0	3.0	3.0	3	12	18
HSSF	4004A-1	3.5	3.5	3.5	3	12	18
HSSF	4005A-1	4.0	4.0	4.0	3	12	18
HSSF	4006A-1	5.0	5.0	5.0	3	12	18
HSSF	4007A-1	6.0	6.0	6.0	3	12	18
HSSF	4008A-1	8.0	8.0	8.0	3	12	18

*\*For price information see Section 2 Page 10*



**Features:**

- For each additional inch multiply list X 3%
- Single-ply T 321 stainless steel flex
- Tube ends are carbon steel
- Price includes clamp for slip fit end
- Optional features available:
  - All stainless steel fittings and liners

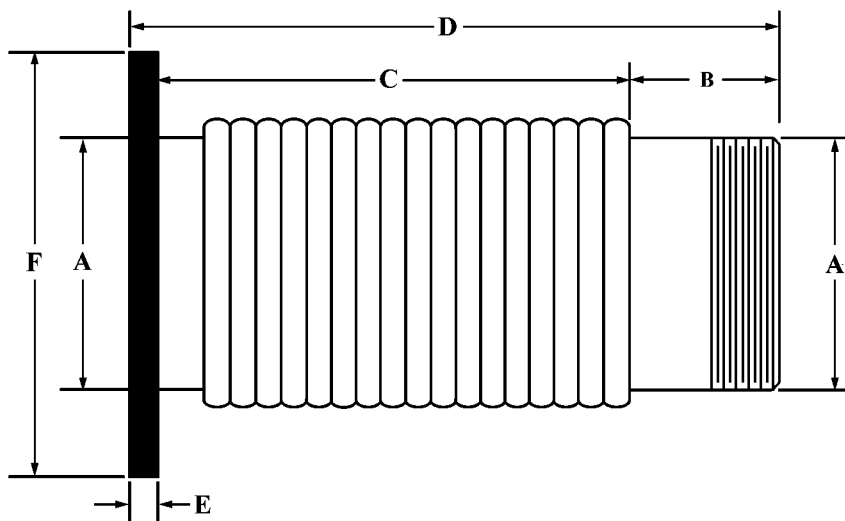
**Accessories:**

- U-Bolt Clamps
- High Temp Blankets

**HAPCO**  
**Exhaust Connector**  
**Male Pipe Thread x Flange (125#)**

PART NUMBER	DWG #	SIZE	A (I.D.)	B	C	D	E	F
HSNP-F	4100A-1	1.5	1.5 MPT	2.0	15.5	18	0.5	5.0
HSNP-F	4101A-1	2.0	2.0 MPT	2.5	15.0	18	0.5	6.0
HSNP-F	4102A-1	2.5	2.5 MPT	2.5	15.0	18	0.5	7.0
HSNP-F	4103A-1	3.0	3.0 MPT	3.0	14.5	18	0.5	7.5
HSNP-F	4104A-1	3.5	3.5 MPT	3.0	14.5	18	0.5	8.5
HSNP-F	4105A-1	4.0	4.0 MPT	3.5	14.0	18	0.5	9.0
HSNP-F	4106A-1	5.0	5.0 MPT	4.0	13.5	18	0.5	10.0
HSNP-F	4107A-1	6.0	6.0 MPT	4.0	13.5	18	0.5	11.0

\*For price information see Section 2 Page 10



**Features:**

- For each additional inch multiply list X 3%
- T321 stainless steel flex
- Pipe and flange connections are carbon steel
- Optional features available:
  - All stainless steel fittings and liner

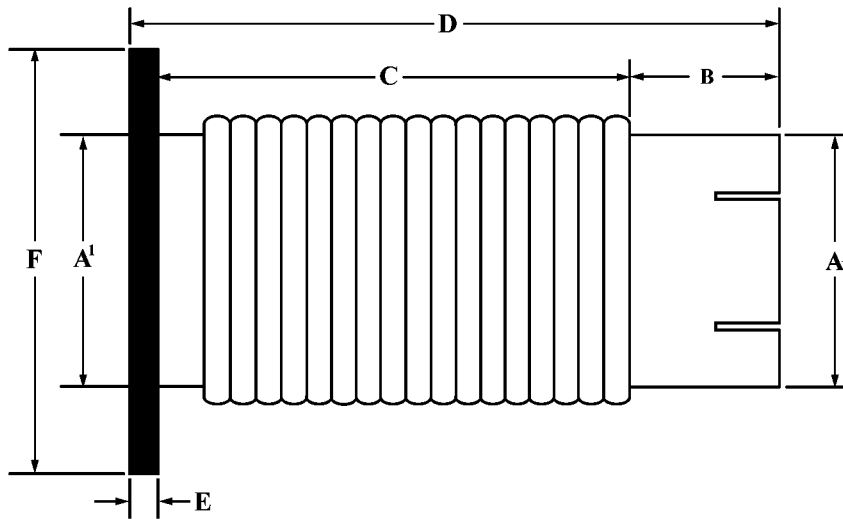
**Accessories:**

- Gaskets
- Fasteners
- High Temp Blankets

**HAPCO**  
**Exhaust Connector**  
**Flanged x Slip Fit**

PART NUMBER	DWG #	SIZE	A	A1	B	C	D	E	F
HSFXF	4200A-1	1.5	1.5 ID	1.5	3	14.5	18	0.5	5.0
HSFXF	4201A-1	2.0	2.0 ID	2.0	3	14.5	18	0.5	6.0
HSFXF	4202A-1	2.5	2.5 ID	2.5	3	14.5	18	0.5	7.0
HSFXF	4203A-1	3.0	3.0 ID	3.0	3	14.5	18	0.5	7.5
HSFXF	4204A-1	3.5	3.5 ID	3.5	3	14.5	18	0.5	8.5
HSFXF	4205A-1	4.0	4.0 ID	4.0	3	14.5	18	0.5	9.0
HSFXF	4206A-1	5.0	5.0 ID	5.0	3	14.5	18	0.5	10.0
HSFXF	4207A-1	6.0	6.0 ID	6.0	3	14.5	18	0.5	11.0
HSFXF	4208A-1	8.0	8.0 ID	8.0	3	14.5	18	0.5	13.5

*\*For price information see Section 2 Page 10*



**Features:**

- For each additional inch multiply list X 3%
- Single-ply 321 stainless steel flex
- Fittings are carbon steel
- Optional features available:
  - All stainless steel fittings and liner

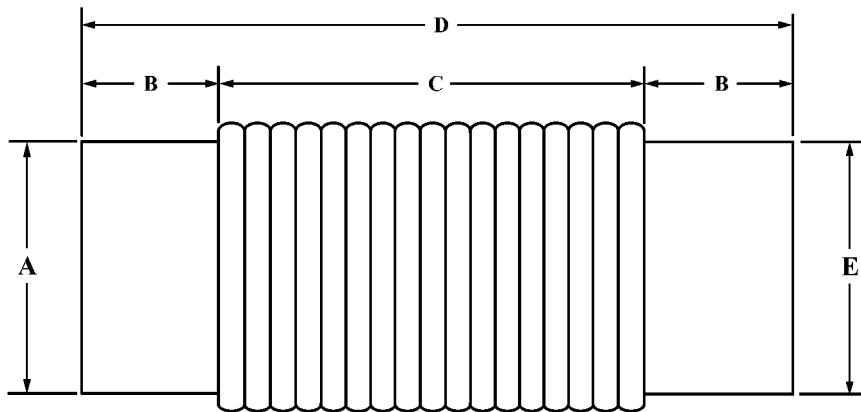
**Accessories:**

- Gaskets
- Fasteners
- U-Bolt Clamps
- High Temp Blankets

**HAPCO**  
**Exhaust Connector**  
**Multi-Ply**

PART NUMBER	DWG #	SIZE	A (O.D.)	B	C	D	E (I.D.)	F
HPS3	4300A-1	3	3.5	1.25	7.5	10	3	18
HPS3-8	4301A-1	3.5	4	1.25	7.5	10	3.5	18
HPS4	4302A-1	4	4.5	1.25	7.5	10	4	18
HPS5	4303A-1	5	5.625	1.25	7.5	10	5	13
HPS6	4304A-1	6	6.625	1.25	7.5	10	6	13
HPS8	4305A-1	8	8.625	1.25	7.5	10	8	13
HPS10	4306A-1	10	10.75	1.25	7.5	10	10	10
HPS12	4307A-1	12	12.75	1.25	7.5	10	12.5	10
HPS14	4308A-1	14	14	1.25	7.5	10	13.5	8
HPS16	4309A-1	16	16	1.25	7.5	10	15.5	8
HPS18	4310A-1	18	18	1.25	7.5	10	17.25	8
HPS20	4311A-1	20	20	1.25	7.5	10	19.25	8
HPS22	4312A-1	22	22	1.25	7.5	10	21.25	8
HPS24	4313A-1	24	24	1.25	7.5	10	23.25	8
HPS26	4314A-1	26	26	1.25	7.5	10	25.25	8
HPS28	4315A-1	28	28	1.25	7.5	10	27.25	8

\*For price information see Section 2 Page 10



**Features:**

- Prices are net to the user and subject to no other discounts
- For lengths different than above, call the factory for a quote
- Multi-ply (2) T321 stainless steel ends are carbon steel
- All weldments are free from contact with convolutions
- \*F = Number of convolutions
- Dimension (A) may be either tube or pipe
- Optional features available:
  - All stainless steel ends and liners

**Accessories:**

- High Temp Blankets

**HAPCO**  
**Backfire Relief Cover**

SILENCER DIAMETER	ORIFICE SIZE	PART NUMBER
8 to 10	EQUAL TO INLET SIZE	HEX3
11 to 14	EQUAL TO INLET SIZE	HEX4
16 to 18	EQUAL TO INLET SIZE	HEX6
20 to 24	EQUAL TO INLET SIZE	HEX8
26 to 36	EQUAL TO INLET SIZE	HEX12
42 to 48	EQUAL TO INLET SIZE	HEX16
54 to 60	EQUAL TO INLET SIZE	HEX20
66 to 72	EQUAL TO INLET SIZE	HEX24

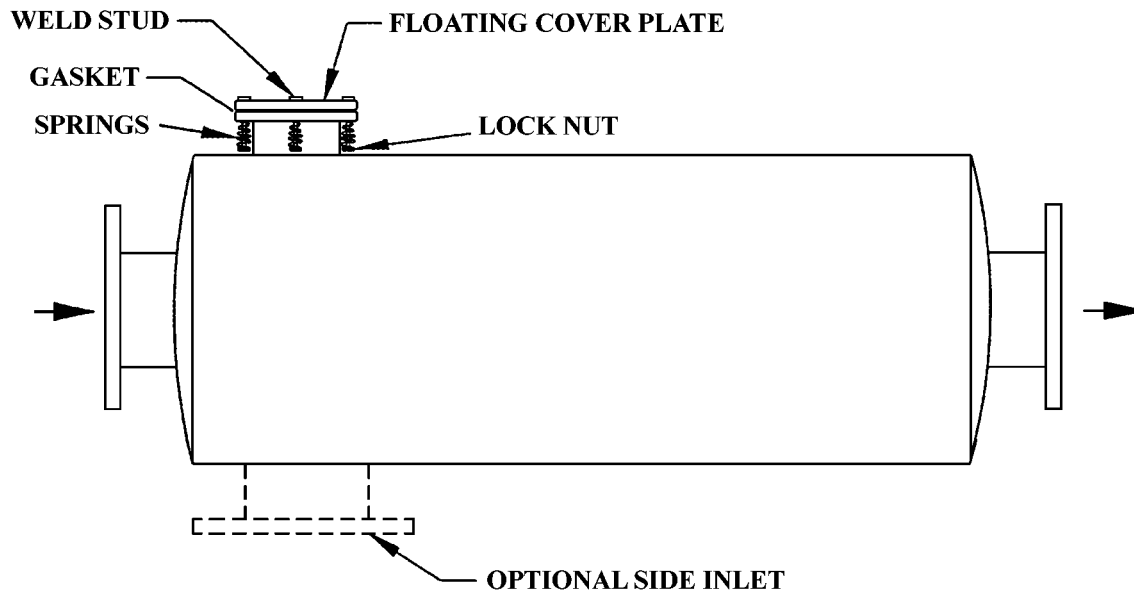
*\*For price information see Section 2 Page 11*

**Features:**

- Designed for pressure relief at 5 psi
- Provides for protection against damage to silencer in case of backfire or explosion
- **NOTE:** Must be installed in the first silencer chamber to provide maximum protection

**Accessories:**

- 
- 





**Insulated Exhaust Pipe Wall/Roof Thimbles - Zero Clearance**  
**WT = Wall Thimble • RT = Roof Thimble • (WT or RT to precede Item#)**

NUMBER	ITEM #	A (Pipe)	B	C	D
1.0"	470100	1.375 ID	5.375	13	10.25
1.25"	470125	1.75 ID	5.75	13	10.25
1.5"	470150	2.0 ID	6.0	13	10.25
2.0"	470200	2.5 ID	6.5	14	11.5
2.5"	470250	3.0 ID	7.0	14	11.5
3.0"	470300	3.625 ID	7.625	15	12.0
3.5"	470350	4.125 ID	8.125	15	12.0
4.0"	470400	4.625 ID	8.625	20	14.25
5.0"	470500	5.625 ID	9.625	20	14.25
6.0"	470600	6.75 ID	10.75	22	16.25
8.0"	470800	8.875 ID	12.875	24	17.25
10.0"	471000	10.875 ID	14.875	28	20.5
12.0"	471200	12.875 ID	16.875	30	23.5
14.0"	471400	14.187 ID	18.187	30	23.5
16.0"	471600	16.187 ID	20.187	32	26.5
18.0"	471800	18.187 ID	22.187	32	26.5
20.0"	472000	20.187 ID	24.187	34	28.5
22.0"	472200	22.187 ID	26.187	36	30.5
24.0"	472400	24.187 ID	28.187	40	32.5
26.0"	472600	26.187 ID	30.187	42	34.5
28.0"	472800	28.187 ID	32.187	44	36.5
30.0"	473000	30.187 ID	34.187	46	38.5

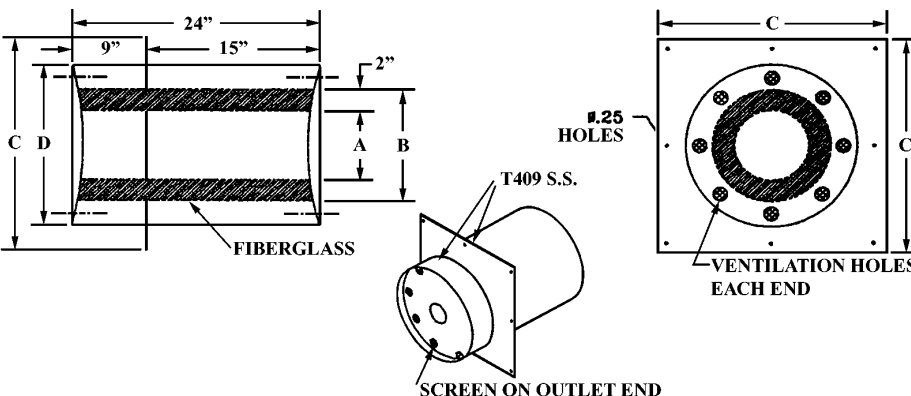
\*For price information see Section 2 Page 11

**Recommended Application:**

- HAPCO Insulated exhaust roof and wall thimbles are recommended for use with exhaust pipes that must pass through a structure. The thimbles prevent exhaust pipe heat from being transmitted to the combustible material

**Features:**

- Insulated exhaust roof and wall thimbles are triple wall **ALL STAINLESS STEEL TYPE 304 CONSTRUCTION**
- Ventilation holes are located on each end to provide air cooling
- Screening is used on outlet end to prevent birds, rodents etc. from entering
- 24" is standard length, for longer requirements multiply list price X 4% for each additional inch
- Roofs with:  
 Pitch 1-12 to 3-12 add \$60.00  
 Pitch 4-12 and 5-12 add \$70.00  
 Pitch 6-12 and up add \$86.00



**Accessories:**

- Gaskets
- Fasteners

**HAPCO**

**Insulated Exhaust Tube Wall/Roof Thimbles - Zero Clearance**

**WT = Wall Thimble • RT = Roof Thimble • (WT or RT to precede Item#)**

NUMBER	ITEM #	A (Tube)	B	C	D
1.0"	570100	1.125	5.375	13	10.25
1.25"	570125	1.375	5.75	13	10.25
1.5"	570150	1.625	6.0	13	10.25
2.0"	570200	2.125	6.5	14	11.5
2.5"	570250	2.625	7.0	14	11.5
3.0"	570300	3.125	7.625	15	12.0
3.5"	570350	3.75	8.125	15	12.0
4.0"	570400	4.25	8.625	20	14.25
5.0"	570500	5.25	9.625	20	14.25
6.0"	570600	6.25	10.75	22	16.25
8.0"	570800	8.25	12.875	24	17.25
10.0"	571000	10.25	14.875	28	20.5
12.0"	571200	12.25	16.875	30	23.5
14.0"	571400	14.187	18.187	30	23.5
16.0"	571600	16.187	20.187	32	26.5
18.0"	571800	18.187	22.187	32	26.5
20.0"	572000	20.187	24.187	34	28.5
22.0"	572200	22.187	26.187	36	30.5
24.0"	572400	24.187	28.187	40	32.5
26.0"	572600	26.187	30.187	42	34.5
28.0"	572800	28.187	32.187	44	36.5
30.0"	573000	30.187	34.187	46	38.5

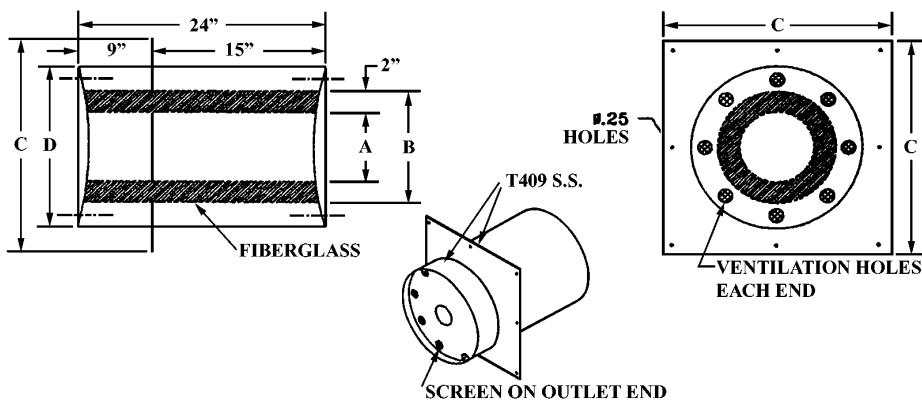
\*For price information see Section 2 Page 11

**Recommended Application:**

- HAPCO insulated exhaust roof and wall thimbles are recommended for use with exhaust pipes that must pass through a structure.

**Features:**

- The thimbles prevent exhaust pipe heat from being transmitted to the combustible material
- Insulated exhaust roof and wall thimbles are triple wall **ALL STAINLESS STEEL TYPE 304 CONSTRUCTION**
- Ventilation holes are located on each end to provide air cooling
- Screening is used on outlet end to prevent birds, rodents etc. from entering
- 24" is standard length, for longer requirements multiply list price X 4% for each additional inch
- Roofs with:
  - Pitch 1-12 to 3-12 add \$60.00
  - Pitch 4-12 and 5-12 add \$70.00
  - Pitch 6-12 and up add \$86.00



**Accessories:**

- Gaskets
- Fasteners

**HAPCO**  
**Insulated Exhaust Pipe**  
**Underground Wall Thimbles**

SIZE	ITEM #	A (O.D.)	B	# BOLTS	DIA. BOLTS	C (B.C.)	D (DIA.)	E
2.0"	480200	2.375 O.D.	8.5	8	.625	6.0	14.5	1.0
2.5"	480250	2.875 O.D.	9.0	8	.625	6.5	15.0	1.0
3.0"	480300	3.5 O.D.	9.5	8	.625	7.0	15.5	1.0
3.5"	480350	4.0 O.D.	10.0	8	.625	7.5	16.0	1.0
4.0"	480400	4.5 O.D.	10.5	8	.750	7.5	16.5	1.0
5.0"	480500	5.5 O.D.	11.625	8	.750	8.5	17.625	1.0
6.0"	480600	6.625 O.D.	12.75	8	.750	9.5	18.75	1.0
8.0"	480800	8.625 O.D.	15.625	8	.750	11.75	21.75	1.0
10.0"	481000	10.75 O.D.	16.75	8	.750	13.25	22.75	1.0
12.0"	481200	12.75 O.D.	18.75	12	.750	15.25	24.75	1.0
14.0"	481400	14.0	20.0	12	1.0	16.5	26.0	1.0
16.0"	481600	16.0	22.0	14	1.0	18.5	28.0	1.0
18.0"	481800	18.0	24.0	16	1.0	20.5	30.0	1.25
20.0"	482000	20.0	26.0	18	1.0	22.5	32.0	1.25
22.0"	482200	22.0	28.0	20	1.0	24.5	34.0	1.25
24.0"	482400	24.0	30.0	24	1.0	26.5	36.0	1.25
26.0"	482600	26.0	32.0	24	1.0	28.5	38.0	1.25
28.0"	482800	28.0	34.25	28	1.375	32.0	40.0	1.25
30.0"	483000	30.0	36.25	28	1.375	34.0	42.0	1.375

**NOTE: Consult Factory for prices and availability**

**Recommended Application:**

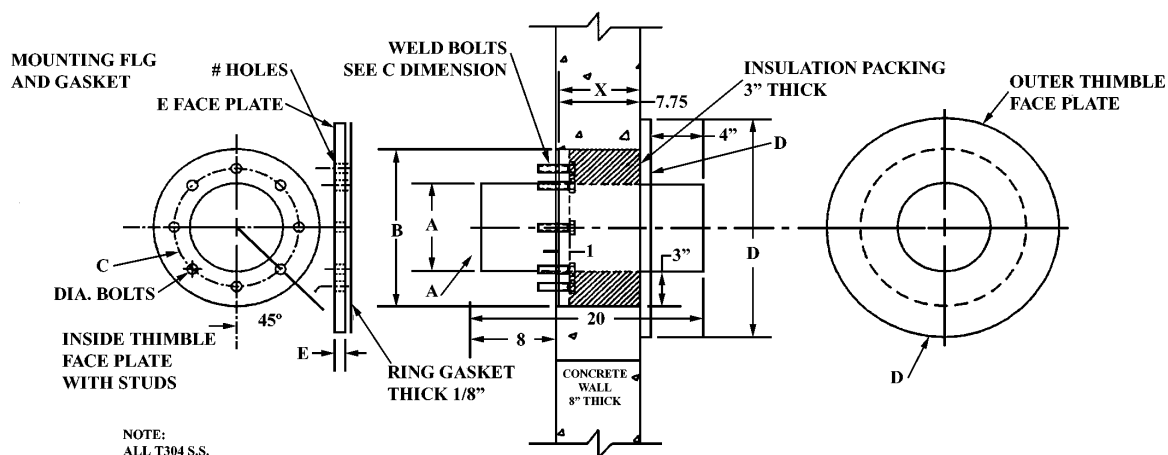
- HAPCO insulated exhaust underground wall thimbles are recommended for use with exhaust pipes that must pass through a structure

**Features:**

- The thimbles prevent exhaust pipe heat, sound and vibration from being transmitted to structure
- Insulated exhaust underground thimbles are constructed of type 304 stainless

**Accessories:**

- Gaskets
- Fasteners



**NOTE:** Thimble Thickness or Length (X) must be .25" less than wall thickness.  
 Above diagram is for 8" thick wall. Thimble sized for sch. 40 pipe.

## HAPCO Insulated and Vented Exhaust Pipe Wall and Roof Thimbles

### Recommended Application:

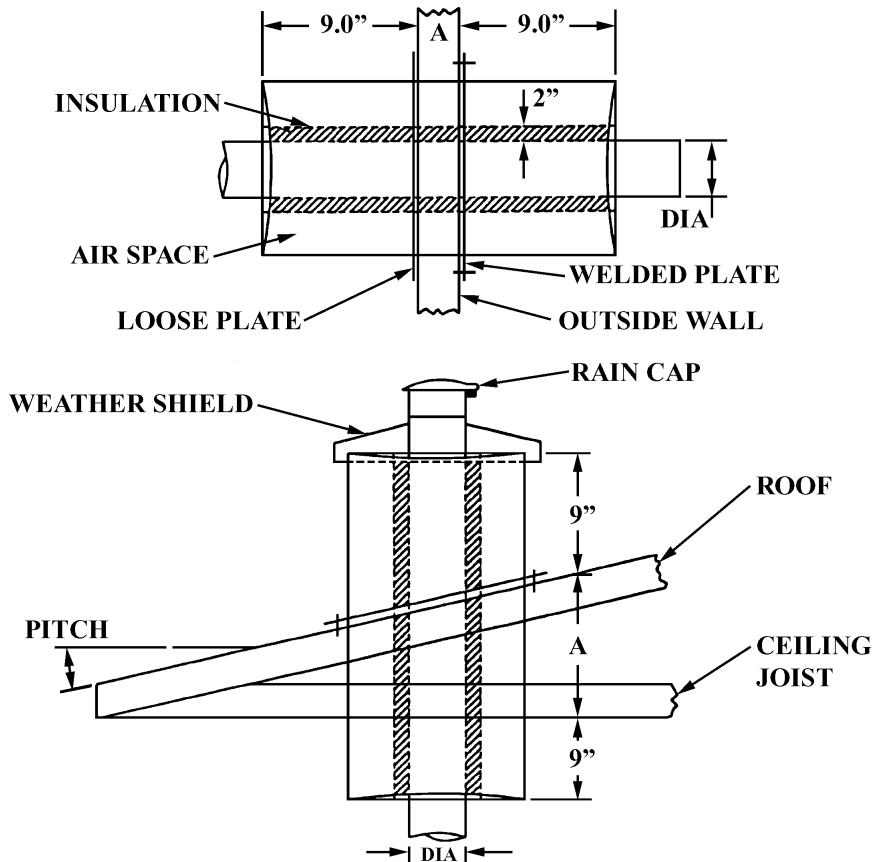
- Recommended for use with exhaust pipes that must pass through a wall or roof structure.

### Features:

- The thimble prevents exhaust pipe heat from being transmitted to the combustible material
- Insulated exhaust wall and roof thimbles are **triple wall constructed of type 304 stainless steel**
- Ventilation holes are located on each end to provide air cooling
- Screening is used on the outlet end to prevent birds, rodents, etc from entering the thimble
- 24" is standard but longer lengths are available
- Thimbles are internally insulated with 2" of fiberglass insulation
- Optional weather shield and rain cap available and recommended

### Information needed when ordering:

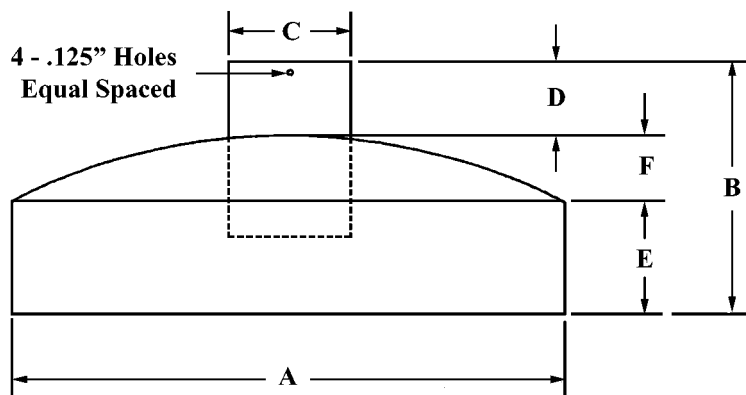
- Wall or roof thickness
- Type of construction (wood, masonry, steel, etc.)
- Pitch of roof for roof thimbles
- Diameter of the exhaust pipe
- NOTE: "A" dimension must be added to find the overall length. 9" of extension is required to meet code. Add "A" + 18" for the overall length needed



**HAPCO**  
**Exhaust Weather Shields**

ITEM #	SIZE	A	B	C	Tube	D	E	F
490100	1.0	12	5.375	1.375	1.125	2	2.5	0.875
490125	1.25	12	5.375	1.75	1.375	2	2.5	0.875
490150	1.5	12	5.375	2.0	1.625	2	2.5	0.875
490200	2.0	14	5.375	2.5	2.125	2	2.5	0.875
490250	2.5	14	5.375	3.0	2.625	2	2.5	0.875
490300	3.0	14	5.375	3.625	3.125	2	2.5	0.875
490350	3.5	14	5.875	4.125	3.75	2	3.0	0.875
490400	4.0	16	5.875	4.625	4.25	2	3.0	0.875
490500	5.0	16	5.875	5.625	5.25	2	3.0	0.875
490600	6.0	18	6.25	6.75	6.25	2	3.0	1.25
490800	8.0	20	6.25	8.875	8.25	2	3.0	1.25
491000	10.0	22	7.75	10.875	10.25	2	4.0	1.75
491200	12.0	26	8.0	12.875	12.25	2	4.0	2.0
491400	14.0	26	8.0	14.1875	14.1875	2	4.0	2.0
491600	16.0	28	10.0	16.1875	16.1875	2	6.0	2.0
491800	18.0	28	10.0	18.1875	18.1875	2	6.0	2.0
492000	20.0	30	12.5	20.1875	20.1875	2	6.0	4.5
492200	22.0	36	13.25	22.1875	22.1875	2	6.0	5.25
492400	24.0	38	15.0	24.1875	24.1875	3	6.0	6.0
492600	26.0	38	15.0	26.1875	26.1875	3	6.0	6.0
492800	28.0	40	15.625	28.1875	28.1875	3	6.0	6.625
493000	30.0	42	15.625	30.1875	30.1875	3	6.0	6.625

\*For price information see Section 2 Page 11



**Features:**

- HAPCO weather shields are used in conjunction with the insulated exhaust thimbles to prevent water from entering the thimble
- All welded steel painted black or optional stainless steel
- Specify pipe or tube size (C)
- Size listed above are for schedule 40 pipe

**Accessories:**

- Gaskets
- Fasteners

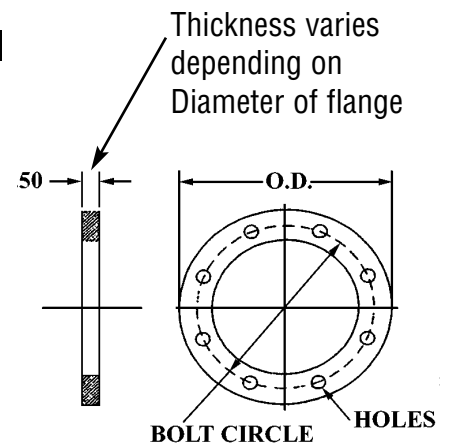
**HAPCO**  
**Flanges and Gaskets**

SIZE	FLANGE PART #	FLANGE KIT PART #	GASKET PART #	O.D.	B.C.	# BOLT HOLES	HOLE DIA.	NUT & BOLT FASTENER PART #	SIZE
1.25	500125	500125A	500125B	4.625	3.5	4	0.625	50011	.5"
1.5	500150	500150A	500150B	5.0	3.874	4	0.625	50011	.5"
2.0	500200	500200A	500200B	6.0	4.75	4	0.75	50012	.625"
2.5	500250	500250A	500250B	7.0	5.5	4	0.75	50012	.625"
3.0	500300	500300A	500300B	7.5	6.0	4	0.75	50012	.625"
3.5	500350	500350A	500350B	8.5	7.0	8	0.75	50012	.625"
4.0	500400	500400A	500400B	9.0	7.5	8	0.75	50012	.625"
5.0	500500	500500A	500500B	10.0	8.5	8	0.875	50013	.75"
6.0	500600	500600A	500600B	11.0	9.5	8	0.875	50013	.75"
8.0	500800	500800A	500800B	13.5	11.75	8	0.875	50013	.75"
10.0	501000	501000A	501000B	16.0	14.25	12	1.0	50014	.875"
12.0	501200	501200A	501200B	19.0	17.0	12	1.0	50014	.875"
14.0	501400	501400A	501400B	21.0	18.75	12	1.125	50015	1.0"
16.0	501600	501600A	501600B	23.5	21.25	16	1.125	50015	1.0"
18.0	501800	501800A	501800B	25.0	22.75	16	1.25	50016	1.125"
20.0	502000	502000A	502000B	27.5	25.0	20	1.25	50016	1.125"
22.0	502200	502200A	502200B	29.5	27.25	20	1.375	50017	1.25"
24.0	502400	502400A	502400B	32.0	29.5	20	1.375	50017	1.25"
26.0	502600	502600A	502600B	34.25	31.75	24	1.375	50017	1.25"
28.0	502800	502800A	502800B	36.5	34.0	28	1.375	50017	1.25"
30.0	503000	503000A	503000B	38.75	36.0	28	1.375	50017	1.25"

\*For price information see Section 2 Page 17

**Features:**

- Material specification, carbon steel, .50 thick machined surfaces, 125# flanges
- Optional 304 or 316L stainless
- Flanges are available in O.D. Tube and Sch Pipe, companion flanges
- **Flange Kits consist of:**
  - 2 Flanges
  - 2 Gaskets
  - Nuts & Bolts for 2 flanges
  - Half Kits are also available, consult factory for prices



ITEM #	SPECIAL FLGS	ITEM #	GASKETS	ITEM #	GASKETS
500600CAT	CAT 6	500600G	CAT 6	50120MG	12AC METAL
500800CAT	CAT 8	500800G	CAT 8		
501000CAT	CAT 10	501000G	CAT 10		
501200CAT	CAT 12	501200G	CAT 12		
501400CAT	CAT 14	501400G	CAT 14		
50588CUM	5.88 CUM	50588G	5.88CUM		
50078CUM	7-8 CUM	50078G	7-8CUM		
501200AC	12AC12	501200G	12AC12		
500800DD	DD 8	500800DDG	DD 8		
501000DD	DD 10	501000DDG	DD 10		

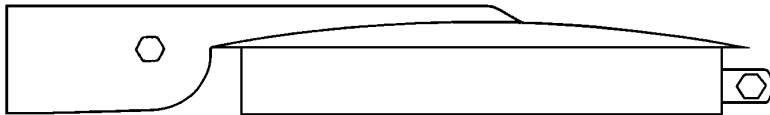
**Weather Stops**

Rev. 3/2006

**HAPCO  
Weather Stops  
Heavy Duty Rain Cap**

ITEM NUMBER	PART NUMBER	STACK SIZE	WEIGHT (Lbs.)
51003-H	HD 3	3 O.D.	3
51038-H	HD 3-8	3 PIPE	3
51004-H	HD 4	4 O.D.	3
51048-H	HD 4-8	4 PIPE	4
51005-H	HD 5	5 O.D.	4
51058-H	HD 5-8	5 PIPE	4
51006-H	HD 6	6 O.D.	4
51610-H	HD 6-10	6 PIPE	4
51008-H	HD 8	8 O.D.	6
51810-H	HD 8-10	8 PIPE	6
51010-H	HD 10	10 O.D.	10
51012-H	HD 10-12	10 PIPE	10
51112-H	HD 12	12 O.D.	12
51212-H	HD12-12	12 PIPE	15
51014-H	HD 14	14 PIPE	15
51016-H	HD 16	16 PIPE	21
51018-H	HD 18	18 PIPE	30
51020-H	HD 20	20 PIPE	
51022-H	HD 22	22 PIPE	
51024-H	HD 24	24 PIPE	

*\*For price information see Section 2 Page 12*



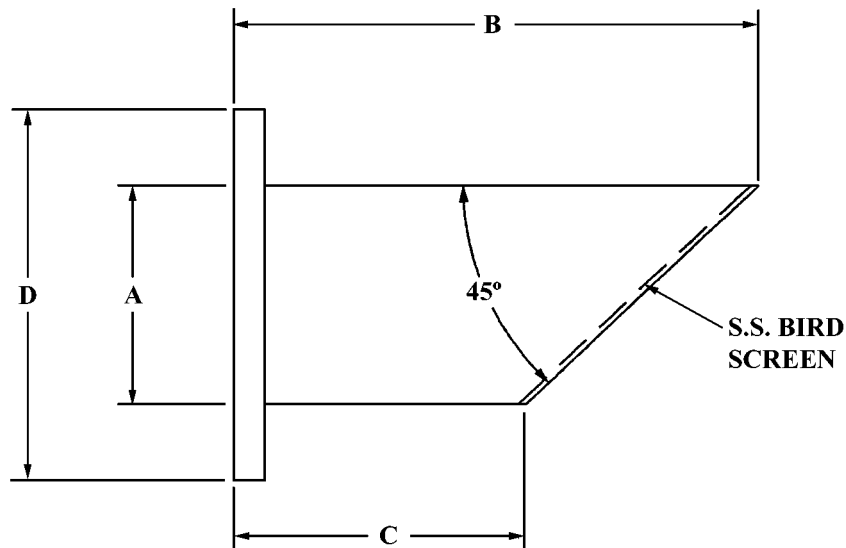
**Features:**

- Expands with pipe
- Hi Temp Paint
- Optional stainless steel
- Easy to install
- Welded heavy duty construction
- **NOTE:** Always specify outside diameter of stack
- Larger sizes available

**HAPCO**  
**Flanged Mitered Exhaust Pipe Extension**  
**With Bird Screen**

<b>PART NUMBER</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
51003	3.0	8.0	5.0	7.5
51038	3.5	8.0	4.5	8.5
51040	4.0	10.0	6.0	9.0
51050	5.0	12.0	7.0	10.0
51060	6.0	16.0	10.0	11.0
51080	8.0	18.0	10.0	13.5
51100	10.0	18.0	8.0	16.0
51120	12.0	20.0	8.0	19.0
51140	14.0	24.0	10.0	21.0
51160	16.0	24.0	8.0	23.5
51180	18.0	28.0	10.0	25.0
51200	20.0	30.0	10.0	27.5
51220	22.0	32.0	10.0	29.5
51240	24.0	36.0	12.0	32.0

*\*For price information see Section 2 Page 13*





**Weather Stops**

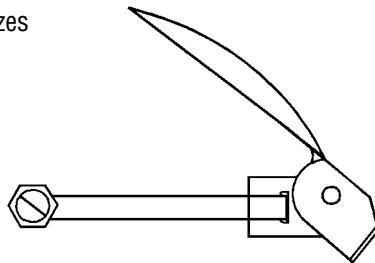
Rev. 3/2006

**HAPCO**  
**Weather Stops - Remembers to Protect**  
**Light Duty**

PART NUMBER	STACK SIZE	LIST PRICE \$
#32	Up to 2-1/2"	\$ 14.00
#44	2-9/16" to 3-1/8"	\$ 16.00
#64	3-3/16" to 4-3/4"	\$ 21.00
#80	4-7/8" to 5-1/2"	\$ 30.00
#96	5-5/8" to 6-1/2"	\$ 40.00
#104	6-5/8" to 7"	\$ 43.00
#120	7-1/8" to 7-7/8"	\$ 50.00
#132	8" to 8-3/4"	\$ 58.00

*\*For price information see Section 2 Page 12*

- Stainless steel clamp
- Aluminized steel cap
- Brass bushing hinge
- Adjustable clamp
- Lightweight
- Adjustable sizes



**Features:**

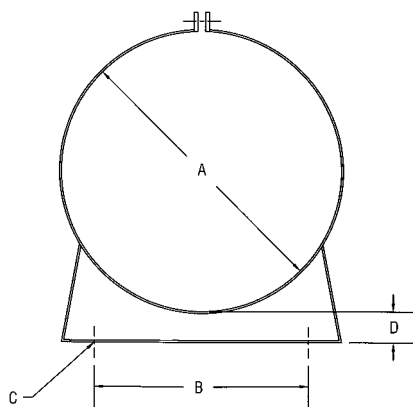
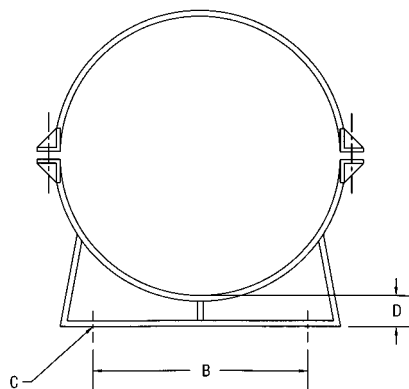
- HAPCO lightweight weather stops provide protection for open exhaust stacks by preventing rain, snow, sleet, dust and insects from getting into the engine
- Weather stops prevent flooded pistons, cracked cylinder heads and rusted valves
- Simple installation requires only one screw to be tightened
- Stainless steel attachment band quickly adjusts to all pipe sizes within each size range
- HAPCO weather stops are available for all sizes and make of equipment

**HAPCO  
Mounting Bands**

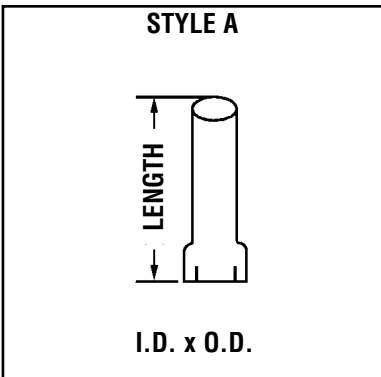
SIZE MODEL	A	B	C	D	MATERIAL GAUGE	WIDTH	WEIGHT (Lbs.)
MB 5	5.25	3.625	0.437	1.0	10 GA	1.0	2
MB 6	6.0	3.75	0.437	1.0	10 GA	1.0	2
MB 7	7.0	4.75	0.437	1.0	10 GA	1.0	3
MB 7-8	7.5	4.75	0.437	1.0	10 GA	1.0	3
MB 8	8.0	5.75	0.437	1.0	10 GA	1.25	4
MB 9	9.0	6.75	0.437	1.0	10 GA	1.5	5
MB 10	10.0	7.75	0.437	1.0	10 GA	1.5	5
MB 11	11.0	8.75	0.437	1.0	10 GA	1.75	6
MB 12	12.0	9.75	0.437	1.0	10 GA	1.75	6
MB 14	14.0	11.75	0.437	2.0	0.1875	1.75	7
MB 16	16.0	13.75	0.625	2.0	0.1875	1.75	7
MB 17	17.0	13.75	0.625	2.0	0.1875	1.75	15
MB 18	18.0	13.75	0.625	3.0	0.25	3.0	18
MB 20	20.0	17.75	0.625	3.0	0.25	3.0	20
MB 22	22.0	17.75	0.625	3.0	0.25	3.0	21
MB 24	24.0	19.5	0.6875	3.0	0.25	3.0	24
MB 26	26.0	21.5	0.6875	3.0	0.25	3.0	26
MB 28	28.0	23.5	0.6875	3.0	0.25	3.0	32
MB 30	30.0	25.5	0.6875	3.0	0.25	3.0	55
MB 36	36.0	30.0	0.875	4.0	0.375	4.0	68
MB 38	38.0	32.0	0.875	4.0	0.375	4.0	80
MB 42	42.0	36.0	0.875	4.0	0.375	4.0	95
MB 48	48.0	42.0	1.125	5.0	0.375	6.0	110
MB 54	54.0	42.0	1.125	6.0	0.375	6.0	135
MB 60	60.0	50.0	1.25	6.0	0.375	6.0	160

\*For price information see Section 2 Page 12

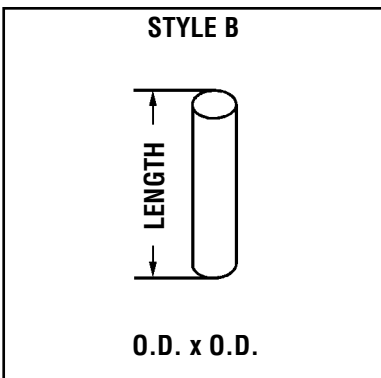
\*Note: Estimated weight only

**17" And Below****18" And Above****Features:**

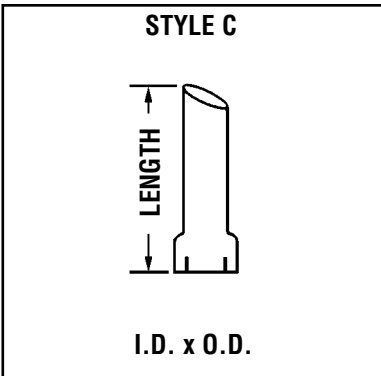
- 17" and above have half clamps as shown
- All welded steel
- Optional stainless steel



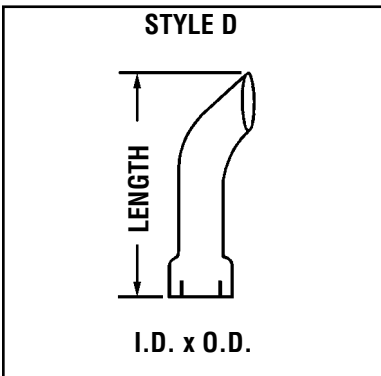
ITEM#	SIZE	LENGTH				
		12"	24"	36"	48"	60"
540020A	2.0"	\$ 18.00	\$ 20.00	\$ 22.00	\$ 26.00	\$ 32.00
540028A	2.5"	\$ 20.00	\$ 23.00	\$ 26.00	\$ 33.00	\$ 38.00
540030A	3.0"	\$ 24.00	\$ 28.00	\$ 32.00	\$ 38.00	\$ 42.00
540038A	3.5"	\$ 26.00	\$ 31.00	\$ 36.00	\$ 41.00	\$ 48.00
540040A	4.0"	\$ 28.00	\$ 34.00	\$ 40.00	\$ 46.00	\$ 52.00
540050A	5.0"	\$ 30.00	\$ 42.00	\$ 52.00	\$ 64.00	\$ 72.00
540060A	6.0"	\$ 43.00	\$ 54.00	\$ 66.00	\$ 78.00	\$ 90.00
540080A	8.0"	\$ 50.00	\$ 65.00	\$ 80.00	\$ 95.00	\$110.00
540100A	10.0"	\$ 66.00	\$ 90.00	\$115.00	\$140.00	\$165.00
540120A	12.0"	\$ 80.00	\$110.00	\$140.00	\$180.00	\$210.00



ITEM#	SIZE	LENGTH				
		12"	24"	36"	48"	60"
540020B	2.0"	\$ 12.00	\$ 16.00	\$ 20.00	\$ 24.00	\$ 28.00
540028B	2.5"	\$ 14.00	\$ 19.00	\$ 24.00	\$ 31.00	\$ 36.00
540030B	3.0"	\$ 16.00	\$ 24.00	\$ 30.00	\$ 36.00	\$ 42.00
540038B	3.5"	\$ 18.00	\$ 25.00	\$ 32.00	\$ 39.00	\$ 46.00
540040B	4.0"	\$ 20.00	\$ 28.00	\$ 36.00	\$ 44.00	\$ 54.00
540050B	5.0"	\$ 28.00	\$ 38.00	\$ 48.00	\$ 58.00	\$ 68.00
540060B	6.0"	\$ 36.00	\$ 48.00	\$ 60.00	\$ 72.00	\$ 84.00
540080B	8.0"	\$ 38.00	\$ 52.00	\$ 66.00	\$ 80.00	\$ 94.00
540100B	10.0"	\$ 55.00	\$ 80.00	\$105.00	\$130.00	\$155.00
540120B	12.0"	\$ 60.00	\$ 95.00	\$130.00	\$135.00	\$170.00



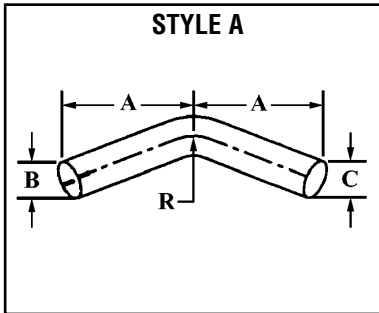
ITEM#	SIZE	LENGTH				
		12"	24"	36"	48"	60"
540020C	2.0"	\$ 33.00	\$ 37.00	\$ 41.00	\$ 45.00	\$ 49.00
540028C	2.5"	\$ 35.00	\$ 40.00	\$ 45.00	\$ 50.00	\$ 55.00
540030C	3.0"	\$ 39.00	\$ 49.00	\$ 59.00	\$ 69.00	\$ 79.00
540038C	3.5"	\$ 41.00	\$ 52.00	\$ 63.00	\$ 74.00	\$ 85.00
540040C	4.0"	\$ 43.00	\$ 51.00	\$ 59.00	\$ 67.00	\$ 75.00
540050C	5.0"	\$ 45.00	\$ 55.00	\$ 65.00	\$ 75.00	\$ 85.00
540060C	6.0"	\$ 61.00	\$ 73.00	\$ 85.00	\$ 97.00	\$109.00
540080C	8.0"	\$ 70.00	\$ 84.00	\$ 98.00	\$112.00	\$126.00
540100C	10.0"	\$ 91.00	\$116.00	\$141.00	\$166.00	\$191.00
540120C	12.0"	\$100.00	\$135.00	\$170.00	\$205.00	\$240.00



ITEM#	SIZE	LENGTH				
		12"	24"	36"	48"	60"
540020D	2.0"	\$ 44.00	\$ 46.00	\$ 48.00	\$ 50.00	\$ 52.00
540028D	2.5"	\$ 46.00	\$ 48.00	\$ 53.00	\$ 58.00	\$ 63.00
540030D	3.0"	\$ 49.00	\$ 59.00	\$ 69.00	\$ 79.00	\$ 89.00
540040D	4.0"	\$ 54.00	\$ 62.00	\$ 70.00	\$ 78.00	\$ 86.00
540050D	5.0"	\$ 65.00	\$ 70.00	\$ 75.00	\$ 80.00	\$ 90.00
540060D	6.0"	\$ 95.00	\$107.00	\$119.00	\$131.00	\$143.00

To order use Item # plus length

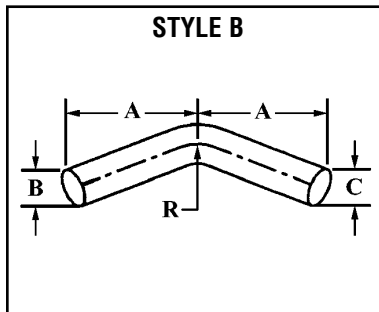
## HAPCO Exhaust Elbows



### 45° I.D. X O.D. STYLE A

PART NUMBER	A	B (I.D.)	C (O.D.)	R
EE45-3	6	3	3	6
EE45-3-8	6	3.5	3.5	7
EE45-4	6	4	4	8
EE45-5	6.3	5	5	10
EE45-6	10	6	6	12

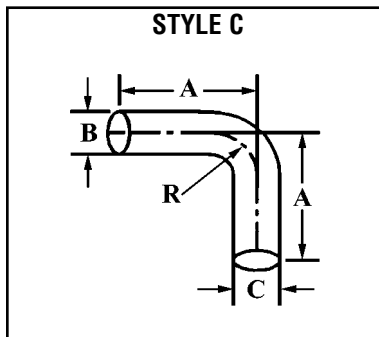
*\*For price information see Section 2 Page 13*



### 45° O.D. X O.D. STYLE B

PART NUMBER	A	B	C	R
EP45-3	6	3	3	6
EP45-3-8	6	3.5	3.5	7
EP45-4	6	4	4	8
EP45-5	6.3	5	5	10
EP45-6	10	6	6	12

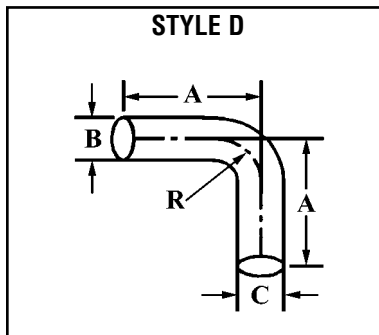
*\*For price information see Section 2 Page 13*



### 90° I.D. X O.D. STYLE C

PART NUMBER	A	B (I.D.)	C (O.D.)	R
EE90-2	4	2	2	2
EE90-2-8	5	2.5	2.5	2.5
EE90-3	5	3	3	3
EE90-3-8	5.5	3.5	3.5	3.5
EE90-4	6	4	4	4
EE90-5	7.5	5	5	5
EE90-6	10	6	6	6
EE90-8	15	8	8	8
EE90-10	19	10	10	10
EEO90-12	24	12	12	12

*\*For price information see Section 2 Page 13*



### 90° O.D. X O.D. STYLE D

PART NUMBER	A	B (I.D.)	C (O.D.)	R
EP90-2	4	2	2	2
EP90-2-8	5	2.5	2.5	2.5
EP90-3	5	3	3	3
EP90-3-8	5.5	3.5	3.5	3.5
EP90-4	6	4	4	4
EP90-5	7.5	5	5	5
EP90-6	10	6	6	6
EP90-8	9.875	8	8	8
EP90-10	11	10	10	10
EP90-12	18	12	12	12

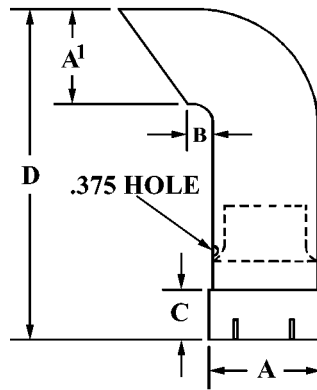
*\*For price information see Section 2 Page 13*

**HAPCO**  
**Exhaust Stack Rain Guard**

PART NUMBER	SIZE	A	A1	B	C	D
ESRL-3	3	3.0 I.D.	3.0 D.	1.5	3.5	28
ESRL-3-8	3.5	3.5 I.D.	3.5 D.	1.75	3.5	28
ESRL-4	4	4.0 I.D.	4.0 D.	2.0	3.5	28
ESRL-5	5	5.0 I.D.	5.0 D.	2.5	3.5	28
ESRL-6	6	6.0 I.D.	6.0 D.	3.0	3.5	38
ESRL-8	8	8.0 I.D.	8.0 D.	4.0	3.5	38

\*For price information see Section 2 Page 13

**Optional:** Stainless steel or chrome plated finish and with pipe thread or flanged connections.



**Pipe Elbow with 125# ASA Flange**

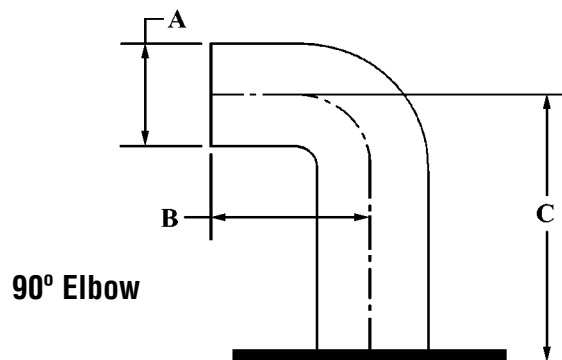
PART NUMBER	A DIAMETER	B	C
FLEL-2	2	2	2.5
FLEL-3	3	3	3.5
FLEL-3-8	3.5	4	4.0
FLEL-4	4	4	4.5
FLEL-5	5	5	5.5
FLEL-6	6	6	6.5
FLEL-8	8	8	8.5
FLEL-10	10	10	10.5
FLEL-12	12	12	12.5

\*For price information see Section 2 Page 13

**Pipe Elbow 45° & 90°  
 Short Radius Plain Ends**

PART NUMBER	SIZE DIAMETER
ELS-2	2
ELS-3	3
ELS-3-5	3.5
ELS-4	4
ELS-5	5
ELS-6	6
ELS-8	8
ELS-10	10
ELS-12	12

\*For price information see Section 2 Page 14

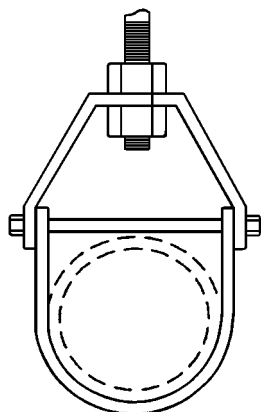


**HAPCO**  
**Pipe Hanger Brackets**

<b>PART SIZE</b>	<b>PART NUMBER</b>	<b>HANGER ROD SIZE</b>	<b>MAX LOAD</b>	<b>WT (Lbs.)</b>
2-1/2	G260-2-8	3/8	1130	0.85
3	G260-3	1/2	1130	0.95
4	G260-4	5/8	1430	1.35
5	G260-5	5/8	1430	1.82
6	G260-6	3/4	1940	2.74
8	G260-8	3/4	2000	4.15
10	G260-10	7/8	3600	7.25
12	G260-12	7/8	3800	10.8
14	G260-14	1	4200	12.4
16	G260-16	1	4600	19.85
18	G260-18	1	4800	22.25
20	G260-20	1-1/4	4800	40.33
24	G260-24	1-1/4	4800	49.83
30	G260-30	1-1/4	6000	70.18

*\*For price information see Section 2 Page 13*

*\*Note: Estimated weight only*



**Features:**

- **Approvals:** Complies with Federal Specification WW-H-171
- **Installation:** Hanger load nut above clevis must be tightened securely to assure proper hanger performance, when a oversized clevis is used, a nipple should be placed over the clevis bolt as a spacer to assure the lower U-Strap will not move in on the bolt
- Design has yoke on outside of lower U-Strap so yoke cannot slide toward center of bolt, thus bending of bolt is minimized

**Threaded Rod**

<b>PART SIZE</b>	<b>NUMBER</b>
3/8"	63-375
1/2"	63-500
5/8"	63-625
3/4"	63-750
7/8"	63-875
1"	63-100
1-1/4"	63-1250

*\*For price information see Section 2 Page 12*

**Tube Elbows**

Rev. 3/2006

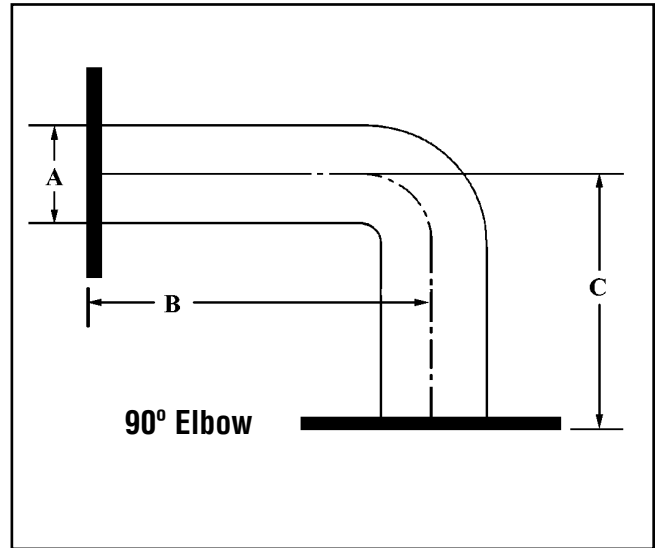
**HAPCO**

**Tube Elbow with 125# ASA Flange**

**Tube Elbow with 125# ASA Flange on Both Ends**

<b>PART NUMBER</b>	<b>A DIA.</b>	<b>B</b>	<b>C</b>
TFFLEL-2	2	2.5	2.5
TFFLEL-3	3	3.5	3.5
TFFLEL-3-8	3.5	4	4
TFFLEL-4	4	4.5	4.5
TFFLEL-5	5	5.5	5.5
TFFLEL-6	6	6.5	6.5
TFFLEL-8	8	8.5	8.5
TFFLEL-10	10	10.5	10.5
TFFLEL-12	12	12.5	12.5

*\*For price information see Section 2 Page 15*



**Tube Elbow with 125# ASA Flange**

<b>PART NUMBER</b>	<b>A DIA.</b>	<b>B</b>	<b>C</b>
TFLEL-2	2	2	2.5
TFLEL-3	3	3	3.5
TFLEL-3-8	3.5	4	4
TFLEL-4	4	4	4.5
TFLEL-5	5	5	5.5
TFLEL-6	6	6	6.5
TFLEL-8	8	8	8.5
TFLEL-10	10	10	10.5
TFLEL-12	12	12	12.5

*\*For price information see Section 2 Page 15*

