

Quiet-Duct Ultra™ / Green Silencers

Section 15000 Specifications

1.01 General

- A. Furnish and install "Quiet-Duct Ultra™/Green" (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. 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. Acoustic fill material shall be 100% environmentally friendly, and constructed of recycled natural fibers. Each fiber shall be treated with an EPA registered fungal inhibitor in order to prevent mold, mildew, fungi, and pest protection. The fill material must not contain any harmful chemicals, irritants, and/or volatile organic compounds (VOCs) in order to prevent off-gassing.
- 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	5
Smoke Development Rating.....	35

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: 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

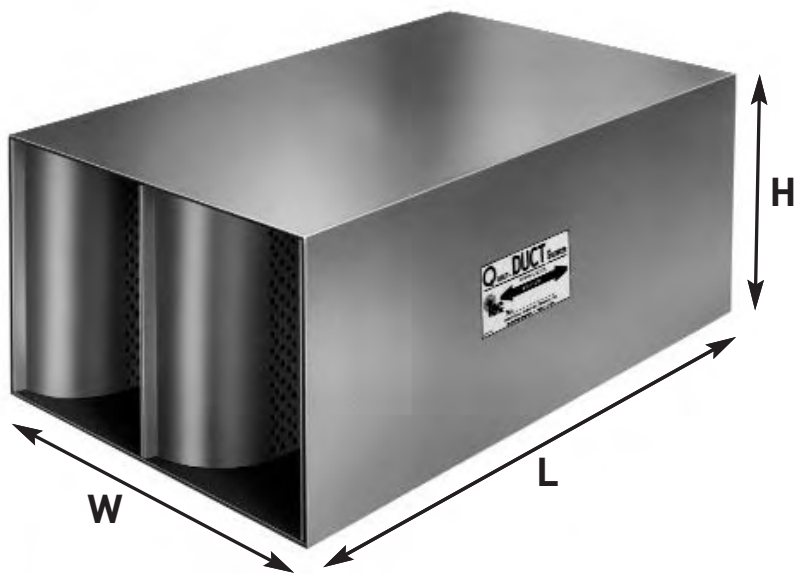
- A. When transitions are required to adapt silencer dimensions to connecting duct work they shall be furnished by the installing contractor.

Quiet-Duct Ultra™ / Green Silencers

Introduction

Environmentally Sound Silencers with Forward & Reverse Flow Ratings

The Ultra™/Green Quiet-Duct Series complements the traditional Commercial Series Silencers, but instead of using fiberglass or mineral wool insulation as the infill material, Ultra™/Green Quiet-Duct Series line of silencers have been designed and developed in response to the trend for environmentally friendly building projects and products. This 100% environmentally friendly attenuation solution uses recycled cotton-fiber based acoustic fill material and delivers performance that meets or exceeds that of a standard Quiet-Duct silencer. They still have the necessary flame-/smoke-spread ratings they also inhibit the growth of mold, which is a significant concern in many interior environments needing this specific type of application. All Ultra™/Green Quiet-Duct silencers have been rated with procedures certified in strict accordance with ASTM E477-99 in IAC's NVLAP Accredited Acoustical Laboratory.



QUIET-DUCT ULTRA™ / GREEN SILENCER TYPES:

- UGLFS
- UGLFM
- UGLFL
- UGS
- UGMS
- UGML
- UGL

Quiet-Duct Ultra™ / Green Silencers

Type: UGLFM

Environmentally Sound Silencers with Forward & Reverse Flow Ratings



The IAC Type UGLFM Quiet-Duct Ultra™/Green Silencers come with a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material, instead of fiberglass. The UGLFM also provides the same improved low frequency attenuation particularly in the third octave band. When the third band performance is critical, a Type UGLFM Quiet Duct Ultra-Green selection often results in a shorter silencer length than other equivalent silencer models. Type UGLFM Quiet-Duct Ultra™/Green 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 UGLFM Silencers are advantageous where low frequency, particularly in the third octave band, DIL requirements are high in HVAC systems.

Designating Silencers

Model: 5UGLFM-24-18

Type: UGLFM **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							
3UGLFM	-2000	5	9	17	24	20	13	14	12
	-1000	4	8	17	25	20	14	15	11
	0	3	8	16	24	20	14	14	10
	1000	2	6	14	22	18	13	12	10
	2000	2	6	14	22	18	12	12	10
5UGLFM	-2000	6	17	28	37	31	16	18	16
	-1000	6	15	27	37	31	18	21	15
	0	6	14	27	36	31	18	19	14
	1000	6	12	24	34	30	18	15	10
	2000	5	10	23	32	30	18	15	9
7UGLFM	-2000	10	21	35	44	38	20	16	16
	-1000	9	19	33	42	40	22	20	15
	0	9	19	32	42	40	22	19	14
	1000	9	15	29	43	39	23	18	16
	2000	8	14	28	42	40	23	18	16
10UGLFM	-2000	13	26	43	51	49	25	19	17
	-1000	12	23	42	50	50	28	24	17
	0	13	23	41	51	51	28	23	16
	1000	12	20	39	52	51	29	22	17
	2000	11	19	37	52	52	29	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	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.															
UGLFM	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	0.19	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	100	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								
UGLFM (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