

ADDENDUM CC-1

TO THE

PROJECT MANUAL AND DRAWINGS

FOR

DLR Group
6225 North 24th Street, Suite 250
Phoenix, AZ 85016
(602) 381-8580

February 09, 2010

GILA COUNTY PUBLIC WORKS PROJECTS
GLOBE, ARIZONA

DLR GROUP PROJECT NOS. 30-09115-00 AND 30-09118-00

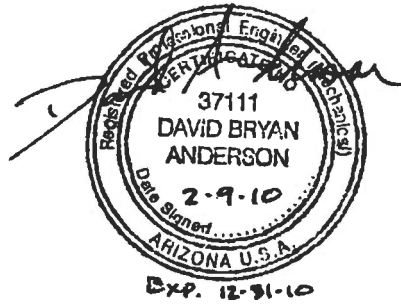
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COMBINED CONTRACT



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NOTICE TO BIDDERS: The Project Manual and Drawings to the above referenced project are hereby amended as follows:

PROJECT MANUAL

ITEM NO. 1 - VOLUME 1 – SECTION 00 0110 - TABLE OF CONTENTS

- a. At Table of Contents, Page 5: Add the following Sections in Volume III, Division 23:
“Section 23 5523 Gas-Fired Radiant Heaters”.
“Section 23 8216 Air Coils”.

ITEM NO. 2 - VOLUME 1 – SECTION 00 1113 - INVITATION FOR BIDDERS

- a. At bid acceptance time, delete time of “11:00 AM/Local Time” and replace with “**11:30 AM/Local Time**”.
- b. At plan room list, add the following:
“A&E Reprographics and Plan Room Central, 1030 Sandretto Drive, Suite F,
Prescott, AZ 86305 (928) 442-9116.”
- c. At cost for plan deposit (paragraph 4), delete fee of “One Hundred Dollars (\$100) per set” and replace with fee of “One Hundred Seventy Five Dollars (\$175) per set”.

ITEM NO. 3 - VOLUME 1 – SECTION 13 3419 – METAL BUILDING SYSTEMS

- a. Delete this Section entirely and substitute Section 13 3419 per Attachment A-1 to Addendum CC-1 dated February 9, 2010.

ITEM NO. 4 - VOLUME 2 – SECTION 22 4000 - PLUMBING FIXTURES

- a. Subparagraph 2.1.A.5. Delete the following lines:
“a. Oasis”
“b. EBCO Manufacturing Co.”
“d. Halsey Taylor; A Household International Co.”
“e. Haws Drinking Faucet Co.”
“f. Sunroc Corp.”
“g. Western Drinking Fountain; Sunroc Corp.”
- b. Subparagraph 2.1.A.7. Delete the following lines:
“a. Delany Co”
“c. Zurn Co.”

ITEM NO. 5 - VOLUME 3 – SECTION 22 4000 - PLUMBING FIXTURES

- a. Subparagraph 2.1.A.5. Delete the following lines:
“a. Oasis”
“b. EBCO Manufacturing Co.”
“d. Halsey Taylor; A Household International Co.”
“e. Haws Drinking Faucet Co.”
“f. Sunroc Corp.”
“g. Western Drinking Fountain; Sunroc Corp.”
- b. Subparagraph 2.1.A.7. Delete the following lines:
“a. Delany Co.”
“c. Zurn Co.”

ITEM NO. 6 - VOLUME 3 – INDEX 23 – HEATING, VENTILATING AND AIR CONDITIONING

a. Add the following Sections:

- "Section 23 5523 Gas-Fired Radiant Heaters23 5523 - 1; 5"
- "Section 23 8216 Air Coils.....23 8216 - 1; 3"

ITEM NO. 7 - VOLUME 3 – SECTION 23 0993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

a. Add the following: 3.11.A GAS-FIRED RADIANT HEATERS

- a) Remote thermostat shall energize gas burners on a call for heat.

ITEM NO. 8 - VOLUME 3 – SECTION 23 5523 - GAS-FIRED RADIANT HEATERS

a. Add the section in its entirety.

ITEM NO. 9 - VOLUME 3 – SECTION 23 8126 - SPLIT-SYSTEM HEAT PUMPS

a. Subparagraph 2.1.A. Delete the following lines:

- "a. Carrier Air Conditioning Div of Carrier Corporation."
- "b. Day and Night."
- "c. JCI"

ITEM NO. 10 - VOLUME 3 – SECTION 23 8216 – AIR COILS

a. Add the section in its entirety.

DRAWINGS

Public Works Administration Building

ITEM NO. 11 - SHEET 0.0 – INDEX OF DRAWINGS

- a. At Index of Drawings, Electrical Sheets, delete Sheet Title "A5.1 – ELECTRICAL DETAILS" and replace with Sheet Title "E5.1 – ELECTRICAL DETAILS".
- b. At Index of Drawings, Electrical Sheets, delete Sheet Title "A5.2 – ELECTRICAL DETAILS" and replace with Sheet Title "E5.2 – ELECTRICAL DETAILS".

ITEM NO. 12 - SHEET AS1.1 – OVERALL ARCHITECTURAL ORIENTATION PLAN

- a. Delete this Sheet entirely and substitute Sheet AS1.1 per Attachment A-2 to Addendum CC-1 dated February 9, 2010.

Facilities and Sign Shop

ITEM NO. 13 - SHEET AS1.1 – OVERALL ARCHITECTURAL ORIENTATION PLAN

- a. Delete this Sheet entirely and substitute Sheet AS1.1 per Attachment A-3 to Addendum CC-1 dated February 9, 2010.

ITEM NO. 14 - SHEET CP1.1 – CODE PLANS AND ANALYSIS

- a. Add reference to fire extinguisher adjacent to Door 100D per Attachment A-4 to Addendum CC-1 dated February 9, 2010.
- b. Add reference to fire extinguisher cabinet in Woodworking 101E adjacent to Door 101D per Attachment A-4 to Addendum CC-1 dated February 9, 2010.
- c. Add fire extinguisher in Warehouse A 101E at bottom of stair per Attachment A-4 to Addendum CC-1 dated February 9, 2010.
- d. Modify Building Construction Type from V-B to II-B per Attachment A-5 to Addendum CC-1 dated February 9, 2010.
- e. Delete reference to Section 1007.1 per Attachment A-5 to Addendum CC-1 dated February 9, 2010.

ITEM NO. 15 - SHEET A1.1 – FLOOR PLAN

- a. Add fire extinguisher in Warehouse A 101E at bottom of stair.

ITEM NO. 16 - SHEET A6.1 – BUILDING SECTIONS

- a. Delete this Sheet entirely and substitute Sheet A6.1 per Attachment A-6 to Addendum CC-1 dated February 9, 2010.

ITEM NO. 17 - SHEET M1.1 – HVAC FLOOR PLANS

- a. HVAC Floor Plan – Second Level. Add gas fired radiant heat and electric duct coil as shown on Attachment No. M1 to Addendum CC-1 dated February 4, 2010.
- b. HVAC Floor Plan – First Level. Add thermostat for gas fired radiant heat and electric duct coil as shown on Attachment No. M2 to Addendum CC-1 dated February 4, 2010.

ITEM NO. 18 - SHEET M2.1 – HVAC PIPING FLOOR PLANS

- a. HVAC Piping Floor Plan – Second Level. Modify gas piping for gas fired radiant heat as shown on Attachment No. M3 to Addendum CC-1 dated February 4, 2010.
- b. HVAC Piping Floor Plan – First Level. Modify gas piping for gas fired radiant heat as shown on Attachment No. M4 to Addendum CC-1 dated February 4, 2010.

ITEM NO. 19 - SHEET M3.1 – MECHANICAL DETAILS

- a. Add INFRA RED BURNER DETAIL and INFRA RED WIRING DETAILS as shown on Attachment No. M5 to Addendum CC-1 dated February 4, 2010.

ITEM NO. 20 - SHEET M4.1 – MECHANICAL SCHEDULES

- a. Add DUCT HEATER – ELECTRIC and RADIANT TUBULAR HEATERS – GAS FIRED as shown on Attachment No. M6 to Addendum CC-1 dated February 4, 2010.

ITEM NO. 21 - SHEET E2.1 – POWER MAIN PLAN

- a. Electrical Room 118 : Delete equipment layout and Add new equipment layout per Attachment E1, dated 04 February 2010.

ITEM NO. 22 - SHEET E2.2 – MEZZANINE POWER PLAN

- a. Provide electrical connections to new Duct Heater EDH-1 and to the Radiant Heater Fan Motors per Attachment E2, dated 04 February 2010.

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ITEM NO. 23 - SHEET E6.1 – ELECTRICAL ONE – LINE DIAGRAM

- a. Provide feeder breaker and electrical connections to DP-HF per Attachment E3, dated 04 February 2010.

ITEM NO. 24 - SHEET E7.1 – PANEL SCHEDULES

- a. Delete Schedule DP-HF and Add new schedule DP-HF per Attachment E4, dated 04 February 2010.
- b. Panel Schedule LFA, add two(2) new 20/1P breakers each for circuits #27, 29 for the Radiant Heater Fan Motors.

END of ADDENDUM CC-1

- G. ASTM A 529 - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2005.
 - H. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
 - I. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2008.
 - J. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of building Materials; 2008.
 - K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.
 - L. AWS D1.1 - Structural Welding Code - Steel; American Welding Society; 2008.
 - M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
 - N. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Underwriters Laboratories Inc.; 2006.
- 1.5 DESIGN REQUIREMENTS
- A. Installed Thermal Resistance of Wall System: R value of 11.
 - B. Installed Thermal Resistance of roof System: R value of 25 between purlins plus 15 continuous.
 - C. Design members for the applicable building code live load, to withstand dead load, snow load, and wind design loads, seismic loads and collateral loads indicated on the Drawings.
 - D. Design drift for frames as indicated on the Drawings.
 - E. Design deflection for members as indicated on the Drawings.
 - F. Design members to withstand UL 580 Uplift Class 90.
 - G. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 120 deg F.
 - H. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.
- 1.6 SUBMITTALS
- A. See Sections 01 3323 and 01 3324 for submittal procedures.

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- B. Delegated-Design Submittal: For metal building systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Shop Drawings: For metal building system components. Include plans, elevations, sections, details, and attachments to other work. Provide anchor bolt shop drawing and correspond loads on plans to anchor bolt groups for foundation verification of design.
- D. Samples: Submit two samples of precoated metal panels for each color selected, 12 x 12 inch in size illustrating color and texture of finish.
- E. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement, and any bracing locations. Provide complete submittal with erection and piecemark sheets.
- F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.
- G. Project Record Documents: Record actual locations of concealed components and utilities.

1.7 QUALITY ASSURANCE

- A. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this Work.
 - 1. Design Engineer Qualifications: Licensed in Arizona State.
 - 2. Conform to applicable code for submission of design calculations as required for acquiring permits.
 - 3. Cooperate with regulatory agency or authority and provide data as requested.
- B. Perform work in accordance with AISC 360 "Specification for Structural Steel Buildings" for design requirements.
- C. Perform welding in accordance with AWS D1.1.
- D. Manufacturer Qualifications: Company specializing in manufacturing the Projects specified in this Section with minimum five years documented experience.
- E. Erector Qualifications: Company specializing in performing the work of this Section with minimum 5 years experience.

1.8 WARRANTY

- A. See Division 01 Section "Closeout Procedures" for additional warranty requirements.
- B. Correct defective Work within a five-year period after Date of Substantial Completion.
- C. Provide five-year manufacturer warranty for panel finish.
 - 1. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or facing. Include coverage for weather tightness of building enclosure elements after installation.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Pre-engineered Buildings: A qualified manufacturer that meets the requirements of MBMA.
 - 1. Basis-of-Design is Metallic Building Company.
 - 2. Substitutions: refer to Division 01 Section "Substitution Procedures".
 - 3. Available Manufacturers meeting MBMA requirements and the Specification and Drawings.

2.2 PRE-ENGINEERED BUILDING

- A. Tapered beam, bay spacing as indicated on the Drawings.
- B. Primary Framing: Rigid frame of rafter beams and columns, end wall columns, and wind bracing.
- C. Secondary Framing: Purlins, and girts.
- D. Wall System: Preformed metal panels of vertical profile, with sub-girt framing / anchorage assembly, insulation, and metal stud infill, and accessory components.
- E. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing / anchorage assembly, insulation, liner panels, and accessory components.
- F. Roof Slope: 2 inches in 12 inches.

2.3 FRAMING

- A. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse S2.3 framing; rafter, rake; sidewall, intermediate, end-wall, and corner columns; and wind bracing. Provide grade of material as required to meet design requirement.
 - 1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly.
 - 2. Frame Configuration: Single gable.
 - 3. Exterior Column Type: Tapered at Facilities and Sign Shop Building and Straight at Public Works Administration Building.
 - 4. Rafter Type: Tapered.
- B. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly.
- C. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating. Provide material to meet design requirements.

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- D. Bolts: Provide plain-finish bolts for structural-framing components that are primed or finish painted. Provide zinc-plated or hot-dip galvanized bolts for structural-framing components that are galvanized.
- E. Finish: Factory primed. Apply SSPC-Paint 20, zinc rich after cleaning and pre-treating.
- F. Grout: ASTM C 1107/C 1107M, non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 2400 psi in two days and 7000 psi in 28 days.

2.4 MATERIALS - WALLS AND ROOF

- A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A 653 /A 653M, SS Grade 33/230, with G90/Z275 coating.
- B. Insulation: Semi-rigid glass fiber type, faced with reinforced white vinyl, ASTM E 84 flame spread index of 25 or less where exposed, friction fit, in thickness necessary to achieve R-Value of 19 at walls and 30 at roof.
- C. Joint Seal Gaskets: Manufacturer's standard type.
- D. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A 153/A 153M, finish to match adjacent surfaces when exterior exposed.
- E. Bituminous Paint: Asphaltic type.
- F. Sealant: Manufacturer's standard type.
- G. Ruff Curbs: Insulated metal same as roofing, 2-inch-thick, designed for imposed equipment loads, anchor fasteners to equipment, counterflashed to metal roof system.
- H. Trim, Closure Pieces, Caps, Flashings, Rain Water Diverter and Fascias: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

2.5 COMPONENTS

- A. Doors and Frames: Manufacturer's standard.
- B. Coiling Overhead Doors and Frames and 1 hp Operators: Manufacturer's standard.

2.6 WINDOWS

- A. Aluminum Windows: Metal building system manufacturer's standard, with self-flashing mounting fins, and as follows:
 - 1. Type, Performance Class, and Performance Grade: Comply with AAMA / WDMA / CSA 101 / I.S.2 / A440 and as follows:
 - a. Fixed Units: Manufacturers standard aluminum framed units for insulated glazing.
- B. Glazing: Comply with requirements specified in Division 08 Section "Glazing."

- C. Finish:
 - 1. Baked-Enamel Finish: Thermosetting, modified-acrylic enamel primer / topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 0.7 mil (0.02 mm), medium gloss.
 - a. Color: As selected by Architect from manufacturer's full range.

2.7 SOURCE AND FIELD QUALITY CONTROL

- A. Testing and Special Inspection Agency: Engage a qualified testing agency to perform the following tests and inspections and to submit reports. Special inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.
 - 1. Special inspections will not be required if fabrication is performed by manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.
 - a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.
- B. Testing: Test and inspect shop connections for metal buildings according to the following if fabricator does not meet "approved fabricator" status:
 - 1. Bolted Connections: Shop-bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 2. Welded Connections: In addition to visual inspection, shop-welded connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- C. Product will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

2.8 FABRICATION - FRAMING

- A. Fabricate in accordance with AISC specifications.
- B. General: Design components and field connections required for erection to permit easy assembly.
 - 1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings.
 - 2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

- C. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- D. Primary Framing: Shop fabricate framing components to size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
- E. Secondary Framing: Shop fabricate framing components to size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

2.9 FABRICATION - WALL AND ROOF PANELS

- A. Siding: Similar to Butlerib II System; minimum metal thickness manufacturer's standard for application, profile indicated, 3 feet wide x 1-1/2-inch deep, lapped edges fitted with continuous gaskets.
- B. Roofing: Similar to Butlerib II Roof System; minimum metal thickness manufacturer's standard for application profile, 36 inches wide x 1-1/2-inch deep lapped edges fitted with continuous gaskets.
- C. Girts / Purlins: Rolled formed structural shape to receive siding, roofing and liner sheet.
- D. Flashings, Closure Pieces, Fascia: Same material and finish as adjacent material, profile to suite system.
- E. Fasteners: To maintain load requirements and weathertight installation, same finish as cladding, non-corrosive type.

2.10 FINISHES

- A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.
- B. Exterior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.
- C. Interior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position.

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3.2 ERECTION - FRAMING

- A. Erect framing in accordance with AISC 360 - Specification for Structural Steel Buildings.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
- C. Set column base plates with non-shrink grout to achieve full plate bearing, use shim wedges to level plates.
- D. Do not field cut or alter structural members without approval, from Engineer of Record.

3.3 ERECTION - WALL AND ROOF PANELS

- A. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners.
- G. Install sealant and gaskets to prevent weather penetration.

3.4 ERECTION - GUTTERS AND DOWNSPOUTS

- A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Slope gutters minimum 1/8 inch per foot.
- C. Install splash pads under each downspout.

3.5 WINDOW INSTALLATION

- A. General: Install windows plumb, rigid, properly aligned, without warp or rack of frames or sash, and securely fasten in place according to manufacturer's written instructions. Coordinate installation with wall flashings and other components. Seal perimeter of each window frame with elastomeric sealant used for metal wall panels.
 - 1. Separate dissimilar materials from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in AAMA/WDMA/CSA 101/I.S.2/A440.
- B. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

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- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Mount screens directly to frames with tapped screw clips.
- E. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing."

3.6 INSTALLATION - ACCESSORIES

- A. Install door frames, doors, overhead doors, and windows and glass in accordance with manufacturer's instructions.
- B. Seal wall and roof accessories watertight and weathertight with sealant.

3.7 TOLERANCES

- A. Framing Members: See Structural Notes on Drawings.
- B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

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SECTION 235523 - GAS-FIRED RADIANT HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes gas-fired, tubular infrared radiant heaters.

1.3 SUBMITTALS

- A. Product Data: For each type of gas-fired radiant heater indicated. Include rated capacities, operating characteristics, and accessories.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power and control wiring.
- C. Startup service reports.
- D. Operation and Maintenance Data: For gas-fired radiant heaters to include in emergency, operation, and maintenance manuals.
- E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. American National Standard / CSA Standard: Construct and certify gas fired infrared heaters in accordance with latest edition ANSI Z83.20 / CSA 2.34 " Gas-Fired Low Intensity Infrared Heaters".

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of gas-fired radiant heater that fails in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Burner Igniters: One hot-surface burner igniter(s) for each style of gas-fired radiant heater furnished.

PART 2 - PRODUCTS

2.1 TUBULAR INFRARED HEATERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Detroit Radiant Products, RE-VERBER-RAY
 - 2. Gas-Fired Products Inc.; Space-Ray Div.
 - 3. Reznor/Thomas & Betts Corporation.
 - 4. Roberts-Gordon, Inc.
- B. Description: Factory assembled, piped, and wired, and complying with ANSI Z83.20/CSA 2.34.
- C. Fuel Type: Design burner for natural gas having characteristics same as those of gas available at Project site.
- D. Combustion Tubing: 4-inch diameter aluminized steel with high-emissivity, high-temperature, corrosion-resistant external finish.
- E. Tubing Connections: Stainless-steel couplings or flared joints with stainless-steel draw bolts.
- F. Reflector: Polished aluminum, 97 percent minimum reflectivity, with end caps. Shape to control radiation from tubing for uniform intensity at floor level with 100 percent cutoff above centerline of tubing. Provide for rotating reflector or heater around a horizontal axis, rotatable from 0 to 45 degrees.
 - 1. Reflector Extension Shields: Same material as reflectors, arranged for fixed connection to lower reflector lip and rigid support to provide 100 percent cutoff of direct radiation from tubing at angles greater than 30 degrees (0.52 radians) from vertical.
 - 2. Include hanger kit.

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G. Burner Safety Controls:

1. Gas Control Valve: Single-stage, regulated redundant 24-V ac gas valve containing pilot solenoid valve, electric gas valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff all in one body.
2. Blocked Vent Safety: Differential pressure switch in burner safety circuit to stop burner operation with high discharge or suction pressure.
3. Control Panel Interlock: Stops burner if panel is open.
4. Indicator Lights: Burner-on indicator light.

H. Burner and Emitter Type: Gravity-vented power burner, with the following features:

1. Emitter Tube: 4-inch diameter, aluminized steel tubing with sight glass for burner and pilot flame observation.
2. Venting: Connector at exit end of emitter tubing for vent-pipe connection.
 - a. Vent Terminal: See plans for orientation.
3. Burner/Ignition: Power gas burner with electronic spark and electronic flame safety.
4. Combustion-Air Connection: Duct connection for combustion air to be drawn directly from outdoors by burner fan.

2.2 LISTED TYPE B VENTS

- A. Description: Double-wall metal vents tested according to UL 441 and rated for 480 deg F continuously for Type B; with neutral or negative flue pressure complying with NFPA 211.
- B. Construction: Inner shell and outer jacket separated by at least a ¼-inch airspace.
- C. Inner Shell: 0.014" aluminum.
- D. Outer Jacket: Galvanized steel.
- E. Accessories: Tees, elbows, increasers, connectors, terminations, storm collars, support assemblies, thimbles, firestop spacers, and fasteners; fabricated from similar materials and designs as vent-pipe straight sections; all listed for same assembly.
 1. Termination: Stack cap designed to exclude minimum 90 percent of rainfall.

2.3 CONTROLS

- A. Thermostat: 2-stage, 24v, wall-mounting type with 40 to 100 deg F operating range, similar to Peco TH-109.
 1. Control Transformer: Integrally mounted.

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PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and connect gas-fired radiant heaters and associated fuel and vent features and systems according to NFPA 54, applicable local codes and regulations, and manufacturer's written installation instructions.
- B. Suspended Units: Suspend from substrate using chain hanger kits and building attachments.
 - 1. Spring hangers are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment"
- C. Maintain manufacturers' recommended clearances to combustibles.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to gas-fired radiant heaters to allow service and maintenance.
- C. Gas Piping: Comply with Division 23 Section "Facility Natural-Gas Piping." Connect gas piping to gas train inlet; provide union with enough clearance for burner removal and service.
- D. Electrical Connections: Comply with applicable requirements in Division 26 Sections.
 - 1. Install electrical devices furnished with heaters but not specified to be factory mounted.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 2. Verify bearing lubrication.
 - 3. Verify proper motor rotation.
- C. Remove and replace malfunctioning units and retest as specified above.

3.4 ADJUSTING

- A. Adjust initial temperature set points.
- B. Adjust burner and other unit components for optimum heating performance and efficiency.

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3.5 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain gas-fired radiant heaters.

END OF SECTION

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SECTION 238216 - AIR COILS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following types of air coils that are not an integral part of air-handling units:
 - 1. Electric.
- B. Related Sections include the following:
 - 1. Division 23 Sections for air coils that are integral to air-handling units.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each air coil. Include rated capacity and pressure drop for each air coil.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which coil location and ceiling-mounted access panels are shown and coordinated with each other.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For air coils to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ASHRAE Compliance:
 - 1. Comply with ASHRAE 15 for refrigeration system safety.

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2. Comply with ASHRAE 33 for methods of testing cooling and heating coils.
3. Comply with applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

PART 2 - PRODUCTS

2.1 ELECTRIC COILS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 1. Brasch Manufacturing Co., Inc.
 2. Chromalox, Inc., Wiegand Industrial Division; Emerson Electric Company.
 3. Dunham-Bush, Inc.
 4. INDEECO.
 5. Trane.
- B. Coil Assembly: Comply with UL 1995.
- C. Heating Elements: Coiled resistance wire of 80 percent nickel and 20 percent chromium; surrounded by compacted magnesium-oxide powder in tubular-steel sheath; with spiral-wound, copper-plated, steel fins continuously brazed to sheath.
- D. Heating Elements: Open-coil resistance wire of 80 percent nickel and 20 percent chromium, supported and insulated by floating ceramic bushings recessed into casing openings, and fastened to supporting brackets.
- E. High-Temperature Coil Protection: Disk-type, automatically reset, thermal-cutout, safety device; serviceable through terminal box without removing heater from duct or casing.
 1. Secondary Protection: Load-carrying, manually reset or manually replaceable, thermal cutouts; factory wired in series with each heater stage.
- F. Frames: Galvanized-steel channel frame, minimum 0.064 inch thick for flanged mounting.
- G. Control Panel: Unit mounted with disconnecting means and overcurrent protection. Include the following controls:
 1. Magnetic contactor.
 2. Mercury contactor.
 3. Pilot lights; one per step.
 4. Airflow proving switch.
- H. Thermostats: Wall-mounted thermostats, with temperature range from 50 to 90 deg F throttling range.
- I. Capacities and Characteristics: See schedule on plan.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine ducts, plenums, and casings to receive air coils for compliance with requirements for installation tolerances and other conditions affecting coil performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install coils level and plumb.
- B. Install coils in metal ducts and casings constructed according to SMACNA's "HVAC Duct Construction Standards, Metal and Flexible."
- C. Straighten bent fins on air coils.
- D. Clean coils using materials and methods recommended in writing by manufacturers, and clean inside of casings and enclosures to remove dust and debris.

3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Operational Test: After electrical circuitry has been energized, operate electric coils to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION 238216

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