Effective December 1, 2004, gypsum board should now be specified using ASTM C 1396, “Standard Specification for Gypsum Board,” which replaces nine individual standards that previously were used in commercial and residential construction. To facilitate the transition from the old standards to this one new all-encompassing standard, in 1999, the gypsum industry agreed to a five-year phase-in period. During that time, product labels and literature featured dual labels that included both the new standard and the original specification number.

That five-year transition period ended last December, and now specifiers should use the new C 1396 designation in all instances that it applies, as well as write in the specific name of the type of gypsum board they are specifying. Building codes also now reflect the new standard and, at press time, most of the previous standards have successfully been balloted for withdrawal from ASTM, which will completely remove those standards from use.

Incorporated into the new ASTM C 1396 standard for gypsum board are:

- C 36 Standard Specification for Gypsum Wallboard
- C 37 Standard Specification for Gypsum Lath
- C 79 Standard Specification for Gypsum Sheathing Board
- C 442 Standard Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board
- C 588 Standard Specification for Gypsum Base for Veneer Plaster
- C 630 Standard Specification for Water-Resistant Gypsum Backing Board
- C 931 Standard Specification for Exterior Gypsum Soffit Board
- C 960 Standard Specification for Predecorated Gypsum Board
- C 1395 Standard Specification for Gypsum Ceiling Board

Although these specifications have all now been incorporated into the one umbrella specification, it’s important to note that no technical changes have been made to any of the individual specifications. “We didn’t change any of the individual product properties,” says Keith Poerschke, chairman on the ASTM Committee C11 on Gypsum and Related Building Materials and Systems. “We’ve simply assembled them all into one document.”

Poerschke notes, however, that one of the reasons for the umbrella designation is to simplify matters if and when requirements for individual product specifications need to be changed to reflect evolving materials and manufacturing technologies. Because the former specifications all had staggered document revision schedules, necessary changes were sometimes applied to one specification but not to another until a later time.

Learning Objectives

This article covers the new ways architects will specify gypsum board and the key differences between various types of gypsum board for commercial and residential applications. Key points include:

- The new ASTM standard and the standards that have been replaced
- Common characteristics of all gypsum board products
- Characteristics and applications of different types of gypsum board
- Additional changes to standards and documents related to specifying gypsum board

To take the quiz and earn 1 AIA/CES Learning Unit (LU) of health, safety, and welfare go to www.architecturemag.com, click on “Continuing Ed,” and proceed to “ASTM Changes in How to Specify Gypsum Products” or turn to page 88. You must answer 70% of the questions correctly to receive credit for this course. This course requires online reading in addition to the following article in order to be able to take the quiz. See page 88 for details.
“Now if we make changes, it will only be to the one document,” says Poerschke, “which will ensure consistency throughout all the applicable gypsum products.”

In addition, the change simplifies product labeling from the manufacturer. In a sense, it also simplifies the job of the specifier in that there is only one number to remember for most gypsum board products. However, the specifier must still be familiar with the different types of products and specify exactly which product is called for in a given situation. “Someone can’t simply specify ‘gypsum board complying with C 1396,’ ” says Poerschke, “because that could be any number of products. The correct specification still has to indicate exactly which kind of product, such as ‘gypsum wallboard complying with C 1396’ or ‘exterior gypsum soffit board complying with C 1396.’ ”

Characteristics of All Gypsum Board

Although there are numerous kinds of gypsum board that can be specified, there are certain characteristics that are true of all types of gypsum board. Gypsum board, often called drywall, wallboard, or plasterboard, is the generic name for panel-type products that consist of the non-combustible core—gypsum—with a paper surfacing on the face, back, and long edges.

Gypsum is a mineral naturally found in sedimentary rock formations in a crystalline form called calcium sulfate dihydrate, and it is found in all parts of the world. The gypsum rock is mined or quarried, then crushed and ground into a fine powder. It’s then heated, in a process called “calcination,” until three-quarters of the moisture content has evaporated. Water and other additives are then added back into the calcined gypsum and fed between continuous layers of paper on a board machine. The calcined gypsum rehydrates and reverts to its original rock state, with the paper binding to the core.

All types of gypsum board share the following characteristics:

Fire Resistance: Gypsum board is the most commonly used interior finish where fire resistance classifications are required. The key is its non-combustible core, which contains chemically combined water that is slowly released as steam under high heat conditions—thus, retarding heat transfer. Even after all the water has been released, gypsum board continues to act as a heat-insulating barrier. Increased fire resistance is available with products that have a Type X or Type C core (see “Enhanced Fire Resistance,” far right). These products are used in establishing fire resistance-rated designs, tested in accordance with ASTM E 119, “Standard Test Methods for Fire Tests of Building Construction and Materials.” These designs are specified when fire resistance-rated walls and floors/ceilings are required in building construction. In addition, tests conducted in accordance with ASTM E 84, “Standard Test Method for Surface Burning Characteristics for Building Materials,” shows that gypsum board has a low flame spread index and smoke density index.

Sound Attenuation: Gypsum board wall and ceiling systems effectively control sound transmission in residences and commercial structures.

Durability and Versatility: Gypsum board is used to construct high-quality walls and ceilings with excellent dimensional stability and durability. It’s adaptable to all forms of decoration, with surfaces that are easily decorated and surfaced.

Availability and Economy: Gypsum board is relatively available and easy to apply. Found naturally throughout the world, gypsum deposits are virtually unlimited in the Northern Hemisphere. In the United States, it’s found in two principle belts, one starting in southwest Texas and running all the way to the Niagara River in New York State, and the other starting in the Imperial Valley in California and fanning out into Utah, with a thin extension into Montana. There are also smaller belts, and several million tons a year are mined in Canada’s Nova Scotia and in Mexico. More than 34 billion square feet of gypsum board are manufactured in the United States yearly.

Gypsum Board Products Included in the New Standard

Despite their numerous shared characteristics, different types of gypsum board have different properties that make them best suited for particular applications. When specifying a gypsum board in accordance with the ASTM C 1396 standard, it is essential to indicate the exact name of the product along with any possi-
ble variables for that product, such as thickness, enhanced fire resistance, edging, and so on.

Following is a summary of each of the products now included in the new standard, including key characteristics and applications of each (see figure A for a visual).

**Gypsum Wallboard:** Designed for use on walls, ceilings, or partitions and affords a surface suitable to receive decoration. Consisting of a non-combustible core, essentially gypsum, surfaced with face paper bonded to the core, it is manufactured in a variety of thicknesses, and may be mold/mildew-resistant and/or moisture-resistant, may be vapor-retardant, and may be flexible for use in radius wall and ceiling construction. Also available with enhanced fire resistance (see sidebar at right).

**Gypsum Lath:** Designed for use as a base for the application of gypsum plaster (not gypsum veneer plaster). It is typically manufactured in sheets that are 16 inches wide with absorbent facing paper to improve adhesion of gypsum plaster. It is available in two thicknesses and may be manufactured with a vapor-retardant backing.

**Gypsum Sheathing Board:** Designed for use as a sheathing on buildings as a backing under exterior siding or cladding. It consists of a non-combustible water-resistant core, essentially gypsum, surfaced on both the face and back with water-repellant paper bonded to the core. It may be manufactured with a square or tongue-and-groove edge.

**Gypsum Backing Board, Coreboard, and Shaftliner Board:** Designed for use as a base in multilayer systems or as a gypsum stud or core in semisolid or solid gypsum board partitions, or in shaft wall assemblies. Gypsum backing board is used as a base layer for other gypsum board materials systems or as a base for dry claddings such as acoustic tile. Gypsum shaftliner is manufactured with enhanced fire resistance (see sidebar) with an edge configuration designed to facilitate installation into specialized stud systems.

**Gypsum Base for Veneer Plaster:** Designed for use as a base for the application of gypsum veneer plaster with a blue-tinted face paper that is treated to facilitate the adhesion of thin coats of hard, high-strength gypsum veneer plaster. It is typically produced in sheets that are the same width as wallboard. May be manufactured with a fire-resistant core (see sidebar).

**Water-Resistant Gypsum Backer Board:** Designed to be used as a base for the application of ceramic, plastic, and other non-absorbent tile in dry areas or areas with limited water exposure, such as walls in bath, kitchen, and laundry areas. It is commonly referred to as “greenboard” because of its green-tinted face paper and is suitable for decoration. Consists of a non-combustible water-resistant core, essentially gypsum, surfaced on both the back and face with water-repellant paper bonded to the core.

**Exterior Gypsum Soffit Board:** Designed for use on the underside of exterior soffits, carport ceilings, eaves, and canopies that are indirectly exposed to the weather and completely protected from contact with liquid water. It has a water-repellant face and back paper, typically a light brown, and is more sag-resistant than regular wallboard. It may be manufactured with enhanced fire resistance (see sidebar).

**Predecorated Gypsum Wallboard:** Designed for use as the finished surface for walls, ceilings, or partitions and does not require any additional treatment. Consists of a non-combustible core, essentially gypsum, surfaced with paper bonded to the core with the face covered with a decorative sheet, film, or coating. Class I predecorated gypsum board has a decorative sheet or film laminated to the face; Class II predecorated gypsum board has a decorative coating applied to the face. Available in a variety of thicknesses as both a regular- and fire-resistant core material (see sidebar).

**Gypsum Ceiling Board:** Designed for use on interior ceilings with framing spaced not more than 24 inches on center and that affords a surface suitable to receive water-based texture and other decorations. It has the same physical appearance as gypsum wallboard and is manufactured as a 1/2-inch thick material with a sag-resistance equal to 5/8-inch thick gypsum wallboard. It is also suitable for use on interior walls.

**What’s Not Included**

ASTM C 1396 includes all paper-faced gypsum board products. However, certain other gypsum panel products still maintain their own specifications, including fiber reinforced gypsum panels (C 1278), glass mat gypsum substrate for use as sheathing (C 1177), and glass mat water-resistant gypsum backing panel (C 1178).

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**Enhanced Fire Resistance**

Because gypsum board is made of a non-combustible core material, all gypsum board products have a natural fire resistance. Gypsum board with a Type X core have enhanced fire-resistive properties created with the addition of glass fibers and vermiculite. (The name was coined in the 1940s after its development when the new product was shown to demonstrate “eXtra” fire resistance.) Type X gypsum board provides greater fire resistance than regular gypsum board of the same thickness because the fibers help maintain the integrity of the core as shrinkage occurs, providing greater resistance to heat transfer during a fire. Type C, also called Improved Type X, gypsum board meets all the requirements of Type X, with additional properties to further enhance the fire-resistive characteristics of the product.
TEST QUESTIONS

1. When did the new standard ASTM C 1396 go into effect?
   a. It went into effect in 1999, with all subsequent specifications required to use the new standard.
   b. There was a five-year transition period from 1999 to 2004 in which either the new standard or the old standards were acceptable; as of December 1, 2004, the new standard must be used on all specifications.
   c. A five-year transition period started in 2004; in 2009, all new specifications must use the new standard.
   d. It has not yet gone into effect.

2. What is the purpose of ASTM C 1396?
   a. To ensure consistency in all specifications.
   b. To make technical changes to gypsum product specifications, effective with the introduction of ASTM C 1396.
   c. To eliminate the need for specifiers to understand the differences between the various gypsum products.
   d. To stagger the document revision schedules.

3. What of the following is characteristic of all types of gypsum board?
   a. They are all made of a Type X core of gypsum and glass fibers.
   b. They all feature a non-combustible core of gypsum.
   c. Every gypsum board product is appropriate for use on the outside of commercial or residential applications.
   d. All gypsum board is water-resistant.

4. Which of the following standards is ASTM C 1396 not intended to replace?
   a. Gypsum sheathing board standard
   b. Fire-resistant gypsum sheathing board standard
   c. Water-resistant gypsum backing board standard
   d. Glass mat gypsum substrate for use as sheathing standard

5. Which of the following is true about ASTM C 840?
   a. Revisions to ASTM C 840 require changes to ASTM C 1396.
   b. The standard explains procedures for installing and finishing many of the products included in ASTM C 1396.
   c. ASTM C 840 is a new standard, created to go along with ASTM C 1396.
   d. A recent change to ASTM C 840 mandated the thickness of gypsum board products for certain applications.

6. What is gypsum?
   a. A mineral found naturally in sedimentary rock formations in a crystalline form.
   b. A mineral that is able to be heated so that moisture is removed and then rehydrated to create a rock state.
   c. A mineral that is abundant throughout North America.
   d. All of the above.

7. What is the difference between gypsum wallboard and gypsum sheathing board?
   a. Gypsum wallboard is designed for use on interiors and gypsum sheathing board is designed for use on exteriors.
   b. Gypsum sheathing board is designed for commercial use and gypsum wallboard is designed for residential use.
   c. Gypsum wallboard is always surfaced with a water-repellent paper bonded to the core and gypsum sheathing board is always a flexible face over a type X core.
   d. All of the above.

8. Which of the following is true?
   a. Gypsum sheathing board and exterior gypsum soffit board can be used interchangeably.
   b. Gypsum wallboard is more sag resistant than gypsum ceiling board.
   c. Gypsum wallboard can be specified with several variables, including thickness and enhanced fire, moisture, and mold resistance.
   d. Water-resistant backing board is for exterior use only.

9. Which of these does not now need to be included when specifying gypsum board?
   a. The standard ASTM C 1396
   b. The former standard for that particular gypsum board product (e.g., ASTM C 36, ASTM C 37, etc.)
   c. The exact name of the gypsum board product written out
   d. Variables such as thickness, type X core, edging, etc.

10. What needs to be added when specifying enhanced fire-resistant gypsum board?
    a. Nothing. All gypsum board has enhanced fire-resistive properties.
    b. Either “Type X core” or “Type C core.”
    c. “Gypsum board with enhanced fire-resistive properties.”
    d. ASTM C 1832, standard specification for gypsum board with enhanced fire-resistive properties.

ASTM Changes in How to Specify Gypsum Products
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