

Quiet-Duct Clean-Flow™ Silencers

Section 15000 Specifications

1.01 General

- A. Furnish and install "Clean-Flow" (rectangular) silencers of the types and sizes shown on the plans and/or listed in the schedule. Silencers shall be the product of IAC Acoustics. Any specification change must be submitted in writing and approved by the Architect/Engineer, in writing, at least 10 days prior to the bid due-date.

2.01 Materials

- A. Outer casings of rectangular silencers shall be made of 22 gauge type #G-90 lock-former-quality galvanized steel.
- B. Interior partitions for rectangular silencers shall be not less than 26 gauge type #G-90 galvanized lock-former-quality perforated steel.
- C. Filler material shall be inorganic glass fiber of a proper density to obtain the specified acoustic performance and be packed under not less than 5% compression to eliminate voids due to vibration and settling. Material shall be inert, vermin- and moisture-proof. Filler material shall be totally encapsulated and sealed with polymeric film of an appropriate thickness. The encapsulated fill material shall be separated from the interior perforated baffles by means of a noncombustible, erosion resistant, factory-installed, acoustic stand-off. It shall not be acceptable to omit the acoustic stand-off and try to compensate for its absence by means of corrugated baffles.
- D. Combustion ratings for the silencer acoustic fill shall be not greater than the following when tested to ASTM E 84, NFPA Standard 255, or UL No. 723:

Flamespread Classification	20
Smoke Development Rating.....	20

3.01 Construction

- A. Units shall be constructed in accordance with the ASHRAE Guide recommendations for high pressure duct work. Seams shall be lock formed and mastic filled. Rectangular casing seams shall be in the corners of the silencer shell to provide maximum unit strength and rigidity. Interior partitions shall be fabricated from single-piece, margin-perforated sheets and shall have die-formed entrance and exit shapes so as to provide the maximum aerodynamic efficiency and minimum self-noise characteristics in the sound attenuator. Blunt noses or squared off partitions will not be accepted.
- B. Attachment of the interior partitions to the casing shall be by means of an interlocking track assembly. Tracks shall be solid galvanized steel and shall be welded to the outer casing. Attachment of the interior partitions to the tracks shall be such that a minimum of 4 thicknesses of metal exist at this location. The track assembly shall stiffen the exterior casing, provide a reinforced attachment detail for the interior partitions, and shall maintain a uniform airspace width along

the length of the silencer for consistent aerodynamic and acoustic performance. Interior partitions shall be additionally secured to the outer casing with welded nose clips at both ends of the sound attenuator.

- C. Sound attenuating units shall not fail structurally when subjected to a differential air pressure of 8 inches water gauge from inside to outside the casing. Airtight construction shall be provided by use of a duct sealing compound on the job-site material and labor furnished by the contractor.

4.01 Acoustic Performance

- A. All silencer ratings shall be determined in a duct-to-reverberant room test facility which provides for airflow in both directions through the test silencer in accordance with ASTM Specification E477-99. The test facility shall be NVLAP accredited for the ASTM E477-99 test standard. Data from a non-accredited laboratory will not be acceptable. The test set-up and procedure shall be such that all effects due to end reflection, directivity, flanking transmission, standing waves and test chamber sound absorption are eliminated.

Acoustic ratings shall include Dynamic Insertion Loss (DIL) and Self-Noise (SN) Power Levels both for FORWARD FLOW (air and noise in same direction) and REVERSE FLOW (air and noise in opposite directions) with airflow of at least 2000 fpm entering face velocity. Data for rectangular and tubular type silencers shall be presented for tests conducted using silencers no smaller than the following cross-sections:

Rectangular, inch: 24 x 24, 24 x 30, or 24 x 36
Tubular, inch: 12, 24, 36 and 48

5.01 Aerodynamic Performance

- A. Static pressure loss of silencers shall not exceed those listed in the silencer schedule as the airflow indicates. Airflow measurements shall be made in accordance with ASTM specification E477-99 and applicable portions of ASME, AMCA, and ADC airflow test codes. Tests shall be reported on the identical units for which acoustic data is presented.

6.01 Certification

- A. With submittals, the manufacturer shall supply certified test data on Dynamic Insertion Loss, Self-Noise Power Levels, and Aerodynamic Performance for Reverse and Forward Flow test conditions. Test data shall be for a standard product. All rating tests shall be conducted in the same facility, shall utilize the same silencer, and shall be open to inspection upon request from the Architect/Engineer.

7.01 Duct Transitions

- A. When transitions are required to adapt silencer dimensions to connecting duct work they shall be furnished by the installing contractor.

Quiet-Duct Clean-Flow™ Silencers

Type: HLFS

Forward & Reverse Flow Ratings



Designating Silencers

Model: 5HLFS 24 x 18

Type: HLFS **Length:** 5' **Width:** 24" **Height:** 18"

The IAC Type HLFS Clean-Flow Quiet-Duct Silencers provide superior low frequency attenuation for air handling systems requiring a high degree of cleanliness and hygiene. The non-erosive, non-pregnable, "Clean Flow" features make these silencers ideal for hospital, laboratory and clean-room type applications.

All HLFS Silencers have been rated with procedures certified in accordance with applicable portions of ASTM E477. All Dynamic Insertion Loss and Self-Noise Acoustic Performance Data were obtained in IAC's Aero-Acoustic Laboratory using the duct-to-room reverberant test facility **with air flowing through the silencers.**

Type HLFS Silencers are advantageous where low frequency DIL requirements are high in HVAC systems. The acoustic fill is totally encapsulated to prevent erosion or entrainment of particulate. A honeycomb acoustic stand-off provides additional protection and performance.

Table I: Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB							
3HLFS	-2000	7	13	15	20	19	18	16	10
	-1000	7	12	14	20	19	18	15	10
	0	9	14	15	21	19	18	15	11
	1000	7	11	14	20	18	15	15	10
	2000	7	11	14	18	17	16	14	9
5HLFS	-2000	11	18	22	26	25	21	19	13
	-1000	11	16	23	26	25	21	19	14
	0	12	16	23	27	25	21	19	14
	1000	12	16	23	26	25	20	18	14
	2000	13	15	22	25	24	20	17	13
7HLFS	-2000	14	17	23	29	31	29	22	16
	-1000	15	17	23	30	31	29	22	16
	0	15	18	23	28	29	27	20	15
	1000	15	18	22	25	27	24	18	14
	2000	15	20	23	26	26	23	17	13
10HLFS	-2000	17	24	29	35	38	37	28	19
	-1000	15	23	30	36	39	36	28	18
	0	15	23	30	34	38	37	27	19
	1000	15	23	30	34	38	37	27	18
	2000	17	22	28	34	37	37	28	18



(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99. Contact IAC if attenuation in excess of 50 dB is required.

Table II: Weights & Measures

Nominal Length	W/In H/In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
3'	Wt/lb.	18	21	25	29	31	35	35	42	50	57	61	70	54	64	74
5'		29	35	42	47	52	59	58	70	83	94	104	117	89	104	121
7'		41	49	59	67	75	83	82	98	118	134	150	166	125	146	175
10'		59	70	84	95	N/A	N/A	117	140	167	190	N/A	N/A	178	209	250

Nominal Length	W/In H/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
3'	Wt/lb.	82	92	102	89	106	124	139	153	172	108	128	148	164	184	204
5'		136	152	157	147	174	204	230	256	274	178	208	242	272	304	314
7'		196	218	240	207	244	293	330	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10'		280	N/A	N/A	295	349	417	470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table III: Aerodynamic Performance

IAC Model	L/Ft	Static Pressure Drop, i.w.g.															
HLFS	3'	0.04	0.05	0.07	0.09	0.11	0.14	0.17	0.20	0.24	0.28	0.32	0.36	0.41	0.46	0.51	0.57
	5'	0.04	0.06	0.08	0.10	0.13	0.16	0.19	0.22	0.26	0.31	0.35	0.40	0.45	0.51	0.56	0.62
	7'	0.04	0.06	0.08	0.10	0.13	0.16	0.20	0.23	0.28	0.32	0.37	0.42	0.47	0.53	0.59	0.65
	10'	0.04	0.06	0.09	0.11	0.14	0.18	0.21	0.26	0.30	0.35	0.40	0.45	0.51	0.57	0.64	0.71
Silencer Face Velocity, fpm		250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm								
HLFS (all sizes)	-2000	58	54	58	61	62	62	65	63
	-1500	51	49	53	56	56	59	60	53
	-1000	45	42	45	43	45	49	44	37
	1000	46	42	45	43	45	49	44	37
	1500	56	54	57	56	52	56	57	51
	2000	68	64	65	66	61	61	64	61

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

- Silencer Face Area is the cross-sectional area at the silencer entrance
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 $PD = (Actual\ FV/Catalog\ FV)^2 \times (Catalog\ PD)$
- Self Noise values shown are for a four-square-foot face area silencer
- For each doubling of the face area add 3 dB to the self-noise values listed
- For each halving of the face area subtract 3 dB from the self-noise values listed
- Weights and measures are listed for limited number of available sizes

Quiet-Duct Clean-Flow™ Silencers

Type: HLFM

Forward & Reverse Flow Ratings



The IAC Type HLFM Clean-Flow Quiet-Duct Silencers provide improved low frequency attenuation with medium range pressure loss for air handling systems requiring a high degree of cleanliness and hygiene. The non-erosive, non-pregnable, “Clean Flow” features make these silencers ideal for hospital, laboratory and clean-room type applications.

All HLFM Silencers have been rated with procedures certified in accordance with applicable portions of ASTM E477. All Dynamic Insertion Loss and Self-Noise Acoustic Performance Data were obtained in IAC’s Aero-Acoustic Laboratory using the duct-to-room reverberant test facility **with air flowing through the silencers.**

Type HLFM Silencers provide improved low frequency attenuation for medium velocity HVAC systems. The acoustic fill is totally encapsulated to prevent erosion or entrainment of particulate. A honeycomb acoustic stand-off provides additional protection and performance.

Designating Silencers

Model: 5HLFM 24 x 18

Type: HLFM **Length:** 5’ **Width:** 24” **Height:** 18”

Table I: Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB							
3HLFM	-2000	6	8	11	15	15	14	13	8
	-1000	6	8	11	15	15	13	12	8
	0	6	7	11	16	15	12	11	8
	1000	4	7	10	15	14	13	11	8
	2000	4	7	10	14	13	12	11	8
5HLFM	-2000	9	14	21	23	22	16	13	10
	-1000	8	13	21	23	23	16	13	10
	0	9	12	22	23	23	16	14	10
	1000	8	12	20	23	22	16	13	10
	2000	7	11	19	22	22	16	13	9
7HLFM	-2000	11	16	23	29	29	19	18	13
	-1000	11	16	24	29	29	19	19	14
	0	11	16	24	29	28	20	19	14
	1000	11	16	23	28	27	19	18	13
	2000	11	15	23	28	27	21	18	14
10HLFM	-2000	14	21	28	31	33	23	22	16
	-1000	14	21	28	31	32	24	23	17
	0	15	21	28	32	31	25	23	17
	1000	15	21	27	30	32	25	23	16
	2000	13	20	27	30	32	25	23	16



(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99. Contact IAC if attenuation in excess of 50 dB is required.

Table II: Weights & Measures

Nominal Length	W/In H/In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
3'	Wt/lb.	18	21	25	29	31	35	35	42	50	57	61	70	54	64	74
5'		29	35	42	47	52	59	58	70	83	94	104	117	89	104	121
7'		41	49	59	67	75	83	82	98	118	134	150	166	125	146	175
10'		59	70	84	95	N/A	N/A	117	140	167	190	N/A	N/A	178	209	250

Nominal Length	W/In H/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
3'	Wt/lb.	82	92	102	89	106	124	139	153	172	108	128	148	164	184	204
5'		136	152	157	147	174	204	230	256	274	178	208	242	272	304	314
7'		196	218	240	207	244	293	330	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10'		280	N/A	N/A	295	349	417	470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table III: Aerodynamic Performance

IAC Model	L/Ft	Static Pressure Drop, i.w.g.															
HLFM	3'	0.05	0.07	0.09	0.12	0.15	0.19	0.23	0.27	0.32	0.37	0.42	0.48	0.55	0.61	0.68	0.76
	5'	0.05	0.07	0.10	0.13	0.16	0.20	0.24	0.29	0.34	0.39	0.45	0.51	0.57	0.64	0.72	0.79
	7'	0.05	0.07	0.10	0.13	0.17	0.21	0.25	0.30	0.35	0.41	0.47	0.53	0.60	0.67	0.75	0.83
	10'	0.06	0.08	0.12	0.15	0.18	0.24	0.29	0.34	0.40	0.46	0.53	0.60	0.68	0.76	0.85	0.94
Silencer Face Velocity, fpm		500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm								
HLFM (all sizes)	-3000	64	62	64	66	65	64	66	62
	-2000	53	50	54	56	56	59	58	51
	-1000	42	40	43	45	47	46	37	27
	1000	47	34	36	35	40	37	27	20
	2000	54	52	58	56	51	56	55	50
	3000	68	64	64	63	61	63	66	63

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

- Silencer Face Area is the cross-sectional area at the silencer entrance
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 $PD = (Actual\ FV/Catalog\ FV)^2 \times (Catalog\ PD)$
- Self Noise values shown are for a four-square-foot face area silencer
- For each doubling of the face area add 3 dB to the self-noise values listed
- For each halving of the face area subtract 3 dB from the self-noise values listed
- Weights and measures are listed for limited number of available sizes

Quiet-Duct Clean-Flow™ Silencers

Type: HS

Forward & Reverse Flow Ratings



Designating Silencers

Model: 5HS 24 x 18

Type: HS **Length:** 5' **Width:** 24" **Height:** 18"

The IAC Type HS Clean-Flow Quiet-Duct Silencers are designed for air handling systems requiring the ultimate in cleanliness and hygiene. They are:

- **Non-Erosive:** to eliminate carryover of inorganic particulate matter from the silencer.
- **Non-Pregnable:** to prevent or minimize the adsorption of gases and/or entry of Brownian particles into the fill.
- **Cleanable:**
 1. Non-removable fill permits periodic cleaning of exposed surfaces with soft brush vacuum cleaner.
 2. Optional removable parts also permit cleaning of concealed surfaces and replacement of acoustic fill.
- **Performance Rated:** Dynamic Insertion Loss (DIL), Self-Noise (SN) and Aerodynamic Ratings are given in Tables II, III and IV. All acoustic data are for forward and reverse flow.
- **Construction Materials:** Standard galvanized steel, polymer sheeting, acoustic infill and other materials. Special materials available on request.

Table I: Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB							
3HS	-2000	7	12	15	22	26	30	28	14
	-1000	5	9	17	25	27	32	29	14
	0	5	7	15	33	26	30	19	14
	1000	5	6	13	21	24	28	29	13
	2000	5	8	11	17	21	26	31	13
5HS	-2000	14	15	22	27	35	42	33	15
	-1000	9	13	23	31	40	47	34	16
	0	8	11	22	29	38	46	34	16
	1000	8	12	18	28	36	44	34	14
	2000	8	12	16	23	32	40	33	15
7HS	-2000	15	18	23	31	45	49	34	13
	-1000	15	17	25	41	48	50	36	14
	0	13	15	22	39	48	50	38	15
	1000	11	12	19	38	49	50	38	17
	2000	11	11	16	31	45	50	35	16
10HS	-2000	20	22	30	34	49	50	33	11
	-1000	20	24	33	44	51	51	36	11
	0	17	20	31	42	52	51	38	15
	1000	14	16	27	40	51	50	39	19
	2000	14	17	24	34	48	50	36	17



(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99. Contact IAC if attenuation in excess of 50 dB is required.

Table II: Weights & Measures

Nominal Length	W/In H/In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
3'	Wt/lb.	25	35	42	49	60	70	43	52	62	74	83	93	71	86	102
5'		44	63	75	87	105	126	73	89	107	125	141	158	121	147	173
7'		61	88	102	122	147	176	102	125	150	176	199	226	170	207	243
10'		86	123	150	171	206	246	155	177	212	250	N/A	N/A	241	293	345

Nominal Length	W/In H/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
3'	Wt/lb.	117	132	147	81	102	142	162	182	204	142	172	204	234	264	294
5'		204	230	256	142	177.5	249	284	319	355	242	294	346	408	460	512
7'		288	325	362	N/A	N/A	N/A	N/A	N/A	N/A	340	414	486	576	650	724
10'		405	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	482	586	690	810	N/A	N/A

Table III: Aerodynamic Performance

IAC Model	L/Ft	Static Pressure Drop, i.w.g.															
		HS	3'	0.01	0.03	0.06	0.09	0.13	0.18	0.23	0.29	0.36	0.44	0.52	0.61	0.71	0.82
5'	0.02		0.04	0.07	0.10	0.15	0.20	0.26	0.33	0.41	0.49	0.59	0.69	0.80	0.91	1.04	1.17
7'	0.02		0.04	0.07	0.11	0.16	0.21	0.28	0.35	0.44	0.53	0.63	0.74	0.85	0.98	1.11	1.26
10'	0.02		0.04	0.08	0.12	0.18	0.24	0.32	0.40	0.49	0.60	0.71	0.83	0.97	1.11	1.26	1.43
Silencer Face Velocity, fpm		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm								
HS (all sizes)	-2000	68	62	61	66	61	64	67	66
	-1000	54	51	50	51	54	56	52	40
	-500	40	40	39	36	47	48	37	20
	500	36	29	35	30	31	35	22	20
	1000	55	49	49	47	46	49	42	32
	2000	74	69	63	64	61	63	62	56

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

- Silencer Face Area is the cross-sectional area at the silencer entrance
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 $PD = (Actual\ FV/Catalog\ FV)^2 \times (Catalog\ PD)$
- Self Noise values shown are for a four-square-foot face area silencer
- For each doubling of the face area add 3 dB to the self-noise values listed
- For each halving of the face area subtract 3 dB from the self-noise values listed
- Weights and measures are listed for limited number of available sizes

Quiet-Duct Clean-Flow™ Silencers

Type: HMS

Forward & Reverse Flow Ratings



The IAC Type HMS Clean-Flow Quiet-Duct Silencers provide superior performance with mid-range frequency from third thru sixth octave bands and has significant pressure loss for air handling systems requiring a high degree of cleanliness and hygiene. The non-erosive, non-pregnable, “Clean Flow” features make these silencers ideal for hospital, laboratory and clean-room type applications.

All HMS Silencers have been rated with procedures certified in accordance with applicable portions of ASTM E477. All Dynamic Insertion Loss and Self-Noise Acoustic Performance Data were obtained in IAC’s Aero-Acoustic Laboratory using the duct-to-room reverberant test facility **with air flowing through the silencers.**

Designating Silencers

Model: 5HMS 24 x 18

Type: HMS **Length:** 5’ **Width:** 24” **Height:** 18”

Table I: Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB							
3HMS	-4000	4	6	10	15	18	22	16	8
	-2000	5	6	9	15	17	21	17	8
	0	5	6	9	15	17	18	17	8
	2000	4	4	8	14	17	17	16	8
	4000	4	3	7	13	16	18	17	8
5HMS	-4000	6	10	15	29	29	30	23	9
	-2000	4	8	14	27	29	29	23	9
	0	4	9	13	25	29	28	23	10
	2000	3	7	11	24	27	27	22	12
	4000	3	6	10	22	28	28	22	12
7HMS	-4000	8	15	21	31	30	39	28	11
	-2000	7	12	18	33	35	38	28	11
	0	7	13	17	32	34	37	26	12
	2000	7	11	16	30	33	34	24	13
	4000	6	11	15	29	34	35	26	14
10HMS	-4000	11	14	25	30	36	40	32	15
	-2000	11	14	24	32	36	43	33	14
	0	12	14	23	33	35	41	30	15
	2000	10	12	23	32	34	40	28	16
	4000	9	13	21	31	32	37	30	18



(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99. Contact IAC if attenuation in excess of 50 dB is required.

Table II: Weights & Measures

Nominal Length	W/In H/In	7.5	7.5	7.5	7.5	7.5	7.5	15	15	15	15	15	15	30	30	30
		18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3'	Wt/lb.	26	40	45	51	66	80	47	57	67	80	89	100	80	95	110
5'		46	67	80	91	112	134	80	96	114	134	150	167	135	161	187
7'		65	95	100	129	158	190	112	135	159	193	216	240	188	224	261
10'		90	135	157	180	223	270	159	192	226	273	N/A	N/A	220	319	371

Nominal Length	W/In H/In	30	30	30	45	45	45	45	45	45	60	60	60	60	60	60
		36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3'	Wt/lb.	130	145	160	127	152	156	177	197	218	160	190	220	260	290	320
5'		22	248	274	215	257	275	310	345	381	270	322	374	44	496	548
7'		310	347	384	300	359	N/A	N/A	N/A	N/A	376	448	522	620	694	768
10'		440	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	440	638	742	880	N/A	N/A

Table III: Aerodynamic Performance

IAC Model	L/Ft	Static Pressure Drop, i.w.g.															
		HMS	3'	0.06	0.08	0.10	0.12	0.14	0.17	0.20	0.23	0.26	0.29	0.33	0.36	0.40	0.44
5'	0.08		0.10	0.12	0.15	0.17	0.20	0.24	0.27	0.31	0.35	0.39	0.44	0.48	0.53	0.58	0.64
7'	0.10		0.12	0.15	0.18	0.22	0.26	0.30	0.34	0.39	0.44	0.49	0.54	0.60	0.67	0.73	0.80
10'	0.12		0.15	0.19	0.23	0.27	0.31	0.36	0.42	0.48	0.54	0.60	0.67	0.74	0.82	0.90	0.98
Silencer Face Velocity, fpm		800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm								
HMS (all sizes)	-3000	67	63	61	66	61	64	67	67
	-2000	60	56	56	56	57	59	58	49
	-1000	46	45	45	41	50	51	43	23
	1000	44	32	36	34	31	32	29	21
	2000	63	54	52	50	47	48	47	44
	3000	74	64	60	58	56	58	59	57

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

- Silencer Face Area is the cross-sectional area at the silencer entrance
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 $PD = (Actual\ FV/Catalog\ FV)^2 \times (Catalog\ PD)$
- Self Noise values shown are for a four-square-foot face area silencer
- For each doubling of the face area add 3 dB to the self-noise values listed
- For each halving of the face area subtract 3 dB from the self-noise values listed
- Weights and measures are listed for limited number of available sizes

Quiet-Duct Clean-Flow™ Silencers

Type: HLFL

Forward & Reverse Flow Ratings



The IAC Type HLFL Clean-Flow Quiet-Duct Silencers provide low frequency attenuation at reduced pressure loss for higher velocity HVAC systems requiring a high degree of cleanliness and hygiene. The non-erosive, non-pregnable, “Clean Flow” features make these silencers ideal for hospital, laboratory and clean-room type applications.

All HLFL Silencers have been rated with procedures certified in accordance with applicable portions of ASTM E477. All Dynamic Insertion Loss and Self-Noise Acoustic Performance Data were obtained in IAC’s Aero-Acoustic Laboratory using the duct-to-room reverberant test facility **with air flowing through the silencers.**

Type HLFL Silencers provide low frequency attenuation with low pressure drop for higher velocity HVAC systems. The acoustic fill is totally encapsulated to prevent erosion or entrainment of particulate. A honeycomb acoustic stand-off provides additional protection and performance.

Designating Silencers

Model: 5HLFL 24 x 18

Type: HLFL **Length:** 5’ **Width:** 24” **Height:** 18”

Table I: Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB							
3HLFL	-2000	4	6	10	13	16	11	11	6
	-1000	3	6	9	13	16	11	10	7
	0	3	6	10	16	16	13	10	7
	1000	3	6	10	17	18	15	10	7
	2000	3	6	9	16	18	12	10	5
5HLFL	-2000	6	8	15	20	23	16	14	10
	-1000	7	9	15	20	23	17	13	10
	0	6	8	14	20	22	15	13	9
	1000	5	7	14	19	22	14	12	8
	2000	4	7	14	17	21	15	12	8
7HLFL	-2000	7	12	18	25	27	25	16	11
	-1000	6	12	17	26	27	25	17	12
	0	6	12	16	26	26	24	16	11
	1000	6	10	16	25	25	24	18	11
	2000	6	10	15	23	24	26	16	11
10HLFL	-2000	10	15	24	33	36	25	19	12
	-1000	8	15	24	35	36	26	18	12
	0	8	14	23	33	34	26	17	12
	1000	8	13	22	33	33	26	17	12
	2000	8	12	21	32	33	26	16	12



(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99. Contact IAC if attenuation in excess of 50 dB is required.

Table II: Weights & Measures

Nominal Length	W/In H/In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
3'	Wt/lb.	18	21	25	29	31	35	35	42	50	57	61	70	54	64	74
5'		29	35	42	47	52	59	58	70	83	94	104	117	89	104	121
7'		41	49	59	67	75	83	82	98	118	134	150	166	125	146	175
10'		59	70	84	95	N/A	N/A	117	140	167	190	N/A	N/A	178	209	250

Nominal Length	W/In H/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
3'	Wt/lb.	82	92	102	89	106	124	139	153	172	108	128	148	164	184	204
5'		136	152	157	147	174	204	230	256	274	178	208	242	272	304	314
7'		196	218	240	207	244	293	330	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10'		280	N/A	N/A	295	349	417	470	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table III: Aerodynamic Performance

IAC Model	L/Ft	Static Pressure Drop, i.w.g.															
HLFL	3'	0.01	0.05	0.08	0.11	0.15	0.19	0.24	0.30	0.36	0.43	0.51	0.59	0.68	0.77	0.87	0.97
	5'	0.01	0.05	0.08	0.12	0.16	0.20	0.26	0.32	0.39	0.46	0.54	0.63	0.72	0.82	0.92	1.04
	7'	0.01	0.05	0.09	0.12	0.17	0.22	0.28	0.34	0.41	0.49	0.57	0.67	0.77	0.87	0.98	1.10
	10'	0.02	0.06	0.10	0.14	0.19	0.24	0.31	0.38	0.46	0.55	0.64	0.74	0.86	0.97	1.10	1.23
Silencer Face Velocity, fpm		400	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm								
HLFL (all sizes)	-3000	55	54	56	57	56	59	61	56
	-2000	46	45	48	49	50	54	49	42
	-1000	31	30	34	35	40	45	28	20
	1000	32	24	32	25	34	39	24	20
	2000	47	42	46	44	46	51	46	38
	3000	56	53	54	55	53	58	59	53

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

- Silencer Face Area is the cross-sectional area at the silencer entrance
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 $PD = (Actual\ FV/Catalog\ FV)^2 \times (Catalog\ PD)$
- Self Noise values shown are for a four-square-foot face area silencer
- For each doubling of the face area add 3 dB to the self-noise values listed
- For each halving of the face area subtract 3 dB from the self-noise values listed
- Weights and measures are listed for limited number of available sizes

Quiet-Duct Clean-Flow™ Silencers

Type: HML

Forward & Reverse Flow Ratings



The IAC Type HML Clean-Flow Quiet-Duct Silencers provide improved medium-low frequency attenuation as well as low pressure drop aerodynamic performance in conjunction with the fourth and fifth octave bands needing critical low pressure loss for air handling systems requiring a high degree of cleanliness and hygiene. The non-erosive, non-pregnable, “Clean Flow” features make these silencers ideal for hospital, laboratory and clean-room type applications.

All HML Silencers have been rated with procedures certified in accordance with applicable portions of ASTM E477. All Dynamic Insertion Loss and Self-Noise Acoustic Performance Data were obtained in IAC’s Aero-Acoustic Laboratory using the duct-to-room reverberant test facility **with air flowing through the silencers.**

Designating Silencers

Model: 5HML 24 x 18

Type: HML **Length:** 5’ **Width:** 24” **Height:** 18”

Table I: Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB							
3HML	-5000	4	4	7	14	12	7	8	4
	-2000	3	4	7	13	12	8	8	4
	0	3	4	7	13	12	7	9	5
	2000	3	2	6	12	11	8	9	6
	5000	2	3	6	11	11	8	10	
5HML	-5000	5	7	12	25	25	11	7	5
	-2000	4	6	12	23	24	11	8	5
	0	4	6	11	23	24	13	10	7
	2000	3	5	10	22	23	15	12	9
	5000	3	6	10	20	24	14	12	9
7HML	-5000	5	9	16	30	30	18	16	10
	-2000	6	8	15	29	31	17	15	9
	0	6	9	14	27	31	18	16	10
	2000	5	7	12	24	31	21	16	11
	5000	5	7	10	25	29	21	16	11
10HML	-5000	9	12	20	32	34	24	15	12
	-2000	8	12	19	33	37	23	16	12
	0	9	12	18	31	36	25	16	12
	2000	7	11	17	31	35	26	17	12
	5000	8	10	17	32	36	26	17	14



(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99. Contact IAC if attenuation in excess of 50 dB is required.

Table II: Weights & Measures

Nominal Length	W/In H/In	9	9	9	9	9	9	18	18	18	18	18	18	36	36	36
		18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3'	Wt/lb.	35	41	52	57	65	73	52	61	71	84	94	104	69	103	120
5'		60	71	82	95	107	119	87	103	121	142	158	175	119.5	175	201
7'		84	100	116	133	150	167	122	144	168	200	223	247	168.5	246	283
10'		118	141	167	190	240	215	174	205	239	284	N/A	N/A	237.5	349	403

Nominal Length	W/In H/In	36	36	36	54	54	54	54	54	54	72	72	72	72	72	72
		36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3'	Wt/lb.	138	153	168	121	164	191	222	247	272	138	206	240	276	306	336
5'		239	265	291	206.5	278	322	381	423	466	239	350	402	478	530	582
7'		337	374	411	290.5	390	451	537	597	658	337	492	566	674	748	822
10'		475	N/A	N/A	411.5	554	642	759	N/A	N/A	475	698	806	950	N/A	N/A

Table III: Aerodynamic Performance

IAC Model	L/Ft	Static Pressure Drop, i.w.g.															
		HML	3'	0.05	0.07	0.10	0.13	0.16	0.20	0.24	0.28	0.33	0.38	0.44	0.50	0.57	0.64
5'	0.06		0.08	0.12	0.15	0.19	0.24	0.28	0.34	0.40	0.46	0.53	0.60	0.68	0.76	0.85	0.94
7'	0.07		0.11	0.14	0.19	0.24	0.29	0.36	0.42	0.50	0.58	0.66	0.75	0.85	0.95	1.06	1.18
10'	0.09		0.13	0.18	0.23	0.29	0.36	0.44	0.52	0.61	0.71	0.82	0.93	1.05	1.18	1.31	1.45
Silencer Face Velocity, fpm		1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm								
HML (all sizes)	-3000	64	59	59	63	60	62	63	59
	-2000	56	53	52	53	56	58	52	44
	-1000	42	42	41	38	49	50	37	20
	1000	39	35	30	27	26	28	28	20
	2000	58	52	46	43	42	45	45	39
	3000	71	61	55	53	51	55	56	52

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

- Silencer Face Area is the cross-sectional area at the silencer entrance
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 $PD = (Actual\ FV/Catalog\ FV)^2 \times (Catalog\ PD)$
- Self Noise values shown are for a four-square-foot face area silencer
- For each doubling of the face area add 3 dB to the self-noise values listed
- For each halving of the face area subtract 3 dB from the self-noise values listed
- Weights and measures are listed for limited number of available sizes

Quiet-Duct Clean-Flow™ Silencers

Type: HL

Forward & Reverse Flow Ratings



The IAC Type HL Clean-Flow Quiet-Duct Silencers provide excellent frequency attenuation as well as low pressure drop aerodynamic performance in conjunction with the fifth and sixth octave bands needing critical low pressure loss for air handling systems requiring a high degree of cleanliness and hygiene. The non-erosive, non-pregnable, “Clean Flow” features make these silencers ideal for hospital, laboratory and clean-room type applications.

All HL Silencers have been rated with procedures certified in accordance with applicable portions of ASTM E477. All Dynamic Insertion Loss and Self-Noise Acoustic Performance Data were obtained in IAC’s Aero-Acoustic Laboratory using the duct-to-room reverberant test facility **with air flowing through the silencers.**

Designating Silencers

Model: 5HL 24 x 18

Type: HL **Length:** 5’ **Width:** 24” **Height:** 18”

Table I: Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB							
3HL	-5000	1	2	3	8	9	20	17	10
	-2000	2	3	3	8	8	19	17	9
	0	3	4	4	8	8	18	17	8
	2000	2	4	3	7	7	17	17	6
	5000	2	4	3	5	4	12	16	5
5HL	-5000	5	9	12	18	25	32	26	10
	-2000	5	8	10	17	24	37	23	10
	0	5	8	10	16	22	36	22	10
	2000	4	6	7	15	20	33	22	9
	5000	4	5	6	11	16	28	23	8
7HL	-5000	5	10	13	21	27	32	20	10
	-2000	6	7	10	19	25	42	21	10
	0	6	8	10	18	24	41	21	9
	2000	5	7	9	16	20	38	21	8
	5000	4	6	6	13	17	32	22	8
10HL	-5000	7	12	16	26	28	30	18	9
	-2000	9	8	12	24	29	44	20	9
	0	9	8	12	23	29	46	20	9
	2000	8	6	11	22	28	47	20	8
	5000	5	6	7	18	23	40	21	9



(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99. Contact IAC if attenuation in excess of 50 dB is required.

Table II: Weights & Measures

Nominal Length	W/In H/In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
3'	Wt/lb.	29	35	42	49	56	63	43	52	62	74	83	93	71	86	102
5'		52	63	75	87	99	111	73	89	107	125	141	158	121	147	173
7'		72	88	105	122	139	156	102	125	150	176	199	226	170	207	243
10'		101	123	147	171	163	187	155	177	212	25	N/A	N/A	241	293	345

Nominal Length	W/In H/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
3'	Wt/lb.	117	132	147	101	121	143	163	184	205	140	168	182	209	235	261
5'		204	230	256	180	211	245	279	312	346	242	284	312	353	395	438
7'		288	325	362	252	295	351	398	445	492	N/A	N/A	N/A	N/A	N/A	N/A
10'		405	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table III: Aerodynamic Performance

IAC Model	L/Ft	Static Pressure Drop, i.w.g.															
HL	3'	0.05	0.07	0.10	0.13	0.16	0.20	0.24	0.29	0.34	0.39	0.45	0.51	0.58	0.65	0.72	0.80
	5'	0.06	0.08	0.11	0.14	0.18	0.22	0.27	0.32	0.37	0.43	0.50	0.56	0.64	0.71	0.79	0.88
	7'	0.06	0.09	0.12	0.15	0.19	0.24	0.29	0.35	0.41	0.47	0.54	0.61	0.69	0.78	0.87	0.96
	10'	0.07	0.10	0.13	0.17	0.22	0.27	0.33	0.39	0.46	0.53	0.61	0.69	0.78	0.87	0.97	1.08
Silencer Face Velocity, fpm		1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC Model	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm								
HL (all sizes)	-3000	64	59	58	62	60	62	62	58
	-2000	55	52	52	53	56	56	56	43
	-1000	41	41	41	38	49	48	38	20
	1000	38	31	37	32	32	36	24	20
	2000	57	51	51	49	47	50	44	35
	3000	68	63	59	60	56	58	56	50

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

- Silencer Face Area is the cross-sectional area at the silencer entrance
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 $PD = (Actual\ FV/Catalog\ FV)^2 \times (Catalog\ PD)$
- Self Noise values shown are for a four-square-foot face area silencer
- For each doubling of the face area add 3 dB to the self-noise values listed
- For each halving of the face area subtract 3 dB from the self-noise values listed
- Weights and measures are listed for limited number of available sizes