

# 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.



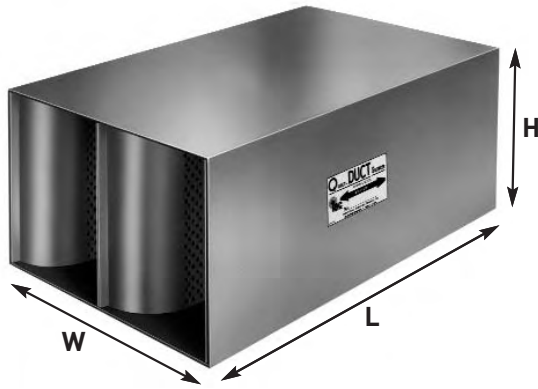
### QUIET-DUCT ULTRA™ / GREEN SILENCER TYPES:

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

# Quiet-Duct Ultra™ / Green Silencers

## Type: UGML

Environmentally Sound Silencers with Forward & Reverse Flow Ratings



The IAC Type UGML Quiet-Duct Ultra-Green Silencer provides that same 100% environmentally friendly attenuation solution which uses recycled acoustic fill material, instead of fiberglass, and still provides that same excellent attenuation in the medium-to-low velocity ranges. Type UGML 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.

### Designating Silencers

**Model:** 5UGML-24-18

**Type:** UGML    **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							
3UGML	-3000	3	4	11	21	17	10	7	5
	-2000	2	4	10	21	17	11	7	5
	-1000	4	3	10	21	17	11	8	6
	1000	4	3	8	19	16	11	8	6
	2000	3	3	8	18	16	11	8	7
	3000	2	3	7	17	16	12	9	8
5UGML	-3000	6	8	17	35	30	16	7	4
	-2000	6	7	16	34	29	16	8	4
	-1000	5	7	16	34	29	17	9	5
	1000	4	6	14	32	28	18	10	9
	2000	4	6	13	31	29	18	11	9
	3000	4	5	13	29	29	19	12	10
7UGML	-3000	6	10	21	44	41	24	14	10
	-2000	6	9	20	43	40	23	14	10
	-1000	6	9	20	42	40	23	13	10
	1000	5	7	18	40	39	24	13	10
	2000	5	7	17	38	39	24	13	11
	3000	5	7	16	37	39	24	14	12
10UGML	-3000	7	14	28	44	44	33	17	11
	-2000	7	14	27	48	50	30	17	12
	-1000	7	12	25	47	51	30	14	11
	1000	6	10	23	48	51	30	15	11
	2000	6	10	22	48	51	31	16	12
	3000	6	9	22	48	53	32	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	120	175	201
7'		84	100	116	133	150	167	122	144	168	200	223	247	169	246	283
10'		118	141	167	190	240	215	174	203	239	284	N/A	N/A	238	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	207	278	322	381	423	466	239	350	402	478	530	582
7'		337	374	411	291	390	451	537	597	658	337	492	566	674	748	822
10'		475	N/A	N/A	412	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.															
		UGML	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

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:

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

**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								
3UGML	-3000	42	53	56	60	61	62	61	51
	-2000	33	47	51	55	56	57	50	36
	-1000	31	35	38	43	40	31	22	24
	1000	35	30	30	33	33	26	21	25
	2000	36	41	43	45	48	50	45	35
	3000	44	52	51	53	53	58	58	51
5UGML	-3000	41	59	62	66	61	62	64	51
	-2000	37	50	53	55	55	58	48	36
	-1000	34	37	37	40	39	30	22	25
	1000	33	32	32	35	35	26	22	24
	2000	34	44	46	48	49	51	45	36
	3000	44	53	55	57	56	60	59	52
7UGML	-3000	42	54	58	62	61	62	62	52
	-2000	38	48	52	55	55	57	50	38
	-1000	35	36	40	43	41	33	22	25
	1000	34	28	27	28	31	23	24	27
	2000	35	41	41	42	45	49	43	32
	3000	45	52	51	52	51	57	57	49
10UGML	-3000	42	57	61	65	63	62	64	54
	-2000	36	50	53	56	55	58	50	39
	-1000	35	38	38	40	39	30	22	24
	1000	33	30	27	28	30	21	21	24
	2000	35	40	40	42	45	50	43	33
	3000	47	53	51	52	51	57	58	51

Self-Noise values shown are for a four-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 IV.