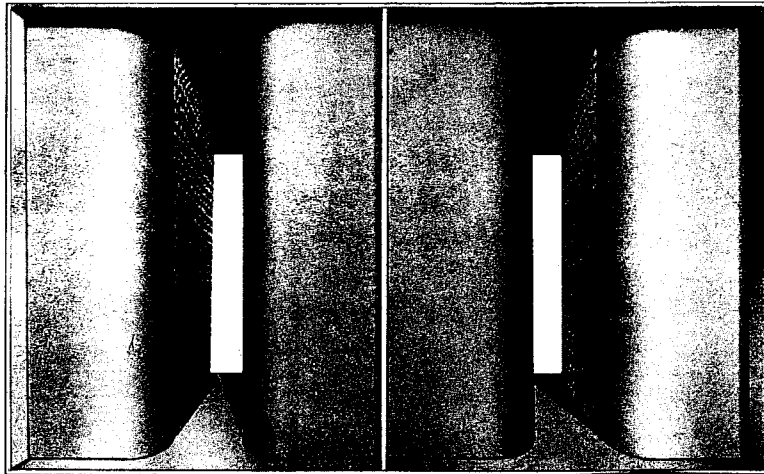




***AIR ZONE INDUSTRIES, INC.***

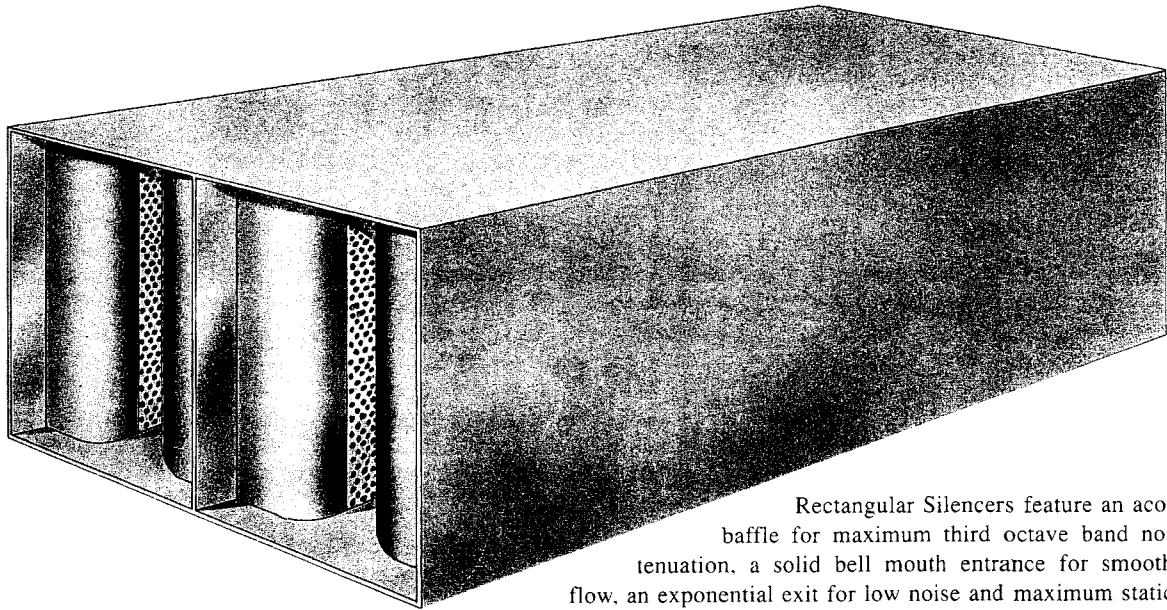
# SONATROL™ SILENCERS

*Efficient Sound Control for Air Distribution*



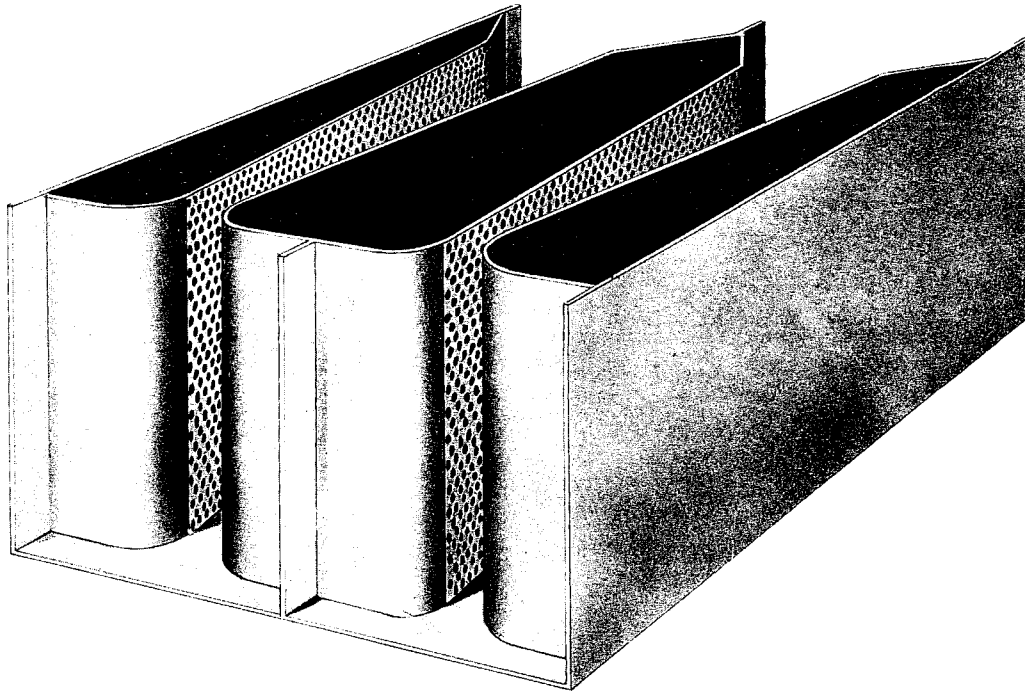
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Rectangular Silencers feature an acoustical baffle for maximum third octave band noise attenuation, a solid bell mouth entrance for smooth inlet flow, an exponential exit for low noise and maximum static pressure regain, plus quality construction throughout.

## Construction Materials



Outer casings are 22 gauge galvanized steel. All external seams are lockformed and filled with mastic or continuously welded, and are airtight up to 8" water gauge pressure differential. Casings are stiffened to prevent deformation when tested at 8" pressure differential, and stiffeners prohibit audible vibration during normal operation of air handling system.

Interior partitions are minimum 22 gauge galvanized steel perforated to remove no more than 15% of the area. Inorganic fiber-glass acoustically absorptive filler material is

compressed at least 5% to eliminate voids and prevent settling, and is vermin-proof, moisture-proof and odorless.

Incombustible filler material does not exceed the following fire hazard classification values when tested in accordance with standard ASTM E84 or UL-723 test methods:

Flamespread	25
Fuel Contributed	0
Smoke Developed	50

# Aerodynamic Performance

# Airflow Generated Sound

SOUND POWER LEVELS ( $L_w$ ) IN dB re:  $10^{-12}$  WATTS

## SILENCER MODEL HP

LENGTH	STATIC PRESSURE DROP, i.w.g.				
	36	.05	.08	.21	.47
60	.09	.20	.37	.84	1.48
84	.19	.21	.38	.86	1.52
FACE VELOCITY fpm	500	750	1000	1500	2000

FACE VELOCITY fpm	OCTAVE BAND / PREFERRED CENTER FREQUENCIES (Hz)							
	1	2	3	4	5	6	7	8
	63	125	250	500	1000	2000	4000	8000
	AIR FLOW GENERATED SOUND POWER LEVELS, dB							
-1500	63	58	57	62	66	71	68	61
-1000	55	51	51	56	61	63	57	49
+1000	50	49	43	44	41	40	42	38
+2000	66	62	58	56	56	60	55	62

## SILENCER MODEL MP

LENGTH	STATIC PRESSURE DROP, i.w.g.				
	36	.018	.039	.07	.16
60	.026	.058	.10	.23	.41
84	.03	.07	.13	.28	.50
FACE VELOCITY fpm	500	750	1000	1500	2000

FACE VELOCITY fpm	OCTAVE BAND / PREFERRED CENTER FREQUENCIES (Hz)							
	1	2	3	4	5	6	7	8
	63	125	250	500	1000	2000	4000	8000
	AIR FLOW GENERATED SOUND POWER LEVELS, dB							
-1500	61	55	54	58	60	62	56	48
-1000	54	50	49	52	55	55	47	37
+1000	54	50	42	42	39	36	34	29
+2000	60	59	59	52	52	55	56	52

## SILENCER MODEL LP

LENGTH	STATIC PRESSURE DROP, i.w.g.				
	36	.03	.05	.11	.19
60	.04	.07	.15	.27	.42
84	.05	.10	.21	.38	.59
FACE VELOCITY fpm	750	1000	1500	2000	2500

FACE VELOCITY fpm	OCTAVE BAND / PREFERRED CENTER FREQUENCIES (Hz)							
	1	2	3	4	5	6	7	8
	63	125	250	500	1000	2000	4000	8000
	AIR FLOW GENERATED SOUND POWER LEVELS, dB							
-2000	66	61	57	61	63	67	59	52
-1000	55	51	48	52	56	49	42	32
+1000	58	49	40	39	34	27	24	22
+2000	62	59	52	50	51	54	53	48

Both acoustic and aerodynamic tests were performed on the same silencer, in the same INDEPENDENT LABORATORY and in accordance with ASTM standard E-477 (Standard Method of Testing Duct Liner Materials and Prefabricated Silencers for Acoustic and Airflow Performance). Certified copies of these test reports are available upon request.

### Notes:

- All tests were performed with static air (no airflow) and several airflow conditions, including reverse airflow, using a 24" X 24" rectangular silencer. FORWARD FLOW (+) occurs when noise and air travel in the same direction, as in a typical supply or fan discharge system. REVERSE FLOW (-) occurs when noise and air travel in opposite directions, as in a typical return or fan intake system.
- Silencer approach face velocities represent velocity across the connection cross-sectional area of the silencer.
- Pressure drop is the difference in static pressure between two points in a duct system. ASTM E-477 require specified lengths of straight duct of the same size as test specimen both upstream and downstream of silencer. The downstream measurement is at five duct diameters (or equivalent for rectangular duct) downstream of the silencer exit which includes "static regain". Therefore, if silencers are installed immediately before or after elbows, transitions, or at the intake or discharge of the system, sufficient allowance to compensate for these factors must be included when calculating the operating static pressure drop through the silencer. These conditions can add .5 to several velocity heads, depending on specific conditions.

## FACE AREA CORRECTION FACTORS

ADD OR SUBTRACT FROM PWL VALUES ABOVE

SILENCER FACE AREA, SQ. FT. *										
		.5	1	2	4	8	16	32	64	128
PWL CORRECTION FACTOR, dB	-8	-6	-3	0	+3	+6	+9	+12	+15	+18

\* FOR INTERMEDIATE FACE AREAS, INTERPOLATE TO NEAREST WHOLE NUMBER

# Attenuation

IN DECIBELS WITH AND WITHOUT AIRFLOW

(+) FORWARD FLOW (-) REVERSE FLOW

SILENCER MODEL	SILENCER LENGTH inches	SILENCER FACE VELOCITY fpm	OCTAVE BAND / PREFERRED CENTER FREQUENCIES (Hz)							
			1	2	3	4	5	6	7	8
			63	125	250	500	1000	2000	4000	8000
SILENCER INSERTION LOSS, dB										
HP	36	-1500	3	9	16	26	30	27	18	11
		-1000	3	8	15	26	31	28	19	12
		0	3	6	14	27	36	31	21	13
		+1000	3	6	13	25	35	31	21	13
		+2000	2	6	12	23	32	30	19	11
	60	-1000	9	14	22	40	44	45	31	15
		-500	10	13	21	42	46	48	33	17
		0	8	12	21	42	49	50	35	20
		+1000	8	11	19	40	48	50	36	20
		+1500	6	10	18	39	47	49	35	19
	84	-1000	9	18	31	39	43	45	33	19
		-500	10	17	30	42	46	48	37	22
0		10	16	26	45	49	51	38	23	
+1000		9	14	25	44	47	48	37	22	
+1500		7	14	25	44	45	46	35	20	
MP	36	-1500	2	6	12	21	29	23	13	7
		-1000	2	6	11	21	29	23	13	7
		0	2	5	10	21	28	23	16	10
		+1000	2	4	10	20	28	23	16	10
		+2000	1	4	9	18	27	23	15	10
	60	-1500	3	10	17	35	45	36	20	11
		-1000	4	9	16	35	46	38	22	11
		0	5	9	16	35	47	41	25	14
		+1000	5	8	15	34	47	41	26	14
		+2000	4	7	15	33	46	39	26	14
	84	-1500	8	12	24	40	46	40	26	15
		-1000	8	12	23	42	47	41	27	15
0		6	11	21	43	49	45	29	16	
+1000		7	10	20	42	49	46	29	16	
+2000		6	9	19	41	46	44	30	17	
LP	36	-2000	1	5	10	18	25	19	13	9
		-1000	1	5	9	19	25	19	13	10
		0	2	4	9	18	25	19	14	10
		+2000	2	4	8	16	24	19	15	10
		+2500	1	4	8	16	24	19	15	10
	60	-2000	1	9	15	31	41	30	17	8
		-1000	2	9	14	31	42	31	17	9
		0	2	7	13	30	45	33	19	12
		+2000	2	6	12	27	42	34	21	12
		+2500	1	6	12	26	41	33	20	12
	84	-2000	4	13	23	40	44	38	21	11
		-1000	4	11	20	42	47	40	23	11
0		4	10	19	41	49	42	26	15	
+1000		3	9	18	40	49	42	27	15	
+2000		3	9	17	39	47	40	27	16	

# Testing And Rating Methods

Nationally known qualified independent laboratories should determine acoustic and aerodynamic performance ratings of silencing devices. Performance claims can only be properly compared when they are rated in the same laboratory using the same test methods and standards.

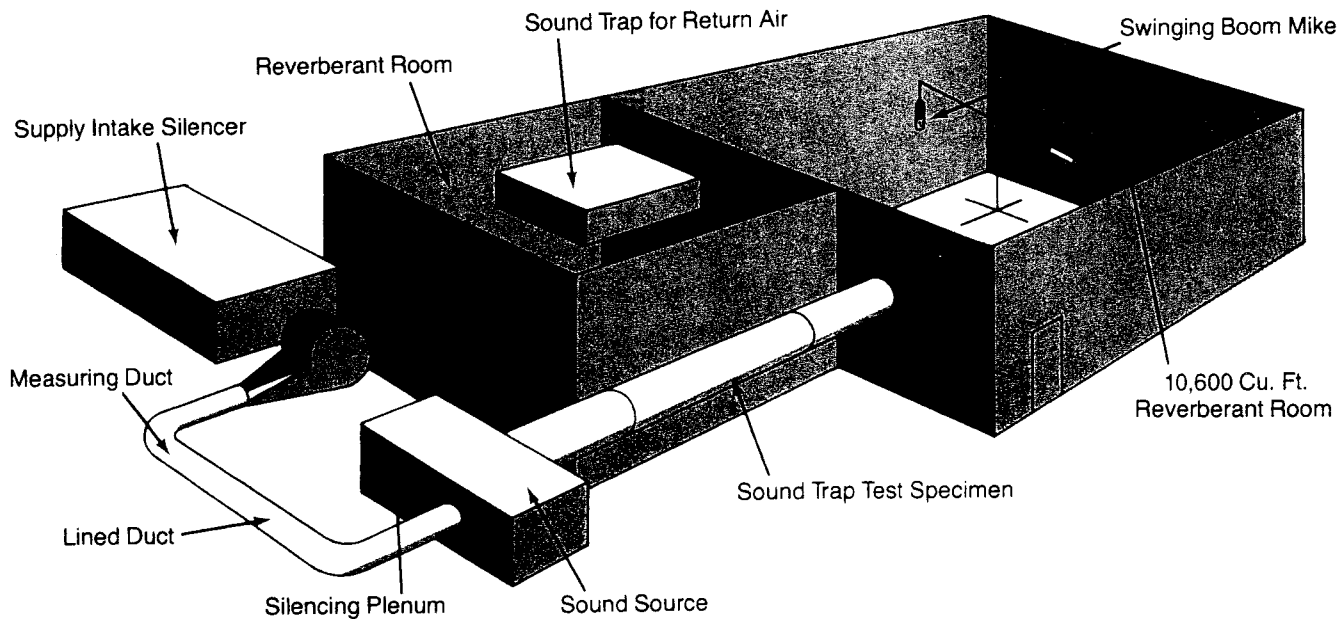
The method of testing silencers which has been informally adopted by the industry is the Insertion Loss method using a "duct-to-reverberation room" facility with a reverberation room of at least 10,000 cubic feet in volume. The method was originally recommended by the S1W42 Subcommittee of the American Standards Association in 1960 for testing silencers.

Insertion Loss is the noise reducing capability of a silencer. Ratings are obtained by making complete octave band sound level measurements of a constant upstream noise source in the

test room before and after the silencer is installed in the duct leading to the room. The decibel difference between the two measurements is the silencer Insertion Loss, and may be determined for conditions of airflow or no airflow. This method is recommended for all silencer ratings.

Since acoustic and aerodynamic characteristics of silencers are directly related, performance depends on a satisfactory compromise between these characteristics. To determine whether or not a good compromise exists, the same unit must be tested for both airflow and acoustic performance. Pressure drop characteristics should be corroborated by an independent AMCA test laboratory.

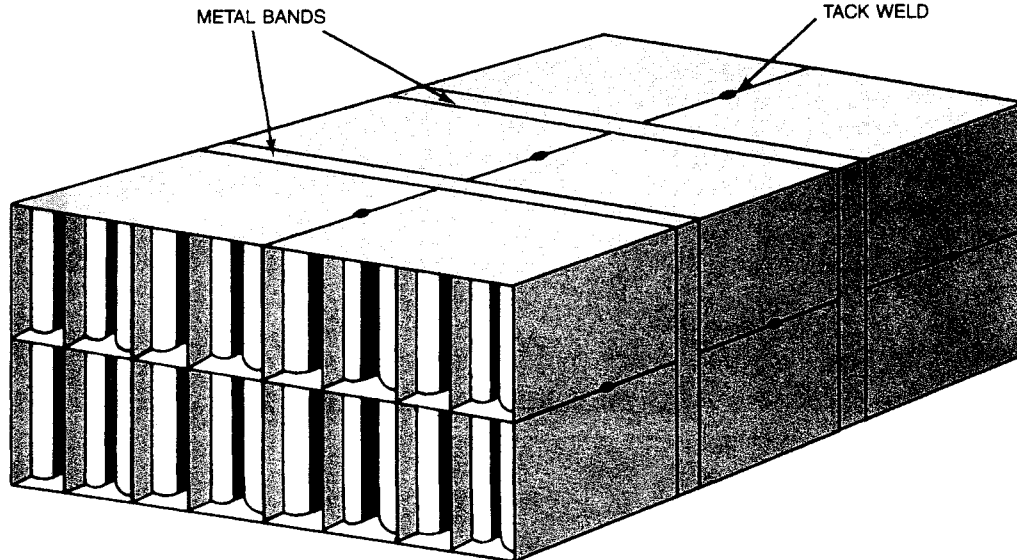
Silencers have been proven in controlled tests at qualified independent laboratories in test facilities such as these shown.



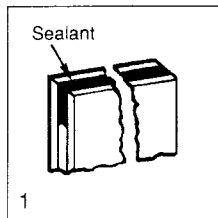
# Installation Details

Rectangular Sonatrol Silencers are available in modules of many different cross-sections for convenience in shipping and handling and for passing through existing openings. Multiple

modules are shipped loose for jobsite assembly or tack welded or banded at the factory and shipped as a complete assembly, depending on size.

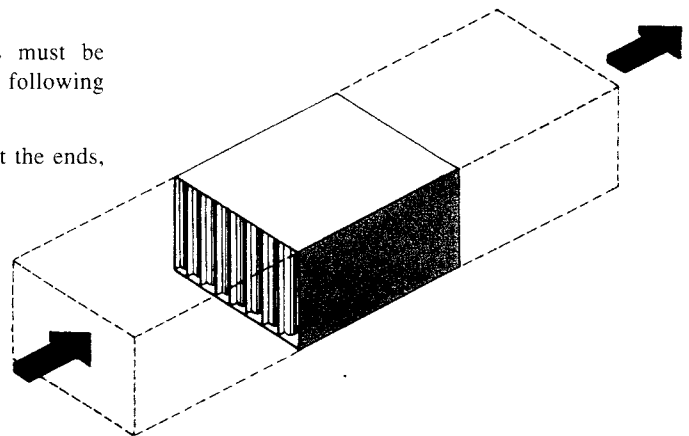
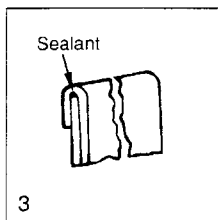
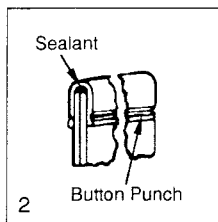


**Assembly** — Modules should be banded together with at least two metal straps or steel frames around entire bank. Three or four tack welds along the length of each adjoining surface should be made to provide structural rigidity.

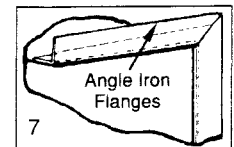
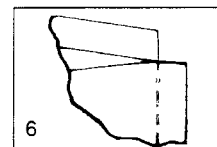
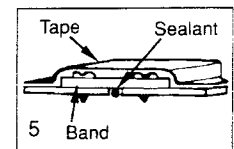
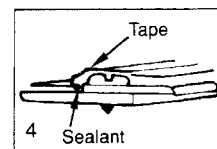


**Sealing** — To prevent leaks, modules must be sealed together at each end. One of the following methods is recommended, (1, 2, or 3).

1. Place duct sealant between modules at the ends, just before assembly.
2. "U" clip of steel may be button punched in place over adjacent surfaces at the ends.
3. One flange may be cut back and the adjoining flange bent over the cut back area of the other.



**Attachment** — All Sonatrol Silencers have 1 1/2" straight extensions unobstructed at both ends, which makes them easily attached to ductwork with both lap joint and slip joint connections (4 and 5). Extensions may be cut at the corners and bent back or angle iron backup flanges may be attached for mating with flanged equipment as in illustrations 6 and 7. Also, refer to pp. 14-17, second edition (1969) SMACNA Duct Manual for High Velocity Systems.



## GUARANTEE

Air Zone Industries, Inc. warrants the products it manufactures to be of finest quality materials and workmanship and to perform according to published ratings when properly installed and operated under normal conditions. AZI's obligation is limited to making good at its factory any part, parts or complete assemblies which shall, within one year of shipment to the original purchaser, be returned with transportation charges prepaid, and which shall, to AZI's satisfaction, be proven defective. Warranty will be honored only after products are paid for in full prior to their being returned for repair or replacement. Correction of such defects shall be by repair or replacement and shall constitute fulfillment of all AZI obligations to purchaser. AZI shall not be liable for loss, damage, or expenses directly or indirectly arising from the installation and/or use of its products or from any other cause.

AZI assumes no liability for expenses or repairs made outside its factory except by prior written consent. No liability of any kind shall attach to AZI until said products have been paid for in full. This warranty supersedes and is in lieu of all other warranties, expressed or implied and no person or representative is authorized to give any other warranties, nor to assume any other liability in connection with AZI products. No warranty is made by AZI on motors or accessories, since they are covered separately by the warranties of their respective manufacturers.

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