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.

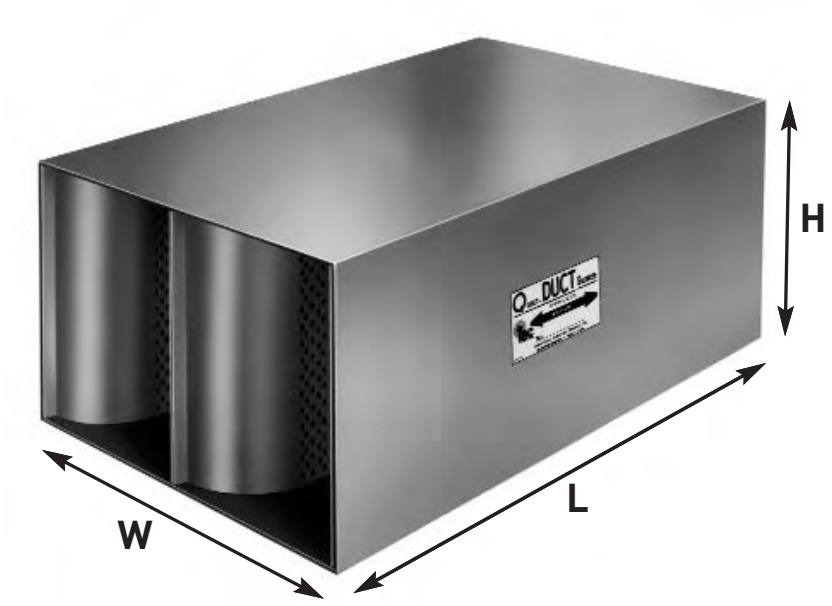
7.01 Duct Transitions

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.

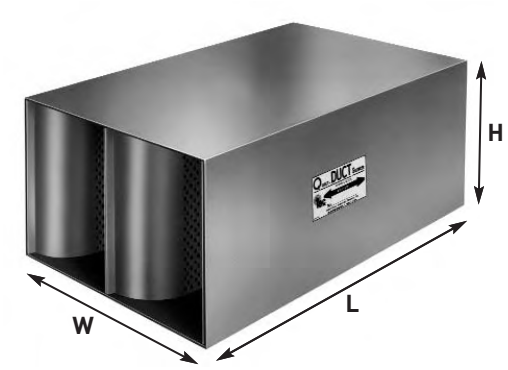


QUIET-DUCT ULTRA™/GREEN SILENCER TYPES:

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

Quiet-Duct Ultra™ / Green Silencers
Type: UGMS

Environmentally Sound Silencers with Forward & Reverse Flow Ratings



The IAC Type UGMS 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 velocity range. Type UGMS 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. The UGMS Quiet-Duct Ultra-Green Silencer is very advantages in that it provides an awesome design flexibility suitable for many different types of applications based on its baffle geometry.

Designating Silencers

Model: 5UGMS-24-18
Type: UGMS **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							
3UGMS	-3000	4	6	13	25	27	19	12	9
	-2000	4	6	13	25	26	17	11	8
	-1000	5	5	12	24	25	18	11	9
	1000	4	5	11	23	24	19	14	10
	2000	4	4	11	21	24	20	15	11
	3000	3	4	10	20	23	21	15	11
5UGMS	-3000	4	11	21	41	42	30	16	11
	-2000	3	10	20	40	45	29	16	11
	-1000	2	9	19	39	43	28	16	9
	1000	2	7	16	37	42	31	20	13
	2000	2	7	15	35	42	31	20	14
	3000	2	7	15	34	42	33	20	14
7UGMS	-3000	4	18	28	43	41	41	21	13
	-2000	4	14	26	47	48	40	21	12
	-1000	3	13	24	47	51	40	20	11
	1000	2	11	21	45	50	43	25	16
	2000	3	10	20	44	50	42	26	16
	3000	2	9	20	44	50	45	28	18
10UGMS	-3000	6	18	33	42	41	44	28	16
	-2000	6	19	35	47	49	47	28	15
	-1000	5	16	32	47	51	50	28	14
	1000	4	14	29	47	51	51	32	19
	2000	4	12	26	47	51	50	34	21
	3000	4	12	25	46	46	46	37	23

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(+) 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	7.5	7.5	7.5	7.5	7.5	7.5	15	15	15	15	15	15	30	30	30
	H/In	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	30	30	30	45	45	45	45	45	45	60	60	60	60	60	60
	H/In	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.															
UGMS	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	0.49	0.53
	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

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								
3UGMS	-3000	46	58	60	64	63	63	65	57
	-2000	35	50	53	56	58	61	56	43
	-1000	36	38	39	44	43	37	25	26
	1000	40	33	30	34	35	32	22	25
	2000	40	45	45	47	48	52	59	40
	3000	49	58	56	57	57	59	60	54
5UGMS	-3000	45	56	59	63	63	64	66	58
	-2000	37	48	53	56	57	61	57	43
	-1000	33	37	40	42	43	39	26	26
	1000	34	32	30	32	35	29	22	25
	2000	36	44	46	46	47	52	48	38
	3000	50	57	56	57	55	59	61	54
7UGMS	-3000	45	60	63	67	66	65	68	60
	-2000	37	53	56	59	58	62	59	46
	-1000	34	39	41	42	43	39	27	26
	1000	36	32	30	32	36	32	23	26
	2000	39	47	47	47	47	53	49	40
	3000	52	59	57	58	56	58	61	54
10UGMS	-3000	46	59	64	66	65	63	67	58
	-2000	38	53	56	58	56	60	57	43
	-1000	35	42	43	43	43	39	27	26
	1000	34	33	36	37	37	31	23	26
	2000	38	49	51	53	52	54	50	41
	3000	53	61	61	62	61	61	62	55

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.