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U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
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Letter
Circular
LC-539



SOUND ABSORPTION COEFFICIENTS OF THE MORE COMMON ACOUSTIC MATERIALS.

The following figures have been obtained at the National Bureau of Standards for the sound absorption coefficients of a number of acoustic materials. It is our intention to publish results only for materials which are on the market. The measurements on some of these materials were made several years ago, but we believe these materials are essentially the same as when the measurements were made. The inclusion of a material in this letter circular is not to be construed as a general approval. Each material should be judged on its merits in any particular case as there are other requirements such as fire resisting qualities; light reflection, appearance, etc. Figures are also given for the absorption of an audience seated in chairs of different kinds. All the results have been obtained by the reverberation method on samples having an area of approximately 72 square feet.

The sound absorption coefficient of a material is defined as the fractional part of the energy of a sound wave which is absorbed at each reflection. Experimental figures such as are given here must be regarded as approximate only. This branch of applied science is new and in a state of development. The methods and formulas used in obtaining these figures are those which, while not entirely satisfactory, are open to the least objection. The uncertainty involved is such that all the coefficients are probably somewhat too large.

The "noise coefficient" given in the table is the average to the nearest multiple of 0.05 of the coefficients for 256, 512, 1024 and 2048 cycles. It has been recommended by many consultants that such a coefficient be used when the problem is one of reducing the noise level, as in offices, restaurants, etc.

Fibrous materials and acoustic tiles may exhibit large variations in coefficient arising from different methods of mounting. The figures here given apply only to cases where the materials are mounted in the same manner as when tested.

Acoustic plasters require special skill in their application, as improper manipulation may reduce the coefficient. Particular attention is called to the fact that a dry base coat is used for most applications. Also the sound absorption coefficients are affected quite materially by the time between the application of the first and second coat of accustic plaster.

It is not necessarily the case that the materials of highest coefficient are the most advantageous. When there is room enough to apply the requisite quantity, a material of low coefficient will give better results than one of higher absorption, because of the more uniform distribution

of material. Also, in comparing different materials it should be borne in mind that there is some variation in manufacture, hence the sample which was measured may have more or less absorption than the material delivered on the job. Minor differences in coefficients, therefore, should be disregarded in choosing between materials.

For the foregoing reasons it is advisable in drawing up specifications for auditoriums to lay emphasis upon the reverberation time desired rather than upon coefficients of material. See National Bureau of Standards Circular C418 entitled "Architectural Acoustics", which may be obtained of the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents per copy. Additional details regarding any of the materials mentioned in this letter circular will be furnished on application.

Additional information regarding the absorption coefficients of acoustical materials may be obtained from the Acoustical Materials Association, 919 North Michigan Avenue, Chicago, Illinois.

## Sound Absorption Coefficients and Description of Test Samples

### Table 1
### Acoustical Tiles, Cast Materials, Boards and Blankets

| Material | Thickness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ACOUSTICAL CORPORATION OF AMERICA** | | | | | | | | | | | | | |
| Mutetile (2" Rockwool) | 2 1/2" | 4 | .53 | .71 | .80 | .78 | .76 | .45 | .75 | 12"x 12" | - - | Cast plaster of paris perforated 2536 holes per sq ft, dia. 1/16". | 1932 |
| **ACOUSTONE COMPANY, LTD.** | | | | | | | | | | | | | |
| Trutone Tile, cast on 1/4" gypsum wall board | 7/8" | 4 | .16 | .17 | .48 | .82 | .65 | .74 | .55 | 12"x 24" | - - | Spray painted by manufacturer. | 1932 |
| **AMERICAN GYPSUM CO.** | | | | | | | | | | | | | |
| Muffletone, Standard Finish | 1" | 1 | .19 | .45 | .84 | .87 | .83 | .88 | .75 | 12"x 12" | 1.83 | Painted by mfr. | 1938 |
| Muffletone, Standard Finish | 3/4" | 1 | .13 | .36 | .65 | .62 | .70 | .69 | .60 | 12"x 12" | 1.62 | Unpainted. | 1938 |
| Muffletone, Standard Finish | 1" | 1 | .15 | .46 | .75 | .80 | .72 | .68 | .70 | 12"x 12" | 1.84 | Unpainted. | 1938 |
| Muffletone, Standard Finish | 1" | 1 | .13 | .44 | .78 | .80 | .75 | .82 | .70 | 12"x 12" | 1.84 | Spray painted 3 coats at N.B.of S. | 1938 |
| Muffletone, Travertine Finish | 1" | 1 | .16 | .45 | .71 | .69 | .71 | .70 | .65 | 12"x 12" | 1.96 | Unpainted. | 1938 |
| Muffletone, Travertine Finish | 1" | 1 | .16 | .44 | .68 | .69 | .69 | .71 | .65 | 12"x 12" | 1.96 | Spray painted 3 coats at N.B. of S. | 1938 |
| **ARMSTRONG CORK & INSULATION COMPANY** | | | | | | | | | | | | | |
| Ceramacoustic Tile | 1 1/8" | 1 | .34 | .48 | .63 | .66 | .65 | .58 | .60 | 4½" x 9" | 3.4 | Unpainted | 1932 |
| Ceramacoustic Tile | 1 1/8" | 1 | .28 | .49 | .62 | .62 | .66 | .54 | .60 | 4½" x 9" | 3.4 | Spray painted 4 coats at N.B. of S. | 1932 |

| Material | Thick-ness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ARMSTRONG CORK & INSULATION COMPANY (Cont'd)** | | | | | | | | | | | | | |
| Corkoustic Tile | 1 1/2" | 1 | .08 | .23 | .70 | .61 | .52 | .52 | .50 | 12"x 12" | .83 | Painted by mfr. | 1936 |
| Temlock | 1/2" | 5 (16" o.c.) | .24 | .31 | .27 | .27 | .36 | .47 | .30 | - - | - | Unpainted. | 1931 |
| Temlock DeLuxe | 1/2" | 4 | .12 | .24 | .39 | .31 | .31 | .32 | .30 | 48"x 54" | 1.18 | Painted by mfr. | 1937 |
| Temlock DeLuxe | 7/8" | 4 | .22 | .46 | .35 | .32 | .39 | .57 | .40 | 48"x 54" | 1.19 | " " " | 1937 |
| Temlock DeLuxe | 1 3/8" | 4 | .32 | .45 | .37 | .39 | .46 | .63 | .40 | 48"x 54" | 1.65 | " " " | 1937 |
| **BASALT ROCK COMPANY** | | | | | | | | | | | | | |
| Basalt Rock Type A | 5" | 4 | .32 | .81 | .75 | .73 | .74 | .73 | .75 | 18"x 24" | 25.2 | Unpainted | 1938 |
| **SAMUEL CABOT, INC.** | | | | | | | | | | | | | |
| Cabots Quilt | - | 4 | .12 | .30 | .69 | .82 | .41 | .31 | .55 | - - | .41 | Covered with paper. | 1938 |
| **THE CELOTEX CORPORATION** | | | | | | | | | | | | | |
| Absorbex Type A on 1" Absorbex Type F (10 gauge) | 2" | 4 | - | .39 | .80 | .96 | .92 | - | .75 | 9"x 9" tile on 20"x 64" | - sheets. | Spray painted by mfr. | 1932 |
| Absorbex Type A | 1" | 1 | - | .22 | .45 | .87 | .91 | - | .60 | 9"x 9" | 2.5 | Spray painted by mfr. | 1932 |
| Absorbex Type A | 1" | 9 | .19 | .63 | .95 | .86 | .78 | .77 | .80 | 18"x 18" | 2.6 | Unpainted | 1936 |
| Absorbex Type A | 1" | 2 (18" o.c.) | .19 | .33 | .80 | .86 | .80 | .83 | .70 | 18"x 18" | 2.7 | Kerfed, spray painted 4 coats paint at N.B.of S. | 1936 |
| Absorbex Type C | 1" | 4 | .14 | .19 | .34 | .73 | .62 | .62 | .45 | 20"x 64" | - | Unpainted | 1932 |
| Absorbex Type C (14 gauge) | 1" | 2 (20" o.c.) | .14 | .21 | .67 | .69 | .59 | .62 | .55 | 20"x 64" | - | Unpainted | 1932 |
| Absorbex Type F (10 gauge) | 1" | 2 (16" o.c.) | .06 | .17 | .47 | .66 | .53 | - | .45 | 20"x 64" | - | Spray painted by mfr. | 1934 |
| Absorbex Type F (8 gauge) | 2" | 7 | .13 | .47 | .98 | .70 | .78 | .70 | .75 | 20"x 64" | 4.7 | Spray painted 4 coats paint at N.B.of S. | 1934 |
| Acousti-Celotex Type C5 | 13/16" | 1 | .15 | .24 | .62 | .73 | .70 | .71 | .55 | 12"x 12" | - | Unpainted, perforated 441 holes per sq ft, 1/4" dia., 5/8" deep. | 1931 |

THE CELOTEX CORPORATION (Cont'd)

| Material | Thick-ness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acousti-Celotex Type C5 | 13/16" | 1 | .13 | .26 | .62 | .78 | .86 | .77 | .65 | 12"x 12" | - | Same as sample above, brush painted 1 coat glue size, 4 coats lead and oil at N.B.of S. | 1931 |
| Acousti-Celotex Type C5 | 13/16" | 2 | .09 | .56 | .77 | .90 | .78 | .62 | .75 | 12"x 12" | .86 | Unpainted, perforated 441 holes per sq ft, 1/4" dia., 5/8" deep. | 1933 |
| Acousti-Celotex Type C6 | 1 1/4" | 4 | .12 | .41 | .90 | .92 | .66 | .64 | .70 | 12"x 12" | 1.44 | Unpainted, perforated 441 holes per sq ft, 1/4" dia., 1" deep. | 1932 |
| Acousti-Celotex Type C1 | 1/2" | 1 | .12 | .26 | .48 | .50 | .46 | .56 | .45 | 12"x 12" | .78 | R.I. finish, perforated 441 holes per sq ft, 3/16" dia., 3/8" deep. | 1936 |
| Acousti-Celotex Type C1 Slow-burning | 1/2" | 1 | .17 | .24 | .40 | .45 | .43 | .51 | .40 | 12"x 12" | .88 | Unpainted, perforated 441 holes per sq ft, 3/16" dia., 3/8" deep. | 1936 |
| Acousti-Celotex Type C2 | 11/16" | 1 | .11 | .31 | .71 | .80 | .67 | .57 | .60 | 12"x 12" | .88 | R.I. finish, perforated 441 holes per sq ft, 3/16" dia., 1/2" deep. | 1936 |
| Acousti-Celotex Type C2 | 11/16" | 2 | .14 | .65 | .63 | .73 | .67 | .55 | .65 | 12"x 12" | .88 | R.I. finish, perforated 441 holes per sq ft, 3/16" dia., 1/2" deep. | 1936 |
| Acousti-Celotex Type C2 Slow burning | 5/8" | 1 | .09 | .25 | .68 | .79 | .69 | .66 | .60 | 12"x 12" | .89 | Unpainted, perforated 441 holes per sq ft, 3/16" dia., 1/2" deep. | 1937 |
| Acousti-Celotex Type C3 | 13/16" | 1 | .18 | .32 | .76 | .93 | .63 | .50 | .65 | 12"x 12" | 1.11 | R.I. finish, perforated 441 holes per sq ft, 3/16" dia., 5/8" deep. | 1936 |
| Acousti-Celotex Type C3 | 13/16" | 3 | .55 | .66 | .66 | .80 | .69 | .52 | .70 | 12"x 24" | 1.09 | R.I. finish, perforated 441 holes per sq ft, 3/16" dia., 5/8" deep. | 1936 |

THE CELOTEX CORPORATION (Cont'd)

| Material | Thickness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acousti-Celotex Type C3 Slow-burning | 13/16" | 1 | .18 | .36 | .67 | .74 | .67 | .66 | .60 | 12"x 12" | 1.35 | Unpainted, perforated 441 holes per sq ft 3/16" dia., 5/8" deep. | 1936 |
| Acousti-Celotex Type C3 Slow-burning | 13/16" | 8 | .45 | .58 | .67 | .91 | .71 | .66 | .70 | 12"x 24" | 1.06 | Unpainted, perforated 441 holes per sq ft, 3/16" dia., 5/8" deep. | 1937 |
| Acousti-Celotex Type C4 | 1 1/4" | 1 | .17 | .48 | .97 | .72 | .50 | .41 | .65 | 12"x 12" | 1.58 | R.I. finish, perforated 441 holes per sq ft, 3/16" dia., 1 1/16" deep. | 1936 |
| Acousti-Celotex Type C4 | 1 1/4" | 8 | .53 | .68 | .96 | .78 | .60 | .50 | .75 | 12"x 24" | 1.44 | R.I. finish, perforated 441 holes per sq ft, 3/16" dia., 1 1/16" deep. | 1936 |
| Acousti-Celotex Type C4 Slow burning | 1 1/4" | 1 | .13 | .51 | .94 | .84 | .58 | .52 | .70 | 12"x 12" | 1.80 | Unpainted, perforated 441 holes per sq ft, 3/16" dia., 1 1/16" deep. | 1936 |
| Acousti-Celotex Type MU-1 | 1/2" | 1 | .10 | .17 | .53 | .68 | .66 | .72 | .55 | 12"x 12" | 1.39 | Unpainted, not perforated. | 1936 |
| Acousti-Celotex Type M1 | 9/16" | 1 | .11 | .29 | .68 | .74 | .82 | .74 | .65 | 12"x 12" | 1.23 | Painted by mfr., perforated 676 holes per sq ft, 5/32" dia., 1/2" deep. | 1936 |
| Acousti-Celotex Type M3 | 1 1/4" | 1 | .15 | .50 | .93 | .89 | .74 | .69 | .75 | 12"x 12" | 2.58 | Painted by mfr., perforated 676 holes per sq ft, 5/32" dia., 1 1/8" deep. | 1936 |
| Calicel Acoustic Tile | 3/4" | 1 | .07 | .21 | .62 | .90 | .75 | .75 | .60 | 12"x 12" | - | Unpainted. | 1936 |
| Calicel Acoustic Tile | 1" | 1 | .09 | .26 | .74 | .97 | .78 | .84 | .70 | 12"x 12" | 2.66 | Unpainted. | 1935 |
| Calicel Acoustic Tile | 1 | 5 (12" o.c.) | .28 | .90 | .86 | .72 | .85 | .89 | .85 | 12"x 12" | 2.66 | Unpainted. | 1935 |
| Calicel Acoustic Tile | 1 1/4" | 1 | .14 | .43 | .90 | .90 | .82 | .80 | .75 | 12"x 12" | 3.42 | Unpainted. | 1935 |
| Calicel Acoustic Tile | 1 1/4" | 5 (12" o.c.) | .38 | .95 | .76 | .78 | .89 | .87 | .85 | 12"x 12" | 3.42 | Unpainted. | 1935 |

THE CELOTEX CORPORATION (Cont'd)

| Material | Thick-ness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calistone | 2" | 4 | .12 | .45 | .87 | .82 | .76 | .67 | .75 | 12"x 12" | 9.3 | Unpainted | 1935 |
| Calistone | 2" | 5 (12" o.c.) | .46 | .91 | .71 | .75 | .84 | .72 | .80 | 12"x 12" | 9.3 | Unpainted | 1935 |
| Calistone | 4" | 4 | .38 | .59 | .60 | .63 | .63 | .62 | .60 | 18"x 24" | 17.8 | Unpainted | 1937 |
| Calistone | 5" | 4 | .45 | .37 | .81 | .80 | .78 | .81 | .80 | 18"x 24" | 22.4 | Unpainted | 1937 |

CERTAIN-TEED PRODUCTS CORPORATION

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kalite, cast on 1/4" backing of moulding plaster, Grade D(fine) | 1" | 4 | .09 | .30 | .49 | .54 | .47 | .48 | .45 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast on 1/4" backing of moulding plaster, Grade A(Coarse) | 1" | 4 | .06 | .19 | .42 | .69 | .74 | .64 | .50 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast on 1/4" backing of moulding plaster, Grade D(Fine) | 1 1/2" | 4 | .20 | .39 | .59 | .61 | .60 | .67 | .55 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast on 1/4" backing of moulding plaster, Grade A(Coarse) | 1 1/2" | 4 | .15 | .34 | .64 | .74 | .68 | .69 | .60 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast on 1/4" backing of moulding plaster, Grade D(Fine) | 2" | 4 | .22 | .48 | .55 | .58 | .54 | .53 | .55 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast on 1/4" backing of moulding plaster, Grade A(Coarse) | 2" | 4 | .23 | .55 | .73 | .67 | .64 | .62 | .65 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast on 1/4" backing of moulding plaster, Grade A(Coarse) | 2" | 4 | .26 | .51 | .72 | .69 | .67 | .71 | .65 | 24"x 36" | - | Spray painted 4 coats of Mural-tone paint. | 1937 |

| Material | Thickness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CORK INSULATION COMPANY, Inc.** | | | | | | | | | | | | | |
| Corinco Acousticator | 1 1/2" | 1 | .07 | .20 | .53 | .39 | .37 | .35 | .35 | 12"x 24" | 1.20 | Unpainted | 1938 |
| Corinco Acousticator | 1 1/2" | 2 | .10 | .58 | .35 | .34 | .31 | .42 | .40 | 12"x 24" | 1.07 | Spray painted by manufacturer. | 1938 |
| Corinco Corkbestos | 1 1/2" | 2 | .22 | .69 | .57 | .53 | .65 | .63 | .60 | 12"x 24" | 1.12 | Unpainted | 1938 |
| **CORNING GLASS COMPANY** | | | | | | | | | | | | | |
| Corning Glass Mineral Wool Acoustic Blankets | 1" | 4 | .27 | .63 | .75 | .75 | .78 | .75 | .75 | - - | .44 | Covered with thin muslin. | 1938 |
| Corning Glass Mineral Wool Acoustic Blankets | 2" | 4 | .34 | .72 | .87 | .87 | .75 | .70 | .80 | - - | .72 | " " | 1938 |
| Corning Glass Mineral Wool Acoustic Blankets | 3" | 4 | .39 | .91 | .97 | .91 | .82 | .85 | .90 | - - | 1.07 | " " | 1938 |
| **THE FELTERS COMPANY, Inc.** | | | | | | | | | | | | | |
| Felt | 1" | 4 | .11 | .40 | .80 | .84 | .78 | .98 | .70 | - - | .96 | No surface covering. | 1938 |
| **R. GUASTAVINO COMPANY** | | | | | | | | | | | | | |
| Akoustolith Tile Grade D | 1" | 4 | .08 | .13 | .25 | .54 | .67 | .42 | .40 | - - | - | Unpainted | 1930 |
| Akoustolith Tile Grade D | 2" | 4 | .15 | .26 | .59 | .74 | .52 | .50 | .55 | - - | - | Unpainted | 1930 |
| Akoustolith Tile Grade C | 1 1/2" | 4 | .12 | .19 | .44 | .61 | .66 | .56 | .50 | 6"x 12" | 7.5 | Unpainted | 1930 |
| Akoustolith Tile Grade C | 2" | 4 | .19 | .26 | .53 | .64 | .70 | .56 | .55 | 6"x 12" | 10.1 | Unpainted | 1930 |
| Akoustolith Tile Grade B-2 | 1" | 4 | .09 | .17 | .46 | .77 | .77 | .58 | .55 | 6"x 12" | 4.6 | Unpainted | 1932 |
| Akoustolith Tile Grade B-2 | 1 1/2" | 4 | .14 | .30 | .67 | .87 | .82 | .57 | .65 | 6"x 12" | 6.1 | Unpainted | 1932 |
| Akoustolith Tile Grade B-2 | 2" | 4 | .21 | .50 | .85 | .81 | .70 | .70 | .70 | 6"x 12" | 8.5 | Unpainted | 1932 |

R. GUASTAVINO COMPANY (Cont'd)

| Material | Thick-ness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Akoustolith Tile Grade B-1 | 2" | 5 (12" o.c.) Not nailed | .42 | .75 | .67 | .75 | .80 | .78 | .75 | 6"x 12" | 9.4 | Unpainted | 1936 |
| Akoustolith Tile Grade B-1 | 1 1/4" | 5 (12" o.c.) Not nailed | .41 | .83 | .78 | .72 | .78 | .82 | .80 | 6"x 12" | 5.8 | Unpainted | 1936 |
| Akoustolith Tile Grade C | 4" | 10 | .54 | .70 | .78 | .85 | .83 | .81 | .80 | 12"x 12" | 19.5 | Unpainted | 1937 |
| Akoustolith Tile Grade C | 4" | 4 | .32 | .82 | .90 | .77 | .79 | .81 | .80 | 12"x 12" | 19.5 | Unpainted | 1937 |
| Akoustolith Tile Grade C | 5" | 4 | .43 | .92 | .91 | .88 | .86 | .74 | .90 | 12"x 12" | 24.4 | Unpainted | 1937 |
| Akoustolith Tile Grade C | 5" | 5 Not nailed | .67 | .80 | .96 | .93 | .80 | .87 | .85 | 12"x 12" | 24.4 | Unpainted | 1937 |
| Akoustolith Tile Grade C | 5" | 10 | .60 | .80 | .95 | .91 | .90 | .78 | .90 | 12"x 12" | 24.4 | Unpainted | 1937 |
| Akoustolith Tile Grade D | 4" | 10 | .54 | .80 | .70 | .88 | .87 | .74 | .80 | 12"x 12" | 18.8 | Unpainted | 1937 |
| Akoustolith Tile Grade D | 4" | 4 | .27 | .76 | .93 | .78 | .74 | .69 | .80 | 12"x 12" | 18.8 | Unpainted | 1937 |
| HAWAIIAN CANE PRODUCTS, Ltd. | | | | | | | | | | | | | |
| Hawaiian Cane Tile | 1" | 1 | .10 | .40 | .69 | .78 | .77 | .79 | .65 | 11½"x 11½" | 0.75 | Unpainted | 1933 |
| Hawaiian Cane Tile | 1" | 2 | .24 | .70 | .40 | .48 | .54 | .60 | .55 | 12"x 12" | .81 | Unpainted | 1935 |
| THE INSULITE COMPANY | | | | | | | | | | | | | |
| Insulite Acoustile Type 44 | 1 3/4" | 4 | .26 | .42 | .50 | .57 | .61 | .59 | .55 | 12"x 12" | 1.47 | Unpainted | 1931 |

JOHNS-MANVILLE SALES CORPORATION

| Material | Thickness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Air-Acoustic Sheets | 1/2" | 11 | .14 | .45 | .53 | .70 | .67 | .70 | .60 | 18"x 24" | .80 | Unpainted | 1938 |
| Air-Acoustic Sheets | 1" | 11 | .31 | .55 | .70 | .74 | .76 | .76 | .70 | 18"x 24" | 1.51 | Unpainted | 1938 |
| Fibretex Type 30R | 5/8" | 2 | .11 | .20 | .59 | .91 | .85 | .72 | .65 | 12"x 12" | 1.34 | Unpainted | 1938* |
| Fibretex Type 40R | 3/4" | 1 | .06 | .17 | .37 | .68 | .82 | .74 | .50 | 12"x 12" | 1.75 | Unpainted | 1938* |
| Fibretex Type 40R | 3/4" | 2 | .15 | .22 | .61 | .93 | .79 | .69 | .65 | 12"x 12" | 1.54 | Unpainted | 1938* |
| Fibretex Type 50R | 7/8" | 2 | .13 | .28 | .70 | .98 | .85 | .87 | .70 | 12"x 12" | 1.79 | Unpainted | 1938* |
| Fibretex Type 60R | 1" | 1 | .07 | .24 | .55 | .87 | .86 | .88 | .65 | 12"x 12" | - | Unpainted | 1937* |
| Fibretex Type 60R | 1" | 2 (1"x 3" furring) | .11 | .33 | .77 | .92 | .70 | .96 | .70 | 12"x 12" | 2.07 | Unpainted | 1936* |
| Nashkote A | 1/2" | 1 | .05 | .13 | .25 | .26 | .20 | .18 | .20 | 36"x 48" | - | Painted 2 coats oil paint. | 1929 |
| Nashkote A | 1/2" | 1 | .08 | .15 | .43 | .62 | .65 | .58 | .45 | 36"x 48" | - | Same as above except membrane perforated with fine holes after painting. | 1929 |
| Nashkote A | 3/4" | 1 | .09 | .16 | .27 | .30 | .23 | .23 | .25 | 36"x 48" | - | Painted 2 coats oil paint. | 1929 |
| Nashkote A | 3/4" | 1 | .11 | .21 | .51 | .68 | .71 | .68 | .55 | 36"x 48" | - | Same as above except membrane perforated with fine holes after painting. | 1929 |
| Nashkote A | 1" | 1 | .12 | .20 | .33 | .33 | .28 | .28 | .30 | 36"x 48" | - | Painted 2 coats oil paint. | 1929 |
| Nashkote A | 1" | 1 | .13 | .26 | .58 | .73 | .77 | .71 | .60 | 36"x 48" | - | Same as above except membrane perforated with fine holes after painting. | 1929 |
| Permacoustic | 1" | 5 (Not nailed) | .27 | .74 | .66 | .82 | .70 | .70 | .75 | 12"x 12" | 2.33 | Unpainted | 1938 |
| Permacoustic | 1" | 1 | .20 | .62 | .83 | .74 | .77 | .80 | .75 | 12"x 12" | 2.33 | Unpainted | 1938 |
| Rockoustile | 1" | 1 | .09 | .27 | .70 | .79 | .65 | .77 | .60 | 12"x 12" | 1.3 | Unpainted | 1938 |
| Rockoustile | 7/8" | 1 | .10 | .21 | .65 | .93 | .69 | .83 | .60 | 12"x 12" | - | Unpainted | 1938 |
| Sanacoustic, Pad plus metal facing, pad supports, & furring 2½" | 1 1/4" | 3 | .14 | .55 | .92 | .89 | .84 | .75 | .80 | 12"x 24" | Pad 1.2 | Perforated enameled metal surface 4608 holes per sq ft. | 1938 |

*These values are based on tests of Acoustex manufactured by the National Gypsum Company. Fibretex is the trade name used for this material by Johns-Manville Sales Corporation.

| Material | Thickness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **JOHNS-MANVILLE SALES CORPORATION (Cont'd)** | | | | | | | | | | | | | |
| Sound Isolation Blanket (Rockwool) | - | 4 | .11 | .58 | .85 | .83 | .81 | .83 | .75 | - | 1.5 | Metal lath | 1932 |
| Studio Element | 1" | 4 | .16 | .54 | .72 | .74 | .71 | .81 | .70 | 22"x 36" | 1.47 | No covering | 1937 |
| Transite Acoustical Units | 1 1/8" | 4 | .19 | .39 | .77 | .74 | .70 | .55 | .65 | 12"x 12" | 3.0 | Transite, perforated 576 holes per sq ft, diameter 5/32". | |
| **DAVID E. KENNEDY, Inc.** | | | | | | | | | | | | | |
| Kenccustex | 1" | 1 | .12 | .21 | .40 | .64 | .73 | .72 | .50 | 11⅛"x 11½" | 1.46 | Unpainted | 1938 |
| Kenkoustic (cork) | 1 1/2" | 1 | .09 | .16 | .66 | .64 | .50 | .62 | .50 | 12"x 36" | .88 | Unpainted | 1938 |
| KenKoustone | 1" | 1 | .08 | .10 | .31 | .29 | .19 | .25 | .20 | 5⅛"x 11½" | 2.34 | Painted by mfr. | 1938 |
| **LUSE STEVENSON COMPANY** | | | | | | | | | | | | | |
| Lusco Hair Felt | 1" | 4 | .06 | .27 | .57 | .77 | .81 | .88 | .60 | 4'x 9' | - | No surface covering | 1934 |
| **MAIZEWOOD PRODUCTS CORPORATION** | | | | | | | | | | | | | |
| Maizewood Tile | 1 1/2" | 4 | .23 | .41 | .63 | .79 | .70 | .62 | .65 | 12"x 12" | 2.1 | 12 saw cuts across tile 1" deep. | 1932 |
| Maizewood Tile | 1 1/2" | 4 | .21 | .41 | .64 | .73 | .70 | .58 | .60 | 12"x 12" | 2.1 | Same sample as above painted 1 coat glue size, 2 coats lead and oil at N.B. of S. | 1932 |
| **NATIONAL GYPSUM COMPANY** | | | | | | | | | | | | | |
| Acoustex Type 30R | 5/8" | 2 | .11 | .20 | .59 | .91 | .85 | .72 | .65 | 12"x 12" | 1.34 | Unpainted | 1938 |
| Acoustex Type 40R | 3/4" | 1 | .06 | .17 | .37 | .68 | .82 | .74 | .50 | 12"x 12" | 1.75 | Unpainted | 1938 |
| Acoustex Type 40R | 3/4" | 2 | .15 | .22 | .61 | .93 | .79 | .69 | .65 | 12"x 12" | 1.54 | Unpainted | 1938 |
| Acoustex Type 50R | 7/8" | 2 | .13 | .28 | .70 | .98 | .85 | .87 | .70 | 12"x 12" | 1.79 | Unpainted | 1938 |
| Acoustex Type 60R | 1" | 1 | .07 | .24 | .55 | .87 | .86 | .88 | .65 | 12"x 12" | - | Unpainted | 1937 |
| Acoustex Type 60R | 1" (1" x 3" furrigg) | 2 | .11 | .33 | .77 | .92 | .70 | .96 | .70 | 12"x 12" | 2.07 | Unpainted | 1936 |

NATIONAL GYPSUM COMPANY (Cont'd)

| Material | Thickness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acoustolic (Maftex) | 1/2" | 5 | .44 | .24 | .31 | .44 | .48 | .37 | .35 | - | - | Unpainted | 1930 |
| Acoustolic | 1/2" | 5 (24" o.c.) | - | .29 | .28 | .41 | - | - | - | - | - | Tinted with water soluble aniline color at N.B.of S. | 1930 |
| Acoustolic | 1/2" | 5 (24" o.c.) | .40 | .33 | .31 | .38 | .37 | .35 | .35 | - | - | Painted with cold water paint at N.B.of S. | 1930 |

NORRISTOWN MAGNESIA & ASBESTOS COMPANY

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nodin Type B | 1" | 1 | .13 | .38 | .76 | .85 | .78 | .37 | .75 | 12"x 12" | 1.71 | Unpainted | 1938 |
| Nodin Type B | 1" | 12 | .25 | .62 | .76 | .88 | .63 | .34 | .70 | 12"x 12" | 1.54 | Unpainted | 1938 |
| Nodin Type B | 1" | 12 | .31 | .65 | .79 | .86 | .66 | .34 | .75 | 12"x 12" | 1.54 | Brush painted 2 coats at N.B. of S. | 1938 |

SOUND CONTROL CORPORATION

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Softone Tile | 1" | 1 | .07 | .25 | .65 | .84 | .72 | .83 | .60 | 12"x 12" | 1.40 | Spray painted by mfr. | 1937 |

THE SPHINX ACOUSTICAL COMPANY

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sphinxstone | 2" | 4 | .10 | .33 | .78 | .87 | .71 | .70 | .65 | 18"x 24" | - | Unpainted | 1932 |

UNITED STATES GYPSUM COMPANY

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acoustone Type D | 1/2" | 1 | .05 | .14 | .53 | .75 | .75 | .74 | .55 | 12"x 12" | .76 | Unpainted | 1937 |
| Acoustone Type D | 3/4" | 1 | .10 | .36 | .73 | .78 | .75 | .76 | .65 | 12"x 12" | 1.26 | Unpainted | 1937 |
| Acoustone Type D | 7/8" | 1 | .14 | .46 | .75 | .77 | .84 | .82 | .70 | 12"x 12" | 1.52 | Unpainted | 1938 |
| Acoustone Type D | 1" | 1 | .13 | .48 | .85 | .83 | .80 | .85 | .75 | 12"x 12" | 1.73 | Unpainted | 1936 |
| Acoustone Type W | 1" | 1 | .11 | .34 | .86 | .95 | .87 | .87 | .75 | 12"x 12" | 1.35 | Unpainted | 1938 |
| Quietile Type 80 | 1" | 4 | .06 | .47 | .76 | .74 | .72 | .76 | .65 | 12"x 12" | 0.81 | Unpainted, brush finish. | 1932 |
| Red Top Acoustic Tile | 1/2" | 1 | .14 | .22 | .40 | .48 | .52 | .51 | .40 | 12"x 12" | 0.55 | Unpainted | 1932 |

UNITED STATES GYPSUM COMPANY (Cont'd)

| Material | Thick-ness | Mounting (See Footnote) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thermofil | 3" | 4 | .43 | .39 | .66 | .78 | .81 | .93 | .65 | - | - | No surface covering. | 1932 |
| U.S. Gypsum Metal Tile, Rockwool pad. (Perfatone) | 1 1/2" | 4 | .12 | .56 | .91 | .87 | .78 | .70 | .80 | 12"x 12" | 1.03 (Pad) | Perforated enameled metal 2401 holes per sq ft. | 1933 |

WILSON AND COMPANY, Inc.

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soundex | 1" | 9 (16" o.c.) | .19 | .51 | .87 | .94 | .84 | .87 | .80 | 16"x 16" | 2.06 | Unpainted | 1938 |
| Soundex | 1" | 2 (16"o.c.) | .13 | .26 | .61 | .89 | .78 | .91 | .65 | 16"x 16" | 2.06 | Unpainted | 1938 |
| Soundex | 1" | 2 (16"o.c.) | .10 | .27 | .61 | .88 | .71 | .89 | .65 | 16"x 16" | 2.06 | Spray painted 2 coats at M.B. of S. | 1938 |
| Soundex | 1 1/8" | 10 (16"o.c.) | .27 | .94 | .80 | .77 | .84 | .87 | .85 | 16"x 16" | 2.36 | Painted by mfr. | 1938 |

WOOD CONVERSION COMPANY

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Balsam Wool | 1" | 4 | .18 | .36 | .55 | .65 | .67 | - | .55 | - | .29 | Scrim facing | 1928 |
| Krexstone Tile (Balsam Wool) | 1" | 6 | .12 | .24 | .62 | .73 | .73 | .78 | .60 | 12"x 12" | 0.83 | Screen wire | 1931 |
| Nuwood Bevel Lap Tile | 1/2" | 6 | .12 | .19 | .30 | .40 | .40 | .51 | .30 | 12"x 12" | 0.69 | Unpainted | 1931 |
| Nuwood Bevel Lap Tile | 1" | 6 | .14 | .19 | .37 | .37 | .41 | .56 | .35 | 12"x 12" | 1.41 | Unpainted | 1931 |

FOOTNOTES:

1. Cemented to gypsum wall board. This is considered equivalent to cementing to plaster or masonry.
2. Nailed on 13/16" x 2" furring 12" o.c. unless otherwise indicated.
3. Metal supports attached to 13/16" x 2" wood furring.
4. Laid directly on laboratory floor. As a rule the results obtained this way are the same as when the tile is cemented to gypsum wall board.
5. Nailed on 2 x 4's 12" o.c. unless otherwise indicated.
6. Cemented to the floor of the reverberation chamber.
7. Back of sample covered with concrete.
8. Attached to metal suspension system. 4" air space back of tile.
9. Acoustic tile nailed to 13/16" x 2" furring 18" o. c. Space between furring filled with Rockwool.
10. Laid on 2 x 8's 12" o. c.
11. Laid on 24 gauge sheet iron, nailed to 13/16" x 2" furring 24" o.c.
12. Clipped at corners to 5/8" x 1 3/8" metal furring 12" o.c. Furring was clipped to 1 1/2" channels which were 3'6" o.c.

Table 2

Acoustical Plasters

Unless otherwise stated each sample of acoustical plaster was mixed according to the specifications furnished by the manufacturers and applied by a skilled plasterer on a false ceiling at the N. B. of S. The panels were laid on the floor of the Reverberation Chamber for test.

| Material | Thickness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No. of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **THE AMERICAN GYPSUM COMPANY** | | | | | | | | | | | | | |
| Reverbolite (Regular) | 1/2" | .19 | .29 | .51 | .70 | .69 | .78 | .55 | 1st coat 1/4" 2nd coat 1/4" | 3/4" gypsum plaster on metal lath. | 1st coat applied on dry base coat, 2nd coat applied as soon as first coat had set. | Finished with steel trowel. | 1938 |
| Reverbolite (Pumice aggregate) | 1/2" | .18 | .29 | .41 | .51 | .55 | .65 | .45 | 1st coat 1/4" 2nd coat 1/4" | 3/4" gypsum plaster on metal lath. | 1st coat applied on dry base coat. 2nd coat applied 24 hours after 1st coat. | Brushed with rice root brush then finished with steel trowel. | 1938 |
| **CALIFORNIA STUCCO PRODUCTS OF NEW ENGLAND, Inc.** | | | | | | | | | | | | | |
| Stuccostic Plaster Type A.D. | 3/4" | .18 | .36 | .65 | .65 | .62 | .62 | .55 | 1st coat 7/16" 2nd coat 5/16" | Gypsum plaster. | 1st coat applied to half green base coat. 2nd coat applied 3 hours after 1st coat. | Troweled with steel trowel. | 1935 |
| **CERTAIN-TEED PRODUCTS CORPORATION** | | | | | | | | | | | | | |
| Kalite H Coarse Aggregate | 1/2" | .36 | .33 | .46 | .70 | .66 | .68 | .55 | 1st coat 3/8" 2nd coat 1/8" | Gypsum plaster on metal lath, attached to 1" channels. | 1st coat applied to dry base coat. 2nd coat applied 1 hour after 1st coat. | Finished with steel trowel. | 1935 |

CERTAIN-TEED PRODUCTS CORPORATION (Cont'd)

| Material | Thick-ness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No. of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kalite H Coarse Aggregate | 1/2" | .26 | .31 | .46 | .67 | .65 | .68 | .50 | 1st coat 3/8" 2nd coat 1/8" | Same sample as above. | | Brush painted 2 coats non-bridging lacquer. | 1936 |
| Kalite H Coarse Aggregate | 3/4" | .43 | .38 | .63 | .78 | .65 | .70 | .60 | 1st coat 5/8" 2nd coat 1/8" | Gypsum plaster on metal lath attached to 1" channels. | 1st coat applied to dry base coat. 2nd coat applied 1 hr. after 1st coat. | Finished with steel trowel. | 1935 |

CLEVELAND GYPSUM SUPPLY COMPANY

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hushkote Acoustic Plaster | 1/2" | .13 | .24 | .45 | .71 | .56 | .49 | .50 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 24 hrs. after 1st coat. | Finished with steel trowel. | 1935 |
| Hushkote Acoustic Plaster | 5/8" | .16 | .34 | .50 | .53 | .43 | .37 | .45 | 1st coat 3/8" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 24 hrs. after 1st coat. | Finished with steel trowel. | 1937 |
| Hushkote Acoustic Plaster | 3/4" | .28 | .36 | .45 | .50 | .53 | .57 | .45 | 1st coat 1/4" 2nd coat 1/4" 3rd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 5 days after first coat. 3rd coat applied 3 days after 2nd coat. | Finished with steel trowel. | 1938 |

| Material | Thick-ness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No. of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **R. GUASTAVINO COMPANY** | | | | | | | | | | | | | |
| Akoustolith Plaster | 1/4" | .13 | .21 | .19 | .23 | .33 | .45 | .25 | 1 coat | Gypsum plaster. | Applied on binder coat. See mfg. directions. | Floated | 1931 |
| Akoustolith Plaster | 3/4" | .20 | .26 | .35 | .56 | .59 | .50 | .45 | 1 coat | Gypsum plaster. | Applied on binder coat. See mfg. directions. | Floated | 1932 |
| **GYPSUM INSULATION AND MANUFACTURING COMPANY** | | | | | | | | | | | | | |
| Super-Acoustic Plaster | 1/2" | .12 | .24 | .45 | .71 | .62 | .63 | .50 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 24 hours after 1st coat. | Finished with cork float. | 1938 |
| **NATIONAL GYPSUM COMPANY** | | | | | | | | | | | | | |
| Macoustic Plaster (Trowel Finish) | 1/2" | .15 | .27 | .42 | .45 | .36 | .29 | .40 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to half green base coat. 2nd coat applied 2 hours after 1st coat. | Finished with steel trowel. | 1936 |
| Macoustic Plaster (Trowel Finish) | 1/2" | .17 | .27 | .52 | .76 | .66 | .55 | .55 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 24 hrs. after 1st coat. | Finished with steel trowel. | 1937 |
| Macoustic Plaster (Trowel Finish) | 3/4" | .25 | .41 | .67 | .63 | .52 | .47 | .55 | 1st coat 3/8" 2nd coat 3/8" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 24 hrs. after 1st coat. | Finished with steel trowel. | 1937 |

| Material | Thickness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No. of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NATIONAL GYPSUM COMPANY (Cont'd)** | | | | | | | | | | | | | |
| Rockwall Acoustic Plaster | 1/2" | .31 | .36 | .39 | .42 | .44 | .41 | .40 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath, attached to 1" channels. | 1st coat applied to dry base coat. 2nd coat applied 24 hrs after 1st coat. | Finished with cork float. | 1938 |
| Rockwall Acoustic Plaster | 1/2" | .13 | .20 | .35 | .65 | .70 | .64 | .50 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 3 hours after 1st coat. | Finished with steel trowel. | 1935 |
| **NEWARK PLASTER COMPANY** | | | | | | | | | | | | | |
| Old Newark Acoustic Plaster | 1/2" | .13 | .21 | .42 | .70 | .67 | .69 | .50 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 24 hours after 1st coat. | Finished with steel trowel. | 1937 |
| Old Newark Acoustic Plaster | 3/4" | .16 | .34 | .63 | .74 | .73 | .72 | .60 | 1st coat 1/4" 2nd coat 1/4" 3rd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 24 hours after 1st coat. 3rd coat applied 24 hours after 2nd coat. | Finished with steel trowel. | 1938 |
| **PACIFIC PORTLAND CEMENT CO.** | | | | | | | | | | | | | |
| Calacoustic Plaster | 1/2" | .15 | .28 | .44 | .67 | .66 | .66 | .50 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied to dry base coat. 2nd coat applied 72 hours after 1st coat. | Finished with cork float. | 1936 |

UNITED STATES GYPSUM COMPANY

| Material | Thick-ness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sabinite Plaster Hydraulic | 1/2" | .14 | .24 | .27 | .38 | .48 | .64 | .35 | 1st coat 1/4" 2nd coat 1/4" | Gypsum plaster. | 1st coat applied to dry base coat. 2nd coat applied after 1st coat had set and partly dried. | Floated with cork float. | 1931 |
| Sabinite Plaster A | 1/2" | .16 | .24 | .38 | .78 | .75 | .77 | .55 | 1st coat 1/4" 2nd coat 1/4" | Gypsum plaster. | 1st coat applied to dry base coat. 2nd coat applied 24 hrs. after 1st coat. | Floated with cork float. | 1935 |
| Sabinite Plaster A | 3/4" | .13 | .27 | .59 | .81 | .74 | .85 | .60 | 1st coat 1/4" 2nd coat 1/4" 3rd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied on dry base coat. 2nd coat applied 48 hrs. after 1st coat. 3rd coat applied 72 hrs. after 2nd coat. | Floated with cork float. | 1935 |
| Sabinite Plaster F | 1/2" | .19 | .22 | .43 | .80 | .75 | .75 | .55 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster on metal lath. | 1st coat applied on dry base coat. 2nd coat applied 48 hrs. after 1st coat. | Floated with cork float. | 1936 |

Table 3

Audience seated in chairs of various types

A - cane seat chairs, open back
B - theatre chairs, box spring seat, heavily padded back
C - same as B, but single layer of padding on back
D - church pews, seating five

Absorption per person *

| | | 128 | 256 | 512 | 1024 | 2048 | Date |
|---|---|---|---|---|---|---|---|
| Women without coats, | A | 0.7 | 1.3 | 2.3 | 3.6 | 4.6 | 1930 |
| Women with coats, | A | 1.3 | 2.4 | 4.0 | 5.8 | 6.7 | 1930 |
| Men without overcoats, | A | 1.3 | 2.1 | 4.1 | 5.5 | 7.4 | 1930 |
| Men with overcoats, | A | 2.3 | 3.2 | 4.8 | 6.2 | 7.6 | 1930 |
| Mixed audience, | B | | | 3.9 | 4.7 | | 1929 |
| Empty seat, | B | | 3.4 | 3.0 | 3.3 | 3.6 | 1929 |
| Mixed audience, | C | | 3.5 | 4.1 | 4.9 | 4.2 | 1930 |
| Empty seat | C | | 3.0 | 2.5 | 2.9 | 3.1 | 1929 |
| Mixed audience, | D | | 2.7 | 3.3 | 3.8 | 3.6 | 1930 |
| Plywood Chair, | | | 0.2 | 0.3 | 0.5 | 0.5 | 1930 |

* These figures are numerically equal to the number of square feet of a material having an absorption coefficient of 1.00, which would absorb the same amount of sound energy.

## Suggestions Concerning the Proper Use of Acoustical Material.

As there has been considerable misconception as to the proper use of acoustical material it is considered desirable to call attention to two of the fundamental principles underlying the formulas which are used in acoustical design. It is assumed in all of the formulas that (1) the absorption is proportional to the area of the absorbing material and that (2) there is a uniform distribution of sound energy. As a rule neither one of these assumptions is true.

It has been found from experiment when very small areas are used, such as the panels in a coffered ceiling having areas from 1 to 4 square feet and separated from each other by a foot or more, that the effective absorption of the material in these panels is greater than when the material is installed in one large area. In fact, for materials having large coefficients, this effective absorption may be as much as 50 percent more than one would expect from the coefficient.

It has also been found when all of the acoustical material is applied on one surface of a relatively small room, say 50,000 cubic feet or under, that this creates a non-uniform distribution of sound energy in the following manner. Let us assume that the ceiling of a room is covered with a highly absorbent material. Under these conditions the sound energy which is traveling between the floor and ceiling is absorbed quite rapidly, while that traveling between the untreated wall surfaces, having very little to absorb it, may continue for some considerable time. This persistence of sound energy between the untreated surfaces may cause the measured reverberation time to be considerably longer than would be computed using the ordinary reverberation formula and the coefficient usually given. For this reason, it is essential in small rooms that the acoustical material be distributed on the side walls as well as on the ceiling, if the effective absorption of the material is to be anywhere near that which one would expect from the coefficient of the material. For further discussion of this problem see Circular C418.

We also wish to call attention to the fact that a proper distribution of the acoustical material should be worked out in the initial plans of a building, as it is frequently impossible to obtain a satisfactory distribution after the interior design has been completed without taking into account the acoustical treatment.