



Aero Tech Manufacturing Inc.
 395 W. 1100 N.
 North Salt Lake, UT 84054
 Phone: (866) 390-2376
 Phone: (801) 292-0493
 Fax: (801) 292-9908
 E-mail: mriley@aerotechmfg.com
www.aerotechmfg.com

This MANU-SPEC® utilizes the Construction Specifications Institute (CSI) *Project Resource Manual* (PRM), including *MasterFormat*™, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies extruded and formed metal hydronic radiant ceiling panels. These products are manufactured by Aero Tech Manufacturing Inc. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

**SECTION 23 83 00
 RADIANT HEATING UNITS**

PART 1 GENERAL

1.01 SUMMARY

Specifier Note: Revise paragraphs below to suit project requirements.

- A. Section Includes: Metal hydronic radiant ceiling panels.
- B. Related Sections:

Specifier Note: Provide aluminum moldings in wet areas. Retain or delete article below to suit project requirements.

1. Aluminum Molding: Division 05 metal fabrication sections.
2. Ceiling Suspension Grid: Division 09 suspended ceiling sections.
3. Wall Channel Moldings and T-Bars: Division 09 suspending sections.
4. Connections to hydronic radiant heating system piping: Division 23 heating sections.

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 01 References Section may establish the edition date of standards. This article does not require compliance with standard, but is merely a listing of references used. Article below should list only those industry standards referenced in this section.

1.02 REFERENCES

- A. ASTM International:
 1. ASTM B88 Standard Specification for Seamless Copper Water Tube.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements:
 1. Heating Output: _____ Btu per hour linear foot for a _____ inch wide panel at _____ degrees F mean water

temperature when the room temperature is 70 degrees F (21 degrees C) and the roof is of medium insulation value and natural convection prevails in the room.

Specifier Note: Retain above for extruded panels; retain below for formed panels. Fill in required values; see manufacturer's website for performance values.

2. Heating Output: _____ Btu per hour square foot at _____ degrees F mean water temperature when the room temperature is 70 degrees F (21 degrees C) and the roof is of medium insulation value and natural convection prevails in the room.

Specifier Note: Extruded ceiling system shall be completely pre-engineered, designed and tested system installed in an exposed inverted "T" suspension system supplied and installed by acoustical contractor. System must include interconnecting piping and required trim.

3. Suspension System: Consisting of main inverted "T's" of 0.030 inch (0.76 mm) minimum steel thickness accurately leveled and installed per drawings. Cross-tees shall be 0.021 inch (0.53 mm) minimum steel thickness installed per drawings and cut with proper tools to ensure clean edges. Hangers shall be installed at not more than 3 feet (0.91 m) on center.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 01 Submittal Procedures Section.

1.04 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01 Submittal Procedures Section.
- B. Product Data: Submit product data, including manufacturer's SPEC-DATA® sheet, for specified products.

Specifier Note: Article below should include prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 01 Quality Assurance Section.

- C. Shop Drawings: Submit 1/8 inch (3.2 mm) scale coordination drawings with panel layout and details of areas where hydronic radiant panels are indicated.
- D. Samples: Submit samples of each type of panel and accessory specified.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Employee and supervisor on payroll of hydronic radiant panel manufacturer.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 01 Regulatory Requirements Section. Repetitive statements should be avoided.

- B. Regulatory Requirements and Approvals: [Specify applicable requirements of regulatory agencies.].
 1. [Code agency name].
 - a. [Report or approval number].

Specifier Note: Article below should include special and unique requirements. Coordinate article below with Division 01 Product Requirements Section.

1.06 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 01 Product Requirements Section.
- B. Delivery: Complete factory assembled panels shall be shipped to jobsite in crates to minimize storage and to simplify handling. Maintain materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1.07 SEQUENCING

- A. Sequence With Other Work: Installation of hydronic radiant ceiling panels will not commence, without exception, until all glazing has been completed. Exterior openings must also be cleaned and all wet work, including cementing, plastering and other, must be dried out to the satisfaction of the hydronic radiant ceiling contractor prior to installation of hydronic radiant ceiling panels.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as “or equal” or “or approved equal” or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining “or equal” products.

2.01 HYDRONIC RADIANT PANELS

Specifier Note: Paragraph below is an addition to CSI *SectionFormat* and a supplement to MANU-SPEC. Retain or delete paragraph below per project requirements and specifier’s practice.

- A. Manufacturer: Aero Tech Manufacturing Inc.
1. Contact: 395 W. 1100 N., North Salt Lake, UT 84054; Telephone: (866) 390-2376, (801) 292-0493; Fax: (801) 292-9908; E-mail: mriley@aerotechmfg.com; website: www.aerotechmfg.com.

Specifier Note: Edit Paragraph below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 01 Project Requirements (Product Substitutions Procedures) Section.

- B. Substitutions: No substitutions permitted.

2.02 MANUFACTURED UNITS

Specifier Note: Retain extruded and/or formed panels below to suit project requirements; coordinate selection(s) with drawings.

- A. Extruded Aluminum Hydronic Radiant Panels:

Specifier Note: Retain extrusion(s) to suit project requirements.

1. Standard Extrusions: [9 inch (229 mm) Fluted (2 tubes)] [8 inch (203 mm) Fluted (2 tubes)] [6 inch (152 mm) Fluted (1 tube)] [5 3/4 inch (146 mm) Fluted (1 tube)] [5 inch (127 mm) Fluted (1 tube)] [5 inch (127 mm) V-Groove (1 tube)] [6 inch (152 mm) V-Groove (1 tube)] [8 inch (203 mm) V-Groove (2 tubes)] [8 inch (203 mm) Smooth (2 tubes)] [6 inch (152 mm) Smooth (1 tube)].
2. Drapery Recess Extrusions: [6 inch (152 mm) Fluted (1 tube)] [8 inch (203 mm) Fluted (2 tubes)] [6 inch (152 mm) V-Groove (1 tube)].
3. All extruded linear panels are to be completely factory assembled.

Specifier Note: 12 feet (3.7 m) is the standard maximum panel length; panels up to 16 feet (4.9 m) long are available on special request. Edit length below to suit project requirements.

4. Panel Length: 12 feet (3.7 m).
5. Copper Tubing: ASTM B88, Type L, 0.505 inch (12.8 mm) inside-diameter.

Specifier Note: Custom finishes are available.

6. Finish: Manufacturer’s baked enamel in white.

Specifier Note: Retain accessories below to suit project requirements.

7. Accessories:

Specifier Note: Bullnose can be used for free hanging of panels where instances of an open structure are specified or desired. In lieu of Bullnose, a panel with a 2 inch (51 mm) integral side section may also be used. Contact manufacturer for more information.

- a. Bullnose: Provide Bullnose Fluted Extrusion as indicated.
- b. Surface Mounting: Provide Surface Mount Frame with Hanger Bracket as indicated.

Specifier Note: Frame below can be used to flush mount panels to a gypsum board ceiling.

- c. Recess Mounting: Provide recess mounting frames as indicated.

B. Formed Metal Hydronic Radiant Panels:

Specifier Note: Select size(s), edge(s) and pattern required. If more than one panel configuration is selected, coordinate locations with drawings.

1. Size: [2 feet x 4 feet (610 x 1219 mm)] [2 feet x 2 feet (610 x 610 mm)].
2. Edge: [Square] [Tegular for 15/16 inch (23.8 mm) grid] [Tegular for 9/16 inch (14.3 mm) grid].
3. Perforations: Manufacturer's standard block perforation pattern.

Specifier Note: Custom finishes are available. Silk screen patterns are available to match some USG, Celotex and Armstrong ceiling panels; see manufacturer's SPEC-DATA sheet.

4. Copper Tubing: ASTM B88, Type L, 0.505 inch (12.8 mm) inside-diameter.

Specifier Note: Custom colors are available.

5. Finish: [Manufacturer's baked enamel in white] [Silk screen pattern to match _____].

Specifier Note: Retain accessories below to suit project requirements.

6. Accessories:

Specifier Note: False Tees below can be used to simulate a grid pattern other than 2 x 4 or 2 x 2.

- a. False Tee: Provide False Tees to simulate grid pattern as indicated.

Specifier Note: Bracket below can be used to surface mount panels to a gypsum board ceiling.

- b. Surface Mounting: Provide Surface Mount Frame with Hanger Bracket as indicated.

Specifier Note: Frame below can be used to flush mount panels to a gypsum board ceiling.

- c. Recess Mounting: Provide recess mounting frames as indicated.

2.03 FABRICATION

Specifier Note: Retain extruded and/or formed panels below to suit project requirements.

A. Extruded Aluminum Hydronic Radiant Panels:

1. All panels are to be factory assembled. The panel manufacturer shall provide factory installed return bends upon request from purchaser.
2. Fabricate panels with extruded aluminum strips approximately 0.100 inch (2.54 mm) in overall thickness with copper tube crimped into the extrusion for an intimate 300 degree contact between copper tube and aluminum extrusion under all operating temperature conditions. The use of adhesives or clips to attach copper tube to aluminum extrusion is not acceptable.

B. Formed Metal Hydronic Radiant Panels:

1. Fabricate edges to fit standard ceiling suspension grid as indicated.
2. Fabricate panels from 0.040 inch (1 mm) thick aluminum sheet with reinforcing to maintain horizontal plane flatness.
3. Fabricate panels with not less than 6 rows of serpentine copper tubing spaced at 3 1/2 to 4 inches (89 to 102 mm) on center and continuously soldered lengthwise along the back of the panel. Solder joints shall develop sufficient strength

so that the tube cannot be peeled away from the panel without distorting the panel. Leave tube ends unsoldered for a length of 6 inches (152 mm) to provide for soldered joint panel connections. Attachment of copper tube to aluminum sheet using adhesive or clips is not acceptable.

PART 3 EXECUTION

Specifier Note: Paragraph below is an addition to CSI *SectionFormat* and a supplement to MANU-SPEC. Retain or delete paragraph below per project requirements and specifier's practice.

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.
- B. Panels shall be installed as recommended as directed by hydronic radiant panel manufacturer. Contractor shall provide all labor, materials, tools, service and supervision for complete, functional system as shown on mechanical and architectural plans.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
- B. Hydronic radiant ceiling contractor's responsibility shall terminate at supply and return point to each room or zone. Interconnecting piping between supply and return joints shall be joined and tested by hydronic radiant panel contractor.
 - 1. Leak test panels in accordance with piping testing requirements.

3.03 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch up, repair or replace damaged products prior to Substantial Completion.
- C. Damage to hydronic radiant ceiling panels by unauthorized removal of panels, once installed by hydronic radiant ceiling contractor, shall be responsibility of trade causing such damage.

END OF SECTION