

Quiet-Duct Ultra™ / Low Silencers

Section 15000 Specifications

1.01 General

- A. Furnish and install "Quiet-Duct Ultra™/Low" (rectangular) silencers of the types and sizes shown on the plans and/or listed in the schedule. Silencers shall be the product of Industrial Acoustics Company. 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. 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.
- 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 jobsite 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: 24x24, 24x30, or 24x36

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.

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.

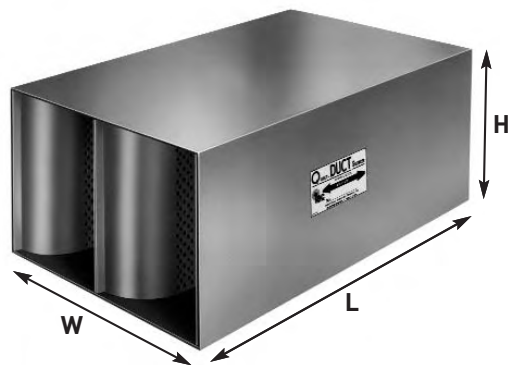
7.01 Duct Transitions

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

Quiet-Duct Ultra™ / Low Silencers

Type: ULS1

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULS1-24-18

Type: ULS1 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULS1 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250 – 750 fpm. All Quiet-Duct Ultra™/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULS1	-750	3	6	15	22	24	22	17	14	13
	-500	2	6	15	22	24	22	18	14	13
	-250	2	6	14	21	24	22	18	14	13
	250	2	6	14	21	24	22	18	14	13
	500	2	6	14	21	23	22	18	14	13
	750	2	5	13	20	23	22	18	14	13
5ULS1	-750	4	10	22	35	38	34	25	17	16
	-500	4	10	22	34	38	34	25	17	16
	-250	4	10	21	34	38	34	25	18	16
	250	4	9	20	33	37	34	25	18	16
	500	3	9	20	32	37	34	25	18	16
	750	3	9	20	32	36	34	25	18	16
7ULS1	-750	6	14	29	43	47	43	31	20	17
	-500	6	13	28	42	46	42	31	20	18
	-250	5	13	28	42	46	42	31	20	18
	250	5	12	27	41	45	42	31	21	18
	500	5	12	26	41	45	42	31	21	19
	750	4	11	25	40	45	42	31	21	19
10ULS1	-750	8	19	39	52	54	52	38	24	21
	-500	8	19	38	52	54	52	38	24	21
	-250	8	18	37	51	54	52	38	25	21
	250	7	17	36	51	54	51	38	25	22
	500	6	16	35	50	54	51	38	25	22
	750	6	15	34	50	53	51	38	25	23



(+) 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	15 12	15 18	15 24	15 30	15 36	15 42	15 48	30 12	30 18	30 24	30 30	30 36	30 42	30 48
3'	Wt/lb.	35	43	51	58	66	74	82	57	68	79	91	102	113	124
5'		57	69	82	94	106	118	131	93	110	127	144	161	178	195
7'		79	96	113	129	146	163	179	129	152	175	198	221	244	267
10'		113	136	159	183	206	229	253	183	215	246	278	310	N/A	N/A

*Note: Widths are available from 12" to 18" and from 24" to 36"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULS1	3'	0.07	0.29	0.66	N/A	N/A	N/A
	5'	0.09	0.35	0.78	N/A	N/A	N/A
	7'	0.10	0.40	0.90	N/A	N/A	N/A
	10'	0.12	0.48	N/A	N/A	N/A	N/A
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULS1	-750	2	2	3	5	6	9
	-500	2	2	3	5	6	9
	-250	2	2	3	4	6	9
	250	2	2	3	4	6	8
	500	2	2	3	4	5	8
	750	2	2	3	4	5	8
5ULS1	-750	3	4	6	8	11	14
	-500	3	4	5	8	10	14
	-250	3	4	5	7	10	14
	250	3	4	5	7	9	13
	500	3	3	5	7	9	13
	750	3	3	4	6	9	12
7ULS1	-750	5	6	8	11	15	20
	-500	4	6	8	11	14	19
	-250	4	5	7	10	14	19
	250	4	5	7	9	13	18
	500	4	5	6	9	12	17
	750	3	4	6	9	12	17
10ULS1	-750	6	8	12	16	21	28
	-500	6	8	11	15	20	27
	-250	6	8	11	15	20	26
	250	5	7	10	13	18	24
	500	5	6	9	13	17	24
	750	4	6	9	12	17	23

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULS1	-750	54	51	50	48	48	51	54	47	40
	-250	34	31	24	24	24	32	34	>20	>20
	+250	33	30	23	23	23	31	33	>20	>20
	+750	53	50	49	47	47	50	53	46	39

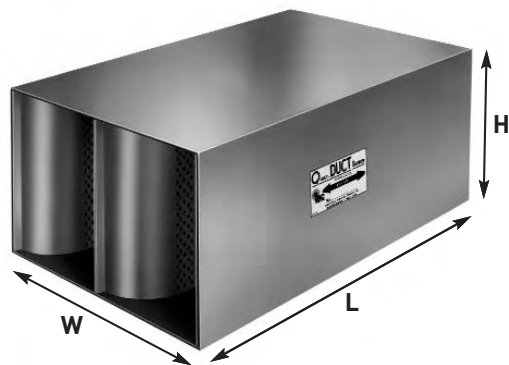
Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated

Quiet-Duct Ultra™ / Low Silencers

Type: ULS2

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULS2-24-18

Type: ULS2 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULS2 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250 – 750 fpm. All Quiet-Duct Ultra/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULS2	-750	3	8	16	19	19	16	14	12	11
	-500	3	8	15	19	19	16	14	12	11
	-250	3	8	15	19	19	17	14	12	11
	250	3	7	15	18	19	17	14	12	11
	500	3	7	15	18	19	17	14	12	11
	750	3	7	14	18	19	17	14	12	11
5ULS2	-750	5	12	23	29	29	23	18	15	13
	-500	5	12	23	29	29	23	18	15	13
	-250	5	11	2	28	29	24	18	15	13
	250	4	11	2	28	29	24	18	15	13
	500	4	11	21	27	29	24	18	15	14
	750	4	10	21	27	29	24	18	15	14
7ULS2	-750	7	16	30	39	39	30	22	17	15
	-500	6	15	30	38	39	30	22	18	15
	-250	6	15	29	38	39	31	22	18	16
	250	6	14	28	37	38	31	22	18	16
	500	6	14	28	36	38	31	22	18	16
	750	5	14	27	36	38	31	22	18	16
10ULS2	-750	9	21	38	46	47	38	26	20	18
	-500	9	21	38	46	47	38	26	20	18
	-250	9	20	37	46	47	38	26	21	18
	250	8	19	36	45	46	38	26	21	19
	500	8	18	36	45	46	38	26	21	19
	750	7	18	35	44	46	38	26	21	19



(+) 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	21 12	21 18	21 24	21 30	21 36	21 42	21 48	42 12	42 18	42 24	42 30	42 36	42 42	42 48
3'	Wt/lb.	42	50	59	67	76	84	93	70	83	96	108	121	134	147
5'		68	81	94	108	121	134	147	114	133	153	172	191	210	229
7'		94	112	130	148	166	184	202	158	184	210	235	261	N/A	N/A
10'		134	159	184	209	234	259	284	224	260	295	N/A	N/A	N/A	N/A

*Note: Widths are available from 18" to 24" and from 36" to 48"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULS2	3'	0.07	0.27	0.60	N/A	N/A	N/A
	5'	0.08	0.30	0.68	N/A	N/A	N/A
	7'	0.08	0.34	0.76	N/A	N/A	N/A
	10'	0.10	0.39	0.88	N/A	N/A	N/A
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULS2	-750	2	3	4	6	9	12
	-500	2	3	4	6	9	11
	-250	2	3	4	6	8	11
	250	2	3	4	5	8	11
	500	2	3	4	5	8	11
	750	2	3	4	5	8	10
5ULS2	-750	4	5	7	9	13	17
	-500	3	5	7	9	13	16
	-250	3	5	6	9	12	16
	250	3	4	6	8	12	15
	500	3	4	6	8	11	15
	750	3	4	6	8	11	15
7ULS2	-750	5	7	9	13	17	22
	-500	5	7	9	12	17	21
	-250	5	6	9	12	16	21
	250	4	6	8	11	15	20
	500	4	6	8	11	15	19
	750	4	5	8	11	15	19
10ULS2	-750	7	10	13	18	23	29
	-500	7	9	13	17	23	29
	-250	6	9	12	17	22	28
	250	6	8	11	16	21	27
	500	6	8	11	15	20	26
	750	5	8	11	15	20	26

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULS2	-750	55	52	52	49	49	53	55	48	42
	-250	35	32	25	26	25	33	36	>20	>20
	+250	33	30	23	23	23	31	33	>20	>20
	+750	53	50	49	47	47	50	53	46	39

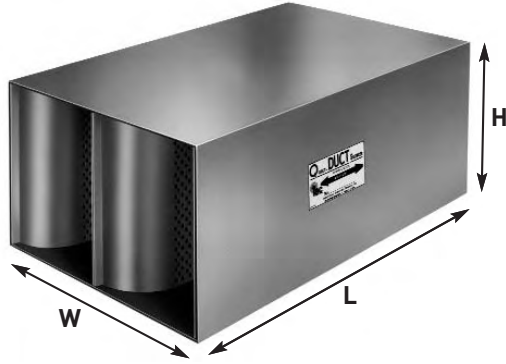
Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated

Quiet-Duct Ultra™ / Low Silencers

Type: ULS3

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULS3-24-18

Type: ULS3 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULS3 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250 – 750 fpm. All Quiet-Duct Ultra/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULS3	-750	4	10	15	17	16	14	12	11	9
	-500	4	10	15	17	16	14	12	11	9
	-250	4	10	15	17	16	14	12	11	9
	250	3	9	14	17	16	15	12	11	9
	500	3	9	14	16	16	15	12	11	9
	750	3	9	14	16	16	15	12	11	9
5ULS3	-750	6	14	22	25	23	18	15	13	11
	-500	6	14	22	25	23	18	15	13	11
	-250	5	13	21	25	23	19	15	13	11
	250	5	13	21	24	23	19	15	13	11
	500	5	13	20	24	23	19	15	13	11
	750	5	12	20	24	23	19	15	13	11
7ULS3	-750	8	17	29	33	30	23	17	15	13
	-500	7	17	28	32	30	23	17	15	13
	-250	7	17	28	32	30	23	17	15	13
	250	7	16	27	31	30	23	17	15	13
	500	7	16	27	31	30	23	17	15	14
	750	6	15	26	31	30	23	17	15	14
10ULS3	-750	10	23	38	44	40	29	20	18	15
	-500	10	22	37	43	40	30	20	18	15
	-250	10	22	37	43	40	30	20	18	15
	250	9	21	36	42	40	30	21	19	15
	500	9	20	35	41	40	30	21	19	15
	750	8	20	35	41	40	30	21	19	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	27 12	27 18	27 24	27 30	27 36	27 42	27 48	54 12	54 18	54 24	54 30	54 36	54 42	54 48
3'	Wt/lb.	48	58	67	76	86	95	104	83	98	112	126	141	155	169
5'		79	93	107	121	136	150	164	136	157	178	199	221	242	263
7'		109	128	147	167	186	205	224	178	216	244	272	301	N/A	N/A
10'		154	181	208	236	261	288	315	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Note: Widths are available from 24" to 30" and from 48" to 54"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULS2	3'	0.06	0.25	0.57	N/A	N/A	N/A
	5'	0.07	0.28	0.63	N/A	N/A	N/A
	7'	0.08	0.30	0.68	N/A	N/A	N/A
	10'	0.09	0.34	0.77	N/A	N/A	N/A
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULS3	-750	3	4	5	8	11	13
	-500	3	4	5	8	10	12
	-250	3	3	5	8	10	12
	250	2	3	5	7	10	12
	500	2	3	5	7	10	12
	750	2	3	4	7	9	11
5ULS3	-750	4	6	8	11	15	18
	-500	4	6	8	11	14	18
	-250	4	5	7	11	14	17
	250	4	5	7	10	14	17
	500	4	5	7	10	13	16
	750	3	5	7	10	13	16
7ULS3	-750	6	8	11	15	19	23
	-500	6	8	10	14	18	23
	-250	5	7	10	14	18	22
	250	5	7	10	13	17	21
	500	5	7	9	13	17	21
	750	5	6	9	13	16	21
10ULS3	-750	8	11	15	19	24	30
	-500	8	11	14	19	24	30
	-250	7	10	14	19	23	29
	250	7	10	13	18	22	28
	500	7	9	13	17	22	28
	750	6	9	12	17	22	27

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULS2	-750	56	53	53	50	51	54	56	50	43
	-250	37	34	26	27	27	34	37	20	<20
	+250	33	30	23	23	23	31	33	<20	<20
	+750	53	50	49	47	47	50	53	46	39

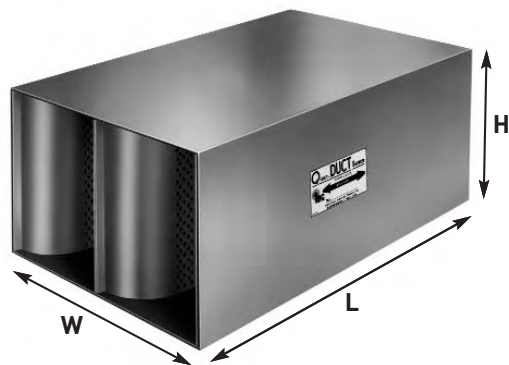
Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated

Quiet-Duct Ultra™ / Low Silencers

Type: ULM1

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULM1-24-18

Type: ULM1 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULM1 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250–1000 fpm. All Quiet-Duct Ultra™/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULM1	-1000	2	6	14	20	23	20	16	13	12
	-750	2	6	13	20	22	20	16	13	12
	-500	2	6	13	20	22	20	16	13	12
	500	2	5	12	19	22	20	17	13	12
	750	2	5	12	18	21	20	17	13	12
	1000	2	5	12	18	21	21	17	13	12
5ULM1	-1000	4	9	20	32	36	31	21	16	14
	-750	4	9	20	32	35	31	23	16	14
	-500	4	9	19	31	35	31	23	16	14
	500	3	8	18	29	34	31	23	16	15
	750	3	8	18	29	33	31	23	16	15
	1000	3	7	17	29	33	31	23	16	15
7ULM1	-1000	5	13	27	40	44	39	28	19	16
	-750	5	12	26	40	43	39	28	19	16
	-500	5	12	26	39	43	39	28	19	16
	500	4	11	24	37	42	39	28	19	17
	750	4	10	23	37	42	39	28	19	17
	1000	4	10	22	36	41	39	28	20	18
10ULM1	-1000	8	18	36	49	52	48	35	23	18
	-750	7	17	35	49	52	48	35	23	19
	-500	7	17	34	48	52	48	35	23	19
	500	6	14	32	47	51	48	35	23	20
	750	5	14	31	47	51	48	35	24	21
	1000	5	13	30	46	51	48	35	24	21



(+) 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	15 12	15 18	15 24	15 30	15 36	15 42	15 48	30 12	30 18	30 24	30 30	30 36	30 42	30 48
3'	Wt/lb.	35	43	50	58	66	73	81	57	68	79	90	101	112	123
5'		58	70	82	94	106	118	130	94	111	127	144	161	178	194
7'		80	97	113	130	146	162	179	131	153	176	198	221	243	266
10'		114	137	160	183	206	229	252	185	217	248	279	311	N/A	N/A

*Note: Widths are available from 12" to 18" and from 24" to 36"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULS2	3'	0.04	0.14	0.32	0.57	N/A	N/A
	5'	0.04	0.16	0.36	0.64	N/A	N/A
	7'	0.04	0.18	0.40	0.71	N/A	N/A
	10'	0.05	0.20	0.46	0.82	N/A	N/A
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULM1	-1000	2	2	3	4	6	8
	-750	2	2	3	4	6	8
	-500	2	2	3	4	5	8
	500	1	2	3	4	5	7
	750	1	2	2	3	5	7
	1000	1	2	2	3	5	7
5ULM1	-1000	3	4	5	7	10	13
	-750	3	4	5	7	9	13
	-500	3	4	5	7	9	12
	500	2	3	4	6	8	11
	750	2	3	4	6	8	11
	1000	2	3	4	5	8	11
7ULM1	-1000	4	5	7	10	13	18
	-750	4	5	7	10	13	17
	-500	4	5	7	9	13	17
	500	3	4	6	8	11	15
	750	3	4	5	8	11	15
	1000	3	4	5	7	10	14
10ULM1	-1000	6	8	11	14	19	25
	-750	5	7	10	14	19	25
	-500	5	7	10	13	18	24
	500	4	6	8	11	16	21
	750	4	5	8	11	15	20
	1000	4	5	7	10	14	20

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULS2	-750	55	52	52	49	49	53	55	49	43
	-250	42	39	35	34	34	40	43	30	<20
	+250	41	38	34	33	33	39	42	29	<20
	+750	54	51	51	48	48	52	54	48	42

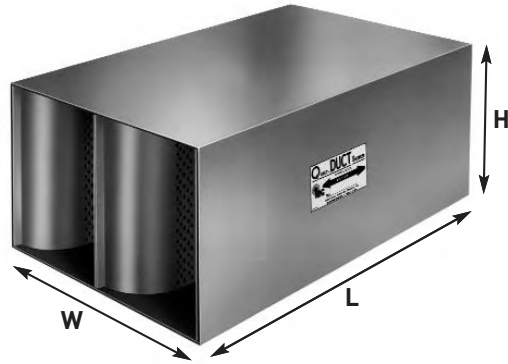
Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated

Quiet-Duct Ultra™ / Low Silencers

Type: ULM2

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULM2-24-18

Type: ULM2 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULM2 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250 – 1000 fpm. All Quiet-Duct Ultra™/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULM2	-1000	3	7	14	18	18	15	13	11	10
	-750	3	7	14	17	18	15	13	11	10
	-500	3	7	14	17	18	15	13	11	10
	500	2	7	13	16	18	16	13	11	10
	750	2	6	13	16	18	16	13	11	10
	1000	2	6	13	16	17	16	13	11	10
5ULM2	-1000	5	11	21	27	27	21	16	13	12
	-750	4	11	21	26	27	21	16	13	12
	-500	4	11	20	26	27	21	16	13	12
	500	4	10	19	25	26	22	17	14	12
	750	4	9	19	25	26	22	17	14	12
	1000	3	9	19	24	26	22	17	14	12
7ULM2	-1000	6	14	28	36	36	28	20	16	14
	-750	6	14	27	36	36	28	20	16	14
	-500	6	14	27	35	36	28	20	16	14
	500	5	13	25	33	35	28	20	16	14
	750	5	12	25	33	35	28	20	16	14
	1000	5	12	24	33	35	28	20	16	14
10ULM2	-1000	9	19	36	44	44	35	24	18	15
	-750	8	19	35	43	44	35	24	19	15
	-500	8	19	34	43	44	35	24	19	15
	500	7	17	32	41	43	35	24	19	16
	750	7	16	32	41	43	35	24	19	16
	1000	6	16	31	41	43	35	24	19	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	21 12	21 18	21 24	21 30	21 36	21 42	21 48	42 12	42 18	42 24	42 30	42 36	42 42	42 48
3'	Wt/lb.	42	50	59	67	75	84	92	71	83	96	108	120	133	145
5'		69	82	95	108	121	134	147	116	135	153	172	191	210	228
7'		95	113	131	149	1666	184	202	1661	186	211	236	261	N/A	N/A
10'		136	160	185	210	234	259	284	228	263	298	N/A	N/A	N/A	N/A

*Note: Widths are available from 12" to 18" and from 24" to 36"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULM2	3'	0.03	0.13	0.30	0.53	0.83	N/A
	5'	0.04	0.14	0.33	0.58	0.91	N/A
	7'	0.04	0.16	0.35	0.63	N/A	N/A
	10'	0.04	0.17	0.39	0.70	N/A	N/A
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULM2	-1000	2	3	4	5	8	10
	-750	2	3	4	5	8	10
	-500	2	3	4	5	8	10
	500	2	2	3	5	7	9
	750	2	2	3	4	7	9
	1000	2	2	3	4	7	9
5ULM2	-1000	3	5	6	8	12	15
	-750	3	4	6	8	11	15
	-500	3	4	6	8	11	15
	500	3	4	5	7	10	13
	750	3	4	5	7	10	13
	1000	2	3	5	7	10	13
7ULM2	-1000	5	6	9	12	15	20
	-750	4	6	8	11	15	19
	-500	4	6	8	11	15	19
	500	4	5	7	10	13	17
	750	3	5	7	10	13	17
	1000	3	5	7	9	13	17
10ULM2	-1000	6	9	12	16	21	27
	-750	6	9	12	16	21	26
	-500	6	8	11	15	20	26
	500	5	7	10	14	18	24
	750	5	7	9	13	18	23
	1000	4	6	9	13	17	22

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULM2	-1000	56	53	53	51	51	54	56	50	44
	-500	44	41	37	36	36	42	44	32	<20
	+500	41	38	34	33	33	39	42	29	<20
	+1000	54	51	51	48	48	52	54	48	42

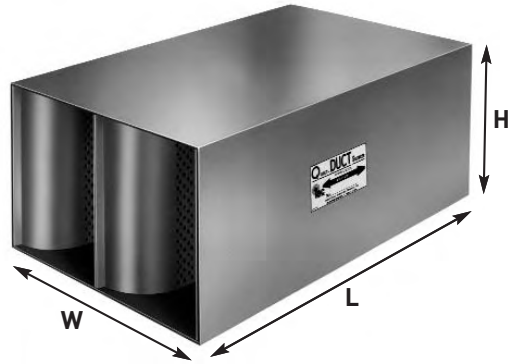
Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated

Quiet-Duct Ultra™ / Low Silencers

Type: ULM3

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULM3-24-18

Type: ULM3 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULM3 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250 – 1000 fpm. All Quiet-Duct Ultra™/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULM3	-1000	3	9	14	16	14	12	11	10	8
	-750	3	9	13	16	15	13	11	10	8
	-500	3	9	13	16	15	13	11	9	8
	500	3	8	13	15	15	14	11	9	8
	750	3	8	13	15	15	14	11	9	8
	1000	3	8	12	15	15	14	11	9	8
5ULM3	-1000	5	13	20	23	21	17	13	12	9
	-750	5	12	20	23	21	17	13	11	9
	-500	5	12	19	23	21	17	13	11	9
	500	4	11	18	22	21	17	14	11	9
	750	4	11	18	22	21	18	14	11	9
	1000	4	11	18	21	21	18	14	11	9
7ULM3	-1000	7	16	26	30	28	21	16	13	11
	-750	7	16	26	30	28	21	16	13	11
	-500	7	15	26	30	28	21	16	13	11
	500	6	14	24	29	28	21	16	13	11
	750	6	14	24	28	28	21	16	13	11
	1000	5	14	24	28	28	22	16	13	11
10ULM3	-1000	9	21	35	41	37	27	19	16	12
	-750	9	20	35	40	37	27	19	16	12
	-500	9	20	34	40	37	27	19	16	12
	500	8	18	32	38	37	27	19	16	12
	750	8	18	32	38	37	27	19	16	12
	1000	7	18	31	38	37	27	19	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	27 12	27 18	27 24	27 30	27 36	27 42	27 48	54 12	54 18	54 24	54 30	54 36	54 42	54 48
3'	Wt/lb.	48	57	67	76	85	94	103	84	98	112	125	139	153	167
5'		79	93	107	121	135	149	163	137	158	178	199	219	240	261
7'		110	129	148	167	186	204	223	191	218	245	273	300	N/A	N/A
10'		157	183	209	235	261	287	313	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Note: Widths are available from 24" to 30" and from 48" to 54"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULM3	3'	0.03	0.13	0.29	0.51	0.80	N/A
	5'	0.03	0.14	0.31	0.55	0.86	N/A
	7'	0.04	0.15	0.33	0.58	0.91	N/A
	10'	0.04	0.16	0.36	0.64	0.99	N/A
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULM3	-1000	2	3	5	7	9	11
	-750	2	3	5	7	9	11
	-500	2	3	5	7	9	11
	500	2	3	4	6	9	10
	750	2	3	4	6	8	10
	1000	2	3	4	6	8	10
5ULM3	-1000	4	5	7	10	13	16
	-750	4	5	7	10	13	16
	-500	4	5	7	10	13	16
	500	3	4	6	9	12	15
	750	3	4	6	9	12	14
	1000	3	4	6	9	11	14
7ULM3	-1000	5	7	10	13	17	21
	-750	5	7	9	13	17	21
	-500	5	7	9	13	16	20
	500	5	7	9	13	16	20
	750	4	6	8	11	15	19
	1000	4	6	8	11	14	18
10ULM3	-1000	7	10	13	18	22	28
	-750	7	10	13	17	22	27
	-500	7	9	13	17	22	27
	500	6	8	11	15	20	25
	750	6	8	11	15	19	25
	1000	5	8	11	15	19	24

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULM3	-750	57	54	55	52	52	55	57	51	45
	-250	45	42	38	37	37	43	45	33	21
	+250	41	38	34	33	33	39	42	29	<20
	+750	54	51	51	48	48	52	54	48	42

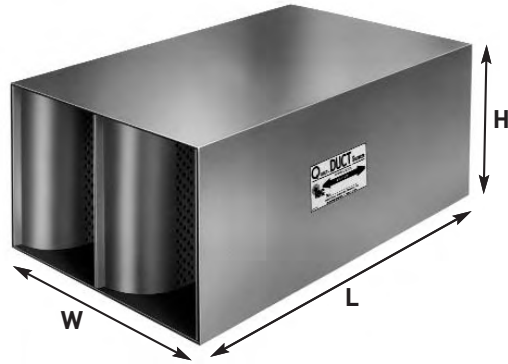
Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated

Quiet-Duct Ultra™ / Low Silencers

Type: ULL1

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULL1-24-18

Type: ULL1 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULL1 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250 – 1250 fpm. All Quiet-Duct Ultra™/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULL1	-1250	2	5	12	18	21	18	14	11	11
	-1000	2	5	12	18	21	18	14	11	11
	-750	2	5	12	18	20	18	15	11	11
	750	2	4	11	17	19	19	15	12	11
	1000	2	4	10	16	19	19	15	12	11
	1250	2	4	10	16	19	19	15	12	11
5ULL1	-1250	3	8	18	29	33	28	20	15	13
	-1000	3	8	18	29	32	28	20	15	13
	-750	3	8	18	28	32	28	21	15	13
	750	3	7	16	26	31	28	21	15	13
	1000	2	7	16	26	30	28	21	15	13
	1250	2	6	15	26	30	28	21	15	13
7ULL1	-1250	5	11	24	37	41	36	25	17	15
	-1000	5	11	24	36	41	36	25	17	15
	-750	4	11	23	36	40	36	25	18	15
	750	3	9	21	34	39	35	26	18	16
	1000	3	9	20	33	38	35	26	18	16
	1250	3	8	20	33	38	35	26	18	16
10ULL1	-1250	7	16	33	46	49	44	31	21	17
	-1000	6	16	32	46	49	44	31	21	17
	-750	6	15	31	45	49	44	32	21	17
	750	5	12	28	43	48	44	32	22	19
	1000	4	12	27	43	48	44	32	22	19
	1250	4	11	26	43	48	44	32	22	19



(+) 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	15 12	15 18	15 24	15 30	15 36	15 42	15 48	30 12	30 18	30 24	30 30	30 36	30 42	30 48
3'	Wt/lb.	35	43	50	58	65	73	80	58	68	79	90	100	111	122
5'		58	70	82	94	106	118	129	95	111	128	144	160	177	193
7'		81	97	114	130	146	162	178	132	154	177	199	221	243	265
10'		116	138	161	184	206	229	252	188	219	250	280	311	N/A	N/A

*Note: Widths are available from 12" to 18" and from 24" to 36"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULL1	3'	0.03	0.10	0.23	0.41	0.64	N/A
	5'	0.03	0.12	0.26	0.47	0.73	N/A
	7'	0.03	0.13	0.29	0.52	0.82	N/A
	10'	0.04	0.15	0.34	0.60	0.94	N/A
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULL1	-1250	1	2	3	4	5	7
	-1000	1	2	3	4	5	7
	-750	1	2	3	4	5	7
	750	1	2	2	3	4	6
	1000	1	2	2	3	4	6
	1250	1	1	2	3	4	6
5ULL1	-1250	3	3	5	6	9	12
	-1000	2	3	4	6	8	11
	-750	2	3	4	6	8	11
	750	2	2	3	5	7	10
	1000	2	2	3	5	7	9
	1250	2	2	3	5	6	9
7ULL1	-1250	4	5	6	9	12	16
	-1000	3	5	6	9	12	16
	-750	3	4	6	8	11	15
	750	2	3	5	7	9	13
	1000	2	3	5	6	9	13
	1250	2	3	4	6	9	12
10ULL1	-1250	5	7	9	13	17	23
	-1000	5	6	9	12	17	22
	-750	5	6	9	12	16	22
	750	3	5	7	9	13	18
	1000	3	4	6	9	13	17
	1250	3	4	6	9	12	17

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULL1	-1250	55	52	53	50	50	53	56	50	44
	-750	46	43	41	39	39	44	47	36	26
	+750	45	42	40	38	38	43	46	35	25
	+1250	55	52	52	49	49	52	55	49	43

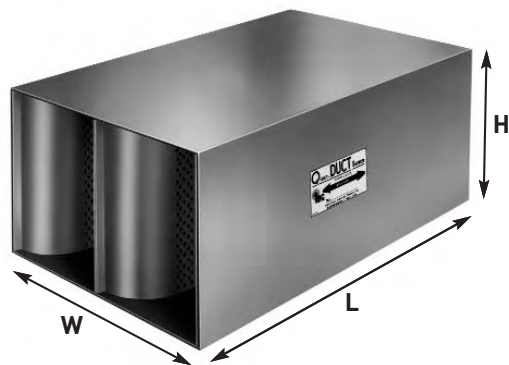
Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated

Quiet-Duct Ultra™ / Low Silencers

Type: ULL2

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULL2-24-18

Type: ULL2 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULL2 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250 – 1250 fpm. All Quiet-Duct Ultra™/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULL2	-1250	3	7	13	16	16	13	11	10	9
	-1000	2	6	13	16	16	14	11	10	9
	-750	2	6	12	16	16	14	11	10	9
	750	2	6	11	15	16	15	12	10	8
	1000	2	6	11	15	16	15	12	10	8
	1250	2	5	11	14	16	15	12	10	8
5ULL2	-1250	4	10	19	25	25	19	15	12	10
	-1000	4	10	19	24	25	19	15	12	10
	-750	4	9	19	24	24	19	15	12	10
	750	3	8	17	22	24	20	15	12	10
	1000	3	8	17	22	24	20	15	12	10
	1250	3	8	16	22	24	20	15	12	10
7ULL2	-1250	5	13	25	33	33	25	18	14	12
	-1000	5	13	25	33	33	25	18	14	12
	-750	5	12	24	32	33	25	18	14	12
	750	4	11	22	30	32	25	18	14	12
	1000	4	11	22	30	32	25	18	14	12
	1250	4	10	22	29	32	25	18	14	12
10ULL2	-1250	8	18	32	41	41	31	22	17	13
	-1000	7	17	32	40	41	31	22	17	13
	-750	7	17	32	40	41	31	22	17	13
	750	6	14	29	38	40	31	22	17	13
	1000	5	14	28	38	40	31	22	18	14
	1250	5	14	28	37	39	31	23	18	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	21 12	21 18	21 24	21 30	21 36	21 42	21 48	42 12	42 18	42 24	42 30	42 36	42 42	42 48
3'	Wt/lb.	42	50	58	67	75	83	91	71	83	95	107	119	131	143
5'		69	82	95	107	120	133	146	117	135	153	171	189	208	226
7'		96	114	131	148	166	183	200	163	187	211	236	260	N/A	N/A
10'		137	161	185	210	234	258	282	232	265	299	N/A	N/A	N/A	N/A

*Note: Widths are available from 18" to 24" and from 36" to 48"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULL2	3'	0.02	0.10	0.22	0.38	0.60	0.87
	5'	0.03	0.11	0.24	0.42	0.66	0.95
	7'	0.02	0.11	0.26	0.46	0.72	N/A
	10'	0.03	0.13	0.29	0.51	0.80	N/A
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULL2	-1250	2	3	3	5	7	9
	-1000	2	2	3	5	7	9
	-750	2	2	3	5	7	9
	750	1	2	3	4	6	8
	1000	1	2	3	4	6	8
	1250	1	2	3	4	6	8
5ULL2	-1250	3	4	6	8	10	14
	-1000	3	4	5	7	10	13
	-750	3	4	5	7	10	13
	750	2	3	4	6	9	12
	1000	2	3	4	6	9	11
	1250	2	3	4	6	8	11
7ULL2	-1250	4	6	8	10	14	18
	-1000	4	5	7	10	14	17
	-750	4	5	7	10	13	17
	750	3	4	6	8	12	15
	1000	3	4	6	8	11	15
	1250	3	4	6	8	11	15
10ULL2	-1250	6	8	11	15	19	24
	-1000	6	8	10	14	19	24
	-750	5	7	10	14	18	23
	750	4	6	8	12	16	21
	1000	4	6	8	11	15	20
	1250	4	5	8	11	15	20

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULL2	-1250	57	54	54	52	52	55	57	51	45
	-750	48	45	42	41	41	46	48	38	27
	+750	45	42	40	38	38	43	46	35	25
	+1250	55	52	52	49	49	52	55	49	43

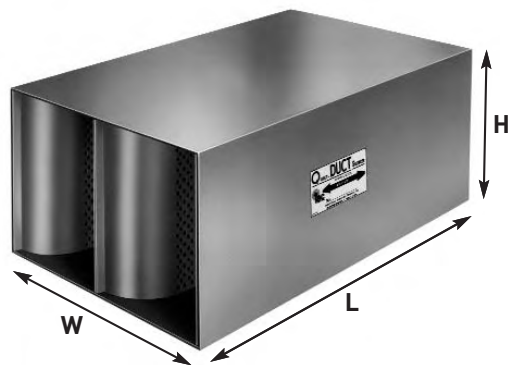
Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated

Quiet-Duct Ultra™ / Low Silencers

Type: ULL3

Low Frequency Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5ULL3-24-18

Type: ULL3 **Length:** 5' **Width:** 24" **Height:** 18"

First introduced back in 2005, these have been designed to optimize Dynamic Insertion Loss performance for frequencies between 25 Hz and 80 Hz. The Quiet-Duct Ultra™/Low silencers offers to the industry, first to be published by IAC, a guaranteed performance data in the 31.5 Hz full octave-band center frequencies.

ULL3 is designed to provide optimization for applications where the Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources, using a finer resolution of the 1/3 Octave Band DIL Data with Static Pressure Drop ratings +/- from 250 – 1250 fpm. All Quiet-Duct Ultra™/Low silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm	Dynamic Insertion Loss, dB								
3ULL3	-1250	3	8	12	14	13	11	10	8	7
	-1000	3	8	12	14	13	11	10	8	7
	-750	3	8	12	14	13	12	10	8	7
	750	2	7	11	13	14	12	10	8	6
	1000	2	7	11	13	14	13	10	8	6
	1250	2	7	11	13	14	13	10	7	6
5ULL3	-1250	5	11	18	21	19	15	12	10	7
	-1000	5	11	18	21	19	15	12	9	7
	-750	4	11	18	21	19	15	12	9	7
	750	4	10	16	20	20	16	12	9	7
	1000	4	10	16	20	20	16	12	9	7
	1250	4	9	16	19	20	16	12	9	7
7ULL3	-1250	6	14	24	28	25	19	14	10	9
	-1000	6	14	24	28	25	19	14	10	9
	-750	6	14	23	27	25	19	14	10	9
	750	5	12	22	26	25	19	14	9	8
	1000	5	12	21	26	25	19	15	9	8
	1250	5	12	21	25	25	20	15	9	8
10ULL3	-1250	8	19	32	37	34	24	17	14	10
	-1000	8	19	32	37	34	24	17	13	9
	-750	8	18	31	37	34	24	17	13	9
	750	7	16	29	35	33	24	18	13	9
	1000	6	16	28	34	33	24	18	13	9
	1250	6	15	28	34	33	24	18	13	8



(+) 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	27 12	27 18	27 24	27 30	27 36	27 42	27 48	54 12	54 18	54 24	54 30	54 36	54 42	54 48
3'	Wt/lb.	49	57	66	75	84	93	102	84	98	111	124	138	151	164
5'		80	94	107	121	135	148	162	139	159	179	198	218	238	258
7'		112	130	148	167	185	204	222	193	220	246	273	299	N/A	N/A
10'		159	184	210	236	261	287	312	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Note: Widths are available from 24" to 36" and from 48" to 54"

Table III: Aerodynamic Performance

Silencer Face Area is the cross-sectional area at the air entering face of the module or bank of modules. The Face Velocity is the CFM of airflow divided by the Face Area (in square feet). Pressure Drop for any face velocity can be calculated from the equation:

$$PD = (\text{Actual FV}/\text{Catalog FV})^2(\text{Catalog PD}).$$

PD values are per ASTM E477 test standard. For the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

IAC Model	Static Pressure Drop, i.w.g.						
ULL3	3'	0.02	0.09	0.21	0.37	0.58	0.83
	5'	0.02	0.10	0.22	0.40	0.62	0.89
	7'	0.03	0.11	0.24	0.42	0.66	0.96
	10'	0.03	0.12	0.26	0.47	0.73	1.05
Silencer Face Velocity, fpm	250	500	750	1000	1250	1500	

Table IV: 1/3 Octave Band DIL Data

IAC Model	Octave Band	31.5 Hz			63 Hz		
	Hz	25	31.5	40	50	63	80
	Silencer Face Velocity, fpm						
3ULL3	-1250	2	3	4	6	8	10
	-1000	2	3	4	6	8	10
	-750	2	3	4	6	8	10
	750	2	2	3	5	7	9
	1000	2	2	3	5	7	9
	1250	2	2	3	5	7	9
5ULL3	-1250	3	5	6	9	12	15
	-1000	3	5	6	9	12	14
	-750	3	4	6	9	11	14
	750	3	4	5	8	10	13
	1000	3	4	5	8	10	13
	1250	3	3	5	7	10	12
7ULL3	-1250	5	6	9	12	15	19
	-1000	4	6	8	12	15	19
	-750	4	6	8	11	15	18
	750	4	5	7	10	13	17
	1000	3	5	7	10	13	16
	1250	3	5	7	9	13	16
10ULL3	-1250	6	9	12	16	20	25
	-1000	6	9	12	15	20	25
	-750	6	8	11	15	19	24
	750	5	7	10	13	17	22
	1000	5	7	9	13	17	22
	1250	4	6	9	13	17	21

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

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

IAC Model	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5'	63	125	250	500	1K	2K	4K	8K
	Silencer Face Velocity, fpm									
ULL3	-1250	58	55	56	53	53	56	58	52	47
	-750	49	46	43	42	42	47	49	39	28
	+750	45	42	40	38	38	43	46	35	25
	+1250	55	52	52	49	49	52	55	49	43

Self-Noise values are shown for a five-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table V.

* Estimated