

## SECTION 23 8323

### RADIANT CEILING HEATING SYSTEMS

This section includes editing notes to assist the user in editing the section to suit project requirements. These notes are included as hidden text, and can be revealed or hidden by one of the following methods:

Microsoft Word 2007: Click the OFFICE button, select WORD OPTIONS, select DISPLAY, then select or deselect the HIDDEN TEXT option.

Microsoft Word (earlier versions): From the pull-down menus select TOOLS, then OPTIONS. Under the tab labeled VIEW, select or deselect the HIDDEN TEXT option.

Corel WordPerfect: From the pull-down menus select VIEW, then select or deselect the HIDDEN TEXT option.

This master specification section has been prepared by Therma-Ray Incorporated for use in the preparation of a project specification section covering:

Architectural Series (exposed) radiant ceiling panels installed in a T-grid suspension system, surface, or recess mounted

Therma-Ray (concealed) radiant ceiling panels installed between ceiling framing and covered with gypsum board ceiling finish.

The following should be noted in using this specification:

Hypertext links to specific websites are included after manufacturer names and names of organizations whose standards are referenced within the text, to assist in product selection and further research. Hypertext links are contained in parenthesis and shown in blue, e.g.:

([www.spexplus.net](http://www.spexplus.net))

Optional text requiring a selection by the user is enclosed within brackets, e.g.: "Section [09 0000.] [\_\_\_\_.]"

Items requiring user input are enclosed within brackets, e.g.: "Section [\_\_\_\_ - \_\_\_\_]."

Optional paragraphs are separated by an "OR" statement, e.g.:

\*\*\*\* OR \*\*\*\*

For assistance on the use of the products in this section, contact Therma-Ray Incorporated by calling 1-866-457-4600, by email at [sales@thermaray.com](mailto:sales@thermaray.com), or visit their website at [www.thermaray.com](http://www.thermaray.com).

#### **PART 1 GENERAL**

##### 1.1 SUMMARY

Edit the following paragraphs to include only those items specified in this section.

- A. Section Includes:
1. Radiant ceiling heating panels.
  2. Thermostat controls.
  3. Connection to power supply.

Coordinate the following paragraphs with other sections in the project manual.

- B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
  2. Section [06 1100 - Framing and Sheathing:] [\_\_\_\_ - \_\_\_\_:] Wood ceiling framing.
  3. Section [09 2200 - Metal Suspension Systems:] [\_\_\_\_ - \_\_\_\_:] Metal ceiling suspension system.
  4. Section [09 2900 - Gypsum Board:] [\_\_\_\_ - \_\_\_\_:] Gypsum board ceilings.
  5. Section [09 5100 - Acoustical Ceilings:] [\_\_\_\_ - \_\_\_\_:] Metal ceiling suspension system.

## 1.2 REFERENCES

In the following paragraphs, retain only those reference standards that are used elsewhere in this section.

- A. Canadian Standards Association (CSA) ([www.csa.ca](http://www.csa.ca)) - Canadian Electrical Code
- B. National Fire Protection Association (NFPA) ([www.nfpa.org](http://www.nfpa.org)) 70 - National Electrical Code.
- C. Underwriters Laboratories, Inc. (UL) ([www.ul.com](http://www.ul.com))<http://www.ul.com> - Product Directories.

## 1.3 SUBMITTALS

Limiting submittals to only those actually required helps to minimize liability arising from the review of submittals. Minimize submittals on smaller, less complex projects.

Include the following for submission of shop drawings, product data, and samples for the Architect's review.

- A. Submittals for Review:
  - 1. Shop Drawings: Include reflected ceiling plans with heating panel layout, panel sizes, and power supply locations.
  - 2. Product Data: Manufacturer's descriptive data for heating panels and accessories, including electrical characteristics.

## 1.4 QUALITY ASSURANCE

The following paragraph specifies a minimum level of experience required of the parties performing the work of this section. Retain if required, and edit to suit project requirements.

- A. Installer Qualifications: Minimum [2] [ ] years [documented] experience in work of this Section.

Include one of the following two paragraphs as applicable.

- B. Electrical Products: Tested by Underwriters Laboratories, Inc.
  - 1. Bear UL Listing Mark.
  - 2. Listed in UL Product Directory.

\*\*\*\* OR \*\*\*\*

- C. Electrical Products: Certified by CSA.

\*\*\*\* OR \*\*\*\*

- D. Electrical Products: Certified by an independent laboratory approved by authorities having jurisdiction.

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, and handle panels in manner to prevent damage.

## 1.6 WARRANTIES

In the following paragraph select 10 years for Architectural Series panels and 20 years for Therma-Ray panels.

- A. Furnish manufacturer's [10] [20] year warranty providing coverage against defects in materials and workmanship.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Contract Documents are based on products by Therma-Ray ([www.thermaray.com](http://www.thermaray.com)).

Edit the following to indicate whether or not substitutions will be permitted for the products in this section.

- B. Substitutions: [Under provisions of Division 01.] [Not permitted.]

## 2.2 COMPONENTS

Include the following for Architectural Series (exposed) panels.

- A. Radiant Ceiling Heating Panels:
  - 1. Product: Architectural Series.
  - 2. Utilize alloy resistance wire element, electrically insulated, rated to 250 degrees C, uniformly distributed over panel face.
  - 3. Utilize reflective foil to adhere heating elements to panels.
  - 4. 2 inch thick, 4 PSF density high temperature mineral wool insulation.
  - 5. 22 gage precoat galvanized steel frame.

Edit the following to indicate required panel face finish.

- 6. Front panel finish: [High-temperature baked-on powder coating, [white.] [custom color to be selected.]] [Silk-screened to match architectural ceiling panels.] [Type [304] [316] stainless steel.]
- 7. Watt density range of 65 to 95 watts per square foot at rated voltage.
- 8. Electrical junction box attached to back of panel, with cover and internal pigtail wires.
- 9. Hanger support clips at each panel corner.

Refer to Therma-Ray technical data for assistance in selecting specific panels.

- 10. Size and electrical characteristics:
  - a. 24 x 24 inches, 120 VAC: [250] [310] [335] [375] watts.
  - b. 24 x 24 inches, 208 VAC: [250] [310] [355] [375] watts.
  - c. 24 x 24 inches, 240 VAC: [250] [310] [325] watts.
  - d. 24 x 24 inches, 277 VAC: [210] [250] [335] [375] watts.
  - e. 24 x 24 inches, 347 VAC: [250] [300] [360] [375] watts.
  - f. 24 x 48 inches, 120 VAC: [500] [625] [750] watts.
  - g. 24 x 48 inches, 208 VAC: [515] [535] [625] [715] [750] watts.
  - h. 24 x 48 inches, 240 VAC: [500] [625] [725] watts.
  - i. 24 x 48 inches, 277 VAC: [500] [660] [675] [750] watts.
  - j. 24 x 48 inches, 347 VAC: [500] [625] [650] [700] [750] watts.
  - k. 14 x 48 inches, 120 VAC: 350 watts.
  - l. 14 x 48 inches, 208 VAC: [300] [400] [435] watts.
  - m. 14 x 48 inches, 240 VAC: [300] [435] watts.
  - n. 14 x 48 inches, 277 VAC: [350] [435] watts.
  - o. 14 x 48 inches, 347 VAC: 400 watts.
  - p. 14 x 60 inches, 120 VAC: 350 watts.
  - q. 14 x 60 inches, 208 VAC: 450 watts.
  - r. 14 x 60 inches, 240 VAC: [375] [530] [550] watts.
  - s. 14 x 60 inches, 277 VAC: [375] [535] watts.
  - t. 14 x 60 inches, 347 VAC: 540 watts.
  - u. 20 x 60 inches, 120 VAC: 700 watts.
  - v. 20 x 60 inches, 208 VAC: 615 watts.
  - w. 20 x 60 inches, 240 VAC: 790 watts.
  - x. 20 x 60 inches, 277 VAC: [375] [535] watts.
  - y. 20 x 60 inches, 347 VAC: [675] [725] watts.

Include the following for high moisture areas.

- 11. Sealtite flexible conduit and connectors and silicone sealed seams.

Include the following for panels requiring a mounting frame. Edit to suit project requirements.

- B. Mounting System: [[Surface] [Plaster] mounting frame sized to panel size.] [Tegular reveal edge for 15/16 inch suspension grid.] [Fineline Tegular reveal edge for 9/16 inch suspension grid.]

\*\*\*\* OR \*\*\*\*

Include the following for Therma-Ray radiant ceiling (concealed) panels.

- C. Radiant Ceiling Heating Panels:
  - 1. Product: Therma-Ray Radiant Heating Panels.

2. Utilize alloy resistance wire element, electrically insulated, rated to 250 degrees C, uniformly distributed over panel face, embedded in 1/2 inch thick gypsum board.

Refer to Therma-Ray technical data for assistance in selecting specific panels.

3. Size: [9] [12] [18] inches wide x [2] [3] [4] [5] [6] [7] [8] [9] [10] feet long.
4. Electrical characteristics:
  - a. 120 VAC: [65] [70] [85] [95] [105] [125] [130] [150] [160] [195] [215] watts.
  - b. 208 VAC: [50] [55] [65] [70] [80] [90] [95] [110] [120] [130] [135] [140] [150] [165] [190] [195] [205] [225] [245] [285] [335] watts.
  - c. 240 VAC: [50] [70] [75] [80] [85] [95] [100] [105] [120] [130] [140] [150] [155] [160] [170] [175] [195] [200] [215] [255] [260] [325] watts.
  - d. 277 VAC: [65] [75] [90] [95] [100] [110] [115] [120] [125] [130] [135] [145] [150] [155] [175] [180] [190] [200] [215] [220] [230] [250] [300] [335] watts.
5. End caps: No. PC-1.
6. Connectors: No. 3M567.

### 2.3 ACCESSORIES

Include one of the following two paragraphs for Architectural Series panels suspended from overhead structure. Chains may be used for panels weighing up to 30 pounds.

- A. Hanger Wire: Minimum [12] [ ] gage galvanized steel.  
  
\*\*\*\* OR \*\*\*\*
- B. Chains: Galvanized steel.
- C. Thermostat Controls: No. SR-240/120 SmartRoom Comfort Controller.

### PART 3 EXECUTION

Include the following for Architectural Series (exposed) panels.

#### 3.1 INSTALLATION

- A. Install panels and accessories in accordance with manufacturer's instructions, approved Shop Drawings, and [NFPA 70.] [Canadian Electrical Code.]
- B. Locate thermostat controls [where indicated.] [\_\_\_\_.]

Include the following for panels suspended from overhead structure.

- C. Install hangers at each corner of panels suspended from structure. Do not suspend hangers directly from metal deck, ducts, pipes, or conduit.

\*\*\*\* OR \*\*\*\*

Include the following for panels attached using mounting frames.

- D. Support panels in mounting frames attached to ceiling framing.
- E. Wire panels to branch circuits in parallel.
- F. Connect to power supply and control wiring.

\*\*\*\* OR \*\*\*\*

Include the following for Therma-Ray (concealed) radiant ceiling systems.

#### 3.2 INSTALLATION

- A. Install panels and accessories in accordance with manufacturer's instructions, approved Shop Drawings, and [NFPA 70.] [Canadian Electrical Code.]

- B. Locate controllers [where indicated.] [\_\_\_\_.]
- C. Place panels between framing members.
- D. Secure panels in position using temporary strapping provided by panel manufacturer.
- E. Wire panels to branch circuits in parallel.
- F. Place end caps over panels, connectors, and feed wires.
- G. Connect to power supply and control wiring.

### 3.3 TESTING

- A. Test installed panels at rated voltage using ammeter. Ensure that ammeter values are same as calculated for heating load.

END OF SECTION