SOUND ATTENUATOR

Standard Performance | Medium Performance | High Performance

DESIGN AND CONSTRUCTION

The OLSON Acoustics standard range of sound attenuators are designed with three splitter arrangements to give virtually any attenuation required for axial or centrifugal fans. Air passage widths and splitter thicknesses varies to provide the required low and high frequency attenuation. The number of air passages and their height are arranged to meet resistance to air flow requirements. Different lengths provide for the amount of attenuation required.

The OLSON Acoustics Sound Attenuators are constructed of specially selected high quality materials. The casing is constructed of high quality pre-galvanised steel sheet. Aerodynamic designed splitters are constructed of specially designed pre-galvanized perforated steel sheet with medium density fiberglass in-fill material for maximum sound attenuation.

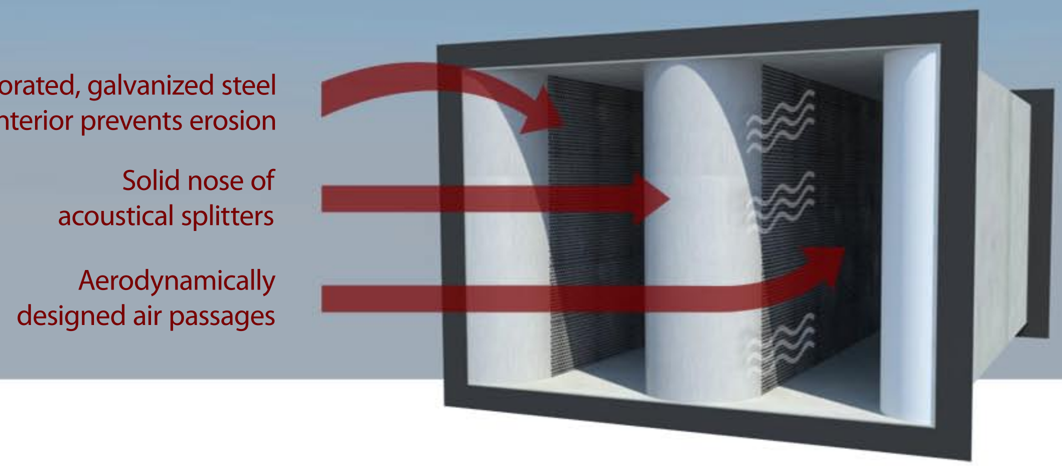
The solid nose of the acoustical splitters which form a bell-mouth entrance to the sound attenuator minimize pressure loss and generated noise.

NOTE: Sound attenuators may also be constructed of stainless steel material for marine, pharmaceutical or clean room applications. In-fills may also be made of acoustic foam for clean room purposes.

TYPICAL APPLICATION

To obtain the rated performance from a sound attenuator, the air velocity should be uniform across the entire face area of the unit. A sound attenuator should not be located immediately after a duct elbow or divided flow fitting. Either type of fitting can cause unsymmetrical airflow as the air enters the sound attenuator, thereby resulting in too high air velocity on one side of the unit with a resulting increase in pressure loss and generated sound level. If an enlarger must be used immediately ahead of the sound attenuator, the included angle of the enlarger should not exceed 15 degrees. If a reducer is necessary rather than an enlarger, the included angle of the reducer is not as critical with 45 degrees being the maximum desirable angle.

EFFECTIVE NOISE CONTROL



FOR NOISE CONTROL IN AIR HANDLING SYSTEMS
Flexible and Efficient Design System

Fans in large air handling systems usually produce undesirable high noise level that may be transmitted through both the supply and return air systems serving the conditioned areas of a building.

To provide the proper acoustical environment in the occupied areas, we have developed a line of sound attenuators which have been thoroughly tested by the National Association of Testing Authority (NATA) registered laboratory and the results published herein.

TESTING AND PERFORMANCE
According to the 1971 Methods of Test for Silencers for Air Distribution Systems

All static insertion loss, generated sound power levels and pressure loss data were obtained in an independent testing laboratory in accordance with BS4718 “1971 Methods of Test for Silencers for Air Distribution System.” The static insertion loss was measured without airflow through the attenuator. Additionally, the dynamic insertion was measured with airflow travelling with (supply air) and against (return air) the direction of noise flow. It is recognized that the velocity of air flow through the sound attenuator slightly affect its attenuation. However, exhaustive tests indicated that the effect is negligible for the range of velocities tested. Instead, consideration should be given to generated sound as air velocity increases may limit the attenuation achieved by the sound attenuator.

SPECIFICATION

The sound attenuator casings are constructed of minimum 0.7 mm galvanized steel sheet with aerodynamically designed splitters. Splitters shall be constructed of galvanized steel perforated sheet of 23% open area with medium density bonded fiberglass in-fill. Hole diameter of perforated sheet must not exceed 3.0 mm to prevent erosion. Test data on static insertion loss, generated noise and pressure loss with airflow up to 7 m/s must be submitted for approval. These datas must be obtained in a reverberant chamber in accordance with BS 4718: “1971 Methods of Tests for Silencers for Air Distribution Systems.” Sound attentuators shall be splitter type models as manufactured by OLSON Acoustics (S) Pte Ltd.

STANDARD SIZES

Standard Widths of Rectangular Sound Attenuators - 300, 600, 900, 1200, 1500, 1800, 2100, 2400 mm
Standard Heights of Rectangular Sound Attenuators - 300, 450, 600, 750, 900, 1050, 1200, 1350, 1500 mm
Standard Lengths of Rectangular Sound Attenuators - 900, 1200 1500, 1800, 2100, 2400 mm

HOW TO ORDER

When ordering rectangular sound attenuators, specify as follows: **type, length, width and height**.

XX-XXX-XXX-XXX

Model
HP: High Performance
MP: Medium Performance
SP: Standard Performance

Standard sound attenuator length
060 - 600 mm
090 - 900 mm
120 - 1200 mm
150 - 1500 mm
180 - 1800 mm
210 - 2100 mm
240 - 2400 mm
Other lengths are available upon request

Standard sound attenuator width
030 - 300 mm
060 - 600 mm
090 - 900 mm
120 - 1200 mm
150 - 1500 mm
180 - 1800 mm
210 - 2100 mm
240 - 2400 mm
Other widths are available upon request

Standard sound attenuator height
030 - 300 mm
045 - 450 mm
060 - 600 mm
075 - 750 mm
090 - 900 mm
105 - 1050 mm
120 - 1200 mm
135 - 1350 mm
150 - 1500
Other heights are available upon request

SELECTION PROCESS GUIDE

Step 1
Determine the dynamic insertion loss required. This may be obtained by subtracting the required noise level after the attenuator from the sound level of the equipment.

Step 2
Determine the type and length of the sound attenuator that will give the required insertion loss from table 1.

Step 3
Adjust resultant noise for the generated noise of sound attenuator from table 3. After adjustment, if the resultant noise is equal or less than the required noise downstream of the sound attenuator, the selection is acceptable.

Step 4
From figure 1, determine the face velocity that will meet the static pressure loss allowed.

Step 5
Determine the size of the sound attenuator base on the face velocity determined in step 4.

Example Selection

It is desired to reduce the noise level of a centrifugal fan to NC 65 immediately downstream of the sound attenuator. Airflow capacity of the fan is 20,000 CMH. Allowable static pressure to the sound attenuator is 50 Pa. The sound power level of the centrifugal fan is as follows:

	Octave band centre frequency, Hz	125	250	500	1000	2000	4000	8000
1	Fan Sound Power Level (SWL)	94	92	90	88	85	82	80
2	Required noise downstream of sound attenuator, NC65	75	72	68	68	64	63	62
3	Required Insertion Loss (1) - (2)	19	20	22	20	21	19	18
From table 1: Model HP-210 of 2100 mm length should meet the required attenuation.								
4	HP-210 Dynamic Insertion Loss from table 1	19	32	43	49	50	44	33
5	HP-210 Generated noise from table 3	51	52	51	47	49	52	50
6	Resultant noise downstream of sound attenuator before adjusting for generated noise (1) - (4)	75	60	47	39	35	38	47
7	Resultant noise downstream of sound attenuator after adjusting for generated noise compare (5) & (6)	75	60	51	47	49	52	50
Compare (2) and (7) shows resultant noise lower than the required noise level at each octave confirming HP-210 selection								
8	From figure 1: Sound attenuator face velocity is 3.5 m/s or 12,600 m/hr based on 50 Pa pressure loss							
9	Sound attenuator face area required = 20,000 m3/hr / 12,600 m/hr = 1.59 m2, sound attenuator of size 1500W X 1050H or 1800W X 900H or 2100W X 750H will meet the required face area.							

In all octave bands, the generated noise is less than the required NC 65. Therefore, the selection is acceptable.

TECHNICAL DATA

All static insertion loss, generated sound power levels and static pressure loss data were obtained in a reverberation and in accordance with BS4718: "1971 Methods of Tests for Silencers for Air Distribution Systems."

Note 1: When designing duct system for sound, generated noise of sound attenuator can become an important consideration. The generated noise of a sound attenuator determines the minimum noise levels that can be realized downstream of the attenuator. Regardless of the attenuation of the sound attenuator, the noise level leaving the unit cannot be lower than its generated noise level. OLSON Acoustics sound attenuator have been designed to minimize generated noise, thereby permitting higher degrees of attenuation.

Table 1. Dynamic Insertion Loss - DB

MODEL	Octave Band Center Frequency (Hz)						
	125	250	500	1000	2000	4000	8000
HP-90	8	15	27	35	37	26	22
HP-120	11	22	35	41	44	32	25
HP-150	15	28	41	46	45	38	30
HP-180	17	30	42	47	48	42	32
HP-210	19	32	43	49	50	44	33
HP-240	21	36	44	50	52	48	38
MP-90	6	10	19	30	30	21	15
MP-120	8	15	26	37	38	26	17
MP-150	10	19	32	45	46	32	24
MP-180	11	21	34	46	49	37	25
MP-210	13	24	36	48	52	41	28
MP-240	15	27	40	50	56	45	31
SP-90	7	9	18	29	24	18	17
SP-120	7	11	24	37	29	20	18
SP-150	8	14	30	44	35	22	20
SP-180	8	19	32	45	38	23	21
SP-210	9	22	33	47	41	26	21
SP-240	10	28	36	49	44	27	22

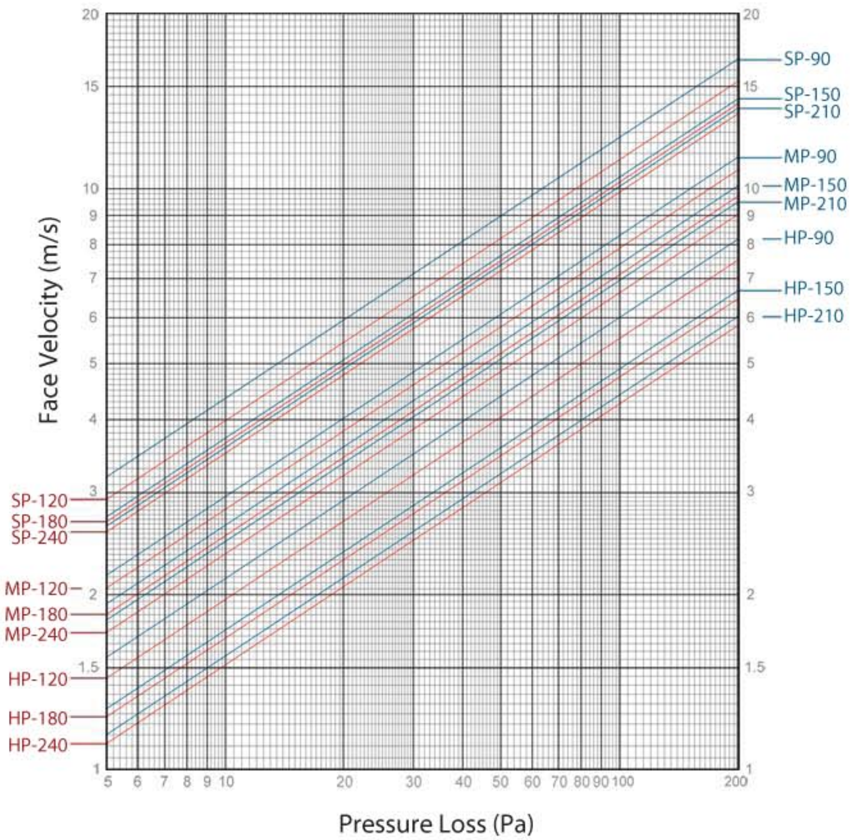
Table 2. Static Insertion Loss - DB

MODEL	Octave Band Center Frequency (Hz)						
	125	250	500	1000	2000	4000	8000
HP-90	8	17	28	38	38	27	20
HP-120	12	23	36	43	45	33	25
HP-150	15	29	43	48	51	39	30
HP-180	19	32	43	49	53	43	33
HP-210	22	36	44	51	55	47	36
HP-240	25	40	45	52	58	51	41
MP-90	6	11	19	32	29	20	17
MP-120	8	16	26	39	38	27	19
MP-150	10	20	33	46	47	33	23
MP-180	12	23	36	47	50	37	26
MP-210	13	25	39	49	53	41	28
MP-240	15	28	43	52	57	45	31
SP-90	6	9	18	29	24	18	16
SP-120	7	11	24	37	30	21	18
SP-150	8	14	31	45	36	24	22
SP-180	8	19	33	47	39	25	21
SP-210	9	24	36	49	43	26	21
SP-240	9	29	39	51	45	27	20

Table 3. Generated Sound Power Level - DB (re 10^{-12} watts at 7 m/s)

MODEL	Octave Band Center Frequency (Hz)						
	125	250	500	1000	2000	4000	8000
HP-90	52	53	51	48	50	53	50
HP-120	52	53	51	49	51	51	49
HP-150	52	53	51	49	51	51	49
HP-180	51	51	51	48	50	51	50
HP-210	52	52	57	47	50	52	50
HP-240	52	52	51	47	49	50	50
MP-90	50	51	47	44	49	50	48
MP-120	50	50	47	44	49	51	48
MP-150	50	50	47	44	49	51	48
MP-180	50	50	47	44	49	50	48
MP-210	50	45	47	44	49	50	48
MP-240	50	50	47	46	49	50	48
SP-90	47	44	40	40	44	45	41
SP-120	47	44	40	40	43	44	41
SP-150	47	44	40	40	43	44	41
SP-180	47	49	40	40	43	44	41
SP-210	47	43	40	40	42	44	41
SP-240	47	43	40	40	42	44	41

Fig 1. Static pressure loss through Rectangular Sound Attenuators



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