



# Standard Guide for Installation of Gypsum Products in Concealed Radiant Ceiling Heating Systems<sup>1</sup>

This standard is issued under the fixed designation C1546; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This guide<sup>2</sup> provides information for trades installing gypsum products in conjunction with a concealed radiant ceiling heating system constructed from thin sheet flexible radiant heating panels, and for the installation of gypsum products after repair of existing concealed radiant ceiling heating systems constructed from heating cable or thin sheet flexible radiant heating panels.

1.2 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 This guide does not purport to address any aspect of concealed radiant heating system design or performance, and is limited to the proper installation of gypsum products specified for use in a concealed radiant ceiling heating system.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

1.5 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes shall not be considered as requirements of the standard.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>3</sup>

[C840 Specification for Application and Finishing of Gypsum Board](#)

[C841 Specification for Installation of Interior Lathing and Furring](#)

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee C11 on Gypsum and Related Building Materials and Systems and is the direct responsibility of Subcommittee C11.03 on Specifications for the Application of Gypsum and Other Products in Assemblies.

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<sup>2</sup> The first edition of this guide replaced Appendix X.7 of Specification C840 - 99a.

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[C842 Specification for Application of Interior Gypsum Plaster](#)

## 3. Terminology

### 3.1 Definitions:

3.1.1 *concealed radiant heating system, n*—a system that operates by heating the building materials that conceal the heat source, which in turn transfer the heat into the heated area by radiant emission.

3.1.2 *facing, n*—the finished surface layer through which heat is transferred into a heated area.

3.1.3 *flexible radiant heating panel, n*—a thin sheet heating element intended to produce heat when connected to an electrical supply.

3.1.4 *furring, n*—spacer elements added to a building structure to facilitate fastening of gypsum panel products.

3.1.5 *gypsum product, n*—building material intended for use in radiant heated ceiling construction, containing gypsum in its composition or construction.

3.1.5.1 *Discussion*—The gypsum products most often associated with radiant heating systems are gypsum board and gypsum plaster.

3.1.6 *heating cable, n*—an electrically insulated cable intended to produce heat when connected to an electrical supply.

## 4. Significance and Use

4.1 The purpose of this guide is to provide information to gypsum product installers for the avoidance of hazards associated with the installation of gypsum products adjacent to, or surrounding, electric heating components and conductors; and to avoid damage to gypsum products when used in conjunction with a concealed radiant heating system.

4.2 The information given in this guide is applicable to repair of existing cable heating systems and to new construction of radiant heating systems constructed from flexible radiant heating panels.

## 5. Summary of Guide

### 5.1 Heating System Design:

5.1.1 The heating system shall be designed to satisfy the heating needs of the building and to work effectively with all building materials specified for use in the heating system installation.

NOTE 1—The architect bears the responsibility of preparing and correlating complete plans and specifications, and to engage a professional familiar with the heating system to design the system to meet the requirements of 5.1.1 and 5.1.2.

5.1.2 The heating system shall be designed so that a gypsum product is not exposed to a temperature more than 125°F (52°C) for periods of time sufficient to cause calcination.

NOTE 2—The foregoing requirement is intended to provide guidance to heating system designers, consistent with Specification C840, in the absence of a comprehensive radiant heating system standard.

### 5.2 *Installation of Heating Equipment:*

5.2.1 Installation of radiant heating and related electrical equipment is governed by codes and regulations, and is the responsibility of other trades.

### 5.3 *General Installation Guidelines:*

5.3.1 The application of gypsum panel products under this guide shall be performed in accordance with Specification C840, except as herein modified.

5.3.2 The radiant heating system shall be disconnected from the electric supply prior to the commencement of work.

NOTE 3—Disconnection from the electric supply is accomplished by switching the heating system circuit breakers off, or removing fuses. Lowering a thermostat setting until the heating system turns off is not supply disconnection.

5.3.3 Unless the concealed radiant heating system is no longer in use and has been permanently disconnected from the electrical supply, or unless the previous facing has been removed, gypsum panel products or gypsum plaster shall not be installed as a new facing on the heated area side of an existing concealed radiant heating system.

NOTE 4—The increased thickness resulting from addition of gypsum panel products or gypsum plaster to an existing concealed radiant heating system can impair heat transfer into the heated area, and may cause overheating of the electrical heat source.

5.3.4 All inspection and testing of the heating system shall be completed before application of gypsum facing materials.

5.3.5 Care shall be taken in the installation of fasteners to avoid the penetration of heating equipment and electrical conductors.

5.3.6 The radiant heating system shall not be operated to accelerate the drying of joint compound or texture finishes.

5.3.7 Follow the radiant heat-source manufacturer's start-up and operating instructions when operating the radiant heating system.

### 5.4 *Repair of Cable Heating Systems:*

5.4.1 Repair of heating cables is the responsibility of other trades.

5.4.2 The application of gypsum plaster shall conform to Specification C842 except as herein modified.

5.4.3 Filler added to gypsum plaster used to repair a heating cable system, if any, shall be of sand or similar thermally conductive material. Thermal insulating fillers such as vermiculite or perlite, and foaming agents that impair heat transfer shall not be used in plaster applied to radiant heating systems.

5.4.4 Application of metal lath shall conform to Specification C841. Metal lath and fasteners installed for repair of a cable heating system shall not contact heating cables.

5.4.5 Complete embedding of the heating cable in plaster is necessary after cable repair is completed.

### 5.5 *Flexible Radiant Heating Panel Systems:*

5.5.1 Application of gypsum panel products shall comply with the requirements for System I or System II of Specification C840, as applicable, based on the specified number of layers; and with the requirements of System XII where floating interior angles are used.

5.5.2 Application of gypsum panel products to steel framing or furring shall comply with System VIII of Specification C840.

5.5.3 The thickness of a gypsum panel product installed as a facing shall not exceed the thickness specified in the heating system design specification.

NOTE 5—Installing facing thicker than specified can impair heat transfer into the heated area, and may cause overheating of the electrical heat source.

5.5.4 Furring of any material or construction shall not be installed between gypsum panel product facing and flexible radiant heating panels.

NOTE 6—The air gap produced by furring can impair heat transfer into the heated area, and may cause flexible radiant heating panels to overheat.

5.5.5 All joints and heads of fasteners shall be finished in accordance with Specification C840, to the specified level of finish.

NOTE 7—When repairing an existing surface, the level of finish of the repair should be the same as that of the original surface.

5.5.6 Foil backed gypsum panel products shall not be installed in contact with thin sheet flexible radiant heating panels.

### 5.6 *Decoration:*

5.6.1 The heating system shall be turned off and allowed to cool before decorating.

5.6.2 Decoration of finished work, including sizing or sealing, shall not proceed until joint compound has dried.

5.6.3 When texture finishes are used, such finishes must be thoroughly dry prior to heating system operation.

## 6. **Keywords**

6.1 furring; gypsum panel product; gypsum plaster; heating cable; heating panel; lath; radiant heat