

**Acoustically
Engineered,
Architecturally
Appealing,
Wall-Mounted or
Ceiling-Suspended
Modules**

**attenuate sound,
control noise,
reduce reverberation
effects,
with insulating
characteristics that
contribute to
energy savings. . .**



GYMNASIUM, UNIVERSITY OF MIAMI

INDUSTRIAL ACOUSTICS COMPANY
VARITONE™ SOUND
ABSORPTION
SYSTEM



**. . . in
auditoriums,
gymnasiums,
convention
centers,
concert halls,
restaurants,
houses of
worship,
schools, theaters,
broadcasting and
recording studios,
transit systems, and
correctional facilities**

IAC VARITONE Sound Absorption System

Industrial Acoustics Company's VARITONE™ Sound Absorption System features acoustically engineered, architecturally compatible, rectangular modules for attachment to walls or for suspension from ceilings of enclosed or semi-enclosed areas to reduce distracting echo or reverberation effects and thus create an acoustically softer, more pleasant ambience.

Fabricated from 22-gage (0.76 mm) steel in standard widths, in lengths up to 12 feet (3658 mm), and in thicknesses of two or four inches (51 or 102 mm), VARITONE System modules containing acoustic/thermal fill have a higher



VARITONE modules enhance the tonal quality of the musicians' rehearsal hall. This is a typical example of how VARITONE modules can improve acoustical properties.

degree of sound absorption, particularly in the hard-to-control low frequencies, than do light-weight-metal or fabric-covered designs. (We can supply the steel modules in heavier gages for special applications.)

Fashioned with interior-design appeal and for long-service life, VARITONE modules can be installed easily as individual units, in clusters, or in series. No matter where or how this IAC System is applied, the modules exhibit the best in visually attractive, abuse-resistant, sound-absorptive properties to meet the most demanding requirements of consultants, architects, and owners.

VARITONE System Features and Benefits

✓ Acoustical Conditioning/Noise Control

VARITONE System modules are characterized by standard Noise Reduction Coefficients (NRC) of 0.95 and higher. High performance in low frequencies (63 Hz and 125 Hz) will help tune out the boom and echo in these troublesome ranges. To create a satisfactory acoustical environment with the VARITONE System depends on specification of module quantity, thickness, area of installation, and module arrangement. When these factors are determined, a VARITONE System installation can be planned to control noise-level buildup and to realize desired reverberation time.

✓ Interior Design Appeal

VARITONE System modules come with a standard vinyl-clad finish in neutral beige. But we can supply them in colors suitable to the architectural or interior-design concept of the area of installation. Also, the modules can be factory painted in beige or prime painted for finishing in the field. (Other painted colors are optional.) This range of eye-pleasing finishes coupled with the variety of possible installation groupings and patterns promotes VARITONE modules adding to the attractive appearance of building walls, ceilings, soffits, and facades.

✓ Fire Safety

VARITONE System metal modules contain fire-resistant sound-absorbing fill tested for flamespread, smoke, and fuel contribution per ASTM E84—70T, UL 723, and NFPA 255. Ratings are shown in specifications (see page 4).

✓ Installation Ease

VARITONE System modules are readily fastened to masonry walls, wood studs, metal girders, and other structural members with mechanical fasteners IAC supplies. (We can also furnish special vibration-resistant fasteners and attachments so modules can be installed to withstand positive and negative wind loading.) System design permits integration, structurally and architecturally, of modules with existing or new windows and doors, lights, sprinkler systems, and ventilation grilles in either remodeling or new-building construction. Due to the higher sound-absorption properties of the VARITONE System, installation and material costs can be less than other systems as fewer modules may be required to achieve desired results.

✓ Abuse Resistance

VARITONE System modules are fabricated from rugged, 22-gage (0.76 mm) galvanized steel. This construction designed to withstand wear and tear can be enhanced by a mar-resistant laminated-vinyl surface finish. Combined, these two properties are insurance, against the abuse which can be expected in places of public accommodation, and protection for investment in the VARITONE System.

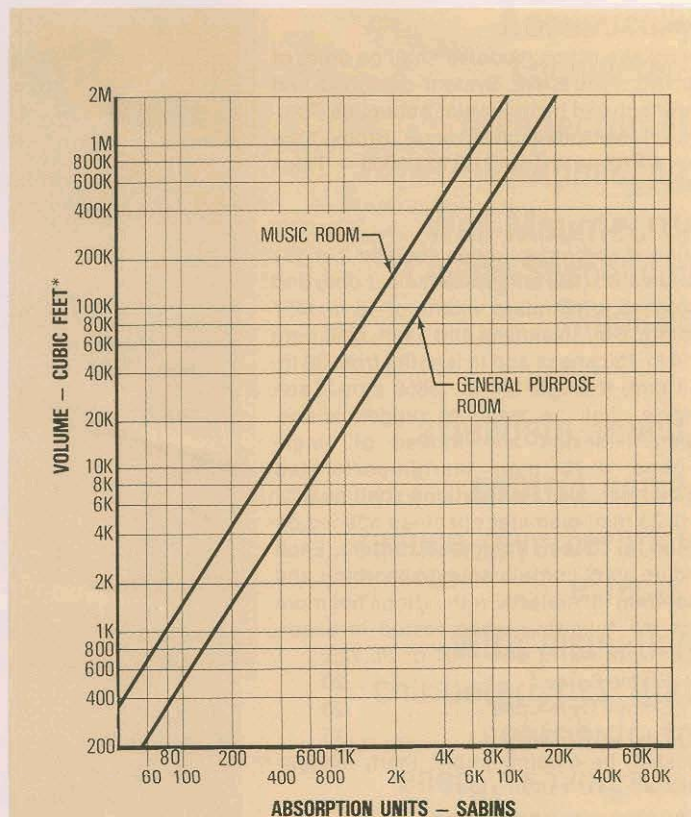
✓ Thermal/Energy Control

VARITONE System modules' inherent insulation characteristics help keep buildings warmer in winter and cooler in summer for savings in energy consumption. Overall heat transfer coefficient is 0.07 BTU/hr/sq ft/°F (0.4 W/sq m/°C) for the four-inch-thick (102 mm) module and 0.14 BTU/hr/sq ft/°F (0.8 W/sq m/°C) for the two-inch-thick (51 mm) module.

How to Use VARITONE

The reverberation characteristics of interior spaces largely determine their acoustic environment assuming that the noise-reduction design of the rooms is well executed. There are no ideal reverberation times. However, the quantity of absorptive units in Sabins shown in graph when added to a space results in obtaining commonly used satisfactory reverberation times. The graph is based on the assumption that the existing walls, ceiling and floor are acoustically reflective with a combined average sound absorption coefficient of approximately 0.075.

From the graph, find the required amount of sound absorption units (Sabins) to be added to the room. Use Table 2 which lists the number of sabins for each size varitone to calculate the number of modules needed to obtain the required amount of Sabins. Data is tabulated at various frequencies however, for most applications this determination can be made using the Effective Average column. Allowance must be made for carpets, drapes and other sound absorptive material, if any. Where low frequency "boominess" is a problem, use 4 in. (102 mm) thick modules.



NOTE: M = million
K = thousand

*To obtain volume in cubic meters multiply by 0.0283 or divide by 35.31.

TABLE 1 — VARITONE SOUND ABSORPTION COEFFICIENTS

Module	Octave Band Center Frequency, Hz						
	125	250	500	1K	2K	4K	NRC*
2 in. (51 mm)	0.57	0.86	1.15	1.07	0.94	0.82	1.00
4 in. (102 mm)	0.99	1.19	1.11	1.06	1.03	1.03	1.10

*NRC stands for Noise Reduction Coefficient and is the average of the 250, 500, 1000, and 2000 Hz coefficients. It is a single number indicator of relative absorption values.

NOTE: The above absorption measurements are based upon ASTM C423-65 test procedure. Certified laboratory test reports available upon request.

Table 2 — ABSORPTION UNITS, SABINS RELATED TO DIMENSIONS OF IAC VARITONE MODULES

Length ft-in.(mm)	18 in. (457 mm) Wide — 2 in. (51 mm) Thick								14 in. (356 mm) Wide — 4 in. (102 mm) Thick							
	Area ft ²	Frequency						*Effective Average	Area ft ²	Frequency						*Effective Average
		125	250	500	1K	2K	4K			125	250	500	1K	2K	4K	
6'-0" (1829)	9.00	5.1	7.7	10.4	9.6	8.5	7.4	9.0	7.00	6.6	8.2	7.8	7.4	7.2	7.2	7.7
6'-6" (1981)	9.75	5.6	8.4	11.2	10.4	9.2	8.0	9.8	7.60	7.1	9.0	8.4	8.0	7.8	7.8	8.3
7'-0" (2134)	10.50	6.0	9.0	12.1	11.2	9.9	8.6	10.5	8.17	7.7	9.7	9.1	8.7	8.4	8.4	9.0
7'-6" (2286)	11.25	6.4	9.7	12.9	12.0	10.0	9.2	11.3	8.75	8.2	10.4	9.7	9.3	9.0	9.0	9.6
8'-0" (2438)	12.00	6.8	10.3	13.8	12.8	11.3	9.8	12.0	9.30	8.8	11.1	10.4	9.9	9.6	9.6	10.2
8'-6" (2591)	12.75	7.3	11.0	14.7	13.6	12.0	10.5	12.8	10.00	9.3	11.8	11.0	10.5	10.2	10.2	11.0
9'-0" (2743)			11.6	15.5	14.4	12.7	11.1	13.5	10.50	9.9	12.5	11.7	11.1	10.8	10.8	11.6
9'-6" (2896)	14.25	8.1	12.3	16.4	15.2	13.4	11.7	14.3	11.00	10.4	13.2	12.3	11.7	11.4	11.4	12.1
10'-0" (3048)	15.00	8.6	12.9	17.3	16.1	14.1	12.3	15.0	11.70	11.0	13.9	13.0	12.9	12.0	12.0	12.9
10'-6" (3200)	15.75	9.0	13.5	18.1	16.9	14.8	12.9	15.8	12.25	11.5	14.6	13.6	13.0	12.6	12.6	13.5
11'-0" (3353)	16.50	9.4	14.2	19.0	17.7	15.5	13.5	16.5	12.80	12.1	15.3	14.2	13.6	13.6	13.6	14.1
11'-6" (3505)	17.25	9.8	14.8	19.8	18.5	16.2	14.1	17.3	13.40	12.6	16.0	14.9	14.2	13.8	13.8	14.7
12'-0" (3658)	18.00	10.3	15.5	20.7	19.3	16.9	14.8	18.0	14.00	13.2	16.7	15.5	14.8	14.4	14.4	15.4

*Effective averages are based on NRC values

Technical Specifications IAC Varitone™ Modules

MANUFACTURER

Sound-absorbing modules shall be units of the IAC VARITONE System designed and manufactured by Industrial Acoustics Company, 1160 Commerce Avenue, Bronx, New York 10462 — Phone (212) 931-8000 — Telex 12-5880.

MATERIALS

Sound-absorbing modules shall be 2 in. (51 mm) or 4 in. (102 mm) thick (*select one*) and furnished in standard widths of 18 in. (457 mm) for 2-in. thickness and 14-in. (356 mm) for 4-in. thickness and in lengths from 36 in. (914 mm) through 144 in. (3658 mm). Each module shall be made of rugged abuse-resistant design and formed of single 22-gage (0.76 mm) margin-perforated galvanized steel. Perforations shall be 3/32 in. (2.38 mm) diameter openings spaced on 3/16 in. (4.76 mm) staggered centers. Each module shall contain sound-absorbing and insulating fill material with ratings not more than the following when tested in accordance with ASTM E84-70T or UL 723:

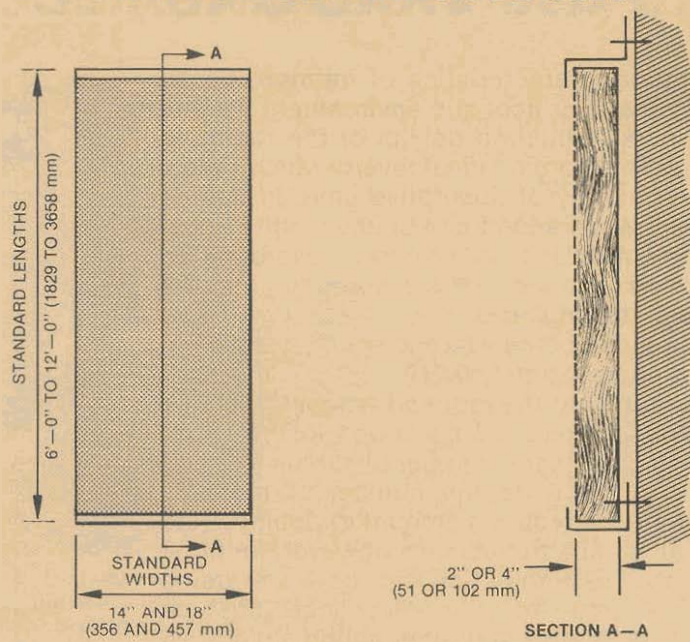
Flame Spread	20
Smoke Developed	20
Fuel Contributed	15

Fill shall be incombustible, inert, mildew-resistant, and verminproof.

ACOUSTIC PERFORMANCE

Sound-absorption values per ASTM C423-65 shall be not less than those shown in Table 1 (see page 3).

TYPICAL INSTALLATION DETAILS



OTHER DETAILS AVAILABLE. REQUEST BULLETIN 3.0702.0.

FINISH

Option 1 — VARITONE System modules to be fabricated from vinyl-coated steel in standard beige (other colors optional).

Option 2 — VARITONE System modules shall be primed and finished in beige color with nitrocellulose modified phenolic paint to a dry film thickness of 0.6 mil (0.015 mm)

minimum. (Other colors optional.)

INSTALLATION

Manufacturer shall supply brackets or clips to allow for module attachment to walls and ceilings. All additional attachment devices such as expansion bolts and clamps shall be supplied by others.

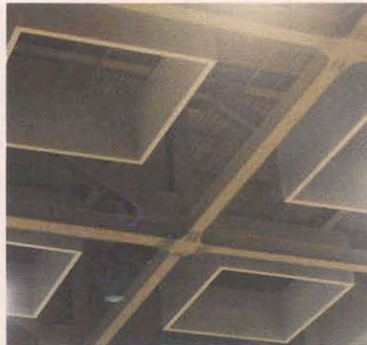
VARITONE System Advisory Service

IAC with the assistance of our area representatives will be glad to help determine type and quantity of VARITONE modules required for your specific applications.

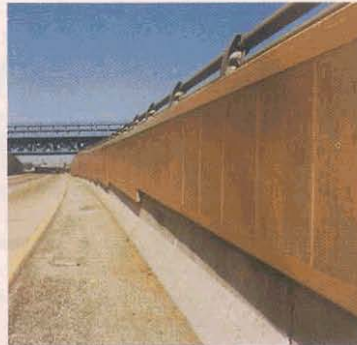
Varied Applications for IAC VARITONE System Modules



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CONVENTION CENTERS
Washington (DC) Convention Center



TRAFFIC/TRANSIT NOISE CONTROL
I-95 Society Hill, Philadelphia, PA



CAFETERIAS, DINING HALLS
Hegy Training Center, Derby, CT

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INDUSTRIAL ACOUSTICS COMPANY

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