Quiet-Elbow™ Silencers
Section 15000 Specifications

1.01 General

A. Furnish and install "Quiet-Duct Elbow" style silencers of the types and sizes shown on the plans and/or listed in the schedule. Silencers shall be the product of IAC Acoustics. 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 casing of the silencer shall be made of minimum 18 gauge type #G-90 lock-former-quality galvanized steel. Interior partitions for the silencer shall be not less than 22 gauge type #G-90 galvanized perforated steel.

B. Filler material shall be of 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.

C. Combustion ratings for the silencer acoustic fill shall be not greater than the following when tested per 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. Casing seams shall be formed, welded, and mastic sealed. Interior acoustic baffles shall be perforated sheets with solid evase design entrance/exit shapes to provide maximum aerodynamic efficiency and minimum self-noise. Blunt shapes will not be accepted.

B. Interior partitions shall be welded to the casing and shall be of radius design so as to provide a uniform elbow airway in the silencer.

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.

4.01 Acoustic Performance

A. Silencer ratings shall have been determined from data taken in a duct-to-reverberant room test facility which provides for airflow 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.

B. 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 radius elbow silencers shall be presented for tests conducted using silencers no smaller than the following sizes:

Rectangular, inches: 24 x 24, 24 x 30, or 24 x 36

5.01 Aerodynamic Performance

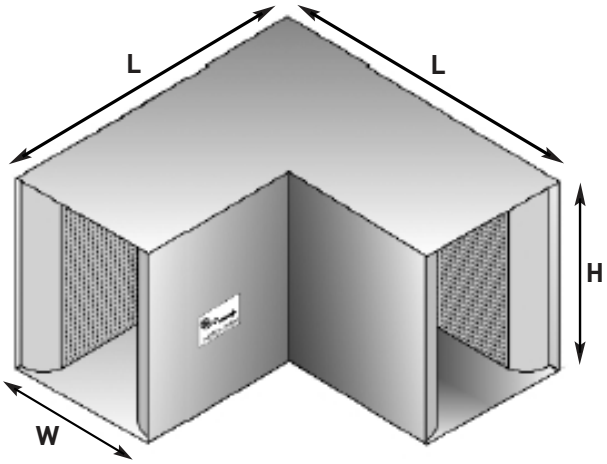
A. Static pressure loss of the silencer shall not exceed that listed in the schedule at the airflow indicated. Airflow measurements shall be made in accordance with ASTM specification E477-99 and applicable portions of ASME, AMCA, and ADC airflow test codes.

6.01 Certification

A. With submittals, the manufacturer shall supply data on Dynamic Insertion Loss, Self-Noise Power Levels, and Aerodynamic Performance for Forward and Reverse Flow test conditions. All rating tests shall be conducted in the same facility, shall have utilized the same silencer, and the facility shall be open to inspection upon request from the Architect/Engineer.

Quiet-Elbow™ Silencers
Type: ELBM-LFS

Forward & Reverse Flow Ratings



IAC Type ELBM Modular Elbows are designed to fit where shorter type of duct runs do not allow for standard type rectangular silencers. ELBM elbows also add the benefit of improved mid-rage frequency performance while keeping the pressure drop minimal. ELBM's can come as standard with fiberglass infill with the same characteristics of our Quiet-Duct Commercial Series; they can also come as 100% Environmental friendly having the same characteristics of our Quiet-Duct Ultra/Green Series and they can also come with our "Hospital Grade" type characteristics, as with our Quiet-Duct Clean-Flow Series.

Designating Silencers

Model: 5ELBM 24 x 18
Type: ELBM **Length:** 5' **Width:** 24" **Height:** 18"
Pressure Loss for ELBM silencers is 0.2" at 1000 fpm

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							
3ELBM-LFS	-2000	10	13	24	33	31	27	22	19
	-1000	10	13	24	33	31	27	22	19
	0	10	13	24	33	31	27	22	19
	1000	10	13	24	33	31	27	22	19
	2000	10	13	24	33	31	27	22	19
5ELBM-LFS	-2000	13	19	32	42	44	32	27	21
	-1000	13	19	32	42	44	32	27	21
	0	13	19	32	42	44	32	27	21
	1000	13	19	32	42	44	32	27	21
	2000	13	19	32	42	44	32	27	21
7ELBM-LFS	-2000	13	24	41	54	54	42	34	24
	-1000	13	24	41	54	54	42	34	24
	0	13	24	41	54	54	42	34	24
	1000	13	24	41	54	54	42	34	24
	2000	13	24	41	54	54	42	34	24
10ELBM-LFS	-2000	21	29	48	59	58	51	41	28
	-1000	21	29	48	59	58	51	41	28
	0	21	29	48	59	58	51	41	28
	1000	21	29	48	59	58	51	41	28
	2000	21	29	48	59	58	51	41	28

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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

IAC Model	W/In	12	12	12	12	12	12	12	24	24	24	24	24	24	24
	H/In	12	18	24	30	36	42	48	12	18	24	30	36	42	48
3ELBM-LFS	Wt/lb.	48	63	83	103	123	148	178	83	98	118	138	158	188	218
5ELBM-LFS		83	103	138	163	198	235	273	138	158	188	218	248	293	338
7ELBM-LFS		125	153	202	237	286	337.8	391	202	230	272	314	356	419	482
10ELBM-LFS		188	228	298	348	418	492	568	298	338	398	458	518	608	698

IAC Model	W/In	36	36	36	36	36	36	36	48	48	48	48	48	48	48
	H/In	12	18	24	30	36	42	48	12	18	24	30	36	42	48
3ELBM-LFS	Wt/lb.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5ELBM-LFS		133	203	243	278	318	393	443	184	218	298	378	458	538	618
7ELBM-LFS		195	293	349	398	454	559	629	266.4	314	426	538	650	762	874
10ELBM-LFS		288	428	508	578	658	808	908	390	458	618	778	938	1098	1258

Table III: Aerodynamic Performance

IAC Model	L/Ft	Static Pressure Drop, i.w.g.															
ELBM-LFS	3'	0.04	0.05	0.07	0.09	0.11	0.14	0.17	0.20	0.24	0.28	0.32	0.36	0.41	0.46	0.51	0.57
	5'	0.04	0.05	0.07	0.09	0.11	0.14	0.17	0.20	0.24	0.28	0.32	0.36	0.41	0.46	0.51	0.57
	7'	0.04	0.05	0.07	0.09	0.11	0.14	0.17	0.20	0.24	0.28	0.32	0.36	0.41	0.46	0.51	0.57
	10'	0.04	0.05	0.07	0.09	0.11	0.14	0.17	0.20	0.24	0.28	0.32	0.36	0.41	0.46	0.51	0.57
Silencer Face Velocity, fpm		250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000

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								
ELBM-LFS	-2000	64	67	68	71	69	68	68	66
	-1000	58	61	60	62	53	57	55	59
	0	59	65	62	63	61	65	60	58
	1000	59	69	63	63	68	72	65	56
	2000	69	76	74	77	76	75	74	65

(+) 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 x (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