

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: UGS

Environmentally Sound Silencers with Forward & Reverse Flow Ratings



Designating Silencers

Model: 5UGS-24-18

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

The IAC Type UGS Quiet-Duct Ultra™/Green Silencer for many years has been the industry standard for maximum noise reduction with minimum silencer length. In response to the current trend for environmentally friendly building products, the UGS Quiet-Duct Ultra™/Green Silencers also come with a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material, instead of fiberglass. The IAC Type UGS 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.

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							
3UGS	-1500	4	9	18	35	41	36	22	14
	-1000	3	9	17	35	40	36	23	15
	-750	3	8	16	34	41	36	24	16
	750	3	6	14	31	39	35	25	16
	1000	3	6	14	31	39	35	25	16
	1500	3	6	13	29	38	35	25	16
5UGS	-1500	8	15	28	46	47	42	35	21
	-1000	8	14	26	45	46	45	37	22
	-750	8	13	26	45	46	45	37	22
	750	6	10	23	44	46	45	38	23
	1000	6	10	22	43	46	45	38	24
	1500	5	9	21	42	46	45	39	24
7UGS	-1500	12	22	35	48	46	44	39	24
	-1000	11	20	33	47	47	46	44	25
	-750	10	19	33	47	47	46	44	26
	750	7	15	28	48	47	46	44	32
	1000	7	15	27	48	47	46	44	33
	1500	6	14	27	48	48	46	45	34
10UGS	-1500	14	27	43	45	47	46	41	31
	-1000	14	30	42	45	47	46	46	32
	-750	13	27	41	45	47	46	46	33
	750	10	21	40	47	48	46	47	42
	1000	10	21	39	46	48	46	47	43
	1500	9	19	39	47	48	47	46	44



(+) 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	12	12	12	12	12	12	12
3'	Wt/lb.	22	35	49	33	43	52	62	74	83	93
5'		40	63	87	56	73	89	107	125	141	158
7'		55	88	122	78	102	125	150	176	199	226
10'		77	123	171	111	155	177	212	250	N/A	N/A

Nominal Length	W/In H/In	24	24	24	24	24	24	36	36	36	36
3'	Wt/lb.	71	86	102	117	132	147	142	162	182	204
5'		121	147	173	204	230	256	249	284	319	355
7'		170	207	243	288	325	362	N/A	N/A	N/A	N/A
10'		241	293	345	405	N/A	N/A	N/A	N/A	N/A	N/A

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:

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

IAC Model	Static Pressure Drop, i.w.g.						
UGS	3'	0.88	0.40	0.22	0.25	0.43	0.93
	5'	1.10	0.49	0.25	0.25	0.47	1.08
	7'	1.40	0.61	0.31	0.29	0.54	1.30
	10'	1.98	0.80	0.42	0.40	0.71	1.65
Silencer Face Velocity, fpm	-1500	-1000	-750	750	1000	1500	

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								
3UGS	-1500	42	49	53	56	57	66	65	46
	-1000	33	41	45	47	51	54	43	32
	-750	34	35	38	41	44	42	29	26
	750	36	36	37	40	45	42	31	25
	1000	38	42	43	45	48	50	42	31
	1500	47	53	52	54	55	57	55	46
5UGS	-1500	41	48	53	56	57	66	65	47
	-1000	35	42	45	47	49	54	41	31
	-750	35	36	38	40	43	39	28	26
	750	31	33	37	38	42	37	26	25
	1000	34	42	44	45	47	48	40	31
	1500	47	54	53	54	53	56	54	46
7UGS	-1500	43	49	54	56	57	63	62	49
	-1000	34	43	46	48	50	54	43	33
	-750	32	37	39	39	44	41	28	26
	750	37	38	38	37	42	39	28	25
	1000	38	45	46	45	46	48	40	30
	1500	50	56	56	57	54	56	56	48
10UGS	-1500	40	46	51	56	57	61	62	49
	-1000	35	40	45	48	49	54	43	34
	-750	35	36	39	41	43	42	30	26
	750	35	39	40	41	44	42	30	25
	1000	38	46	47	47	48	50	43	33
	1500	53	58	58	58	55	58	57	49

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.