

WINDOW INSTALLATION - HEAD/SILL REQUIREMENTS

ALTERNATE 1 INSTALLATION (EXISTING OPENING)

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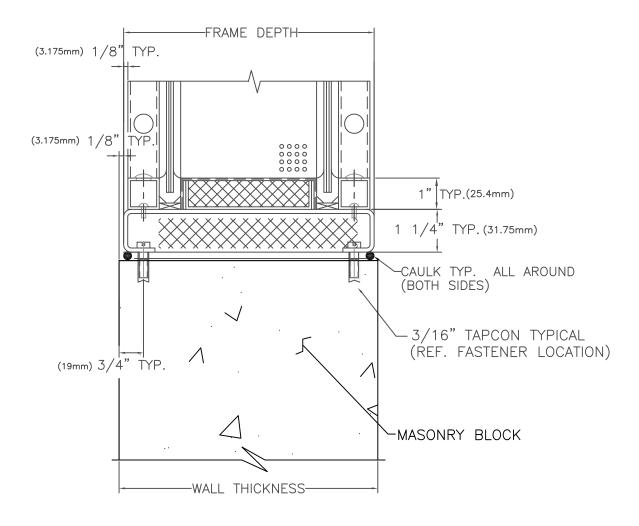


WALL DETAIL FOR NOISE-LOCK WINDOW INSTALLATION

1160	Commerce	Avenue •	Bronx,	NY	10462

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WINDOW INSTALLATION - HEAD/SILL REQUIREMENTS

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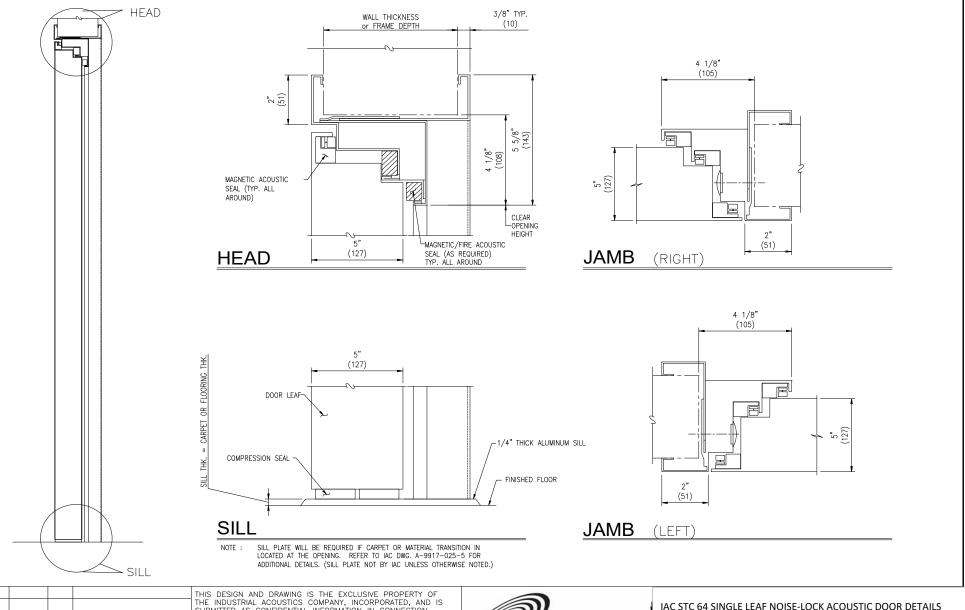


WALL DETAIL FOR NOISE-LOCK WINDOW INSTALLATION

INDUSTRIAL ACOUSTICS COMPANY 1160 Commerce Avenue • Bronx, NY 10462

JOB No. DRAWING No.

ISSUE



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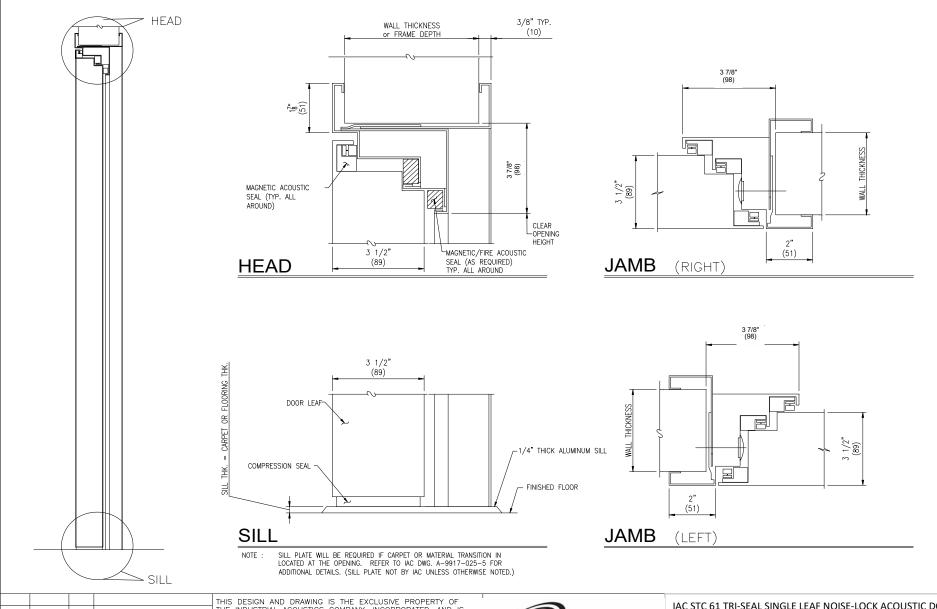
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IAC STC 64 SINGLE LEAF NOISE-LOCK ACOUSTIC DOOR I	DETAI	All	٨I
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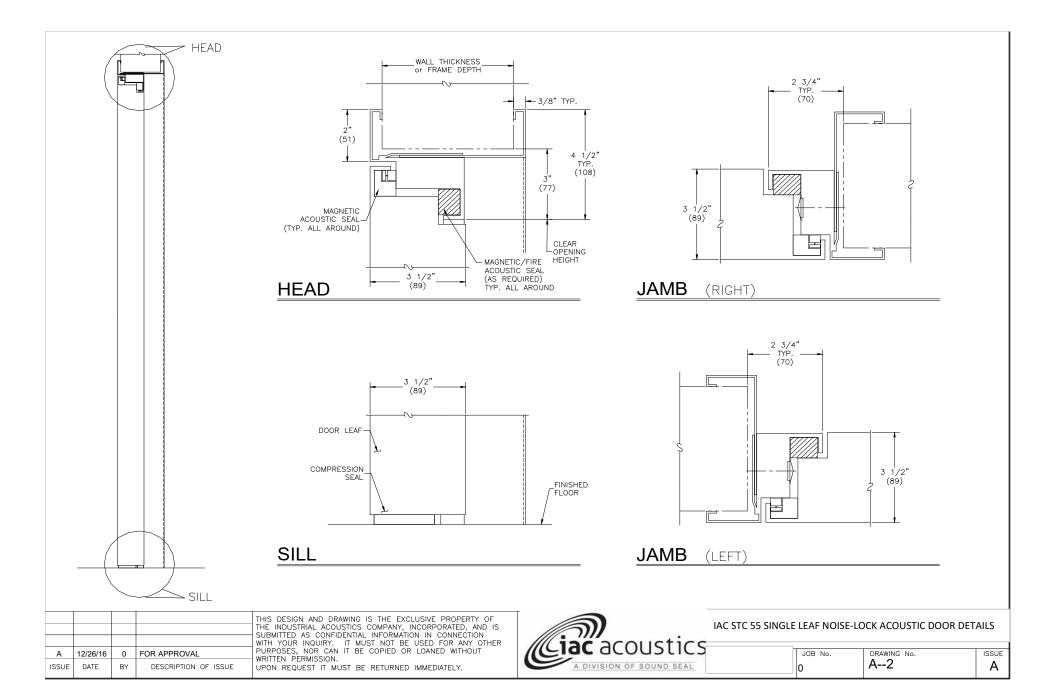


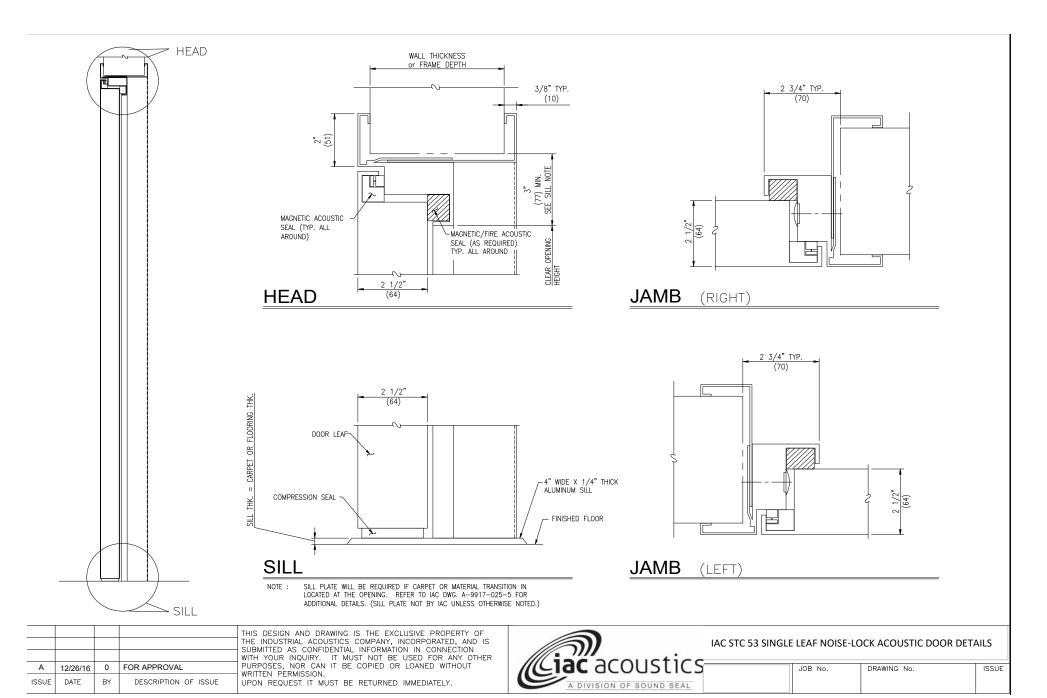
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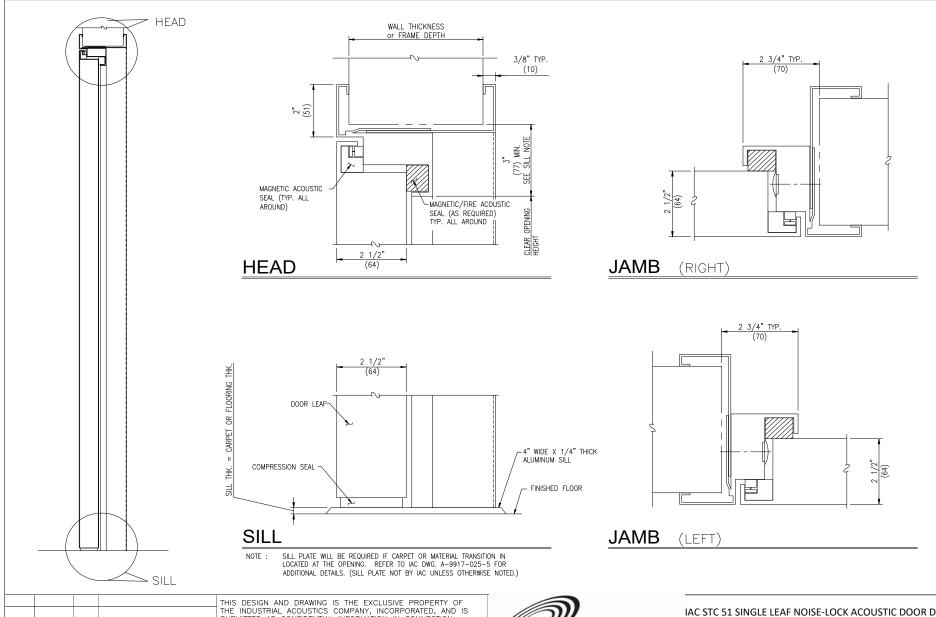


IAC STC 61 TRI-SEAL SINGLE LEAF NOISE-LOCK ACOUSTIC DOO	R
DETAILS	

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ISSUE	DATE	BY	DESCRIPTION OF ISSUE

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INGLE LEAF	MOISE-FOC	K ACOUSTIC	DOOK DETAIL

JOB No. DRAWING No. A--2

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ISSUE **A**

Noise-Lock® Windows

Architectural High-Performance Acoustic Windows



- Certified performance
- Steel construction
- Standard and custom sizes
- Fully factory assembled
- UL fire, bullet and angled pane options available
- Over 60 years experience







High-performance acoustic windows to suit a wide range of applications

IAC Acoustics is a leading supplier of high-performance steel acoustic windows with over sixty years of experience in solving issues relating to noise isolation and containment. IAC Acoustics offers a wide range of standard models, plus the ability to custom design and manufacture windows to suit specific applications.

Thousands of Noise-Lock® acoustic windows have been installed in industrial and commercial buildings throughout the world. Typical applications include hospitals, hotels, schools, offices, broadcasting studios, nightclubs, museums, test cells, laboratories, plant rooms, and power stations — in fact virtually any situation where sound must be contained within or excluded while still maintaining visibility.

Engineered Advantages

IAC Acoustics produces an engineered system — custom-designed in-house to suit the required opening of any given project. Utilizing precision sheet steel cutting and state-of-the-art fabrication, all Noise-Lock® windows are simple to assemble on site by our network of highly experienced installation crews.

Noise-Lock® windows are laboratory-tested for performance in independent laboratories, further supported by installed site testing and engineering calculations for custom specifications. IAC Acoustics is renowned for quality, durability and guarantees in-field performance.

Glazing Options

- Laminated Safety Glass
- Tempered Safety Glass
- One-Way Vision Mirror
- Non-Reflective, Heat Resistant
- Bullet Resistant
- Polycarbonate
- Wire-Inserted Safety Glass

Features

- STC ratings from 35 to 59
 - Noise reduction NIC 30 54 dB
 - Sound absorbing liner: pre-finished
 - Factory assembled including glazing
 - Fasteners/anchors
 - Retrofit fasteners
 - Sized to fit any wall thickness
 - Integrates with all types of construction (drywall, studs, concrete, masonry)
 - Stackable

Performance and Flexibility

IAC Acoustics offers a comprehensive range of products designed for architectural, industrial and security applications. IAC Acoustics' Noise-Lock® windows feature:

- Design flexibility with all windows available in standard and custom sizes or designs
- Supported with laboratory test data
- High-performance windows for both architectural and industrial applications
- UL fire ratings available
- Bullet resistant glass options available
- Industry leading fabrication times and quick-ship programs



Noise-Lock® "C"-Class vs. All-Con Noise-Lock® Windows

NOISE-LOCK® "C"-CLASS WINDOWS	ALL-CON NOISE-LOCK® WINDOWS	
Single glazed: STC 35, STC 39	Single glazed: STC 35, STC 39, STC 41	
Double glazed: STC 47, STC 50, STC 53	Double glazed: STC 53, STC 57, STC 58, STC 59	
Window trim: aluminum frame with black trim	Frame: cold rolled steel, powder coated	
Factory glazed / field assembled	Factory glazed / factory assembled	
Horizontal and vertical window configuration	Horizontal and vertical window configuration	
Windows cannot be sloped	Windows can be sloped	
Size restrictions apply (7' w x 5' h)	Size restrictions apply (8' w x 6' h)	
Glass thickness options: 1/4" and 1/2"	Glass thickness options: 1/4", 3/8", 1/2", 3/4" 1-3/16"	
Glass options: tinted, mirror, anti-reflective	Glass options: tinted, mirror, bullet resistant, anti-reflective	
LEED credit category: materials and resource-recycled content and regional materials	LEED credit category: materials and resource-recycled content and regional materials	
LEED credit category: indoor environment - daylight and views	LEED credit category: indoor environment - daylight and views	

Acoustic Performance

	Acoustic		1/3 00	TAVE BA	AND CEN	ITER FR	EQUENC	Y, HZ		Frame Depth	Glass		Weight	
TYPE	Rating	63	125	250	500	1000	2000	4000	8000	Minimum Inches	Thickness Inches	Glass Type	lb/ft²	Test Report
Ľ	STC		S	OUND T	RANSMI	SSION L	OSS, DB			(mm)	(mm)		(kg/m²)	·
SINGLE	35	18	24	28	31	35	37	40	41	4 (102)	1/4 (6)	LSG	5 (24)	543-82-2
SIN	39	27	30	33	36	39	42	48	53	4 (102)	1/2 (13)	LSG	8 (39)	VW-549-1-83
	53	17	31	40	53	59	62	60	58	8 (203)	1/4 – 1/4 (6 – 6)	LSG-LSG	12 (59)	AC-609-1-87
DOUBLE	57	25	39	47	52	60	68	77	70	10 (254)	1/2 – 1/4 (13 – 6)	LSG-LSG	18 (88)	VW-587-1-86
DOU	58	29	42	47	55	64	63	63	67	18 (457)	1-3/16 - 1/4 (30 - 6)	BRG-LSG	27 (132)	AC-654-89
	59	29	42	50	55	59	70	78	72	10 (254)	1/2-3/8 (13-9.5)	LSG-LSG	20 (98)	VW-586-1-85





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www.iacacoustics.com

Noise-Lock® Doors

Architectural High-Performance Acoustic Doors



- Certified performance
- Steel construction
- Standard and custom sizes
- Pre-hung and fully factory assembled
- UL fire, blast and security rating options available
- Over 60 years experience
- Wood veneer and powder coat finishes





Noise-Lock®

High-performance doorsets to suit a wide range of applications

IAC Acoustics is a leading supplier of high-performance steel acoustic doors with over sixty years of experience in solving issues relating to noise isolation and containment. IAC Acoustics offers a wide range of standard models, plus the ability to custom design and manufacture doors to suit specific applications.

Over one million Noise-Lock® acoustic door sets have been installed in industrial and commercial buildings throughout the world. Typical applications include hospitals, hotels, schools, offices, broadcasting studios, nightclubs, museums, test cells, laboratories, plant rooms, and power stations — in fact virtually any situation where sound must be contained within or excluded from a room or building.

Engineered and Factory Assembled Advantages

IAC Acoustics produces an engineered system — fully factory assembled complete with a leaf, split-frame, seals, hinges and hardware. All doors are pre-hung for operational alignment, fit and finish before shipping.

Noise-Lock® Doors are laboratory-tested for performance in independent laboratories, further supported by installed site testing. IAC Acoustics is renowned for quality, durability and guarantees in-field performance.

Noise-Lock® Range

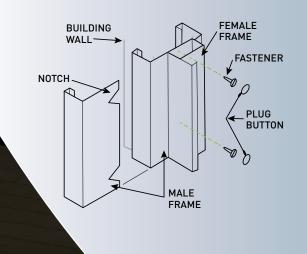
- Single leaf
- Double leaf
- Fire rated
- Link
- Glazed
- Hatches

Features Available

- Blast / ballistic resistance
- Radio frequency shielding
- Electrical operation

Acoustic Performance

STC-51 / Rw50 to STC-64 / Rw63



Performance and Flexibility

IAC Acoustics offers a comprehensive range of high-performance products designed for architectural, industrial and security applications. IAC Acoustics' Noise-Lock® doors feature:

- Performance ratings from STC-51 / Rw50 to more than STC-64 / Rw63
- Design flexibility with all doors available in standard and custom sizes or designs
- Multiple sized options of Vision Panels, supported with laboratory test data
- Wood veneer and powder coat finish options
- UL fire ratings available
- Blast-resistance ratings up to 3psi
- Radio frequency shielding up to 100dB
- Security rated SCIF that meets ICD 705, JAFAN 6/9 and TEMPEST requirements
- ADA compliance
- Industry leading fabrication times and quick-ship programs



High-Performance Features

- Self-aligning magnetic seals assure long life and high field performance, even under constant use
- Cam-lift hinges lower and seal the door to the floor eliminating the high-maintenance of automatic drop seals
- Split frames eliminate in-field grouting to achieve the specified acoustic performance and provide quick and clean installation times

Acoustic Performance

T	Acou	ustic						1/:	3 OCT.	AVE B	AND	CENTI	ER FR	EQUE	NCY,	HZ						Test	тнк	WT	
TYPE	Rat	ting	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	Report	Inches	lb/ft²	Seals
Ĺ	STC	Rw							S0	UND.	TRAN:	SMISS	ION L	oss,	DB							(Year)	(mm)	(kg/m²)	
	43	-	23	12	18	23	31	38	43	42	41	41	42	43	42	43	44	43	45	49	51	815-29-95 (1995)	1-3/4 (45)	8 (39)	а
	51	50	24	20	23	28	37	44	47	49	48	50	53	52	53	52	51	51	54	58	59	815-19C (1994)	2-1/2 (64)	9 (44)	b
DOOR	53	52	22	24	27	31	42	47	47	48	50	53	54	54	54	53	51	51	53	57	58	815-17 (1994)	2-1/2 (64)	11 (54)	b
SWINGING	54	53	21	58	28	40	48	52	51	52	52	54	55	55	54	51	51	51	54	59	63	815-23h (1994)	3-1/2 (89)	16 (78)	b
SWIN	55	-	21	28	29	40	48	50	51	53	53	54	55	56	56	55	53	52	53	58	61	815-20L (1994)	3-1/2 (89)	16 (78)	b
	61	59	22	28	28	41	51	54	53	55	55	60	62	60	60	61	61	62	64	66	69	815-23G (1994)	3-1/2 (89)	16 (78)	С
	64	63	24	32	33	44	51	53	58	58	59	62	63	63	65	66	65	66	67	70	70	815-24P (1994)	5 (127)	18 (88)	d
GLASS	52	-	22	22	29	36	41	40	43	44	49	50	50	52	53	53	54	56	56	58	62	1079-15-05 (2005)	2-1/2 (64)	16 (77)	b
FULL	55	-	22	26	29	35	42	44	48	50	51	51	52	54	55	56	57	59	63	65	68	1079-19-06 (2006)	3-1/2 (64)	19 (92)	С
	NIC									ا	NOISE	RED	UCTIO	N, DB											
SLIDING	54	1	1	-	-	45	45	45	45	49	49	49	52	52	52	60	60	65	65	65	63	72-0365-S (1984)	6 (152)	24 (118)	е
IS	62	-	-	-	-	47	46	51	55	57	59	56	59	64	63	63	>65	>65	>65	>65	>65	72-0732 (1990)	8 (203)	50 (245)	f





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www.iacacoustics.com







Noishield® Sound Barriers Protect Communities Against Noise Highly Absorptive Noishield® Panels Maximize Noise Reduction

HVAC Equipment | Chillers | Pumps | Compressors | Fans | Transformers & Electrical Substations Highway & Rail Transportation Systems | Loading Docks | Rail-Yards | Drive-Thrus | Salvage Yards

Overview

- Galvanized Steel or Aluminum
- Free-Draining
- Light Weight
- Easily Installed
- Highly Sound Absorptive
- Weather-Tested Finishes
- Freestanding or Add-on Cladding Panels
- Relocatable
- Horizontal or Vertical Installation

Standard Features



Laboratory Rated Acoustic Performance STC-30 to STC-33 NRC 1.00 to 1.05



Excellent weather and corrosion resistance.
Galvanized steel materials with powder coated finish applied post assembly. Fully non-welded construction to avoid damage to galvanized coating.



Freestanding, able to span supports of up to 20 feet depending on local codes and wind-speed requirements.







Freestanding Barriers

Noishield Types: FS and SFS Barriers — sound absorptive on one and two sides respectively — optimize sound transmission loss and sound absorption properties in a durable and attractive wall system in harmony with the community.

- Excellent low frequency absorption for heavy equipment
- Laboratory-rated sound absorption on one or both sides
- Low weight, rugged construction ideal for wall or roof mounting
- 5" thick (127 mm) modular metal module system in steel or aluminum
- Abuse resistant dual-coated, galvanized steel or aluminum construction
- \bullet Withstands wind velocities of 110 mph (177 km/hr) designs for specific wind loads are available
- Readily relocated in the event of expansion or other projects

		Type FS	Type SFS
Configu	uration	Thickness 5"/127 mm	Thickness 5"/127 mm
	Steel	FS/S-6.5 (31.7)	SFS/S-9.9 (48.3)
Weight lb/ft² (kg/m²)	Steet	FSt/S* - 8.6 (42.0)	-
Aluminum		FS/A-4.5 (22.0)	SFS/A-5.2 (25.4)
Application		Freestanding along- side noisy equipment	Freestanding between multiple noise sources

Sound Absorptive Treatment for New Construction & Retrofit Applications

Noishield Type C Cladding Modules — sound absorptive to control reflections from acoustically hard barriers

- Apply to new or existing wood, concrete or steel barriers to reduce reflected noise levels in the community
- Retrofit existing barriers to eliminate or mitigate noise complaints
- Low weight, rugged construction ideal for retrofit applications
- Laboratory-rated sound absorption coefficients
- 2-1/2" (64 mm) thick metal module system
- Abuse resistant galvanized steel or aluminum construction
- Individual modules readily manufactured and replaced if damaged

		Type C	Type C12	Type C38				
Configu	uration	Thickness 2.5"/64 mm	Thickness 3"/76 mm	Thickness 4"/102 mm				
Weight lb/ft²	Steel	C/S-3.25 (15.9)	C12/S-3.55 (17.3)	C38/S - 2.8 (19.8)				
(kg/m²)	Aluminum	C/A-1.1 (5.4)	C12/A-1.4 (6.8)	C38/A - 1.9 (9.3)				
Applio	cation	Apply to new or retrofit existing metal, wood, brick, concrete, stone or other noise-reflecting walls. Select Types C12 & C38 for enhanced 125 Hz sound absorption.						







Acoustic Performance

Noishield barrier panels are rated with sound transmission loss values fully compatible with typical acoustic screen performance requirements. All Noishield barrier panels incorporate sound absorbing materials to prevent noise reflections that degrade barrier performances. Type C modules are used to clad new or existing non-absorbing barriers while Type FS and SFS are free-standing walls that combine excellent sound transmission loss (used for 125 Hz insertion loss up to 10 dB) with high sound absorption ratings.

* Freestanding Type FSt is used for applications requiring 125 Hz insertion loss between 10 and 14 dB.

	1/3 Octave Band Center Frequency, Hz									
Barrier Model	125	250	500	1k	2k	4k	8k	STC		
			Sound '	Transm	ission L	.oss, dB				
FS/S and SFS/S	21	34	40	33	32	26	37	30		
FSt/S	24	38	41	33	35	29	34	33		
FS/A and SFS/A	21	32	37	30	37	28	30	31		
		Sou	nd Abso	rption	Coeffici	ents		NRC		
FS/S, FS/A and FSt/S	1.12	1.12	1.10	1.01	0.89	0.76	0.57	1.05		
SFS/S and SFS/A	0.49	1.04	1.14	1.05	0.96	0.95	0.87	1.05		
C/S and C/A	0.30	1.05	1.07	1.01	0.96	0.88	0.78	1.00		
C12/S and C12/A	0.48	1.08	1.10	0.99	0.92	0.83	0.78	1.00		
C38/S and C38/A	0.68	1.19	1.10	1.03	0.90	0.81	0.76	1.05		

- \bullet Sound Transmission Loss: All data in accordance with ASTM E90 and E413
- Sound Absorption Coefficients: All data in accordance with ISO Standard 354, ASTM C423 and E413 with 120 ft² (11.15 m²) test sample in 10,000 ft³ (262 m³) reverberation room. Type A mounting. Coefficients greater than 1.0 result from edge diffraction effects. Do not use sound absorption values greater than 0.95.

Durable Noishield Barrier Finishes

Noishield Barriers are finished with a tough, thermosetting, polyester powder coating which is not damaged by the harsh cleaning chemicals used to remove spray paint graffiti. A wide variety of standard colors allow complementary decorative schemes and attractive designs to reduce apparent wall height as perceived by the community.

- Tested for accelerated weathering per ASTM G 23 for 2,400 hours with chalking not less than No. 8 rating (ASTM D 659) and color changes less than 5 NBS units (ASTM D 2244)
- Salt spray tested for checking, blistering, loss or adhesion, or evidence of corrosion per ASTM B 117 for more than 4,000 hours without coating failure

Weather Shedding Construction

Noishield Sound Barrier Modules are constructed with solid top surfaces to minimize water infusion and perforated bottom surfaces to allow any entrapped water to escape. Infill is non-hygroscopic — water does not "wick" into the modules. Hence, traditional polymer fill protection is neither required or desirable due to adverse effects on sound absorbing characteristics.

Ground Mount/Roof Mount/Structure Mount

Noishield Sound Barriers are engineered from the foundation up for structural and acoustical integrity and economic installation. Low weight modules stack between posts to achieve required wall heights. Noishield Barriers can be installed with horizontal or vertical reveals to satisfy aesthetic and architectural considerations.

Specifications | Noishield® Sound Barriers FS/S Module

Section 32 35 16 | Sound Barriers | FS Noishield Barriers

Part 2 — Products

2.01 Manufacturers

- A. Basis of Design: IAC Acoustics, Division of Sound Seal, Noishield Barrier Wall System.
 - IAC, Division of Sound Seal, 401 Airport Road, North Aurora, IL, 60542;
 Telephone: (630) 270-1790; Fax: (630) 966-9710; E-mail: iacacoustics@soundseal.com; Web site: www.iacacoustics.com.

2.02 Performance Requirements

Specifier Note: Select one of the following options for panel construction. Delete the alternative. Apply to panel structural requirements as well.

A. FS/S (steel construction) Sound Transmission Loss (dB) per ASTM E90 & Sound Transmission Class (STC) per E413:

1/3 Octave Band Center Frequency (Hz)	125	250	500	1K	2K	4K	8K	STC
Noishield FS/S (steel construction)	21	34	40	33	32	26	37	30

B. FS/S (steel construction) Sound Absorption Coefficients per ASTM C423:

1/3 Octave Band Center Frequency (Hz)	125	250	500	1K	2K	4K	8K	NRC
Noishield FS/S (steel construction)	1.12	1.12	1.10	1.01	0.89	0.76	0.57	1.05

C. FS/A (aluminum) Sound Transmission Loss (dB) per ASTM E90 & Sound Transmission Class (STC) per E413:

1/3 Octave Band Center Frequency (Hz)	125	250	500	1K	2K	4K	8K	STC
Noishield FS/A (aluminum construction)	21	32	37	30	37	28	30	31

 $\textbf{D.} \ \mathsf{FS/A} \ (\mathsf{aluminum}) \ \mathsf{Sound} \ \mathsf{Absorption} \ \mathsf{Coefficients} \ \mathsf{per} \ \mathsf{ASTM} \ \mathsf{C423} \colon$

1/3 Octave Band Center Frequency (Hz)	125	250	500	1K	2K	4K	8K	NRC
Noishield FS/A (aluminum construction)	1.12	1.12	1.10	1.01	0.89	0.76	0.57	1.05

Specifier Note: Retain the longest applicable span. Delete the remaining options.

- E. Structural: Galvanized steel panels shall be designed to withstand a wind pressure of [24.2 PSF at a span of twenty [20] feet] [37.8 PSF at a span of sixteen [16] feet] [67.3 PSF at a span of twelve (12) feet] without reinforcement.
- F. Structural: Aluminum panels shall be designed to withstand a wind pressure of [14.3 PSF at a span of twenty [20] feet] [22.3 PSF at a span of sixteen [16] feet] [39.7 PSF at a span of twelve [12] feet] without reinforcement.
- G. Corrosion Testing: Modules shall prove testing for corrosion resistance in accordance with ASTM B117. After 2,400 hours of exposure, the coating system shall not fail due to blistering, loss of adhesion or corrosion along the score lines.
- H. Weather Testing: Modules shall prove testing for accelerated weathering in accordance with ASTM G23. After 2,400 hours of testing, module samples shall not exhibit chalking greater than No. 8 per ASTM D4214 or a color change greater than 5 NBS units per ASTM D2244.

2.03 Components

- A. Standard Panel Construction
 - 1. Individual panels shall be two (2) feet high or one-and-a-half (1.5) feet high x five (5) inches thick x up to twenty (20) feet in length.
 - Specifier Note: Select one of the following two options for panel construction. Delete the alternative. Apply to panel structural requirements as well.
 - 2. Panels shall be constructed of [galvanized steel manufactured in accordance with ASTM A924 and ASTM A653] [aluminum type 5052].
 - 3. Panel components shall meet the following structural requirements:
 - **a.** Perforated face sheet shall be [20 gauge steel] [0.050 mill finished aluminum].
 - **b.** Solid face sheet shall be [14 gauge steel] [0.050 mill finished aluminum].
 - c. Solid end caps shall be [18 gauge steel] [0.050 mill finished aluminum]
- B. Acoustic Fill
 - 1. Fiberglass, non-corrosive, resistant to attack by fungus, vermin proof and non-hygroscopic.
- 2. Free draining, self-supporting and shall retain physical and sound absorptive characteristics after long term exposure to the elements.
- 3. Class A Fire Rating with a Flame Spread not greater than 25.
- C. Bearing Blocks shall be:
 - 1. Used to support the bottom panel of the wall system
 - 2. 1 inch thick x 2.25 inch wide x 4 inch long
 - 3. 65 durometer EPDM, neoprene or rubber.
- D. Steel columns:

Specifier Note: Select one of the following two options for steel column finish.

- 1. Fabricated structural steel members to [be hot-dipped galvanized after fabrication per ASTM A123] [receive epoxy paint coating].
- Steel for wide flange shapes and built-up column members shall conform to ASTM A992. All other structural steel base plates and braces shall conform to ASTM A36.
- 3. Anchor Bolts: ASTM A36 galvanized.
- E. Post Footing: Refer to Section 03 30 0.

2.04 Fabrication

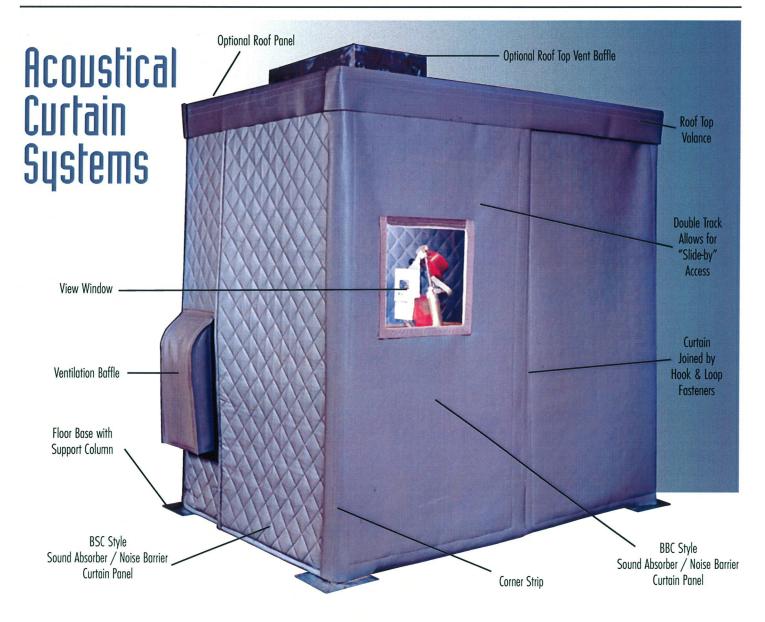
- **A.** Perforated and solid sheets shall be roll-formed in lengths up to twenty (20) feet.
- **B.** Panel shall be assembled to form a free-draining module.
- C. Spot welds or mechanical fasteners shall not be acceptable to join the solid inner and perforated outer panel sheets together. Internal reinforcement shall not be acceptable.
- **D.** Fabricate panels to be rigid, neat in appearance and free from defects.
- **E.** Panel assembly shall such so as to compress and hold the fill materials in place under severe conditions of vibration such as encountered in shipment and installation. Any voids in the panel will be unacceptable.
- **F.** Panel manufacturer, where required, shall provide openings for any large known penetrations. Pipe and conduit penetrations shall be located and cut in the field and sealed in accordance with manufacturer's instructions.

2.05 Finish

- **A.** Panels shall be finished with a factory-applied polyester powder coating system.
- **B.** Finish coating shall have a dry film thickness of three (3) mils (+/- 0.5 mils).

All designs and specifications subject to change without notice. Metric dimensions nominal. Request CSI format specifications on disk or hard copy for Types FS/S, FS/A, FSt/S, SFS/A and C.





FEATURES:

- ◆ High actual noise reduction up to 25 dB(A)
- ◆ Custom engineered systems for any application
- Roof Panels and ventilation systems available when required
- Quick access to machinery and equipment for operation and maintenance
- ◆ Fire safe and low smoke emissions per ASTM E-84, Class 1: Per ASTM E-162, ASTM E-662
- ◆ Easily installed, relocated or modified

- ♦ View windows for visibility
- Washable and steam cleanable component materials
- Durable constructions for long service life in severe industrial conditions
- Curtain system models are offered in various styles for optimum solution of application's requirements
- Economical alternative to rigid acoustical panel systems



Sound Seal's Industrial Division Acoustical Curtain Systems offer an effective, economic method of noise reduction in a wide variety of industrial, architectural, community and OEM noise control applications. Acoustical Curtain Systems can be configured to create total enclosures, partial enclosures, hoods or shrouds, barrier walls and divider partitions.

A wide variety of Industrial Acoustical Curtain Panels and curtain support framing options are available from Sound Seal to meet any requirements.

Acoustical Curtain Enclosures

- Modular panels join together to form any configuration required
- ◆ A variety of framing systems available
- ◆ Double track systems for slide-by access
- View windows for visibility
- Optional roof panels for maximum noise reduction
- ♦ Intake and exhaust ventilation baffles available

Photo shows floor and wall mounted acoustical curtain system with "BBC" style panels for perimeter walls on slide-open double track, and "BSC" style panels as partition walls between three blowers.



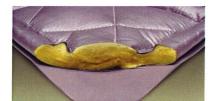




"BSC" Style: Barrier Septum Combination

- Sound absorptive faced quilted fiberglass (gray, white, tan or black) on both sides of noise barrier material
- Modular acoustical curtain panels feature grommets at top, hook & loop fasteners along each edge
- Utilized as perimeter walls, separator walls, or divider partitions between noise sources
- Utilized as absorber/barrier composite liner in enclosures, rooms or buildings
- Adds additional sound absorption to environment
- ◆ Also available in bound or unbound rolls
- ◆ STC ratings up to 33, NRC ratings up to .85
- ◆ Class 1 flammability rating (per ASTM E-84)





"BBC" Style: Barrier Backed Combination

- Sound absorptive quilted faced fiberglass on one side of reinforced noise barrier material
- Modular acoustical curtain panels feature grommets at top, and hook & loop fasteners along each edge
- Reinforced barrier back offers excellent durability and abuse resistance
- Utilized as sliding doors on acoustical curtain enclosures
- Suitable for outdoor applications
- Custom fabricated for "acoustical jackets" on blowers, fans or compressor housings
- ◆ Also available in bound or unbound rolls
- STC ratings up to 32, NRC ratings up to .85
- ◆ Class 1 flammability rating (per ASTM E-84)

In addition to very effective, high performance acoustical curtain panels, a successful, functional acoustical enclosure often requires a wide array of features and options. These include roof-top panels, valances, corner treatments, view windows, ventilation baffles, exhaust fans and a wide variety of curtain support frame options.

Curtain Support Framework

- Standard curtain track
 and hardware system
 manufactured from heavy
 gauge galvanized steel components
- Floor mounted, beam mounted, suspended, wall mounted and ceiling mounted styles available
- Double track configurations allows for slide-by access at any point
- Curved corner options allow for even greater access
- ◆ Type "H-D" Heavy Duty Frame (optional) features structural steel tubing for maximum strength to accommodate larger enclosures



- BSC and BBC style roof panels incorporate an internal stiffener
- Allows for spanning across top of enclosure without sagging
- ♦ Custom sizes available
- ◆ BSC-25RP roof panel STC rating 31



Roof Top Valance

- ♦ Used on enclosures with roofs
- Flexible barrier valance closes gap between roof panels and side panels
- ◆ Hook & Loop fastener attachment

Roof Top Vent Baffle

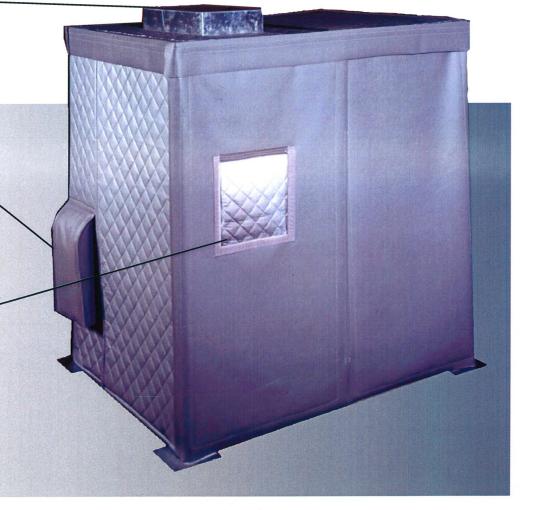
- ◆ Allows for exhaust air flow out of enclosure
- Rugged sheet metal construction lined with sound absorption material
- ◆ Attaches to rigid roof panel

Intake Air Ventilation Baffle

- Allows for air flow into enclosure without compromising performance
- ◆ Manufactured from same components as BBC curtain panels
- Sewn onto side curtain panels for maximum integrity

View Windows

- ◆ Allows for visibility
- ◆ Manufactured from transparent flexible vinyl sheet noise barrier material
- Maintains acoustical performance
- Sewn-on, removable, hook & loop fastener attached, drop-down or lift-up styles available



The most effective noise reduction products combine both sound absorption and noise barrier properties. Tested under strict compliance to appropriate ASTM standards, we offer the following results.

Acoustical Data:

So	Sound Transmission Loss (dB) Octave Band Center Frequencies (Hz)												
Curtain Product	Thickness (In./Nom.)	Wt. Lb./S.F.	125	250	500	1000	2000	4000	STC				
BBC-13-2"	2	1.5	13	20	29	40	50	55	32				
BBC-13	1	1.3	11	16	24	30	35	35	27				
BSC-25-2B	2	2.5	19	22	28	40	56	61	33				
BSC-25	2	1.5	12	16	27	40	44	43	29				
BSC-31	2	1.5	12	16	23	33	38	39	27				
BSC-25-RP	2.5	2.6	19	20	28	42	56	62	31				

Per ASTM: E 90

Sound Absorption Data-Absorber Component Random Incident Sound Absorption												
Octave Band Center Frequencies (Hz)												
	125	250	500	1000	2000	4000	NRC					
BBC Products 1" th.	.12	.47	.85	.84	.64	.62	.70					
BBC Products 2" th.	BBC Products 2" th.											
BSC Products 2" th.												

Per ASTM: C 423

Flammability Ratings:

Product	Description	Flame Spread	Smoke Density
BSC-25	Vinyl faced 1" quilted fiberglass on both sides of a 1 lb. PSF non-reinforced loaded vinyl noise barrier septum	23	30
BSC-26	Silicone faced 1" quilted fiberglass on both sides of a 1 lb. PSF non-reinforced noise barrier septum	4	19
BSC-24	Scrim faced 1" quilted fiberglass on both sides of a 1 lb. PSF non-reinforced noise barrier septum	5	1
BBC-13-2"	Vinyl faced 2" quilt on one side of a 1 lb. reinforced loaded vinyl noise barrier	23	12
BBC-13	Vinyl faced 1" quilt on one side of a 1 lb. reinforced loaded vinyl noise barrier	23	30
BBC-14	Silicone faced 1" quilt on one side of a 1 lb. reinforced loaded vinyl noise barrier	4	19

Above table shows flame spread and smoke density ratings per ASTM Designation E84; Surface Burning Characteristics of Building Materials. Note: Class 1 (or A) rating applies to products with a flame spread of 25 or less.

Additional products tested to ASTM E 162 and ASTM E 662, available on request.

Also Available...

Table-top Acoustical Enclosures Hoistable Acoustical Enclosures Portable Acoustical Enclosures (See Bulletin SS-103)

Distributed By



50 H. P. Almgren Drive Agawam, MA 01001 TEL: 413.789.1770

FAX: 413.789.2248 e-mail: sales@soundseal.com

www.soundseal.com

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KINETICS™ KNC Noise Control Curtains are modular, reinforced limp-mass and quilted fiber-glass composites designed to block noise or to act as a movable barrier between noisy and quiet areas. Kinetics Noise Control Curtain Systems incorporate a self-supporting track which allows the curtain to open for access at virtually any point along the barrier or enclosure.

Kinetics curtains are available from 0.50 to 2.50 PSF (2.5 to 12.5 kg/m²) surface weight. The systems are typically used for applications where accessibility, toughness, oil and chemical resistance, and an attractive appearance are required. A curtain system can yield noise reduction of 12-15 dBA.

Each curtain panel is furnished with Velcro®, self-adhering, nylon closures along the entire length of each edge and heavy-duty grommets along the top.

KINETICS™ KNC-50C and 100C Clearview Curtains or windows are available. Models KNC-50RB and 100RB are reinforced vinyl barriers. Models KNC-50RBQ and 100RBQ have an aluminum-faced, quilted fiberglass absorber towards the noise source to block sound from escaping and to absorb sound that is reflected. Models KNC-50BQQ and 100BQQ are vinyl barriers completely encased in quilted

fiberglass absorber and are designed where additional absorption and Class A flame and smoke test requirements are needed.

Channel support systems for curtains are standard 1.625" x 1.625" (41 mm x 41 mm), 12-gauge rolled channel that can be floormounted or suspended. Curtain panels can be attached to the support system by trolly assemblies for movable curtains or fixed to the support system by mechanical fasteners for non-movable curtains. Standard BQQ curtain panels are 48" (1219 mm) wide and standard RBQ curtain panels are 54" (1372 mm) wide. BQQ and RBQ are available in lengths of up to 20' (6096 mm). Kinetics model KSD strip doors and clear vinyl windows are easily incorporated into model KNC curtain systems for visual and personnel access. We are also able to design structured steal support frames when needed.

Application

Model KNC Curtain Systems can be used as a partial or complete enclosure around noise sources. Curtains are especially useful for enclosures around industrial equipment since the enclosure is more versatile and economical than a rigid enclosure. Typical applications include enclosures around punch presses, compressors, pumps, granulators, blowers, and generators, etc.



Absorption Charateristics

	Octave Band Frequency (Hz)									
Product	125 250 500 1000 2000 4000 NRG									
Q1 - 1" Quilt	0.12	0.47	0.85	0.84	0.64	0.62	0.70			
Q2 - 2" Quilt	0.08	0.33	0.79	1.02	1.04	1.02	0.80			
Q4 - 4" Quilt	0.30	0.83	1.16	1.18	1.10	1.07	1.10			

Sound Transmission Loss (dB)

ASTM E90-90

	Weight								
Product	lb/ft²	kg/m²	125	250	500	1000	2000	4000	STC*
KNC-50RB	0.5	2.44	12	13	16	21	27	32	21
KNC-100RB	1.0	4.89	13	17	21	28	33	40	26
KNC-50RBQ	0.7	3.4	6	12	17	27	38	46	23
KNC-100RBQ	1.3	6.4	10	16	22	30	42	49	27
KNC-50BQQ	1.0	4.9	7	12	18	31	46	50	24
KNC-100BQQ	1.5	7.4	11	16	28	41	50	53	29
KNC-200BQQ	2.5	12.5	16	20	30	40	51	55	33
KNC-50C	0.5	2.44	13	13	17	22	27	31	20
KNC-100C	1.0	4.89	19	19	23	28	33	37	26

^{*}Per ASTM designation E413-87

KEY

RB: Reinforced Barrier
B: Non-Reinforced Barrier

Q: Quilt

Silicone faced quilt is also available

Specifications

Curtain systems shall consist of panels which meet the specifications and physical properties of the curtain material. Each panel shall be furnished with Velcro® self-adhering nylon closures along the entire length of each edge.

Support points at the top of each panel shall be reinforced at grommet locations not more than 12" (305 mm) apart. Support systems for curtains shall be 1.625" x 1.625" (41 mm x 41 mm) 12-gauge formed channel with associated hardware as designed by Kinetics Noise Control.

Complete system shall be Model KNC as manufactured by Kinetics Noise Control, Inc.

Product Descriptions

KNC-50RB: Reinforced barrier KNC-100RB: Reinforced barrier KNC-50RBQ: Reinforced barrier with

quilting on one (1) side

KNC-100RBQ: Reinforced barrier with

quilting on one (1) side

KNC-50BQQ: Barrier quilting on both sides **KNC-100BQQ**: Barrier quilting on both sides **KNC-200BQQ**: Barrier quilting on both sides

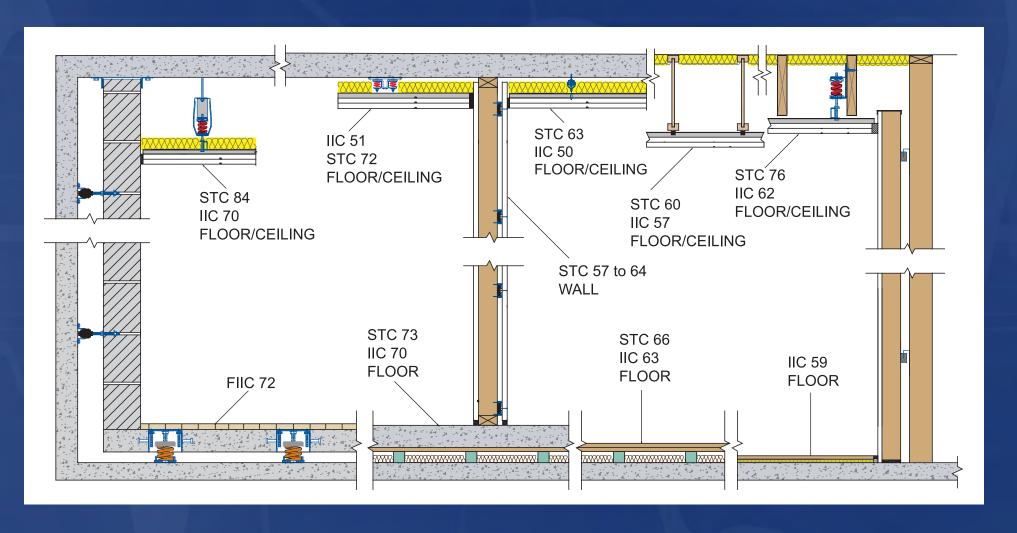
KNC-50C: Clearview barrier KNC-100C: Clearview barrier



kineticsnoise.com

sales@kineticsnoise.com 1-800-959-1229

KINETICSNoise Control



Noise Control Solutions for Floors, Walls, Ceilings, and Structures





IsoMax: Resilient Sound Isolation Wall and Ceiling Clip Patent No. 7,093,814

- Effective sound control at low installed cost
- Error free installation of standard drywall furring channel
- Low-profile design; maximizes available occupied space
- Best performance for the fewest dollars spent to build noise control ceilings and walls
- Exclusive UL design L583 offers 1-hour fire rating for typical wood-framed ceiling composites

Composites								
Description	STC	Sections						
5/8" Gypsum Board 2x4 Wood Stud Fiberglass Insulation KINETICS™ IsoMax Clips 7/8" Drywall Furring Channel 5/8" Gypsum Board	57	M-20000						
2 Layers of 5/8" Gypsum Board 2x4 Wood Stud Fiberglass Insulation KINETICS™ IsoMax Clips 7/8" Drywall Furring Channel 2 Layers of 5/8" Gypsum Board	64		c (U) us					
2 Layers of 5/8" Gypsum Board 1-5/8" x 3-5/8" Steel Stud Fiberglass Insulation KINETICS™ IsoMax Clips 7/8" Drywall Furring Channel 2 Layers of 5/8" Gypsum Board	63		c Unus					

Sound Damp2 Add to second layer of drywall for improved STC · Great for renovations Tested up to STC 53 Easy to apply Water Cleanup without Sound Damp2 with Sound Damp2 **STC 39** +11 STC 5/8" Gypsum Board 5/8" Gypsum Board 2" x 4" Wood Stud Wall - 2" x 4" Wood Stud Wall Studs 16" on Center Studs 24" on Center Sound Damp2 by **Kinetics Noise Control** (one side) Fiberglass Insulation Fiberglass Insulation (2) Layers (2) Layers 5/8" Gypsum Board 5/8" Gypsum Board



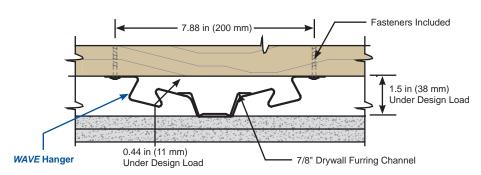


WAVE Hanger Worldwide Patents Pending

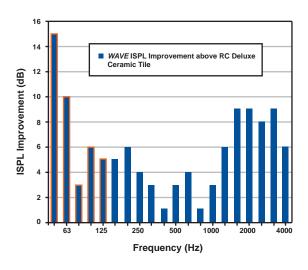
Quick and Easy Wood-Framed Installations

Don't design mixed use or multi-family projects without KINETICS™ WAVE Hanger!

- Outperforms resilient channel and sound clips
- Highest performance-to-cost value for wood-framed floor/ceilings
- Fast and simple No more pinching furring channel into clips!



ISPL Improvement vs. **Resilient Channel**



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Sections



Concrete and Wood-Framed Ceiling Isolation Systems

Description

1/2" Plywood

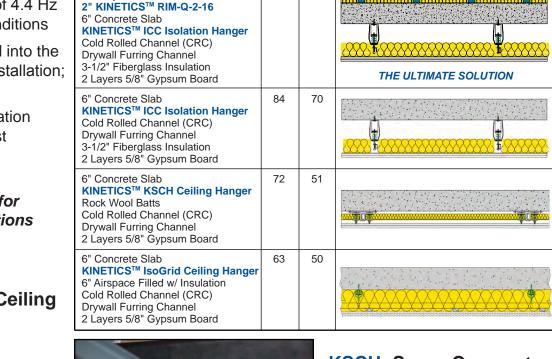
4" Concrete Slab



ICC: Deck-Suspended Ceiling Hanger

- Maximum natural frequency of 4.4 Hz under lightest typical load conditions
- Multiple features incorporated into the design ensure inexpensive installation; eliminates tying wire
- Spring/neoprene cup combination improves performance against low-frequency noise

Contact your local sales rep for wire-tie and other hanger options



IIC

STC

94



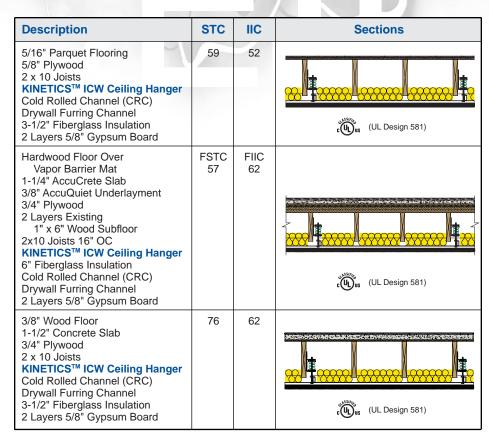
IsoGrid: Quick-Connect Ceiling Hanger

- Dramatic labor savings over conventional ceiling hangers
- Meet code requirements while maximizing ceiling height
- Various attachment methods allow for installation on a variety of ceiling structures
- Known deflection rates ensure performance under design loads



KSCH: Super-Compact Ceiling Hanger Patent No. 7,028,432

- Low ~4" airspace using 7/8" drywall furring channel with full
 1-inch spring deflection; Multiple mounting options
- Meets building code for STC/IIC 50 in smallest possible space





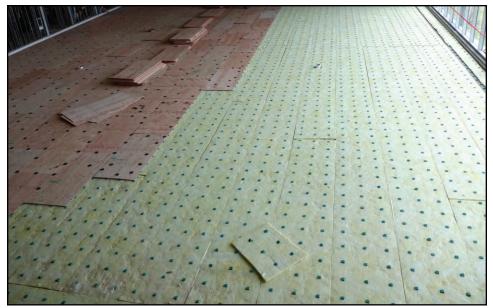
- Exclusive UL design L581 offers 1-hour fire rating for typical wood-framed ceiling composites
- Maxium natural frequency of 4.4Hz under lightest typical loads
- Actual installed load can vary between 75% and 150% of rated load without significant impact to ceiling performance
- Superior noise control for wood-framed construction without floor underlayment
- Ideal solution for new-build and renovations





Concrete Floating Floor Systems

Description	STC	IIC	Sections
2" Topping Slab Precast Concrete 14" Tee	54	24	
4" Concrete Slab 1/2" Plywood 2" KINETICS™ RIM L-2-12 2" Topping Slab Precast Concrete 14" Tee	73	70	
4" Concrete Structural Floor 6" Concrete Structural Floor	49 53	25 27	
3" Lightweight Concrete (polished) 1/2" Plywood 2" KINETICS™ RIM L-2-16 3-1/2" Wood Deck Subfloor Steel Beam and Glue Lam Joist Support No Ceiling	NNIC* 62	FIIC 54	LOFT FIELD TEST
4" Concrete Slab 1/2" Plywood 2" KINETICS™ RIM-Q-2-16 6" Concrete Slab	72	62	
4" Concrete Slab 1/2" Plywood 2" KINETICS™ RIM-Q-2-16 6" Concrete Slab KINETICS™ ICC Isolation Hanger Cold Rolled Channel (CRC) Drywall Furring Channel 3-1/2" Fiberglass Insulation 2 Layers 5/8" Gypsum Board	94	82	THE ULTIMATE SOLUTION



RIM: Roll-Out Isolation Mat System

- Design for any load range
- Easy to create 1", 2", 3", and 4" airspaces
- Fast, simple, inexpensive installation
- Installation and supervision available
- RIM System successfully installed for over 45 years
- Natural Frequency constant over a wide load range
- Slab cast-in-place with no lifting required; trades back on the job as soon as concrete cures

^{*}Normalized Noise Isolation Class, field test for airborne noise reduction

		107	
Description	STC	IIC	Sections
Wood Flooring 4" Concrete Slab KINETICS™ LSM Isolator 2" Air Space, Vented 6" Structural Slab		FIIC 72	-g-
4" Reinforced Concrete Slab KINETICS™ FLM Isolator W/Neoprene Pad 2" Air Space 6" Structural Slab	69 hich is k	61 cetter?	
4" Reinforced Concrete Slab KINETICS™ FLM Isolator w/ Model KIP Pad 2" Air Space 6" Structural Slab	69	61	
4" Reinforced Concrete Slab KINETICS™ FLM Isolator w/ Neoprene Pad 4" Air Space 6" Structural Slab	71	63	



KSSM: Spring Formwork Isolation System

- Optimal placement of isolation system across low capacity structural floor designs
- Pre-loaded assemblies eliminate long wait to lift concrete slab
- Coordinate design directly with Kinetics at SD/DD Phase

LSM: Spring Lift Slab Concrete Floating Floor System



- Proven effective for vibration mitigation of intense impact noises, in gyms, weight rooms, bowling alleys, and sensitive instrumentation spaces.
 Concrete floors only.
- In-field acoustical testing yielded results of FIIC 72, FSTC 61 for a vented floating floor.

FLM: Neoprene/KIP Lift Slab Concrete Floating Floor System



- Various load capacities offered in either fiberglass or neoprene isolators
- Easy to adapt for wide range of air spaces
- Standard mounts available for 4" thick concrete slabs
- Low-cost adapters available for thicker concrete slabs

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Low Profile Floating Floors and Continuous Underlayent Systems

RIM: Roll-out Isolation Material



Highest Performance for Demanding Applications

Ideal for dance studios, loft style condominiums, music practice rooms, and other applications requiring high performance noise control. Surpasses performance of continuous underlayments due to the airspace and lower natural frequency created by KINETICSTM KIP isolators.

Description	STC	IIC	Sections
1" Oak Hardwood Floor 3" Subfloor		FIIC 15	
3/4" Oak Hardwood Floor 3/4" Sleepers 1-1/2" Gypsum Concrete 2 Layers 1/2" OSB 1" KINETICS™ RIM-L-1-16 1" Oak Hardwood Floor 3" Subfloor	FSTC 50	FIIC 45	
3/8" Plywood 2 Layers 3/4" Plywood 2" KINETICS™ RIM-I-2-16 6" Concrete Slab	66	63	
Add 2 Layers 5/8" Gypsum Board between 2 Layers 3/4" Plywood	71	64	

Soundmatt: Low Profile for All Finish Floor Types



Economical and Effective

- Low cost continuous floor underlayment
- Low-profile underlayment for wood, tile, and carpet
- Fast, easy installation no bonding required

Description	STC	IIC	Sections
Ceramic Tile 1/2" Wonderboard 5/16" KINETICS™ Soundmatt 6" Concrete Slab	60	53	
Vinyl Floor Covering 1" Gypsum Concrete 5/16" KINETICS™ Soundmatt 3/4" Oriented Stand Board (OSB) 18" I-Joist 3" Mineral Fiber Batts Resilient Channel 5/8" Gypsum Board		FIIC 51 +18	
without Soundmatt		FIIC 33	

ISOLayment QT: Lowest Profile for Wood Floors and Ceramic Tile



- Low-cost, recycled rubber noise control underlayment
- Extensively tested at the top labs in the USA
- Two (2) Styles: Flat (F) and Bumpy (B) in full rolls

Description	STC	IIC	Sections
Engineered Wood KINETICS™ IsoLayment QT-F 4" Concrete Hambro 500D System 1 Layer 1/2" GWB on furring channel	54	51	
Ceramic Tile KINETICS™ IsoLayment QT-F 8" PT Slab		FIIC 59	A A A A

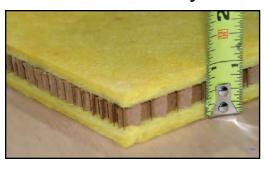
SR Floorboard: Sound Rated Floor System



- Withstands live loads up to 1000 psf
- Cuts easily using standard construction knife
- Floor composites with finished tile flooring can be under two-inches (2") high

Description	STC	IIC	Sections
Ceramic Tile 7/16" Glass Mesh Mortar Unit/Bond Coat 5/8" KINETICS TM SR Floorboard 8" Flexicore Precast Subfloor	59	59	
5/8" Hardwood Floor 3/4" Plywood Subfloor 5/8" KINETICS™ SR Floorboard 7" Concrete Slab		FIIC 54	

Ultra Quiet SR Floorboard: High Performance Sound Rated Floor System



- Same features as SR Floorboard with higher performance capabilities
- High resilience and sound absorption in a single layer

Description	STC	IIC	Sections
Hardwood Floor with 1/8" Pad 1-1/4" Gypsum Concrete 1" KINETICS™ Ultra Quiet SR Floorboard 3/4" Plywood 14" I-Joist 6" Fiberglass Insulation Resilient Channel 2 Layers of 5/8" Gypsum Board	54	59	
No Resilient Channel	53	51	

 Approved for use with gypsum concrete, standard concrete, and built-up wood floors

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Wall Isolation



Wallmat: Resilient Partition Isolation Pad

- Easy to install pre-cut strips
- · Field cut to length with a utility knife
- Continuous resilient support of the partition
- Engineered for a wide range of studwall loads
- Use for both top and bottom plate installation



IsoBacker: Acoustical Fire Rated Outlet Backer Pad

- Underwriters Laboratories classified
- Maintains acoustical ratings per ASTM C 919 and ASTM E 497
- Testing to UL 263 (ASTM E119) and UL 1479 (ASTM E814)
- Outstanding adhesion to outlet boxes and other substrates
- UL listed for metallic and non-metallic outlet boxes



PSB and UniBrace L Resilient Sway Braces

When an isolated masonry or stud partition requires bracing to the adjacent vertical structure, this sway brace acoustically decouples the two walls.

Pipe/Duct Lagging Barrier Model KNM-100ALQ

Composite material designed to reduce the sound transmission from ductwork, piping, and equipment housings by combining a fire-rated limp mass barrier with a decoupling quilted fiber glass lining.



(KNM-100AL is available without the guilted fiberglass lining)

- Fire Rated Indoor or Outdoor Noise Barrier Material
- Barrier Overlap Tab for Fast, Noise-Tight Installation

Insertion Loss

Tested as a duct wrap over 2" fiberglass board (ASTM E1222-90)

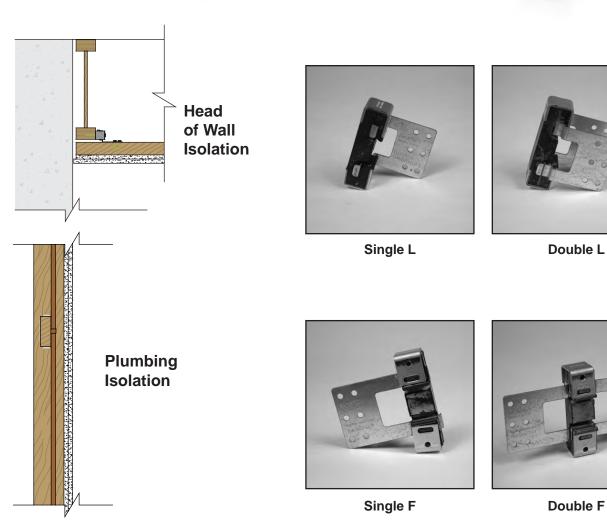
Frequency, Hz	63	125	250	500	1000	2000	4000
KNM-100ALQ	2	10	16	27	35	34	33

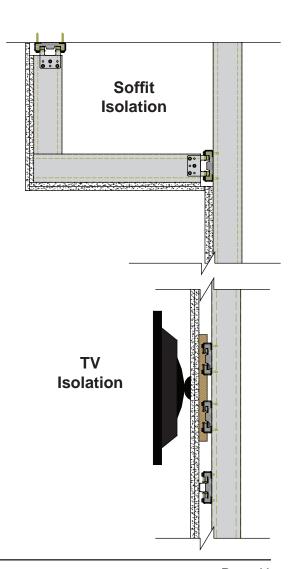
Tested as a duct wrap directly over duct (ASTM E1222-90)

Frequency, Hz	63	125	250	500	1000	2000	4000
KNM-100ALQ	3	6	7	18	24	27	28

UniBrace

Quick and easy solutions to challenging isolation hurdles.





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Bringing you the largest selection of Acoustic, Noise Control, and Vibration Isolation Products

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Room Acoustics

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Vibration Isolation

www.kineticsnoise.com/hvac/

Airflow Attenuation

www.kineticsnoise.com/industrial/air control.html

Environmental

www.kineticsnoise.com/industrial/environmental.html



kineticsnoise.com/arch/

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Manufacturing facilities in Ohio, USA; California, USA; and Ontario, Canada. Sales offices worldwide.

Moduline® Acoustic Enclosure System

Rugged Noise Control Structures Using Acoustically Rated & Field Proven Demountable Components



- Lab certified acoustic ratings
- Broad range of performance levels
- 63 Hz & 8 kHz sound transmission loss performance
- UL fire rated constructions
- Versatile modular constructions
- Simple to install, disassemble and reconfigure
- Durable powder coated finish





Moduline® Acoustic Enclosure System Rugged Noise Control Structures Using Acoustically Rated & Field Proven Demountable Components IAC Acoustics Moduline acoustic enclosures protect workers and the conform pairs apparated by manufacturing and power generating machine

IAC Acoustics Moduline acoustic enclosures protect workers and the community from noise generated by manufacturing and power generating machinery. In industrial settings, noise from this equipment frequently exceeds OSHA limits for hearing safety while also impeding communication. Without noise control remediation, local noise ordinances at plant property lines may be exceeded. IAC Acoustics' line of acoustic enclosures are an effective and efficient way to address these problems.

IAC Acoustics offers standard packages for lighting, electrical and mechanical system components as well as the ability to fully customize the enclosure for unique customer requirements. When desired, electrical services can be integrated into the construction of the panel at the plant for a superior aesthetic and an unobstructed interior.

When you choose a Moduline Acoustic Enclosure, you can count on IAC Acoustics as the single point of responsibility for all the different components that affect the acoustic performance of the enclosure, including wall and roof panels, doors, windows and ventilation systems. IAC Acoustics professionals will work with you to identify and design the right solution to effectively mitigate your noise problem. We guarantee the performance of our products and continue to support our customers long after the job is complete.

IAC Acoustics Moduline Enclosures Offer:

- Integration of lighting, ventilation, fire fighting systems, air-conditioning, etc.
 - Available sound and vibration isolating floor systems
 - Designs for interior and exterior installation sites
 - Available Noise-Lock® sound control door & window systems
 - Installation services that can be included in IAC Acoustics' scope of supply

Moduline Acoustic Panels

Rugged, quickly installed, high-performance noise control systems with an infinite number of configurations and layouts. Included sound control doors, windows and ventilations systems ensure acoustic integrity and performance of the full structure.



Typical Moduline Applications

- Gen-Set Enclosures
- Compressor & Pump Package Enclosures
- In-Plant Offices
- Sound Isolating Building Partitions
- Machinery Enclosures
- Test Environments for Quality-Control & Product Development
- Acoustic/Thermal Plenums
- Transformer Sub-Stations
- Communication Centers

- Observation/Control Rooms
- Vibration-Test Enclosures
- Control Pulpits
- Press Enclosures
- Equipment Penthouses
- Coordinate Measuring Machine Enclosures
- Cooling Tower Enclosure
- Outdoor Construction Offices
- Document Storage Rooms

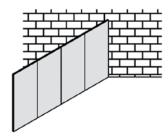
Designing a Moduline Structure

IAC Moduline System features modular Noishield® and Noise-Lock® components with high sound transmission loss and sound absorption ratings providing excellent noise reduction characteristics. Components include acoustical wall, roof & floor panels, sound control doors and windows, ventilation units with integrated silencers, as well as panel joiners, trim & hardware — all part of an acoustically and structurally rated "building block" system for a multitude of applications.



Straight Walls/Barriers

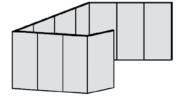
A straight wall or barrier is the most basic of configurations and constitutes a starting point. The noise blocking Moduline panel wall may be part of a full enclosure or a partial barrier between existing walls. The panels are connected by 'H'-joiners and securely joined to the floor in a standard floor channel. A seal against other structures is made with angle connectors and felt stripping, cut to size and supplied with the components.





Partial Enclosures/Shields

Walls at right angles to the basic wall may be added by using a Moduline corner joiner. If other than a right angle connection is desired, angular joiners are used.





Access to Enclosed Equipment

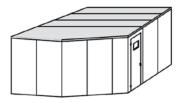
Sound control doors for personnel and materials access, and acoustically rated windows for visibility are included in IAC Acoustics' Moduline system. No-sill personnel access doors framed openings and a wide range of hinged single and double-leaf doors with magnetic seals are all available. For visibility, IAC Acoustics standard Noise-Lock® double-glazed windows range from $12" \times 12" (305 \times 305 \text{ mm})$ to $27" \times 74.5" (686 \times 1892 \text{ mm})$.





Roof for a Complete Enclosure

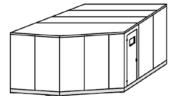
Moduline roof constructions are similar to that used for walls. Standard 'H'-joiners, roof channels and a perimeter apron provide the necessary structural and acoustical seals and may be used for most spans. When the roof must support more than its own weight or clear spans are large, spans a special 'H'-joiner or structural steel is utilized.





Floors & Vibration Control

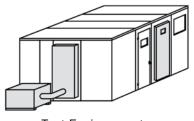
To provide vibration isolation and address structurally transmitted noise, Moduline enclosures can be built with an integrated acoustic floor supported on vibration isolators kits.



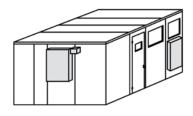


Ventilation for Complete Enclosures

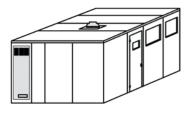
Moduline ventilation systems for both low and high-volume flow designs are available for both Noishield® and Noise-Lock® constructions. Integrated noise control packages and connections to a host building HVAC system are available for all enclosures, including personnel shelters and test environments.



Test Environments



Machinery Enclosures



Personnel Structures



Versatile Components & Installation

Walls, Ceilings & Floors

- Moisture protection for absorption materials prevents entrapment of volatile or corrosive liquids
- Noise-Foil® sound absorption system reduces reverberant build-up within existing "hard" structures
- Optional Fire-Noise-Lock® construction provides certification of 1.5 hour fire rating — all components shipped with UL label

Doors & Other Accessories

- Single and double-leaf "Cam-Lift", no-sill personnel doors. Clear opening to 8' x 14' (2438 x 4267 mm).
 Special designs for larger openings available.
- Panic hardware
- Manual and automated single and double-leaf sliding doors
- Removable panel details all hardware captive

Standard Materials

 Cold-rolled solid steel and galvanized steel with a durable powder coated finish

Ventilation

- Acoustically compatible systems 100-10,000 cfm (170-17,000 m³/hr)
- Wide range of acoustically and aerodynamically rated silencers for normal & most exacting requirements

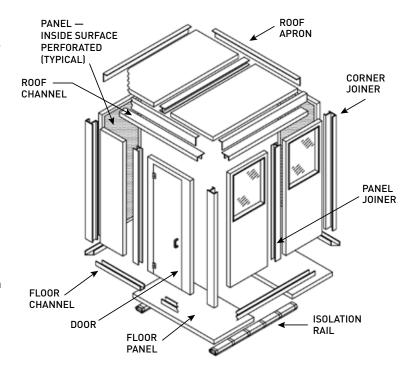
- · Access plugs for local access
- Double-glazed window units provide visibility at no loss of acoustic integrity
- UL fire-rated doors 3 hours up to 42" x 90" (1067 x 2286 mm) single-leaf clear opening.
 84" x 90" (2134 x 2286 mm) double-leaf clear opening.

Optional Materials

- · All galvanized construction
- Special stainless constructions contact IAC Acoustics for additional details

Installation Information & Sequence

- Two technicians can handle Moduline components
- Doors installed just like other panel components, with leaves shipped pre-assembled in a frame
- Place floor channels in lengths needed for room perimeter & anchor to floor
- Starting at a corner, install panels & joiners to make up walls
- Install roof angles, place ceiling panels & joiners, and finish off with external roof apron
- Install accessory items, including forced ventilation system and electrical work
- Use easy to follow, detailed & illustrated installation instructions provided with each structure



Moduline Acoustic Performance

Moduline Construction Type	Sound Transmission Loss, dB, by Octave Band Center Frequency, and Sound Transmission Class, STC, Rating									
	63	125	250	500	1k	2k	4k	8k	STC	WT lb/ft²
Noishield Regular	20	21	27	38	48	58	67	66	40	8
Noishield Septum	21	19	23	35	50	60	68	72	37	9
Mill Duty Regular	28	27	28	41	50	57	57	64	43	10.5
Noise-Lock I	25	27	31	41	51	60	65	66	44	10
Noise-Lock II & Fire-Noise-Lock	27	30	32	41	50	59	67	71	45	11
Super-Noise-Lock	31	34	35	44	54	63	62	68	48	15
Noishield Hard	22	33	45	52	58	68	75	65	56	9.5
Noise-Lock III	20	36	51	68	75	83	84	73	59	11
Noise-Lock II Hard	24	40	50	57	65	73	80	78	61	12
Noise-Lock IV Hard	21	30	50	60	73	79	80	71	62	11.3
Gemini Regular	34	48	58	69	75	82	86	76	70	21

Panel Construction Type	Sound Absorption Coefficients at Octave Band Center Frequency, and Noise Reduction Coefficient, NRC									
, , , , , , , , , , , , , , , , , , , ,	125	250	500	1k	2k	4k	8k	NRC		
Noishield Regular	0.89	1.20	1.16	1.09	1.01	1.03	0.93	(1.10)/0.95		
Noishield Septum	0.50	0.68	1.03	1.05	1.00	0.99	_	(1.10)/0.95		
Noise-Lock I, II, Fire-Noise-Lock & Super-Noise-Lock	0.94	1.19	1.11	1.06	1.03	1.03	1.04	(1.10)/0.95		
Noishield Regular with fill protection & spacer	0.56	0.99	1.09	0.97	0.95	0.90	_	(1.10)/0.95		
Noise-Lock III	0.49	0.37	0.83	0.96	0.99	1.00	_	0.80		
Noise-Foil I & II (2" - 51 mm thick)	0.35	0.65	1.20	1.21	1.07	0.92	_	0.95		
Noise-Foil I & II (4" - 102 mm thick)	0.97	1.39	1.34	1.29	1.19	1.01	_	1.30		
Noise-Foil V	0.24	0.95	1.13	0.99	0.94	0.86	_	1.00		

Fire Resistance Ratings

Fire-Noise-Lock $^{\text{M}}$ panels ship with UL labels certifying 1-hour (solid side) and 1.5-hour (absorptive side) fire ratings. Doors are certified and ship with UL fire ratings available up to 3 hours.

Blast Resistance

Moduline structures and components can be designed to withstand blast loads, with doors remaining operable after blast — please contact the factory for details.





USA - North Aurora, IL

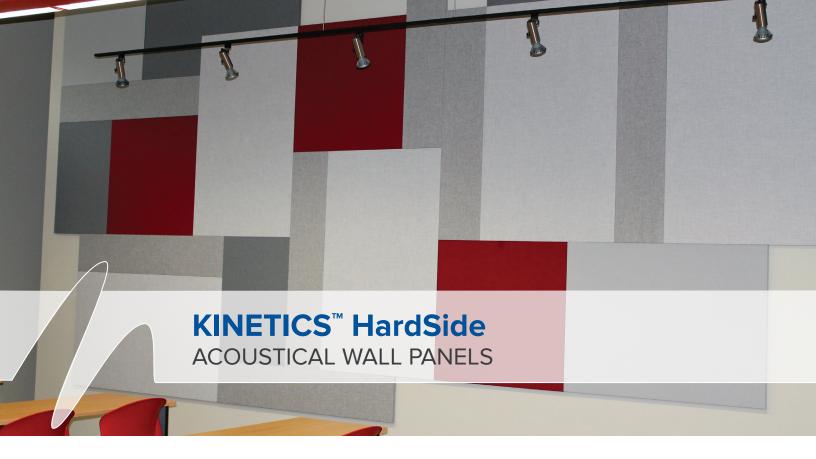
T: +1 (630) 270 1790

F: +1 (630) 966 9710

E: iacacoustics@soundseal.com



www.iacacoustics.com



A combination of great appearance, superior acoustical performance, and design flexibility makes HardSide Acoustical Wall Panels the perfect solution for many interior reverberant noise problems.

HardSide is a traditional acoustical wall panel offering design versatility. A variety of shaped edges and panel thicknesses allow you to design for the desired appearance and acoustics. The perfect solution for many reverberant noise problems, HardSide delivers superior performance.

The core of this panel is a 6-7 PCF fiberglass board. The edges are chemically hardened for durability. Fabric facing, from the FR-701 collection from Guilford of Maine or factory-approved, customer-selected fabric, is stretched over the panel, wrapped and bonded around the edges for a crisp, finished look. Vinyl finishes are also available.

Design for panel sizes up to a maximum 4 ft. \times 10 ft. or custom shaped panels with angled or contoured perimeter cuts.



HardSide - Acoustical Wall Panels

DESCRIPTION

A versatile fiberglass acoustical wall panel wrapped in a wide selection of fabrics or vinyls.

Available with hardened shaped edges.

Engineered sound control with thicknesses from 1 to 4 inches and sizes up to 4 ft. x 10 ft.

5' x 10' option available with 66-inch wide fabric.

COMPOSITION

6-7 PCF density fiberglass core

Chemically hardened edges

Wrapped in fabric from Guilford of Maine, or factory-approved customer-selected material

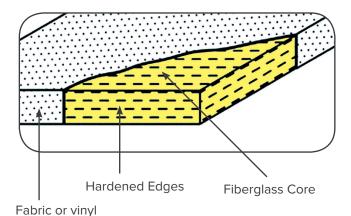
FIRE TEST DATA

Class A per ASTM E 4

ACOUSTICAL PERFORMANCE

Sound Absorption per ASTM C-423. Type A Mounting

Frequency, (Hz)	125	250	500	1000	2000	4000	NRC
1" Thick	0.05	0.32	0.82	1.04	1.02	1.01	0.80
2" Thick	0.29	0.82	1.10	1.04	1.01	1.02	1.00
3" Thick	0.90	1.03	1.06	1.01	0.98	0.97	1.00
4" Thick	1.02	1.11	1.03	1.01	1.03	1.03	1.05



APPLICATIONS

- · Interior surfaces where superior acoustical performance is required.
- · Conference Rooms
- · Schools/Classrooms
- Auditoriums
- Media Rooms
- Multi-Purpose Rooms
- Churches
- Office Spaces
- · Reception Areas
- · Home Theaters
- Pro Theaters

MOUNTING

HardSide Impaling Clips with Adhesive

Rotofast Clips for ceilings

Z-Clips - movable

Velcro - movable

See HardSide cloud panels for ceiling

suspension

EDGE OPTIONS

Square



Bevel



Radius



Pencil

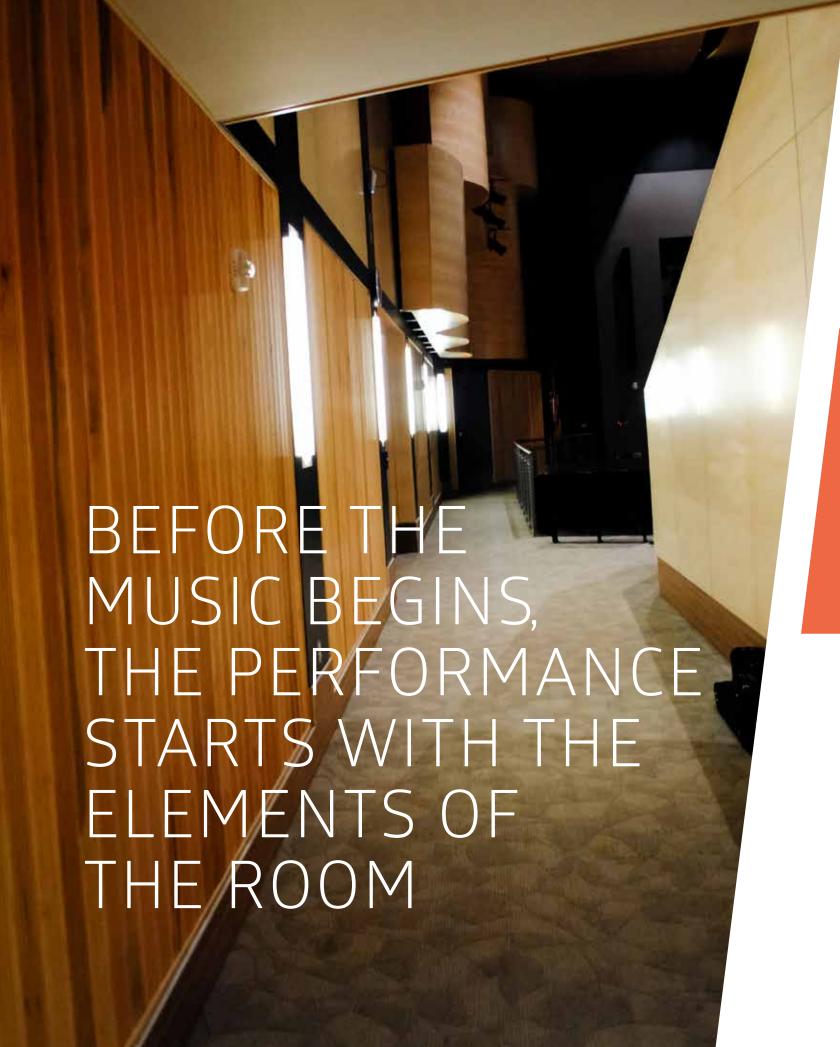




kineticsnoise.com

sales@kineticsnoise.com 1-800-959-1229







KINETICS STANDS OUT

ACOUSTIC PRODUCT EXPERTS SINCE 1958

DIVERSITY OF PRODUCT SOLUTIONS AND FINISHES

CUSTOMIZABLE, FULL-SCALE MANUFACTURING

WORLDWIDE PRESENCE

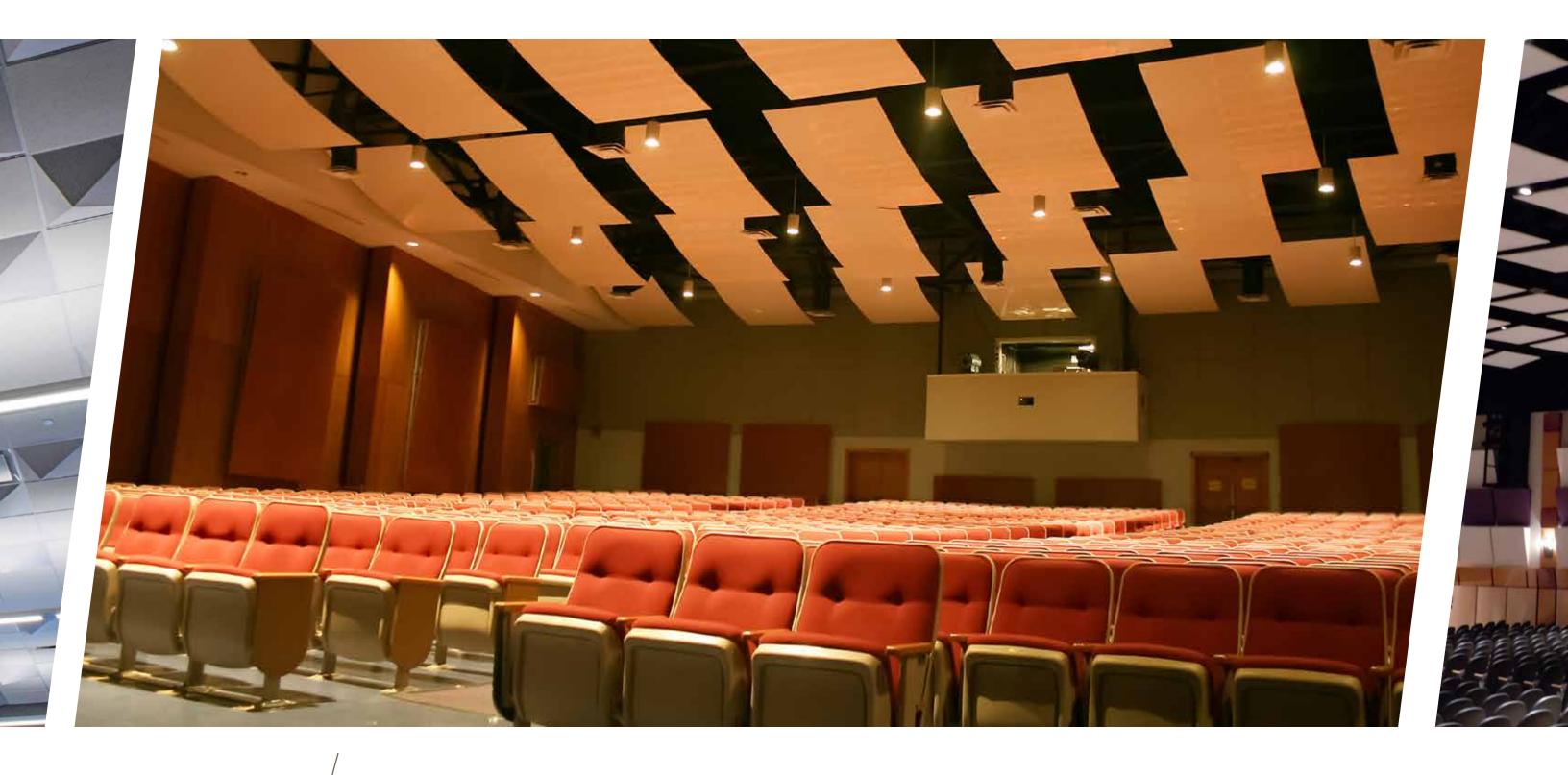
KINETICS PRODUCES THE INDUSTRY'S LARGEST SELECTION OF INNOVATIVE ACOUSTIC AND NOISE

CONTROL PRODUCTS AND SOLUTIONS. YOU CAN COUNT ON AN EXPERT TEAM OF SALES, MANUFACTURING,

ENGINEERING AND CUSTOMER SUPPORT PROFESSIONALS TO HELP YOU ACHIEVE YOUR ACOUSTICAL

AND DESIGN OBJECTIVES.

ONE SOURCE / COUNTLESS POSSIBILITIES



TYPES OF PRODUCT



ABSORBERS

Reduce reverberation (echo) in a variety of settings. Multiple products offered to address any application.

> OFFICES & OPEN SPACES MUSIC ATHLETICS



DIFFUSERS

Distribute sound evenly throughout the listening space and control undesirable pitches and tones.

AUDITORIUMS REHEARSAL SPACES SOUND STUDIOS



REFLECTORS

Redirect sound towards the audience. Reflectors on walls and ceilings enhance the listening experience.

PERFORMANCE HALLS AUDITORIUMS WORSHIP FACILITIES





FINETUNE

CREATES ACOUSTIC BALANCE ACROSS ALL FREQUENCIES. SPECIALLY ENGINEERED, FABRIC-WRAPPED ABSORBERS COMPENSATE FOR THE LOSS OF ACOUSTICAL BALANCE PRODUCED BY CONVENTIONAL PANELS.

VERSATUNE

Common acoustical panels are most effective at absorbing mid-to-high frequencies. VersaTune's engineered composite core boosts low frequency absorption to create balanced performance across all frequencies.

TAD TUNED/ ABSORBER DIFFUSER

Typical acoustical panels can over-absorb high frequencies.

TAD panels scatter high-frequency sound waves, so rooms are lively and authentic.

WOOD ABSORBERS

CONTROL REVERBERANT SPACES WITH THE WARMTH AND BEAUTY OF WOOD IN A VARIETY OF PATTERNS, VENEERS AND FINISHES.



ALTO

The Alto grooved wood surface adds visual refinement to the project, with small openings that allow sound to be absorbed.



SERENO

Sereno features symmetrical hole patterns of various sizes for the passage of sound into the concealed absorber.



PICADO

Picado highlights a veneered wood surface with pinholes that are invisible from a distance, concealing a perforated core that provides excellent sound absorption.



TAD REVEALED

TAD Revealed has the acoustical benefits of TAD panels with the beautiful look of wood. Available in a variety of hardwoods and finishes.

ENSEMBLE

This all-in-one prefabricated panel comes complete with fiberglass for easy installation. Choose from any of the above wood patterns.









GREATER IMPACT

SPORTSBOARD ELITE

GYMNASIUMS | MULTI-PURPOSE | TRAINING FACILITIES

The tough, perforated, co-polymer surface of SportsBoard Elite can tolerate extreme impacts such as baseballs and basketballs. Wrapped in a variety of fabric options.

SPORTSBOARD CONFORM

GYMNASIUMS | MULTI-PURPOSE | TRAINING ROOMS

A highly protective, perforated co-polymer shell covers the edges and face of the panel, making the surface capable of withstanding the toughest of impacts. The SportsBoard Conform's hard surface is easy to clean and can be matched to many team colors.

HIGH IMPACT HARDSIDE

HALLWAYS | LOBBIES | ACADEMIC SPACES

A fabric-wrapped panel featuring a special surface layer that provides greater durability than traditional panels. Ideal for high-traffic common areas.

KNP PERFORATED METAL PANEL

GYMNASIUMS | NATATORIUMS | RECREATIONAL CENTERS

A perforated steel or aluminum shell with a powder-coated finish encases an absorptive core for a rugged, clean appearance with excellent absorptive properties. Available with either a flat or ridged face.

ACOUSTIGRAPHIX GRAPHIC WRAP

Increases the dynamics of any space with high-resolution graphics or photo-images in an acoustically transparent fabric. Use in any environment with any of our fabric-wrapped panel solutions.



PRODUCTS USED AcoustiGraphix HardSide Panels Wave Baffles When the University of Cincinnati (UC) Bearcats basketball team required a quieter practice gym, Kinetics supplied products that reduced reverberant noise while proudly displaying the UC brand. The University of Cincinnati Design and Construction Department worked with Kinetics local representatives to create a quiet and more impactful setting for press conferences, and a better learning environment for players and coaches. The Lindner Athletic Complex is now a more purposeful and attractive facility, as well as a great recruiting tool!





HARDSIDE

RESTAURANTS | AUDITORIUMS | CLASSROOMS

HardSide is a conventional panel available in many thicknesses, sizes and shapes and can be wrapped in a variety of fabrics.

HI-TACK PANEL

OFFICES | COMMUNITY CENTERS | CLASSROOMS

This non-absorptive panel captures the same look as other fabric-wrapped panels while providing a highly-tackable bulletin board surface.



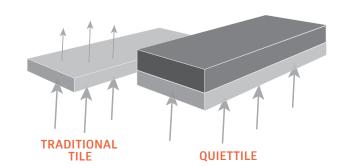




QUIETTILE LAY-IN CEILING TILES ABSORBERS/BLOCKERS

Achieve the highest speech privacy and sound control in an acoustical ceiling tile system. When walls don't extend to the deck, QuietTile composite-ceiling tiles are specifically designed to control noise between spaces.

QuietTile is an engineered composite panel consisting of multiple layers faced with any acoustical ceiling tile.



STANDARD SIZES 2 ft. x 2 ft. / 2 ft. x 4 ft. COMPOSITION

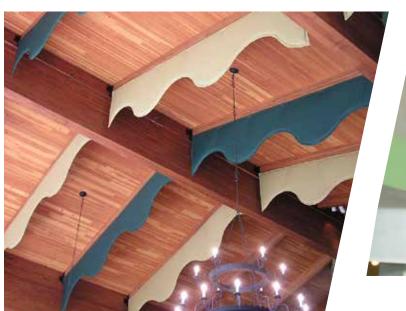
Acoustical Ceiling Tile (ACT)
Composite Sound-Damping Backer

TESTED AND PROVEN TO PROVIDE THE HIGHEST REDUCTION OF SOUND TRANSMISSION IN THE INDUSTRY.

ELEMENTAL ELEVATION

SUSPENDING ACOUSTICAL MATERIALS FROM THE CEILING OFFERS ABSORPTION FOR REVERBERANT NOISE PROBLEMS WHILE ACHIEVING ACOUSTIC GOALS. HORIZONTAL AND VERTICAL ORIENTATION OF CLOUDS AND BAFFLES IS PROVEN TO BE HIGHLY EFFECTIVE, BOOSTING LOW AND MID-FREQUENCY ABSORPTION BY 20-40%.







WAVE BAFFLES

ARENAS | GYMNASIUMS | MULTI-PURPOSE ROOMS

Create a stunning visual effect with dramatic acoustical results in large, reverberant spaces.

KB803

CAFETERIAS | RESTAURANTS | NATATORIUMS

Vertically mounted, vinyl-wrapped baffle for efficient and cost-effective absorption.

HARDSIDE CLOUD

LIBRARIES | CORRIDORS | ACADEMIC SPACES

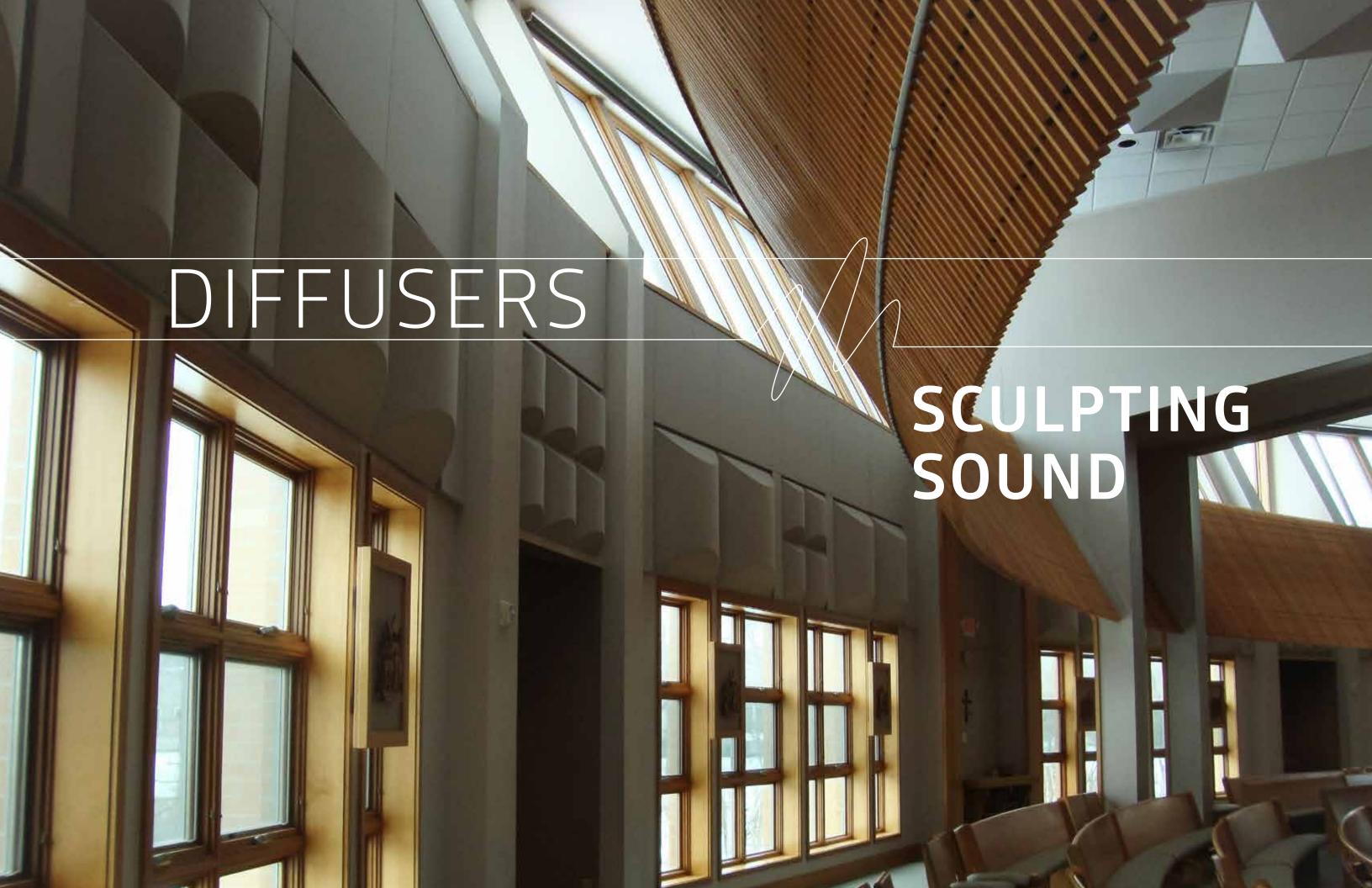
Modify our fabric-wrapped HardSide panel into a suspended horizontal cloud to create a dramatic architectural feature.

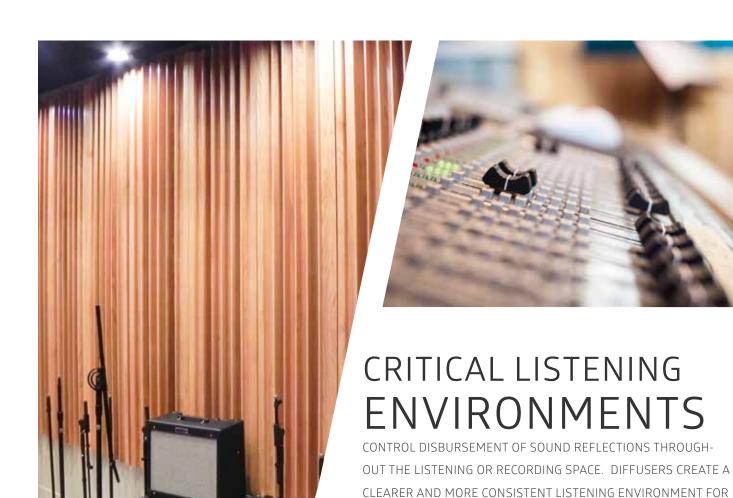
HARDSIDE BAFFLE

OPEN OFFICES | MULTI-PURPOSE ROOMS | ACADEMIC SPACES

Fabric-wrapped, two-sided, vertically oriented baffle.







SCATTERBOX

RECORDING STUDIOS | HOME THEATERS

The premium choice of musicians, artists, and engineers in professional recording environments. Beautiful wood, striking visuals, and two-dimensional diffusion

HIGHTONES & MIDTONES

AUDIENCES AND PERFORMERS.

RECORDING STUDIOS | ACADEMIC SPACES | AUDITORIUMS

Design critical listening spaces with precise diffusion across specific frequency ranges. Elegant and beautiful diffusers are available in a variety of hardwoods and finishes.



MIDTONES

HIGHTONES/SCATTERBOX

650 to 2,500Hz

→ 2,500+ H



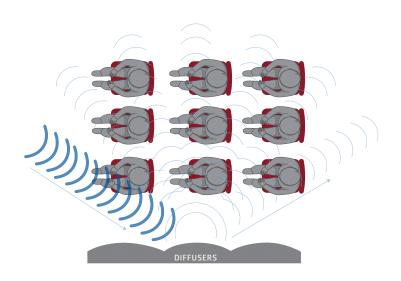


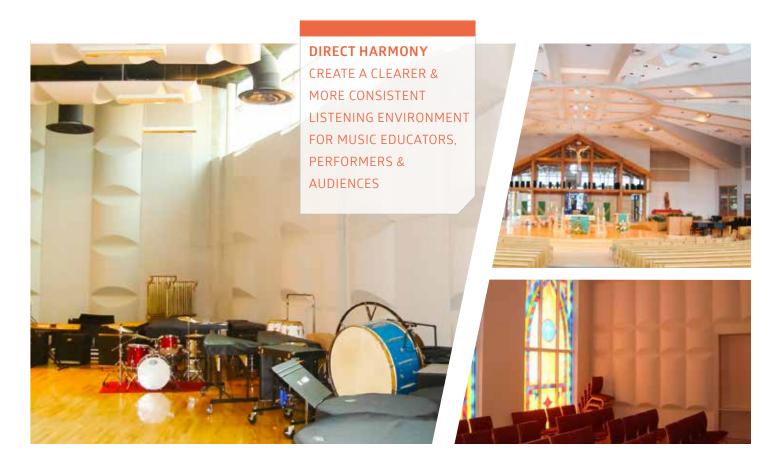
HIGHTONES CONTROLS HIGH FREQUENCIES FOR HIGHER-PITCHED INSTRUMENTS. THE WIDER, DEEPER WELLS OF MIDTONES CONTROL FREQUENCIES BETWEEN 650 Hz AND 2,500 Hz.

GEOMETRIC SOUND

CHURCHES | BAND ROOMS | CAFETORIUMS

Make rooms look and sound more dynamic.
Geometric diffusers placed on walls and ceilings
add visual dimension and disburse sound in multiple
directions to improve the sound quality within the
space. Perfect for churches, band rooms and other
performance spaces. Available in molded co-polymer
finishes, or wrapped in fabric of the client's choice.

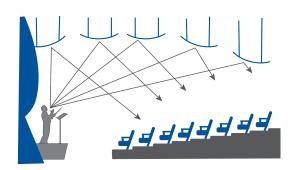












REFLECTORS ARE SHAPED TO DISBURSE SOUND EVENLY ACROSS THE AUDIENCE

OVATION REFLECTORS

PERFORMANCE HALLS | AUDITORIUMS | WORSHIP FACILITIES

Reflectors create a visually stunning space and assure the timing and strength of live performances by eliminating late reflections.

Architects and designers have many creative options from traditional wood and wood-like surfaces to a variety of gel coat colors. Reflectors add shape and dimension to walls and ceilings. A retractable version is also available and is ideal for multi-use environments.





SOUND IN MOTION

THE WORLD OF ROOM ACOUSTICS

The size, shape, and finish materials of a room define its sound quality - good or bad. Have you ever experienced a restaurant where dinner conversation is nearly impossible because of reverberant noise? Have you ever listened to a public address announcement in a gymnasium or at the airport where the words were unclear? Proper application of the right acoustical materials will solve these problems.

REVERBERATION CONTROL & SOUND ABSORPTION

Reducing reverberation will lower the background noise level and improve speech and music clarity. An easy way to analyze a room is to calculate its T60 reverberation time. This is simply the amount of time it takes (in seconds) for sound to decay 60 decibels in a room. Adding Kinetics absorptive materials reduces T60 time in predictable levels.

It's easy to understand how different rooms should have different acoustic characteristics. For example, a concert hall's acoustic field should be rich and full, with some reverberation. In contrast, a classroom should be much less lively, so the instructor is clearly heard and easily understood.

OPTIMAL T60 TIMES ROOM TYPE T60 (SEC) Classrooms 0.6-0.7 **Band Rooms** 0.9-1.1 **Movie Theaters** 0.9-1.2 **Choral Rooms** 1.2-1.6 Multi-Purpose Rooms

1.6-1.8

1.7-2.2

PANEL CONSTRUCTION (Application Driven)

Concert Halls

FINISH/SURFACE

ENGINEERED CONTROL

CORE

REFLECTION/DIFFUSION

Another goal in room acoustics is to create even sound fields. Controlling the timing and direction of sound reflections is an important part in the design of critical listening spaces, from recording studios to rehearsal rooms to performance halls.

Reflectors and diffusers enhance listening environments by controlling strong reflections and disbursing sound evenly across the audience and their listening space.

A NOISE REDUCTION OF 8-10 DECIBELS LOWERS REVERBERATION IN A ROOM BY 40-50%

ACHIEVE THE LOOK YOU WANT WITH THE ACOUSTICAL PERFORMANCE YOU NEED







KineticsNoise.com

1-800-959-1229 | Sales@kineticsnoise.com

Corporate Office: 6300 Irelan Place, Dublin, OH 43017 USA Manufacturing facilities in Ohio, USA; California, USA; and Ontario, Canada. FR701° 2100 Acoustic



FR701° 2100 Acoustic

Specifications

Content

100% post-consumer recycled polyester

Weight

 16.0 ± 0.5 oz./lin. yd.

Width

66" min. useable

Repeat

none

Cleaning Code

W-S

Performance



Colorfastness to Light (AATCC 16 Option 3)

Grade 4 min. at 40 hours



Colorfastness to Crocking (AATCC 8) Grade 4 min. dry & Grade 3 min. wet



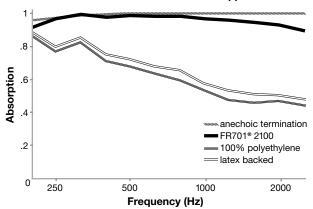
Breaking Strength (ASTM D5034) 150 lbf min. warp and fill

* Flammability (ASTM E84) Class I or A

Acoustical Performance

The plot below summarizes impedance tube measurements of absorption of an anechoic termination and various fabrics in front of the anechoic termination.

Acoustical Performance for Panel Applications



NRC of anechoic termination

NRC of fabric in front of anechoic termination

Miscellaneous

Colors may vary slightly between dye lots. This is a non-directional fabric. Application testing of this product is recommended.

Visit guilfordofmaine.com for complete specs and samples.



fabrics that are made from 100% recycled or compostable material using increasingly sustainable manufacturing practices to produce a high quality product that is recyclable at the end of its useful life. (terratex.com)



CO² emissions from 100% of the electricity used by the manufacturer to produce this product have been measured and offset in accordance with



This pattern is included in the underwriters laboratory panel fabric recognition program. Additional testing of this U.L. recognized component fabric is not required on approved panels from participating manufacturers.

*ACT® registered certification marks.

Guilford of Maine

guilfordofmaine.com

5300 Corporate Grove Drive SE Suite 250 Grand Rapids, MI 49512

800 544 0200 Sales Service 207 876 3806 Fax

12/11



Anchorage 2335

Specifications

Content

35% post-consumer recycled polyester 65% pre-consumer recycled polyester

Weight

 15.0 ± 1.0 oz./lin. yd.

Width

66" min. useable

Repeat

none

Cleaning Code

W-S

Performance



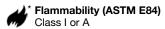
Colorfastness to Light (AATCC 16 Option 3) Grade 4 min. at 40 hours



Colorfastness to Crocking (AATCC 8) Grade 4 min. dry & Grade 3 min. wet



Breaking Strength (ASTM D5034)
275 lbf min. warp and fill

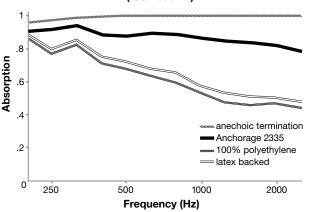


Acoustical Performance

The plot below summarizes impedance tube measurements of absorption of an anechoic termination and various fabrics in front of the anechoic termination.

Acoustic

Acoustical Performance for Panel Applications (ISO 10534-2)



NRC of anechoic termination

NRC of fabric in front of anechoic termination

Miscellaneous

Colors may vary slightly between dye lots. This is a directional fabric. Application testing of this product is recommended. Also available in 54" width (Open House 2334).

Visit guilfordofmaine.com for complete specs and samples.



Terratex is a registered trademark of True Textiles, Inc. and designates fabrics that are made from 100% recycled or compostable material using increasingly sustainable manufacturing practices to produce a high quality product that is recyclable at the end of its useful life. (terratex.com)





This pattern is included in the underwriters laboratory panel fabric recognition program. Additional testing of this U.L. recognized component fabric is not required on approved panels from participating manufacturers.

Guilford of Maine

guilfordofmaine.com

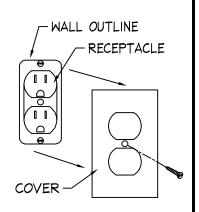
5300 Corporate Grove Drive SE Grand Rapids, MI 49512

800 544 0200 Sales Service 207 876 3806 Fax

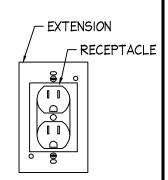
04/12



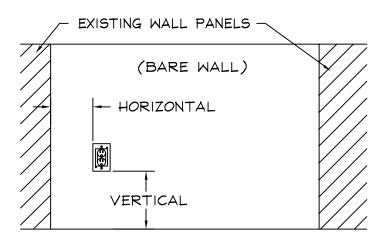
TURN OFF POWER SUPPLY TO THE ELECTRICAL OUTLET



REMOVE OUTLET COVER PLATE AND PULL PLUG AWAY FROM WALL

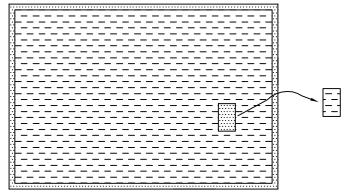


INSTALL OUTLET EXTENSION TO WALL OUTLET PER MANUFACTURER'S INSTRUCTIONS

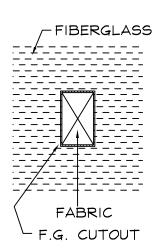


MEASURE LOCATION OF EXTENSION ON THE WALL AND TRANSFER THESE DIMENSIONS TO THE BACK OF THE WALL PANEL

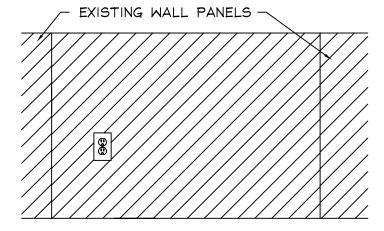




REMOVE FIBERGLASS OUTLINE ON EXTENSION WITH UTILITY KNIFE BEING CAREFUL NOT TO CUT FABRIC.



CUT "X" IN FABRIC. SPRAY FABRIC WITH ADHESIVE. PULL FABRIC THROUGH AND ADHERE TO BACK OF PANEL



ATTACH PANEL TO THE WALL. PANEL SHOULD CLEAR EXTENSION. SCREW INTO PLACE LARGER OUTLET COVER THAN ORIGINAL AND RESTORE POWER TO THE OUTLET.



FIELD-CUT FOR ELECTRICAL OUTLET EXTENSION

LAST DATE REVISED

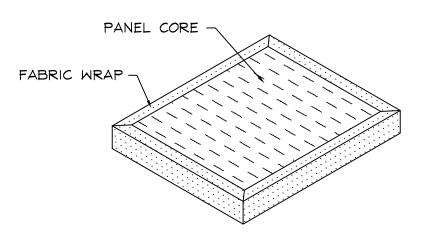
8/12/03

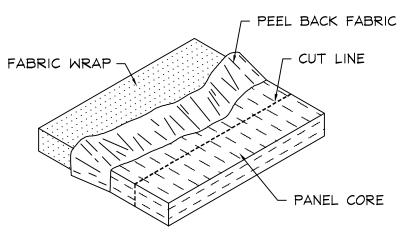
DRAWN BY

DRAWING NO.

T-DWG

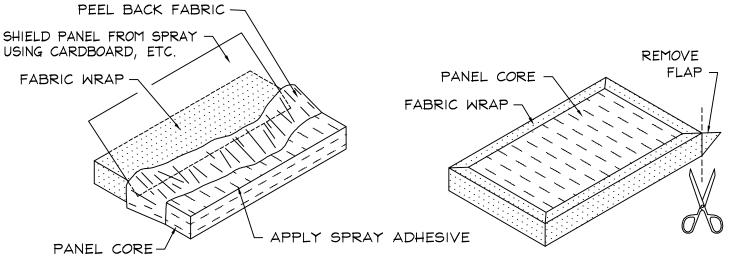
INSTAL47





PANEL FACE DOWN

PANEL FACE UP



PANEL FACE DOWN

INSTRUCTIONS:

- 1. PEEL FABRIC BACK PAST DESIRED CUT LINE (USE HEAT GUN TO AID IN THE RELEASE OF FABRIC ADHESIVE)
- 2. CUT PANEL, FACE UP, WITH A STRAIGHT EDGE AND RAZOR KNIFE (CARE SHOULD BE TAKEN NOT TO CUT FABRIC)
- 3. APPLY ADHESIVE TO EXPOSED PANEL CORE AND REWRAP FABRIC (ALL FIELD ALTERATIONS REQUIRE 1" FABRIC RETURN ON BACK OF PANEL)
- 4. PINCH EXCESS FABRIC TOGETHER WITH FINGERS AND CUT OFF FLAP WITH A PAIR OF SCISSORS

PANEL FACE UP

TITLE FIELD CUT AND REWRAP

LAST DATE **REVISED**

DRAWN BY

DRAWING NO.

T-DWG

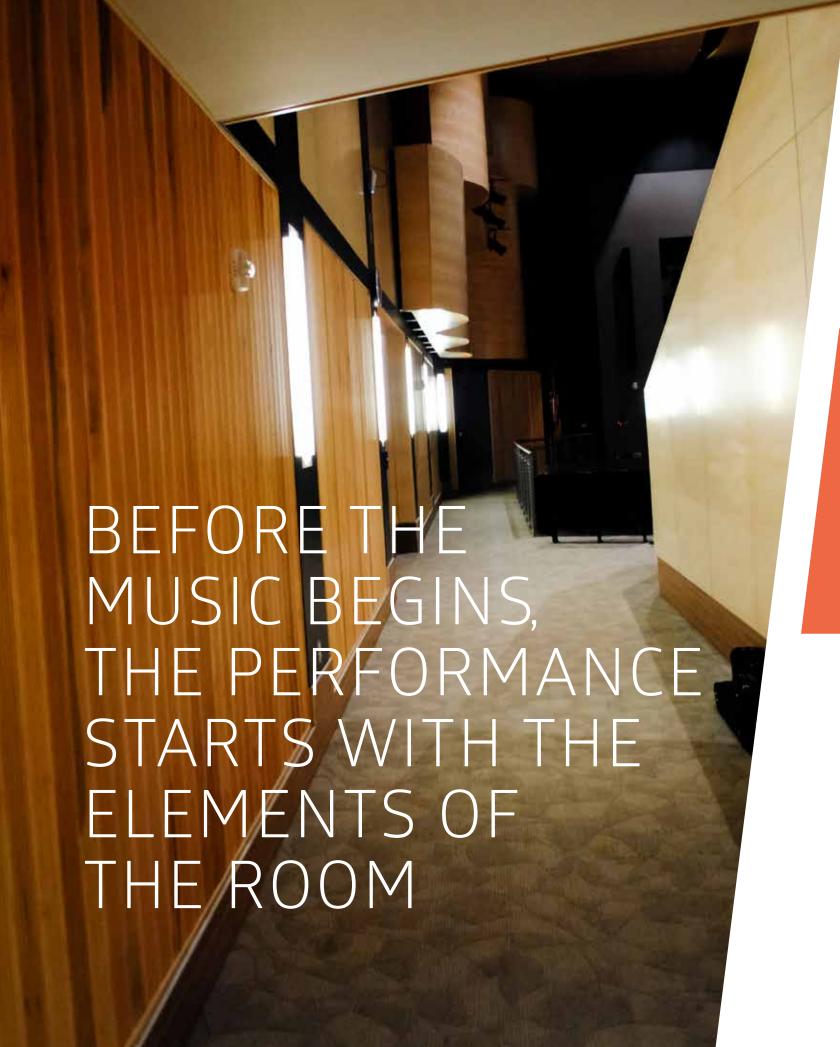
Noise Contro

OF KNC WALL PANELS

8/12/03

INSTAL45







KINETICS STANDS OUT

ACOUSTIC PRODUCT EXPERTS SINCE 1958

DIVERSITY OF PRODUCT SOLUTIONS AND FINISHES

CUSTOMIZABLE, FULL-SCALE MANUFACTURING

WORLDWIDE PRESENCE

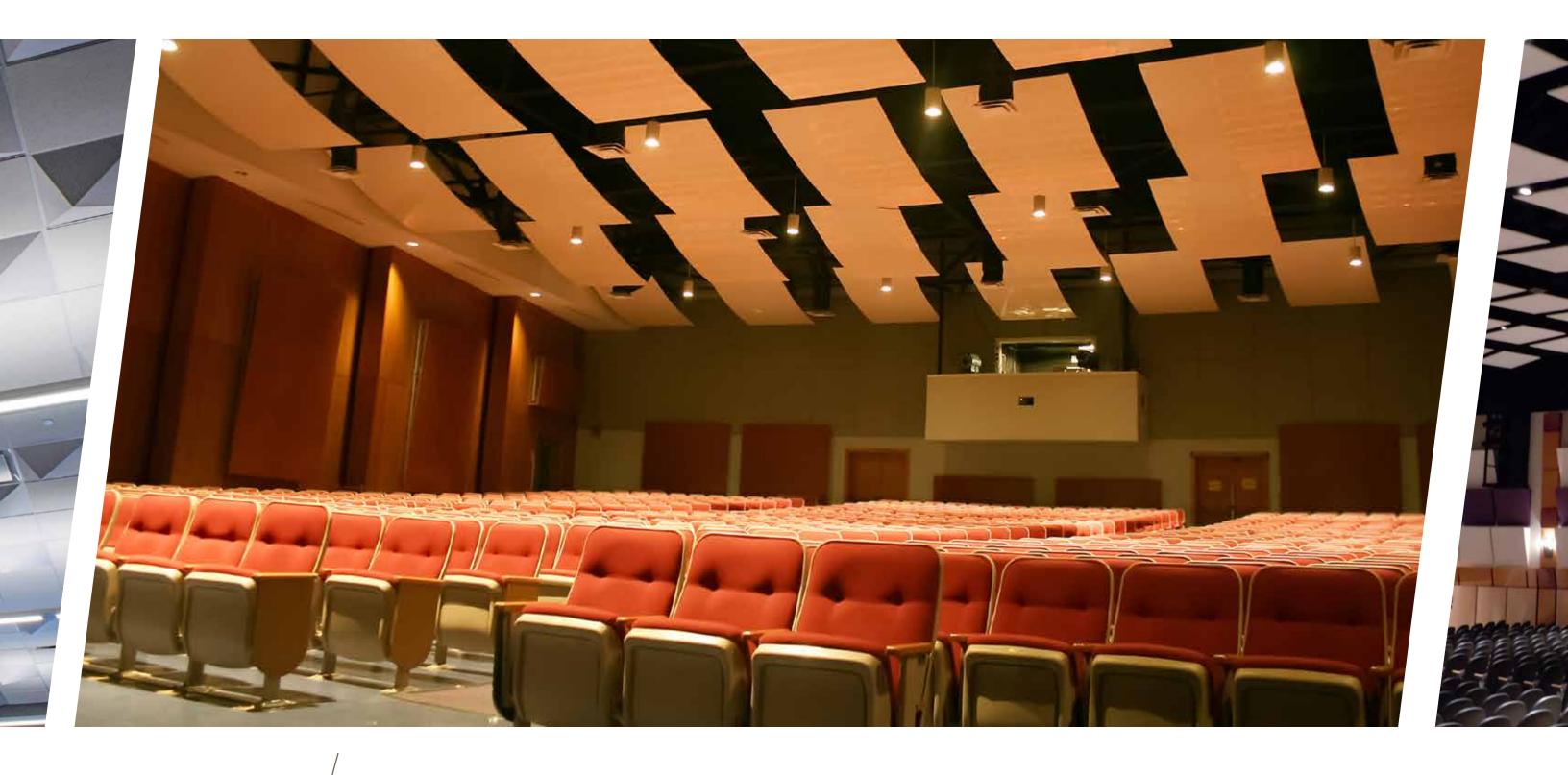
KINETICS PRODUCES THE INDUSTRY'S LARGEST SELECTION OF INNOVATIVE ACOUSTIC AND NOISE

CONTROL PRODUCTS AND SOLUTIONS. YOU CAN COUNT ON AN EXPERT TEAM OF SALES, MANUFACTURING,

ENGINEERING AND CUSTOMER SUPPORT PROFESSIONALS TO HELP YOU ACHIEVE YOUR ACOUSTICAL

AND DESIGN OBJECTIVES.

ONE SOURCE / COUNTLESS POSSIBILITIES



TYPES OF PRODUCT



ABSORBERS

Reduce reverberation (echo) in a variety of settings. Multiple products offered to address any application.

> OFFICES & OPEN SPACES MUSIC ATHLETICS



DIFFUSERS

Distribute sound evenly throughout the listening space and control undesirable pitches and tones.

AUDITORIUMS REHEARSAL SPACES SOUND STUDIOS



REFLECTORS

Redirect sound towards the audience. Reflectors on walls and ceilings enhance the listening experience.

PERFORMANCE HALLS AUDITORIUMS WORSHIP FACILITIES





FINETUNE

CREATES ACOUSTIC BALANCE ACROSS ALL FREQUENCIES. SPECIALLY ENGINEERED, FABRIC-WRAPPED ABSORBERS COMPENSATE FOR THE LOSS OF ACOUSTICAL BALANCE PRODUCED BY CONVENTIONAL PANELS.

VERSATUNE

Common acoustical panels are most effective at absorbing mid-to-high frequencies. VersaTune's engineered composite core boosts low frequency absorption to create balanced performance across all frequencies.

TAD TUNED/ ABSORBER DIFFUSER

Typical acoustical panels can over-absorb high frequencies.

TAD panels scatter high-frequency sound waves, so rooms are lively and authentic.

WOOD ABSORBERS

CONTROL REVERBERANT SPACES WITH THE WARMTH AND BEAUTY OF WOOD IN A VARIETY OF PATTERNS, VENEERS AND FINISHES.



ALTO

The Alto grooved wood surface adds visual refinement to the project, with small openings that allow sound to be absorbed.



SERENO

Sereno features symmetrical hole patterns of various sizes for the passage of sound into the concealed absorber.



PICADO

Picado highlights a veneered wood surface with pinholes that are invisible from a distance, concealing a perforated core that provides excellent sound absorption.



TAD REVEALED

TAD Revealed has the acoustical benefits of TAD panels with the beautiful look of wood. Available in a variety of hardwoods and finishes.

ENSEMBLE

This all-in-one prefabricated panel comes complete with fiberglass for easy installation. Choose from any of the above wood patterns.









GREATER IMPACT

SPORTSBOARD ELITE

GYMNASIUMS | MULTI-PURPOSE | TRAINING FACILITIES

The tough, perforated, co-polymer surface of SportsBoard Elite can tolerate extreme impacts such as baseballs and basketballs. Wrapped in a variety of fabric options.

SPORTSBOARD CONFORM

GYMNASIUMS | MULTI-PURPOSE | TRAINING ROOMS

A highly protective, perforated co-polymer shell covers the edges and face of the panel, making the surface capable of withstanding the toughest of impacts. The SportsBoard Conform's hard surface is easy to clean and can be matched to many team colors.

HIGH IMPACT HARDSIDE

HALLWAYS | LOBBIES | ACADEMIC SPACES

A fabric-wrapped panel featuring a special surface layer that provides greater durability than traditional panels. Ideal for high-traffic common areas.

KNP PERFORATED METAL PANEL

GYMNASIUMS | NATATORIUMS | RECREATIONAL CENTERS

A perforated steel or aluminum shell with a powder-coated finish encases an absorptive core for a rugged, clean appearance with excellent absorptive properties. Available with either a flat or ridged face.

ACOUSTIGRAPHIX GRAPHIC WRAP

Increases the dynamics of any space with high-resolution graphics or photo-images in an acoustically transparent fabric. Use in any environment with any of our fabric-wrapped panel solutions.



PRODUCTS USED AcoustiGraphix HardSide Panels Wave Baffles When the University of Cincinnati (UC) Bearcats basketball team required a quieter practice gym, Kinetics supplied products that reduced reverberant noise while proudly displaying the UC brand. The University of Cincinnati Design and Construction Department worked with Kinetics local representatives to create a quiet and more impactful setting for press conferences, and a better learning environment for players and coaches. The Lindner Athletic Complex is now a more purposeful and attractive facility, as well as a great recruiting tool!





HARDSIDE

RESTAURANTS | AUDITORIUMS | CLASSROOMS

HardSide is a conventional panel available in many thicknesses, sizes and shapes and can be wrapped in a variety of fabrics.

HI-TACK PANEL

OFFICES | COMMUNITY CENTERS | CLASSROOMS

This non-absorptive panel captures the same look as other fabric-wrapped panels while providing a highly-tackable bulletin board surface.



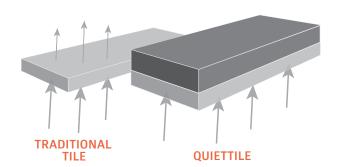




QUIETTILE LAY-IN CEILING TILES ABSORBERS/BLOCKERS

Achieve the highest speech privacy and sound control in an acoustical ceiling tile system. When walls don't extend to the deck, QuietTile composite-ceiling tiles are specifically designed to control noise between spaces.

QuietTile is an engineered composite panel consisting of multiple layers faced with any acoustical ceiling tile.



STANDARD SIZES 2 ft. x 2 ft. / 2 ft. x 4 ft. COMPOSITION

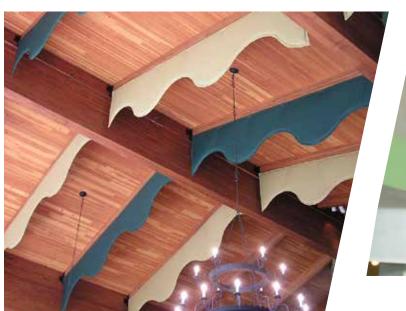
Acoustical Ceiling Tile (ACT)
Composite Sound-Damping Backer

TESTED AND PROVEN TO PROVIDE THE HIGHEST REDUCTION OF SOUND TRANSMISSION IN THE INDUSTRY.

ELEMENTAL ELEVATION

SUSPENDING ACOUSTICAL MATERIALS FROM THE CEILING OFFERS ABSORPTION FOR REVERBERANT NOISE PROBLEMS WHILE ACHIEVING ACOUSTIC GOALS. HORIZONTAL AND VERTICAL ORIENTATION OF CLOUDS AND BAFFLES IS PROVEN TO BE HIGHLY EFFECTIVE, BOOSTING LOW AND MID-FREQUENCY ABSORPTION BY 20-40%.







WAVE BAFFLES

ARENAS | GYMNASIUMS | MULTI-PURPOSE ROOMS

Create a stunning visual effect with dramatic acoustical results in large, reverberant spaces.

KB803

CAFETERIAS | RESTAURANTS | NATATORIUMS

Vertically mounted, vinyl-wrapped baffle for efficient and cost-effective absorption.

HARDSIDE CLOUD

LIBRARIES | CORRIDORS | ACADEMIC SPACES

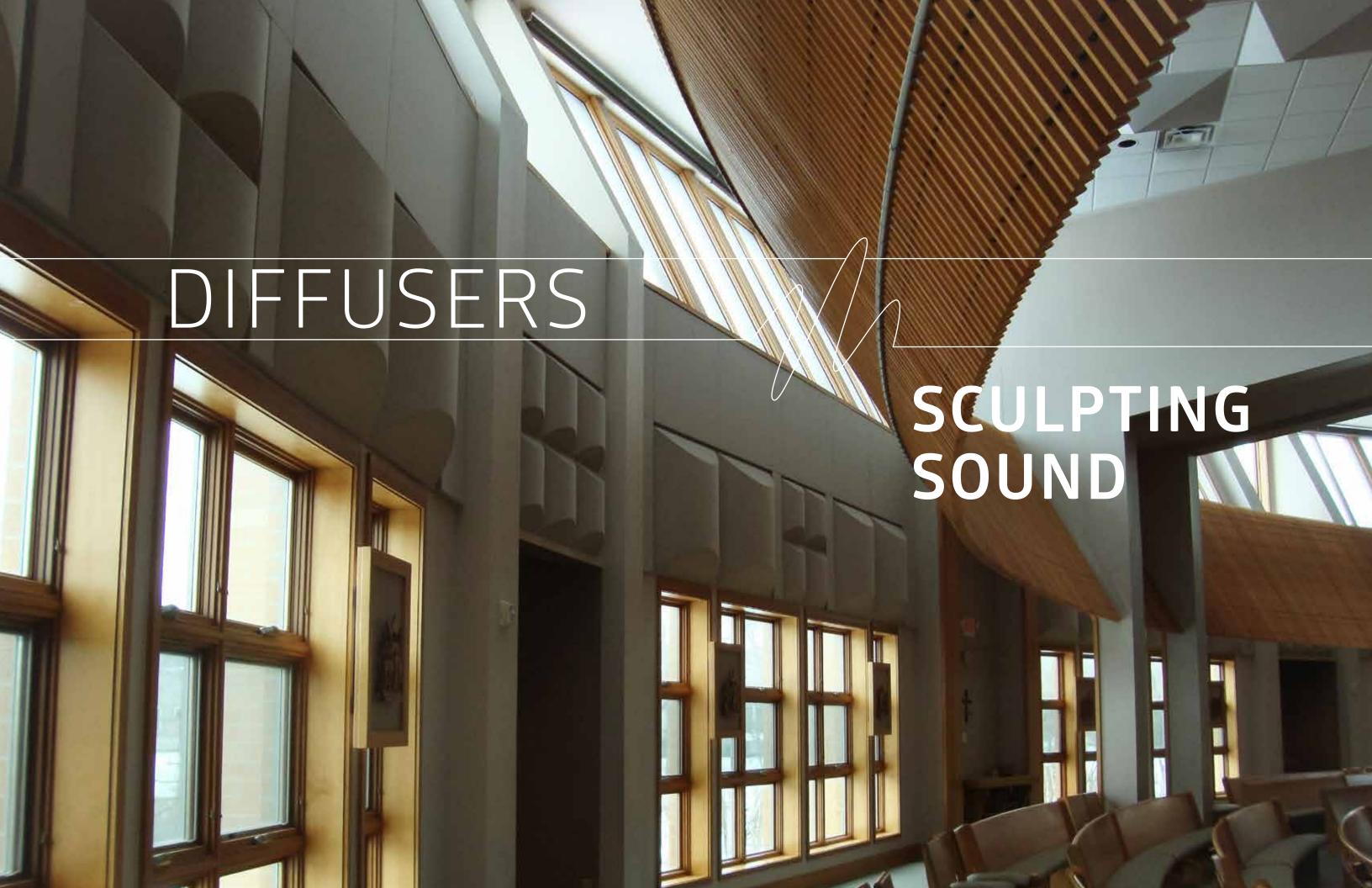
Modify our fabric-wrapped HardSide panel into a suspended horizontal cloud to create a dramatic architectural feature.

HARDSIDE BAFFLE

OPEN OFFICES | MULTI-PURPOSE ROOMS | ACADEMIC SPACES

Fabric-wrapped, two-sided, vertically oriented baffle.







SCATTERBOX

RECORDING STUDIOS | HOME THEATERS

The premium choice of musicians, artists, and engineers in professional recording environments. Beautiful wood, striking visuals, and two-dimensional diffusion

HIGHTONES & MIDTONES

AUDIENCES AND PERFORMERS.

RECORDING STUDIOS | ACADEMIC SPACES | AUDITORIUMS

Design critical listening spaces with precise diffusion across specific frequency ranges. Elegant and beautiful diffusers are available in a variety of hardwoods and finishes.



MIDTONES

HIGHTONES/SCATTERBOX

650 to 2,500Hz

→ 2,500+ Hz



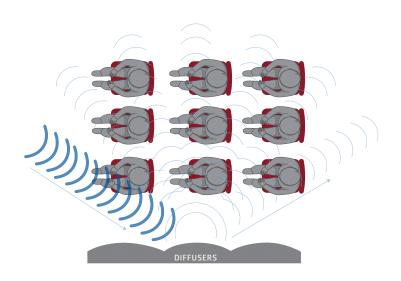


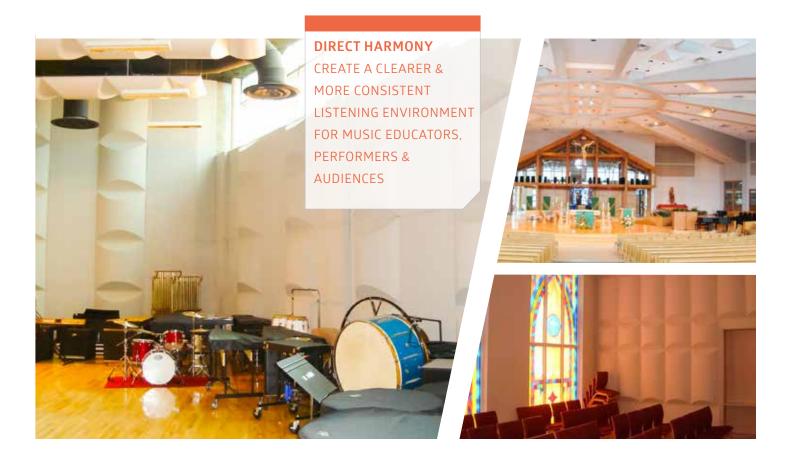
HIGHTONES CONTROLS HIGH FREQUENCIES FOR HIGHER-PITCHED INSTRUMENTS. THE WIDER, DEEPER WELLS OF MIDTONES CONTROL FREQUENCIES BETWEEN 650 Hz AND 2,500 Hz.

GEOMETRIC SOUND

CHURCHES | BAND ROOMS | CAFETORIUMS

Make rooms look and sound more dynamic.
Geometric diffusers placed on walls and ceilings
add visual dimension and disburse sound in multiple
directions to improve the sound quality within the
space. Perfect for churches, band rooms and other
performance spaces. Available in molded co-polymer
finishes, or wrapped in fabric of the client's choice.

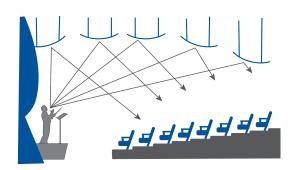












REFLECTORS ARE SHAPED TO DISBURSE SOUND EVENLY ACROSS THE AUDIENCE

OVATION REFLECTORS

PERFORMANCE HALLS | AUDITORIUMS | WORSHIP FACILITIES

Reflectors create a visually stunning space and assure the timing and strength of live performances by eliminating late reflections.

Architects and designers have many creative options from traditional wood and wood-like surfaces to a variety of gel coat colors. Reflectors add shape and dimension to walls and ceilings. A retractable version is also available and is ideal for multi-use environments.





SOUND IN MOTION

THE WORLD OF ROOM ACOUSTICS

The size, shape, and finish materials of a room define its sound quality - good or bad. Have you ever experienced a restaurant where dinner conversation is nearly impossible because of reverberant noise? Have you ever listened to a public address announcement in a gymnasium or at the airport where the words were unclear? Proper application of the right acoustical materials will solve these problems.

REVERBERATION CONTROL & SOUND ABSORPTION

Reducing reverberation will lower the background noise level and improve speech and music clarity. An easy way to analyze a room is to calculate its T60 reverberation time. This is simply the amount of time it takes (in seconds) for sound to decay 60 decibels in a room. Adding Kinetics absorptive materials reduces T60 time in predictable levels.

It's easy to understand how different rooms should have different acoustic characteristics. For example, a concert hall's acoustic field should be rich and full, with some reverberation. In contrast, a classroom should be much less lively, so the instructor is clearly heard and easily understood.

OPTIMAL T60 TIMES ROOM TYPE T60 (SEC) Classrooms 0.6-0.7 **Band Rooms** 0.9-1.1 **Movie Theaters** 0.9-1.2 **Choral Rooms** 1.2-1.6 Multi-Purpose Rooms

1.6-1.8

1.7-2.2

PANEL CONSTRUCTION (Application Driven)

Concert Halls

FINISH/SURFACE

ENGINEERED CONTROL

CORE

REFLECTION/DIFFUSION

Another goal in room acoustics is to create even sound fields. Controlling the timing and direction of sound reflections is an important part in the design of critical listening spaces, from recording studios to rehearsal rooms to performance halls.

Reflectors and diffusers enhance listening environments by controlling strong reflections and disbursing sound evenly across the audience and their listening space.

A NOISE REDUCTION OF 8-10 DECIBELS LOWERS REVERBERATION IN A ROOM BY 40-50%

ACHIEVE THE LOOK YOU WANT WITH THE ACOUSTICAL PERFORMANCE YOU NEED







KineticsNoise.com

1-800-959-1229 | Sales@kineticsnoise.com

Corporate Office: 6300 Irelan Place, Dublin, OH 43017 USA Manufacturing facilities in Ohio, USA; California, USA; and Ontario, Canada.

KINETICS NOISE CONTROL

Ovation Reflector Panels

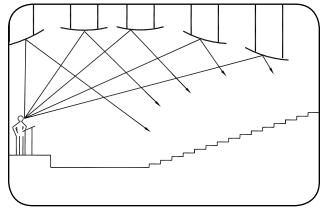


Ovation Reflector Panels create superior acoustics in auditoriums, performance spaces and lecture halls.



Designed for large spaces requiring improved sound directivity, strength, and timing of reflections from the ceiling area, this product is perfect for auditoriums, lecture halls, and performing arts centers.

Standard panels are constructed of a 1/2" plywood core that is finished with a fiber reinforced gel coat, these curved panels are ceiling-suspended with attachment points on the steel framing. Select from a wide range of colors. Laminate or hardwood veneer finishes are available on 3/4" plywood core. Ovation panels allow the designer to custom size large curved reflector surfaces. Typically 8' x



8' minimum sizes are recommended for broad band sound reflection. The sound reflector/diffuser is shipped as a flat panel and is bowed in the field to the architects' or acoustical consultants' specifications. The bowed surfaces produce more diffuse reflections and wider coverage.

Panel radius and dimensions are variable to meet both acoustical and design requirements. The angle of reflection is adjusted in the field using turnbuckle and cable suspension.



Over 50 years of success solving acoustics and noise control problems!

RMATON

О Ш Z

Description

Overhead acoustical reflector/diffuser.

Composition

- 1/2" plywood core with standard (stock) gel coat colors or optional custom colors
- Specify glossy (standard) or satin (optional) finish
- Also available with optional laminate facing or hardwood veneer on a 3/4" core board
- · Painted steel reinforcing angles
- Standard sizes up to 20' length with width varying between 9'-4" and 10' depending on desired finish
- Approximate weight varies based on panel size and type. Minimum 2-1/2 psf
- Optional: Absorber or mass layer on back side

Acoustical Performance

Sound Absorption per ASTM C-423.

Fire Test Data

- Standard: Gel Coat Finish, Class C rated per ASTM E84
- Special Option: Class A rated 4' x 10' maximum panel size with fire rated core and laminate face

Applications

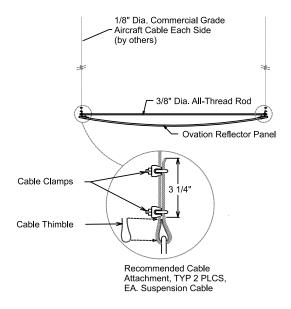
- Large spaces that require improved direction strength and timing of sound reflections to greatly enhance listening quality.
- Auditoriums
- Lecture Halls
- Performing Arts Centers
- Worship Spaces
- Music Rehearsal Spaces

Mounting

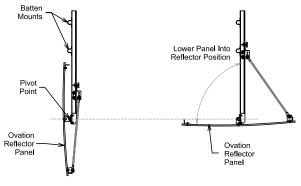
To be mounted following manufacturer's recommendations. See Kinetics' Product Installation Guide

Frequency, (Hz)	125	250	500	1000	2000	4000	NRC
J Mounting	0.15	0.00	0.03	0.04	0.05	0.14	0.05

Typical Installation



Retractable Option



Panel In Vertical Position

Panel In Horizontal Position

Download the Specification in CSI Masterformat at www.kineticsnoise.com

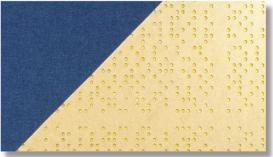


KINETICS NOISE CONTROL

Tuned Absorber/Diffuser (TAD) Panel



KINETICS™ Tuned Absorber/ Diffuser (TAD) Panel combines engineered acoustics and a choice of fabric or vinyl coverings to give you an excellent design solution where more balanced sound absorption and high frequency diffusion are desirable.



Place the Tuned Absorber/Diffuser where low and mid-frequency absorption is desired in conjunction with increasing reflectivity and diffusion in higher frequencies. The outstanding acoustical performance of this panel is the result of the assembly of a sound absorptive fibrous core covered with a variable impedance laminate. Openings in the laminate are sized and spaced to optimize the absorption in low to mid frequencies while creating random higher frequency reflective surfaces between openings (variable impedance). A design program is utilized to acoustically optimize the hole pattern in the laminate while maintaining the desired overall open versus reflective area in the panel surface. For increased low frequency sound absorption, a thicker fibrous core (2 to 4 inches) can be specified. For increased high frequency absorption, the hole size can be changed to 5/8 inch diameter versus the standard 1/2 inch opening.



6300 Irelan Place www.kineticsnoise.com

Description

A versatile absorber/diffuser panel wrapped in a wide selection of fabrics or vinyls. Available with hardened shaped edges. Engineered to control room acoustics with thicknesses from 1 to 4 inches and sizes up to 4 ft. x 8 ft. Standard sizes (in feet) are 2 x 2, 2 x 4, 4 x 4, 4 x 6 and 4 x 8. Custom sizes available.

Composition

œ

6-7 PCF density fiberglass core • Chemically hardened edges • Perforated laminate face with randomized pattern of 1/2 inch diameter holes, 5/8 inch optional • Fabric faced with factory in-stock fabric by Guilford of Maine, or factory-approved customer-selected material

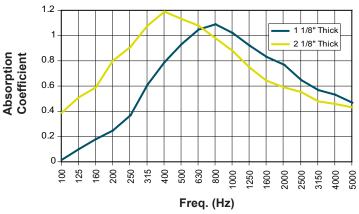
Acoustical Performance

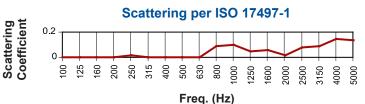
Panel Wrapped in woven polyester fabric.

1/3 Octave Center, Freq. (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
1-1/8" Thick with 5/8" Holes*	0.01	0.10	0.18	0.25	0.37	0.61	0.79	0.93	1.05	1.09	1.08	0.92	0.83	0.77	0.65	0.57	0.53	0.47
1-1/8" Thick with 1/2" Holes*	0.04	0.26	0.31	0.33	0.40	0.63	0.82	0.94	0.95	0.96	0.91	0.79	0.73	0.63	0.51	0.51	0.42	0.35
2-1/8" Thick with 1/2" Holes*	0.39	0.51	0.59	0.80	0.91	1.08	1.19	1.13	1.08	0.98	0.88	0.75	0.64	0.59	0.55	0.48	0.46	0.43
1-1/8" Thick with 1/2" Holes**	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.11	0.12	0.06	0.07	0.02	0.10	0.11	0.18	0.17

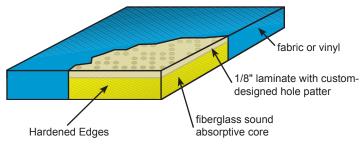
^{*}Absorption Coefficient per ASTM C423

Absorption per ASTM C423





Cross-Section of Tuned Absorber/Diffuser



Download the Specification in CSI Masterformat at www.kineticsnoise.com

Applications

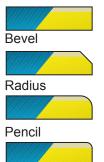
- Interior surfaces where superior acoustical performance is required.
- · Conference Rooms
- · Schools/Classrooms
- Auditoriums
- · Media and Multi-Purpose Rooms
- Churches
- · Office Spaces
- Reception Areas
- · Home Theatres
- · Pro Theatres

Mounting

HardSide Impaling Clips with Adhesive Rotofast Clips Z-Clips - movable Velcro - movable

Edge Options

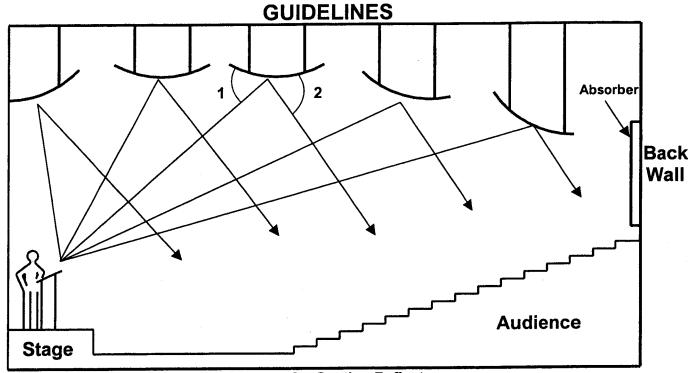
Square





^{**}Scattering Coefficient per ISO 17497-1

KINETICS OVATION ACOUSTICAL REFLECTORS DESIGN, LAYOUT



Ray Diagram for Ovation Reflectors

Coverage

The reflector panel layout, elevation and coverage area is critical to the performance of the space and the effectiveness of the overhead reflectors. A minimum percentage of coverage area would be 50% of the ceiling from the front of the stage to the rear wall of the auditorium. The maximum recommended coverage would be 70%. Open spaces between reflectors allow for coupling of the air volume above and below the reflectors. This maintains the desired effect from the overall room volume of the auditorium. Panel layouts more dense than 70% will not allow for acoustical coupling and desirable room reverberation will suffer.

Panel Position

Design so the entire surface of each reflector is visible from the stage (source) area. Angle reflectors so that sound reflections are projected to the audience, with emphasis on middle and rear seating areas. The angle of incidence (1) equals the angle of reflection (2) for sound reflections (See Ray diagram). Bowed reflectors provide greater sound diffusion and are especially useful for music.

<u>Panel</u> Size

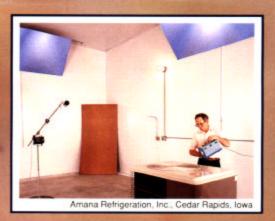
In regards to the size of the reflectors, we recommend the following. For speech programs, the minimum panel size should be 8 ft. x 8 ft., assuming that there are spaces between the panels. For musical performance, the panel size should be larger with minimums in the 10-12 ft. range for width and length. The reason for these size requirements is the nature of the various sound frequencies and the size of the sound waves being reflected. A sound wave of 250 Hz is almost 5 ft. in length and will easily move around smaller panels such as 4' x 6's or 4' x 8's. This is called sound diffraction and is not desirable where the goal is to reflect the sound with minimal energy loss to the audience. As sound waves become larger at low frequencies, particularly in music performance, larger panels are desirable.

Sound

Acoustical panels like Kinetics Model Hardside may be recommended to control back wall or Absorption side wall reflections. Absorptive fiberglass batt on the backside of the reflectors (optional) also reduces reverberation levels. The services of a qualified acoustical consultant are recommended for overall acoustic and noise control design in music performance spaces.



Anechoic and Reverberation Rooms





BULLETIN 7.0102.0



Aerospace Company



↑ Defense Research Agency, 'Aquila', Bromley, Kent, England



TNASA's Langley Research Center, Hampton, Virginia







Microdyne™ Anechoic Rooms and Macrodyne™ Reverberation Rooms

In this brochure, we combine technical data, discussions, and illustrations on several types of Microdyne Anechoic Rooms (or Free-Field Rooms) and Macrodyne Reverberation Rooms:

- Anechoic¹ and Hemi-Anechoic¹ Rooms with foam or glass-fiber wedges.
- Anechoic Rooms with Metadyne™ Rugged metal protected wedges.
- Anechoic Rooms with specially designed level PlanarCHOIC™ Modules.
- · Mini-Anechoic Rooms.
- Macrodyne Reverberation Rooms.

Institutions, universities, colleges and corporations frequently require both anechoic and reverberation room facilities.

Since 1949, Industrial Acoustics Company (IAC) has designed and constructed thousands of acoustic test facilities including more than 150 large and small Anechoic Rooms and Reverberation Rooms.

These controlled environments encompass a wide range of performance specifications – from simple quality control requirements to elaborate, high precision acoustic measurements.

IAC's design engineers and research physicists bring a wealth of experience to provide data for an informed decision on how to select free-field anechoic rooms and diffused-field reverberation rooms.

We will be happy to furnish additional infor-

A Hemi-Anechoic' Room is the same as an Anechoic, except floor is usually sound reflective and load bearing. Inverse square law tolerances for both room types are shown in Table 1, page 2.

*The ISO Standards refer to Anechoic and Semi-Anechoic Rooms.

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Any acoustical 'firsts' are most likely to come from IAC, a pioneer in noise control and acoustical engineering since 1949. For instance, IAC Anechoic Metadyne Metal Protected Wedges are being introduced on page 6. When IAC customizes and fabricates your Anechoic and/or Reverberation Rooms, you will have the highest quality and most advanced test facilities available.

Note: Though we offer standardized Reverberation Rooms, Mini and large Walk-In Anechoic Rooms, IAC has longtime, proven expertise in 'specials' custom-designed for specific acoustical and dimensional requirements.

Please do not hesitate to contact us for further information.

¹We are following the International Standards Organization, ISO, terminology *defining* an Anechoic Room as one with free-field materials on all walls, ceiling, and floor. (We use 'anechoic' and 'free field' interchangeably).

Microdyne™ Anechoic Rooms

WHAT IS AN ANECHOIC ROOM?

An anechoic room can be considered analogous to a precision acoustical measurement instrument providing a freefield environment without noise interference.

An acoustical free-field exists in a homogeneous, isotropic medium in which reflecting boundaries, or their effects, are absent. In an ideal free-field environment, the inverse square law would function perfectly. This means that the sound level from a spherically radiating sound source decreases six decibels (6 dB) for each doubling of distance from the source. A room designed and constructed to provide such an environment is called an anechoic room.

An anechoic room also provides a quiet environment free from excessive variations in temperature, pressure, and humidity. Outdoors, local variations in these conditions, as well as wind, can significantly and unpredictably disturb the uniform radiation of sound waves. This means a true acoustical free field is only likely to be found inside an anechoic room.

For a free field to exist with perfect inverse square law characteristics, room boundaries must have a sound absorption coefficient of unity at all angles of incidence. However, in practical anechoic rooms, deviations from inverse square law are to be expected. Permissible tolerances are shown in Table 1.

The aerospace, aviation, ground transportation, communications, electronic, business machinery, computer, automotive, and trucking industries utilize anechoic rooms for the development of quieter products. Medical research facilities, including colleges and universities, are also primary users for such acoustical environments.

CONSTRUCTION OF ANECHOIC ROOMS

For anechoic rooms to function well, a number of acoustical, mechanical, electrical, and aerodynamic considerations apply. These may include some, or all, of the following:

- · Room size vs test object size (page 7).
- Anechoic treatment selection.
- · Cut-off frequency.
- Inside acoustic ambient.
- · Noise reduction.
- Vibration isolation.
- · Silenced ventilation systems.
- Anechoic doors operation and sizes.
- · Interior floors cables and/or gratings.
- Lighting and electrical systems.
- Overall structural design considerations.
- RF shielding requirements.

Microdyne Anechoic Rooms are constructed from the Moduline® Component System, used in thousands of installations, consisting of acoustically rated walls, ceilings, floors, doors, windows, ventilation silencers, and vibration isolators.

These rugged, metal-clad, incombustible, building components are linked together into unified structures by means of pre-engineered Moduline joiners to assure acoustical, structural, and mechanical integrity. IAC's Moduline literature provides comprehensive acoustical and structural data on Moduline Noishield® and Noise-Lock® components.

NOISE AND VIBRATION ISOLATION CHARACTERISTICS

A well-constructed room must provide good sound isolation against outside noise so that resulting inside sound will not invalidate acoustic measurements. This may require the use of single- or double-wall construction (Fig. 1) with appropriately designed vibration isolation to adequately reduce air and/or structure borne noise transmission. For best results, anechoic rooms should be individual structures separate from any building walls.

INVERSE SQUARE LAW DEVIATIONS

According to ISO Standard 3745, "an anechoic room provides the preferred environment for measurements with the smallest uncertainty".

Permissible deviations from the theoretical inverse square law are shown below.

TABLE 1 – Maximum Allowable Differences Between the Measured and Theoretical Levels

Type of Room	1/s Octave Band Center Frequency, Hz	Allowable Differences, dB		
Anechoic or Free-Field	<630 800 to 5,000 >6,300	± 1.5 ± 1.0 ± 1.5		
Hemi-Anechoic or Simulated Free-Field	<630 800 to 5,000 >6,300	± 2.5 ± 2.0 ± 3.0		

FREE-FIELD WEDGES

Sound absorption coefficients are a function of frequency and are critically dependent on type of material, its thickness, and configuration. The low-frequency sound absorption of a material such as an anechoic wedge for sound at normal incidence can be measured in a device called an impedance tube. The lowest frequency at which a material has a normal incidence sound absorption coefficient of 0.99 is called its cut-off frequency.

However, the controlling parameter for a well functioning anechoic room is its inverse square law performance. One practical well-proven method to achieve a free-field is to shape sound-absorbing material into wedge configurations for mounting onto the interior surfaces. The cut-off frequency

1

Noise Reduction curves for Schedule 40 and Schedule 60 Sound Isolation Rooms measured without anechoic wedges. Additional attenuation will be realized depending on depth of anechoic treatment used. Other variables depend on the degree of low-frequency vibration present in the floor structure, the location of the room inside a specific noise field, and the quality of room assembly.

2

Inverse Square Law Curves demonstrate the excellent performance characteristics of IAC Microdyne™ Anechoic Rooms — (internal clear dimensions: 32 ft-0 in. x 26 ft-0 in. x 24 ft-6 in. high [9754 x 7925 x 7468mm], Glassfiber wedges, Cut-off frequency 70 Hz.)

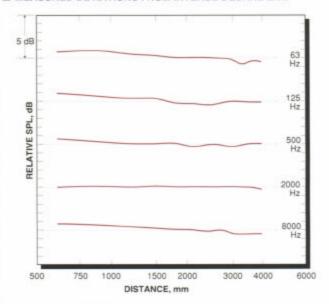
3

Approximate wedge depths and corresponding cut-off frequencies are shown in Table. IAC will determine precise dimensions through tests in a large impedance tube (24 in. x 24 in. x 288 in. long — 610 x 610 x 7315mm) in conjunction with the actual glass-fiber or foam materials to be used.

4

Inverse Square Law Curves for Microdyne Simulated Open-Field or Hemi-Anechoic Rooms also demonstrate acoustical performance well within specified tolerances of applicable ISO Standards — (internal clear dimensions: 20 ft-0 in. x 33 ft-0 in. x 12 ft-0 in. high [6096 x 10058 x 3658mm]. Foam wedges. Cut-off frequency 75 Hz.)

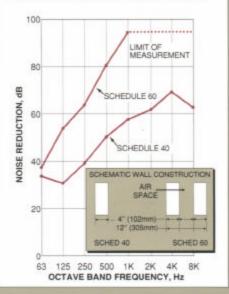


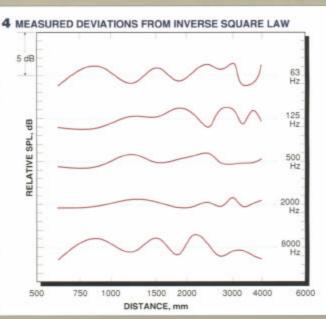


3 APPROXIMATE WEDGE DEPTHS

Cut-Off Frequency, Hz	60	75	90	100	125	150	200	250
Wedges Mounted on Hard Wall, in. mm	51 1295	46 1168	41 1041	381/2 978	33 838	281/2 724	21 533	17 432
Wedges Mounted on Moduline® Panel, in. mm	47 1194	42 1067	37 940	34¹/2 876	29 737	241/2 622	17 432	13 330

1 NOISE REDUCTION WITHOUT WEDGES





of this configuration is inversely proportional to the depth of the wedge.

IAC's 24 in. x 24 in. x 288 in. long (610mm x 610mm x 7315mm) impedance tube is used for critical adjustment of wedge dimensions before finalizing each design.

Due to variations in material characteristics, statistical quality control procedures are employed during wedge production to assure specified acoustical performance. This may result in small dimensional changes. When wedges are mounted on a sound-absorptive IAC Noise-Lock® panel, its depth can be shortened, thereby reducing room dimensions and costs.

IAC MICRODYNE™ ANECHOIC ROOMS

Schedule 60 (Dual wall) Construction

The IAC Microdyne Schedule 60 Anechoic Room is designed for the research physicist or engineer who must make precise sound measurements in a free-field acoustical environment. The Microdyne Schedule 60 Anechoic Room provides high sound transmission loss (TL) characteristics and a completely anechoic wedge-lined interior to meet these requirements.

For maximum sound isolation, the IAC Schedule 60 Microdyne Anechoic Room is designed as a room-within-aroom structure, featuring IAC Noise-Lock Moduline® components. The inner room is set on a vibration isolation system created for the specific weight and frequency cut-off of the room.

Schedule 40 (Single wall) Construction

The IAC Microdyne Schedule 40 Anechoic Room is designed for applications and locations where the noise reduction characteristics of Schedule 40, single-wall and ceiling construction, provide adequate noise isolation.

The single-wall construction results in smaller outside dimensions and is particularly suitable for placement in less noisy areas. In every other respect this series is similar to the Microdyne Schedule 60 series; the same standard and optional features apply.

IAC MICRODYNE HEMI-ANECHOIC ROOMS

The IAC Microdyne Schedule 60 and Schedule 40 Hemi-Anechoic Rooms, double- and single-wall structures respectively, are used for sound level measurements in a space which, except for reflective ground conditions, provides free-field environments. This results in hemispherical radiation patterns for sound waves emanating from a source. Such an environment is particularly suitable for the acoustical testing of road or floor-mounted equipment such as automobiles, trucks, tractors, fork-lifts, stationary engines, office machinery and computers as may be required by certain measurement standards.

The IAC Microdyne Hemi-Anechoic Rooms are available in Schedule 60 and Schedule 40 designs with, and without, IAC Acousti-Flote™ Floor Systems. Since no floor wedges are used, these rooms can often be erected on existing concrete floors when vibration isolation is not required.

Except for the floor, IAC Microdyne Hemi-Anechoic Rooms are equipped with the same standard features and options as the Microdyne Anechoic versions. Hemi-Anechoic Rooms are also referred to as Simulated Open-Field Rooms.

The use of Microdyne Anechoic Rooms combined with up-to-date sound pressure and intensity instrumentation enhances the quality, accuracy, and repeatability of acoustical measurents. High precision instrumentation, to be fully effective, requires highest quality anechoic rooms, reverberation rooms, and other test environments.

STANDARD FEATURES

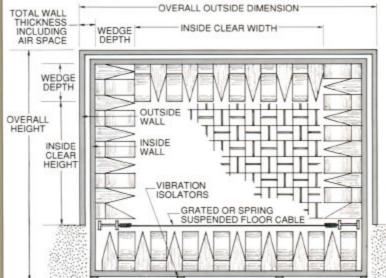
Microdyne Anechoic and Hemi-Anechoic Rooms come equipped with the following features:

- Anechoic glass-fiber wedges with required low frequency cut-offs.
- Double- or single-wall and ceiling construction.
- IAC Tranquil-Aire® Ventilation Systems coupled to building supply.
- · Lighting, interior minimally acoustically reflective.
- · Tubular cable ports.
- Interior non-reflective cable floor above floor wedges for fully Anechoic Rooms. Nylon catch net below the cable floor.
- IAC Acousti-Flote Floor System with 61/2 Hz, rubber-inshear vibration isolators for fully anechoic room.
- One 36 in. x 84 in. (914mm x 2134mm) clear opening Noise-Lock Wedge Door.

OPTIONS

- · Glass-fiber wedges with fabric or wire mesh protection.
- · Foam wedges.
- Metadyne[™] Anechoic Wedges protected with perforated metal casings, patent pending, (see page 6).
- PlanarCHOIC™ treatment where suitable, (see page 7).
- Floor grating for heavier loads.
- · Additional or larger Noise-Lock Doors.
- Access panels for equipment and test openings.
- Acousti-Flote Floor for Hemi-Anechoic Rooms.
- Double IAC Acousti-Flote Floor for Schedule 60 Rooms.
- Air mounts, springs or other type vibration isolators.
- · Independent ventilation system.
- · RF shielding.

MICRODYNE™ ANECHOIC AND HEMI-ANECHOIC ROOMS



Schedule 40 Microdyne Hemi-Anechoic Room – Similar to Schedule 60, except outer room and wedge/cable floor eliminated (Acousti-Flote™ Floor optional).

Schedule 60 Microdyne Anechoic Room – Doors, ventilation system, lighting fixtures not shown.

FIGURE 1

TABLE 2 - ANECHOIC ROOMS WITH ACOUSTI-FLOTE FLOOR, 125 Hz CUT-OFF

	Innida	Dimensions	. H mm		Schedule 40				Sche	dule 60	
Model No.	inside	Dimensions	s, it min	Outside	Dimension	s*, ft mm	Weight,	Outside	Dimension	s*, ft mm	Weight,
NO.	Length	Width	Height	Length	Width	Height	Ib kg	Length	Width	Height	lb kg
A-1	8'-0" 2,438	6'-0'' 1,829	7'-0'' 2,134	13'-6" 4,115	11'-6" 3,505	13'-3'' 4,039	10,700 4,850	14'-10'' 4,521	12'-10" 3,912	13'-11" 4,242	17,900 8,100
A-2	10'-0" 3,048	7'-0" 2,134	8'-0'' 2,438	15'-6" 4,724	12'-6" 3,810	14'-3'' 4,343	13,300 6,050	16'-10'' 5,131	13'-10" 4,216	14'-11" 4,547	21,800 9,900
A-3	12'-0" 3,658	10'-0" 3,048	8'-0'' 2,438	17'-6" 5,334	15'-6" 4,724	14'-3'' 4,343	17,300 7,850	18'-10" 5,740	16'-10" 5,131	14'-11" 4,547	27,100 12,300
A-4	15'-0'' 4,572	12'-0" 3,658	8'-0'' 2,438	20'-6" 6,248	17'-6'' 5,334	14'-3'' 4,343	21,600 9,800	21'-10" 6,655	18'-10" 5,740	14'-11" 4,547	33,800 15,300
A-5	20'-0'' 6,096	15'-0'' 4,572	10'-0" 3,048	25'-6" 7,772	20'-6" 6,248	16'-4'' 4,978	31,400 14,250	26'-10" 8,179	21'-10" 6,655	17'-0" 5,182	49,600 22,500

*Outside dimensions do not include ventilation silencers or structural components.

TABLE 3 - HEMI-ANECHOIC ROOMS, NO ACOUSTI-FLOTE FLOOR, 125 Hz CUT-OFF

	Incide	Dimensions	. 64		Sche	dule 40			Sche	dule 60	7/
Model No.	inside	Dimensions	, it min	Outside	Dimension	s*, ft mm	Weight,	Outside	Weight,		
140.	Length	Width	Height	Length	Width	Height	lb kg	Length	Width	Height	lb kg
S-1	15'-0" 4,572	12'-0" 3,658	10'-0" 3,048	20'-6" 6,248	17'-6'' 5,334	12'-9'' 3,886	17,500 7,950	21'-10" 6,655	18'-10" 5,740	13'-5'' 4,089	28,600 13,000
S-2	20'-0'' 6,096	15'-0'' 4,572	10'-0" 3,048	25'-6" 7,772	20'-6" 6,248	12'-9'' 3,886	23,000 10,400	26'-10'' 8,179	21'-10" 6,655	13'-5" 4,089	37,400 17,000
S-3	25'-0'' 7,620	20'-0'' 6,096	12'-0" 3,658	30'-6" 9,296	25'-6'' 7,772	14'-9'' 4,496	34,000 15,400	31'-10'' 9,703	26'-10" 8,179	15'-5" 4,699	54,000 24,500
S-4	40'-0'' 12,192	30'-0'' 9,144	14'-0'' 4,267	45'-6'' 13,868	35'-6'' 10,820	16'-9'' 5,105	65,500 29,700	46'-10'' 14,275	36'-10" 11,227	17'-5" 5,309	100,000 45,500
S-5	50'-0'' 15,240	40'-0'' 12,192	16'-0'' 4,877	55'-6'' 16,916	45'-6'' 13,868	18'-9'' 5,715	98,800 44,800	56'-10'' 17,323	46'-10" 14,275	19'-5" 5,918	150,000 68,000

*Outside dimensions do not include ventilation silencers or structural components. Add 7 in. (178mm) if Acousti-Flote Floor is required.

METADYNE™ ANECHOIC PROTECTED WEDGES

Metadyne Anechoic Wedges, another IAC 'first', provide acoustical performance of the highest standard and are fully encapsulated in perforated metallic casings. Features include:

- · Impact resistance.
- · Resistance to erosion and circulation of fibrous materials.
- · Readily cleanable and paintable surfaces.
- High fire-resistance (in case of oil spills or use of flammable wedge materials).
- · Interchangeability and adjustability.

The rugged wedge construction and its long life cycle offer advantages to laboratories working with heavy equipment and/or flammable materials.

Fig. 2 shows that Metadyne Anechoic Wedges for Hemi-Anechoic Rooms provide deviations from theoretical freefield inverse square law well within ISO Standards per Table 1 on page 2. Fig. 3 shows Metadyne room at Ford Motor Company.

This new design was developed in the IAC Aero-Acoustic Laboratories in New York City where a hemi-anechoic prototype room, fully treated with Metadyne wedges, was constructed. as shown in Fig. 4. This room is available for inspection and demonstration.

The new wedge construction, together with the inverse square law data obtained, was studied by Ford Motor Company. Because of excellent acoustic performance, safety, and maintenance features, twelve large Microdyne Hemi-Anechoic Rooms equipped with Metadyne Wedges were purchased.

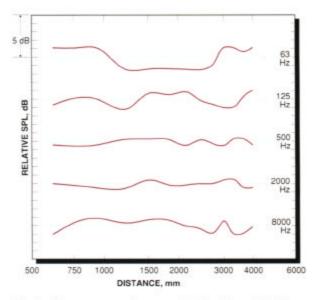
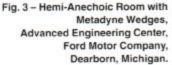


Fig. 2 – Inverse square law curves for Hemi-Anechoic Room with Metadyne Wedges fall well within acceptable ISO tolerance standards. Inside clear dimensions: 21 ft-1 in. x 31 ft-2 in. x 11 ft-10 in. high (6426 x 9500 x 3607mm). Cut-off frequency 60 Hz.



Fig. 4 – Prototype hemi-anechoic room fully treated with Metadyne Wedges at IAC Aero-Acoustic Laboratory in New York. Inside clear dimensions: 8 ft-2 in. x 12 ft-2 in. x 6 ft-10 in. high (2489 x 3708 x 2083mm).





PlanarCHOIC™ FREE-FIELD ROOMS

These IAC Hemi-Anechoic Rooms, usually in relatively large sizes, can be placed on hard floors in the absence of structurally transmitted vibration and noise. They are suitable for sound measurements of cars, truck cabs, fork-lifts, construction equipment, transformers, and other equipment. Several car and truck manufacturers use PlanarCHOIC Rooms.

PlanarCHOIC Rooms, while maximizing space utilization, come with specially engineered, planar anechoic modules with perforated metal surfaces. They are available in Schedule 40 or Schedule 60 construction.

Special care must be taken in the relationship of PlanarCHOIC Room volume to test object dimensions to assure a free-field measurement environment. Also, correctly specified measurement locations are essential for accuracies as in Table 1. Features are the same as for Metadyne™ Wedges, (p. 6).

PlanarCHOIC measured inverse square law plots and room are shown in Figs. 5 and 6, respectively. (See page 3 for noise reduction data.)

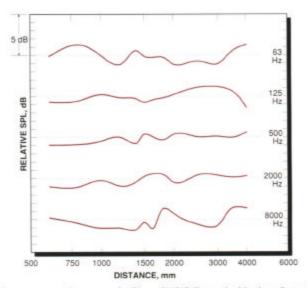


Fig. 5 – Inverse square law curves for PlanarCHOIC Room; inside clear dimensions: 59 ft-5 in. x 29 ft-5 in. x 15 ft-0 in. high (18110 x 8966 x 4572mm). Cut-off frequency 63 Hz.

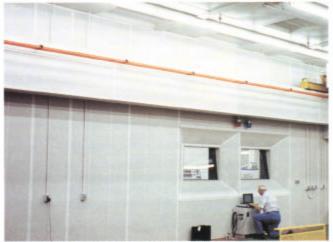


Fig. 6 - Typical PlanarCHOIC Room with Noise-Lock® Observation Windows.

ROOM SIZE vs TEST OBJECT SIZE

According to ISO Standard 3745, the preferred volume of the test object should be less than 0.5% of the working volume of the room:

"To make measurements in the far radiation field of the source, it is recommended that the volume of the test room be at least 200 times greater than the volume of the source whose sound power level is to be determined."

If the ratio of the cubical test object (Tv) to the cubical volume of the test room (Lv) is $Tv^3/Lv^3 \le 0.005$, the following equation can be developed:

where: L = room length, width, or height, meters

> T = test object length, width, or height, meters

It is clear from this relationship that for large test objects the anechoic room dimensions could become impractical and/or very expensive. However, ISO Standards also require near-field measurement positions no closer than 1 meter from test object and 1/4 wavelength from anechoic treatment.

The following equations can therefore be useful in determining anechoic-room dimensions for measurements at one meter from a hypothetical rectangular parallelepiped enclosing the test object –

Length or width of Anechoic Room:

$$L = T_1 + \lambda/2 + 2 \qquad \text{Eq. 2}$$

where: L = minimum room length or width, meters

T₁= maximum length or width of test object, meters

λ = wavelength of cut-off frequency, meters

Height of Anechoic Room:

$$H = T_2 + \lambda/2 + 2$$
 Eq. 3

where: H = minimum height of test room, meters

T₂= maximum height of test object, meters

 = wavelength of cut-off frequency, meters

For Hemi-Anechoic Rooms, height becomes:

$$H = T_2 + \lambda / 4 + 1$$
 Eq. 4

The hemi-anechoic room height cannot be cut in half, relative to the fully anechoic room, since the test object must always have a vertical dimension.

Based on numerous installations, anechoic rooms designed in accordance with equations 2, 3, and 4 have excellent nearfield measurement characteristics. Test reports and other information available on request.

MINI-MICRODYNE™ ANECHOIC ROOMS



Single and Multi-Compartment Mini-Anechoic Rooms are used for new product development and quality control testing of small components such as computer disc drives, timers, small electric motors, small fans, audio-video production and recording devices, health-care examination and diagnostic equipment, automotive components and accessories, small household appliances, and other components not requiring large walk-in rooms.

A microphone is connected to an outside sound-level meter and/or other monitoring instrumentation. The soundgenerating component is placed on a grating or suspended from a hanger.

The room is positioned on vibration isolators to minimize structural noise transmission. It includes wall penetrations to accommodate cables, contact wiring, and other connections for monitoring and testing.

Acoustical and Construction Data, Mini-Anechoic Model 5656*

Outside: 56 in. x 56 in. x 80 in. high (1422 x 1422 x 2032mm). Inside Space: 36 in. x 36 in. x 60 in. high (914 x 914 x 1524mm)

between wedge tips.

Construction: 4 in. (102mm) thick Noishield® modules with solid, cold-rolled textured steel outside.

Weight: 1750 lb (795 kg).

Cut-Off Frequency of foam wedges: 300 Hz. Noise Reduction: outside-to-inside NIC 50.

Color: Desert Sands.

*Other models can be designed to meet specific requirements.

MULTI-COMPARTMENT MICRODYNE MINI-ANECHOIC ROOMS



Multi-Compartment Mini-Anechoic Rooms are designed for testing a number of components simultaneously; quality control of components produced in quantity is one example.

A compartmentalized unit may be more economical to purchase and operate than several free-standing individual booths. Two, three, four, or more compartments can be provided; all mounted on vibration isolators to minimize structural noise transmission

Also included are wall penetrations to accommodate cables, control wiring and connections. Rooms are shipped assembled and ready for service.

Acoustical and Construction Data, Standard 4-Compartment Mini-Anechoic Model 6868*

Outside: 68 in. wide x 68 in. high x 3613/16 in. deep

(1727 x 1727 x 935mm).

Inside Space: 20 in. (508mm) each in width, height and depth

between wedge tips per compartment.

Construction: 4 in. (102mm) thick Noishield® modules

with solid, cold-rolled textured steel outside.

Weight: 1600 lb (726kg).

Cut-Off Frequency of foam wedges: 300 Hz. Noise Reduction: outside-to-inside NIC 50.

Noise Reduction Between Compartments: NIC 45.

Color: Desert Sands.

*Other models can be designed to meet specific requirements.

All Mini-Anechoic Rooms are shipped assembled and ready for service.

SILENCERS DUIET-DUCT®



Engineered Noise Control for Air Handling Systems

Featuring:

QUIET-DUCT ULTRA™ SERIES

COMMERCIAL™ SERIES

CONIC-FLOW™ SERIES





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Sporation and maintenance Tritining	HMS
Out at Duct IIItus IV /I am	HLFL
Quiet-Duct Ultra™ /Low	HML
ULS111	HL
ULS2	nL03
ULS315	
ULM1	Quiet-Duct Conic Flow®
ULM219	FCS
ULM321	FCL89
ULL 1	CS91
ULL2	CL
ULL3 27	NS95
	NL97
Quiet-Duct Ultra™ /Green	D. D D
UGLFS	D-Duct Diffuser
UGLFM31	D-Duct 99
UGLFL	D-Duct99
UGS	
UGMS	Ultra-Pals™ Packless
UGML	
UGL	XM101
OGE	XL103
0 1 1 D 1 III TV /74 D D	KL
Quiet-Duct Ultra™ /ZAPD	KM107
764	TXS /TXL
Z6A	TXLB111
Z6C	
Z6D	Quiet-Duct® Elbow Silencers
Z6E	ELB113
Z9A	ELBM

QUIET-DUCT SILENCERS

with FORWARD and REVERSE FLOW AERO-ACOUSTIC

RATING CERTIFIED

in accordance with

ASTM E 477 and **ISO 7235**

and BRITISH STANDARD 4718

ENGINEERED
NOISE
CONTROL
FOR
AIR-HANDLING
SYSTEMS



IAC SILENCERS: LABORATORY TESTED AND FIELD PROVEN

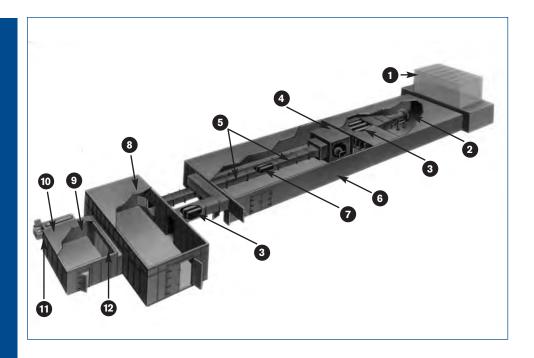
IAC America offers the broadest range of silencers in the industry. New additions within this manual include the Modular Elbow Silencer and the new Quiet-Duct Ultra Series. Performance data for these silencers is based on NVLAP-accredited laboratory tests conducted in strict accordance with ASTM E477-99

The ELB Modular Elbow Silencer features the capability to both nest and stack elbow silencer modules so the size is scalable while aerodynamic and acoustic performance are maintained. The silencer is cost-effective and can accept added acoustic extension sections.

The Quiet-Duct Ultra™ /Low line of silencers offers the industry's first published and guaranteed performance data in the 31.5 Hz full-octave-band center frequencies. The tests were conducted using scale modeling developed by IAC America in cooperation with K. Uno Ingard, co-author of Theoretical Acoustics.

The Quiet-Duct Ultra™ /Green line was developed in response to the trend for environmentally friendly building products. This 100% environmentally friendly attenuation solution uses recycled acoustic fill material and delivers performance that meets or exceeds that of a standard Quiet-Duct silencer.

The Quiet-Duct Ultra™ /ZAPD line was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer is ideal for high velocity systems or systems that have little or no room for additional pressure drop.



IAC AMERICA'S NVLAP-RATED LABORATORY

Given today's highly specialized markets, it is essential that an engineering and manufacturing organization operate its own development and test facilities to advance the existing technology and assure the quality of its products.

IAC America's labs are accredited for nine tests under the National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program (NVLAP). IAC's research and development team continuously designs new products and reengineers existing products to address unique noise-control requirements. The IAC laboratory provided a major impetus for the ASTM standard method of testing (E477-99) for prefabricated silencers. All IAC silencers are tested in accordance with applicable portions of the ASTM, British, and International Industry Standards.

The wind tunnel and reverberation room combined, measure more than 160 ft. (48.8m) long. Silencers as large as 50 in. (1524mm) in diameter and 120 in. (3048mm) in length have been tested in IAC America's aero-acoustic laboratory.

- Removable hatch-in roof for testing silencers up to 10 ft. x 10 ft. (3.05m x 3.05m) cross section
- 2. 25,000 cfm (42,480m³/hr) vane-axial fan
- 3. Systemic silencer
- 4. Plenum with loudspeaker and flow diffuser
- 5. Test unit pitot tube ports
- 6. Super-Noise-Lock® housing
- 7. Test silencer
- 8. 10,000 ft³ (283m³) reverberation receiving room
- 9. 3,000 ft³ (85m³) reverberation source room
- 10. 3 in. (76mm) impedance tube
- 11. 24 in. x 24 in. (610mm x 610mm) anechoic wedge impedance tunnel
- 12. 14 ft. x 9 ft. (4.3m x 2.7m) test frame for transmission loss tests

IAC America's aero-acoustic research center permits forward- and reverse-flow dynamic insertion loss, self-noise, and pressure drop rating of silencers and other elements in closed-loop wind tunnels and other facilities. Dual reverberation rooms permit testing of system components or assembled air handling units.

Because they are laboratory developed and tested under controlled conditions, all of IAC's duct silencers provide effective, predictable noise reduction. They are manufactured to specific metal tolerances and with controlled acoustic infill flow resistances to achieve consistent results.

To assure consistency, production line silencers are periodically tested in IAC's aero-acoustic laboratory. This practice of quality control performance testing ensures that all silencers exhibit catalogued Dynamic Insertion Loss (DIL), Self-Noise (SN), and Pressure Drop Performance Data. IAC always guarantees the in-field performance of the specification.

MILESTONES IN LABORATORY TESTING AT IAC

1963

IAC builds the first full-sized dynamic duct-to-reverberant room test facility.

1965

IAC offers duct silencers accurately rated for acoustic performance with air flowing through them.

IAC introduces the terms "Dynamic Insertion Loss" (DIL) and "Self Noise" (SN).

1972

IAC confirms the in-field performance of its first product developed with model-testing.

IAC adds testing in the reverse flow mode.

1974

The laboratory is moved to IAC America's current facility, equipped with a controllable-pitch, vaneaxial fan, and made part of a closed-loop system.

1981

A series of new vane-axial fan diffuser silencers is developed with complete aerodynamic and acoustic ratings.

1984

IAC develops a new low-frequency resonator silencer with substantial sound attenuation below 90 Hz.

1986

LF low-frequency and tubular packless lines of silencers are developed.

1991

IAC achieves significant improvement in techniques for predicting low-frequency performance of power flow splitter silencers.

1996

Most standard silencers are retested for quality control and to support domestic and overseas business.

NVLAP accreditation maintained for six standard testing procedures.

1997

New Sentry™ Quiet-Duct TLS and RFS silencers meet STC ratings of critical environments and offer the added advantage of RF shielding.

2003

IAC's new Quiet-Elbow[®] modular system enables silencer banks to be economically constructed from standard-size elbow modules while ensuring consistency and repeatability of acoustic and aerodynamic performance.

2004

The IAC Aero-Acoustic Laboratory begins offering thirdparty testing services.

2005

Quiet-Duct Ultra™ /Low silencers introduced.

Quiet-Duct Ultra™ /Green silencers offer 100% environmentally friendly attenuation solutions.

2006

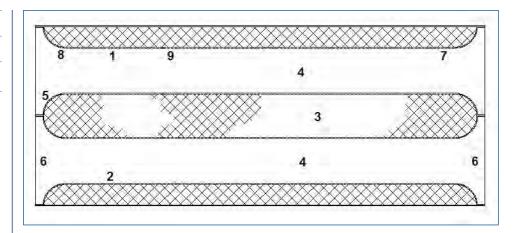
Quiet-Duct Ultra™ /ZAPD silencers are introduced.

IAC: LEADERSHIP IN SILENCER DEVELOPMENT AND TECHNOLOGY

PERFORMANCE: DUCT LINING VS. SILENCER

A question frequently asked by our customers is whether duct lining alone can provide sufficient attenuation from noise handling equipment. In most cases the answer is "no."

As an example based on the guide-lines from the 1999 ASHRAE
Fundamentals Handbook, in the 250
Hz octave band, an 18 in. x 54 in.
duct would require 57 feet of one-inch-thick, 1.5 lb/ft.³-density, surface-coated, duct-liner material to achieve as much insertion loss (i.e. 32 dB) as one five-foot-long IAC 5 LFS Silencer.
In the lower frequencies, such as 125
Hz, even greater lengths of duct lining would be required to achieve the 10 - 20 dB insertion loss typically achievable by many of the broad range of IAC silencers including the LFS series.



DYNAMICS OF DUCT SILENCER DESIGN

Proper structural design assures long, trouble-free life. The attributes of a typical Quiet-Duct Silencer include:

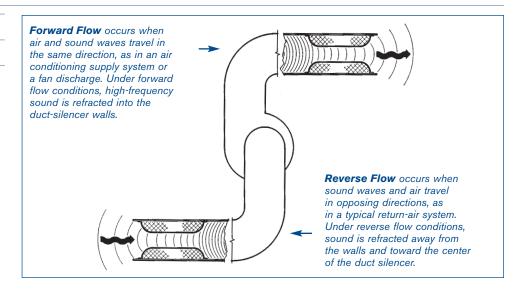
- 1. Die-formed, single-piece splitter construction throughout.
- 2. Shell-noise radiation minimized by double-skin or splitter construction in most models.
- Acoustic baffles designed for maximum attenuation at low frequencies, the toughest job of all.

- Straight-through air passages designed for maximum air handling at minimum pressure drop.
- 5. Solid, rounded noses that increase noise reduction.
- Bell-mouth entrance and exit to minimize turbulence, pressure drop and self noise.
- 7. No protruding fastener heads to cause turbulence or self-noise.
- Solid air-impingement surfaces and self-cleaning air passages to minimize dirt entrapment.
- Acoustic fill protected against erosion by perforated metal containments.

FORWARD AND REVERSE FLOW

In 1972, IAC developed silencer Dynamic Insertion Loss and Self-Noise ratings both under Forward Flow (+) and Reverse Flow (-) conditions for rectangular and cylindrical silencers.

Since attenuation values are generally higher in the first five octave bands in the reverse flow mode compared to the forward flow mode, more economical silencer selections can often be made on return air systems.



A COMPLETE FAMILY OF SILENCERS

All of IAC's silencers were developed in response to specific requirements from acoustical consultants, consulting engineers, owners, and contractors. Having been pre-tested for performance, they provide the most economical

choices for solving the wide variety of noise control problems encountered in HVAC engineering.

IAC standard, rectangular silencercross sections range from 6 in. x 6 in. to 48 in. x 48 in. For small mains, branches, and duct run-outs, module sizes fit every need. When large silencer banks are required, multiple-module assemblies can be arranged to provide almost limitless dimensional flexibility.

SILENCER	APPLICATION
Quiet-Duct Ultra™ /Low	For conventional applications where guaranteed performance is required down to 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring full octave band performance to match specific sound sources.
Quiet-Duct Ultra™ /Green	A 100% environmentally friendly attenuation solution. Silence is achieved through the use of recycled acoustic fill material. Ideal for any clean and green application.
Quiet-Duct Ultra™ /ZAPD	For applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer is ideal for high velocity systems or systems that have little or no room for additional pressure drop.
Quiet-Duct Commercial Series	For conventional applications including low frequency. Silencers are specifically engineered to enhance insertion loss in the 63 Hz, 125 Hz, and 250 Hz octave bands.
Clean-Flow Rectangular Silencers	For systems requiring a higher degree of cleanliness and hygiene such as in hospitals or clean rooms. Linings on the fill material guard against erosion of particulate matter into the air-stream. Specific internal construction features protect the lining against chafing or premature failure and are necessary to maintain the rated aero-acoustic performance.
Conic-Flow® Tubular Silencers	For silencer applications including low frequency. Silencers are specifically engineered to enhance insertion loss in the 63 Hz, 125 Hz, and 250 Hz octave bands.
D-Duct™ Acoustic Diffuser Silencers	For use on axial-fan systems. The combined interior diffuser cone and exterior square jacket casing make these units aerodynamic-regain devices as well as silencers.
Ultra-Pals™ Rectangular Packless Silencers	The ultimate solution for ultra-clean environments and corrosive/flammable environments. The complete absence of fill makes Ultra-Pals Packless Silencers ideally suited for any application where particulate matter or fiber erosion from conventional fill materials could contaminate the air/gas streams.
	The complete absence of fill, combined with ease of cleaning and draining, make Ultra-Pals™ Silencers ideal in corrosive/flammable environments and for facilities handling gasoline, grease, solvents, and other hazardous materials.
Ultra-Pals Tubular Packless Silencers	For small-diameter circular duct systems such as fume hoods. Additionally, the packless design of these units makes them equally applicable to the types of systems mentioned for the Rectangular Ultra-Pals Silencers.

IAC: ONE STOP FOR SILENCER INFORMATION AND SPECIFICATION

BENEFITS OF PASSIVE SILENCER DESIGN

All of the silencers manufactured by IAC are of passive design which means that they do not require mechanical or electrical means to function. They work by providing a trouble-free static means for dissipating sound energy by converting it into minute quantities of heat.

Passive silencers provide low first-cost, simple installation, and maintenance-free lifetime operation to make them the natural choice in HVAC-engineered noise control.

SOURCES OF DESIGN INFORMATION

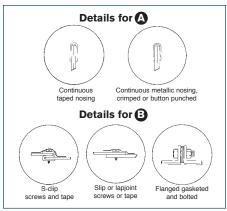
The effective and economical application of noise control methods depends on an accurate knowledge of the system's silencing requirements. There are several sources of information available for determining the required noise reduction for a wide range of HVAC applications.

The ASHRAE Handbook presents a procedure for calculating the noise reduction required. IAC also offers several methods which conform to the guide and quickly yield accurate results for specific issues.



The IAC SNAP form is programmed with calculations that enable the user to evaluate the entire HVAC distribution system. Request from HVACinfo@industrialacoustics.com.

HVAC NOISE-CONTROL ISSUE	METHODOLOGYLOGY
Evaluation of the Entire HVAC Air Distribution System	The IAC Snap Form The analysis starts with the acoustic criterion for the occupied space and then accounts for the system effects of each component such as terminals, mixing boxes, branch take-offs, elbows, ductwork, fan sources, plus room characteristics.
Cross-Talk Noise Transmission	The IAC Quiet-Vent* Catalogue Silencers installed in the connecting ductwork between spaces must provide airborne noise reduction to at least match the sound transmission loss of the separating structure (wall, window, door, whichever is the least effective noise barrier). This catalogue of air-transfer silencers includes relevant comparative transmission loss data.
Cooling Tower Noise	IAC Noise Control for Cooling Towers, Bulletin 1.0401.1, explains how to calculate the noise reduction required and how to apply the noise control equipment selected.
Louver Applications	IAC Noishield® Louvers, Bulletin 1.0502 and the SNAP II Form, Bulletin 1.0503.
Deciding Among Silencers	Short-Form Silencer Availability Guide. This guide suggests the most effective model of silencer configuration based on 250 Hz octave band DIL attenuation. It also lists typical applications where the individual silencer models would most often be used. When a particular model has been selected, more complete aero-acoustic data can be found on the technical data sheet for that model contained in this manual.
Additional Questions or Unusual Noise Control Products	Consult Your Local IAC Representative or Contact the HVAC Product Manager: HVACinfo@industrialacoustics.com (718) 931-8000.

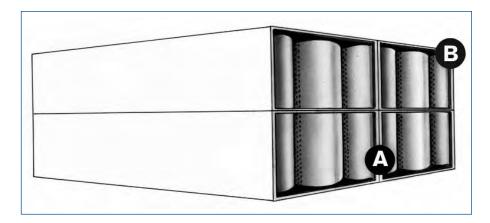


Multiple units are easily field-assembled using these types of connections.



The two following pages provide guidelines for locating silencers in air handling systems. In addition, they provide a rapid means of estimating the combined pressure drop (ΔP) due to air flow through the silencer as it is affected by the silencer's location with respect to the other system components such as fans, coils, elbows, etc.

The airflow and ΔP data contained on these pages is based on tests run in accordance with applicable ASTM, AMCA, ASME and ADC test codes. These specify minimum lengths of straight duct connections up and downstream of the component under test. However, in practice, because of space considerations, it is often necessary to install silencers under conditions which vary significantly from the test procedure. Therefore, the effect of these variations must be included to determine the resultant ΔP of air flow through the silencer. The tables which follow provide multiplication factors essentially based on empirical considerations to be applied to cataloged ΔP 's.



NOTES:

- For maximum structural integrity,
 Quiet-Duct™ Silencer splitters
 should be installed vertically. When
 vertical installation is not feasible,
 structural reinforcement is required
 for silencers wider than 24 in.
- Unless otherwise indicated, connecting ductwork is assumed to have the same dimensions as fan intake or discharge openings.
- When elbows are directly connected to the entrance of the silencers, the direction of the splitters should be parallel to the plane of the elbow turn.
- 4. L₁ = Distance from fan exhaust to entrance of discharge silencer.
 - L_2 = Distance from fan inlet to exit of intake silencer.
- ΔP Factor = Pressure Drop multiplier relative to silencer laboratory-rated-data and as specified by ASHRAE.
- D = Diameter of round duct or equivalent diameter of rectangular duct.

- Unless otherwise noted, multipliers shown do not include pressure drop of other components (elbows, transitions, dump losses, etc.), which must be calculated separately.
- 8. The ΔP Factors given are subject to minimum duct runs of 2.5 D after discharge silencers and 2.5 D before intake silencers. Otherwise, use additional multipliers as shown, such as for fans, elbows, silencers immediately at system entrance or exit, or other system components.

Note: These ΔP factors represent IAC's suggested benchmarks based on previous laboratory and field experience. While seemingly aggressive benchmarks, they will allow the user to achieve optimal performance from the silencer. In some situations, where these factors cannot be applied it may still be possible to achieve these published performance levels from your attenuator. The results will vary on a case-by-case basis and efficacy should be determined by the HVAC system engineer or by an IAC representative.

GUIDELINES FOR LOCATING SILENCERS

DUCTED CENTRIFUGAL FANS

Discharge Quiet-Duct-Rectangular Silencers

a. L_1 = one duct diameter for every 1000 fpm (5m/s) average duct velocity including suitably designed transition section for maximum regain.

b. If space is limited, velocity distribution vanes, diffusers, or other flow equalizers will have to be provided by system designer. Allow minimum L_1 =0.75 D.

Intake Quiet-Duct Rectangular Silencers

Use minimum $L_2 = 0.75$ D including suitably designed transition sections if required.

△P FACTOR SILENCER

UP	DOWN
STREAM	STREAM
-	1.0
_	1.0
1.0	_

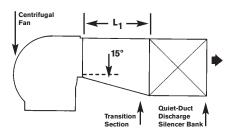
1.0

1.0

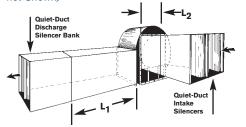
1.0

1.0

1.0



Recommended Transition Section Arrangement Between Centrifugal Fan and Silencer Bank (Ducting not Shown)



Intake and Discharge Silencers for Centrifugal Fans (Ducting not Shown)

DUCTED 50% HUB-VANE AXIAL FANS

Discharge Quiet-Duct Rectangular Silencers

a. L_1 = one duct diameter for every 1000 fpm (5m/s) average duct velocity including suitably designed transition section for maximum regain

b. If space is limited, velocity distribution vanes, diffusers, or other flow equalizers will have to be provided by system designer Allow minimum L_1 =0.75 D.

Discharge Conic-Flow Tubular Silencers

 $L_1 = 0$ when fan hub is matched to silencer center body

Intake Quiet-Duct Rectangular Silencers

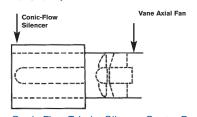
Use minimum $L_2 = 0.75$ D including intake cones of not more than 60° included angle

Intake Conic-Flow Tubular Silencers

 $L_2 = 0$ when fan hub is matched to silencer center body

Quiet-Duct Intake Silencer Bank Vane Axial Fan Discharge Transition Quiet-Duct Discharge Silencer Bank Vane Axial Fan Discharge Transition

Recommended Transition Section Arrangement Between Vane-Axial Fan and Silencer Bank (Ducting not Shown)



Conic-Flow Tubular Silencer Center Body Matched to Axial Fan Hub (Ducting not Shown)

ELBOWS (WITHOUT TURNING VANES)

Distance of silencer from elbow

D x 3

D x 2

D x 1

ELBOWS (WITH TURNING VANES)

Distance of silencer from elbow

D x 3

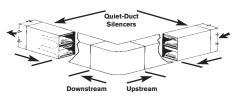
D x 2

D x 1

D x 0.5

Directly connected

1.0	1.0
1.5	1.5
2.0	2.0
1.0 1.2 1.75 3.0 4.0	1.0 1.2 1.75 3.0 Not Advised



Silencers Before and After Elbows

Note: Silencer baffles should be parallel to the plane of the elbow turn.

△P FACTOR SILENCER

DOWN

STREAM

1.0

1.0

1.0

UP

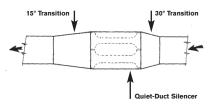
STREAM

1.0

1.25

1.5

With 15° included angle (7.5° slope)	
With 30° included angle (15° slope)	
With 60° included angle (30° slope)	



Silencer between Upstream and Downstream Transitions

COILS AND FILTERS

TRANSITIONS

Downstream – 12 in. from face Upstream – 24 in. from face

		Quiet-Duct Silencer	
- 0	1.0 –	Quiet-Duct Silencer Upstream from Filter	Qui Dov
		Opstream from Filter	

COOLING TOWERS AND CONDENSERS

All IAC Silencers

The pressure drop increase due to the addition of silencers to a cooling tower is partially offset by the resulting decrease in the entrance and discharge losses of the system.

2.0	2.0

This multiplier includes typical allowance for intake and discharge dum loses.

SILENCER

AT Intake

2.02.0

1.5

1.5

1.5

1.5

3.0

2.0

1.5

Quiet-Duct Discharge Silencers
Quiet-Duct Intake Silencers

ENTRANCE OR EXIT

Silencer Type or Model

CL, FCL

NL

ML

CS, FCS, NS, L, HL, LFL, HLFL, KB

MS, LFM, HLFM, KM, KL

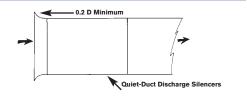
S, ES, LFS, HLFS, XM, XL

The relatively higher multipliers for the lower pressure drop silencers, such as the CL and L type P, for instance, are due to the dump losses to the atmosphere being significantly higher relative to their rated values.

Pressure-drop factors for silencers at the entrance to a system can be materially reduced by use of a smooth converging bell mouth with sides having a radius equal to at least 20% of its outlet dimension.

SILENCER	Quiet-Duct Intake Silencers
AT DISCHARGE	
5.0	
4.0	Quiet-Duct Discharge Silencers
3.5	Silencers Immediately at Intake and Discharge

Silencers Immediately at Intake and Discharge of Equipment Room



OPERATION AND MAINTENANCE INSTRUCTIONS

- IAC Silencers have no moving parts and therefore require no lubrication or routine maintenance.
- 2. All silencers are furnished rigidly constructed, well-made and free of any defects in materials or workmanship. To ensure continuing proper operation, the silencers should be visually inspected at least once a year to verify that:
 - a. Perforated acoustic splitters are undamaged, remaining parallel and true.
 - b. Airspaces between the acoustic splitters are free of any debris.
 - c. The holes in the perforated steel are open and free of dust or other foreign material.
- In the event that debris must be cleaned from the airspaces or the perforated metal, the silencer should be vacuum-cleaned or wiped clean with a cloth dampened in a mild detergent solution.
- In no event should solutions that might affect the galvanized protection on the steel be used to clean IAC Silencers.
- The occurrence of "White Rust"
 (zinc oxide) on galvanized silencers
 is a normal event and not a mainte nance item. It occurs when the zinc
 in the galvanizing reacts electrolytically with moisture to protect the
 steel.
- In the event of fire, flood, structural damage or other severe occurrences, contact your local IAC Representative or the IAC Factory direct for specific instructions and recommendations.



1.01 GENERAL

A. Furnish and install "Quiet-Duct Ultra™/Low" (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. 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. Filler material shall be 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.
- 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:

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: 24x24, 24x30, or 24x36

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.

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.

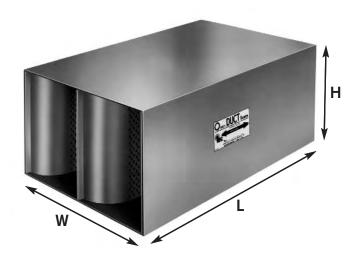
7.01 DUCT TRANSITIONS

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



TYPE: ULS1

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULS1-24-18

Length: 5' Type: ULS1 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULS1	-750 -500 -250 250 500 750	3 2 2 2 2 2	6 6 6 6 5	15 15 14 14 14 13	22 22 21 21 21 20	24 24 24 24 23 23	22 22 22 22 22 22 22	17 18 18 18 18	14 14 14 14 14	13 13 13 13 13 13
5ULS1	-750 -500 -250 250 500 750	4 4 4 4 3 3	10 10 10 9 9	22 22 21 20 20 20	35 34 34 33 32 32	38 38 38 37 37 36	34 34 34 34 34 34	25 25 25 25 25 25 25	17 17 18 18 18	16 16 16 16 16
7ULS1	-750 -500 -250 250 500 750	6 6 5 5 5 4	14 13 13 12 12	29 28 28 27 26 25	43 42 42 41 41 40	47 46 46 45 45 45	43 42 42 42 42 42	31 31 31 31 31 31	20 20 20 21 21 21	17 18 18 18 19
10ULS1	-750 -500 -250 250 500 750	8 8 8 7 6	19 19 18 17 16	39 38 37 36 35 34	52 52 51 51 50 50	54 54 54 54 54 54	52 52 52 51 51	38 38 38 38 38 38	24 24 25 25 25 25	21 21 21 22 22 22 23



Nominal Length	W, in. H, in.	15 12	15 18	15 24	15 30	15 36	15 42	15 48	30 12	30 18	30 24	30 30	30 36	30 42	30 48
3 Feet		35	43	51	58	66	74	82	57	68	79	91	102	113	124
5 Feet	Wt, lb.	57	69	82	94	106	118	131	93	110	127	144	161	178	195
7 Feet		79	96	113	129	146	163	179	129	152	175	198	221	244	267
10 Feet		113	136	159	183	206	229	253	183	215	246	278	310	NA	NA

^{*}Note: Widths are available from 12" to 18" and from 24" to 36"

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 = (Actual FV/Catalog FV)²(Catalog PD). PD values are per ASTM E477 test standard. For

Model	el Static Pressure Drop, i.w.g.													
ULS1	3 ft. 5 ft. 7 ft. 10 ft.	0.07 0.09 0.10 0.12	0.29 0.35 0.40 0.48	0.66 0.78 0.90 NA	NA NA NA NA	NA NA NA NA	NA NA NA NA							
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500							

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULS1	-750 -500 -250 250 500 750	2 2 2 2 2 2	2 2 2 2 2 2	3 3 3 3 3	5 4 4 4 4	6 6 6 5 5	9 9 9 8 8
5ULS1	-750 -500 -250 250 500 750	3 3 3 3 3 3	4 4 4 4 3 3	6 5 5 5 4	8 8 7 7 7 6	11 10 10 9 9	14 14 14 13 13
7ULS1	-750 -500 -250 250 500 750	5 4 4 4 4 3	6 5 5 5	8 8 7 7 6 6	11 11 10 9 9	15 14 14 13 12 12	20 19 19 18 17
10ULS1	-750 -500 -250 250 500 750	6 6 5 5 4	8 8 8 7 6 6	12 11 11 10 9	16 15 15 13 13	21 20 20 18 17 17	28 27 26 24 24 23

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

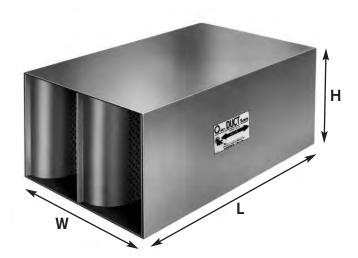
IAC Model	Octave Band Hz Silencer Face Velocity, fpm	0 31.5*	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ULS1	-750 -250 +250 +750	54 34 33 53	51 31 30 50	50 24 23 49	48 24 23 47	48 24 23 47	51 32 31 50	54 34 33 53	47 <20 <20 46	

Self-Noise values are shown for a five-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 V.



TYPE: ULS2

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULS2-24-18

Length: 5' Type: ULS2 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULS2	-750 -500 -250 250 500 750	3 3 3 3 3	8 8 8 7 7 7	16 15 15 15 15 14	19 19 19 18 18	19 19 19 19 19	16 16 17 17 17	14 14 14 14 14	12 12 12 12 12 12	11 11 11 11 11
5ULS2	-750 -500 -250 250 500 750	5 5 5 4 4 4	12 12 11 11 11 11	23 23 22 22 22 21 21	29 29 28 28 27 27	29 29 29 29 29 29	23 23 24 24 24 24	18 18 18 18 18	15 15 15 15 15 15	13 13 13 13 14 14
7ULS2	-750 -500 -250 250 500 750	7 6 6 6 6 5	16 15 15 14 14	30 30 29 28 28 27	39 38 38 37 36 36	39 39 39 38 38 38	30 30 31 31 31 31	22 22 22 22 22 22 22	17 18 18 18 18	15 15 16 16 16 16
10ULS2	-750 -500 -250 250 500 750	9 9 9 8 8 7	21 21 20 19 18 18	38 38 37 36 36 35	46 46 46 45 45	47 47 47 46 46 46	38 38 38 38 38 38	26 26 26 26 26 26	20 20 21 21 21 21	18 18 18 19 19



Nominal Length	W/ in. H/ in.	21 12	21 18	21 24	21 30	21 36	21 42	21 48	42 12	42 18	42 24	42 30	42 36	42 42	42 48
3 Feet		42	50	59	67	76	84	93	70	83	96	108	121	134	147
5 Feet	Wt/ lb.	68	81	94	108	121	134	147	114	133	153	172	191	210	229
7 Feet		94	112	130	148	166	184	202	158	184	210	235	261	NA	NA
10 Feet		134	159	184	209	234	259	284	224	260	295	NA	NA	NA	NA

^{*}Note: Widths are available from 18" to 24" and from 36" to 48"

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 = (Actual FV/Catalog FV)²(Catalog PD).

PD values are per ASTM E477 test standard. For

Model		Stati	c Pressu	re Drop,	i.w.g.		
ULS2	3 ft. 5 ft. 7 ft. 10 ft.	0.07 0.08 0.08 0.10	0.27 0.30 0.34 0.39	0.60 0.68 0.76 0.88	NA NA NA NA	NA NA NA NA	NA NA NA NA
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULS2	-750 -500 -250 250 500 750	2 2 2 2 2 2	3 3 3 3 3	4 4 4 4 4	6 6 6 5 5 5	9 9 8 8 8	12 11 11 11 11 11
5ULS2	-750 -500 -250 250 500 750	4 3 3 3 3 3	5 5 4 4 4	7 7 6 6 6 6	9 9 9 8 8	13 13 12 12 11 11	17 16 16 15 15
7ULS2	-750 -500 -250 250 500 750	5 5 5 4 4 4	7 7 6 6 6 5	9 9 9 8 8	13 12 12 11 11	17 17 16 15 15	22 21 21 20 19
10ULS2	-750 -500 -250 250 500 750	7 7 6 6 6 5	10 9 9 8 8 8	13 13 12 11 11	18 17 17 16 15	23 23 22 21 20 20	29 29 28 27 26 26

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

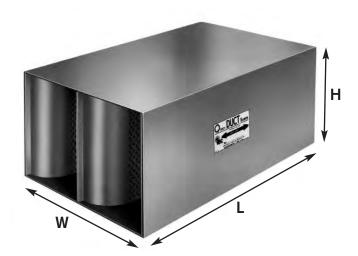
IAC	Octave Band Hz Silencer Face	0 31.5*	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
Model	Velocity, fpm									
ULS2	-750 -250 +250 +750	55 35 33 53	52 32 30 50	52 25 23 49	49 26 23 47	49 25 23 47	53 33 31 50	55 36 33 53	48 <20 <20 46	
		*F .:								

Self-Noise values are shown for a seven-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 V.



TYPE: ULS3

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULS3-24-18

Length: 5' Type: ULS3 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULS3	-750 -500 -250 250 500 750	4 4 4 3 3 3	10 10 10 9 9	15 15 15 14 14	17 17 17 17 16 16	16 16 16 16 16	14 14 14 15 15	12 12 12 12 12 12	11 11 11 11 11	9 9 9 9 9
5ULS3	-750 -500 -250 250 500 750	6 6 5 5 5 5	14 14 13 13 13 12	22 22 21 21 20 20	25 25 25 24 24 24	23 23 23 23 23 23	18 18 19 19 19	15 15 15 15 15	13 13 13 13 13	11 11 11 11 11
7ULS3	-750 -500 -250 250 500 750	8 7 7 7 7 6	17 17 17 16 16	29 28 28 27 27 26	33 32 32 31 31 31	30 30 30 30 30 30	23 23 23 23 23 23 23	17 17 17 17 17 17	15 15 15 15 15 15	13 13 13 13 14 14
10ULS3	-750 -500 -250 250 500 750	10 10 10 9 9	23 22 22 21 20 20	38 37 37 36 35	44 43 43 42 41 41	40 40 40 40 40 40	29 30 30 30 30 30	20 20 20 21 21 21	18 18 18 19 19	15 15 15 15 15 16



Nominal	W/ in.	27	27	27	27	27	27	27	54	54	54	54	54	54	54
Length	H/ in.	12	18	24	30	36	42	48	12	18	24	30	36	42	48
3 Feet		48	58	67	76	86	95	104	83	98	112	126	141	155	169
5 Feet	Wt/ lb.	79	93	107	121	136	150	164	136	157	178	199	221	242	263
7 Feet		109	128	147	167	186	205	224	178	216	244	272	301	NA	NA
10 Feet		154	181	208	236	261	288	315	NA						

^{*}Note: Widths are available from 24" to 30" and from 48" to 54"

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 = (Actual FV/Catalog FV)²(Catalog PD).

PD values are per ASTM E477 test standard. For

Model		Stati	c Pressu	re Drop,	i.w.g.		
ULS3	3 ft. 5 ft. 7 ft. 10 ft.	0.06 0.07 0.08 0.09	0.25 0.28 0.30 0.34	0.57 0.63 0.68 0.77	NA NA NA	NA NA NA NA	NA NA NA NA
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULS3	-750 -500 -250 250 500 750	3 3 2 2 2	4 4 3 3 3 3	5 5 5 5 5 4	8 8 8 7 7 7	11 10 10 10 10	13 12 12 12 12 12
5ULS3	-750 -500 -250 250 500 750	4 4 4 4 4 3	6 6 5 5 5 5 5	8 8 7 7 7	11 11 11 10 10	15 14 14 14 13 13	18 18 17 17 16 16
7ULS3	-750 -500 -250 250 500 750	6 6 5 5 5 5 5	8 8 7 7 7 6	11 10 10 10 9 9	15 14 14 13 13	19 18 18 17 17	23 23 22 21 21 21
10ULS3	-750 -500 -250 250 500 750	8 7 7 7 6	11 11 10 10 9 9	15 14 14 13 13	19 19 19 18 17	24 24 23 22 22 22	30 30 29 28 28 27

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

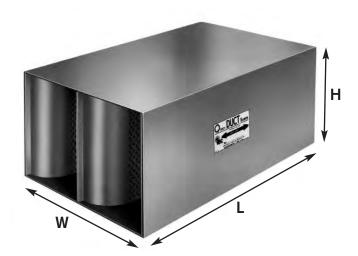
	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5*	63	125	250	500	1K	2K	4K	8K
IAC Model	Silencer Face Velocity, fpm									
ULS3	-750	56	53	53	50	51	54	56	50	43
	-250	37	34	26	27	27	34	37	20	<20
	+250	33	30	23	23	23	31	33	<20	<20
	+750	53	50	49	47	47	50	53	46	39

Self-Noise values are shown for a nine-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 V.



TYPE: ULM1

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULM1-24-18

Length: 5' Type: ULM1 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULM1	-1000 -750 -500 500 750 1000	2 2 2 2 2 2	6 6 6 5 5 5	14 13 13 12 12 12	20 20 20 19 18 18	23 22 22 22 21 21	20 20 20 20 20 20 21	16 16 16 17 17	13 13 13 13 13	12 12 12 12 12 12
5ULM1	-1000 -750 -500 500 750 1000	4 4 4 3 3 3	9 9 9 8 8 7	20 20 19 18 18	32 32 31 29 29	36 35 35 34 33	31 31 31 31 31 31	23 23 23 23 23 23 23	16 16 16 16 16	14 14 14 15 15
7ULM1	-1000 -750 -500 500 750 1000	5 5 5 4 4 4	13 12 12 11 10	27 26 26 24 23 22	40 40 39 37 37 36	44 43 43 42 42 41	39 39 39 39 39	28 28 28 28 28 28	19 19 19 19 19	16 16 16 17 17
10ULM1	-1000 -750 -500 500 750 1000	8 7 7 6 5	18 17 17 14 14 13	36 35 34 32 31 30	49 49 48 47 47	52 52 52 51 51	48 48 48 48 48	35 35 35 35 35 35	23 23 23 23 24 24	18 19 19 20 21 21



Nominal	W/ in.	15	15	15	15	15	15	15	30	30	30	30	30	30	30
Length	H/ in.	12	18	24	30	36	42	48	12	18	24	30	36	42	48
3 Feet		35	43	50	58	66	73	81	57	68	79	90	101	112	123
5 Feet	Wt/ lb.	58	70	82	94	106	118	130	94	111	127	144	161	178	194
7 Feet		80	97	113	130	146	162	179	131	153	176	198	221	243	266
10 Feet		114	137	160	183	206	229	252	185	217	248	279	311	NA	NA

^{*}Note: Widths are available from 12" to 18" and from 24" to 36"

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 = (Actual FV/Catalog FV)²(Catalog PD). PD values are per ASTM E477 test standard. For

Model		Stati	c Pressu	re Drop,	i.w.g.		
ULM1	3 ft. 5 ft. 7 ft. 10 ft.	0.04 0.04 0.04 0.05	0.14 0.16 0.18 0.20	0.32 0.36 0.40 0.46	0.57 0.64 0.71 0.82	NA NA NA NA	NA NA NA NA
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULM1	-1000 -750 -500 500 750 1000	2 2 2 1 1	2 2 2 2 2 2	3 3 3 2 2	4 4 4 4 3 3	6 6 5 5 5 5	8 8 8 7 7 7
5ULM1	-1000 -750 -500 500 750 1000	3 3 2 2 2	4 4 4 3 3 3	5 5 4 4 4	7 7 7 6 6 5	10 9 9 8 8	13 13 12 11 11
7ULM1	-1000 -750 -500 500 750 1000	4 4 4 3 3 3	5 5 4 4 4	7 7 7 6 5	10 10 9 8 8 7	13 13 13 11 11	18 17 17 15 15
10ULM1	-1000 -750 -500 500 750 1000	6 5 5 4 4 4	8 7 7 6 5 5	11 10 10 8 8 7	14 14 13 11 11	19 19 18 16 15	25 25 24 21 20 20

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

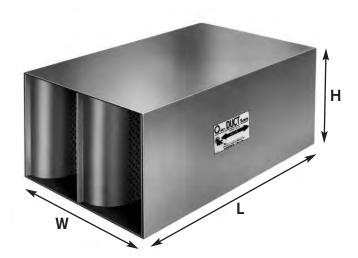
IAC	Octave Band Hz Silencer Face Velocity, fpm	0	1	2	3	4	5	6	7	8
Model		31.5*	63	125	250	500	1K	2K	4K	8K
ULM1	-1000	55	52	52	49	49	53	55	49	43
	-500	42	39	35	34	34	40	43	30	<20
	+500	41	38	34	33	33	39	42	29	<20
	+1000	54	51	51	48	48	52	54	48	42
		*E .:								

Self-Noise values are shown for a five-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 V.



TYPE: ULM2

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULM2-24-18

Length: 5' Type: ULM2 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULM2	-1000 -750 -500 500 750 1000	3 3 2 2 2	7 7 7 7 6 6	14 14 14 13 13	18 17 17 16 16	18 18 18 18 18 17	15 15 15 16 16	13 13 13 13 13 13	11 11 11 11 11	10 10 10 10 10
5ULM2	-1000 -750 -500 500 750 1000	5 4 4 4 4 3	11 11 11 10 9	21 21 20 19 19	27 26 26 25 25 24	27 27 27 26 26 26	21 21 21 22 22 22	16 16 16 17 17	13 13 13 14 14 14	12 12 12 12 12 12
7ULM2	-1000 -750 -500 500 750 1000	6 6 5 5 5	14 14 14 13 12	28 27 27 25 25 24	36 36 35 33 33	36 36 35 35 35	28 28 28 28 28 28	20 20 20 20 20 20 20	16 16 16 16 16	14 14 14 14 14
10ULM2	-1000 -750 -500 500 750 1000	9 8 8 7 7	19 19 19 17 16	36 35 34 32 32 31	44 43 43 41 41	44 44 43 43 43	35 35 35 35 35 35	24 24 24 24 24 24	18 19 19 19 19	15 15 15 16 16



Nominal Length	W/ in. H/ in.	21 12	21 18	21 24	21 30	21 36	21 42	21 48	42 12	42 18	42 24	42 30	42 36	42 42	42 48
3 Feet		42	50	59	67	75	84	92	71	83	96	108	120	133	145
5 Feet	Wt/ lb.	69	82	95	108	121	134	147	116	135	153	172	191	210	228
7 Feet		95	113	131	149	1666	184	202	1661	186	211	236	261	NA	NA
10 Feet		136	160	185	210	234	259	284	228	263	298	NA	NA	NA	NA

^{*}Note: Widths are available from 18" to 24" and from 36" to 48"

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 = (Actual FV/Catalog FV)²(Catalog PD). PD values are per ASTM E477 test standard. For

Model		Stati	c Pressu	re Drop,	i.w.g.		
ULM2	3 ft. 5 ft. 7 ft. 10 ft.	0.03 0.04 0.04 0.04	0.13 0.14 0.16 0.17	0.30 0.33 0.35 0.39	0.53 0.58 0.63 0.70	0.83 0.91 NA NA	NA NA NA NA
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULM2	-1000 -750 -500 500 750 1000	2 2 2 2 2 2	3 3 2 2 2	4 4 4 3 3 3	5 5 5 4 4	8 8 8 7 7 7	10 10 10 9 9
5ULM2	-1000 -750 -500 500 750 1000	3 3 3 3 2	5 4 4 4 4 3	6 6 6 5 5 5	8 8 8 7 7 7	12 11 11 10 10	15 15 15 13 13
7ULM2	-1000 -750 -500 500 750 1000	5 4 4 4 3 3	6 6 6 5 5	9 8 8 7 7	12 11 11 10 10	15 15 15 13 13	20 19 19 17 17
10ULM2	-1000 -750 -500 500 750 1000	6 6 6 5 5 4	9 9 8 7 7 6	12 12 11 10 9	16 16 15 14 13	21 21 20 18 18 17	27 26 26 24 23 22

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

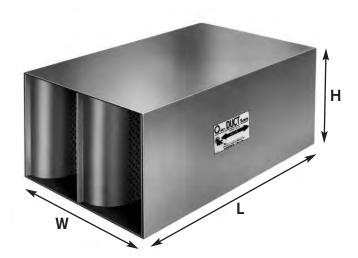
	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5*	63	125	250	500	1K	2K	4K	8K
IAC Model	Silencer Face Velocity, fpm									
ULM2	-1000	56	53	53	51	51	54	56	50	44
	-500	44	41	37	36	36	42	44	32	<20
	+500	41	38	34	33	33	39	42	29	<20
	+1000	54	51	51	48	48	52	54	48	42

Self-Noise values are shown for a seven-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 V.



TYPE: ULM3

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULM3-24-18

Length: 5' Type: ULM3 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULM3	-1000 -750 -500 500 750 1000	3 3 3 3 3	9 9 9 8 8	14 13 13 13 13 13	16 16 16 15 15	14 15 15 15 15 15	12 13 13 14 14 14	11 11 11 11 11	10 10 9 9 9	8 8 8 8 8
5ULM3	-1000 -750 -500 500 750 1000	5 5 5 4 4 4	13 12 12 11 11	20 20 19 18 18	23 23 23 22 22 22	21 21 21 21 21 21	17 17 17 17 18 18	13 13 13 14 14	12 11 11 11 11	9 9 9 9 9
7ULM3	-1000 -750 -500 500 750 1000	7 7 7 6 6 5	16 16 15 14 14	26 26 26 24 24 24	30 30 30 29 28 28	28 28 28 28 28 28	21 21 21 21 21 21 22	16 16 16 16 16	13 13 13 13 13	11 11 11 11 11
10ULM3	-1000 -750 -500 500 750 1000	9 9 9 8 8 7	21 20 20 18 18	35 35 34 32 32 31	41 40 40 38 38 38	37 37 37 37 37 37	27 27 27 27 27 27	19 19 19 19 19	16 16 16 16 16	12 12 12 12 12 12



Nominal		27	27	27	27	27	27	27	54	54	54	54	54	54	54
Length	H/ in.	12	18	24	30	36	42	48	12	18	24	30	36	42	48
3 Feet		48	57	67	76	85	94	103	84	98	112	125	139	153	167
5 Feet	Wt/ lb.	79	93	107	121	135	149	163	137	158	178	199	219	240	261
7 Feet		110	129	148	167	186	204	223	191	218	245	273	300	NA	NA
10 Feet		157	183	209	235	261	287	313	NA						

^{*}Note: Widths are available from 24" to 30" and from 48" to 54"

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 = (Actual FV/Catalog FV)²(Catalog PD). PD values are per ASTM E477 test standard. For

Model		Stati	c Pressu	re Drop,	i.w.g.		
ULM3	3 ft. 5 ft. 7 ft. 10 ft.	0.03 0.03 0.04 0.04	0.13 0.14 0.15 0.16	0.29 0.31 0.33 0.36	0.51 0.55 0.58 0.64	0.80 0.86 0.91 0.99	NA NA NA NA
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULM3	-1000 -750 -500 500 750 1000	2 2 2 2 2 2	3 3 3 3 3 3	5 4 4 4 4	7 7 7 6 6 6	9 9 9 9 8 8	11 11 11 10 10
5ULM3	-1000 -750 -500 500 750 1000	4 4 4 3 3 3	5 5 4 4 4	7 7 7 6 6 6	10 10 10 9 9	13 13 13 12 12 11	16 16 16 15 14
7ULM3	-1000 -750 -500 500 750 1000	5 5 5 4 4 4	7 7 7 6 6 6	10 9 9 8 8	13 13 13 12 11	17 17 16 15 15	21 21 20 19 19
10ULM3	-1000 -750 -500 500 750 1000	7 7 7 6 6 5	10 10 9 8 8 8	13 13 13 11 11	18 17 17 15 15	22 22 22 20 19 19	28 27 27 25 25 25 24

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

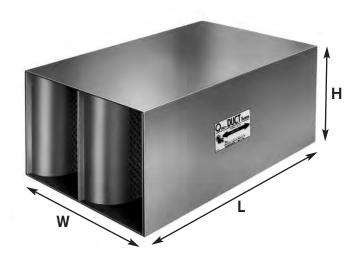
	Octave Band	0	1	2	3	4	5	6	7	8
	Hz	31.5*	63	125	250	500	1K	2K	4K	8K
IAC Model	Silencer Face Velocity, fpm									
ULM3	-750	57	54	55	52	52	55	57	51	45
	-250	45	42	38	37	37	43	45	33	21
	+250	41	38	34	33	33	39	42	29	<20
	+750	54	51	51	48	48	52	54	48	42

Self-Noise values are shown for a nine-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 V.



TYPE: ULL1

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULL1-24-18

Length: 5' Type: ULL1 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULL1	-1250 -1000 -750 750 1000 1250	2 2 2 2 2 2	5 5 4 4 4	12 12 12 11 10 10	18 18 18 17 16	21 21 20 19 19	18 18 18 19 19	14 14 15 15 15	11 11 11 12 12	11 11 11 11 11
5ULL1	-1250 -1000 -750 750 1000 1250	3 3 3 2 2	8 8 8 7 7 6	18 18 18 16 16	29 29 28 26 26 26	33 32 32 31 30	28 28 28 28 28 28	20 20 21 21 21 21	15 15 15 15 15 15	13 13 13 13 13 13
7ULL1	-1250 -1000 -750 750 1000 1250	5 5 4 3 3	11 11 11 9 9	24 24 23 21 20 20	37 36 36 34 33 33	41 41 40 39 38 38	36 36 36 35 35 35	25 25 25 26 26 26	17 17 18 18 18	15 15 15 16 16
10ULL1	-1250 -1000 -750 750 1000 1250	7 6 6 5 4	16 16 15 12 12	33 32 31 28 27 26	46 46 45 43 43	49 49 49 48 48	44 44 44 44 44	31 31 32 32 32 32	21 21 21 22 22 22	17 17 17 19 19



Non Len		W/ in. H/ in.	15 12	15 18	15 24	15 30	15 36	15 42	15 48	30 12	30 18	30 24	30 30	30 36	30 42	30 48
3 Fe	eet		35	43	50	58	65	73	80	58	68	79	90	100	111	122
5 Fe	eet	Wt/ lb.	58	70	82	94	106	118	129	95	111	128	144	160	177	193
7 Fe	eet		81	97	114	130	146	162	178	132	154	177	199	221	243	265
10 F	eet		116	138	161	184	206	229	252	188	219	250	280	311	NA	NA

^{*}Note: Widths are available from 12" to 18" and from 24" to 36"

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 = (Actual FV/Catalog FV)²(Catalog PD). PD values are per ASTM E477 test standard. For

Model	Static Pressure Drop, i.w.g. 3 ft. 0.03 0.10 0.23 0.41 0.64 NA 5 ft. 0.03 0.12 0.26 0.47 0.73 NA 7 ft. 0.03 0.13 0.29 0.52 0.82 NA													
ULL1	5 ft.	0.03	0.12	0.26	0.47	0.73	NA							
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500							

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULL1	-1250 -1000 -750 750 1000 1250	1 1 1 1 1	2 2 2 2 2 1	3 3 2 2 2	4 4 4 3 3 3	5 5 4 4 4	7 7 7 6 6 6
5ULL1	-1250 -1000 -750 750 1000 1250	3 2 2 2 2 2	3 3 2 2 2	5 4 4 3 3 3	6 6 6 5 5 5	9 8 8 7 7 6	12 11 11 10 9
7ULL1	-1250 -1000 -750 750 1000 1250	4 3 3 2 2 2	5 5 4 3 3	6 6 5 5 4	9 9 8 7 6 6	12 12 11 9 9	16 16 15 13 13
10ULL1	-1250 -1000 -750 750 1000 1250	5 5 5 3 3 3	7 6 6 5 4 4	9 9 9 7 6 6	13 12 12 9 9	17 17 16 13 13	23 22 22 18 17

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

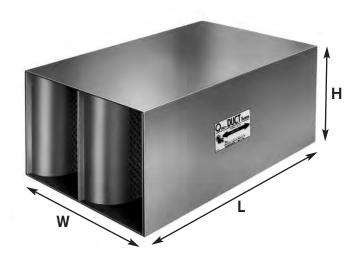
IAC Model	Octave Band Hz Silencer Face Velocity, fpm	0 31.5*	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ULL1	-1250	55	52	53	50	50	53	56	50	44
	-750	46	43	41	39	39	44	47	36	26
	+750	45	42	40	38	38	43	46	35	25
	+1250	55	52	52	49	49	52	55	49	43

Self-Noise values are shown for a five-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 V.



TYPE: ULL2

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULL2-24-18

Length: 5' Type: ULL2 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULL2	-1250 -1000 -750 750 1000 1250	3 2 2 2 2 2	7 6 6 6 6 5	13 13 12 11 11	16 16 16 15 15	16 16 16 16 16	13 14 14 15 15	11 11 11 12 12 12	10 10 10 10 10	9 9 9 8 8
5ULL2	-1250 -1000 -750 750 1000 1250	4 4 4 3 3 3	10 10 9 8 8	19 19 19 17 17	25 24 24 22 22 22	25 25 24 24 24 24	19 19 19 20 20 20	15 15 15 15 15 15	12 12 12 12 12 12	10 10 10 10 10
7ULL2	-1250 -1000 -750 750 1000 1250	5 5 5 4 4 4	13 13 12 11 11	25 25 24 22 22 22	33 33 32 30 30 29	33 33 33 32 32 32	25 25 25 25 25 25 25	18 18 18 18 18	14 14 14 14 14	12 12 12 12 12 12
10ULL2	-1250 -1000 -750 750 1000 1250	8 7 7 6 5	18 17 17 14 14	32 32 32 29 28 28	41 40 40 38 38 37	41 41 41 40 40 39	31 31 31 31 31 31	22 22 22 22 22 22 23	17 17 17 17 18 18	13 13 13 13 14



Nominal Length	W/ in. H/ in.	21 12	21 18	21 24	21 30	21 36	21 42	21 48	42 12	42 18	42 24	42 30	42 36	42 42	42 48
3 Feet		42	50	58	67	75	83	91	71	83	95	107	119	131	143
5 Feet	Wt/ lb.	69	82	95	107	120	133	146	117	135	153	171	189	208	226
7 Feet		96	114	131	148	166	183	200	163	187	211	236	260	NA	NA
10 Feet		137	161	185	210	234	258	282	232	265	299	NA	NA	NA	NA

^{*}Note: Widths are available from 18" to 24" and from 36" to 48"

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 = (Actual FV/Catalog FV)²(Catalog PD).

PD values are per ASTM E477 test standard. For

Model	Static Pressure Drop, i.w.g. 3 ft. 0.02 0.10 0.22 0.38 0.60 0.87 5 ft. 0.03 0.11 0.24 0.42 0.66 0.95 7 ft. 0.02 0.11 0.26 0.46 0.72 NA													
ULL2	5 ft.	0.03	0.11	0.24	0.42	0.66	0.95							
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500							

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULL2	-1250 -1000 -750 750 1000 1250	2 2 2 1 1	3 2 2 2 2 2	3 3 3 3 3	5 5 4 4 4	7 7 7 6 6 6	9 9 9 8 8
5ULL2	-1250 -1000 -750 750 1000 1250	3 3 2 2 2	4 4 4 3 3 3	6 5 5 4 4 4	8 7 7 6 6	10 10 10 9 9	14 13 13 12 11
7ULL2	-1250 -1000 -750 750 1000 1250	4 4 4 3 3 3	6 5 5 4 4 4	8 7 7 6 6 6	10 10 10 8 8	14 14 13 12 11	18 17 17 15 15
10ULL2	-1250 -1000 -750 750 1000 1250	6 5 4 4 4	8 8 7 6 6 5	11 10 10 8 8	15 14 14 12 11	19 19 18 16 15	24 24 23 21 20 20

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face	0 31.5*	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
Model	Velocity, fpm									
	-1250	57	54	54	52	52	55	57	51	45
ULL2	-750 +750	48 45	45 42	42 40	41 38	41 38	46 43	48 46	38 35	27 25
	+1250	55	52	52	49	49	52	55	49	43

Self-Noise values are shown for a seven-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 V.



TYPE: ULL3

LOW FREQUENCY SILENCERS with FORWARD and REVERSE FLOW Ratings



The Quiet-Duct Ultra™/Low line of modular silencers, introduced in 2005, has been designed to optimize Dynamic Insertion Loss (DIL) performance for frequencies between 25 Hz and 80 Hz. The tests were conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory. IAC is the first manufacturer to publish guaranteed test data at 31.5 Hz, including finer resolution of one-third-octave-band data for applications requiring narrow-band performance to match specific sound sources.

DESIGNATING SILENCERS

Model: 5ULL3-24-18

Length: 5' Type: ULL3 Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	0 31.5	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULL3	-1250 -1000 -750 750 1000 1250	3 3 2 2 2	8 8 8 7 7 7	12 12 12 11 11	14 14 14 13 13	13 13 13 14 14	11 11 12 12 13 13	10 10 10 10 10	8 8 8 8 8	7 7 7 6 6
5ULL3	-1250 -1000 -750 750 1000 1250	5 5 4 4 4 4	11 11 11 10 10	18 18 18 16 16	21 21 21 20 20 19	19 19 19 20 20 20	15 15 15 16 16	12 12 12 12 12 12	10 9 9 9 9	7 7 7 7 7
7ULL3	-1250 -1000 -750 750 1000 1250	6 6 5 5 5	14 14 14 12 12	24 24 23 22 21 21	28 28 27 26 26 25	25 25 25 25 25 25 25	19 19 19 19 19 20	14 14 14 14 15	10 10 10 9 9	9 9 9 8 8
10ULL3	-1250 -1000 -750 750 1000 1250	8 8 8 7 6 6	19 19 18 16 16	32 32 31 29 28	37 37 37 35 34 34	34 34 34 33 33	24 24 24 24 24 24	17 17 17 18 18	14 13 13 13 13	10 9 9 9 9



Nominal Length	W/ in. H/ in.	27 12	27 18	27 24	27 30	27 36	27 42	27 48	54 12	54 18	54 24	54 30	54 36	54 42	54 48
3 Feet		49	57	66	75	84	93	102	84	98	111	124	138	151	164
5 Feet	Wt/ lb.	80	94	107	121	135	148	162	139	159	179	198	218	238	258
7 Feet		112	130	148	167	185	204	222	193	220	246	273	299	NA	NA
10 Feet		159	184	210	236	261	287	312	NA						

^{*}Note: Widths are available from 24" to 30" and from 48" to 54"

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 = (Actual FV/Catalog FV)²(Catalog PD). PD values are per ASTM E477 test standard. For

Model	Static Pressure Drop, i.w.g. 3 ft. 0.02 0.09 0.21 0.37 0.58 0.83 5 ft. 0.02 0.10 0.22 0.40 0.62 0.89 7 ft. 0.03 0.11 0.24 0.42 0.66 0.96													
ULL3	5 ft.	0.02	0.10	0.22	0.40	0.62	0.89							
Silencer Face Velocity, fpm		250	500	750	1000	1250	1500							

the smaller widths available add 15% and subtract 5% for the larger widths available. If silencers are near elbows, transitions or other non-ideal conditions sufficient allowances must be made to account for system effects when calculating the overall silencer pressure loss.

Table IV: 1/3 Octave Band DIL Data

	Octave Band		31.5 Hz			63 Hz	
	Hz	25	31.5	40	50	63	80
IAC Model	Silencer Face Velocity, fpm						
3ULL3	-1250 -1000 -750 750 1000 1250	2 2 2 2 2 2	3 3 2 2 2	4 4 4 3 3 3	6 6 6 5 5 5	8 8 8 7 7 7	10 10 10 9 9
5ULL3	-1250 -1000 -750 750 1000 1250	3 3 3 3 3	5 4 4 4 3	6 6 6 5 5 5	9 9 9 8 8 7	12 12 11 10 10	15 14 14 13 13
7ULL3	-1250 -1000 -750 750 1000 1250	5 4 4 4 3 3	6 6 5 5 5	9 8 8 7 7	12 12 11 10 10	15 15 15 13 13	19 19 18 17 16
10ULL3	-1250 -1000 -750 750 1000 1250	6 6 6 5 5 4	9 9 8 7 7 6	12 12 11 10 9	16 15 15 13 13	20 20 19 17 17	25 25 24 22 22 21

One-Third (1/3) Octave Band data for IAC Quiet-Duct Ultra™/Low silencers is provided for those applications where Dynamic Insertion Loss performance in more discrete frequencies is required to effectively control narrow-band noise sources. Table IV presents the 1/3 Octave Band DIL components that combine to comprise the Full Octave Band DIL values.

Table V: Self-Noise Power Levels,

dB re: 10-12 Watts

IAC Model	Octave Band Hz Silencer Face Velocity, fpm	0 31.5*	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ULL3	-1250	58	55	56	53	53	56	58	52	47
	-750	49	46	43	42	42	47	49	39	28
	+750	45	42	40	38	38	43	46	35	25
	+1250	55	52	52	49	49	52	55	49	43

Self-Noise values are shown for a nine-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 V.



QUIET-DUCT ULTRA™/GREEN SILENCERS

1.01 GENERAL

A. Furnish and install "IAC 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:

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: 24x24, 24x30, or 24x36,

and

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

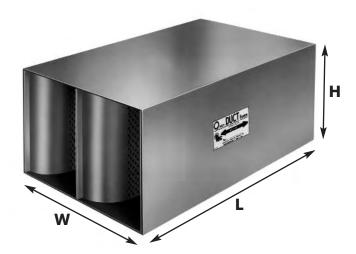
A. When transitions are required to adapt silencer dimensions to connecting duct work they shall be furnished by the installing contractor.



QUIET-DUCT ULTRA™/GREEN SILENCERS

TYPE: UGLFS

ENVIRONMENTALLY SOUND SILENCERS with FORWARD and REVERSE FLOW Ratings



In response to the current trend for environmentally friendly building products, IAC America introduces Quiet-Duct Ultra™ /Green, a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material. Quiet-Duct Ultra™ /Green delivers performance that meets or exceeds that of a standard Quiet-Duct™ silencer in almost every situation. The tests were measured in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory.

DESIGNATING SILENCERS

Model: 5UGLFS-24-18

Length: 5' Type: UGLFS Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3UGLFS	-2000 -1000 0 1000 2000	6 6 5 6 5	13 12 12 11 9	25 24 24 22 20	32 32 32 30 29	28 27 28 27 26	20 20 21 21 20	17 19 19 18 18	14 14 14 14 14
5UGLFS	-2000 -1000 0 1000 2000	11 11 10 10	23 22 20 17 14	39 36 35 31 29	46 45 43 40 38	44 44 43 41 39	27 29 29 28 29	24 25 24 22 20	19 18 17 14
7UGLFS	-2000 -1000 0 1000 2000	12 12 10 10	27 23 24 22 23	43 43 40 35 37	50 48 45 42 45	49 49 46 43 44	33 36 32 29 28	21 25 23 20 19	18 17 16 17
10UGLFS	-2000 -1000 0 1000 2000	16 15 16 14 13	32 31 30 26 24	48 52 51 48 47	52 51 52 54 56	52 54 54 53 55	43 45 47 49	24 30 32 33 36	18 19 20 24 26



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75	35 59 83 -	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166	54 89 125 178	64 104 146 209	74 121 175 250
Nominal	W/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	82 136 196 280	92 152 218	102 157 240	89 147 207 295	106 174 244 349	124 204 293 417	139 230 330 470	153 256 -	172 274 -	108 178 -	128 208 -	148 242 -	164 272 -	184 304 -	204 314 -

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w	.g.											
UGLFS	3 5 7 10	0.04 0.04 0.04 0.04	0.05 0.06 0.06 0.06	0.07 0.08 0.08 0.09	0.09 0.10 0.10 0.11	0.11 0.13 0.13 0.14	0.14 0.16 0.16 0.18	0.17 0.19 0.20 0.21	0.20 0.22 0.23 0.26	0.24 0.26 0.28 0.30	0.28 0.31 0.32 0.35	0.32 0.35 0.37 0.40	0.36 0.40 0.42 0.45	0.41 0.45 0.47 0.51	0.46 0.51 0.53 0.57	0.51 0.56 0.59 0.64	0.57 0.62 0.65 0.71
Silencer Velocity		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	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
UGLFS All Sizes	-2,000	58	54	58	61	62	62	65	63
	-1,500	51	49	53	56	56	59	60	53
	-1,000	45	42	45	43	45	49	44	37
	1,000	46	42	45	43	45	49	44	37
	1,500	56	54	57	56	52	56	57	51
	2,000	68	64	65	66	61	61	64	61

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

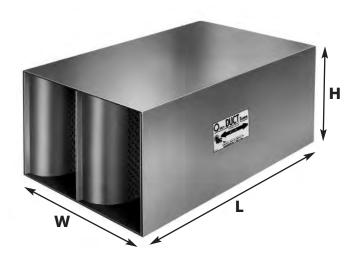
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT ULTRA™/GREEN SILENCERS

TYPE: UGLFM

ENVIRONMENTALLY SOUND SILENCERS with FORWARD and REVERSE FLOW Ratings



In response to the current trend for environmentally friendly building products, IAC America introduces Quiet-Duct Ultra™ /Green, a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material. Quiet-Duct Ultra™ /Green delivers performance that meets or exceeds that of a standard Quiet-Duct™ silencer in almost every situation. The tests were measured in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory.

DESIGNATING SILENCERS

Model: 5UGLFM-24-18

Length: 5' Type: UGLFM Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ULFM	-2000 -1000 0 1000 2000	5 4 3 2 2	9 8 8 6 6	17 17 16 14 14	24 25 24 22 22	20 20 20 18 18	13 14 14 13 12	14 15 14 12	12 11 10 10
5ULFM	-2000 -1000 0 1000 2000	6 6 6 6 5	17 15 14 12 10	28 27 27 24 23	37 37 36 34 32	31 31 31 30 30	16 18 18 18 18	18 21 19 15	16 15 14 10 9
7ULFM	-2000 -1000 0 1000 2000	10 9 9 9	21 19 19 15	35 33 32 29 28	44 42 42 43 42	38 40 40 39 40	20 22 22 23 23	16 20 19 18	16 15 14 16 16
10ULFM	-2000 -1000 0 1000 2000	13 12 13 12 11	26 23 23 20 19	43 42 41 39 37	51 50 51 52 52	49 50 51 51 52	25 28 28 29 29	19 24 23 22 22	17 17 16 17 19



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75	35 59 83 -	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166	54 89 125 178	64 104 146 209	74 121 175 250
Nominal	W/ In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	82 136 196 280	92 152 218 -	102 157 240	89 147 207 295	106 174 244 349	124 204 293 417	139 230 330 470	153 256 -	172 274 - -	108 178 - -	128 208 - -	148 242 - -	164 272 - -	184 304 -	204 314 -

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Dr	op, i.w	.g.											
UGLFM	3 5 7 10	0.05 0.05 0.05 0.06	0.07 0.07 0.07 0.08	0.09 0.10 0.10 0.12	0.12 0.13 0.13 0.15	0.15 0.16 0.17 0.19	0.19 0.20 0.21 0.24	0.23 0.24 0.25 0.29	0.27 0.29 0.30 0.34	0.32 0.34 0.35 0.40	0.37 0.39 0.41 0.46	0.42 0.45 0.47 0.53	0.48 0.51 0.53 0.60	0.55 0.57 0.60 0.68	0.61 0.64 0.67 0.76	0.68 0.72 0.75 0.85	0.76 0.79 0.83 0.94
Silencer Velocity		500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
UGLFM All Sizes	-3,000	64	62	64	66	65	64	66	62
	-2,000	53	50	54	56	56	59	58	51
	-1,000	42	40	43	45	47	46	37	27
	1,000	47	34	36	35	40	37	27	20
	2,000	54	52	58	56	51	56	55	50
	3,000	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!

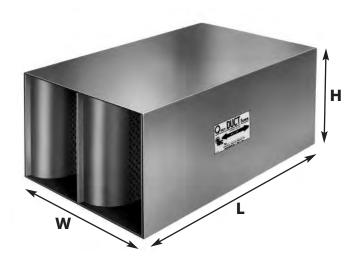
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT ULTRA GREEN SILENCERS

TYPE: UGLFL

ENVIRONMENTALLY SOUND SILENCERS with FORWARD and REVERSE FLOW Ratings



In response to the current trend for environmentally friendly building products, IAC America introduces Quiet-Duct Ultra™ /Green, a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material. Quiet-Duct Ultra™ /Green delivers performance that meets or exceeds that of a standard Quiet-Duct™ silencer in almost every situation. The tests were measured in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory.

DESIGNATING SILENCERS

Model: 5UGLFL-24-18

Length: 5' Type: UGLFL Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3UGLFL	-2000 -1000 0 1000 2000	3 3 3 3 3	7 8 9 9	15 14 16 16 15	20 20 23 25 25	19 18 23 26 25	11 12 16 20 13	14 15 14 13	12 11 10 10
5UGLFL	-2000 -1000 0 1000 2000	5 5 5 4 4	12 12 11 8 7	22 20 20 17 16	31 31 30 27 27	31 30 29 26 25	14 17 16 15	20 21 18 13	16 15 13 9
7UGLFL	-2000 -1000 0 1000 2000	8 7 6 6 5	18 15 15 12 10	28 25 25 23 20	38 37 38 39 38	31 32 32 31 32	16 18 18 19	16 18 17 16	15 14 13 15
10UGLFL	-2000 -1000 0 1000 2000	10 9 9 9 7	23 20 19 15 13	34 33 31 28 26	42 41 43 46 47	41 43 43 42 43	18 21 21 22 22	19 21 20 19	17 16 15 16



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75	35 59 83 -	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166	54 89 125 178	64 104 146 209	74 121 175 250
Nominal	W/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	82 136 196 280	92 152 218 -	102 157 240	89 147 207 295	106 174 244 349	124 204 293 417	139 230 330 470	153 256 -	172 274 - -	108 178 - -	128 208 -	148 242 -	164 272 -	184 304 -	204 314 -

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w	.g.											
UGLFL	3 5 7 10	0.01 0.01 0.01 0.02	0.05 0.05 0.05 0.06	0.08 0.08 0.09 0.10	0.11 0.12 0.12 0.14	0.15 0.16 0.17 0.19	0.19 0.20 0.22 0.24	0.24 0.26 0.28 0.31	0.30 0.32 0.34 0.38	0.36 0.39 0.41 0.46	0.43 0.46 0.49 0.55	0.51 0.54 0.57 0.64	0.59 0.63 0.67 0.74	0.68 0.72 0.77 0.86	0.77 0.82 0.87 0.97	0.87 0.92 0.98 1.10	0.97 1.04 1.10 1.23
Silence Velocity		400	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
UGLFL All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	55 46 31 32 47 56	54 45 30 24 42 53	56 48 34 32 46 54	57 49 35 25 44 55	56 50 40 34 46 53	59 54 45 39 51 58	61 49 28 24 46 59	56 42 20 20 38 53

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

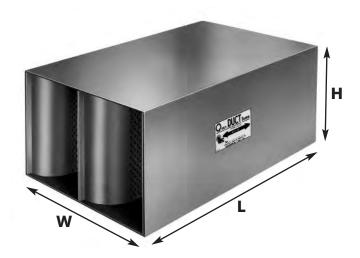
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT ULTRA™/GREEN SILENCERS

TYPE: UGS

ENVIRONMENTALLY SOUND SILENCERS with FORWARD and REVERSE FLOW Ratings



In response to the current trend for environmentally friendly building products, IAC America introduces Quiet-Duct Ultra™ /Green, a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material. Quiet-Duct Ultra™ /Green delivers performance that meets or exceeds that of a standard Quiet-Duct™ silencer in almost every situation. The tests were measured in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory.

DESIGNATING SILENCERS

Model: 5UGS-24-18

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

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3UGS	-1500 -1000 -750 750 1000 1500	4 3 3 3 3 3	9 9 8 6 6 6	18 17 16 14 14	35 35 34 31 31 29	41 40 41 39 39 38	36 36 36 35 35 35	22 23 24 25 25 25	14 15 16 16 16
5UGS	-1500 -1000 -750 750 1000 1500	8 8 8 6 6 5	15 14 13 10 10	28 26 26 23 22 21	46 45 45 44 43 42	47 46 46 46 46 46	42 45 45 45 45 45	35 37 37 38 38 38	21 22 22 23 24 24
7UGS	-1500 -1000 -750 750 1000 1500	12 11 10 7 7 6	22 20 19 15 15	35 33 33 28 27 27	48 47 47 48 48	46 47 47 47 47 48	44 46 46 46 46 46	39 44 44 44 44	24 25 26 32 33 34
10UGS	-1500 -1000 -750 750 1000 1500	14 14 13 10 10	27 30 27 21 21 19	43 42 41 40 39 39	45 45 45 47 46 47	47 47 47 48 48 48	46 46 46 46 46 47	41 46 46 47 47 46	31 32 33 42 43 44



Nominal	W/ In	6	6	6	12	12	12	12	12	12	12
Length	H/ In	12	24	36	12	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	22 40 55 77	35 63 88 123	49 87 122 171	33 56 78 111	43 73 102 155	52 89 125 177	62 107 150 212	74 125 176 250	83 141 199 -	93 158 226
Nominal	W, In	24	24	24	24	24	24	36	36	36	36
Length	H, In	18	24	30	36	42	48	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	71 121 170 241	86 147 207 293	102 173 243 345	117 204 288 405	132 230 325	147 256 362	142 249 - -	162 284 - -	182 319 -	204 355 - -

Table III: Aerodynamic Performance

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

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 = (Actual FV/Catalog FV)²(Catalog PD).

Table IV: Self-Noise Power Levels,

dB re: 10-12 Watts

	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
IAC Model	Silencer Face Velocity, fpm	03	123	230	300	IK	2N	411	or.
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

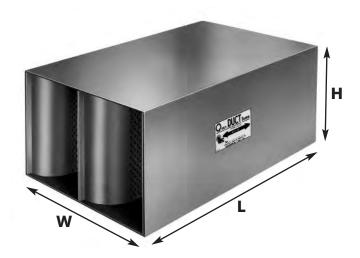
Self-Noise values shown are for a four-square-foot area silencer. For each doubling of the face area add three dB; for each halving of the face area, subtract three dB from the values in Table IV.



QUIET-DUCT ULTRA™/GREEN SILENCERS

TYPE: UGMS

ENVIRONMENTALLY SOUND SILENCERS with FORWARD and REVERSE FLOW Ratings



In response to the current trend for environmentally friendly building products, IAC America introduces Quiet-Duct Ultra™ /Green, a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material. Quiet-Duct Ultra™ /Green delivers performance that meets or exceeds that of a standard Quiet-Duct™ silencer in almost every situation. The tests were measured in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory.

DESIGNATING SILENCERS

Model: 5UGMS-24-18

Length: 5' Type: UGMS Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3UGMS	-3,000 -2,000 -1,000 1,000 2,000 3,000	4 4 5 4 4 3	6 5 5 4 4	13 13 12 11 11	25 25 24 23 21 20	27 26 25 24 24 23	19 17 18 19 20 21	12 11 11 14 15 15	9 8 9 10 11
5UGMS	-3,000 -2,000 -1,000 1,000 2,000 3,000	4 3 2 2 2 2	11 10 9 7 7	21 20 19 16 15	41 40 39 37 35 34	42 45 43 42 42 42	30 29 28 31 31 33	16 16 16 20 20	11 11 9 13 14 14
7UGMS	-3,000 -2,000 -1,000 1,000 2,000 3,000	4 4 3 2 3 2	18 14 13 11 10 9	28 26 24 21 20 20	43 47 47 45 44	41 48 51 50 50	41 40 40 43 42 45	21 21 20 25 26 28	13 12 11 16 16
10UGMS	-3,000 -2,000 -1,000 1,000 2,000 3,000	6 6 5 4 4 4	18 19 16 14 12	33 35 32 29 26 25	42 47 47 47 47 46	41 49 51 51 51 46	44 47 50 51 50 46	28 28 28 32 34 37	16 15 14 19 21 23



Nominal	W/In	7.5	7.5	7.5	7.5	7.5	7.5	15	15	15	15	15	15	30	30	30
Length	H/In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet	Wt/Lb.	26	40	45	51	66	80	47	57	67	80	89	100	80	95	110
5 feet		46	67	80	91	112	134	80	96	114	134	150	167	135	161	187
7 feet		65	95	100	129	158	190	112	135	159	193	216	240	188	224	261
10 feet		90	135	157	180	223	270	159	192	226	273	–	–	220	319	371
A1 . I																
Nominal	W/In	30	30	30	45	45	45	45	45	45	60	60	60	60	60	60
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48

Table III: Aerodynamic Performance

Model	L/Ft.	Statio	Pressu	re Drop	o, i.w.g.												
UGMS	3 5 7 10	0.06 0.08 0.10 0.12	0.08 0.10 0.12 0.15	0.10 0.12 0.15 0.19	0.12 0.15 0.18 0.23	0.14 0.17 0.22 0.27	0.17 0.20 0.26 0.31	0.20 0.24 0.30 0.36	0.23 0.27 0.34 0.42	0.26 0.31 0.39 0.48	0.29 0.35 0.44 0.54	0.33 0.39 0.49 0.60	0.36 0.44 0.54 0.67	0.40 0.48 0.60 0.74	0.44 0.53 0.67 0.82	0.49 0.58 0.73 0.90	0.53 0.64 0.80 0.98
Silencer I		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 = (Actual FV/Catalog FV)² (Catalog PD).

Table IV: Self-Noise Power Levels,

dB re: 10-12 Watts

	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
IAC MODEL	Silencer Face Velocity, fpm								
ЗUGMS	-3,000 -2,000 -1,000 1,000 2,000 3,000	46 35 36 40 40 49	58 50 38 33 45 58	60 53 39 30 45 56	64 56 44 34 47 57	63 58 43 35 48 57	63 61 37 32 52 59	65 56 25 22 49 60	57 43 26 25 40 54
5UGMS	-3,000 -2,000 -1,000 1,000 2,000 3,000	45 37 33 34 36 50	56 48 37 32 44 57	59 53 40 30 46 56	63 56 42 32 46 57	63 57 43 35 47 55	64 61 39 29 52 59	66 57 26 22 48 61	58 43 26 25 38 54
7UGMS	-3,000 -2,000 -1,000 1,000 2,000 3,000	45 37 34 36 39 52	60 53 39 32 47 59	63 56 41 30 47 57	67 59 42 32 47 58	66 58 43 36 47 56	65 62 39 32 53 58	68 59 27 23 49 61	60 46 26 26 40 54
10UGMS	-3,000 -2,000 -1,000 1,000 2,000 3,000	46 38 35 34 38 53	59 53 42 33 49 61	64 56 43 36 51 61	66 58 43 37 53 62	65 56 43 37 52 61	63 60 39 31 54 61	67 57 27 23 50 62	58 43 26 26 41 55

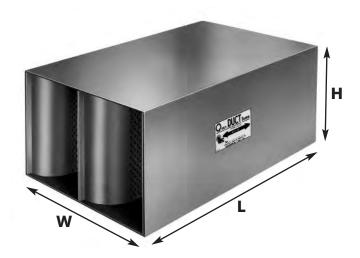
Self-Noise values shown are for a four-square-foot area silencer. For each doubling of the face area add 3dB; for each halving of the face area, subtract 3dB from the values in Table IV.



QUIET-DUCT ULTRA™/GREEN SILENCERS

TYPE: UGML

ENVIRONMENTALLY SOUND SILENCERS with FORWARD and REVERSE FLOW Ratings



In response to the current trend for environmentally friendly building products, IAC America introduces Quiet-Duct Ultra™ /Green, a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material. Quiet-Duct Ultra™ /Green delivers performance that meets or exceeds that of a standard Quiet-Duct™ silencer in almost every situation. The tests were measured in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory.

DESIGNATING SILENCERS

Model: 5UGML-24-18

Length: 5' Type: UGML Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3UGML	-3,000 -2,000 -1,000 1,000 2,000 3,000	3 2 4 4 3 2	4 4 3 3 3 3	11 10 10 8 8 7	21 21 21 19 18 17	17 17 17 16 16	10 11 11 11 11 11	7 7 8 8 8 9	5 5 6 6 7 8
5UGML	-3,000 -2,000 -1,000 1,000 2,000 3,000	6 6 5 4 4	8 7 7 6 6 5	17 16 16 14 13	35 34 34 32 31 29	30 29 29 28 29 29	16 16 17 18 18	7 8 9 10 11 12	4 4 5 9 9
7UGML	-3,000 -2,000 -1,000 1,000 2,000 3,000	6 6 6 5 5 5	10 9 9 7 7	21 20 20 18 17 16	44 43 42 40 38 37	41 40 40 39 39 39	24 23 23 24 24 24	14 14 13 13 13	10 10 10 10 11 11
10UGML	-3,000 -2,000 -1,000 1,000 2,000 3,000	7 7 7 6 6 6	14 14 12 10 10	28 27 25 23 22 22	44 48 47 48 48	44 50 51 51 51 53	33 30 30 30 31 32	17 17 14 15 16 17	11 12 11 11 12 14



Nominal	W/In	9	9	9	9	9	9	18	18	18	18	18	18	36	36	36
Length	H/In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/Lb.	35 60 84 118	41 71 100 141	52 82 116 167	57 95 133 190	65 107 150 240	73 119 167 215	52 87 122 174	61 103 144 203	71 121 168 239	84 142 200 284	94 158 223 -	104 175 247	69 120 169 238	103 175 246 349	120 201 283 403
Nominal	W/In	36	36	36	54	54	54	54	54	54	72	72	72	72	72	72
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48

Table III: Aerodynamic Performance

Model	L/Ft	Static	Pressu	re Drop	, i.w.g.												
	3	0.05 0.06	0.07 0.08	0.10 0.12	0.13 0.15	0.16 0.19	0.20 0.24	0.24 0.28	0.28 0.34	0.33 0.40	0.38 0.46	0.44 0.53	0.50 0.60	0.57 0.68	0.64 0.76	0.71 0.85	0.78 0.94
UGML	7 10	0.07 0.09	0.11 0.13	0.14 0.18	0.19	0.24	0.29	0.36 0.44	0.42	0.50 0.61	0.58 0.71	0.66 0.82	0.75 0.93	0.85	0.95 1.18	1.06 1.31	1.18 1.45
Silence																	
Velocity		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 = (Actual FV/Catalog FV)² (Catalog PD).

Table IV: Self-Noise Power Levels,

dB re: 10-12 Watts

	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
IAC MODEL	Silencer Face Velocity, fpm								
ЗUGML	-3,000 -2,000 -1,000 1,000 2,000 3,000	42 33 31 35 36 44	53 47 35 30 41 52	56 51 38 30 43 51	60 55 43 33 45 53	61 56 40 33 48 53	62 57 31 26 50 58	61 50 22 21 45 58	51 36 24 25 35 51
5UGML	-3,000 -2,000 -1,000 1,000 2,000 3,000	41 37 34 33 34 44	59 50 37 32 44 53	62 53 37 32 46 55	66 55 40 35 48 57	61 55 39 35 49 56	62 58 30 26 51 60	64 48 22 22 45 59	51 36 25 24 36 52
7UGML	-3,000 -2,000 -1,000 1,000 2,000 3,000	42 38 35 34 35 45	54 48 36 28 41 52	58 52 40 27 41 51	62 55 43 28 42 52	61 55 41 31 45 51	62 57 33 23 49 57	62 50 22 24 43 57	52 38 25 27 32 49
10UGML	-3,000 -2,000 -1,000 1,000 2,000 3,000	42 36 35 33 35 47	57 50 38 30 40 53	61 53 38 27 40 51	65 56 40 28 42 52	63 55 39 30 45 51	62 58 30 21 50 57	64 50 22 21 43 58	54 39 24 24 33 51

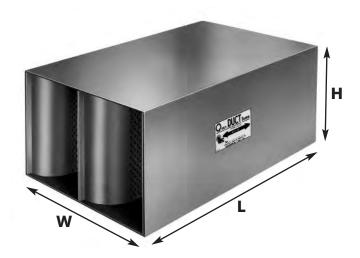
Self-Noise values shown are for a four-square-foot area silencer. For each doubling of the face area add 3dB; for each halving of the face area, subtract 3dB from the values in Table IV.



QUIET-DUCT ULTRA / GREEN SILENCERS

TYPE: UGL

ENVIRONMENTALLY SOUND SILENCERS with FORWARD and REVERSE FLOW Ratings



In response to the current trend for environmentally friendly building products, IAC America introduces Quiet-Duct Ultra™ /Green, a 100% environmentally friendly attenuation solution which uses recycled acoustic fill material. Quiet-Duct Ultra™ /Green delivers performance that meets or exceeds that of a standard Quiet-Duct™ silencer in almost every situation. The tests were measured in strict accordance with ASTM E477-99 in IAC America's NVLAP Accredited Acoustical Laboratory.

DESIGNATING SILENCERS

Model: 5UGL-24-18

Length: 5' Type: UGL Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3UGL	-3000 -2000 -1000 1000 2000 3000	1 1 1 1 1	5 5 4 4 4 4	9 9 8 7 7 7	16 15 15 14 13	21 20 19 18 18 17	18 18 18 19 19	10 10 10 11 11 11	7 7 7 8 8 8
5UGL	-3000 -2000 -1000 1000 2000 3000	3 4 3 3 2 3	9 8 7 6 6 5	15 14 13 12 11	26 25 24 23 22 21	35 33 33 30 29 28	31 31 31 31 31 31	14 14 14 15 16	8 9 9 12 11
7UGL	-3000 -2000 -1000 1000 2000 3000	3 4 4 3 3 2	13 10 9 8 8 7	19 18 17 14 14	35 34 32 30 29 28	40 41 40 38 37 35	38 39 38 39 39	17 16 16 18 19 20	10 10 10 12 12
10UGL	-3000 -2000 -1000 1000 2000 3000	5 7 7 7 6 5	18 14 12 10 10	28 25 23 21 20 19	47 45 43 41 40 39	44 47 47 48 47 47	42 46 46 47 47	21 21 21 23 25 27	11 11 12 16 17 18



Nominal	W/In	(5	12		12	2	12		12		12		12		12
Length	H/In	12	2	12		18	3	24		30		36		42		48
3 feet		24	4	33		43	3	52		62		74		83		93
5 feet	Wt/Lb.	M/4/1 h 41		56	i	73	3	89		107		125		141		158
7 feet	WU/LD.	59	9	78	1	102	2	125		150		176		199		266
10 feet			1	111		155	5	177		212		250		_		-
Nominal	W/In	24	24	24	24	24	24	36	36	36	36	36	48	48	48	48
Length	H/In	18	24	30	36	42	48	24	30	36	42	48	30	36	42	48
3 feet		71	86	102	117	132	147	121	143	163	184	205	182	209	235	261
5 feet	Wt/Lb.	121	147	173	204	230	256	211	245	279	312	346	312	353	395	438
7 feet	WU/LD.	170	207	243	288	325	362	286	351	398	445	492	_	_	-	-
10 feet		241	293	345	405	-	_	-	-	-	-	_	-	_	-	_

Table III: Aerodynamic Performance

Model	L/Ft	Static Pressure Drop, i.w.g.										
UGL	3 5	0.48 0.60	0.21	0.05 0.06	0.06 0.07	0.25 0.27	0.61 0.64					
	7 10	0.75 0.99	0.30 0.41	0.07 0.10	0.08 0.09	0.30 0.35	0.72 0.83					
Silencer Face Velocity, fpm		-3000	-2000	-1000	1000	2000	3000					

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 = (Actual FV/Catalog FV)² (Catalog PD).

Table IV: Self-Noise Power Levels,

dB re: 10-12 Watts

	Octave Band Hz	1 63	2	3	4	5	6	7	8
IAC MODEL	Silencer Face Velocity, fpm	0.5	125	250	500	1K	2K	4K	8K
ЗUGL	-3,000	50	55	58	61	64	69	66	52
	-2,000	37	49	53	56	61	61	48	34
	-1,000	38	34	38	41	41	31	23	26
	1,000	33	30	33	36	36	28	23	26
	2,000	41	45	47	49	52	52	45	32
	3,000	62	64	58	59	60	61	59	50
5UGL	-3,000	48	53	55	58	62	65	64	52
	-2,000	36	46	51	53	59	60	50	35
	-1,000	34	35	37	40	42	31	23	26
	1,000	34	30	29	32	33	24	24	25
	2,000	35	43	43	43	49	50	42	30
	3,000	48	54	54	54	56	59	57	49
7UGL	-3,000 -2,000 -1,000 1,000 2,000 3,000	48 42 33 32 36 54	54 46 31 31 45 56	56 52 34 30 45 56	59 53 38 33 45 56	63 60 41 34 50	69 60 30 23 52 61	66 48 23 22 43 59	52 35 26 26 31 50
10UGL	-3,000	51	54	55	57	61	66	64	52
	-2,000	37	47	51	52	58	59	48	37
	-1,000	34	32	35	39	40	29	23	26
	1,000	32	28	26	31	32	22	23	26
	2,000	35	44	44	43	49	50	41	30
	3,000	52	56	56	55	55	60	57	49

Self-Noise values shown are for a four-square-foot area silencer. For each doubling of the face area add 3dB; for each halving of the face area, subtract 3dB from the values in Table IV.



1.01 GENERAL

A. Furnish and install "Quiet-Duct Ultra™ /ZAPD" (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. Filler material shall be 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.
- 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:

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. 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 job-site 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: 24x24, 24x30, or 24x36.

5.01 AERODYNAMIC PERFORMANCE

 A. IAC Quiet-Duct Ultra™ /ZAPD silencers do not introduce any additional pressure drop into the system.

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.

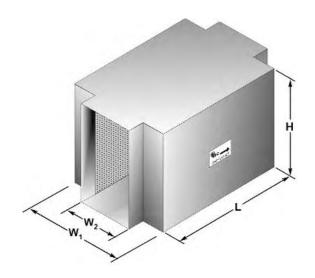
7.01 DUCT TRANSITIONS

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



TYPE: Z6A

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z6A 6 x 12

Length: 5' Type: Z6A W₂: 6" Height: 12"

All Z6A Silencers have W₁ = 12"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

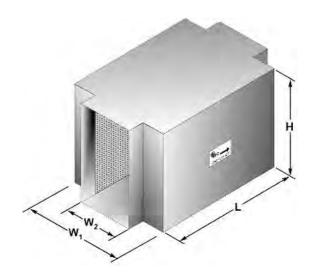
Silencer Length,	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ft	Face Velocity, fpm								
3	-2,000 -1,000 0 1,000 2,000	1 1 1 1	3 3 3 3	7 7 7 7 6	14 14 14 14	9 9 8 7 8	10 11 12 13 13	4 5 6 7 7	4 4 4 4
5	-2,000 -1,000 0 1,000 2,000	1 1 1 1 2	5 5 5 5	13 12 12 12 12	26 26 26 26 26	22 23 23 23 23 23	20 19 21 22 22	10 12 12 12 12	7 8 7 6 7
7	-2,000 -1,000 0 1,000 2,000	2 2 2 2 2	7 7 7 7 7	17 17 17 16 16	36 36 36 36 36	29 30 29 29 30	27 28 29 31 31	13 15 16 17 17	10 11 10 9
10	-2,000 -1,000 0 1,000 2,000	4 4 4 4	10 10 10 10 10	24 24 23 23 22	50 50 49 49 49	37 38 36 35 36	37 38 41 43 43	17 20 22 24 24	13 16 14 12 13





TYPE: Z6B

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z6B 6 x 12

Length: 5' Type: Z6B W₂: 6" Height: 12"

All Z6B Silencers have W₁ = 15"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

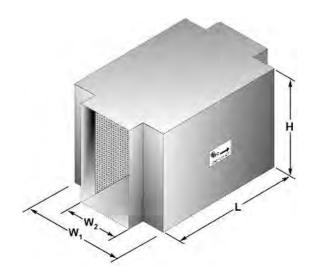
Silencer Length,	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ft	Face Velocity, fpm								
3	-2,000 -1,000 0 1,000 2,000	2 2 2 2 2	5 5 5 4	9 9 9 9	12 13 13 13 13	9 9 8 7 8	11 11 12 13 13	5 5 6 7 7	4 4 4 3 4
5	-2,000 -1,000 0 1,000 2,000	4 4 3 3 3	9 9 8 8 8	18 18 17 17	25 25 25 25 25 25	22 23 23 23 23 23	20 19 21 22 22	11 12 12 12 12	8 9 8 6 7
7	-2,000 -1,000 0 1,000 2,000	5 5 5 5 4	13 12 12 11 11	25 25 24 24 24	35 35 35 35 35	29 30 29 29 29	27 28 29 31 31	14 16 16 17 17	10 12 10 9
10	-2,000 -1,000 0 1,000 2,000	8 7 7 7 6	18 17 16 16 15	33 33 33 33 33	46 46 47 47 47	37 38 36 35 35	38 39 41 43 43	18 21 22 23 24	14 16 14 12 13





TYPE: Z6C

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z6C 6 x 12

Length: 5' Type: Z6C W₂: 6" Height: 12"

All Z6C Silencers have W₁ = 20"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

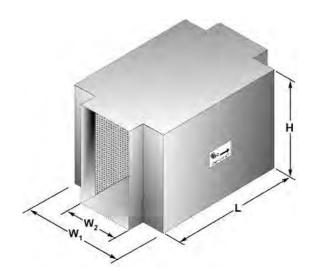
Silencer Length,	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ft	Face Velocity, fpm	33							5.1
3	-2,000 -1,000 0 1,000 2,000	4 4 3 3 3	7 7 7 7	10 11 11 11	10 10 11 11 11	9 9 8 7 7	11 12 12 13 13	5 5 6 7 7	4 4 4 3 4
5	-2,000 -1,000 0 1,000 2,000	6 6 6 5	13 13 12 12 12	21 21 21 21 20	23 24 24 24 24	23 23 23 23 23	19 20 21 22 22	11 12 12 12 12	8 9 8 6 7
7	-2,000 -1,000 0 1,000 2,000	9 8 8 8 7	19 18 18 17 16	30 30 30 29 29	32 32 33 33 33	29 30 30 29 29	27 28 30 31 31	15 16 16 17 17	11 12 10 9
10	-2,000 -1,000 0 1,000 2,000	13 12 11 11 10	26 25 24 24 23	38 38 38 38 38	41 41 41 42 42	37 38 37 35 35	38 39 41 43 44	20 21 22 23 24	15 16 14 12 13





TYPE: Z6D

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z6D 6 x 12

Length: 5' Type: Z6D W₂: 6" Height: 12"

All Z6D Silencers have W₁ = 24"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

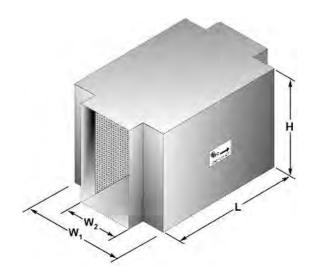
Silencer Length, ft	Octave Band Hz Face Velocity,	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
	fpm								
3	-2,000 -1,000 0 1,000 2,000	4 4 4 4	9 8 8 8	11 11 11 11 11	9 9 10 10	9 9 8 7 7	11 12 12 13 13	5 6 6 7 7	4 5 4 3 4
5	-2,000 -1,000 0 1,000 2,000	8 7 7 7 6	15 15 14 14 14	23 22 22 22 22	24 24 24 24 24	22 23 23 23 23 23	19 20 21 22 22	12 12 12 11 12	8 9 7 6 6
7	-2,000 -1,000 0 1,000 2,000	11 10 10 9	21 21 20 20 19	31 31 30 30 30	31 31 31 31 31	30 31 30 29 29	28 28 30 31 31	15 16 16 17 17	11 12 10 8 9
10	-2,000 -1,000 0 1,000 2,000	15 14 14 13 12	30 29 28 27 27	40 40 40 40 40	39 40 40 40 41	38 39 37 35 35	38 39 41 43 43	20 21 22 23 24	16 16 14 12 12





TYPE: Z6E

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z6E 6 x 12

Length: 5' Type: Z6E W₂: 6" Height: 12"

All Z6E Silencers have W₁ = 30"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

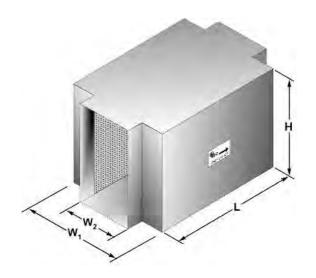
Silencer	Octave Band	1	2	3	4	5	6	7	8
Length,	Hz	63	125	250	500	1K	2K	4K	8K
ft	Face Velocity, fpm								
3	-2,000 -1,000 0 1,000 2,000	5 5 5 4	10 10 9 9	11 11 11 11 11	10 10 10 10 10	9 9 8 7 7	11 12 12 13 13	5 6 6 7 7	4 5 4 3 3
5	-2,000	9	17	23	23	23	19	12	9
	-1,000	9	16	23	23	23	20	12	9
	0	8	16	23	23	23	21	12	7
	1,000	8	16	23	23	23	21	11	6
	2,000	8	15	23	23	23	22	12	6
7	-2,000	12	23	31	32	30	28	16	12
	-1,000	12	23	31	32	31	29	16	12
	0	12	22	31	32	30	30	16	10
	1,000	11	22	31	32	29	31	17	8
	2,000	11	21	31	32	29	31	17	9
10	-2,000	17	33	41	40	38	39	21	16
	-1,000	17	32	41	40	39	40	21	17
	0	16	32	41	40	37	41	22	14
	1,000	16	31	41	40	35	43	23	11
	2,000	15	30	41	40	35	43	23	12





TYPE: Z9A

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z9A 6 x 12

Length: 5' Type: Z9A W₂: 9" Height: 12"

All Z9A Silencers have W₁ = 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

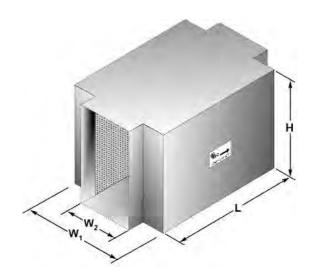
Silencer Length,	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ft	Face Velocity, fpm								
3	-2,000 -1,000 0 1,000 2,000	1 1 1 1	3 3 3 3	9 8 8 8	13 13 13 13 13	13 14 13 13 13	6 7 7 7	3 4 4 4 4	4 4 3 2 3
5	-2,000 -1,000 0 1,000 2,000	2 2 2 2 2	6 6 6 6	15 15 14 14 14	25 25 24 24 24	23 23 24 24 24	11 11 11 11 11	6 7 7 7 7	7 7 6 4 4
7	-2,000 -1,000 0 1,000 2,000	3 3 3 3	9 8 8 8	21 21 20 20 19	35 35 34 34 33	33 34 33 33 33	15 16 16 16 17	9 11 10 10	10 10 8 6 6
10	-2,000 -1,000 0 1,000 2,000	5 5 5 4	12 12 11 11 11	29 29 28 28 27	47 46 46 46 46	45 46 46 46 46	21 22 23 23 23	12 14 14 14 14	14 14 11 8 9





TYPE: Z9B

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z9B 6 x 12

Length: 5' Type: Z9B W₂: 9" Height: 12"

All Z9B Silencers have W₁ = 20"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

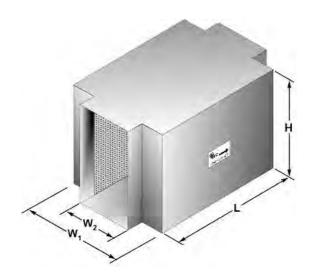
Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3	-2,000 -1,000 0 1,000 2,000	2 2 2 2 2	5 5 4 4 4	9 9 9 9	12 12 12 12 12	13 14 14 13 13	6 7 7 7 7	3 4 4 4 4	4 4 3 2 3
5	-2,000 -1,000 0 1,000 2,000	3 3 3 3	8 8 8 7 7	17 16 16 16 16	24 24 24 23 23	23 23 23 24 24	11 11 11 11 11	6 7 7 7 7	7 7 6 4 4
7	-2,000 -1,000 0 1,000 2,000	5 5 4 4 4	12 11 11 10 10	24 23 23 23 22	34 33 33 33 33	33 34 33 33 33	16 16 16 16 17	9 11 10 10	10 10 8 6 6
10	-2,000 -1,000 0 1,000 2,000	7 7 7 6 6	16 16 15 15	32 32 31 31 31	44 44 44 44	45 47 46 46 46	22 22 23 23 23	12 14 14 14 14	14 14 11 8 9





TYPE: Z9C

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z6C 6 x 12

Length: 5' Type: Z9C W₂: 9" Height: 12"

All Z9C Silencers have W₁ = 22 1/2"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

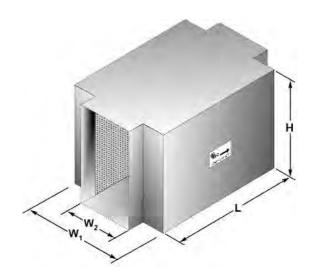
Silencer Length,	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ft	Face Velocity, fpm								
3	-2,000 -1,000 0 1,000 2,000	3 3 3 2 2	6 6 6 5	10 10 10 10 10	11 11 12 12 12	13 14 14 13 13	6 7 7 7 7	3 4 4 4 4	4 4 3 2 3
5	-2,000 -1,000 0 1,000 2,000	5 4 4 4 4	10 10 10 9 9	18 18 18 18	23 23 23 23 23	23 23 24 24 24	11 11 11 11 11	7 7 7 7 7	7 7 6 4 4
7	-2,000 -1,000 0 1,000 2,000	7 6 6 6 5	15 14 14 13 13	26 26 25 25 25	32 32 32 32 32	33 34 34 33 33	16 16 16 16 17	9 11 10 10	10 10 8 6 6
10	-2,000 -1,000 0 1,000 2,000	9 9 8 8 8	20 20 19 18 18	35 34 34 34 34	42 42 42 42 42	45 47 46 46 46	22 22 23 23 23	12 14 14 14 14	14 14 11 8 9





TYPE: Z9D

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z9D 6 x 12

Length: 5' Type: Z9D W₂: 9" Height: 12"

All Z9D Silencers have W₁ = 30"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

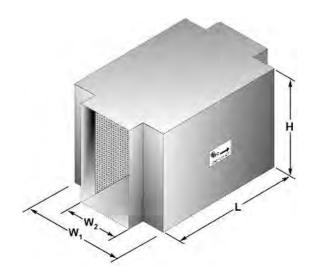
Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3	-2,000 -1,000 0 1,000 2,000	4 4 4 4 3	8 8 8 7 7	10 10 10 10 10	10 10 10 10	13 14 14 13 13	7 7 7 7 7	4 4 4 4	4 4 3 2 2
5	-2,000 -1,000 0 1,000 2,000	7 7 7 6 6	14 14 13 13 13	21 20 20 20 20	22 22 22 22 22	23 23 24 24 24	11 11 11 11 11	7 7 7 7 7	7 7 6 4 4
7	-2,000 -1,000 0 1,000 2,000	10 10 9 9	19 19 18 18	28 28 28 28 27	30 30 30 30 30	33 34 34 33 33	16 16 16 16 17	10 11 10 10	10 10 8 6
10	-2,000 -1,000 0 1,000 2,000	14 13 13 12 12	28 27 26 25 25	37 37 37 37 37	39 39 39 39 39	45 48 47 46 46	22 22 22 23 23	14 14 14 14 14	14 14 11 8 8





TYPE: Z9E

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z9E 6 x 12

Length: 5' Type: Z9E W₂: 9" Height: 12"

All Z9E Silencers have W₁ = 36"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

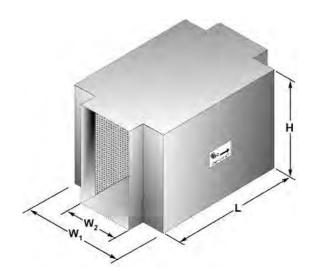
Silencer Length,	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ft	Face Velocity, fpm								
3	-2,000 -1,000 0 1,000 2,000	5 5 4 4 4	9 8 8 8	10 10 10 10 10	10 10 10 10 10	14 15 14 13 13	7 7 7 7	4 4 4 4	4 4 3 2 2
5	-2,000 -1,000 0 1,000 2,000	8 8 8 7 7	15 15 15 14 14	20 20 20 20 20 20	21 21 20 20 20	23 24 24 24 24	11 11 11 11 11	7 7 7 7 7	7 7 6 4 4
7	-2,000 -1,000 0 1,000 2,000	11 11 11 10 10	21 21 21 20 20	29 29 29 29 29 28	30 30 30 30 30	34 34 34 33 33	16 16 16 16 16	11 11 10 10	10 10 8 6 6
10	-2,000 -1,000 0 1,000 2,000	16 16 15 15 14	30 29 29 28 27	37 37 36 36 36	37 37 37 37 37	47 48 47 46 46	22 22 22 22 22 23	14 14 14 14 14	14 14 11 8 8





TYPE: Z12A

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z12A 6 x 12

Length: 5' Type: Z12A W₂: 12" Height: 12"

All Z12A Silencers have W₁ = 24"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

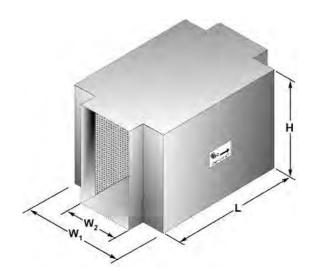
Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3	-2,000 -1,000 0 1,000 2,000	2 2 2 2 1	4 4 4 4	9 9 9 9	13 13 13 12 12	11 11 10 9 9	5 5 4 4 4	3 3 3 3	4 4 3 2 3
5	-2,000 -1,000 0 1,000 2,000	3 3 2 2 2	7 7 7 7 6	16 16 15 15	22 22 22 22 21	17 18 18 19	9 9 8 8	5 6 6 5 5	7 7 6 5 6
7	-2,000 -1,000 0 1,000 2,000	4 4 4 3 3	10 10 10 9 9	22 22 21 21 21	32 32 31 31 30	25 26 25 25 25 25	13 12 12 11 11	7 8 8 7 7	10 10 8 7 7
10	-2,000 -1,000 0 1,000 2,000	5 5 5 5	14 14 14 13 13	31 31 30 30 29	44 43 43 42 42	36 36 35 34 35	17 17 16 14 15	10 12 11 10 10	13 13 11 10 10





TYPE: Z12B

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z12B 6 x 12

Length: 5' Type: Z12B W₂: 12" Height: 12"

All Z12B Silencers have W₁ = 30"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

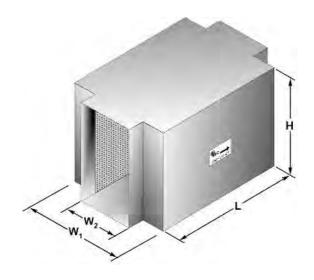
Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
	ipili								
3	-2,000 -1,000 0 1,000 2,000	3 3 3 3 2	6 6 6 6	10 9 9 9 9	11 11 11 11	11 11 10 9 9	5 5 4 4 4	3 3 3 3 3	4 4 3 2 3
5	-2,000 -1,000 0 1,000 2,000	5 5 5 4 4	11 11 10 10	18 18 18 17 17	20 20 20 20 20 20	17 18 18 19	9 9 8 8	5 6 6 5 5	7 7 6 5 6
7	-2,000 -1,000 0 1,000 2,000	7 7 7 6 6	15 15 14 14 14	25 25 24 24 24	28 28 28 28 28	25 26 25 25 25	13 12 12 11 11	7 8 8 7 7	10 10 8 7 7
10	-2,000 -1,000 0 1,000 2,000	10 10 9 9	22 21 20 20 19	34 34 33 33 33	38 38 38 38 38	35 36 35 33 34	17 17 16 14 15	10 12 11 10	13 13 11 9 10





TYPE: Z12C

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z12C 6 x 12

Length: 5' Type: Z12C W₂: 12" Height: 12"

All Z12C Silencers have W₁ = 40"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

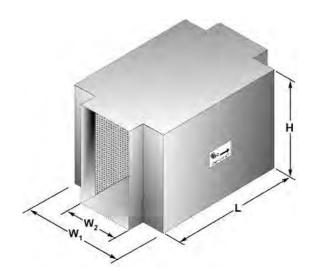
Silencer Length,	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ft	Face Velocity, fpm								
3	-2,000 -1,000 0 1,000 2,000	4 4 4 4	8 8 7 7 7	10 9 9 9	10 10 10 9 9	10 11 10 9	5 5 4 4 4	3 4 3 3 3	4 3 3 2 3
5	-2,000 -1,000 0 1,000 2,000	7 7 7 7 6	14 14 13 13 13	18 18 18 18	18 18 18 18	18 18 18 19	9 9 8 8 8	6 6 6 5 5	7 7 6 5 6
7	-2,000 -1,000 0 1,000 2,000	10 10 10 9 9	20 19 19 18 18	27 26 26 26 26 26	27 27 27 27 27 26	25 26 25 24 25	13 12 11 11	8 9 8 7 7	10 10 8 7 7
10	-2,000 -1,000 0 1,000 2,000	15 14 14 13 13	27 26 26 25 25	34 34 34 34 33	35 34 34 34 34	35 36 34 33 34	17 16 15 14 14	12 12 11 10 10	13 13 11 9 10





TYPE: Z12D

with FORWARD and REVERSE FLOW Ratings



The IAC Quiet-Duct Ultra™/ZAPD line of silencers, introduced in 2006, was designed for applications in which acoustic attenuation is required and no allowance can be made for pressure loss. A Zero-Added-Pressure-Drop silencer (ZAPD) is ideal for high velocity systems, or systems that have little or no room for additional pressure drop.

The IAC Quiet-Duct Ultra™/ZAPD silencers do not create any additional pressure drop in the system.

IAC Quiet-Duct Ultra™/ZAPD silencers have negligible Self Noise Sound Power levels.

DESIGNATING A SILENCER

Model: 5 Z12D 6 x 12

Length: 5' Type: Z12D W₂: 12" Height: 12"

All Z12D Silencers have W₁ = 48"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

Silencer Length, ft	Octave Band Hz Face Velocity,	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ii.	fpm								
3	-2,000 -1,000 0 1,000 2,000	5 5 5 4 4	8 8 8 8	10 10 10 10 10	10 10 10 10 10	11 10 9 9	5 5 4 4 4	3 4 3 3 3	4 3 3 2 2
5	-2,000 -1,000 0 1,000 2,000	8 8 8 8 7	15 15 14 14 14	18 18 18 18 17	18 17 17 17 17	18 18 18 19	9 9 8 8 8	6 6 6 5 5	7 7 6 5 5
7	-2,000 -1,000 0 1,000 2,000	11 11 11 11 10	21 21 21 20 20	26 26 25 25 25	25 25 25 25 25 25	26 26 25 24 25	12 12 11 11	8 9 8 7 7	10 10 8 7 7
10	-2,000 -1,000 0 1,000 2,000	16 16 15 15	29 29 28 28 27	35 35 34 34 34	34 34 34 33 33	36 35 34 33 34	17 16 15 14 14	12 12 11 10 10	13 13 11 9 10





QUIET-DUCT COMMERCIAL™ SERIES SILENCERS

1.01 GENERAL

A. Furnish and install "Quiet-Duct" (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. Filler material shall be 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.
- 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:

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 job-site 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: 24x24, 24x30, or 24x36,

and

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.

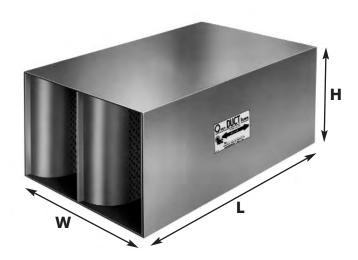
7.01 DUCT TRANSITIONS

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



TYPE: LFS

with FORWARD and REVERSE FLOW Ratings



IAC has produced Quiet-Duct HVAC silencers for more than 50 years, and has developed many of the terms and test standards for rating silencer performance that are used today. These standards are dynamic documents that continue to change based on new developments and discoveries in the field of acoustic engineering. Today we continue our involvement in several of the industry's governing agencies, and we remain committed to ensuring that we are always providing product that is in accordance with all of the latest standards. All published acoustic and aerodynamic performance results are based on tests conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP-Accredited laboratory.

DESIGNATING A SILENCER

Model: 5 LFS 24 x 18

Length: 5' Type: LFS Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3LFS	-2000 -1000 0 1000 2000	8 7 8 9 7	14 13 13 12 11	25 23 23 22 21	29 28 28 28 28 25	27 26 27 27 25	20 20 21 21 21	16 16 17 18 17	12 14 14 14 14
5LFS	-2000 -1000 0 1000 2000	13 13 13 12 10	23 21 20 19 17	36 35 33 31 28	42 41 39 36 33	42 41 41 40 37	28 28 28 27 29	19 21 22 22 20	14 15 16 16
7LFS	-2000 -1000 0 1000 2000	14 14 13 12	25 24 24 23 22	40 42 40 37 37	50 49 47 44 44	51 49 47 45 45	35 35 34 33 34	22 24 25 25 24	16 17 17 17 17
10LFS	-2000 -1000 0 1000 2000	19 18 18 17 16	30 32 30 28 25	46 50 49 47 46	52 52 52 52 52 53	53 53 53 53 53	43 45 46 47 48	25 29 32 35 36	17 19 21 23 24



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75	35 59 83 -	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166	54 89 125 178	64 104 146 209	74 121 175 250
Nominal	W/ In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	82 136 196 280	92 152 218	102 157 240	89 147 207 295	106 174 244 349	124 204 293 417	139 230 330 470	153 256 -	172 274 -	108 178 -	128 208 -	148 242 -	164 272 -	184 304 -	204 314 -

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w	.g.											
LFS	3 5 7 10	0.04 0.04 0.04 0.04	0.05 0.06 0.06 0.06	0.07 0.08 0.08 0.09	0.09 0.10 0.10 0.11	0.11 0.13 0.13 0.14	0.14 0.16 0.16 0.18	0.17 0.19 0.20 0.21	0.20 0.22 0.23 0.26	0.24 0.26 0.28 0.30	0.28 0.31 0.32 0.35	0.32 0.35 0.37 0.40	0.36 0.40 0.42 0.45	0.41 0.45 0.47 0.51	0.46 0.51 0.53 0.57	0.51 0.56 0.59 0.64	0.57 0.62 0.65 0.71
Silence Velocity		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	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
LFS All Sizes	-2,000	58	54	58	61	62	62	65	63
	-1,500	51	49	53	56	56	59	60	53
	-1,000	45	42	45	43	45	49	44	37
	1,000	46	42	45	43	45	49	44	37
	1,500	56	54	57	56	52	56	57	51
	2,000	68	64	65	66	61	61	64	61

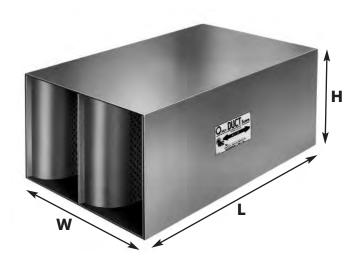
(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



TYPE: LFM

with FORWARD and REVERSE FLOW Ratings



IAC has produced Quiet-Duct HVAC silencers for more than 50 years, and has developed many of the terms and test standards for rating silencer performance that are used today. These standards are dynamic documents that continue to change based on new developments and discoveries in the field of acoustic engineering. Today we continue our involvement in several of the industry's governing agencies, and we remain committed to ensuring that we are always providing product that is in accordance with all of the latest standards. All published acoustic and aerodynamic performance results are based on tests conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP-Accredited laboratory.

DESIGNATING A SILENCER

Model: 5 LFM 24 x 18

Length: 5' Type: LFM Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity, fpm	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
3LFM	-2000 -1000 0 1000 2000	6 6 5 4 4	9 8 8 7 7	17 16 16 15 14	22 21 21 20 19	19 18 18 17 17	14 13 13 13 12	12 12 12 11	10 11 11 10
5LFM	-2000	9	16	26	32	29	17	13	13
	-1000	9	15	26	31	30	17	15	13
	0	9	14	25	30	29	17	15	13
	1000	8	13	23	29	28	17	14	13
	2000	7	12	22	28	28	17	14	12
7LFM	-2000	12	18	32	44	39	21	16	14
	-1000	12	18	32	43	39	21	18	15
	0	12	17	31	42	39	22	18	15
	1000	12	16	30	41	38	22	17	14
	2000	11	15	28	39	38	23	17	15
10LFM	-2000	16	24	41	51	51	26	20	16
	-1000	16	24	42	51	50	27	22	17
	0	16	23	41	51	50	28	22	17
	1000	15	22	39	50	50	28	21	16
	2000	14	20	38	50	50	28	22	17



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75	35 59 83 -	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166	54 89 125 178	64 104 146 209	74 121 175 250
Nominal	W/ In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	82 136 196 280	92 152 218	102 157 240	89 147 207 295	106 174 244 349	124 204 293 417	139 230 330 470	153 256 -	172 274 -	108 178 -	128 208 -	148 242 -	164 272 -	184 304 -	204 314 -

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Dr	op, i.w	.g.											
LFM	3 5 7 10	0.05 0.05 0.05 0.06	0.07 0.07 0.07 0.08	0.09 0.10 0.10 0.12	0.12 0.13 0.13 0.15	0.15 0.16 0.17 0.19	0.19 0.20 0.21 0.24	0.23 0.24 0.25 0.29	0.27 0.29 0.30 0.34	0.32 0.34 0.35 0.40	0.37 0.39 0.41 0.46	0.42 0.45 0.47 0.53	0.48 0.51 0.53 0.60	0.55 0.57 0.60 0.68	0.61 0.64 0.67 0.76	0.68 0.72 0.75 0.85	0.76 0.79 0.83 0.94
Silence Velocity		500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
LFM All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	64 53 42 47 54 68	62 50 40 34 52 64	64 54 43 36 58 64	66 56 45 35 56 63	65 56 47 40 51 61	64 59 46 37 56 63	66 58 37 27 55 66	62 51 27 20 50 63

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



TYPE: S

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 S 24 x 18

Length: 5' Type: S Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
	Face Velocity, fpm	33	.=0				<u> </u>		5.1.
35	-2000 -1000 0 1000 2000	6 5 5 5	12 11 10 9 8	20 17 16 15 14	33 33 32 30 27	39 38 38 37 36	35 35 35 35 35	23 25 26 27 27	14 14 16 17 17
5 S	-2000 -1000 0 1000 2000	10 10 9 7 6	20 19 17 17	27 26 25 23 22	45 44 43 42 40	48 47 47 46 46	43 45 46 46 46	36 38 39 40 40	22 22 24 25 25
75	-2000 -1000 0 1000 2000	12 12 11 9 8	23 22 20 18 16	37 35 33 31 31	48 47 47 47 46	50 49 49 49	45 47 47 47 48	41 44 45 45 45	27 28 31 34 35
10\$	-2000 -1000 0 1000 2000	14 14 13 12 11	26 28 25 22 19	43 42 42 41 40	50 49 49 49 50	51 51 52 52 52	50 50 50 50 50	45 49 49 49	37 37 41 44 46



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	25 44 61 86	35 63 88 123	42 75 102 150	49 87 122 171	60 105 147 206	70 126 176 246	43 73 102 155	52 89 125 177	62 107 150 212	74 125 176 250	83 141 199	93 158 226	71 121 170 241	86 147 207 293	102 173 243 345
Nominal	W/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	117 204 288 405	132 230 325	147 256 362	81 142 -	102 177.5 -	142 249 -	162 284 -	182 319 -	204 355 -	142 242 340 482	172 294 414 586	204 346 486 690	234 408 576 810	264 460 650	294 512 724

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Dr	op, i.w.	g.											
S	3 5 7 10	0.01 0.02 0.02 0.02	0.03 0.04 0.04 0.04	0.06 0.07 0.07 0.08	0.09 0.10 0.11 0.12	0.13 0.15 0.16 0.18	0.18 0.20 0.21 0.24	0.23 0.26 0.28 0.32	0.29 0.33 0.35 0.40	0.36 0.41 0.44 0.49	0.44 0.49 0.53 0.60	0.52 0.59 0.63 0.71	0.61 0.69 0.74 0.83	0.71 0.80 0.85 0.97	0.82 0.91 0.98 1.11	0.93 1.04 1.11 1.26	1.05 1.17 1.26 1.43
Silence Velocity		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
S All Sizes	-2,000 -1,000 -500 500 1,000 2,000	68 54 40 36 55 74	62 51 40 29 49 69	61 50 39 35 49 63	66 51 36 30 47 64	61 54 47 31 46 61	64 56 48 35 49 63	67 52 37 22 42 62	66 40 20 20 32 56

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



TYPE: ES

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 ES 24 x 18

Length: 5' Type: ES Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band	1	2	3	4	5	6	7	8
MODEL	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm								
3ES	-2000	5	8	18	31	38	36	22	16
	-1000	3	8	17	31	38	36	22	17
	0	3	6	16	29	38	35	22	18
	1000	2	5	14	27	36	34	23	17
	2000	2	5	12	25	34	34	23	18
5ES	-2000 -1000 0 1000 2000	10 10 9 7 6	16 15 12 12	25 24 22 19	41 40 38 37 35	52 50 51 51 49	48 50 50 49 49	26 31 33 35 35	17 20 22 23 24
7ES	-2000	11	20	39	53	51	53	37	21
	-1000	11	21	36	51	53	53	43	25
	0	10	19	33	50	53	53	46	29
	1000	7	16	31	50	53	52	46	32
	2000	6	15	29	48	54	50	48	34
10ES	-2000	15	31	40	53	54	53	43	24
	-1000	13	33	44	51	51	53	48	26
	0	11	28	43	52	52	53	49	32
	1000	9	25	41	52	51	54	49	37
	2000	7	24	38	53	51	54	50	39



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	25 44 61 86	35 63 88 123	42 75 102 150	49 87 122 171	60 105 147 206	70 126 176 246	43 73 102 155	52 89 125 177	62 107 150 212	74 125 176 250	83 141 199	93 158 226	71 121 170 241	86 147 207 293	102 173 243 345
Nominal	W/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	117 204 288 405	132 230 325	147 256 362	81 142 -	102 177.5 -	142 249 -	162 284 -	182 319 -	204 355 -	142 242 340 482	172 294 414 586	204 346 486 690	234 408 576 810	264 460 650	294 512 724

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w	.g.											
ES	3 5 7 10	0.01 0.01 0.01 0.02	0.02 0.02 0.03 0.04	0.04 0.04 0.05 0.07	0.06 0.06 0.08 0.11	0.08 0.09 0.12 0.16	0.11 0.12 0.17 0.22	0.14 0.15 0.22 0.28	0.18 0.19 0.28 0.36	0.22 0.24 0.34 0.44	0.27 0.29 0.41 0.54	0.32 0.34 0.49 0.64	0.37 0.40 0.57 0.75	0.43 0.46 0.67 0.87	0.50 0.53 0.76 1.00	0.57 0.60 0.87 1.13	0.64 0.68 0.98 1.28
Silence Velocity		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
ES All Sizes	-2,000 -1,500 -1,000 1,000 1,500 2,000	56 47 41 42 50 60	54 47 41 35 47 57	58 52 45 33 44 54	60 55 47 32 41 50	61 57 52 34 43 49	65 63 60 33 45 53	69 64 48 27 43 53	64 54 38 22 41 50

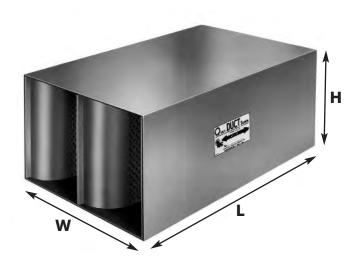
(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



TYPE: MS

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 MS 30 x 18

Length: 5' Type: MS Width: 30" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity, fpm	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
3MS	-4000	5	7	14	24	27	20	12	9
	-2000	6	7	13	24	26	19	13	9
	0	5	7	13	23	25	20	15	10
	2000	4	6	12	21	24	21	16	11
	4000	3	5	11	18	23	22	17	11
5MS	-4000	7	12	21	38	43	32	19	10
	-2000	5	10	19	36	43	31	19	10
	0	5	10	18	35	43	32	21	12
	2000	4	9	17	34	42	33	22	14
	4000	3	8	16	32	40	34	22	15
7MS	-4000	8	17	28	41	46	41	24	13
	-2000	7	14	25	42	50	40	24	13
	0	7	14	24	42	50	42	26	15
	2000	7	13	23	41	49	44	28	17
	4000	6	11	21	40	49	45	30	19
10MS	-4000	12	21	35	43	52	47	31	18
	-2000	11	19	34	45	52	50	33	17
	0	11	18	33	45	52	51	36	19
	2000	10	17	32	45	51	52	38	21
	4000	9	14	29	44	48	50	40	23



Nominal	W/ In	7.5	7.5	7.5	7.5	7.5	7.5	15	15	15	15	15	15	30	30	30
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	26 46 65 90	40 67 95 135	45 80 100 157	51 91 129 180	66 112 158 223	80 134 190 270	47 80 112 159	57 96 135 192	67 114 159 226	80 134 193 273	89 150 216	100 167 240	80 135 188 220	95 161 224 319	110 187 261 371
Nominal	W/In	30	30	30	45	45	45	45	45	45	60	60	60	60	60	60
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Dr	op, i.w	.g.											
MS	3 5 7 10	0.06 0.08 0.10 0.12	0.08 0.10 0.12 0.15	0.10 0.12 0.15 0.19	0.12 0.15 0.18 0.23	0.14 0.17 0.22 0.27	0.17 0.20 0.26 0.31	0.20 0.24 0.30 0.36	0.23 0.27 0.34 0.42	0.26 0.31 0.39 0.48	0.29 0.35 0.44 0.54	0.33 0.39 0.49 0.60	0.36 0.44 0.54 0.67	0.40 0.48 0.60 0.74	0.44 0.53 0.67 0.82	0.49 0.58 0.73 0.90	0.53 0.64 0.80 0.98
Silence Velocity		800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
MS All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	67 60 46 44 63 74	63 56 45 32 54 64	61 56 45 36 52 60	66 56 41 34 50 58	61 57 50 31 47 56	64 59 51 32 48 58	67 58 43 29 47 59	67 49 23 21 44 57

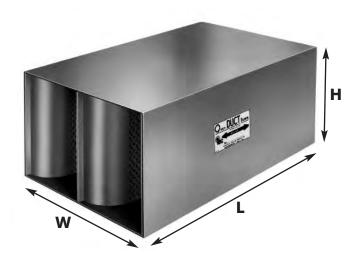
(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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 two-and-a-half squarefoot 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.



TYPE: LFL

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 LFL 24 x 18

Length: 5' Type: LFL Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band	1	2	3	4	5	6	7	8
MODEL	Hz	63	125	250	500	1K	2K	4K	8K
	Face Velocity, fpm								
3LFL	-2000	5	7	14	17	17	11	12	10
	-1000	4	7	13	17	17	11	11	10
	0	4	8	14	19	19	13	11	10
	1000	4	8	14	20	20	15	11	10
	2000	4	8	13	19	20	12	11	9
5LFL	-2000 -1000 0 1000 2000	6 7 7 6 5	12 12 11 10	19 19 18 17 16	27 27 26 24 23	28 27 26 25 25	15 15 15 14 14	15 14 13 12 12	13 13 12 11 11
7LFL	-2000	9	15	25	38	32	17	15	13
	-1000	9	14	24	38	32	17	15	14
	0	8	13	23	38	32	17	15	14
	1000	7	12	22	37	31	17	15	13
	2000	6	12	20	36	31	18	14	13
10LFL	-2000	12	20	32	43	42	20	18	15
	-1000	11	19	32	44	42	21	17	15
	0	11	18	31	44	42	21	17	15
	1000	10	17	29	44	41	21	17	15
	2000	9	16	27	44	41	21	16	15



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75	35 59 83 -	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166	54 89 125 178	64 104 146 209	74 121 175 250
Nominal	W/ In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	82 136 196 280	92 152 218	102 157 240	89 147 207 295	106 174 244 349	124 204 293 417	139 230 330 470	153 256 -	172 274 -	108 178 -	128 208 -	148 242 -	164 272 -	184 304 -	204 314 -

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w	.g.											
LFL	3 5 7 10	0.01 0.01 0.01 0.02	0.05 0.05 0.05 0.06	0.08 0.08 0.09 0.10	0.11 0.12 0.12 0.14	0.15 0.16 0.17 0.19	0.19 0.20 0.22 0.24	0.24 0.26 0.28 0.31	0.30 0.32 0.34 0.38	0.36 0.39 0.41 0.46	0.43 0.46 0.49 0.55	0.51 0.54 0.57 0.64	0.59 0.63 0.67 0.74	0.68 0.72 0.77 0.86	0.77 0.82 0.87 0.97	0.87 0.92 0.98 1.10	0.97 1.04 1.10 1.23
Silence Velocity		400	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
LFL All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	55 46 31 32 47 56	54 45 30 24 42 53	56 48 34 32 46 54	57 49 35 25 44 55	56 50 40 34 46 53	59 54 45 39 51 58	61 49 28 24 46 59	56 42 20 20 38 53

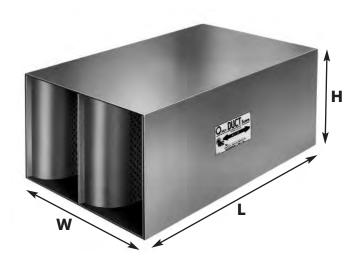
(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



TYPE: ML

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 ML 36 x 18

Length: 5' Type: ML Width: 36" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
	Face Velocity, fpm								
ЗМЬ	-5000 -2000 0 2000 5000	4 3 3 3 2	5 5 5 4 4	12 10 10 9 8	20 19 19 18 16	18 18 18 17 17	11 12 12 12 13	7 8 9 9	5 6 7 8 9
5ML	-5000 -2000 0 2000 5000	6 5 5 4 3	9 8 8 7 6	18 16 15 14	32 31 31 30 28	32 31 31 30 29	17 17 19 20 22	9 10 12 13	6 7 9 10 11
7ML	-5000 -2000 0 2000 5000	6 6 6 5 5	12 11 11 10 9	22 21 20 19 17	42 41 39 37 36	43 40 40 39 38	24 23 25 26 28	14 15 16 16	10 10 11 12 12
10 ML	-5000 -2000 0 2000 5000	9 8 8 7 7	18 17 16 15	28 27 26 25 23	46 47 46 45 44	47 50 50 49 50	34 33 35 36 36	19 20 20 20 21	11 12 12 12 12



Nominal	W/In	9	9	9	9	9	9	18	18	18	18	18	18	36	36	36
Length	H/In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/Lb.	35 60 84 118	41 71 100 141	52 82 116 167	57 95 133 190	65 107 150 240	73 119 167 215	52 87 122 174	61 103 144 205	71 121 168 239	84 142 200 284	94 158 223 -	104 175 247	69 120 169 238	103 175 246 349	120 201 283 403
	VAL/II.															
Nominal	W/In	36	36	36	54	54	54	54	54	54	72	72	72	72	72	72
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48

Table III: Aerodynamic Performance

Model	L/Ft	Statio	: Pressu	ıre Drop	o, i.w.g.												
	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	0.71	0.78
ML	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
IVIL	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 Velocity,		1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band H z Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
ML All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	64 56 42 39 58 71	59 53 42 35 52 61	59 52 41 30 46 55	63 53 38 27 43 53	60 56 49 26 42 51	62 58 50 28 45 55	63 52 37 28 45 56	59 44 20 20 39 52

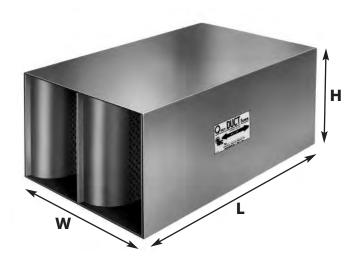
(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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)²x (Catalog PD)
- Self Noise values shown are for a three-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.



TYPE: L

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 L 24 x 18

Length: 5' Type: L Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
	Face Velocity, fpm								
3L	-5000 -2000 0 2000 5000	4 3 3 3 2	7 5 5 5 4	10 9 9 8 7	16 15 15 14 13	23 22 22 21 19	18 19 21 22 22	12 12 13 13	7 8 9 9
5L	-5000 -2000 0 2000 5000	6 5 5 5 4	10 8 8 7 6	15 14 14 13 11	25 24 23 22 20	33 32 31 30 28	32 32 34 35 35	16 16 17 18 19	9 10 12 13
7L	-5000 -2000 0 2000 5000	7 6 6 6 5	15 12 12 11 8	20 18 17 16 15	33 31 30 29 28	42 42 41 39 37	39 40 42 43 43	21 20 21 22 24	12 13 14 15 16
10L	-5000 -2000 0 2000 5000	9 9 9 9	20 16 15 14 12	28 25 24 23 21	44 42 41 40 39	47 48 48 48 47	46 48 49 49	28 28 29 29 32	16 17 19 20 22



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	29 52 72 101	35 63 88 123	42 75 105 147	49 87 122 171	56 99 139 163	63 111 156 187	43 73 102 155	52 89 125 177	62 107 150 212	74 125 176 25	83 141 199	93 158 226	71 121 170 241	86 147 207 293	102 173 243 345
Nominal	W/ In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	117 204 288 405	132 230 325	147 256 362	101 180 252	121 211 295	143 245 351	163 279 398	184 312 445	205 346 492	140 242 -	168 284 -	182 312 -	209 353 -	235 395 -	261 438 -

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Dr	op, i.w	.g.											
L	3 5 7 10	0.05 0.06 0.06 0.07	0.07 0.08 0.09 0.10	0.10 0.11 0.12 0.13	0.13 0.14 0.15 0.17	0.16 0.18 0.19 0.22	0.20 0.22 0.24 0.27	0.24 0.27 0.29 0.33	0.29 0.32 0.35 0.39	0.34 0.37 0.41 0.46	0.39 0.43 0.47 0.53	0.45 0.50 0.54 0.61	0.51 0.56 0.61 0.69	0.58 0.64 0.69 0.78	0.65 0.71 0.78 0.87	0.72 0.79 0.87 0.97	0.80 0.88 0.96 1.08
Silence Velocity		1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
L All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	64 55 41 38 57 68	59 52 41 31 51 63	58 52 41 37 51 59	62 53 38 32 49 60	60 56 49 32 47 56	62 56 48 36 50 58	62 56 38 24 44 56	58 43 20 20 35 50

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



QUIET-DUCT CLEAN-FLOW™ SILENCERS

1.01 GENERAL

A. Furnish and install "Clean-Flow" (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. Filler material shall be 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. Filler material shall be totally encapsulated and sealed with polymeric film of an appropriate thickness. The encapsulated fill material shall be separated from the interior perforated baffles by means of a noncombustible, erosion resistant, factory-installed, acoustic stand-off. It shall not be acceptable to omit the acoustic stand-off and try to compensate for its absence by means of corrugated baffles.
- 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:

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

Rectangular, inch: 24x24, 24x30, or 24x36, and 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

cross-sections:

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

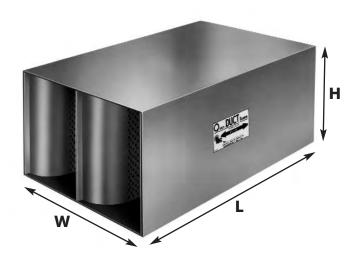
A. When transitions are required to adapt silencer dimensions to connecting duct work they shall be furnished by the installing contractor.



QUIET-DUCT CLEAN-FLOW™ SILENCERS

TYPE: HLFS

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 HLFS 24 x 18

Length: 5' Type: HLFS Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity,	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
	fpm								
3HLFS	-2000 -1000 0 1000 2000	7 7 9 7 7	13 12 14 11	15 14 15 14 14	20 20 21 20 18	19 19 19 18 17	18 18 18 15 16	16 15 15 15 14	10 10 11 10 9
5HLFS	-2000 -1000 0 1000 2000	11 11 12 12 13	18 16 16 16 15	22 23 23 23 23 22	26 26 27 26 25	25 25 25 25 25 24	21 21 21 20 20	19 19 19 18 17	13 14 14 14 13
7HLFS	-2000 -1000 0 1000 2000	14 15 15 15 15	17 17 18 18 20	23 23 23 22 22	29 30 28 25 26	31 31 29 27 26	29 29 27 24 23	22 22 20 18 17	16 16 15 14 13
10HLFS	-2000 -1000 0 1000 2000	17 15 15 15 17	24 23 23 23 22	29 30 30 30 28	35 36 34 34 34	38 39 38 38 37	37 36 37 37 37	28 28 27 27 28	19 18 19 18



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75	35 59 83 -	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166	54 89 125 178	64 104 146 209	74 121 175 250
Nominal	W/ In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	82 136 196 280	92 152 218	102 157 240	89 147 207 295	106 174 244 349	124 204 293 417	139 230 330 470	153 256 -	172 274 -	108 178 -	128 208 -	148 242 -	164 272 -	184 304 -	204 314 -

Table III: Aerodynamic Performance

Model L/ Ft Static Pressure Drop, i.w.g.																	
HLFS	3 5 7 10	0.04 0.04 0.04 0.04	0.05 0.06 0.06 0.06	0.07 0.08 0.08 0.09	0.09 0.10 0.10 0.11	0.11 0.13 0.13 0.14	0.14 0.16 0.16 0.18	0.17 0.19 0.20 0.21	0.20 0.22 0.23 0.26	0.24 0.26 0.28 0.30	0.28 0.31 0.32 0.35	0.32 0.35 0.37 0.40	0.36 0.40 0.42 0.45	0.41 0.45 0.47 0.51	0.46 0.51 0.53 0.57	0.51 0.56 0.59 0.64	0.57 0.62 0.65 0.71
Silence Velocity		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	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
HLFS All Sizes	-2,000 -1,500 -1,000 1,000 1,500 2,000	58 51 45 46 56 68	54 49 42 42 54 64	58 53 45 45 57 65	61 56 43 43 56 66	62 56 45 45 52 61	62 59 49 49 56 61	65 60 44 44 57 64	63 53 37 37 51 61

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

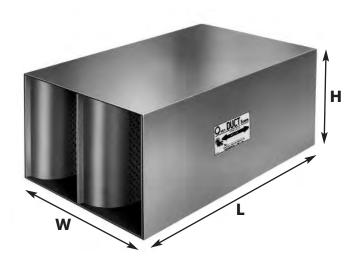
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT CLEAN-FLOW™ SILENCERS

TYPE: HLFM

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 HLFS 24 x 18

Length: 5' Type: HLFM Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3HLFM	-2000 -1000 0 1000 2000	6 6 6 4 4	8 8 7 7 7	11 11 11 10 10	15 15 16 15 14	15 15 15 14 13	14 13 12 13	13 12 11 11	8 8 8 8
5HLFM	-2000 -1000 0 1000 2000	9 8 9 8 7	14 13 12 12 11	21 21 22 20 19	23 23 23 23 22	22 23 23 22 22	16 16 16 16	13 13 14 13	10 10 10 10 9
7HLFM	-2000 -1000 0 1000 2000	11 11 11 11	16 16 16 16 15	23 24 24 23 23	29 29 29 28 28	29 29 28 27 27	19 19 20 19 21	18 19 19 18 18	13 14 14 13 14
10HLFM	-2000 -1000 0 1000 2000	14 14 15 15	21 21 21 21 20	28 28 28 27 27	31 31 32 30 30	33 32 31 32 32	23 24 25 25 25	22 23 23 23 23 23	16 17 17 16 16



Nominal Length	W/In H/In	6 18	6 24	6 30	6 36	6 42	6 48	12 18	12 24	12 30	12 36	12 42	12 48	24 18	24 24	24 30
3 feet 5 feet 7 feet 10 feet	Wt/Lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75 –	35 59 83 –	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166 –	54 89 125 178	64 104 146 209	74 121 175 250
Nominal Length	W/In H/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
	F7/111	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48

Table III: Aerodynamic Performance

Model	L/Ft	Statio	Pressu	ıre Dro	p, i.w.g												
HLFM	3 5	0.05	0.07	0.09	0.12	0.15 0.16	0.19	0.23	0.27 0.29	0.32	0.37 0.39	0.42 0.45	0.48 0.51	0.55	0.61	0.68 0.72	0.76 0.79
	10	0.05	0.07 0.08	0.10 0.12	0.13 0.15	0.17 0.18	0.21 0.24	0.25 0.29	0.30 0.34	0.35 0.40	0.41 0.46	0.47 0.53	0.53 0.60	0.60 0.68	0.67 0.76	0.75 0.85	0.83 0.94
Silencer F Velocity,		500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

	Octave Band	1	2	3	4	5	6	7	8
	Hz	63	125	250	500	1K	2K	4K	8K
IAC Model	Silencer Face Velocity, fpm								
HLFM All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	64 53 42 47 54 68	62 50 40 34 52 64	64 54 43 36 58 64	66 56 45 35 56 63	65 56 47 40 51 61	64 59 46 37 56 63	66 58 37 27 55 66	62 51 27 20 50 63

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

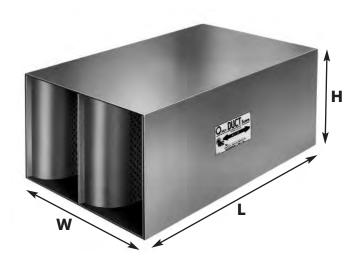
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV) ² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT CLEAN-FLOW™ SILENCERS

TYPE: HS

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 HLFS 24 x 18

Length: 5' Type: HS Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity, fpm	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
3HS	-2000	7	12	15	22	26	30	28	14
	-1000	5	9	17	25	27	32	29	14
	0	5	7	15	33	26	30	19	14
	1000	5	6	13	21	24	28	29	13
	2000	5	8	11	17	21	26	31	13
5HS	-2000 -1000 0 1000 2000	14 9 8 8	15 13 11 12 12	22 23 22 18 16	27 31 29 28 23	35 40 38 36 32	42 47 46 44 40	33 34 34 34 33	15 16 16 14 15
7HS	-2000 -1000 0 1000 2000	15 15 13 11	18 17 15 12 11	23 25 22 19 16	31 41 39 38 31	45 48 48 49 45	49 50 50 50 50	34 36 38 38 35	13 14 15 17 16
10HS	-2000	20	22	30	34	49	50	33	11
	-1000	20	24	33	44	51	51	36	11
	0	17	20	31	42	52	51	38	15
	1000	14	16	27	40	51	50	39	19
	2000	14	17	24	34	48	50	36	17



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	25 44 61 86	35 63 88 123	42 75 102 150	49 87 122 171	60 105 147 206	70 126 176 246	43 73 102 155	52 89 125 177	62 107 150 212	74 125 176 250	83 141 199	93 158 226	71 121 170 241	86 147 207 293	102 173 243 345
Nominal	W/In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	117 204 288 405	132 230 325	147 256 362	81 142 -	102 177.5 -	142 249 -	162 284 -	182 319 -	204 355 -	142 242 340 482	172 294 414 586	204 346 486 690	234 408 576 810	264 460 650	294 512 724

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w	.g.											
нѕ	3 5 7 10	0.01 0.02 0.02 0.02	0.03 0.04 0.04 0.04	0.06 0.07 0.07 0.08	0.09 0.10 0.11 0.12	0.13 0.15 0.16 0.18	0.18 0.20 0.21 0.24	0.23 0.26 0.28 0.32	0.29 0.33 0.35 0.40	0.36 0.41 0.44 0.49	0.44 0.49 0.53 0.60	0.52 0.59 0.63 0.71	0.61 0.69 0.74 0.83	0.71 0.80 0.85 0.97	0.82 0.91 0.98 1.11	0.93 1.04 1.11 1.26	1.05 1.17 1.26 1.43
Silence Velocity		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
HS All Sizes	-2,000 -1,000 -500 500 1,000 2,000	68 54 40 36 55 74	62 51 40 29 49 69	61 50 39 35 49 63	66 51 36 30 47 64	61 54 47 31 46 61	64 56 48 35 49 63	67 52 37 22 42 62	66 40 20 20 32 56

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

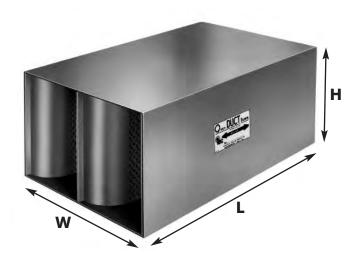
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT CLEAN-FLOW™ SILENCERS

TYPE: HMS

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 HMS 24 x 18

Length: 5' Type: HMS Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
знмѕ	-4000 -2000 0 2000 4000	4 5 5 4 4	6 6 6 4 3	10 9 9 8 7	15 15 15 14 13	18 17 17 17 16	22 21 18 17 18	16 17 17 16 17	8 8 8 8
5HMS	-4000 -2000 0 2000 4000	6 4 4 3 3	10 8 9 7 6	15 14 13 11	29 27 25 24 22	29 29 29 27 28	30 29 28 27 28	23 23 23 22 22	9 9 10 12 12
7HMS	-4000 -2000 0 2000 4000	8 7 7 7 6	15 12 13 11	21 18 17 16 15	31 33 32 30 29	30 35 34 33 34	39 38 37 34 35	28 28 26 24 26	11 11 12 13
10HMS	-4000 -2000 0 2000 4000	11 11 12 10 9	14 14 14 12 13	25 24 23 23 21	30 32 33 32 31	36 36 35 34 32	40 43 41 40 37	32 33 30 28 30	15 14 15 16 18



Nominal	W/ In	7.5	7.5	7.5	7.5	7.5	7.5	15	15	15	15	15	15	30	30	30
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	26 46 65 90	40 67 95 135	45 80 100 157	51 91 129 180	66 112 158 223	80 134 190 270	47 80 112 159	57 96 135 192	67 114 159 226	80 134 193 273	89 150 216	100 167 240	80 135 188 220	95 161 224 319	110 187 261 371
Nominal	W/ In	30	30	30	45	45	45	45	45	45	60	60	60	60	60	60
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet	Wt/ lb.	130 22 310	145 248 347	160 274 384	127 215 300	152 257 359	156 275	177 310	197 345	218 381	160 270 376	190 322 448	220 374 522	260 44 620	290 496 694	320 548 768

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w	.g.											
HMS	3 5 7 10	0.06 0.08 0.10 0.12	0.08 0.10 0.12 0.15	0.10 0.12 0.15 0.19	0.12 0.15 0.18 0.23	0.14 0.17 0.22 0.27	0.17 0.20 0.26 0.31	0.20 0.24 0.30 0.36	0.23 0.27 0.34 0.42	0.26 0.31 0.39 0.48	0.29 0.35 0.44 0.54	0.33 0.39 0.49 0.60	0.36 0.44 0.54 0.67	0.40 0.48 0.60 0.74	0.44 0.53 0.67 0.82	0.49 0.58 0.73 0.90	0.53 0.64 0.80 0.98
Silence Velocity		800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
HMS All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	67 60 46 44 63 74	63 56 45 32 54 64	61 56 45 36 52 60	66 56 41 34 50 58	61 57 50 31 47 56	64 59 51 32 48 58	67 58 43 29 47 59	67 49 23 21 44 57

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

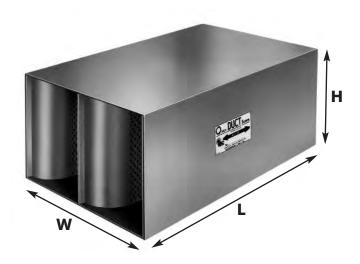
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT CLEAN-FLOW™ SILENCERS

TYPE: HLFL

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 HLFL 24 x 18

Length: 5' Type: HLFL Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3HLFL	-2000 -1000 0 1000 2000	4 3 3 3 3	6 6 6 6	10 9 10 10 9	13 13 16 17 16	16 16 16 18	11 11 13 15 12	11 10 10 10	6 7 7 7 5
5HLFL	-2000 -1000 0 1000 2000	6 7 6 5 4	8 9 8 7 7	15 15 14 14	20 20 20 19 17	23 23 22 22 21	16 17 15 14 15	14 13 13 12 12	10 10 9 8 8
7HLFL	-2000 -1000 0 1000 2000	7 6 6 6 6	12 12 12 10 10	18 17 16 16 15	25 26 26 25 23	27 27 26 25 24	25 25 24 24 26	16 17 16 18 16	11 12 11 11
10HLFL	-2000 -1000 0 1000 2000	10 8 8 8 8	15 15 14 13 12	24 24 23 22 21	33 35 33 33 32	36 36 34 33 33	25 26 26 26 26	19 18 17 17	12 12 12 12 12



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	18 29 41 59	21 35 49 70	25 42 59 84	29 47 67 95	31 52 75	35 59 83 -	35 58 82 117	42 70 98 140	50 83 118 167	57 94 134 190	61 104 150	70 117 166	54 89 125 178	64 104 146 209	74 121 175 250
Nominal	W/ In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	82 136 196 280	92 152 218	102 157 240	89 147 207 295	106 174 244 349	124 204 293 417	139 230 330 470	153 256 -	172 274 -	108 178 -	128 208 -	148 242 -	164 272 -	184 304 -	204 314 -

Table III: Aerodynamic Performance

Model	Model L/ Ft Static Pressure Drop, i.w.g.																
HLFL	3 5 7 10	0.01 0.01 0.01 0.02	0.05 0.05 0.05 0.06	0.08 0.08 0.09 0.10	0.11 0.12 0.12 0.14	0.15 0.16 0.17 0.19	0.19 0.20 0.22 0.24	0.24 0.26 0.28 0.31	0.30 0.32 0.34 0.38	0.36 0.39 0.41 0.46	0.43 0.46 0.49 0.55	0.51 0.54 0.57 0.64	0.59 0.63 0.67 0.74	0.68 0.72 0.77 0.86	0.77 0.82 0.87 0.97	0.87 0.92 0.98 1.10	0.97 1.04 1.10 1.23
Silence Velocity		400	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
HLFL All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	55 46 31 32 47 56	54 45 30 24 42 53	56 48 34 32 46 54	57 49 35 25 44 55	56 50 40 34 46 53	59 54 45 39 51 58	61 49 28 24 46 59	56 42 20 20 38 53

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

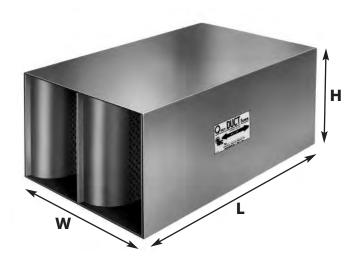
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT CLEAN-FLOW™ SILENCERS

TYPE: HML

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 HML 24 x 18

Length: 5' Type: HML Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity,	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
ЗНМL	-5000	4	4	7	14	12	7	8	4
	-2000	3	4	7	13	12	8	8	4
	0	3	4	7	13	12	7	9	5
	2000	3	2	6	12	11	8	9	6
5HML	5000 -5000 -2000 0 2000 5000	5 4 4 3 3	3 7 6 6 5 6	6 12 12 11 10	25 23 23 22 20	25 24 24 23 24	8 11 11 13 15	7 8 10 12 12	5 5 7 9
7HML	-5000 -2000 0 2000 5000	5 6 6 5	9 8 9 7	16 15 14 12 10	30 29 27 24 25	30 31 31 31 29	18 17 18 21 21	16 15 16 16	10 9 10 11
10HML	-5000	9	12	20	32	34	24	15	12
	-2000	8	12	19	33	37	23	16	12
	0	9	12	18	31	36	25	16	12
	2000	7	11	17	31	35	26	17	12
	5000	8	10	17	32	36	26	17	14



Nominal	W/ In	9	9	9	9	9	9	18	18	18	18	18	18	36	36	36
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	35 60 84 118	41 71 100 141	52 82 116 167	57 95 133 190	65 107 150 240	73 119 167 215	52 87 122 174	61 103 144 205	71 121 168 239	84 142 200 284	94 158 223	104 175 247	69 119.5 168.5 237.5	103 175 246 349	120 201 283 403
Nominal	W/In	36	36	36	54	54	54	54	54	54	72	72	72	72	72	72
Length	H/In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	138 239 337 475	153 265 374	168 291 411	121 206.5 290.5 411.5	164 278 390 554	191 322 451 642	222 381 537 759	247 423 597	272 466 658	138 239 337 475	206 350 492 698	240 402 566 806	276 478 674 950	306 530 748	336 582 822

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w.	.g.											
HML	3 5 7 10	0.05 0.06 0.07 0.09	0.07 0.08 0.11 0.13	0.10 0.12 0.14 0.18	0.13 0.15 0.19 0.23	0.16 0.19 0.24 0.29	0.20 0.24 0.29 0.36	0.24 0.28 0.36 0.44	0.28 0.34 0.42 0.52	0.33 0.40 0.50 0.61	0.38 0.46 0.58 0.71	0.44 0.53 0.66 0.82	0.50 0.60 0.75 0.93	0.57 0.68 0.85 1.05	0.64 0.76 0.95 1.18	0.71 0.85 1.06 1.31	0.78 0.94 1.18 1.45
Silence Velocity		1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
HML All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	64 56 42 39 58 71	59 53 42 35 52 61	59 52 41 30 46 55	63 53 38 27 43 53	60 56 49 26 42 51	62 58 50 28 45 55	63 52 37 28 45 56	59 44 20 20 39 52

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

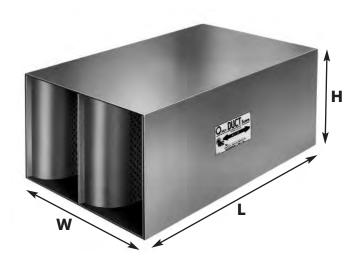
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



QUIET-DUCT CLEAN-FLOW™ SILENCERS

TYPE: HL

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 HL 24 x 18

Length: 5' Type: HL Width: 24" Height: 18"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity, fpm	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
3HL	-5000	1	2	3	8	9	20	17	10
	-2000	2	3	3	8	8	19	17	9
	0	3	4	4	8	8	18	17	8
	2000	2	4	3	7	7	17	17	6
	5000	2	4	3	5	4	12	16	5
5HL	-5000	5	9	12	18	25	32	26	10
	-2000	5	8	10	17	24	37	23	10
	0	5	8	10	16	22	36	22	10
	2000	4	6	7	15	20	33	22	9
	5000	4	5	6	11	16	28	23	8
7HL	-5000	5	10	13	21	27	32	20	10
	-2000	6	7	10	19	25	42	21	10
	0	6	8	10	18	24	41	21	9
	2000	5	7	9	16	20	38	21	8
	5000	4	6	6	13	17	32	22	8
10HL	-5000 -2000 0 2000 5000	7 9 9 8 5	12 8 8 6 6	16 12 12 11 7	26 24 23 22 18	28 29 29 28 23	30 44 46 47 40	18 20 20 20 20 21	9 9 9 8 9



Nominal	W/ In	6	6	6	6	6	6	12	12	12	12	12	12	24	24	24
Length	H/ In	18	24	30	36	42	48	18	24	30	36	42	48	18	24	30
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	29 52 72 101	35 63 88 123	42 75 105 147	49 87 122 171	56 99 139 163	63 111 156 187	43 73 102 155	52 89 125 177	62 107 150 212	74 125 176 25	83 141 199	93 158 226	71 121 170 241	86 147 207 293	102 173 243 345
Nominal	W/ In	24	24	24	36	36	36	36	36	36	48	48	48	48	48	48
Length	H/ In	36	42	48	18	24	30	36	42	48	18	24	30	36	42	48
3 feet 5 feet 7 feet 10 feet	Wt/ lb.	117 204 288 405	132 230 325	147 256 362	101 180 252	121 211 295	143 245 351	163 279 398	184 312 445	205 346 492	140 242 -	168 284 -	182 312 -	209 353 -	235 395 -	261 438 -

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Di	op, i.w	.g.			Model L/ Ft Static Pressure Drop, i.w.g.									
HL	3 5 7 10	0.05 0.06 0.06 0.07	0.07 0.08 0.09 0.10	0.10 0.11 0.12 0.13	0.13 0.14 0.15 0.17	0.16 0.18 0.19 0.22	0.20 0.22 0.24 0.27	0.24 0.27 0.29 0.33	0.29 0.32 0.35 0.39	0.34 0.37 0.41 0.46	0.39 0.43 0.47 0.53	0.45 0.50 0.54 0.61	0.51 0.56 0.61 0.69	0.58 0.64 0.69 0.78	0.65 0.71 0.78 0.87	0.72 0.79 0.87 0.97	0.80 0.88 0.96 1.08	
Silence Velocity		1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
HL All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	64 55 41 38 57 68	59 52 41 31 51 63	58 52 41 37 51 59	62 53 38 32 49 60	60 56 49 32 47 56	62 56 48 36 50 58	62 56 38 24 44 56	58 43 20 20 35 50

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



QUIET-DUCT CONIC-FLOW® SILENCERS

1.01 GENERAL

A. Furnish and install "Conic-Flow" (tubular) 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 tubular silencers shall be made of type #G-90 lock-former-quality galvanized steel in the following gauges:

Outside Diameter, in.	Metal Gauge	Outside Diameter, in.	Metal Gauge
12-36	22	38-60	18

- B. Interior construction of tubular silencers shall be compatible with the respective outside casing.
- C. Filler material shall be 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.
- 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	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. 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. Interior partitions for tubular silencers shall be secured with galvanized steel radial mounting brackets welded to the partition and the outer casing. The radial brackets shall be installed full length and at 120 degree angles to each other to assure uniform spacing for consistent aerodynamic and acoustic performance.

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 job-site 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: 24x24, 24x30, or 24x36,

and

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.



LOW FREQUENCY CONIC-FLOW SILENCERS

TYPE: FCS

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 12 FCS 36

Diameter: 12" Type: FCS Length: 36"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity, fpm	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
12FCS	-4,000	10	18	29	42	40	35	31	21
	-2,000	10	17	27	39	38	35	32	26
	0	10	16	26	36	36	36	33	26
	2,000	9	14	24	33	34	37	34	27
	4,000	8	12	22	29	33	39	35	27
24FCS	-4,000	10	18	31	41	42	35	21	15
	-2,000	10	16	29	38	40	35	22	17
	0	9	15	27	36	38	36	22	18
	2,000	8	13	25	32	37	35	23	19
	4,000	7	12	23	29	35	35	23	20
36FCS	-4,000	12	21	35	41	40	27	19	14
	-2,000	11	20	33	38	39	27	21	14
	0	10	18	31	37	38	27	22	15
	2,000	9	16	29	35	36	28	23	16
	4,000	8	14	27	33	34	28	24	17
48FCS	-4,000	15	25	39	41	37	23	15	11
	-2,000	13	22	37	39	36	23	17	12
	0	12	20	35	37	36	24	19	16
	2,000	10	18	33	35	35	24	20	16
	4,000	9	16	30	34	35	25	21	17
60FCS	-4,000	18	30	43	41	35	16	12	10
	-2,000	16	27	41	40	34	17	13	11
	0	14	25	39	39	33	19	15	13
	2,000	12	22	37	37	33	20	16	15
	4,000	10	20	34	35	33	22	18	16



Model	Duct Dia., in. Silencer L, in.		14 36	16 36	18 36	20 40	22 44	24 48	26 52
FCS	Weight, lb.	99	111	132	149	168	188	208	234
Model	Duct Dia., in. Silencer L, in.		30 60	32 64	36 72	40 80	44 88	48 96	60 120
FCS	Weight, lb.	255	374	495	600	746	951	1140	1873

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Press	ure Dr	op, i.w.	g.											
FCS	All Sizes	0.04	0.06	0.07	0.10	0.12	0.15	0.19	0.22	0.26	0.30	0.34	0.39	0.44	0.50	0.55	0.61
Silencer Velocity,	Face fpm	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
FCS All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	57 50 38 44 56 63	58 49 34 43 54 60	58 51 39 37 50 57	57 49 35 37 50 57	56 46 29 38 50 57	57 47 30 38 50 57	56 45 26 20 41 53	52 39 20 20 31 47

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



LOW FREQUENCY CONIC-FLOW SILENCERS

TYPE: FCL

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 12 FCL 36

Diameter: 12" Type: FCL Length: 36"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity,	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
	fpm								
12FCL	-4,000	8	17	25	30	35	34	23	18
	-2,000	8	16	23	29	34	34	25	19
	0	8	15	22	27	33	31	26	21
	2,000	8	14	20	25	32	27	26	23
	4,000	7	12	18	23	31	29	27	23
24FCL	-4,000	9	16	26	31	35	21	15	12
	-2,000	9	15	24	29	33	21	16	13
	0	8	14	23	28	34	23	19	15
	2,000	7	13	21	26	34	25	21	16
	4,000	6	12	20	24	32	25	21	17
36FCL	-4,000	11	20	29	33	30	20	17	12
	-2,000	10	19	28	33	29	21	18	13
	0	9	17	26	32	29	23	19	15
	2,000	8	15	24	31	29	25	20	16
	4,000	7	13	22	30	28	25	20	16
48FCL	-4,000 -2,000 0 2,000 4,000	12 12 11 9	22 20 19 17 16	33 31 29 27 24	37 36 35 33 32	30 30 30 29 28	17 18 20 22 23	13 15 17 18 18	11 13 15 16 17
60FCL	-4,000	15	26	36	38	29	15	11	10
	-2,000	14	24	34	37	29	16	12	11
	0	13	22	33	36	28	19	15	14
	2,000	11	20	31	35	27	21	17	16
	4,000	10	18	28	35	26	20	17	17



Model	Duct Dia., in. Silencer L, in.		14 36	16 36	18 36	20 40	22 44	24 48	26 52
FCL	Weight, lb.	99	111	132	149	168	188	208	234
Model	Duct Dia., in. Silencer L, in.	28 56	30 60	32 64	36 72	40 80	44 88	48 96	60 120
FCL	Weight, lb.	255	374	495	600	746	951	1140	1873

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Press	sure Dr	op, i.w.	g.											
FCL	All Sizes	0.05	0.06	0.07	0.08	0.10	0.11	0.13	0.14	0.16	0.18	0.20	0.22	0.24	0.26	0.29	0.31
Silencer Velocity,	Face fpm	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	4200	4400	4600	4800	5000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
FCL All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	56 47 31 39 52 60	56 47 32 35 48 56	55 47 32 32 46 54	56 47 31 32 46 54	55 45 30 30 45 53	55 45 30 25 42 52	50 37 20 20 39 50	45 29 20 20 25 40

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



CONIC-FLOW SILENCERS

TYPE: CS

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 12 CS 36

Diameter: 12" Type: CS Length: 36"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity, fpm	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
12CS	-4,000	9	13	22	32	36	35	31	21
	-2,000	7	10	19	31	34	35	32	26
	0	6	10	18	31	34	36	33	27
	2,000	4	9	16	30	34	37	33	27
	4,000	3	8	14	29	33	39	33	27
24CS	-4,000	10	12	20	34	43	34	20	11
	-2,000	8	11	18	34	40	35	22	13
	0	7	11	18	30	38	36	23	17
	2,000	5	11	18	26	36	37	24	20
	4,000	4	11	17	25	34	37	27	21
36CS	-4,000	11	16	22	36	38	28	19	11
	-2,000	10	15	20	35	37	29	21	12
	0	10	15	20	35	37	30	22	15
	2,000	9	14	19	35	36	31	23	17
	4,000	8	13	18	33	35	32	24	18
48CS	-4,000	12	18	23	37	36	20	13	11
	-2,000	11	17	21	36	35	22	14	12
	0	11	17	21	35	35	24	17	14
	2,000	10	16	20	34	35	26	20	16
	4,000	9	14	19	34	35	27	21	17
60CS	-4,000	13	20	25	38	33	16	11	10
	-2,000	12	19	24	36	32	18	12	11
	0	12	18	24	36	32	21	15	13
	2,000	11	17	23	35	31	23	17	15
	4,000	10	15	22	35	31	24	18	16



Model	Duct Dia., in. Silencer L, in.		14 36	16 36	18 36	20 40	22 44	24 48	26 52
cs	Weight, lb.	74	85	105	120	135	150	165	185
Model	Duct Dia., in. Silencer L, in.		30 60	32 64	36 72	40 80	44 88	48 96	60 120
cs	Weight, lb.	200	305	420	530	640	820	990	1660

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Press	ure Dr	op, i.w.	g.											
CS	All Sizes	0.06	0.08	0.11	0.15	0.19	0.23	0.28	0.33	0.39	0.45	0.52	0.59	0.67	0.75	0.83	0.92
Silencer Velocity,	Face fpm	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
CS All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	57 50 38 44 56 63	58 49 34 43 54 60	58 51 39 37 50 57	57 49 35 37 50 57	56 46 29 38 50 57	57 47 30 38 50 57	56 45 26 20 41 53	52 39 20 20 31 47

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



CONIC-FLOW SILENCERS

TYPE: CL

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 12 CL 36

Diameter: 12" Type: CL Length: 36"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC	Octave Band Hz Face Velocity,	1	2	3	4	5	6	7	8
MODEL		63	125	250	500	1K	2K	4K	8K
	fpm								
12CL	-4,000	7	9	17	32	35	34	22	12
	-2,000	4	8	16	31	34	34	24	13
	0	4	7	15	30	34	35	24	15
	2,000	4	6	13	29	34	36	24	16
	4,000	4	6	13	26	33	36	24	17
24CL	-4,000	7	9	16	28	35	21	17	12
	-2,000	6	9	14	27	35	23	18	13
	0	6	9	14	27	35	24	20	16
	2,000	5	8	13	26	34	25	22	18
	4,000	4	8	13	25	34	26	22	18
36CL	-4,000	9	12	18	32	30	19	16	11
	-2,000	8	12	17	32	29	20	17	12
	0	8	12	17	32	29	23	19	15
	2,000	7	11	16	31	29	25	20	17
	4,000	7	10	15	31	28	25	20	17
48CL	-4,000	10	15	21	34	30	17	13	10
	-2,000	10	14	20	33	30	18	14	11
	0	10	14	19	33	30	20	16	14
	2,000	9	14	18	33	29	22	18	16
	4,000	8	12	17	33	28	22	18	17
60CL	4,000 -4,000 -2,000 0 2,000 4,000	12 11 11 11 11	17 17 17 16 14	22 21 21 20 19	35 35 35 35 35	29 29 28 27 26	15 16 18 20 20	11 12 14 16 16	10 11 13 15 16



Model	Duct Dia., in. Silencer L, in.	12 36	14 36	16 36	18 36	20 40	22 44	24 48	26 52
CL	Weight, lb.	74	85	105	120	135	150	165	185
Model	Duct Dia., in. Silencer L, in.		30 60	32 64	36 72	40 80	44 88	48 96	60 120
CL	Weight, lb.	200	305	420	530	640	820	990	1660

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Press	sure Dr	op, i.w.	g.											
CL	All Sizes	0.06	0.08	0.09	0.11	0.12	0.14	0.16	0.18	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.39
Silencer Velocity,	Face , fpm	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	4200	4400	4600	4800	5000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
CL All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	56 47 31 39 52 60	56 47 32 35 48 56	55 47 32 32 46 54	56 47 31 32 46 54	55 45 30 30 45 53	55 45 30 25 42 52	50 37 20 20 39 50	45 29 20 20 25 40

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

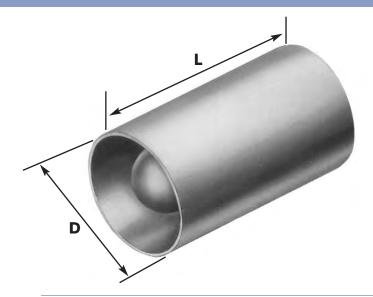
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



CONIC-FLOW SILENCERS

TYPE: NS

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 12 NS 36

Diameter: 12" Type: NS Length: 36"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
12NS	-4,000 -2,000 0 2,000 4,000	3 3 3 3	4 4 4 4	9 9 9 9	15 14 14 14 14	24 24 22 19 17	21 21 21 21 21	13 13 14 14 14	8 8 10 12 12
24NS	-4,000 -2,000 0 2,000 4,000	4 4 4 4	11 10 10 10 9	16 15 15 14 13	22 20 19 18 17	25 24 24 23 23	19 21 21 21 21	11 12 12 12 12	10 11 12 12 12
36NS	-4,000 -2,000 0 2,000 4,000	6 6 6 6	13 13 13 13 12	17 17 17 17 16	23 22 21 20 19	23 23 23 22 22	15 16 17 17 17	10 11 11 11 11	8 9 10 10
48NS	-4,000 -2,000 0 2,000 4,000	7 7 7 7 7	15 15 15 15 15	19 19 19 19	25 23 23 23 23 22	22 20 20 20 20 20	11 12 12 12 12	9 10 10 10	7 8 8 8 8
60NS	-4,000 -2,000 0 2,000 4,000	10 10 10 10 9	17 17 17 17 16	21 20 20 20 20 19	23 23 23 22 22	19 18 18 17 17	8 9 10 10	7 8 9 9	6 7 8 8 9



Model	Duct Dia., in. Silencer L, in.		14 36	16 36	18 36	20 40	22 44	24 48	26 52
NS	Weight, lb.	40	55	75	95	110	125	140	200
Model	Duct Dia., in. Silencer L, in.		30 60	32 64	36 72	40 80	44 88	48 96	60 120
NS	Weight, lb.	255	310	365	425	480	565	650	1640

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Press	ure Dr	op, i.w.	g.											
NS	All Sizes	0.05	0.08	0.10	0.13	0.17	0.21	0.25	0.30	0.36	0.41	0.47	0.54	0.61	0.68	0.76	0.84
Silencer Velocity,	Face , fpm	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
NS All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	59 51 37 44 56 63	56 48 34 37 48 54	55 47 33 33 45 52	57 48 33 32 45 53	57 49 35 35 47 54	59 51 38 31 46 55	55 44 26 20 38 50	50 36 20 20 28 43

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

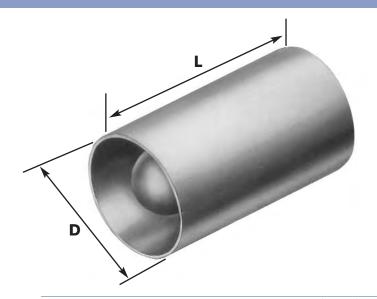
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



LOW FREQUENCY CONIC-FLOW SILENCERS

TYPE: NL

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 12 NL 36

Diameter: 12" Type: NL Length: 36"

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

IAC MODEL	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
	Face Velocity, fpm								
12NL	-4,000 -2,000 0 2,000 4,000	2 1 1 1	5 3 3 3 3	10 9 9 9	11 11 11 11 10	17 16 16 15 14	15 15 15 15 15	9 9 10 10	8 9 10 10
24NL	-4,000 -2,000 0 2,000 4,000	5 3 3 3	11 10 10 9 9	14 12 12 11 11	17 16 16 15 15	18 17 17 16 16	14 14 14 14	10 10 11 11	8 9 10 10
36NL	-4,000 -2,000 0 2,000 4,000	6 4 4 4 4	12 11 11 10 10	16 14 14 13 13	18 17 17 16 16	16 15 15 15 15	12 12 12 12 13	9 9 10 10 11	6 7 8 8
48NL	-4,000 -2,000 0 2,000 4,000	8 5 5 5	13 11 11 11 11	18 16 16 15 15	17 16 16 15 15	14 14 14 14	10 10 11 11	8 9 9 9	4 6 7 7
60NL	-4,000 -2,000 0 2,000 4,000	10 7 7 7 7	14 13 13 13 13	18 16 16 15 15	17 16 16 15 15	11 11 11 11 11	9 9 10 10	6 7 7 7 8	4 5 6 6 7



Model	Duct Dia., in. Silencer L, in.	12 36	14 36	16 36	18 36	20 40	22 44	24 48	26 52
NL	Weight, lb.	40	55	75	95	110	125	140	200
Model	Duct Dia., in. Silencer L, in.		30 60	32 64	36 72	40 80	44 88	48 96	60 120
NL	Weight, lb.	255	310	365	425	480	565	650	1640

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Press	ure Dr	op, i.w.	g.											
NL	All Sizes	0.11	0.13	0.15	0.18	0.21	0.24	0.27	0.30	0.34	0.38	0.42	0.46	0.51	0.56	0.61	0.66
Silencer Velocity,	Face , fpm	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	4200	4400	4600	4800	5000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
NL All Sizes	-3,000 -2,000 -1,000 1,000 2,000 3,000	60 53 40 39 52 59	59 51 38 35 48 56	59 51 38 32 46 54	58 51 38 32 46 54	59 51 38 30 45 53	58 50 36 25 42 52	53 41 20 21 39 50	43 32 20 20 26 40

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



D-DUCT DIFFUSER SILENCERS

1.01 GENERAL

A. Furnish and install "D-Duct" acoustic diffuser 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 tubular silencers shall be made of type #G-90 lock-former-quality galvanized steel in the following gauges based on the smallest diameter of the internal diffuser cone:

Cone Diameter, in.	Metal Gauge	Cone Diameter, in.	Metal Gauge
Up to 35.5	22	Up to 35.5	22
> 36	18	> 36	18

- B. Diffuser silencers shall include an internal core of consistent diameter along the entire length in the direction of airflow. The core diameter shall be selected based on the adjacent hub diameter or, in the case of C-frame mounted motors, the motor frame size for the respective fan system on which the diffuser silencer is installed.
- C. The internal core shall be constructed from lock-former-quality type G-90 galvanized perforated steel in the same gauge as the internal diffuser cone. The core shall be supported by a minimum of three (3) welded radial attachment brackets installed at 120 degree angles to each other to provide uniform support.
- 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	20
Smoke Development Rating	20

3.01 CONSTRUCTION

- A. Four inch long, 11 gauge, sleeved end connections shall be provided as standard. When noted, rolled angle flanges shall be factory welded to the sleeve.
- B. For units where the minimum diffuser cone diameter is 36" or greater, an additional support rod shall be welded between the radial bracket and the sleeve to prevent a twist from being exerted on the internal core by the fan's air flow.
- C. All welds shall be touched-up with zinc-rich paint after fabrication by the manufacturer.

D. The internal core and the rectangular outer jacket of the Diffuser Silencers shall be filled with glass fiber of a density sufficient to obtain the specified acoustic performance. The fill shall be packed under not less than 5% compression to eliminate voids due to vibration or settling. The fill material shall be inert, vermin- and moisture-proof.

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.

5.01 AERODYNAMIC PERFORMANCE

- A. Diffuser Silencers shall function as pressure regain devices to minimize system pressure losses at the fan. Fan selections are based on the regain performance of the Diffuser Silencer configurations specified. Any deviations in configuration which adversely affect the fan performance efficiency will not be accepted.
- B. Silencers shall not fail structurally when exposed to a differential air pressure of 8 inches water gauge inside to outside the casing.

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

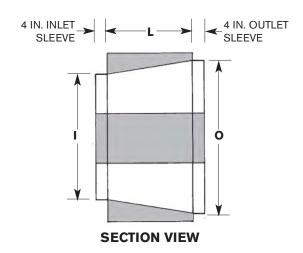
A. When transitions are required to adapt silencer dimensions to connecting duct work they shall be furnished by the installing contractor.



D-DUCT DIFFUSER SILENCERS

TYPE: DDS

with FORWARD and REVERSE FLOW Ratings



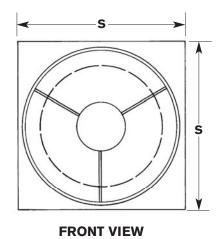


Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

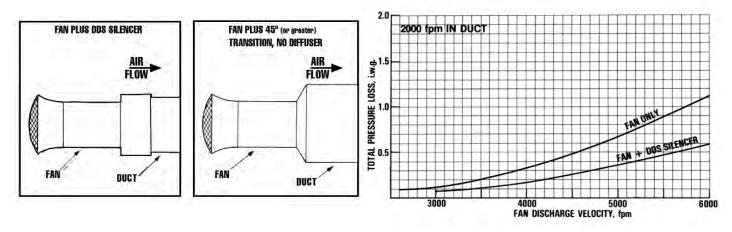
		PH	SICAL D	ATA				DYNA	AIC INSE	RTION LO	OSS, Db		
Model	l Inlat	0	S	L	Weight			Octave	Band Ce	nter Frequ	iency, Hz		
	Inlet Dia., in,	Outlet Dia., in,	in.	in.	lb	63	125	250	500	1000	2000	4000	8000
18-A 20-A 24-A 24-B 30-A	18.5 20.5 24.5 24.5 30.5	24 28 30 30 40	28 32 34 34 44	20.0 20.0 24.0 24.0 30.0	125 140 165 180 225	- 1 1 1	3 2 4 5 7	13 12 14 15	22 20 20 20 19	27 26 24 25 21	23 22 20 21 17	17 16 15 15	13 12 12 12 12
30-B 30-C 36-A 36-B 36-C	30.5 30.5 36.5 36.5 36.5	40 40 46 46 46	44 44 50 50 50	30.0 30.0 37.75 37.75 37.75	240 260 290 300 310	1 2 2 2 2	8 8 8 9	15 15 15 15 15	19 19 18 18 18	21 21 17 17 18	17 18 13 13	14 14 12 11	12 12 11 10 10
36-D 42-A 42-B 42-C 48-A	36.5 42.5 42.5 42.5 48.5	46 52 52 52 60	50 56 56 56 64	37.75 36.0 36.0 36.0 43.5	325 400 410 430 550	2 3 3 3	9 10 10 10	16 16 16 16 17	18 17 17 18 18	19 16 16 16	14 12 12 13 12	11 10 11 11	10 9 10 10
48-B 48-C 54-A 54-B 54-C	48.5 48.5 55.25 55.25 55.25	60 60 68 68	64 64 72 72 72	43.5 43.5 48.0 48.0 48.0	580 610 700 750 790	3 3 3 3	11 11 11 11 11	17 18 17 17	18 19 18 18 19	16 17 16 16	12 13 12 12 12	11 12 10 11 12	10 10 10 10
60-A 60-B 66-A 66-B 70-A 70-B	61.0 61.0 67.0 67.0 73.0 73.0	74 74 82 82 90	78 78 86 86 94 94	52.75 52.75 58.5 58.5 68.0 68.0	750 790 1190 1250 1400 1500	4 4 4 4 4	12 12 12 12 12 12	18 18 18 18 17 18	19 20 19 20 16 18	14 16 14 16 12 15	10 12 10 12 10 10	10 11 10 11 10	10 10 10 10 10

Custom sizes are available. Please contact an IAC representative for details.

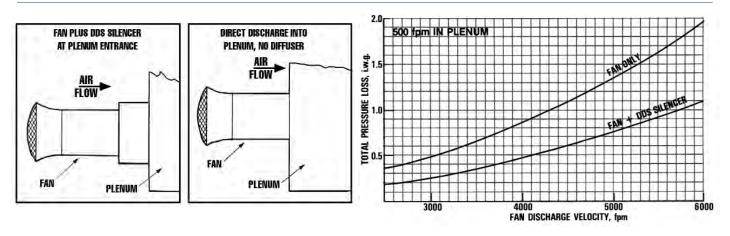


The IAC D-Duct Diffuser Silencer (DDS) is designed for installation at the outlet of vane axial fans. Available in both standard and custom sizes, the DDS can be fitted directly to the fan and has excellent acoustic performance. The IAC DDS also acts as a pressure-regain device, so overall system performance will be improved with the addition of a D-Duct. Finally, the IAC DDS can also be used as an effective inlet cone and silencer. For further information on this product please contact an IAC representative.

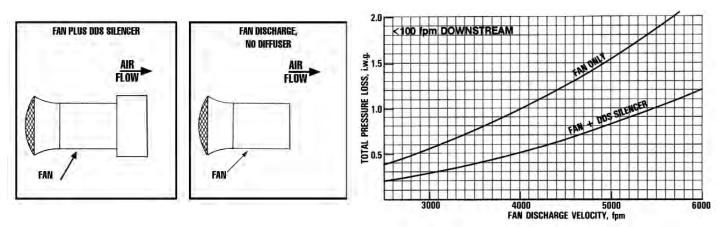
Ducted Discharge



Discharge Into Low Velocity Plenums



Free Discharge



MAJVÐ

(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.



QUIET-DUCT ULTRA PALS™ PACKLESS SILENCERS

1.01 GENERAL

A. Furnish and install "Ultra-Pals" Packless 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 change in this specification must be submitted in writing to and approved by the Architect/Engineer, in writing, at least 10 days prior to bid due-date.

2.01 MATERIALS

- A. Unless otherwise specified, the silencers shall be constructed of Type #G-90 lock-former-quality galvanized steel. The silencer casings shall be a minimum of #22 Gauge solid galvanized. The internal partitions shall be a minimum of #26 Gauge perforated galvanized.
- B. No sound absorptive material of any kind is to be used in the silencers. The silencers shall attenuate air/gas transmitted noise solely by virtue of controlled impedance membranes and broadly tuned resonators.
- C. 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:

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. The interior partitions shall be attached to the casing 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.
- C. 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

D. 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 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.
- 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 1000 fpm entering face velocity. Data for rectangular silencers shall be presented for tests conducted using silencers no smaller than the following cross-sections:

Rectangular, inch: 24x24, 24x30, or 24x36.

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

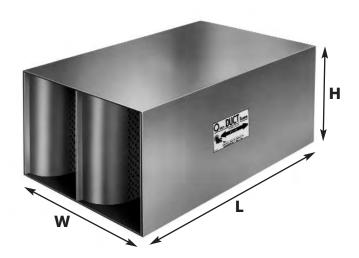
A. When transitions are required to adapt silencer dimensions to connecting duct work, they shall be furnished by the installing contractor.



ULTRA-PALS™ PACKLESS SILENCERS

TYPE: XM

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 XM 24 x 18

Length: 5' Type: XM Width: 24" Height: 18"

- NO FIBERGLASS
- NO MINERAL WOOL
- NO FOAM
- NO FILL OF ANY KIND

The complete absence of fill, combined with the ease of cleaning and draining, makes IAC Ultra-Pals Silencers well-suited for chemical plants, refineries and facilities handling gasoline, grease, solvents or other hazardous materials.

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ХМ	-1,500 -1,000 0 1,000 1,500	6 6 4 6 5	8 6 4 4 5	12 10 7 10 11	18 17 15 17	22 20 17 20 23	13 12 11 12 13	10 9 10 10	7 8 9 9
6XM	-1,500 -1,000 0 1,000 1,500	10 9 5 7 7	15 12 7 9 11	23 17 11 15 17	33 30 25 27 30	30 25 22 25 29	16 14 14 14 16	11 12 13 14 14	10 11 12 12 13
9XM	-1,500 -1,000 0 1,000 1,500	12 10 7 8 7	22 19 12 16 17	32 26 15 22 25	39 36 31 35 38	38 31 27 29 34	21 19 19 20 22	16 18 18 19	13 16 17 18 17



Nominal	W/In	12	12	12	12	12	12	24	24	24	24	24	24
Length	H/In	12	18	24	30	36	48	12	18	24	30	36	48
3 feet	Wt/ lb.	28	37	45	54	63	72	55	67	82	98	113	130
6 feet		56	74	90	108	126	144	110	134	164	196	226	258
9 feet		84	111	135	162	189	216	156	201	246	294	339	380

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	c Pres	sure Dr	op, i.w	.g.											
XM	3 6 9	0.02 0.03 0.04	0.03 0.04 0.05	0.04 0.06 0.07	0.06 0.08 0.10	0.07 0.10 0.12	0.09 0.12 0.15	0.11 0.15 0.18	0.13 0.17 0.22	0.15 0.20 0.26	0.17 0.24 0.30	0.20 0.27 0.34	0.23 0.31 0.39	0.26 0.35 0.44	0.29 0.39 0.49	0.32 0.43 0.55	0.36 0.48 0.60
Silencer Velocity		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	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
3ХМ	-1,500	54	52	56	58	59	64	65	58
	-1,000	42	44	49	51	55	59	55	45
	1,000	46	42	44	46	52	57	55	52
	1,500	54	54	57	54	54	62	65	59
6XM 9XM	-2,000 -1,000 1,000 2,000	64 56 58 66	61 52 54 67	58 52 49 65	59 52 46 61	60 55 52 58	64 61 60 63	67 60 60 69	64 50 50 67

⁽⁺⁾ Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



ULTRA-PALS™ PACKLESS SILENCERS

TYPE: XL

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 XL 24 x 18

Length: 5' Type: XL Width: 24" Height: 18"

- NO FIBERGLASS
- NO MINERAL WOOL
- NO FOAM
- NO FILL OF ANY KIND

The complete absence of fill, combined with the ease of cleaning and draining, makes IAC Ultra-Pals Silencers well-suited for chemical plants, refineries and facilities handling gasoline, grease, solvents or other hazardous materials.

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3XL	-1,500 -1,000 0 1,000 1,500	9 8 8 7 7	12 10 7 8 9	18 16 15 17 18	21 20 17 21 21	13 12 11 13 14	11 11 11 11 13	9 9 9 9	7 7 8 8 9
6XL	-1,500 -1,000 0 1,000 1,500	12 12 8 11 10	20 18 11 14 15	25 23 19 23 24	30 27 23 28 30	19 18 16 19 21	16 15 14 15 17	13 13 13 13 14	10 10 11 12 12
9XL	-1,500 -1,000 0 1,000 1,500	19 16 11 13	28 25 15 20 21	32 29 22 29 29	38 34 27 33 35	27 24 20 25 26	21 19 18 20 23	16 16 16 16	11 12 15 16 15



Nominal	W/In	12	12	12	12	12	12	24	24	24	24	24	24
Length	H/In	12	18	24	30	36	48	12	18	24	30	36	48
3 feet	Wt/ lb.	25	33	40	47	55	63	42	52	63	73	84	95
6 feet		50	66	80	94	110	125	85	104	126	146	168	188
9 feet		75	99	120	141	165	188	126	156	189	219	252	284

Table III: Aerodynamic Performance

Mod	del	L/ Ft	Stati	c Pres	sure Dr	op, i.w	.g.											
XL		3 6 9	0.03 0.04 0.04	0.04 0.05 0.06	0.06 0.07 0.09	0.08 0.10 0.11	0.10 0.12 0.14	0.12 0.15 0.18	0.15 0.18 0.22	0.17 0.22 0.26	0.20 0.26 0.30	0.24 0.30 0.35	0.27 0.34 0.40	0.31 0.39 0.46	0.35 0.44 0.51	0.39 0.49 0.58	0.43 0.55 0.64	0.48 0.60 0.71
		Face 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	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
3XL	-1,500	54	52	56	58	59	64	65	58
	-1,000	42	44	49	51	55	59	55	45
	1,000	46	42	44	46	52	57	55	52
	1,500	54	54	57	54	54	62	65	59
6XL 9XL	-2,000 -1,000 1,000 2,000	64 56 58 66	61 52 54 67	58 52 49 65	59 52 46 61	60 55 52 58	64 61 60 63	67 60 60 69	64 50 50 67

⁽⁺⁾ Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

- 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.



ULTRA-PALS™ PACKLESS SILENCERS

TYPE: KL

with FORWARD and REVERSE FLOW Ratings



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DESIGNATING A SILENCER

Model: 5 KL 24 x 18

Length: 5' Type: KL Width: 24" Height: 18"

- NO FIBERGLASS
- NO MINERAL WOOL
- NO FOAM
- NO FILL OF ANY KIND

The complete absence of fill, combined with the ease of cleaning and draining, makes IAC Ultra-Pals Silencers well-suited for chemical plants, refineries and facilities handling gasoline, grease, solvents or other hazardous materials.

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3KL	-2,000 -1,000 0 1,000 2,000	7 4 5 4 5	9 6 4 5 7	16 14 11 13 15	14 12 9 11 13	11 8 7 7 10	8 7 7 7 8	7 7 7 6 7	6 6 5 4 5
6KL	-2,000 -1,000 0 1,000 2,000	9 7 6 6 8	10 8 6 7 8	22 18 16 18 21	16 14 14 14 16	11 10 9 10 12	9 9 9 9	8 8 9 8	9 9 8 8 7
9KL	-2,000 -1,000 0 1,000 2,000	13 11 9 10 11	15 11 9 9	28 24 20 24 28	19 17 17 17	15 13 12 13 15	10 10 11 11 12	10 10 10 10	9 9 9 8 8



Nominal	W/In	15	15	15	15	15	15	30	30	30	30	30	30
Length	H/In	12	18	24	30	36	48	12	18	24	30	36	48
3 feet	Wt/ lb.	30	37	44	51	59	67	51	61	71	82	92	102
6 feet		60	74	88	102	118	132	101	122	142	164	184	204
9 feet		90	111	132	153	177	198	152	183	213	246	276	305

Table III: Aerodynamic Performance

Model	L/ Ft	Stati	Static Pressure Drop, i.w.g.														
KL	3 6 9	0.03 0.04 0.05	0.05	0.06 0.07 0.09	0.08 0.10 0.12	0.11 0.12 0.15	0.13 0.15 0.18	0.16 0.18 0.22	0.19 0.22 0.26	0.22 0.25 0.30	0.25 0.29 0.35	0.29 0.34 0.41	0.33 0.38 0.46	0.38 0.43 0.52	0.42 0.49 0.58	0.47 0.54 0.65	0.52 0.60 0.72
Silencer Velocity		500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
3KL	-2,000	49	51	54	58	59	63	63	54
	-1,000	38	38	42	47	51	48	41	35
	1,000	36	36	38	43	49	46	38	35
	2,000	53	49	50	51	54	62	63	54
6KL 9KL	-2,000 -1,000 1,000 2,000	54 44 52 58	55 50 43 58	55 44 40 54	57 51 44 53	58 52 50 55	62 49 50 64	62 40 42 66	54 24 25 59

⁽⁺⁾ Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

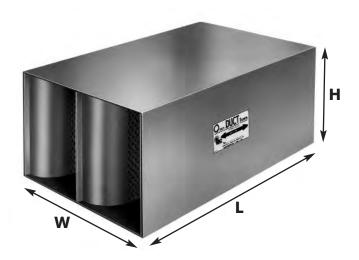
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



ULTRA-PALS™ PACKLESS SILENCERS

TYPE: KM

with FORWARD and REVERSE FLOW Ratings



IAC has produced Quiet-Duct HVAC silencers for more than 50 years, and has developed many of the terms and test standards for rating silencer performance that are used today. These standards are dynamic documents that continue to change based on new developments and discoveries in the field of acoustic engineering. Today we continue our involvement in several of the industry's governing agencies, and we remain committed to ensuring that we are always providing product that is in accordance with all of the latest standards. All published acoustic and aerodynamic performance results are based on tests conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP-Accredited laboratory.

DESIGNATING A SILENCER

Model: 5 KM 24 x 18

Length: 5' Type: KM Width: 24" Height: 18"

- NO FIBERGLASS
- NO MINERAL WOOL
- NO FOAM
- NO FILL OF ANY KIND

The complete absence of fill, combined with the ease of cleaning and draining, makes IAC Ultra-Pals Silencers well-suited for chemical plants, refineries and facilities handling gasoline, grease, solvents or other hazardous materials.

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ЗКМ	-2,000 -1,000 0 1,000 2,000	4 3 3 3 3	5 3 2 3 4	10 7 5 6 7	16 13 12 13 14	14 12 11 11 14	10 8 7 7 8	7 7 7 6 6	7 7 6 5 5
6KM	-2,000 -1,000 0 1,000 2,000	9 8 5 6 7	9 5 4 4 5	17 12 9 10 13	24 19 18 19 23	21 16 15 16 20	9 8 9 9	9 9 9 9	8 8 8 7 8
9KM	-2,000 -1,000 0 1,000 2,000	12 10 9 9	12 8 6 7 9	23 16 12 15 18	33 27 25 26 31	25 20 20 21 25	12 11 12 12 14	12 13 12 12	10 10 11 10 10



Nominal	W/In	15	15	15	15	15	15	30	30	30	30	30	30
Length	H/In	15	18	30	30	36	48	15	18	30	30	36	48
3 feet	Wt/ lb.	32	41	50	58	67	76	53	76	91	106	121	126
6 feet		64	82	100	116	134	152	124	152	182	212	242	272
9 feet		96	123	150	174	201	226	185	228	273	318	363	408

Table III: Aerodynamic Performance

Model	I L/ Ft Static Pressure Drop, i.w.g.																
KM	3 6 9	0.03 0.03 0.04	0.04 0.04 0.05	0.05 0.06 0.07	0.07 0.08 0.09	0.09 0.10 0.12	0.11 0.12 0.14	0.13 0.15 0.17	0.15 0.18 0.20	0.18 0.21 0.24	0.21 0.24 0.28	0.24 0.28 0.32	0.27 0.32 0.36	0.31 0.36 0.41	0.35 0.40 0.46	0.39 0.45 0.51	0.43 0.50 0.57
Silence Velocity		500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
ЗКМ	-2,000	49	51	54	58	59	63	63	54
	-1,000	38	38	42	47	51	48	41	35
	1,000	36	36	38	43	49	46	38	35
	2,000	53	49	50	51	54	62	63	54
6KM 9KM	-2,000 -1,000 1,000 2,000	54 44 52 58	55 50 43 58	55 44 40 54	57 51 44 53	58 52 50 55	62 49 50 64	62 40 42 66	54 24 25 59

⁽⁺⁾ Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

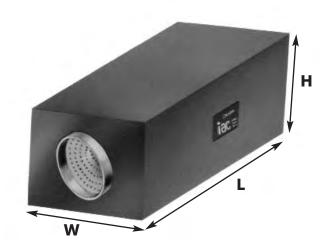
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



TUBULAR ULTRA-PALS™ PACKLESS SILENCERS

TYPE: TXS/TXL

with FORWARD and REVERSE FLOW Ratings



IAC has produced Quiet-Duct HVAC silencers for more than 50 years, and has developed many of the terms and test standards for rating silencer performance that are used today. These standards are dynamic documents that continue to change based on new developments and discoveries in the field of acoustic engineering. Today we continue our involvement in several of the industry's governing agencies, and we remain committed to ensuring that we are always providing product that is in accordance with all of the latest standards. All published acoustic and aerodynamic performance results are based on tests conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP-Accredited laboratory.

DESIGNATING A SILENCER

Model: 12 TXS 36

Diameter: 12" Type: TXS Length: 36"

- NO FIBERGLASS
- NO FOAM
- NO MINERAL WOOL
- NO FILL OF ANY KIND

The complete absence of fill, combined with the ease of cleaning and draining, makes IAC Ultra-Pals Silencers well-suited for chemical plants, refineries and facilities handling gasoline, grease, solvents or other hazardous materials.

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
8TXS36	-2,000 -1,000 0 1,000 2,000	15 15 15 15 15	20 18 18 18 19	26 26 26 26 26	17 16 16 16 18	12 11 10 10	12 12 12 12 11	12 12 12 11 11	7 8 8 7 6
8TXL36	-2,000 -1,000 0 1,000 2,000	13 13 13 13 12	16 16 15 15	25 25 25 25 25 25	16 15 14 14 15	9 8 8 8	7 7 7 7 7	6 6 6 6	4 3 3 4 4
12TXS36	-2,000 -1,000 0 1,000 2,000	11 9 7 7 7	13 11 8 8 8	23 19 17 17 18	25 22 20 20 22	18 14 13 13	12 11 10 10	13 13 11 11 11	9 9 8 8 8
12TXL36	-2,000 -1,000 0 1,000 2,000	5 5 4 4 5	8 8 8 8	16 16 16 16 16	16 16 16 16	7 7 7 7 7	6 6 7 7 7	5 5 5 5	4 4 3 3 3



(+) 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: Aerodynamic Performance

Model	Diameter, in.	Width, in.	Height, in.	Length, in.	Weight, lb.	Statio	Press	ure Dro	op, i.w.	g.			
TXS TXL TXS TXL	8 8 12 12	21 21 21 21	21 21 21 21	36 36 36 36	30 30 35 35	0.15 0.04 0.14 0.04	0.20 0.05 0.19 0.05	0.26 0.07 0.25 0.06	0.33 0.08 0.32 0.08	0.41 0.10 0.39 0.10	0.50 0.12 0.47 0.12	0.59 0.15 0.56 0.14	0.69 0.17 0.66 0.17
Silencer I	Face Velocity,	fpm				1500	1750	2000	2250	2500	2750	3000	3250

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
TXS	-2,000	54	47	49	47	51	50	46	38
	-1,000	20	35	37	37	37	32	20	20
	1,000	20	34	35	35	35	28	20	20
	2,000	54	47	45	45	49	50	45	34
TXL	-2,000	20	33	37	39	36	31	20	20
	-1,000	20	20	25	25	23	20	20	20
	1,000	20	22	28	28	25	20	20	20
	2,000	20	35	42	41	35	29	20	20

⁽⁺⁾ Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99.

TAKE NOTE!

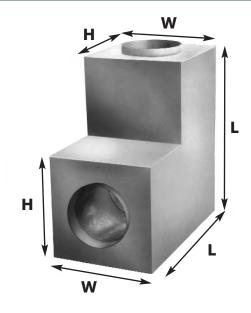
- Silencer Face Area is the cross-sectional area at the silencer entrance.
- Face Velocity is the CFM of airflow divided by the Face Area (in sq. ft.)
- Pressure Drop for any velocity can be calculated from this equation:
 PD = (Actual FV/Catalog FV)² x (Catalog PD)
- Self Noise values shown are for 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.



TUBULAR ELBOW ULTRA-PALS™ PACKLESS SILENCERS

TYPE: TXLB

with FORWARD and REVERSE FLOW Ratings



IAC has produced Quiet-Duct HVAC silencers for more than 50 years, and has developed many of the terms and test standards for rating silencer performance that are used today. These standards are dynamic documents that continue to change based on new developments and discoveries in the field of acoustic engineering. Today we continue our involvement in several of the industry's governing agencies, and we remain committed to ensuring that we are always providing product that is in accordance with all of the latest standards. All published acoustic and aerodynamic performance results are based on tests conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP-Accredited laboratory.

DESIGNATING A SILENCER

Model: 12 TXLB 36

Diameter: 12" Type: TXLB Length: 36"

- NO FIBERGLASS
- NO MINERAL WOOL
- NO FOAM
- NO FILL OF ANY KIND

The complete absence of fill, combined with the ease of cleaning and draining, makes IAC Ultra-Pals Silencers well-suited for chemical plants, refineries and facilities handling gasoline, grease, solvents or other hazardous materials.

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
8TXLB36	-2,000 -1,000 0 1,000 2,000	10 10 9 10 10	14 14 13 13 13	26 26 25 25 24	20 18 17 17 19	17 14 14 14 16	14 14 13 13	12 11 10 11 12	9 9 8 8
12TXLB36	-2,000 -1,000 0 1,000 2,000	7 7 5 5	8 8 6 6 7	21 20 18 18	20 19 17 17 19	15 13 11 11 14	11 10 9 9	9 8 7 7 8	4 4 3 3 3



(+) 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: Aerodynamic Performance

Model	Diameter, in.	Width, in.	Height, in.	Length, in.	Weight, lb.	Statio	Press	ure Dro	op, i.w.ç	g.			
TXLB	8 12	21 21	21 21	36 36	110 120	0.05 0.05	0.09	0.14 0.14	0.20 0.20	0.28 0.28	0.36 0.36	0.46 0.46	0.56 0.56
Silencer I	Face Velocity,	fpm				750	1000	1250	1500	1750	2000	2250	2500

Table IV: Self-Noise Power Levels, dB re: 10-12 Watts

IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
8TXLB36	-2,000	50	43	40	40	41	43	40	31
	-1,000	42	32	32	26	23	20	20	20
	1,000	42	29	27	32	30	23	21	20
	2,000	51	43	41	43	45	49	45	33
12TXLB36	-2,000	58	44	42	44	46	48	47	38
	-1,000	50	40	34	35	31	27	20	20
	1,000	52	38	34	34	35	27	20	20
	2,000	62	47	43	45	49	52	49	38

⁽⁺⁾ 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.



QUIET-DUCT® ELBOW SILENCERS

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 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 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:

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: 24x24, 24x30, or 24x36.

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

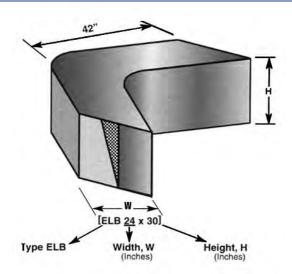
A. With submittals, the manufacturer shall supply data on Dynamic Insertion Loss, Self-Noise Power Levels, and Aerodynamic Performance for Forward and Reverse Flow test conditions. All rating tests shall be conducted in the same facility, shall have utilized the same silencer, and the facility shall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



QUIET-ELBOW® SILENCERS

TYPE: ELB

with FORWARD and REVERSE FLOW Ratings



IAC has produced Quiet-Duct HVAC silencers for more than 50 years, and has developed many of the terms and test standards for rating silencer performance that are used today. These standards are dynamic documents that continue to change based on new developments and discoveries in the field of acoustic engineering. Today we continue our involvement in several of the industry's governing agencies, and we remain committed to ensuring that we are always providing product that is in accordance with all of the latest standards. All published acoustic and aerodynamic performance results are based on tests conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP-Accredited laboratory.

DESIGNATING A SILENCER

Model: 5 ELB 24 x 18

Length: 5' Type: ELB Width: 24" Height: 18'
Pressure loss for ELB Silencer is 0.2" at 1000 fpm

Table I. Dynamic Insertion Loss (DIL) Ratings: Forward (+) / Reverse (-) Flow

Silencer Length, ft	Octave Band Hz Face Velocity, fpm	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
ELB	-2,000 -1,000 0 1,000 2,000	6 6 6 6	15 14 14 13 13	22 21 21 20 19	29 28 28 27 26	33 33 34 34 34	28 28 29 30 30	21 22 24 25 26	18 18 19 20 21

Table II: Weights and Measures

Model	Width, in.	18	18	18	18	24	24	24	24
	Height, in.	12	18	24	30	18	24	30	36
ELB	Weight, lb.	56	74	93	112	86	105	124	143

Nest and stack ELB silencers for larger duct sizes. For module to module connections seal with continuous taped nosing or metallis u-clip nosing crimped or button punched. For end connections use slip fit, S-Clip, or "TDC" style flanging.



Table III: Self-Noise Power Levels, dB re: 10-12 Watts

	Octave Band Hz	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
IAC Model	Silencer Face Velocity, fpm		. = -						
ELB All Sizes	-2,000 -1,000 1,000	54 40 39	56 42 40	55 40 40	53 37 41	52 40 40	54 36 35	51 25 23	44 24 24
All 31265	2,000	54	56	55	55	55	55	50	42



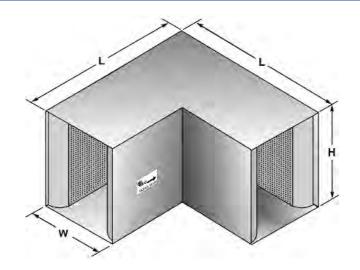
(+) Forward Flow / (-) Reverse Flow. Aero-acoustic performance data based on NVLAP accredited laboratory tests conducted in strict accordance with ASTM E477-99. Contact IAC if attenuation in excess of 50 dB is required.



QUIET-ELBOW® SILENCERS

TYPE: ELBM

with FORWARD and REVERSE FLOW Ratings



IAC has produced Quiet-Duct HVAC silencers for more than 50 years, and has developed many of the terms and test standards for rating silencer performance that are used today. These standards are dynamic documents that continue to change based on new developments and discoveries in the field of acoustic engineering. Today we continue our involvement in several of the industry's governing agencies, and we remain committed to ensuring that we are always providing product that is in accordance with all of the latest standards. All published acoustic and aerodynamic performance results are based on tests conducted in strict accordance with ASTM E477-99 in IAC America's NVLAP-Accredited laboratory.

DESIGNATING A SILENCER

Model: 5 ELBM 24 x 18

Length: 5' Type: ELBM 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

			· · · ·	<u> </u>	<u> </u>				
Silencer Length, ft	Octave Band Hz Face Velocity	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K
3ELBM	-2,000 -1,000 0 1,000 2,000	6 5 5 5	8 8 8 7 7	17 15 15 14 13	27 26 26 25 25	30 30 28 28 28	30 30 30 30 31	20 20 22 23 24	16 17 17 18 19
5ELBM	-2,000 -1,000 0 1,000 2,000	9 9 8 8 7	13 13 12 12 11	23 23 22 22 21	36 36 36 36 36	38 38 38 38 38	24 25 26 26 26	16 17 18 18	11 12 13 13 14

Table II: Weights and Measures

Width, in.	12	12	12	12	12	24	24	24	24	36	36	36	36
Height, in.	12	18	24	30	36	18	24	30	36	18	24	30	36
3ELBM	70	85	105	125	145	120	140	160	180	-	-	300	-
5ELBM	105	125	160	185	220	180	210	240	270	225	265		340

Table III: Self-Noise Power Levels, dB re: 10-12 Watts

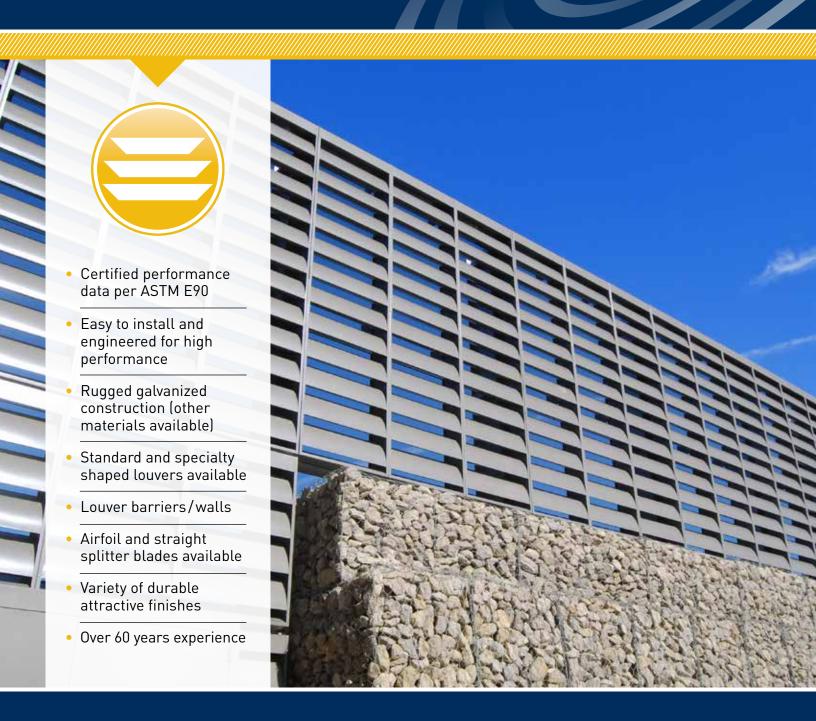
IAC	Octave Band Hz Silencer Face Velocity, fpm	1	2	3	4	5	6	7	8
Model		63	125	250	500	1K	2K	4K	8K
ELBM All Sizes	-2,000 -1,000 1,000 2,000	66 59 57 64	69 64 59 66	66 60 54 61	66 60 54 61	64 58 54 62	65 59 55 62	61 54 50 57	52 45 40 48



(+) 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.

Acoustic Louvers

A Complete Range of Certified, High-Performance Acoustic Louvers to Solve Diverse Environmental Noise Pollution Problems





IAC Acoustics Making the World a Quieter Place

Founded on an unrivalled history of engineering with some of the most pioneering discoveries in the industry, the IAC Acoustics brand is synonymous with technological innovation.

From controlling noise at a power station to tuning the sound in a TV or radio studio, IAC Acoustics has had a positive impact on society and helped to shape what can be achieved to make speech more intelligible, make music more enjoyable, reduce the impact of industrial noise and protect people's sense of hearing.

The continual success of our products and services over the decades has brought the brand a reputation for quality and reliability among customers, whether they are multinational corporations or independent family businesses. This is supported by the expertise and passion of our workforce, the people behind the products, including designers, engineers and industry experts.

To face the ever increasing noise reduction demands of the future, we will strive to further enhance our ability to reduce excessive noise. We aim to focus on developing tomorrow's solution today, innovating faster and delivering solutions that meet the requirements of the next generation. In doing so, we will stay true to our key values and founding philosophy to make the world a quieter place.

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Acoustic Louvers Overview

IAC Acoustics is a leading global manufacturer of rugged, high performance acoustic louvers and has completed thousands of installations worldwide. Applications include:

Air Conditioning Systems & Equipment

- Return air and supply systems
- Cross-talk silencers
- Recording and broadcasting studios
- · Air conditioning and refrigeration equipment
- Ventilation openings
- Cooling towers

- Data centers
- Fans
- Hospitals
- Hotels and motels
- Boiler rooms
- Conference rooms

Industrial, Transportation & Construction Equipment

- Diesel generator sets
- Marine or propulsion fans
- Machinery enclosures
- Gas turbines
- Oil coolers
- Electric motors
- Trucks and buses
- Locomotives
- Transformer barriers

- Tractors
- Pumps
- Bulldozers
- Air compressors
- Diesel powered vehicles and equipment
- Industrial cooling towers
- Noise barriers
- Air coolers

IAC Acoustics can provide louver solutions to combat environmental noise problems in mixed commercial / residential areas, carrying out all relevant noise surveys and acoustical analysis.



Acoustic Louvers Range

Noishield™ - Airfoil Blade

- Model R & Model LP: 12" (305mm) deep
- Model 2R & Model 2LP: 24" (610mm) deep
- LF2-24: 24" (610mm) deep

Slimshield™ – Linear Blade

- SL-4: 4" (101mm deep)
- SL-6: 6" (152mm) deep
- SL-12: 12" (305mm deep)
- SL-24 (double banked): 24" (610mm deep)

Noishield™ Louvers - Sound Transmission Loss (dB)

			Octav	⁄e Ban	d Cen	ter Fre	equen	cy, Hz				
Model	Louver Depth	63	125	250	500	1k	2k	4k	8k			
		Sound Transmission Loss, dB										
Model R	12"	5	7	11	12	13	14	12	9			
Model 2R	24"	6	12	15	21	24	27	25	20			
Model LP	12"	4	5	8	9	12	9	7	6			
Model 2LP	24"	5	8	12	16	22	18	15	14			
Model LF2-24	24"	6	11	19	24	28	23	17	17			

Slimshield[™] Louvers - Sound Transmission Loss (dB)

			Octav	e Ban	d Cen	ter Fre	equen	cy, Hz	
Model	Louver Depth	63	125	250	500	1k	2k	4k	8k
			So	und Tr	ansm	ission	Loss,	dB	
SL-4	4"	5	4	5	6	9	13	14	13
SL-6	6"	6	6	8	10	14	18	16	15
SL-12	12"	6	7	10	12	18	18	14	13
SL-24	24"	7	9	12	24	31	33	29	30

IAC Acoustics' acoustical louvers adhere to and are applicable to ASTM Standard E90.



Our acoustic louvers can be used as standalone screens around mechanical plants, or be integrated into walls and building façades.

Product Features

Our acoustic louvers are multi-purpose, permitting air to flow, while shielding the environment from unwanted noise.

Both IAC Acoustics Noishield™ and Slimshield™ louvers are available in an array of standard modular sizes, meaning that a wide range of performance requirements can be met. By using our range of acoustic louvers, it overcomes architectural consistency issues, especially where space is limited.

Where access is required, both Noishield™ and Slimshield™ acoustic louvers can be supplied as doorsets, either for inclusion in louvered screens, or as standalone units.

Noishield™ Special Features

- Suitable for use behind architectural louvers (4"/101mm air space is required between faces)
- Bold, curved blade appearance
- A highly economical louver system

Slimshield™ Special Features

- Linear appearance
- Superior high frequency performance

Finishes Available

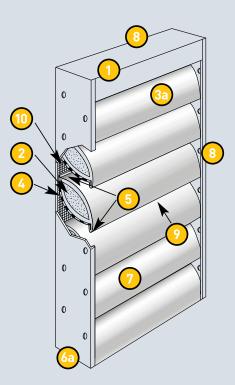
- Galvanized mill steel
- Aluminum
- Stainless steel
- Power coated finish

Other non-standard finishes are available including:

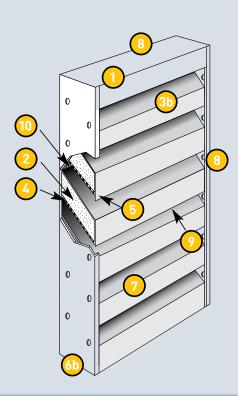
- Galvanized G-90 mill finish
- Galvannealed A-60 in various finishes
- Anodized aluminum
- Stainless steel
- Kynar finish



Noishield™ Louver



Slimshield™ Louver





- Rugged all-steel galvanized construction. Stainless steel, aluminum and other materials are also available
- 2 Inert, vermin-proof, weather-rated non combustible acoustic fill
- FOR NOISHIELD™ airfoil shaped splitter blade for maximum noise reduction with minimum pressure drop
- **FOR SLIMSHIELD™** linear blade appearance for superior high frequency performance
- Perforated splitter underside for maximum sound absorption
- Weather stop inhibits rain / snow entry
- FOR NOISHIELD™ 12" (305mm) for the single banked system or 24" (610mm) deep for the double banked system
- **FOR SLIMSHIELD™** 4, 6, 12" (101, 152, 305mm) deep single banked systems and 24" (610mm) deep for the double banked system
- Available in a variety of durable, attractive finishes, including powder finish, Kynar, mill finish aluminum, anodized aluminum, galvanized and stainless steel
- Modular sizes enable assembly of rectilinear louver 'screens' of almost any size
- Louver blade orientation blocks horizontal line of site, enhancing both aesthetics and acoustic performance
- Bird screens are available in galvanized or stainless steel, insect screens can also be supplied

How to Specify Acoustic Louvers

Specifying Noishield™ Louvers

Furnish and install Noishield™ louvers as manufactured by IAC Acoustics. For Model R, Model LP and Model LF2-24, outer casings are made of 16 gauge (1.613 mm) galvanized steel. Louver splitter blades (baffles) are airfoil configuration and made of 22 gauge (0.8534 mm) galvanized steel. They are packed with inert, vermin and moisture proof mineral fiber and provide the acoustical performance as indicated. For Model R, Model 2R, Model LP and Model 2LP, birdscreens are standard on one side only. Birdscreens will be installed on the perf side as standard. For Model LF2-24, birdscreens are not included. Please contact IAC Acoustics for birdscreen and installation options.

Specifying Slimshield[™] Louvers

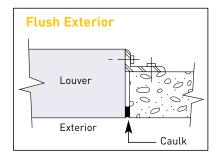
Furnish and install Slimshield™ louvers as manufactured by IAC Acoustics. For SL-4, outer casings are made of 18 gauge (1.27 mm) galvanized steel. For SL-6, SL-12 and SL-24, outer casings are made of 16 gauge (1.613 mm) galvanized steel. Louver splitter blades (baffles) for all models are made of 22 gauge (0.8534 mm) galvanized steel. They are packed with inert, vermin and moisture proof mineral fiber and provide the acoustical performance as indicated. For all Slimshield™ louvers, birdscreens are not included. Please contact IAC Acoustics for birdscreen options.

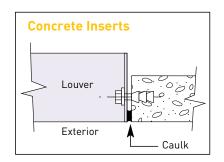
IAC Acoustics' acoustical louvers adhere to and are applicable to ASTM Standard E90.

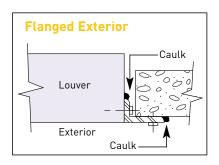


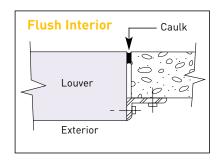
Acoustic Louver Installation

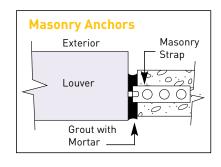
Typical details are shown below. IAC Acoustics will supply all supporting steelwork if necessary. For large louver banks, IAC Acoustics can supply supporting steelwork, engineering services and drawings along with installation if desired.

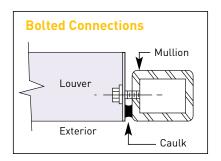














Our acoustic louvers can be used as standalone screens around mechanical plants, or be integrated into walls and building façades.

Acoustic Louver Specifications

Page

16 Model R Noishield	[™] Acoustic Louver
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- 17 Model 2R Noishield™ Acoustic Louver
- 18 Model LP Noishield™ Acoustic Louver
- 19 Model 2LP Noishield™ Acoustic Louver
- 20 Model LF2-24 Noishield™ Acoustic Louver
- 22 SL-4 Slimshield™ Acoustic Louver
- 23 SL-6 Slimshield™ Acoustic Louver
- 24 SL-12 Slimshield™ Acoustic Louver
- 25 SL-24 Slimshield™ Acoustic Louver



Noishield™ Acoustic Louvers (Model R)



Weight

11 lbs/ft^2 (54kg/m²)

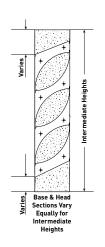
Typical Module Width

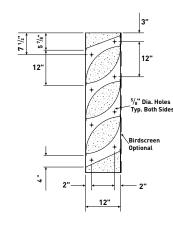
12" - 72" (305-1829mm)

Standard Module Height

24" - 144" with increments of 12" (610mm - 3658mm with increments of 305mm)

Intermediate heights are available





Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss (dB)	5	7	11	12	13	14	12	9

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values

Water Penetration

To minimize water penetration, limit face velocity to 225 ft/min (1.2 m/sec).

Acoustic Louvered Doors

- Single and double doors are available in the Model R louver range
- See page 28 for further details

Aerodynamic Performance

Static Pressure Drop (i.w.g.)	.05	.10	.15	.20	.25	.30	.40	.50	.60	.75	1.0	1.25	Fo
Face Velocity (fpm)	215	305	375	430	480	525	610	675	745	830	960	1070	Ex: Fac ΔP

or other velocities:

$$\Delta P_2 = \Delta P_1 \left(\frac{V_2}{V_1} \right)^2$$

5,000 cfm through a 24"w x 60"h Model R Louver ce Velocity = $V = 5,000 \text{ cfm} / 10 \text{ ft}^2 = 500 \text{ ft/min}$ $= 0.25 \times (500/480)^2 = 0.27$ " wc

Nominal Free Area for standard heights: 20%

Self-Noise (SN) Power Levels (Lw)

Octave Band	1	2	3	4	5	6	7	8
Hz	63	125	250	500	1K	2K	4K	8K
Louver Face Velocity (V), fpm								
-1000	72	78	74	68	66	64	62	53
-750	69	70	66	61	59	57	50	44
-500	53	53	50	47	45	41	33	24
500	56	54	52	48	43	40	32	22
750	69	72	69	66	58	54	51	43
1000	74	81	80	75	67	62	61	54

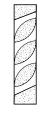
For areas other than 4 ft², add or subtract from above Lw values:

10 LOG (Louver Face Area, ft²)

Ex 1: 48" x 48" SN @ +500 ft/min @ 1 kHz = 43 + 10 LOG (16/4) = 43 + 6 = 49 dB Ex 2: 12" x 24" SN @ +500 ft/min @ 1 kHz = 43 + 10 LOG (2/4) = 43 - 3 = 40 dB

Self-Noise Test Arrangement







Noishield™ Acoustic Louvers (Model 2R)



Weight

 $22 lbs/ft^2 (107kg/m^2)$

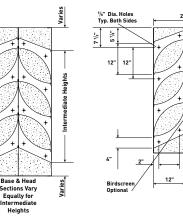
Typical Module Width

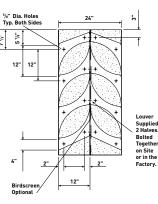
12" - 72" (305-1829mm)

Standard Module Height

24" - 144" with increments of 12" (610mm - 3658mm with increments of 305mm)

Intermediate heights are available





Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss (dB)	6	12	15	21	24	27	25	20

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values.

Water Penetration

To minimize water penetration, limit face velocity to 225 ft/min (1.2 m/sec).

Aerodynamic Performance

Static Pressure Drop (i.w.g.)	.05	.10	.15	.20	.25	.30	.40	.50	.60	.75	1.0	1.25	For othe ΔP_2
Face Velocity (fpm)	154	235	264	305	337	364	371	468	509	573	661	739	Ex: 5,000 c Face Veloc $\Delta P_s = 0.50$

Nominal Free Area for standard heights: 20%

er velocities:

 $=\Delta P_1(\frac{V_2}{V_1})^2$

fm through a 24"w x 60"h Model 2R Louver city = $V = 5,000 \text{ cfm} / 10 \text{ ft}^2 = 500 \text{ ft/min}$ $x (500/468)^2 = 0.57$ " wc

Self-Noise (SN) Power Levels (Lw)

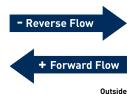
Octave Band	1	2	3	4	5	6	7	8
Hz	63	125	250	500	1K	2K	4K	8K
Louver Face Velocity (V), fpm								
-1000	76	81	77	71	66	63	60	57
-750	71	71	67	62	57	54	50	45
-500	58	58	54	49	43	39	33	24
500	64	64	59	57	49	47	43	35
750	75	76	72	70	62	57	56	50
1000	80	85	81	78	71	65	62	60

For areas other than 4 ft², add or subtract from above Lw values:

10 LOG (Louver Face Area, ft²)

Ex 1: 48" x 48" SN @ +500 ft/min @ 1 kHz = 49 + 10 LOG (16/4) = 49 + 6 = 55 dB Ex 2: 12" x 24" SN @ +500 ft/min @ 1 kHz = 48 + 10 LOG (2/4) = 49 - 3 = 46 dB

Self-Noise Test Arrangement







Noishield™ Acoustic Louvers (Model LP)



Weight

 $9.5 \, lbs / ft^2 (46.4 \, kg / m^2)$

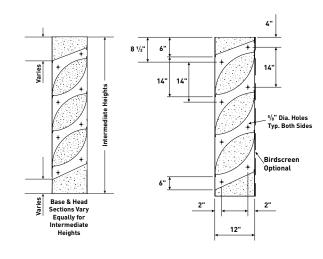
Typical Module Width

12" - 72" (305-1829mm)

Standard Module Height

28" - 140" with increments of 14" [711mm - 3658 mm with increments of 356 mm)

Intermediate heights are available



Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss (dB)	4	5	8	9	12	9	7	6

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values

Water Penetration

To minimize water penetration, limit face velocity to 315 ft/min (1.6 m/sec).

Acoustic Louvered Doors

- Single and double doors are available in the Model LP louver range
- See page 28 for further details

Aerodynamic Performance

Static Pressure Drop (i.w.g.)	.05	.10	.15	.20	.25	.30	.40	.50	.60	.75	1.0	1.25	For other velocities: $\Delta P_2 = \Delta P_1 \left(\frac{v_2}{v_1} \right)^2$
Face Velocity (fpm)	270	380	465	540	600	660	760	850	925	1040	1200	1340	Ex: 5,000 cfm through a 24"w x 70"h Model LP Louver Face Velocity = V = 5,000 cfm / 11.67 ft ² = 429 ft/min $\Delta P_s = 0.10 \text{ x } (429/380)^2 = 0.13$ " wc

Nominal Free Area for standard heights: 30%

Self-Noise (SN) Power Levels (Lw)

Octave Band	1	2	3	4	5	6	7	8
Hz	63	125	250	500	1K	2K	4K	8K
Louver Face Velocity (V), fpm								
-1000	72	75	71	67	61	60	55	49
-750	66	68	64	60	54	52	46	39
-500	54	57	54	49	43	40	31	24
500	58	61	58	55	48	46	38	30
750	69	73	70	67	60	57	52	45
1000	77	81	79	77	70	64	60	55

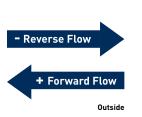
For areas other than 4.67 ft², add or subtract from above Lw values:

10 LOG (Louver Face Area, ft²)



Ex 1: 24" x 84" SN @ +500 ft/min @ 1 kHz = 44 + 10 LOG [14/4.67] = 44 + 4.8 = 48.8 dB Ex 2: 12" x 42" SN @ +500 ft/min @ 1 kHz = 43 + 10 LOG (3.5/4.67) = 44 - 1.3 = 42.7 dB

Self-Noise Test Arrangement





Noishield™ Acoustic Louvers (Model 2LP)



Weight

19 lbs/ft² (92.8kg/m²)

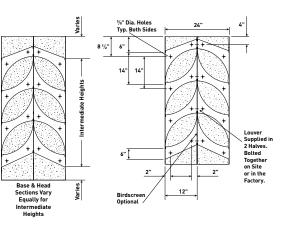
Typical Module Width

12" - 72" (305-1829mm)

Standard Module Height

28" - 140" with increments of 14" (711mm - 3556mm with increments of 356mm)

Intermediate heights are available



Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss (dB)	5	8	12	16	22	18	15	14

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values.

Water Penetration

To minimize water penetration, limit face velocity to 315 ft/min (1.6 m/sec).

Aerodynamic Performance

Static Pressure Drop (i.w.g.)	.05	.10	.15	.20	.25	.30	.40	.50	.60	.75	1.0	1.25	For other velocitie $\Delta P_2 = \Delta P_1 \left[\frac{v_1}{v_1} \right]$
Face Velocity (fpm)	235	310	377	434	493	533	613	685	758	852	984	1100	Ex: 5,000 cfm through a Face Velocity = V = 5,000 $\Delta P_s = 0.15 \times (429/377)^2 = 0.15 \times (429/37)^2 = 0.15 \times (429/37)^2$

Nominal Free Area for standard heights: 30%

a 24"w x 70"h Model 2LP Louver 00 cfm / 11.67 ft² = 429 ft/min = 0.19" wc

Self-Noise (SN) Power Levels (Lw)

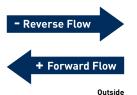
Octave Band	1	2	3	4	5	6	7	8
Hz	63	125	250	500	1K	2K	4K	8K
Louver Face Velocity (V), fpm								
-1000	76	81	77	71	66	63	60	57
-750	71	71	67	62	57	54	50	45
-500	58	58	54	49	43	39	33	24
500	64	64	59	57	49	47	43	35
750	75	76	72	70	62	57	56	50
1000	80	85	81	78	71	65	62	60

For areas other than 4.67 ft², add or subtract from above Lw values:

10 LOG (Louver Face Area, ft²)

Ex 1: 24" x 84" SN @ +500 ft/min @ 1 kHz = 48 + 10 LOG [14/4.67] = 48 + 4.8 = 52.8 dB Ex 2: 12" x 42" SN @ +500 ft/min @ 1 kHz = 48 + 10 LOG (3.5/4.67) = 48 - 1.3 = 46.7 dB

Self-Noise Test Arrangement







Noishield™ Acoustic Louvers (Model LF2-24)



Weight

22 lbs/ft² (107.4 kg/m²)

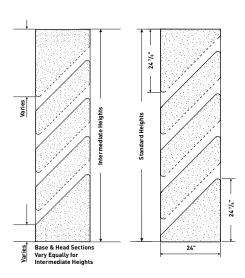
Typical Module Width

12"-48" (305-1219 mm)

Standard Module Height

34" minimum, with increments of 17" (863 mm minimum, with increments of 432 mm)

Intermediate heights are available



Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss (dB)	6	11	19	24	28	23	17	17

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values.

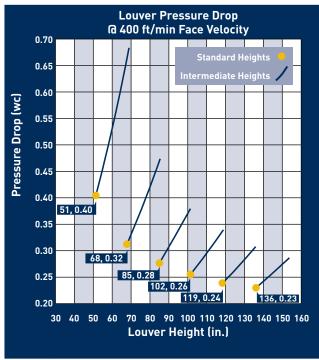
Aerodynamic Performance



For other velocities:

$$\Delta P_2 = \Delta P_1 \left(\frac{V_2}{V_1} \right)^2$$

Ex: 20,000 cfm face velocity through a 48"w x 119"h Model LF2-24 Louver Face Velocity = V = 20,000 cfm / 39.7 ft² = 504 ft/min $\Delta P_{\kappa} = 0.24$ x $(504/400)^2 = 0.38$ " wc





Slimshield™ Acoustic Louvers (Model SL-4)



Weight

 $4 lbs/ft^2 (19.5 kg/m^2)$

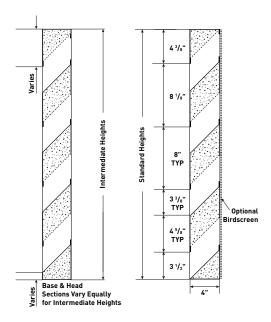
Typical Module Width

12"-60" (305-1524 mm)

Standard Module Height

8" minimum, with increments of 8" (203 mm minimum, with increments of 203 mm)

Intermediate heights are available



Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss	5	4	5	6	9	13	14	13

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values.

Aerodynamic Performance

Static Pressure Drop (i.w.g.)	.05	.10	.15	.20	.25	.30	.40	.50	.60	.75	1.0	1.25	For other velocities: $\Delta P_2 = \Delta P_1 \left(\frac{V_1}{V_1} \right)^2$
Face Velocity (fpm)	202	285	350	404	452	495	571	639	700	785	904	1011	Ex: 5,000 cfm through a 24"w x 64"h Model SL-4 Louver Face Velocity = V = 5,000 cfm / 10.67 ft ² = 469 ft/min $\Delta P_s = 0.30 \times (469/495)^2 = 0.27$ " wc

Nominal Free Area for standard heights: 30%

Water Penetration

To minimize water penetration, limit face velocity to 217 ft/min (1.1 m/sec).

Acoustic Louvered Doors

- Single and double doors are available in the SL-4 louver range
- See page 28 for further details

Noishield™ Acoustic Louvers (Model SL-6)



Weight

 $6 lbs/ft^2 (30kg/m^2)$

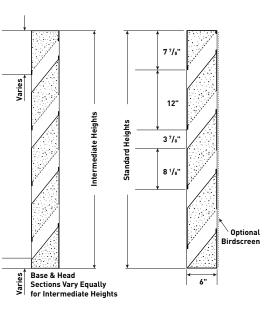
Typical Module Width

12" - 60" (305-1524mm)

Standard Module Height

12" - 140" with increments of 12" (305 mm minimum, with increments of 305 mm)

Intermediate heights are available



Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss (dB)	6	6	8	10	14	18	16	15

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values.

Aerodynamic Performance

Static Pressure Drop (i.w.g.)	.05	.10	.15	.20	.25	.30	.40	.50	.60	.75	1.0	1.25	For other velocities: $\Delta P_2 = \Delta P_1 \left(\frac{v_2}{v_1} \right)^2$
Face Velocity (fpm)	115	160	197	228	255	280	322	360	395	440	510	570	Ex: 5,000 cfm through a 48"w x 60"h Model SL-6 Louver Face Velocity = V = 5,000 cfm / 20 ft 2 = 250 ft/min $\Delta P_s = 0.25 \times (250/255)^2 = 0.24$ " wc

Nominal Free Area for standard heights: 20%

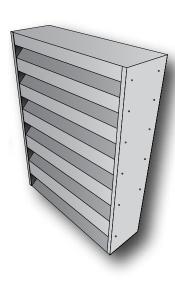
Water Penetration

To minimize water penetration, limit face velocity to 175 ft/min (0.89 m/sec).

Acoustic Louvered Doors

- Single and double doors are available in the SL-6 louver range
- See page 28 for further details

Slimshield[™] Acoustic Louvers (Model SL-12)



Weight

 $10.3 \, lbs / ft^2 (50 \, kg / m^2)$

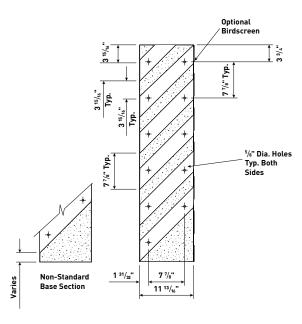
Typical Module Width

12"-72" (305-1829 mm)

Standard Module Height

 $23\,^{5}/8"$ minimum, with increments of $7\,^{7}/8"$ (600mm minimum, with increments of 200mm)

Intermediate heights are available



Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss	6	7	10	12	18	18	14	13

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values.

Aerodynamic Performance

Static Pressure Drop (i.w.g.)	.05	.10	.15	.20	.25	.30	.40	.50	.60	.75	1.0	1.25	For other velocities: $\Delta P_2 = \Delta P_1 \left(\frac{V_2}{V_1} \right)^2$
Face Velocity (fpm)	206	292	357	413	461	505	584	653	715	799	923	1032	Ex: 5,000 cfm through a 24" w x 63"h Model SL-12 Louver Face Velocity = V = 5,000 cfm / 10.5 ft² = 476 ft/min $\Delta P_s = 0.30 \times (476/505)^2 = 0.27$ " wc

Nominal Free Area for standard heights: 30%

Water Penetration

To minimize water penetration, limit face velocity to 309 ft/min (1.57 m/sec).

Acoustic Louvered Doors

- Single and double doors are available in the SL-12 louver range
- See page 28 for further details

Noishield™ Acoustic Louvers (Model SL-24)



Weight

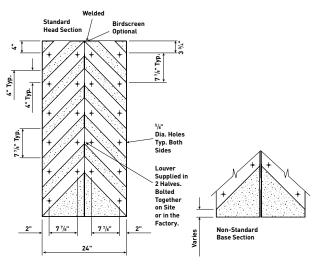
6 lbs/ft² (30kg/m²)

Typical Module Width

12" - 60" (305-1524mm)

Standard Module Height

12" - 140" with increments of 12" (305 mm minimum, with increments of 305 mm) Intermediate heights are available



Acoustic Performance

Octave Band Center Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Transmission Loss (dB)	7	9	12	24	31	33	29	30

Transmission Loss tested in accordance with ASTM E90. For Noise Reduction, add 6 dB to the above values.

Aerodynamic Performance

Static Pressure Drop (i.w.g.)	.05	.10	.15	.20	.25	.30	.40	.50	.60	.75	1.0	1.25	For other velocities: $\Delta P_2 = \Delta P_1 \left(\frac{v_2}{v_1} \right)^2$
Face Velocity (fpm)	149	207	247	289	323	360	419	468	511	569	657	734	Ex: 5,000 cfm through a 24"w x 63"h Model SL-24 Louver Face Velocity = V = 5,000 cfm / 10.5 ft ² = 476 ft/min $\Delta P_s = 0.50 \text{ x } (476/468)^2 = 0.52$ " wc

Nominal Free Area for standard heights: 20%

Water Penetration

To minimize water penetration, limit face velocity to 309 ft/min (1.57 m/sec).

Acoustic Louvered Doors

- Single and double doors are available from the IAC Acoustics louver range
- The structural minimum is 33 ¹/2 in. (850mm) and is available up to 49" x 116" (1250 x 2950 mm) high as standard for a single door, and 98" x 116" (2500 x 2950 mm) high for a double door. Other widths and heights are available on request
- All doors can be supplied with various hardware, including hinges, latches, screws, nuts, bolts, washers, handles and supporting frames
- Acoustic louvered doors can be fitted with bird or insect screens on request
- Doors can be powder coated to match adjoining louvers
- Materials for the door and door frame include galvanized steel, stainless steel and aluminum
- Other door options may be available in the entire IAC Acoustics louver range. Please contact IAC Acoustics for more details.



A Quality Solution

All IAC Acoustics products are designed to stand the test of time and manufactured to suit the application. From offshore environments to extremes in weather and ambient temperature, we can produce a highly engineered solution to your noise control issue.



In addition to providing acoustic louvers located in everyday environments, IAC Acoustics also has the ability to modify products to suit more demanding applications.

A True World Leader

In addition to providing acoustic louvers, IAC Acoustics is also able to provide the following solutions to noise control:

- Acoustic barriers
- Acoustic doors
- Acoustic enclosures
- Acoustic studios
- Acoustic wall treatments
- Acoustic windows
- Aero-engine test facilities
- Anechoic chambers
- Anti-vibration mounts

- Audiology booths
- Engine exhaust silencers
- Gas turbine acoustic packages
- Ground run-up enclosures
- HVAC attenuators
- Jet blast deflectors
- Medical rooms
- Vent silencers

Our wealth of engineering experience means that custom solutions can also be tailored for specific client applications. Please contact your local IAC Acoustics office should you require a unique solution.

An Engineering Benchmark

IAC Acoustics products are respected worldwide for their quality and certified performance. Rest assured that IAC Acoustics can deliver a solution to your unwanted noise problem.





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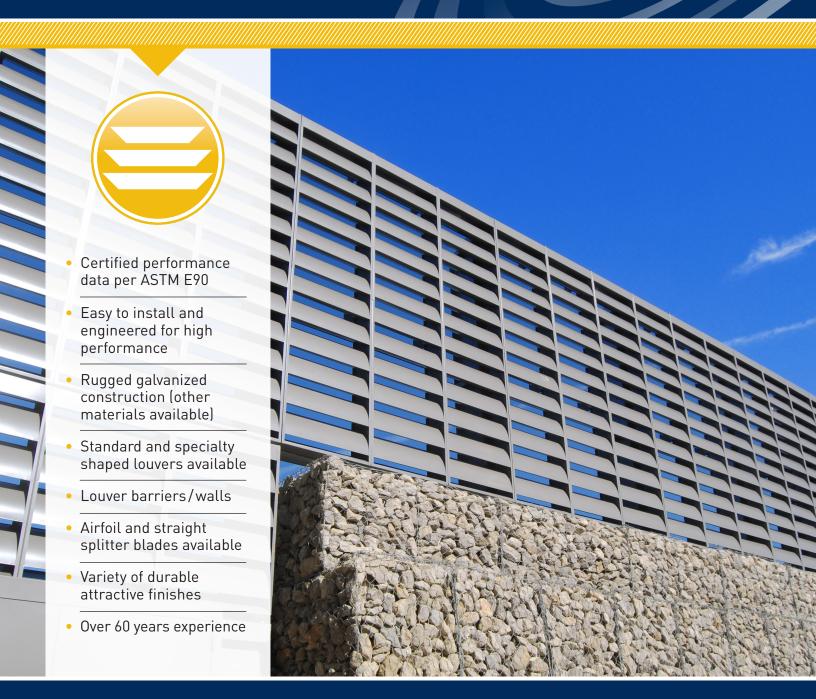
E: iacacoustics@soundseal.com



www.iacacoustics.com

Acoustic Louvers

A Complete Range of Certified, High-Performance Acoustic Louvers to Solve Diverse Environmental Noise Pollution Problems







Acoustic Louvers

A complete range of certified, high-performance acoustic louvers to solve diverse environmental noise pollution problems

IAC Acoustics is a leading global manufacturer of rugged, high performance acoustic louvers and has completed thousands of installations worldwide. Applications include:

Air Conditioning Systems & Equipment

- Return air & supply systems
- Cross-talk silencers
- Recording & broadcasting studios
- Air conditioning & refrigeration equipment
 Hotels & motels
- Ventilation openings
- Cooling towers

- Data centers
- Fans
- Hospitals
- Boiler rooms
- Conference rooms

Industrial, Transportation & Construction Equipment

- Diesel generator sets
- Marine or propulsion fans
 - Machinery enclosures
 - Gas turbines
 - Oil coolers
 - Electric motors
 - Trucks & buses
 - Locomotives
 - Transformer barriers

- Tractors
- Pumps
- Bulldozers
- Air compressors
- Diesel powered vehicles & equipment
- Industrial cooling towers
- Noise barriers
- Air coolers

IAC Acoustics can provide louver solutions to combat environmental noise problems in mixed commercial and residential areas, carrying out all relevant noise surveys and acoustical analysis.

Integrated or Standalone

Our acoustic louvers can be used as standalone screens around mechanical plants, or be integrated into walls and building facades.

Form and Function Together

IAC Acoustics Noishield $^{\text{M}}$ (curved) or Slimshield $^{\text{M}}$ (linear) blade louver styles can be used to match the overall scale and aesthetics of a new or existing building.

Our acoustic louvered screens result in a high performance solution to unwanted levels of noise without the need for additional architectural cladding.



Acoustic Louvers Range

Noishield™ - Airfoil Blade

- Model R & Model LP: 12" (305mm) deep
- Model 2R & Model 2LP: 24" (610mm) deep
- LF2-24: 24" (610mm) deep

Slimshield™ - Linear Blade

- SL-4: 4" (101mm deep)
- SL-6: 6" (152mm) deep
- SL-12: 12" (305mm deep)
- SL-24 (double banked): 24" (610mm deep)

Noishield™ Louvers - Sound Transmission Loss (dB)

		Octave Band Center Frequency, Hz								
Model	Louver Depth	63	125	250	500	1k	2k	4k	8k	
		Sound Transmission Loss, dB								
Model R	12"	5	7	11	12	13	14	12	9	
Model 2R	24"	6	12	15	21	24	27	25	20	
Model LP	12"	4	5	8	9	12	9	7	6	
Model 2LP	24"	5	8	12	16	22	18	15	14	
Model LF2-24	24"	6	11	19	24	28	23	17	17	

Slimshield[™] Louvers - Sound Transmission Loss (dB)

		Octave Band Center Frequency, Hz								
Model	Louver Depth	63	125	250	500	1k	2k	4k	8k	
		Sound Transmission Loss, dB								
SL-4	4"	5	4	5	6	9	13	14	13	
SL-6	6"	6	6	8	10	14	18	16	15	
SL-12	12"	6	7	10	12	18	18	14	13	
SL-24	24"	7	9	12	24	31	33	29	30	

IAC Acoustics' acoustical louvers adhere to and are applicable to ASTM Standard E90.

Product Features

Our acoustic louvers are multi-purpose, permitting air to flow, while shielding the environment from unwanted noise.

Both IAC Acoustics Noishield™ and Slimshield™ louvers are available in an array of standard modular sizes, meaning that a wide range of performance requirements can be met. By using our range of acoustic louvers, it overcomes architectural consistency issues, especially where space is limited.

Where access is required, both Noishield™ and Slimshield™ acoustic louvers can be supplied as doorsets, either for inclusion in louvered screens, or as standalone units.



- Suitable for use behind architectural louvers (4"/101mm air space is required between faces)
- Bold, curved blade appearance
- A highly economical louver system

Slimshield™ Special Features

- Linear appearance
- Superior high frequency performance

Finishes Available

- Galvanized mill steel
- Aluminum
- Stainless steel
- Power coated finish

Other non-standard finishes are available including:

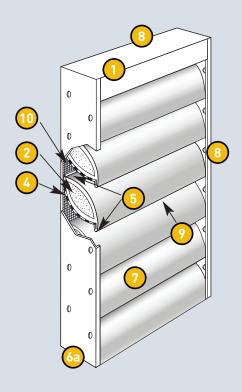
- Galvanized G-90 mill finish
- Galvannealed A-60 in various finishes
- Anodized aluminum
- Stainless steel
- Kynar finish

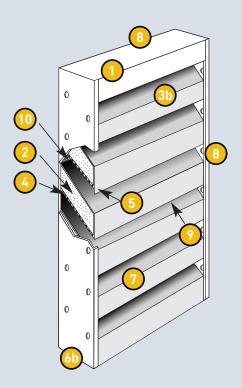




Noishield™ Louver

Slimshield™ Louver





- Rugged all-steel galvanized construction. Stainless steel, aluminum and other materials are also available
- 2 Inert, vermin-proof, weather-rated non combustible acoustic fill
- **FOR NOISHIELD™** airfoil shaped splitter blade for maximum noise reduction with minimum pressure drop
- **FOR SLIMSHIELD™** linear blade appearance for superior high frequency performance
- Perforated splitter underside for maximum sound absorption
- 5 Weather stop inhibits rain / snow entry
- **FOR NOISHIELD™** 12" (305mm) for the single banked system or 24" (610mm) deep for the double banked system
- **FOR SLIMSHIELD™** 4, 6, 12" (101, 152, 305mm) deep single banked systems and 24" (610mm) deep for the double banked system
- Available in a variety of durable, attractive finishes, including powder finish, Kynar, mill finish aluminum, anodized aluminum, galvanized and stainless steel
- Modular sizes enable assembly of rectilinear louver 'screens' of almost any size
- Louver blade orientation blocks horizontal line of site, enhancing both aesthetics and acoustic performance
- Bird screens are available in galvanized or stainless steel, insect screens can also be supplied

How to Specify Acoustic Louvers



Specifying Noishield™ Louvers

Furnish and install Noishield[™] louvers as manufactured by IAC Acoustics. For Model R, Model LP and Model LF2-24, outer casings are made of 16 gauge (1.613 mm) galvanized steel. Louver splitter blades (baffles) are airfoil configuration and made of 22 gauge (0.8534 mm) galvanized steel. They are packed with inert, vermin and moisture proof mineral fiber and provide the acoustical performance as indicated. For Model R, Model 2R, Model LP and Model 2LP, birdscreens are standard on one side only. Birdscreens will be installed on the perf side as standard.



Specifying Slimshield™ Louvers

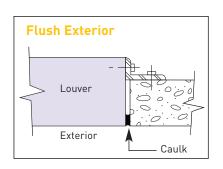
Furnish and install Slimshield[™] louvers as manufactured by IAC Acoustics. For SL-4, outer casings are made of 18 gauge (1.27 mm) galvanized steel. For SL-6, SL-12 and SL-24, outer casings are made of 16 gauge (1.613 mm) galvanized steel. Louver splitter blades (baffles) for all models are made of 22 gauge (0.8534 mm) galvanized steel. They are packed with inert, vermin and moisture proof mineral fiber and provide the acoustical performance as indicated.

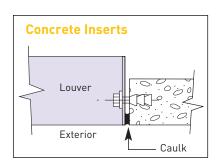
For Noishield Model LF2-24 and all Slimshield Noishield Rouvers, birdscreens are not included. Please contact IAC Acoustics for birdscreen options.

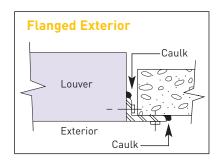
IAC Acoustics' acoustical louvers adhere to and are applicable to ASTM Standard E90.

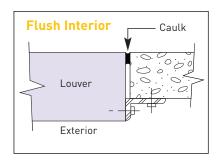
Acoustic Louver Installation

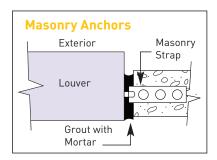
Typical details are shown below. IAC Acoustics will supply all supporting steelwork if necessary. For large louver banks, IAC Acoustics can supply supporting steelwork, engineering services and drawings along with installation if desired.

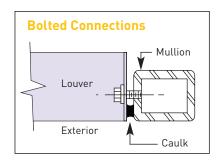


















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