



ARCHITECTURAL **NOISE-FOIL**[™]

SOUND ABSORPTION SYSTEMS FOR INDUSTRY AND COMMERCE

NOISE REDUCTION IN HIGH NOISE LEVEL AREAS • ACOUSTICAL CONDITIONING thru REVERBERATION CONTROL

IDEAL FOR:

POWER PLANTS
 PRINTING PLANTS
 AUDITORIUMS
 TEXTILE PLANTS
 GYMNASIUMS
 CONVENTION CENTERS
 PRESS SHOPS
 MACHINE SHOPS
 CONCERT HALLS
 SHEET METAL SHOPS
 STRUCTURAL SHOPS
 RESTAURANTS
 HOUSES OF WORSHIP
 PLATE FABRICATION SHOPS
 TANK FABRICATION SHOPS
 ENGINE TEST FACILITIES
 SCHOOLS, THEATERS
 PLASMA SPRAY SHOPS
 CORRECTIONAL FACILITIES
 BROADCASTING/RECORDING STUDIOS
 TRANSIT SYSTEMS
 ANY LOCATION REQUIRING NOISE
 REDUCTIONS UP TO 10 dBA
 ACOUSTICALLY UPGRADING CONCRETE,
 STUCCO, OR SHEETROCK ENCLOSURES

FEATURES:

CONSTRUCTION:
 ABUSE RESISTANT METAL JACKETED


HIGH SOUND ABSORPTION: NRC 0.95

THERMAL INSULATION:
 LOW HEAT TRANSFER COEFFICIENTS

ATTRACTIVE FINISH OPTIONS:
 VINYL - TEDLAR - POLYESTER PAINTS
 POWDER COATINGS

INCOMBUSTIBLE:
 CLASS A-FIRE RESISTANT MATERIALS

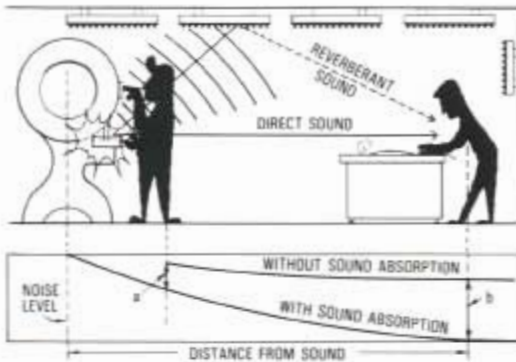
READILY INSTALLED: FLUSH AND
 AIRSPACE MOUNTED ON WALLS AND
 CEILINGS. VERTICALLY SUSPENDED
 FROM ROOFS AND CEILINGS.



U.S. ARMY CORPS OF ENGINEERS'
 HYDRO-ELECTRIC POWER PLANT, CARTERS LAKE, GEORGIA

How Sound-Absorbing Panels Reduce Plant Noise Levels

Noise-Foil™ Sound Absorbing Modules are practical and effective for reducing high noise levels in industrial and commercial facilities. Although providing little noise reduction near noise sources, Noise-Foil will benefit workers further away.








Operators at **a** – not helped; personnel at **b** – benefit from reduced noise levels as reflected sound is absorbed 'en route'. Risk of hearing loss is reduced and speech intelligibility is improved. Noise reduction of 3 to 5 dB is typical; as much as 8 to 10 dB in highly reverberant areas.

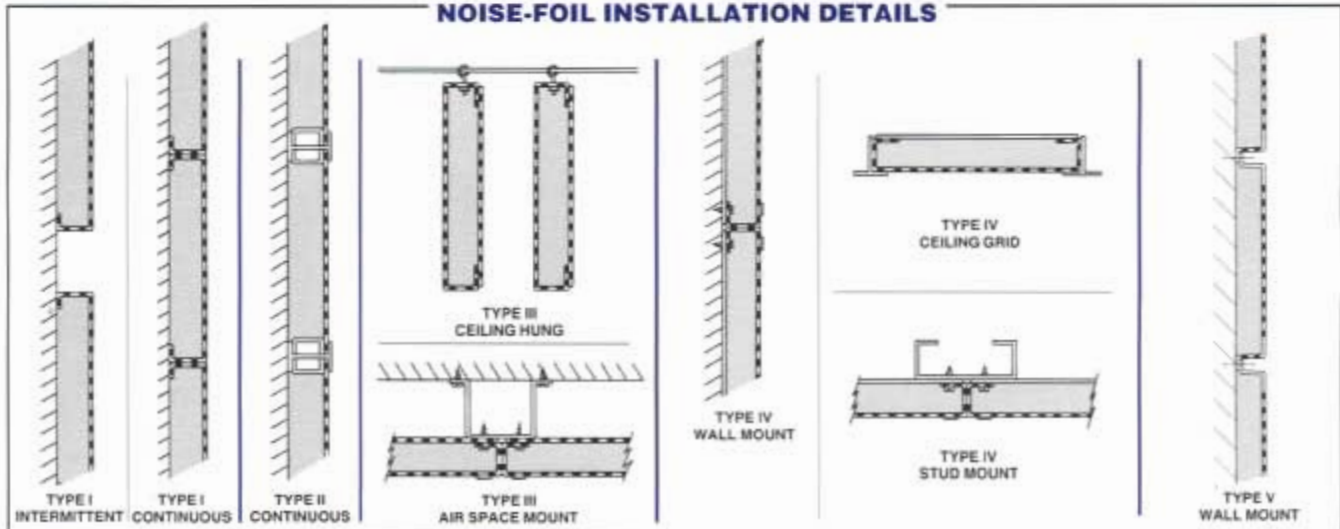


Noise-Foil Sound Absorption Panel Systems reduce reflected noise and provide acoustical conditioning for large and small spaces. Can be attached to walls or suspended from ceiling.

NOISE-FOIL PANEL TYPES

TYPE	ACOUSTIC RATINGS	DESCRIPTION	APPLICATIONS
NF-I 	NRC 0.70 to 1.30 ASTM C 423-84a	Open back – non-welded construction Face sheet fully perforated Max width 14" (356mm) – 2" (51mm) thick 18" (457mm) – 4" (102mm) thick Available in pre-finished materials, steel & aluminum	Wall mount No air space No joiners required
NF-II 	NRC 0.70 to 1.30 ASTM C 423-84a	Open back – welded steel construction Face sheet fully perforated Max width 48" (1219mm) – 4" (102mm) thick Available in a variety of paint finishes (after fabrication).	Wall mount No air space Joiners or trim required
NF-III 	NRC 0.70 to 1.30 ASTM C 423-84a (Apply to total panel surface area, ie, both sides)	Fully perforated – front and back – non-welded construction Max width 42" x 66" x 2" thick (1067 x 1676 x 51mm) 38" x 62" x 4" thick (965 x 1575 x 102mm) Available in pre-finished materials, steel & aluminum	Ceiling hung Wall mount with air space
NF-IV 	NRC 0.95 – ASTM C 423-84a STC 33 – AMA two room method ASTM E 413	Closed back panel Max width 42" x 66" x 2" thick (1067 x 1676 x 51mm) 38" x 62" x 4" thick (965 x 1575 x 102mm) Available in pre-finished materials, steel & aluminum	Wall, stud, and ceiling grid
NF-V 	NRC 1.00 ASTM C 423-84a	Open back Face sheet margined perforations Max width 24" (610mm) – 2 1/2" (64mm) thick Available in pre-finished materials, galvanized steel & aluminum. Accelerated Weather Tested – 4000 hr/ASTM B 117 2400 hr/ASTM G 23	Wall mount Ideal for outdoor applications No air space No joiners required

NOISE-FOIL INSTALLATION DETAILS



Noise-Foil™ Sound Absorption Systems – Design Guidelines



TABLE 1 – CONTINUOUS, WALL-MOUNTED TYPES I, II, III, and V SOUND ABSORPTION COEFFICIENTS

Fill Protection Option	1/3 Octave Band Center Frequency, Hz						
	125	250	500	1K	2K	4K	NRC
4" (102mm) Thick							
-N	0.97	1.39	1.34	1.29	1.19	1.01	1.30
-P	0.86	0.89	0.93	0.89	0.84	0.77	0.90
-PS	0.57	0.60	1.01	1.06	0.99	0.86	0.90
2 1/2" (64mm) Thick TYPE V							
-N	0.24	0.95	1.13	0.99	0.94	0.86	1.00
2" (51mm) Thick							
-N	0.35	0.65	1.20	1.21	1.07	0.92	1.00
-P	0.41	0.47	0.64	0.79	0.85	0.72	0.70
-PS	0.39	0.48	0.71	1.01	0.93	0.77	0.80

NOTE: Coefficients greater than 1.0 result from diffraction effects associated with limited sample size (ASTM C 423, 72 ft² – 6.69m²). For most applications a maximum coefficient of 0.95 is recommended for noise reduction calculations.



TABLE 2 – INTERMITTENT, WALL-MOUNTED TYPES I, II, III, and IV TOTAL ABSORPTION, SABINS/ARRAY

Fill Protection Option	Spacing in. (mm)	1/3 Octave Band Center Frequency, Hz					
		125	250	500	1K	2K	4K
4" (102mm) Thick 6 Panels 14" x 120" (356 x 3048mm). Total area 70 ft² (6.5m²)							
-N	3 (76)	66	111	110	96	95	84
	14 (356)	81	116	140	117	112	100
-P	3 (76)	67	74	88	70	66	75
	14 (356)	75	71	91	92	77	67
-PS	3 (76)	47	56	94	85	85	58
	14 (356)	63	52	102	105	94	67
2" (51mm) Thick 5 Panels 18" x 120" (457 x 3048mm). Total area 75 ft² (7m²)							
-N	3 (76)	24	48	96	96	88	75
	18 (457)	25	58	112	114	107	82
-P	3 (76)	25	42	54	64	60	65
	18 (457)	32	32	50	61	66	63
-PS	3 (76)	37	38	54	80	72	65
	18 (457)	36	32	58	86	82	63



TABLE 3 – CEILING-HUNG TYPE III TOTAL ABSORPTION, SABINS/PANEL

Fill Protection Option	Spacing in. (mm)	1/3 Octave Band Center Frequency, Hz					
		125	250	500	1K	2K	4K
2 in. (51mm) Thick 42 in. x 66 in. (1067 x 1676mm)							
-N	14 (356)	6	10	12	10	12	9
	32 (813)	6	11	16	16	20	14
	42 (1067)	6	12	18	18	25	17
	63 (1600)	6	13	23	25	31	19
-P	14 (356)	6	12	12	12	12	7
	32 (813)	6	13	16	18	20	12
	42 (1067)	6	15	18	20	25	14
	63 (1600)	6	15	23	27	30	16
-PS	14 (356)	5	12	11	12	13	8
	32 (813)	5	14	15	19	21	12
	42 (1067)	5	16	17	22	27	15
	63 (1600)	5	16	22	30	32	17
4 in. (102mm) Thick 38 in. x 62 in. (965 x 1575mm)							
-N	13 (330)	5	11	13	12	13	8
	29 (737)	5	12	18	19	21	12
	38 (965)	5	14	21	21	27	15
	57 (1448)	5	15	26	29	32	17
-P	13 (330)	7	10	12	11	11	7
	29 (737)	7	11	16	17	18	11
	38 (965)	7	13	19	19	23	14
	57 (1448)	7	13	24	26	27	16
-PS	13 (330)	6	10	13	12	11	8
	29 (737)	6	12	18	19	19	11
	38 (965)	6	13	21	22	24	13
	57 (1448)	6	14	26	30	28	16

Sound Absorption is Affected by Panel-Module Placement as demonstrated in the IAC NVLAP-accredited Aero-Acoustic Laboratory.

Ceiling-Hung Panels were tested in several configurations as per ASTM C 423. Sound absorption per sq ft of panel area improved with increased spacing. In the Speech Frequencies, 500, 1000, and 2000 Hz, a 63 in. (1600mm) panel spacing provides highest number of Sabins per module (Sabin or Metric Sabin is the equivalent of 1 sq ft or 1sq m respectively of a perfectly sound absorptive surface).

However, increased spacing reduces total number of panels that can be fitted and sound absorptive Sabins that can be provided. Cost-effective applications can be maximized by considering ceiling-hung and/or ceiling/wall-mounted configurations.

Wall/Ceiling-Mounted Noise-Foil Modules can be very effective in long narrow spaces and relatively low ceilings. See Table 1 for sound absorption coefficients in continuous and Table 2 for Sabins per array in intermittent installations; Table 3 gives Sabins per module for ceiling-hung arrangements.

Ceiling-Hung Noise-Foil Type III Modules can be used to great advantage where there are large floor areas with widely spaced walls. For cost-effective recommendations please check with IAC.

Noise-Foil Testing in IAC Aero-Acoustic Laboratory



HOW TO DESIGNATE NOISE-FOIL PANELS



CODE FOR FILL PROTECTION OPTIONS

- N –No fill protection
- P –All wrapped in polyethylene
- PS –Fill wrapped and set back by acoustic spacer

Specifications for Noise-Foil™ Sound Absorption Systems

1.0 GENERAL

1.1 Scope of Work — This Section covers the furnishing of materials and products for the fabrication of specified sound absorbing module systems.

The extent of work shall be as specified and include but not be limited to the following:

- Sound absorbing panel modules.
- Acoustical insulation.
- Metal support systems.

1.2 Manufacturer of sound absorbing metal liner panels shall be Industrial Acoustics Company, 1160 Commerce Avenue, Bronx, NY 10462, Tel.: (718) 931-8000, Fax: (718) 863-1138.

1.3 Product Submittals shall include materials specifications, installation, and maintenance instructions with cleaning procedures.

1.4 Certified Test Reports shall be submitted with bid demonstrating compliance with sound absorption coefficients or Sabins specified herein and shall have been conducted in a laboratory accredited by the National Voluntary Laboratory Accreditation Program, NVLAP, for Sound Absorption Tests by the Reverberation Room Method, ASTM C 423.

2.0 MATERIALS

2.1 Face sheets shall be minimum 20 gauge G90, 0.0396 in. (1.01mm), galvanized (per ASTM A 525) pre-finished steel or aluminum (*select one*). The face panel shall have sufficient rigidity to provide panel flatness not exceeding a deflection of L/240 as measured diagonally across the panel.

2.2 Pre-finished Material Options (all NF Types except NF-II): Panels shall be finished with (*select one*) 8 mil (0.203mm) thick vinyl, 3 mil (0.076mm) thick polyester powder, or a 1 mil (0.025mm) polyester baked enamel. All trim pieces shall be factory-painted with a modified alkyd-baked enamel to match prefinished color selected by architect or owner.

2.3 Painted Option (all NF Types): All panels and trim shall be factory-painted with a modified alkyd-baked enamel. Color to be selected by architect or owner.

All designs and specifications subject to change without notice. (Metric dimensions in parentheses () nominal).

2.4. Face sheet perforations shall be round and diagonally centered with a maximum diameter of 3/16 in. (4.76mm) on 3/8 in. (9.53mm) staggered centers; open area of approximately 23%.

2.5. Acoustical insulation shall be sound absorbing fiberglass infill, U.L. fire classified with flame spread 25 maximum, smoke developed 50 maximum per ASTM E 84.

2.6 Fill Protection Options (*Select one or both*)

2.6.1 Infill shall be enclosed in polyethylene wrap as recommended by acoustical metal liner panel manufacturer; shall be U.L. classified with flame spread 25 maximum and smoke developed 50 per ASTM E 84.

2.6.2 Infill shall be separated from perforated face sheet by 1/4 in. (6.35mm) acoustic reactive spacer.

2.7 All exposed metal trim shall be minimum 18 gauge (1.31mm) G90 galvanized (per ASTM A 525) steel.

3.0 ACOUSTICAL PERFORMANCE

3.1 Panel Modules, when tested in accordance with ASTM C 423, shall produce minimum (*select one or more*) sound absorption coefficients, Table 1; Sabins per panel array, Table 2; or Sabins per panel, Table 3, as follows:

1/3 Octave Band Center Frequency, Hz						
125	250	500	1000	2000	4000	NRC

insert appropriate values from Table 1, 2, or 3

4.0 PANEL PENETRATIONS

4.1 A channel-shaped steel molding shall be installed on panels wherever panels have to be cut to fit. The molding must close the panel to preclude any loss of panel fill materials. All reinforcing channels shall be installed so as not to compromise the acoustic and structural properties of system. Any fasteners which may be required due to field cutting shall be concealed wherever possible.

OTHER APPLICATIONS

Correctional Facility, Palm Beach County, Florida



Water Pumping Station, Egham, England



Washington (DC) Convention Center



INDUSTRIAL ACOUSTICS COMPANY

SINCE 1949 — LEADERS IN NOISE CONTROL ENGINEERING, PRODUCTS AND SYSTEMS

UNITED STATES
1160 COMMERCE AVENUE
BRONX, NEW YORK 10462-5599
PHONE: (718) 931-8000
FAX: (718) 863-1138

UNITED KINGDOM
CENTRAL TRADING ESTATE
STAINES, MIDDLESEX, TW18 4XB
PHONE: (0784) 456-251
FAX: (0784) 463-303, TELEX: 25518

GERMANY
SOHLWEG 17
D-41372 NIEDERKRÜCHTEN
PHONE: (02163) 8431
FAX: (02163) 80618

TECHNICAL REPRESENTATION IN PRINCIPAL CITIES THROUGHOUT THE WORLD

PRINTED IN U.S.A.