Designation: E 1264 – 98

Standard Classification for Acoustical Ceiling Products[1]

This standard is issued under the fixed designation E 1264; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This classification covers ceiling products that provide acoustical performance and interior finish in buildings. Products used in performance spaces and other special applications may require more detailed specification than provided by this classification.

1.2 This classification classifies acoustical ceilings by type, pattern, and certain ratings for acoustical performance, light reflectance, and fire safety. It does not cover the aspects of acoustical ceilings when used as a component of a system or assembly tested for fire endurance or floor/ceiling sound transmission.

1.3 This classification does not include physical properties, such as structural hardness, friability, sag, linear expansion and contraction, and transverse strength, which may affect the handling, installation, and use of acoustical ceiling products (see Test Methods C 367).

2. Referenced Documents

2.1 *ASTM Standards:*

C 367 Test Methods for Strength Properties of Prefabricated Architectural Acoustical Tile or Lay-In Ceiling Panels[2]

C 423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method[2]

C 634 Terminology Relating to Environmental Acoustics[2]

E 84 Test Method for Surface Burning Characteristics of Building Materials[3]

E 413 Classification for Rating Sound Insulation[2]

E 795 Practices for Mounting Test Specimens During Sound Absorption Tests[2]

E 1110 Classification for Determination of Articulation Class[2]

E 1111 Test Method for Measuring the Interzone Attenuation of Ceiling Systems[2]

E 1414 Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum[2,4]

E 1477 Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers[5]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this classification, see Terminology C 634.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *acoustical panel*—a form of a prefabricated sound absorbing ceiling element used with exposed suspension systems.

3.2.2 *acoustical tile*—a form of a prefabricated sound absorbing ceiling element used with concealed or semi-exposed suspension systems, stapling, or adhesive bonding.

3.2.3 *butt*—a joint detail for acoustical tile, butt bevel, or butt square edge, without kerfing of the edges, intended for adhesive bonding to solid backing.

3.2.4 *edge and joint detail*—various edge and joint details are available in accordance with Table 1 and Fig. 1 for acoustical ceiling products.

3.2.5 *excelsior*—long, thin wood shavings.

3.2.6 *fissured pattern*—a surface with irregular depressions of varying lengths, widths, and depths extending below the basic product face.

3.2.7 *flush reveal edge*—acoustical lay-in panels are intended for use in direct hung exposed suspension systems with a narrow exposed edge that is flush with the panel face.

3.2.8 *glass fiber base*—ceilings composed principally of glass in fiber form with appropriate binders.

3.2.9 *kerfed and rabbeted*—joint detail for acoustical tile. Tile with kerfed and rabbeted edges on all four sides, with or without beveled edges, are intended for concealed suspension system or adhesive bonding.

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[1] This classification is under the jurisdiction of ASTM Committee E-33 on Environmental Acoustics and is the direct responsibility of Subcommittee E33.04 on Application of Acoustical Materials and Systems.

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[2] *Annual Book of ASTM Standards*, Vol 04.06.

[3] *Annual Book of ASTM Standards*, Vol 04.07.

[4] Test Method E 1414 is an adaptation of the AMA-1-II-1967 Test Method for Ceiling Sound Transmission Test by Two-Room Method.

[5] *Annual Book of ASTM Standards*, Vol 06.01.

TABLE 1 Edge and Joint Detail, Types I, II, III, IV, VIII, IX, X, XI, and XII

Acoustical Unit	Edge Detail	Joint Detail
Tile	Beveled	Kerfed and Rabbeted or Tongue and Groove or Butt
	Square	Kerfed and Rabbeted or Tongue and Groove or Butt
	Beveled Long Edges, Square Edge Trimmed on Ends	Kerfed and Rabbeted Long Edges Only, Ends Trimmed. (For Semi-concealed System)
Panels	Square Reveal Flush Reveal Narrow Reveal Narrow Flush Reveal	
Metal Pan	Square Reveal Flush Reveal Narrow Reveal Narrow Flush Reveal	
Metal Strip	Varies with Manufacturer	

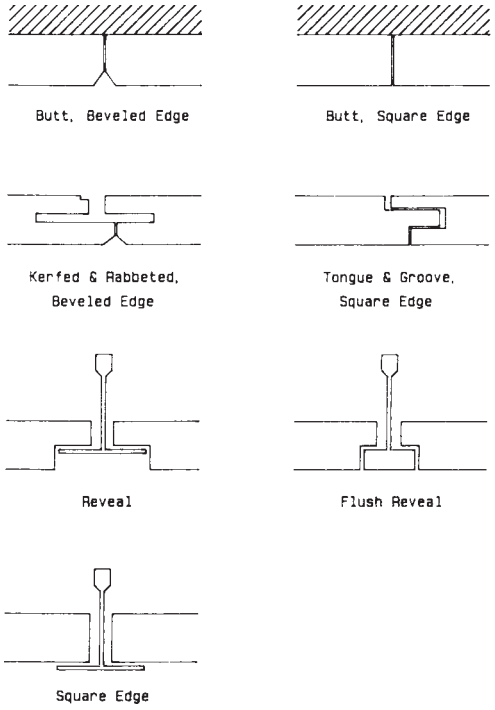

FIG. 1 Edge and Joint Details

3.2.10 *kerfed and rabbeted long edges, ends trimmed*—acoustical tile, 2 ft or longer, is intended for installation in semi-exposed, or semi-exposed direct hung suspension systems.

3.2.11 *metal facings (pans)*—metal facing (pan) ceiling systems with mineral or glass fiber base backings are intended for use where sound absorption is needed and where durable and easily maintainable surfaces are a necessity.

3.2.12 *mineral base*—ceilings composed principally of mineral materials such as fibers manufactured from rock or slag, with or without binders.

3.2.13 *reveal edge*—acoustical lay-in panels with step-down edge are intended for use in direct hung exposed suspension systems.

3.2.14 *square edge*—acoustical lay-in panels with square edges are intended for use in direct hung exposed suspension systems.

3.2.15 *Discussion*—Reveal, flush reveal, and square edged panels are laid in place and can easily be pushed upward for removal or access to the plenum above.

3.2.16 *textured pattern*—granular or raised (fine, coarse, or a blend), felted or matted surface as an integral part of the basic product or superimposed on the product surface.

3.2.17 *tongue and groove*—joint detail for acoustical tile. Tile with tongue and groove edges are intended for stapling, concealed suspension system, or adhesive bonding.

4. Significance and Use

4.1 This classification is used to classify and aid in the selection of acoustical ceiling products.

5. Basis of Classification

5.1 Acoustical ceiling products described using this classification may be of one or more of the following types, forms, patterns, acoustical ratings, light reflectance values, and fire classes, as specified.

5.2 *Ceiling Types*:

5.2.1 *Type I*—Cellulose base with painted finish.

5.2.2 *Type II*—Cellulose base with membrane-faced overlay.

5.2.3 *Type III*—Mineral base with painted finish.

5.2.3.1 *Form 1*—Nodular.

5.2.3.2 *Form 2*—Water felted.

5.2.3.3 *Form 3*—Dry felted.

5.2.3.4 *Form 4*—Cast or molded.

5.2.4 *Type IV*—Mineral base with membrane-faced overlay.

5.2.4.1 *Form 1*—Nodular.

5.2.4.2 *Form 2*—Water felted.

5.2.4.3 *Form 3*—Dry felted.

5.2.4.4 *Form 4*—Cast or molded.

5.2.5 *Type V*—Perforated steel facing (pan) with mineral or glass fiber base backing.

5.2.6 *Type VI*—Perforated stainless steel facing (pan) with mineral or glass fiber base backing.

5.2.7 *Type VII*—Perforated aluminum facing (pan) with mineral or glass fiber base backing.

5.2.8 *Type VIII*—Cellulose base with scrubbable pigmented or clear finish.

5.2.9 *Type IX*—Mineral base with scrubbable pigmented or clear finish.

5.2.9.1 *Form 1*—Nodular.

5.2.9.2 *Form 2*—Water felted.

5.2.9.3 *Form 3*—Dry felted.

5.2.9.4 *Form 4*—Cast or molded.

5.2.10 *Type X*—Mineral base with plastic or aluminum membrane-faced overlay, or both.

5.2.11 *Type XI*—Mineral base with fabric-faced overlay.

5.2.11.1 *Form 1*—Nodular.

5.2.11.2 *Form 2*—Water felted.
5.2.11.3 *Form 3*—Dry felted.
5.2.11.4 *Form 4*—Cast or molded.
5.2.12 *Type XII*—Glass fiber base with membrane-faced overlay.
5.2.12.1 *Form 1*—Plastic.
5.2.12.2 *Form 2*—Cloth.
5.2.12.3 *Form 3*—Other.
5.2.13 *Type XIII*—Aluminum or steel strip with mineral or glass fiber base backing.
5.2.13.1 *Form 1*—Perforated.
5.2.13.2 *Form 2*—Non-perforated.
5.2.14 *Type XIV*—Excelsior bonded with inorganic binders.
5.2.14.1 *Form 1*—No backing.
5.2.14.2 *Form 2*—Backed with mineral or glass fiber base backing.
5.2.15 *Type XX*—Other types (describe).

NOTE 1—The facings specified in Type II, Type IV, Type X, Type XI, and Type XII shall be separate overlays and not coatings similar to paint.

NOTE 2—The minimum thickness of metallic facings (pans) specified in Type V, Type VI, and Type VII shall be sufficient to support the length of the facing, or instead thereof, stiffeners or ribs may be provided to ensure rigidity.

6. Ceiling Pattern

6.1 Acoustical ceilings may be one of or a combination of two or more of the following patterns:

Pattern Designation	Pattern Description
A	Perforated, regularly spaced large holes
B	Perforated, randomly spaced large holes
C	Perforated, small holes
D	Fissured
E	Lightly textured
F	Heavily textured
G	Smooth
H	Printed
I	Embossed
J	Embossed-in-register
K	Surface scored
L	Random swirl
Z	Other patterns (describe)

7. Ratings

7.1 *Acoustical Ratings*—an acoustical ceiling may meet one or more of the following acoustical performance requirements:

7.1.1 *Noise Reduction Coefficient (NRC)*—An acoustical ceiling may meet a NRC rating measured in accordance with Test Method C 423. NRC values are to be expressed in increments of 0.05 as specified by Test Method C 423. Typical values may range from 0.40 to 1.00.

7.1.2 *Articulation Class (AC)*—An acoustical ceiling may meet the minimum AC rating derived in accordance with Test Method E 1111 and Classification E 1110. AC values are to be expressed to the nearest multiple of 10 as specified by the Classification E 1110. Typical values may range from 150 to 250.

NOTE 3—Specify AC rating only when rating the acoustical performance of ceilings designed to accommodate open-plan areas. AC is applicable for any ceiling material used as part of an acoustically designed system incorporating background sound masking and speech privacy space dividers. AC is the preferred rating scheme for selecting ceiling products for open-plan in lieu of the NRC rating scheme. (The addition of hard surfaced elements in the ceiling, such as surface mounted or recessed lighting fixtures can impair the AC rating, depending upon the area of the hard surface and its location relevant to occupants in the space.)

7.1.3 *Ceiling Attenuation Class (CAC)*—An acoustical ceiling may meet a CAC rating, derived in accordance with Test Method E 1414 and Classification E 413. Typical CAC values may range from 5 to 55.

NOTE 4—Ceiling Attenuation Class (CAC) is a single number rating obtained according to Test Method E 1414 and Classification E 413. The Normalized Ceiling Attenuation ($D_{n,c}$) values, obtained according to E 1414 are used instead of Transmission Loss (TL) values in Classification E 413. Test Method E 1414 is a two-room method of test in which a suspended ceiling and common plenum space overlay a two-room suite separated by a massive dividing wall. Sound must travel up through the source room ceiling, across the plenum, and down through the receive room ceiling. Modifications to the plenum space such as overlays and barriers must be specified. STC ratings obtained from Test Method E 90 or E 336 data are not acceptable.

7.2 *Light Reflectance (LR) Coefficient*—An acoustical ceiling may meet a LR coefficient, measured in accordance with Test Method E 1477. Typical values may range from 0.60 to 0.80.

7.3 *Fire Class/Surface Burning Characteristics*—Acoustical ceiling products may be classified by flame spread and smoke developed indexes, tested in accordance with Test Method E 84, as follows:

7.3.1 *Class A*—The flame spread rating of Class A ceiling products shall not exceed 25, nor shall the material show evidence of continued progressive combustion after the test flame has been extinguished. All surfaces, including those that would be exposed by cutting through the material in any way, shall meet these requirements. In addition, Class A ceiling products shall have a smoke developed rating not to exceed 50.

7.3.2 *Class B*—The flame spread of Class B ceiling products shall not exceed 75 on the face side.

7.3.3 *Class C*—The flame spread of Class C Ceiling products shall not exceed 200 on the face side.

NOTE 5—Classes A, B, and C are equivalent, respectively, to Classes I, II, and III of various building code authorities.

8. Test Methods

8.1 *Acoustical Performance Ratings*:

8.1.1 *Noise Reduction Coefficient (NRC)*—Test according to Test Method C 423 using Type E-400 mounting as defined in Practices E 795 unless special means of installation are required. Special means of installation shall be explicitly noted in test reports and in publications of test data.

NOTE 6—*Plenum:* The depth of air space has considerable effect on NRC using mechanically mounted acoustical tiles and panels. Because there are unlimited variations that are possible, it has been established that Practices E 795 mounting Type E-400 (formerly AMA Mounting No. 7) is most consistent with normal usage and existing technology of testing. Some manufacturers publish data for depths of mountings other than 400 mm, designated by an E, followed by numbers which indicate the mounting depth in millimeters. For selecting NRC for mechanically mounted acoustical tiles and panels, mounting Type E-400 is preferred. If a plenum will not be used, a report of how the product performs with the appropriate mounting should be obtained.

8.1.2 *Articulation Class (AC)*—Test according to Test Method E 1111 and determine AC rating according to Classification E 1110, subject to the following:

8.1.2.1 The reported AC rating shall be the minimum articulation class as defined in Test Method E 1111.

8.1.2.2 The ceiling to be tested shall be installed as normally used with its recommended means of installation, no less than 8 ft and no more than 9 ft above the floor, or as otherwise specified and explicitly noted in test reports and in publications of test data.

8.1.2.3 The plenum depth measured from the specimen surface to the underside of the deck above shall be 2 ft, 6 in. unless specified otherwise. The extended surface of the underside of the deck shall be acoustically hard.

8.1.3 *Ceiling Attenuation Class (CAC)*—Test according to Test Method E 1414 and determine CAC rating according to Classification E 413. Special plenum details or additions shall be explicitly noted in test reports and publications of test data.

8.2 *Light Reflectance (LR) Coefficient*—Test according to Test Method E 1477.

8.3 *Fire Class*—Test according to Test Method E 84.

9. Format of Classification

9.1 The ceiling classification shall conform to the following format:

9.1.1 Type [Form]; Pattern; NRC or AC (specify); CAC; LR; Fire Class.

NOTE 7—For example, a lightly textured, water felted mineral base ceiling with painted finish, having an NRC 0.65, AC 180, CAC 42, LR 0.75, and a flame spread rating of 50 would be designated as either:

Type III, Form 2; Pattern E; NRC 0.65; CAC 42; LR 0.75; Fire Class B, or

Type III, Form 2; Pattern E; AC 180; CAC 42; LR 0.75; Fire Class B.

10. Keywords

10.1 acoustical ceilings; acoustical ratings; acoustical tile; light reflectance