



By:
Thermasi LLC

Thermal Mass Furnaces and Duct Heaters

1 GENERAL

1.1 SECTION INCLUDES

- 1.1.1 Electric furnaces and accessories complete with controls.
- 1.1.2 Duct heaters.

1.2 RELATED SECTIONS

- 1.2.1 Section 22 05 00 - Common Work Results for Plumbing.
- 1.2.2 Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCES

- 1.3.1 ASTM International (ASTM):
 - 1.3.1.1 ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
- 1.3.2 American Society of Heating Refrigeration and Air Conditioning (ASHRAE):
 - 1.3.2.1 ASHRAE 62.1 - Ventilation for Acceptable Indoor Air Quality.
 - 1.3.2.2 ASHRAE/IES 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
- 1.3.3 Institute of Education Sciences (IEC).
- 1.3.4 National Fire Protection Association (NFPA):
 - 1.3.4.1 NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.
 - 1.3.4.2 NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
- 1.3.5 National Electrical Manufacturers Association (NEMA):
 - 1.3.5.1 NEMA MG 1 - Motors and Generators.
- 1.3.6 North American Insulation Manufacturers Association (NAIMA).
 - 1.3.6.1 NAIMA - Fibrous Glass Duct Liner Standard.
- 1.3.7 Underwriters Laboratories (UL):

1.3.7.1 UL 1995 - Heating and Cooling Equipment.

1.4 SUBMITTALS

1.4.1 Submit under provisions of Section 01 30 00 - Administrative Requirements.

1.4.2 Product Data:

- 1.4.2.1 Manufacturer's data sheets on each product to be used.
- 1.4.2.2 Preparation instructions and recommendations.
- 1.4.2.3 Storage and handling requirements and recommendations.
- 1.4.2.4 Typical installation methods.

1.4.3 Verification Samples: Two representative units of each type, size, pattern and color.

1.4.4 Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

1.5.1 Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

1.5.2 Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

1.5.3 Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.5.4 Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.

- 1.5.4.1 Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
- 1.5.4.2 If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
- 1.5.4.3 Retain mock-up during construction as a standard for comparison with completed work.
- 1.5.4.4 Do not alter or remove mock-up until work is completed or removal is authorized.

1.6 PRE-INSTALLATION CONFERENCE

1.6.1 Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1 Store and handle in strict compliance with manufacturer's written instructions and recommendations.

1.7.2 Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

1.8.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

2 PRODUCTS

2.1 MANUFACTURERS

2.1.1 Acceptable Manufacturer: Cocoon, which is located at: 165 Duckworth Street, St. Clair, MO 63077; Tel: 314-931-1004; Email: info@cocoonrevolution.com Web: www.cocoonrevolution.com

2.1.2 Substitutions: Not permitted.

2.1.3 Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 ELECTRIC THERMAL MASS FURNACES

2.2.1 Design Characteristics:

- 2.2.1.1 Configuration of Airflow: Upflow.
- 2.2.1.2 Configuration of Airflow: Counterflow.
- 2.2.1.3 Configuration of Airflow: Vertical and horizontal.
- 2.2.1.4 Supply and Return Ducting (L x W): 16 x 22 inch (406 x 559 mm).
- 2.2.1.5 Supply and Return Ducting (L x W): 18 x 24 inch (457 x 610 mm).
- 2.2.1.6 Maximum Coil Dimensions (L x W): 22 x 26 inch (559 x 660 mm).
- 2.2.1.6.1 Maximum Coil Height (in/mm): _____.

2.2.2 Electric Thermal Mass Furnaces: THRMS-1-1800-S-P4.

- 2.2.2.1 Capacity: 61,074 BTUs.
- 2.2.2.2 Active KW: 10.8.
- 2.2.2.3 Active BTUs: 36,851.13.
- 2.2.2.4 Stored BTUs: 24,222.87.
- 2.2.2.5 Number of Circuits: 1.
- 2.2.2.6 Number of Circuit Breakers: 1.
- 2.2.2.7 Volts: 208-240/480.
- 2.2.2.8 Phase: 1 or 3 phase.
- 2.2.2.9 Hertz: 50 or 60.
- 2.2.2.10 Full-Load Amps: 45.
- 2.2.2.11 Furnace Electrical Connection:
 - 2.2.2.11.1 Maximum Overcurrent Protection (Amps): 60.
 - 2.2.2.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.2.2.11.3 Unit Dimensions (W x H x D): 18 x 36 x 24 inch (45.72 x 91.44 x 60.96 cm).
 - 2.2.2.11.4 Blower (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.2.11.5 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.2.11.6 Assembled Weight: 110 lbs (50 kg) blower and heating chamber.
 - 2.2.2.11.7 Build Shape: I.

2.2.3 Electric Thermal Mass Furnaces: THRMS-1-2000-S-P8.

- 2.2.3.1 Capacity (BTU): 61,074 BTUs.
- 2.2.3.2 Active KW: 10.8.
- 2.2.3.3 Active BTU: 36,851.13.
- 2.2.3.4 Stored BTU: 24,222.87.
- 2.2.3.5 Number of Circuits: 1.
- 2.2.3.6 Number of Circuit Breakers: 1.
- 2.2.3.7 Volts: 208-240/480.
- 2.2.3.8 Phase: 1 or 3 phase.
- 2.2.3.9 Hertz: 50 or 60.
- 2.2.3.10 Full-Load Amps: 45.
- 2.2.3.11 Furnace Electrical Connection:
 - 2.2.3.11.1 Maximum Overcurrent Protection (Amps): 60.
 - 2.2.3.11.2 Minimum Circuit Ampacity: NEC and local codes.

- 2.2.3.11.3 Unit Dimensions (W x H x D): 18 x 54 x 24 inch (45.72 x 137.16 x 60.96 cm).
 - 2.2.3.11.4 Blower (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.3.11.5 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.3.11.6 Assembled Weight: 180 lbs (82 kg) blower and heating chambers.
 - 2.2.3.11.7 Build Shape: L.
 - 2.2.3.11.8 Build Shape: U.
 - 2.2.3.11.9 Build Shape: Inverted T.
- 2.2.4 Electric Thermal Mass Furnaces: THRMS-1-2800-S-P8.
- 2.2.4.1 Capacity (BTU): 81,432 BTUs.
 - 2.2.4.2 Active KW: 14.4.
 - 2.2.4.3 Active BTU: 49,134.84.
 - 2.2.4.4 Stored BTU: 32,297.16.
 - 2.2.4.5 Number of Circuits: 2.
 - 2.2.4.6 Number of Circuit Breakers: 2.
 - 2.2.4.7 Volts: 208-240/480.
 - 2.2.4.8 Phase: 1 or 3 phase.
 - 2.2.4.9 Hertz: 50 or 60.
 - 2.2.4.10 Full-Load Amps: 30 each.
 - 2.2.4.11 Furnace Electrical Connection:
 - 2.2.4.11.1 Maximum Overcurrent Protection (Amps): 45 each.
 - 2.2.4.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.2.4.11.3 Unit Dimensions (W x H x D): 18 x 54 x 24 inch (45.72 x 137.16 x 60.96 cm).
 - 2.2.4.11.4 Blower (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.4.11.5 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.4.11.6 Assembled Weight: 180 lbs (82 kg) blower and heating chambers.
 - 2.2.4.11.7 Build Shape: L.
 - 2.2.4.11.8 Build Shape: U.
 - 2.2.4.11.9 Build Shape: Inverted T.
- 2.2.5 Electric Thermal Mass Furnaces: THRMS-1-2900-S-P8.
- 2.2.5.1 Capacity (BTU): 122,148 BTUs.
 - 2.2.5.2 Active KW: 21.6.
 - 2.2.5.3 Active BTU: 73,702.27.
 - 2.2.5.4 Stored BTU: 48,445.73.
 - 2.2.5.5 Number of Circuits: 2.
 - 2.2.5.6 Number of Circuit Breakers: 2.
 - 2.2.5.7 Volts: 208-240/480.
 - 2.2.5.8 Phase: 1 or 3 phase.
 - 2.2.5.9 Hertz: 50 or 60.
 - 2.2.5.10 Full-Load Amps: 45 each.
 - 2.2.5.11 Furnace Electrical Connection:
 - 2.2.5.11.1 Maximum Overcurrent Protection (Amps): 60 each.
 - 2.2.5.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.2.5.11.3 Unit Dimensions (W x H x D): 18 x 54 x 24 inch (45.72 x 137.16 x 60.96 cm).
 - 2.2.5.11.4 Blower (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.5.11.5 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.5.11.6 Assembled Weight: 180 lbs (82 kg) blower and heating chambers.
 - 2.2.5.11.7 Build Shape: L.
 - 2.2.5.11.8 Build Shape: U.
 - 2.2.5.11.9 Build Shape: Inverted T.

- 2.2.6 Electric Thermal Mass Furnaces: THRMS-1-3000-S/R-I-P12 AND THRMS-1-3000-S/R-U-P12.
- 2.2.6.1 Capacity (BTU): 101,790 BTUs.
 - 2.2.6.2 Active KW: 18.
 - 2.2.6.3 Active BTU: 61,418.56.
 - 2.2.6.4 Stored BTU: 40,371.44.
 - 2.2.6.5 Number of Circuits: 2.
 - 2.2.6.6 Number of Circuit Breakers: 2.
 - 2.2.6.7 Volts: 208-240/480.
 - 2.2.6.8 Phase: 1 or 3 phase.
 - 2.2.6.9 Hertz: 50 or 60.
 - 2.2.6.10 Full-Load Amps: 30 and 45.
 - 2.2.6.11 Furnace Electrical Connection:
 - 2.2.6.11.1 Maximum Overcurrent Protection (Amps): 45 and 60.
 - 2.2.6.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.2.6.11.3 "I-Shaped" Unit Dimensions (W x H x D): 18 x 72 x 24 inch (45.72 x 182.88 x 60.96 cm).
 - 2.2.6.11.4 "U-Shaped" Unit Dimensions (W x H x D): 36 x 54 x 24 inch (91.44 x 137.16 x 60.96 cm).
 - 2.2.6.11.5 Blower (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.6.11.6 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.6.11.7 Assembled Weight: 250 lbs (113 kg) blower and heating chambers.
 - 2.2.6.11.8 Build Shape: L.
 - 2.2.6.11.9 Build Shape: U.
 - 2.2.6.11.10 Build Shape: Inverted T.
- 2.2.7 Electric Thermal Mass Furnaces: THRMS-1-3800-S/R-I-P12 AND THRMS-1-3800-S/R-U-P12.
- 2.2.7.1 Capacity (BTU): 122,148 BTUs.
 - 2.2.7.2 Active KW: 21.6.
 - 2.2.7.3 Active BTU: 73,702.27.
 - 2.2.7.4 Stored BTU: 48,445.73.
 - 2.2.7.5 Number of Circuits: 3.
 - 2.2.7.6 Number of Circuit Breakers: 3.
 - 2.2.7.7 Volts: 208-240/480.
 - 2.2.7.8 Phase: 1 or 3 phase.
 - 2.2.7.9 Hertz: 50 or 60.
 - 2.2.7.10 Full-Load Amps: 30 each.
 - 2.2.7.11 Furnace Electrical Connection:
 - 2.2.7.11.1 Maximum Overcurrent Protection (Amps): 45 each.
 - 2.2.7.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.2.7.11.3 "I-Shaped" Unit Dimensions (W x H x D): 18 x 72 x 24 inch (45.72 x 182.88 x 60.96 cm).
 - 2.2.7.11.4 "U-Shaped" Unit Dimensions (W x H x D): 36 x 54 x 24 inch (91.44 x 137.16 x 60.96 cm).
 - 2.2.7.11.5 Blower (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.7.11.6 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.7.11.7 Assembled Weight: 250 lbs (113 kg) blower and heating chambers.
 - 2.2.7.11.8 Build Shape: L.
 - 2.2.7.11.9 Build Shape: U.
 - 2.2.7.11.10 Build Shape: Inverted T.
- 2.2.8 Electric Thermal Mass Furnaces: THRMS-1-3900-S/R-I-P12 AND THRMS-1-3900-S/R-U-P12.
- 2.2.8.1 Capacity (BTU): 183,222 BTUs.
 - 2.2.8.2 Active KW: 32.4.

- 2.2.8.3 Active BTU: 110,553.4.
- 2.2.8.4 Stored BTU: 72,668.6.
- 2.2.8.5 Number of Circuits: 3.
- 2.2.8.6 Number of Circuit Breakers: 3.
- 2.2.8.7 Volts: 208-240/480.
- 2.2.8.8 Phase: 1 or 3 phase.
- 2.2.8.9 Hertz: 50 or 60.
- 2.2.8.10 Full-Load Amps: 45 each.
- 2.2.8.11 Furnace Electrical Connection:
 - 2.2.8.11.1 Maximum Overcurrent Protection (Amps): 60 each.
 - 2.2.8.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.2.8.11.3 "I-Shaped" Unit Dimensions (W x H x D): 18 x 72 x 24 inch (45.72 x 182.88 x 60.96 cm).
 - 2.2.8.11.4 "U-Shaped" Unit Dimensions (W x H x D): 36 x 54 x 24 inch (91.44 x 137.16 x 60.96 cm).
 - 2.2.8.11.5 Blower (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.8.11.6 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.8.11.7 Assembled Weight: 250 lbs (113 kg) blower and heating chambers.
 - 2.2.8.11.8 Build Shape: L.
 - 2.2.8.11.9 Build Shape: U.
 - 2.2.8.11.10 Build Shape: Inverted T.
- 2.2.9 Electric Thermal Mass Furnaces: Number of Chambers: _____.
 - 2.2.9.1 Capacity: 61,074 BTUs to ____ BTUs.
 - 2.2.9.2 Active KW: 10.8 to _____.
 - 2.2.9.3 Active BTU: 36,851.13 to _____.
 - 2.2.9.4 Stored BTU: 24,222.87 to _____.
 - 2.2.9.5 Number of Circuits: 1 to _____.
 - 2.2.9.6 Number of Circuit Breakers: 1 to _____.
 - 2.2.9.7 Volts: 208-240/480.
 - 2.2.9.8 Phase: 1 or 3 phase.
 - 2.2.9.9 Hertz: 50 or 60.
 - 2.2.9.10 Full-Load Amps: 30 to _____.
 - 2.2.9.11 Furnace Electrical Connection:
 - 2.2.9.11.1 Maximum Overcurrent Protection (Amps): 45 to _____.
 - 2.2.9.11.2 Minimum Circuit Ampacity: N.E.C. and local codes.
 - 2.2.9.12 Unit Dimensions (W x H x D): 18 x _____ x 24 inch (45.72 x _____ x 60.96 cm).
 - 2.2.9.12.1 Blower (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.9.12.2 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.2.9.12.3 Assembled Weight (lbs/kg): _____ blower and heating chambers.
 - 2.2.9.12.4 Build Shape: L.
 - 2.2.9.12.5 Build Shape: U.
 - 2.2.9.12.6 Build Shape: Inverted T.
- 2.2.10 Fan; Modulating Airflow: 300 to 2000 cfm (0.142 to 0.944 cu m per sec).
 - 2.2.10.1 External Static Pressure: 0.08. inches wg (19.91 Pa).
 - 2.2.10.2 Motor: Variable speed drive motor system.
 - 2.2.10.2.1 Power: 0.50 Hp (0.37 kW).
 - 2.2.10.2.2 Power: 0.75 Hp (0.56 kW).
 - 2.2.10.2.3 Power: 1.00 Hp (0.75 kW).
 - 2.2.10.2.4 Volts: 120/208-240.
 - 2.2.10.2.5 Phase: 1.
 - 2.2.10.2.6 Hertz: 60.
 - 2.2.10.2.7 Full-Load Amperes: 0.78 to 4.3.
 - 2.2.10.2.8 Minimum Circuit Ampacity: 5.

2.2.10.2.9 Maximum Overcurrent Protection (Amps): 5.

2.2.11 Centrifugal Fan:

- 2.2.11.1 Factory balanced.
- 2.2.11.2 Resilient mounted.
- 2.2.11.3 Direct drive.
- 2.2.11.4 Fan Motors: Comply with requirements in the Division 23 section for common motor requirements for HVAC equipment.
- 2.2.11.5 Fan Motors: Comply with NEMA MG 1.
 - 2.2.11.5.1 Features: Single speed, premium efficiency, with internal thermal protection and permanent lubrication.
 - 2.2.11.5.2 Features: Multi-tapped, multispeed with internal thermal protection and permanent lubrication.
 - 2.2.11.5.3 Features: Electronically controlled motor (ECM) controlled by integrated furnace/blower control.

2.2.12 Heating Element: Ceramic thermal mass heating emitter panel.

2.2.13 Enclosure: Factory painted sheet steel with fiberglass duct liner complying with ASTM C 1071 and NAIMA's "Fibrous Glass Duct Liner Standard."

- 2.2.13.1 Duct Liner Thickness: 1/2 inch (13 mm).
- 2.2.13.2 Duct Liner Thickness: 3/4 inch (19 mm).
- 2.2.13.3 Airstream Coated Surface:
 - 2.2.13.3.1 Per NFPA 90A or NFPA 90B.
 - 2.2.13.3.2 Per ASHRAE 62.1.
- 2.2.13.4 Color: Manufacturer standard.

2.2.14 Controls:

- 2.2.14.1 Sequencer: Switch activating heating element and fan.
 - 2.2.14.1.1 Controls fan speed.
- 2.2.14.2 Summer Fan Switch: Connected to permit independent on-off switch of unit fan.
- 2.2.14.3 Thermostats: Comply with ASHRAE/IES 90.1, "Controls."
 - 2.2.14.3.1 Solid-State Microprocessor: Wall-mounted.
 - 2.2.14.3.1.1 Automatic and manual switching from heating to cooling.
 - 2.2.14.3.1.2 Preferential rate control.
 - 2.2.14.3.1.3 Seven-day programmability. Four presets per day.
 - 2.2.14.3.1.4 Battery backup for program settings.
 - 2.2.14.3.2 Solid-State Microprocessor: Freestanding.
 - 2.2.14.3.2.1 Automatic and manual switching from heating to cooling.
 - 2.2.14.3.2.2 Preferential rate control.
 - 2.2.14.3.2.3 Seven-day programmability. Four presets per day.
 - 2.2.14.3.2.4 Battery backup for program settings.
 - 2.2.14.3.3 Solid-State Microprocessor: Wireless.
 - 2.2.14.3.3.1 Automatic and manual switching from heating to cooling.
 - 2.2.14.3.3.2 Preferential rate control.
 - 2.2.14.3.3.3 Seven-day programmability. Four presets per day.
 - 2.2.14.3.3.4 Battery backup for program settings.
 - 2.2.14.3.4 Single-Stage, Heating-Cooling: Adjustable, heating-cooling, wall-mounted unit with fan on-automatic selector.
 - 2.2.14.3.5 Two-Stage, Heating-Cooling: Adjustable, heating-cooling, wall-mounted unit with fan on-automatic selector.
 - 2.2.14.3.6 Single-Stage, Heating-Only: Wall-mounted unit with fan on-automatic selector.
 - 2.2.14.3.7 Two-Stage, Heating-Only: Wall-mounted unit with fan on-automatic selector.

2.3 ELECTRIC THERMAL MASS DUCT HEATERS

- 2.3.1 Electric Thermal Mass Duct Heater: THRMS-1-1400-R-P4-CA/THRMS-1-1500-R-P4-USA.
 - 2.3.1.1 Capacity: 40,716 BTUs.
 - 2.3.1.2 Active KW: 7.2.
 - 2.3.1.3 Active BTU: 24,567.42.
 - 2.3.1.4 Stored BTU: 16,148.58.
 - 2.3.1.5 Number of Circuits: 1.
 - 2.3.1.6 Number of Circuit Breakers: 1.
 - 2.3.1.7 Volts: 208-240/480.
 - 2.3.1.8 Phase: 1 or 3 phase.
 - 2.3.1.9 Hertz: 50 or 60.
 - 2.3.1.10 Full-Load Amps: 30.
 - 2.3.1.11 Duct Heater Electrical Connection:
 - 2.3.1.11.1 Maximum Overcurrent Protection (Amps): 45.
 - 2.3.1.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.3.1.11.3 Unit Dimensions (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.3.1.11.4 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.3.1.11.5 Assembled Weight: 75 lbs (34 kg) heating chamber.
- 2.3.2 Electric Thermal Mass Duct Heater: THRMS-1-1800-R-P4-USA&CA.
 - 2.3.2.1 Capacity: 61,074 BTUs.
 - 2.3.2.2 Active KW: 10.8.
 - 2.3.2.3 Active BTU: 36,851.13
 - 2.3.2.4 Stored BTU: 24,222.87.
 - 2.3.2.5 Number of Circuits: 1.
 - 2.3.2.6 Number of Circuit Breakers: 1.
 - 2.3.2.7 Volts: 208-240/480.
 - 2.3.2.8 Phase: 1 or 3 phase.
 - 2.3.2.9 Hertz: 50 or 60.
 - 2.3.2.10 Full-Load Amps: 45.
 - 2.3.2.11 Duct Heater Electrical Connection:
 - 2.3.2.11.1 Maximum Overcurrent Protection (Amps): 60.
 - 2.3.2.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.3.2.11.3 Unit Dimensions (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.3.2.11.4 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.3.2.11.5 Assembled Weight: 75 lbs (34 kg) heating chamber.
- 2.3.3 Electric Thermal Mass Duct Heater: THRMS-1-2000-R-P8.
 - 2.3.3.1 Capacity (BTU): 61,074 BTUs.
 - 2.3.3.2 Active KW: 10.8.
 - 2.3.3.3 Active BTU: 36,851.13.
 - 2.3.3.4 Stored BTU: 24,222.87.
 - 2.3.3.5 Number of Circuits: 1.
 - 2.3.3.6 Number of Circuit Breakers: 1.
 - 2.3.3.7 Volts: 208-240/480.
 - 2.3.3.8 Phase: 1 or 3 phase.
 - 2.3.3.9 Hertz: 50 or 60.
 - 2.3.3.10 Full-Load Amps: 45.
 - 2.3.3.11 Duct Heater Electrical Connection:
 - 2.3.3.11.1 Maximum Overcurrent Protection (Amps): 60.
 - 2.3.3.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.3.3.11.3 Unit Dimensions (W x H x D): 18 x 36 x 24 inch (45.72 x 91.44 x 60.96 cm).
 - 2.3.3.11.4 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).

2.3.3.11.5 Assembled Weight: 150 lbs (68 kg) heating chambers.

2.3.4 Electric Thermal Mass Duct Heater: THRMS-1-2800-R-P8.

- 2.3.4.1 Capacity (BTU): 81,432 BTUs.
- 2.3.4.2 Active KW: 14.4.
- 2.3.4.3 Active BTU: 49,134.84.
- 2.3.4.4 Stored BTU: 32,297.16.
- 2.3.4.5 Number of Circuits: 2.
- 2.3.4.6 Number of Circuit Breakers: 2.
- 2.3.4.7 Volts: 208-240/480.
- 2.3.4.8 Phase: 1 or 3 phase.
- 2.3.4.9 Hertz: 50 or 60.
- 2.3.4.10 Full-Load Amps: 30 each.
- 2.3.4.11 Duct Heater Electrical Connection:
 - 2.3.4.11.1 Maximum Overcurrent Protection (Amps): 45 each.
 - 2.3.4.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.3.4.11.3 Unit Dimensions (W x H x D): 18 x 36 x 24 inch (45.72 x 91.44 x 60.96 cm).
 - 2.3.4.11.4 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.3.4.11.5 Assembled Weight: 150 lbs (68 kg) heating chambers.

2.3.5 Electric Thermal Mass Duct Heater: THRMS-1-2900-R-P8.

- 2.3.5.1 Capacity (BTU): 122,148 BTUs.
- 2.3.5.2 Active KW: 21.6.
- 2.3.5.3 Active BTU: 73,702.27.
- 2.3.5.4 Stored BTU: 48,445.73.
- 2.3.5.5 Number of Circuits: 2.
- 2.3.5.6 Number of Circuit Breakers: 2.
- 2.3.5.7 Volts: 208-240/480.
- 2.3.5.8 Phase: 1 or 3 phase.
- 2.3.5.9 Hertz: 50 or 60.
- 2.3.5.10 Full-Load Amps: 45 each.
- 2.3.5.11 Duct Heater Electrical Connection:
 - 2.3.5.11.1 Maximum Overcurrent Protection (Amps): 60 each.
 - 2.3.5.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.3.5.11.3 Unit Dimensions (W x H x D): 18 x 36 x 24 inch (45.72 x 91.44 x 60.96 cm).
 - 2.3.5.11.4 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.3.5.11.5 Assembled Weight: 150 lbs (68 kg) heating chambers.

2.3.6 Electric Thermal Mass Duct Heater: THRMS-1-3000-R-P12.

- 2.3.6.1 Capacity (BTU): 101,790 BTUs.
- 2.3.6.2 Active KW: 18.
- 2.3.6.3 Active BTU: 61,418.56.
- 2.3.6.4 Stored BTU: 40,371.44.
- 2.3.6.5 Number of Circuits: 2.
- 2.3.6.6 Number of Circuit Breakers: 2.
- 2.3.6.7 Volts: 208-240/480.
- 2.3.6.8 Phase: 1 or 3 phase.
- 2.3.6.9 Hertz: 50 or 60.
- 2.3.6.10 Full-Load Amps: 30 and 45.
- 2.3.6.11 Duct Heater Electrical Connection:
 - 2.3.6.11.1 Maximum Overcurrent Protection (Amps): 45 and 60.
 - 2.3.6.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.3.6.11.3 Unit Dimensions (W x H x D): 18 x 54 x 24 inch (45.72 x 137.16 x 60.96 cm).

- 2.3.6.11.4 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
- 2.3.6.11.5 Assembled Weight: 225 lbs (102 kg) heating chambers.
- 2.3.7 Electric Thermal Mass Duct Heater: THRMS-1-3800-R-P12.
 - 2.3.7.1 Capacity (BTU): 122,148 BTUs.
 - 2.3.7.2 Active KW: 21.6.
 - 2.3.7.3 Active BTU: 73,702.27.
 - 2.3.7.4 Stored BTU: 48,445.73.
 - 2.3.7.5 Number of Circuits: 3.
 - 2.3.7.6 Number of Circuit Breakers: 3.
 - 2.3.7.7 Volts: 208-240/480.
 - 2.3.7.8 Phase: 1 or 3 phase.
 - 2.3.7.9 Hertz: 50 or 60.
 - 2.3.7.10 Full-Load Amps: 30 each.
 - 2.3.7.11 Duct Heater Electrical Connection:
 - 2.3.7.11.1 Maximum Overcurrent Protection (Amps): 45 each.
 - 2.3.7.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.3.7.11.3 Unit Dimensions (W x H x D): 18 x 54 x 24 inch (45.72 x 137.16 x 60.96 cm).
 - 2.3.7.11.4 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.3.7.11.5 Assembled Weight: 225 lbs (102 kg) heating chambers.
- 2.3.8 Electric Thermal Mass Duct Heater: THRMS-1-3900-R-P12.
 - 2.3.8.1 Capacity (BTU): 183,222 BTUs.
 - 2.3.8.2 Active KW: 32.4.
 - 2.3.8.3 Active BTU: 110,553.4.
 - 2.3.8.4 Stored BTU: 72,668.6.
 - 2.3.8.5 Number of Circuits: 3.
 - 2.3.8.6 Number of Circuit Breakers: 3.
 - 2.3.8.7 Volts: 208-240/480.
 - 2.3.8.8 Phase: 1 or 3 phase.
 - 2.3.8.9 Hertz: 50 or 60.
 - 2.3.8.10 Full-Load Amps: 45 each.
 - 2.3.8.11 Duct Heater Electrical Connection:
 - 2.3.8.11.1 Maximum Overcurrent Protection (Amps): 60 each.
 - 2.3.8.11.2 Minimum Circuit Ampacity: NEC and local codes.
 - 2.3.8.11.3 Unit Dimensions (W x H x D): 18 x 54 x 24 inch (45.72 x 137.16 x 60.96 cm).
 - 2.3.8.11.4 Heating Chamber (W x H x D): 18 x 18 x 24 inch (45.72 x 45.72 x 60.96 cm).
 - 2.3.8.11.5 Assembled Weight: 225 lbs (102 kg) heating chambers.

3 EXECUTION

3.1 EXAMINATION

- 3.1.1 Do not begin installation until substrates have been properly constructed and prepared.
- 3.1.2 If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- 3.2.1 Clean surfaces thoroughly prior to installation.
- 3.2.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the

best result for the substrate under the project conditions.

3.3 INSTALLATION

3.3.1 Install in accordance with manufacturer's instructions, approved submittals and in proper relationship with adjacent construction.

3.4 FIELD QUALITY CONTROL

3.4.1 Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

3.4.1.1 Operational Test: Confirm proper operation, capability, and compliance with requirements. Test and adjust controls.

3.4.2 Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

3.5.1 Clean products in accordance with the manufacturers recommendations.

3.5.2 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION