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U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON
NOVEMBER 15, 1939.

Letter
Circular
LC-573

# 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 acoustic plaster.

A number of materials have been painted and retested to determine the effect of painting. In every case the paint was applied so as to decrease the sound absorption as little as possible and still obtain a reasonably good paint job. Details of the manner in which the paint was

applied on any particular material will be supplied upon application.

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.

## Trade Name of Acoustic Materials

| Trade Name | Manufacturer | Address | Page |
|---|---|---|---|
| Absorbex | The Celotex Corporation | 919 North Michigan Ave., Chicago, Ill. | 7 |
| Acoustex | National Gypsum Co. | Buffalo, N. Y. | 15 |
| Acousti-Celotex | The Celotex Corporation | 919 North Michigan Ave., Chicago, Ill. | 8 |
| Acousti-Metal | National Gypsum Co. | Buffalo, N. Y. | 15 |
| Acoustone | United States Gypsum Co. | 300 West Adams St., Chicago, Ill. | 16 |
| Air-Acoustic Sheets | Johns-Manville Sales Corp. | 22 East 40th St., New York, N. Y. | 13 |
| Akoustolith Tile | R. Guastavino Co. | 40 Court St., Boston, Mass. | 12 |
| Akoustolith Plaster | R. Guastavino Co. | 40 Court St., Boston, Mass. | 20 |
| Audience (Seated in different types of seats) | - | - | 24 |
| Balsam Wool | Wood Conversion Co. | Cloquet, Minn. | 17 |
| Basalt Rock | Basalt Rock Co. | Napa, Calif. | 7 |
| Berry-Cel | F. E. Berry, Jr., & Co., Inc. | Everett, Mass. | 7 |
| Cabots Quilt | Samuel Cabot, Inc. | 141 Milk St., Boston, Mass. | 7 |
| Calacoustic Plaster | Pacific Portland Cement Co. | 111 Sutter St., San Francisco, Calif. | 23 |
| Calicel | The Celotex Corporation | 919 North Michigan Ave., Chicago, Ill. | 10 |
| Calistone | The Celotex Corporation | 919 North Michigan Ave., Chicago, Ill. | 10 |
| Cellufoam | Cellufoam Corporation | 66th St. & LaVergne Ave., Chicago, Ill. | 7 |
| Ceramacoustic | Armstrong Cork Co. | Lancaster, Pa. | 6 |
| Corinco Acousticator | Cork Insulation Co., Inc. | 155 East 44th St., New York, N. Y. | 11 |
| Corinco Corkbestos | Cork Insulation Co., Inc. | 155 East 44th St., New York, N. Y. | 11 |
| Cork Acoustical | Armor Insulating Co. | 260 Peachtree St., Atlanta, Ga. | 6 |
| Cork Acoustical | United Cork Companies | Kearny, N. J. | 16 |
| Corkoustic | Armstrong Cork Company | Lancaster, Pa. | 6 |
| Corning Glass Mineral Wool Acoustic Blankets | Corning Glass Company | Corning, N. Y. | 12 |
| Felt | The Felter Company, Inc. | 214 South St., Boston, Mass. | 12 |
| Fibretex | Johns-Manville Sales Corp. | 22 East 40th St., New York, N. Y. | 13 |
| Gold Bond Fiber Acoustic Tile | National Gypsum Co. | Buffalo, N. Y. | 16 |
| Hawaiian Cane Tile | Hawaiian Cane Products, Ltd. | 215 Market St., San Francisco, Calif. | 13 |
| Hushkote Acoustic Plaster | Cleveland Gypsum Supply Co. | 1276 West Third St., Cleveland, Ohio. | 19 |

TYPES OF MOUNTING:

1. Cemented to 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 in 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, unless otherwise indicated.
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 3'0" o.c.

## Sound Absorption Coefficients and Description of Test Samples

### Table I

### Prefabricated Acoustic Units.

| Material | Thickness | Mounting (See Page 5) | 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 2556 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 |
| **ARMOR INSULATING CO.** | | | | | | | | | | | | | |
| Cork | 1" | 1 | .02 | .09 | .32 | .63 | .38 | .40 | .35 | 12"x 36" | 0.67 | Painted by mfr. | 1939 |
| Cork | 1 1/2" | 1 | .05 | .16 | .57 | .43 | .32 | .40 | .35 | 12"x 36" | 0.96 | Unpainted | 1939 |
| **ARMSTRONG CORK CO.** | | | | | | | | | | | | | |
| 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 NBS | 1932 |
| Corkoustic Type B4 | 1 1/4" | 1 | .10 | .17 | .57 | .76 | .54 | .67 | .50 | 12"x 12" | .63 | Painted by mfr. | 1939 |
| Corkoustic Type B5 | 1 1/2" | 1 | .08 | .21 | .67 | .70 | .55 | .60 | .55 | 12"x 12" | .75 | Painted by mfr. | 1939 |
| Corkoustic Type B5 | 1 1/2" | 2 | .08 | .35 | .75 | .55 | .54 | .58 | .55 | 12"x 12" | .75 | Painted by mfr. | 1939 |
| Corkoustic Type B5 | 1 1/2" | 1 | .07 | .25 | .70 | .63 | .53 | .63 | .55 | 12"x 12" | .82 | Painted by mfr. | 1939 |
| Corkoustic Type B5 | 1 1/2" | 1 | .11 | .33 | .66 | .45 | .31 | .39 | .45 | 12"x 12" | - | Same as above, brush painted 4 coats at NBS | 1939 |
| Corkoustic Type B6 | 1 3/4" | 1 | .07 | .30 | .79 | .65 | .55 | .62 | .55 | 12"x 12" | .85 | Painted by mfr. | 1939 |
| Temcoustic F-2 | 7/8" | 1 | .15 | .43 | .66 | .65 | .65 | .70 | .60 | 12"x 12" | 1.02 | Painted by mfr. | 1939 |

ARMSTRONG CORK CO. (Cont'd)

| Material | Thickness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temlok DeLuxe | 1/2" | 4 | .12 | .24 | .39 | .31 | .31 | .32 | .30 | 48"x54" | 1.18 | Painted by mfr. | 1937 |
| Temlok DeLuxe | 7/8" | 4 | .22 | .46 | .35 | .32 | .39 | .57 | .40 | 48"x 54" | 1.19 | Painted by mfr. | 1937 |
| Temlok DeLuxe | 1 3/8" | 4 | .32 | .45 | .37 | .39 | .46 | .63 | .40 | 48"x 54" | 1.65 | Painted by mfr. | 1937 |
| BASALT ROCK COMPANY | | | | | | | | | | | | | |
| Basalt Rock Type A | 5" | 4 | .32 | .81 | .75 | .73 | .74 | .73 | .75 | 18"x 24" | 25.2 | Unpainted | 1938 |
| F. E. BERRY, JR. & CO., INC. | | | | | | | | | | | | | |
| Berry-Cel | 1" | 8 | .26 | .66 | .90 | .77 | .88 | .91 | .80 | 12"x 12" | 2.57 | Unpainted | 1939 |
| Berry-Cel, plus rockwool at back of tile. | 1" | 8 | .43 | .96 | .99 | .86 | .89 | .93 | .95 | 12"x 12" | 2.99 | Unpainted | 1939 |
| SAMUEL CABOT, INC. | | | | | | | | | | | | | |
| Cabots Quilt | - | 4 | .12 | .30 | .69 | .82 | .41 | .31 | .55 | - | .41 | Covered with paper | 1938 |
| CELLUFOAM CORPORATION | | | | | | | | | | | | | |
| Acoustical Cellufoam Type HD | 1" | 1 | .11 | .28 | .60 | .70 | .73 | .78 | .60 | 3'x 4' | .14 | No surface covering | 1939 |
| Acoustical Cellufoam Type HD | 1" | 2 | .14 | .33 | .58 | .82 | .83 | .82 | .65 | 3'x 4' | .14 | No surface covering | 1939 |
| 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 04" sheets. | - | Spray painted by mfr. | 1932 |
| Absorbex Type A | 1" | 1 | .09 | .24 | .62 | .89 | .73 | .73 | .60 | 12"x 12" | 2.4 | Unpainted | 1939 |
| Absorbex Type A | 1" | 1 | .14 | .49 | .83 | .61 | .30 | .22 | .55 | 12"x 12" | - | Same as above brush painted 5 coats at NBS | 1939 |
| 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 at NBS | 1936 |

THE CELOTEX CORPORATION (Cont'd)

| Material | Thickness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 at NBS | 1934 |
| 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 as above. | 1936 |
| Acousti-Celotex Type C2 | 5/8" | 1 | .11 | .31 | .71 | .80 | .67 | .57 | .60 | 12"x 12" | .88 | R.I. finish, perforated as above, holes 1/2" deep. | 1936 |
| Acousti-Celotex Type C2 | 5/8" | 2 | .14 | .65 | .63 | .73 | .67 | .55 | .65 | 12"x 12" | .88 | Same as above | 1936 |
| Acousti-Celotex Type C2 | 5/8" | 1 | .09 | .25 | .68 | .79 | .69 | .66 | .60 | 12"x 12" | .89 | Unpainted, perforated as above. | 1937 |
| Acousti-Celotex Type C2 Slow burning | 5/8" | 2 | .12 | .48 | .64 | .70 | .62 | .49 | .60 | 12"x 12" | 1.07 | Painted by mfr. Perforated as above | 1939 |
| Acousti-Celotex Type C3 | 13/16" | 1 | .18 | .32 | .76 | .93 | .63 | .50 | .65 | 12"x 12" | 1.11 | R.I. finish, perforated as above, holes 5/8" deep. | 1936 |
| Acousti-Celotex Type C3 | 13/16" | 1 | .10 | .30 | .78 | .85 | .59 | .42 | .65 | 12"x 12" | 0.94 | Same as above | 1939 |
| Acousti-Celotex Type C3 | 13/16" | 1 | .08 | .33 | .83 | .86 | .53 | .37 | .65 | 12"x 12" | - | Same as above except brush painted 4 coats at NBS | 1939 |
| Acousti-Celotex Type C3 | 13/16" | 8 | .55 | .66 | .66 | .80 | .69 | .52 | .70 | 12"x 24" | 1.09 | R.I. finish, perforated as above. | 1936 |

THE CELOTEX CORPORATION (Cont'd)

| Material | Thickness | Mounting (See Page 5) | 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 as above. | 1936 |
| Acousti-Celotex Type C3 Slow-burning | 13/16" | 8 | .45 | .58 | .67 | .91 | .71 | .66 | .70 | 12"x 24" | 1.06 | Unpainted, perforated as above. | 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 as above, holes 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 | Same as above | 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 as above | 1936 |
| Acousti-Celotex Type C4 Slow-burning | 1 1/4" | 8 | .43 | .62 | .78 | .81 | .61 | .40 | .70 | 12"x 24" | 1.93 | Painted by mfr., perforated as above. | 1939 |
| 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 |
| Acousti-Celotex Type C5 | 13/16" | 1 | .13 | .26 | .62 | .78 | .86 | .77 | .65 | 12"x 12" | - | Same as above, brush painted 1 coat glue size, 4 coats lead & oil at NBS. | 1931 |
| Acousti-Celotex Type C5 | 13/16" | 2 | .09 | .56 | .77 | .90 | .78 | .62 | .75 | 12"x 12" | .86 | Unpainted, perforated as above, holes 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 as above, holes 1" deep. | 1932 |
| Acousti-Celotex Type MU-1 | 1/2" | 1 | .10 | .17 | .63 | .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 M2 | 1" | 8 | .38 | .54 | .66 | .95 | .73 | .68 | .70 | 12"x 24" | 2.32 | Painted by mfr. Perforated as above, holes 7/8" deep. | 1939 |

| Material | Thick-ness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acousti-Celotex Type M3 | 1 1/4" | 1 | .15 | .50 | .93 | .89 | .74 | .69 | .75 | 12"x 12" | 2.58 | Painted by mfr. perforated as above, holes 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 |
| 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 Long edges splayed on opposite sides. 5 holes 3" in dia. through body of tile. | 4" | 4 | .37 | .78 | .82 | .76 | .73 | .67 | .75 | 18"x 36" | 17.6 | Unpainted | 1939 |
| Calistone | 5" | 4 | .45 | .87 | .81 | .80 | .78 | .81 | .80 | 18"x 24" | 22.4 | Unpainted | 1937 |
| Calistone, Type Y, | 5" | 4 | .48 | .77 | .83 | .84 | .85 | .91 | .80 | 18"x 24" | 25.7 | Unpainted | 1939 |
| 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" | - | Same as above, spray painted 3 coats at NBS. | 1938 |

THE CELOTEX CORPORATION (Cont'd)

| Material | Thickness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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" | - | Same as above, spray painted 3 coats at NBS. | 1938 |

CERTAIN-TEED PRODUCTS CORPORATION

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 as above, Grade A(Coarse) | 1 1/2" | 4 | .15 | .34 | .64 | .74 | .60 | .69 | .60 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast as above, Grade A(Coarse) | 2" | 4 | .23 | .55 | .73 | .67 | .64 | .62 | .65 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast as above, Grade A(Coarse) | 2" | 4 | .26 | .51 | .72 | .69 | .67 | .71 | .65 | 24"x 36" | - | Spray painted 4 coats of Muraltone paint. | 1937 |
| Kalite, cast as above, Grade D(Fine) | 1" | 4 | .09 | .30 | .49 | .54 | .47 | .48 | .45 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast as above, Grade D(Fine) | 1 1/2" | 4 | .20 | .39 | .59 | .61 | .60 | .67 | .55 | 24"x 36" | - | Unpainted | 1936 |
| Kalite, cast as above, Grade D(Fine) | 2" | 4 | .22 | .48 | .55 | .58 | .54 | .53 | .55 | 24"x 36" | - | Unpainted | 1936 |

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 mfr. | 1938 |
| Corinco Corkbestos | 1 1/2" | 2 | .22 | .69 | .57 | .53 | .65 | .63 | .60 | 12"x 24" | 1.12 | Unpainted | 1938 |

| Material | Thickness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **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 | Same as above | 1938 |
| Corning Glass Mineral Wool Acoustic Blankets | 3" | 4 | .39 | .91 | .97 | .91 | .82 | .85 | .90 | - | 1.07 | Same as above | 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 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 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-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 |
| 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 C | 4" | 10 | .54 | .70 | .78 | .85 | .88 | .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" | 10 | .60 | .80 | .95 | .91 | .90 | .78 | .90 | 12"x 12" | 24.4 | Unpainted | 1937 |

## R. GUASTAVINO COMPANY (Cont'd)

| Material | Thickness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 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 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 | 3/4" | 1 | .16 | .34 | .79 | .72 | .69 | .64 | .65 | 12"x 12" | .59 | Painted by mfr. | 1939 |
| Insulite | 1/2" | 1 | .07 | .20 | .53 | .77 | .74 | .74 | .55 | 12"x 12" | .41 | Thin coat of paint applied by mfr. | 1939 |
| Insulite | 1" | 1 | .19 | .45 | .71 | .70 | .65 | .69 | .65 | 12"x 12" | .79 | Same as above | 1939 |

## JOHNS-MANVILLE SALES CORPORATION

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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* |

*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.

JOHNS-MANVILLE SALES CORPORATION (Cont'd)

| Material | Thickness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 7/8" | 1 | .10 | .21 | .65 | .93 | .69 | .83 | .60 | 12"x 12" | - | Unpainted | 1938 |
| Rockoustile | 1" | 1 | .09 | .27 | .70 | .79 | .65 | .77 | .60 | 12"x 12" | 1.3 | Unpainted | 1938 |
| Sanacoustic Pad 1 plus metal facing, pad supports and furring 2 | 1/4" 1/2" | 3 | .14 | .55 | .92 | .89 | .84 | .75 | .80 | 12"x 24" | Pad 1.2 | Perforated enameled metal surface 4608 holes per sq ft. | 1938 |
| Sound Isolation Blanket (Rockwool) | - | 4 | .11 | .58 | .85 | .83 | .81 | .83 | .75 | - | 1.5 | Metal lath | 1932 |
| Spongecoustic | 3/4" | 1 | .11 | .26 | .71 | .80 | .76 | .71 | .65 | 12"x 12" | 1.58 | Painted by mfr. | 1938 |
| 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". | 1931 |

| Material | Thickness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DAVID E. KENNEDY, Inc.** | | | | | | | | | | | | | |
| Kencoustex | 1" | 1 | .12 | .29 | .75 | .87 | .71 | .76 | .65 | 12"x 12" | 2.24 | Unpainted | 1939 |
| Kencoustic (cork) | 1 1/2" | 1 | .09 | .16 | .66 | .64 | .50 | .62 | .50 | 12"x 18" | .88 | Painted by mfr. | 1938 |
| Kencoustic (cork) Type CB-1.5 | 1 1/2" | 1 | .03 | .16 | .64 | .56 | .44 | .57 | .45 | 18"x 36" | - | Painted by mfr. | 1939 |
| KenKoustone | 1" | 1 | .08 | .10 | .31 | .29 | .19 | .25 | .20 | 5⅔"x 11⅓" | 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 & oil at NBS. | 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" furring) | 2 | .11 | .33 | .77 | .92 | .70 | .96 | .70 | 12"x 12" | 2.07 | Unpainted | 1936 |
| Acoustex Type 60R | 1" | 1 | .07 | .22 | .54 | .87 | .78 | .77 | .60 | 12"x 12" | 2.31 | Painted by mfr. | 1939 |
| Acoustex Type 60R | 1" | 1 | .09 | .27 | .71 | .92 | .62 | .62 | .65 | 12"x 12" | - | Same as above, brush painted 5 coats at NBS. | 1939 |
| Acoustex Type 70R | 1 1/8" | 1 | .09 | .27 | .62 | .89 | .78 | .84 | .65 | 12"x 12" | - | Unpainted | 1939 |
| Acousti-Metal, Rockwool pad, plus metal facing and pad supports, plus furring | 1 5/8" 4" | 8 | .40 | .84 | .87 | .93 | .82 | .70 | .85 | 12"x 24" | 0.98 (Pad) | Perforated enameled metal, 4608 holes per sq ft, .068" dia. | 1939 |

NATIONAL GYPSUM COMPANY (Cont'd)

| Material | Thickness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gold Bond Fiber Acoustic Unit | 1" | 1 | .14 | .51 | .78 | .78 | .78 | .82 | .70 | 12"x 12" | 0.71 | Unpainted | 1939 |
| Gold Bond Fiber Acoustic Unit | 1" | 1 | .19 | .48 | .78 | .74 | .75 | .80 | .70 | 12"x 12" | - | Same as above, except spray painted 3 coats. | 1939 |
| Gold Bond Fiber Acoustic Unit | 1" | 1 | .18 | .50 | .79 | .74 | .71 | .67 | .70 | 12"x 12" | - | Same as above, except spray painted 7 coats. | 1939 |
| SOUND CONTROL CORPORATION | | | | | | | | | | | | | |
| Sound-Cor | 1" | 1 | .07 | .25 | .65 | .84 | .72 | .83 | .60 | 12"x 12" | 1.40 | Spray painted by mfr. | 1937 |
| Sound-Cor | 1" | 1 | .13 | .40 | .68 | .63 | .60 | .68 | .60 | 12"x 12" | 1.14 | Painted by mfr. | 1939 |
| Sound-Cor | 1" | 1 | .20 | .26 | .31 | .22 | .18 | .23 | .25 | 12"x 12" | - | Same as above except brush painted 5 coats at NBS. | 1939 |
| Sound-Cor | 1 1/8" | 8 | .33 | .58 | .52 | .65 | .74 | .72 | .60 | 12"x 24" | 1.41 | Painted by mfr. | 1939 |
| Sound-Cor | 1 1/8" | 8 | .54 | .48 | .33 | .43 | .51 | .54 | .45 | 12"x 24" | 1.6 | Painted by mfr. | 1939 |
| THE SPHINX ACOUSTICAL COMPANY | | | | | | | | | | | | | |
| Sphinxstone | 2" | 4 | .10 | .33 | .78 | .87 | .71 | .70 | .65 | 18"x 24" | - | Unpainted | 1932 |
| UNITED CORK COMPANIES | | | | | | | | | | | | | |
| Acoustical Cork "B" | 1 1/2" | 2 | .09 | .57 | .37 | .33 | .29 | .41 | .40 | 12"x 12" | .94 | Unpainted | 1939 |
| 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 | .09 | .29 | .75 | .85 | .81 | .84 | .70 | 12"x 12" | 1.25 | Unpainted | 1939 |
| Acoustone Type D | 1" | 1 | .13 | .45 | .79 | .78 | .78 | .75 | .70 | 12"x 12" | 1.66 | Unpainted | 1939 |
| Acoustone Type F | 3/4" | 1 | .11 | .29 | .78 | .84 | .75 | .63 | .65 | 12"x 12" | 1.28 | Unpainted | 1939 |
| Acoustone Type F | 3/4" | 1 | .12 | .42 | .81 | .74 | .61 | .49 | .65 | 12"x 12" | - | Same as above except brush painted 5 coats at NBS. | 1939 |

UNITED STATES GYPSUM COMPANY (Cont'd)

| Material | Thick-ness | Mounting (See Page 5) | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | Size of Unit Tested | Wt. (lb) sq ft | Surface | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Perfatone, Rockwool pad, plus metal facing and pad supports, plus furring | 1 5/8" 8" | 8 | .48 | .79 | .80 | .90 | .87 | .71 | .85 | 12"x 24" | .93 Pad | Perforated enameled metal, 4608 holes per sq ft, .073" dia. | 1939 |
| Quietone | 1/2" | 1 | .10 | .22 | .56 | .69 | .66 | .69 | .55 | 12"x 12" | 0.47 | Unpainted, sand finish | 1939 |
| Quietone | 1" | 4 | .06 | .47 | .76 | .74 | .72 | .76 | .65 | 12"x 12" | 0.81 | Unpainted, brush finish | 1932 |
| Thermofil | 3" | 4 | .43 | .39 | .66 | .78 | .81 | .93 | .65 | - | - | No surface covering | 1932 |

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 |

Table 2

Acoustic Materials for Plastic Application

Unless otherwise stated each sample of accustical 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. All samples of material applied with an air gun or blower were constructed 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CALIFORNIA STUCCO PRODUCTS OF NEW ENGLAND, Inc.** | | | | | | | | | | | | | |
| Stucoustic Type A.D. | 3/4" | .18 | .36 | .65 | .65 | .62 | .62 | .55 | 1st coat 7/16" 2nd coat 5/16" | 3/4" Gypsum plaster. | 1st coat applied to half green base coat. 2nd coat applied 3 hours after 1st coat. | Finished with steel trowel. | 1935 |
| Stucoustic | 1/2" | .12 | .29 | .52 | .78 | .74 | .74 | .60 | 1st coat 1/4" 2nd coat 1/4" | 3/4" Gypsum plaster | 1st coat applied to dry base coat. 2nd coat applied 24 hours after 1st coat. | Finished with steel trowel. | 1939 |
| **THE CELOTEX CORPORATION** | | | | | | | | | | | | | |
| 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 |

CERTAIN-TEED PRODUCTS CORPORATION

| Material | Thickness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No. of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kalite H Coarse Aggregate | 1/2" | .36 | .33 | .46 | .70 | .66 | .63 | .55 | 1st coat 3/8" 2nd coat 1/8" | 3/4" 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 |
| 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" | 3/4" 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 |

CLEVELAND GYPSUM SUPPLY COMPANY

| Material | Thickness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No. of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 1st coat. 3rd coat applied 3 days after 2nd coat. | Finished with steel trowel. | 1938 |

| Material | Thickness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No. of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **THE DODSON MANUFACTURING COMPANY** | | | | | | | | | | | | | |
| Dodson Acoustic Plaster | 3/4" | .15 | .25 | .30 | .35 | .34 | .26 | .40 | 1st coat 1/2" 2nd coat 1/4" | 1/4" gypsum plaster on metal lath. | 1st coat applied to half green base coat. 2nd coat applied as soon as 1st coat had taken initial set. | Finished with cork float and stippled to break surface film. | 1939 |
| **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 |
| **KEASBEY AND MATTISON COMPANY** | | | | | | | | | | | | | |
| Limpet (Sprayed Asbestos) | 1/2" | .57 | .87 | .83 | .78 | .84 | .87 | .85 | | | Applied with air gun on metal lath. | Finished with roller. Unpainted. | 1939 |
| Limpet (Sprayed Asbestos) | 3/8" | .54 | .87 | .78 | .73 | .78 | .75 | .80 | | | Same as above. | Same as above. | 1939 |
| Limpet (Sprayed Asbestos) | 3/8" | .56 | .78 | .70 | .54 | .53 | .59 | .65 | | | Same as above. | Same as above except brush painted 6 coats at NBS. | 1939 |
| Limpet (Sprayed Asbestos) | 3/4" | .59 | .94 | .90 | .78 | .87 | .83 | .85 | | | Same as above. | Finished with roller. Unpainted. | 1939 |

KEASBEY AND MATTISON COMPANY (Cont'd)

| Material | Thick-ness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No.of Coats | Base Coat | Application | Surface Treatment | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Limpet (Sprayed Asbestos) | 3/4" | .52 | .94 | .89 | .80 | .91 | .91 | .90 | | | Same as above | Same as above except spray painted 3 coats at NBS. | 1939 |
| Limpet (Sprayed Asbestos) | 3/4" | .58 | .93 | .87 | .84 | .88 | .84 | .90 | | | Applied with air gun on metal lath. | Finished with roller. Spray painted 10 coats at NBS. | 1939 |
| Limpet (Sprayed Asbestos) | 1/2" | .07 | .17 | .49 | .70 | .79 | .67 | .55 | | | Applied with air gun on gypsum wall board. | Finished with roller. Unpainted. | 1939 |
| Limpet (Sprayed Asbestos) | 3/4" | .13 | .31 | .66 | .83 | .74 | .66 | .65 | | | Same as above | Same as above | 1939 |
| Limpet (Sprayed Asbestos) | 1" | .17 | .38 | .81 | .83 | .78 | .78 | .70 | | | Same as above | Same as above | 1939 |
| Limpet (Sprayed Asbestos) | 1" | .16 | .37 | .82 | .80 | .71 | .77 | .70 | | | Same as above | Same as above except spray painted 3 coats at NBS. | 1939 |
| Limpet (Sprayed Asbestos) | 1" | .16 | .41 | .86 | .81 | .81 | .88 | .70 | | | Same as above | Same as above except spray painted 10 coats at NBS. | 1939 |

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 hours after 1st coat. | Finished with steel trowel. | 1937 |

NATIONAL GYPSUM COMPANY (Cont'd)

| Material | Thick-ness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No.of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 hrs. 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 hrs. after 1st coat. | Finished with steel trowel. | 1938 |
| 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 hrs. after 1st coat. 3rd coat applied 24 hrs. after 2nd coat. | Finished with steel trowel. | 1938 |

PACIFIC PORTLAND CEMENT CO.

| Material | Thick-ness | Coefficients 128 | 256 | 512 | 1024 | 2048 | 4096 | Noise Coef. | No.of Coats | Base Coat | Application | Surface Treatment | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 hrs. after 1st coat. | Finished with cork float. | 1936 |

UNITED STATES GYPSUM COMPANY

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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.