ADDENDUM NUMBER FOUR

for

Coastal Carolina University Atheneum Hall Renovation
Project No.: C-730-11
State PIP No. H17-9554-AC

COLUMBIA, SOUTH CAROLINA

PREPARED BY:

The Boudreaux Group 1330 Lady Street Suite 500, Columbia, South Carolina 29201

DATE OF ISSUE: November 21, 2013

TO: ALL BIDDERS OF RECORD, CONSULTANTS, OWNER:

The following items shall take precedence over the drawings and specifications for the above named project and shall become a part of the contract documents. Where any item called for in the specifications, or indicated on the drawings, is not supplemented hereby, the original requirements shall remain in effect. Where any original item is amended, voided or superseded hereby, the provisions of such item not specifically amended, voided or superseded shall remain in effect.

CONTRACTOR SHALL ACKNOWLEDGE RECEIPT OF ADDENDUM.

This addendum consists of 32 pages and the following attachments:

8.5 x 11 Specification Section 232114 Hydronic Specialties
8.5 x 11 Specification Section 220523 General Duty Valves for Plumbing Piping
8.5 x 11 Specification Section 232113.13 Underground Direct Burried Hydronic Piping
8.5 x 11 RFI 1 from Network Controls
8.5 x 11 RFI 2 from Network Controls
11 x 17 MSK-1
11 x 17 PSK-1
11 x 17 ESK-1
11 x 17 ESK-2
11 x 17 ESK-3
30 x 42 M2.1R
30 x 42 E0.0R
30 x 42 E1.2R

I. Questions and Clarifications:

1. Question from MB KAHN: Specs call for all temporary utilities to be by GC. At the pre-bid, it was announced that utilities would be by the owner. Please confirm the owner will be responsible for utilities? Response: Per CCU, all utilities will remain in the Universities name.

2. Question from MB KAHN: Demolition drawings call for ceramic tile to be removed. The asbestos survey says mastic for ceramic tiles are to be considered suspect materials and should be tested prior to disturbance. Will ceramic tile demolition be required by general contractor?
Response: For clarity, the abatement demolition contractor will remove all asbestos containing materials and will be responsible for removing all flooring throughout the building down to the concrete slab. Contractor will remain responsible for prepping the existing concrete slab to receive new floor finishes.

3. Question from MB KAHN: The asbestos survey shows materials in various colors of floor tile that contain asbestos. Most existing flooring past the lobby is carpet. Per conversations with the owner, the floor tile is under carpet in some areas. Please clarify the limits of flooring demolition that will be required with the general contractor scope of work begins. Response: For clarity, the abatement demolition contractor will remove all asbestos containing materials and will be responsible for removing all flooring throughout the building down to the concrete slab. Contractor will remain responsible for prepping the existing concrete slab to receive new floor finishes.

4. Question from MB Kahn: Please confirm what systems (low voltage) are to be owner provided. Response: All low voltage systems shall be provided as indicated on the drawings and within the specifications.

5. Question from Tungsten Corp: In designing the shoring for the wall demolition for this project, I have the following question. Will the existing “slab on metal deck structure” support the shoring loads without re-shoring required in the crawlspace, or what is the allowable point loading on the first floor structure. Response: Refer to note 1 on sections B/S2.1 and C/S2.1 “Contractor is responsible for determining shoring loads and method of shoring.” The existing structural drawings have been made available online through Coastal Carolina Universities per addendum #1.

II. Architectural:

6. Question from Kapasi Glass Mart: Can you tell me if the muntins at the new storefront windows and doors are surface mounted or mounted between the insulated glass panes? Response: The muntins are to be surface mounted on the #1 exterior glass face.

7. Question from MB KAHN: Please confirm grid is to remain in philanthropy wing. It is to be assumed that the grid and all above ceiling services remaining meet all current seismic codes. Response: This was clarified in Addendum #1. All existing ceiling grid is to be removed in the philanthropy wing. All new ductwork and equipment should be installed in accordance with the “Seismic and Wind Requirements for Mechanical Systems” table shown on M0.0.

8. Clarification on detail 9/A9.1: The top rail for all the railing shall be in a bronze finish. The model number #4429 listed is a steel product. The appropriate profile number should be Julius Blum #4531 or approved equal. Remaining components of the railing systems shall be per plans and specifications.

III. Mechanical:

1. Reference attached revised M2.1 Drawing.
2. Reference Attached Sketch M7.2R – MSK-1

DM1.1:
- Reference (E) Unit Heater, Unit Heater on plan shall be demolished.

M1.1:
- Add general note 5 as follows: “Repair and patch all existing ductwork and insulation associated with (E) AHU.

M7.1:
- Reference Detail 6, Hot Water Coil Piping Detail and add the following Note: “Provide 3-way valve with VAVs 17, 22 and 15.

M7.3:
- Reference AHU Schematic Diagram and Sequence of Operation 1/M7.3. Revise Outdoor Temp/Humidity Control Module note as follows: “Shield from elements per manufacturer’s recommendations. Locate sensors on north side of building out of direct sunlight.”

M8.1:
- Refernece VAV Chilled Water Air Handling Unit Schedule, revise OA CFM to 4,395.
- Reference Fan Schedule, revise EF-2 CFM to 515.
- Reference VAV Terminal Unit Schedule, revise note 1 as follows: “1. Inlet duct shall be same size as VAV Terminal Unit Inlet, UNO.”
- Reference Air Distribution Schedule, revise mounting type for “LS” to “Surface Mount”.

Question from Bidder: There is no info for the heater to be removed on the Mechanical sheets. Please provide somechanical engineer so he can add. How is the wall to be patched?
Answer: Electric Heater and all associated appurtenances shall be demolished. Reference General Note 2 DM1.1 for patching requirements.

IV. Plumbing:

P1.1:
- Provide 1-1/2” cold water connection with shutoff valve for HVAC equipment. See attached sketch PSK-1.

P8.2:
- Reference Plumbing Fixture Schedule, Lavatory LAV-1. Revise to include flowrate, “FIXTURE: SLOAN OPTIMA SYSTEMS EAF-275-ISM, 0.5 GPM MULTI-STREAM LAMINAR SPRAY HEAD.”

Question from Bidder: The Floor Trough E06 on A3.5 shows “Provided and Installed by Contractor”. The Note #1 on P1.2 states “Floor Trough Provided by Owner under Separate Contract”

RESPONSE: Revise Key Note 1, P1.2 to read, “12” X 48” X 4” FLOOR TROUGH WITH STAINLESS STEEL GRATING PROVIDED AND INSTALLED BY CONTRACTOR. BASIS OF DESIGN: ADVANCE TABCO FTG-1242. OTHER MANUFACTURERS EAGLE GROUP, IMC/TEDDY, OR APPROVED EQUAL.”

VI. Electrical:

DE1.1:
- Reference Existing TBB in Electrical Room 101K. Assume that there are 12 strand single mode fiber optic cable and 100 pair copper. Reference to S10 is not applicable. See sheet TC1.1 for conduit routing/reconnection requirements of the copper/fiber to Electrical Room 101K and Communication Closet 111.

E0.0R:

- Sheet Reissued

E1.1R:

- Reference General Notes. Include Note 4 “OCCUPANCY SENSORS CONTROL ALL LIGHTING, EXCEPT FOR EMERGENCY LIGHTING, WITHIN EACH SPACE WHERE INSTALLED WITH THE EXCEPTION OF DECORATIVE LIGHTING APPLICATIONS. SEE KEYED NOTE 4 ON THIS SHEET.”
- Reference Keyed Notes. Include Keyed Note 4 “DECORATIVE LIGHTING (TYPE “P”, “S”, AND “CH”) SHALL BE PROVIDED OCCUPANCY SENSORS SEPARATE FROM GENERAL LIGHTING.”
- Reference Room 101A. Provide ceiling-mounted photosensor for daylighting controls of light fixtures in space. Allow photosensor to automatically adjust fixture output. Photosensor shall be located for optimal operation in relation to source of daylighting, as recommended by manufacturer up to a maximum distance of 15 ft from the source of daylighting. Provide wall-mounted dimmer switch for manual control of fixtures.
- Reference Room 106. Provide ceiling-mounted photosensor for daylighting controls of light fixtures in space. Allow photosensor to automatically adjust fixture output. Photosensor shall be located for optimal operation in relation to source of daylighting, as recommended by manufacturer up to a maximum distance of 15 ft from the source of daylighting. Provide wall-mounted dimmer switch for manual control of fixtures.
- Reference Room 100. Provide occupancy sensor to control fixture type “CH”.
- Reference Room 109. Provide occupancy sensor to control fixture type “S”. Provide additional keyed light switch and separate type “S” and type “G2” into two separately controlled lighting circuits.
- Reference Room 110. Provide occupancy sensor to control fixture type “S”. Provide additional keyed light switch and separate type “S” and type “G2” into two separately controlled lighting circuits.
- Reference Room 105. Provide occupancy sensor to control fixture type “P”.

E1.2R:

- Sheet Reissued

E2.1R:

- Reference Mechanical Equipment Electrical Schedule. Revise AHU-1 Electrical Connection to state “COMBINATION VFD/FDS 100/3/1 (PROVIDED BY CONTROLS CONTRACTOR, SPEC BY MECH)”
- See attached sketch of Panel Schedules for circuiting revisions.

TC1.1R:

- Reference rerouting of fiber optic line. Assume once splice is needed in these lines.
VII. Specifications:

1. Question from MB KAHN: Please confirm there are no allowances to be included in the bid.  
   Response: There are no allowances in this bid.

2. Specification Section 014000 – Quality Requirements
   a. Question from MB KAHN: Specification 014000 – Quality Requirements has discrepancies as to what QC testing is required and who pays for the testing. For Clarification, please advise who is responsible for testing.  
      Response: Per 1.2.B.5, the owner will pay for the special inspections testing as indicated in specification section 014100. All other testing indicated is to be by the contractor per 1.2.B.2.

3. Specification Section 064600 and 064023
   a. Question from MB KAHN: The wood trim spec references the AWI QC program and AWI certified installer. The interior architectural woodwork spec does not have these same requirements. Please advise where, if anywhere, these requirements should apply.  
      Response: AWI QC program and AWI certified installer requirements apply to 064023 Interior Architectural Woodwork, 064600 Wood Trim and 081433 Style and Rail Wood Doors.

4. Clarification for Specification Section 102800 2.3.D Warm Air Dryer: The finish for the warm air dryer is to be white baked enamel finish.

5. Add attached specification 23 21 13.13 Underground Direct Buried Hydronic Piping to the project manual.

6. Replace specification section 23 21 14 Hydronic Specialties with attached revised specification section.

7. Reference specification section 23 05 29 Hangers and Support for HVAC Piping and Equipment and Add the following: “1.4.B.5 All hangers for piping 2-1/2” inches and larger shall be roller-type hangers.”

8. Add attached specification 22 05 23 General Duty Valves for Plumbing Piping

9. Reference Spec Section 265100 2.4.A. Add “IOTA” as an approved manufacturer.

10. Reference Spec Section 23 33 00 2.5.A. Add “United Enertech” as an approved manufacturer.

11. Reference Spec Section 23 25 00 2.1.B. Add “American Wheatley” as an approved manufacturer.

VIII. Prior Approvals:

Lighting Optional Manufacturers:
- Revise SN-2:2.2 to include Pathway Lighting
- Revise SN-2:2.4 to include Evenlite Lighting
- Revise SN-2:2.7 to include LSI Lighting

Mechanical:
- 23 21 13.2.2 – Pumps End Suction Base Mounted Flo Fab – Denied.
- 23 21 14 – Expansion Tanks Amtrol – Approved.
- 23 21 14 .2.2 – Air/Dirt Separator Thrush – Denied.
- 23 21 14 2.9 – Suction Diffusers Flo Fab – Approved.
- 23 09 13 – VFD Yaskawa – Denied.
- 23 21 14 – Expansion Tanks Patterson Pump – Approved.
- 23 25 00 – Chemical Treatment American Wheatly – Approved.
- 23 24 00 – Fans Soler & Palau – Denied.
- 23 30 00 – Dampers United Enertech – Approved.
Electrical:
   - 28 31 00 – Fire Alarm System Hochiki – Denied.

Note: Listing of multiple products or manufacturers within specifications or approval of products or manufacturers via substitution request does not waive or preclude any and all performance, warranty, construction or specific requirements listed within the specification unless specifically noted in the Addendum. Only manufacturers and products meeting the specification requirements and listed in the specifications or included in the Addendum shall be approved for the project.
**Electrical Notes:**

**G6.**

1. **Lighting:**
   - **General:**
     - Universal wall lighting fixtures shall be used.
     - Surface, ceiling, and wall mount fixtures shall be specified.

2. **20A/120V Branch Circuits:**
   - Prior to rough-in, coordinate the location and mounting height of all wall.
   - Extending light switches to screen height.

3. **Fire-Rated Partitions:**
   - High black letters.
   - Fire-rated partitions shall not be mounted in the same wall cavity. Separate outlet boxes for switches, receptacles, etc. mounted on opposite sides of partition.

4. **Firestop System:**
   - Use 3M or approved fire-rated caulk type substance and high temp fiber insulation. Only metal conduit shall be used to penetrate fire-rated partitions.

5. **Specialty Lighting:***
   - High bay lights.
   - Fire alarm systems shall comply with NEC Section 725.

6. **Switches:**
   - Single-pole switches shall be used for incandescent/cfl/hid fixtures.
   - Receptacles shall be quadplex.

7. **Wall-Mounted Fixtures:**
   - Wall-mounted fixtures shall be used.

8. **A/V Control:**
   - A/V control keypads with lighting zones.

9. **Security Cameras:**
   - Stand-alone security cameras.

10. **Lighting Controls:**
    - Dimming controls.

11. **Occupancy Sensors:**
    - Combination infrared/ultrasonic type, with adjustable sensitivity and time delay.

12. **Outlet Covers:**
    - Cover w/ (3) CAT 6 RJ-45 jacks: (2) data above, (1) voice/data below.

13. **Lighting Controls:**
    - Dual technology passive infrared/ultrasonic type, with adjustable sensitivity.

14. **Lighting Fixtures:**
    - LED downlight.

15. **Lighting Fixtures:**
    - Incandescent/cfl/hid downlight.

16. **Lighting Fixtures:**
    - Dome semi-flush ceiling light.

17. **Lighting Fixtures:**
    - 2AVG-217-MDR-SMD-MVOLT-GEB10IS.

18. **Lighting Fixtures:**
    - 2SPG-332-A12125-MVOLT-GEB10IS.

19. **Lighting Fixtures:**
    - 2SPG-232-A12125-MVOLT-GEB10IS.

20. **Lighting Fixtures:**
    - Driver, 4000K.

21. **Lighting Fixtures:**
    - 13WQT/4100K.

22. **Lighting Fixtures:**
    - 10LED/700mA.

23. **Lighting Fixtures:**
    - 3100LUM/36,000HRS.

24. **Lighting Fixtures:**
    - Cree.

25. **Lighting Fixtures:**
    - Canaletto.

26. **Lighting Fixtures:**
    - Rondo.

27. **Lighting Fixtures:**
    - LSI.

28. **Lighting Fixtures:**
    - DAYBRIGHT.

29. **Lighting Fixtures:**
    - FOCAL POINT.

30. **Lighting Fixtures:**
    - FINELITE.

31. **Lighting Fixtures:**
    - KENALL.

**Electrical Legend:**

- **P:** Pushbutton, existing
- **S:** Switch, dimmer type
- **C:** Receptacle: quadplex
- **O:** Occupancy sensor, pir w/ (2) manual paddle
- **D:** Dome semi-flush ceiling light
- **F:** Fire alarm system
- **T:** Telephone backboard
- **W:** Water heater
- **P:** Panelboard, distribution-type
- **A:** A/V control keypad with lighting zones, frame size/no. poles/nema enclosure type
- **R:** Refrigerator
- **H:** Hallway
- **T:** Telephone
- **N:** Water notification appliance, combination
- **F:** Fire alarm manual pull station, existing
- **P:** Panelboard, distribution-type
- **A:** A/V control keypad with lighting zones, frame size/no. poles/nema enclosure type
- **R:** Refrigerator
- **H:** Hallway
- **T:** Telephone
- **N:** Water notification appliance, combination
- **F:** Fire alarm manual pull station, existing
### Existing Panelboard Schedule

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<th>B</th>
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**Notes:**

1. All circuit breakers are existing.
2. All branch circuits are existing, UNO.
3. Extend branch circuit NA-30 from existing spare 20A/1P for control power to VAV terminal units in philanthropy wing.

**Total Phase Load:**

- 7180 VA
- 9112 VA
- 5581 VA

**Total Phase Current:**

- 62 A
- 78 A
- 47 A
## Panelboard Schedule

**Panel Name:** PA  
**Location:** ELE. CL. 104A  
**Source:** MDP  
**Volts:** 120/208 Wye  
**Mains Rating:** 225 A  
**Phases:** 3  
**Wires:** 4  
**Mounting:** Surface  
**Enclosure:** Type 1

### Panelboard Schedule

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**Total Phase Load:** 9700 VA  
**Total Phase Current:** 81 A  
**Total Connected Load:** 12430 VA  
**Total Connected Current:** 90 A

---

**Additional Notes:**
- **Mounting:** Surface  
- **Enclosure:** Type 1  
- **Source:** MDP  
- **Volts:** 120/208 Wye  
- **Mains Rating:** 225 A  
- **Phases:** 3  
- **Wires:** 4

---

**Architectural Design**

---

**Drawing Scale:**
- **Volts:** 120/208 Wye  
- **Mains Rating:** 225 A  
- **Phases:** 3  
- **Wires:** 4

---

**Sheet Reference:**
- **Panel Name:** PA  
- **Location:** ELE. CL. 104A  
- **Source:** MDP  
- **Volts:** 120/208 Wye  
- **Mains Rating:** 225 A  
- **Phases:** 3  
- **Wires:** 4  
- **Mounting:** Surface  
- **Enclosure:** Type 1

---

**Architectural Design**

---

**Drawing Scale:**
- **Volts:** 120/208 Wye  
- **Mains Rating:** 225 A  
- **Phases:** 3  
- **Wires:** 4
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**TOTAL PHASE LOAD:**
- 11660 VA
- 10485 VA
- 11110 VA

**TOTAL PHASE CURRENT:**
- 54 A
- 87 A
- 93 A

**TOTAL CONNECTED CURRENT:** 91 A

---

**Note:** This panel schedule includes various electrical components such as VAV terminal units, control panels, lighting, and various receptacles. The mains current rating is 225 A, and the panel includes various types of receptacles for different electrical loads. The connection designation and circuit identification are detailed for proper installation and use. The project is associated with Coastal Carolina University, and the drawing and design are property of The Boudreaux Group, Inc. Any reproduction or use without written consent is prohibited. Legal action will be taken for infringement.
NOTES:
1. INSTALL IN ACCORDANCE WITH SMACNA STANDARDS

1. LOUVER PLENUM INSTALLATION DETAIL - R
M7.2R / SCALE: NOT TO SCALE
1-1/2" C FOR HVAC EQUIPMENT WITH SHUTOFF VALVE. SEE MECH. FOR DETAILS.
REQUEST FOR INFORMATION

DATE: 20-Nov-13
REQUEST NUMBER: 1

PROJECT NAME: Coastal Carolina Atheneum Hall

SPECIFICATION / SECTION:

1. Is there any information available on the multi-pair copper and the fiber optic cables that feed the Philanthropy Wing? The demolition notes state that the backboard is to remain and the cables are to be disconnected and coiled above the ceiling for extension and reconnection and then refers to note S10. Note S10 does not refer to anything but CATV stub-ups and cables.

   DWG Response:
   Assume that there are 12 strand single mode fiber optic cable and 100 pair copper. Reference to S10 is not applicable. See sheet TC1.1 for conduit routing/reconnection requirements of the copper/fiber to Electrical Room 101K and Communication Closet 111.

2. Is there any information available on the type of CATV cable that needs to be re-routed into Comm Closet 111?

   DWG Response:
   Use appropriate cable type.

3. Do we assume that the existing cables that will be re-used for the feed for the Philanthropy Wing and Atheneum Hall are long enough to re-terminate or will this cable need to be spliced and extended?

   DWG Response:
   Assume one splice is needed in these lines.

Submitted by: Paul Bracewell
Email: pbracewell@networkcontrols.com

DWG Response by:
Mike Cook
11/20/13
REQUEST FOR INFORMATION

DATE: 20-Nov-13  REQUEST NUMBER: 2
PROJECT NAME: Coastal Carolina Atheneum Hall

SPECIFICATION / SECTION:

1. The devices in the Philanthropy Wing are existing to remain per note ED11. The majority of the devices in the Philanthropy Wing on drawing E1.2 are in the exact locations as the devices shown on the demo drawing. Do I need to price just the new devices, the ones not shown on the demo drawing?

DWG Response:
Please see revised print of E1.2 of Addendum 4 with clarified line weights. Half-tone entities are existing to remain.

Submitted by: Paul Bracewell
Email: pbracewell@networkcontrols.com

DWG Response by:
Mike Cook
11/20/13
SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

A. General-duty valves for domestic water and sewer systems.

1.2 RELATED WORK

A. Section COMMON WORK RESULTS FOR PLUMBING.

1.3 SUBMITTALS

A. Submit in accordance with Section SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Valves.
2. Backflow Preventers.
4. All items listed in Part 2 - Products.

1.4 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):

   A536-84(2004)e1 Ductile Iron Castings

C. National Association of Plumbing - Heating - Cooling Contractors (PHCC):

D. 2009 International Plumbing Code

E. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):

   SP-67-2002a Butterfly Valve of the Single flange Type (Lug Wafer)
   SP-70-06 Cast Iron Gate Valves, Flanged and Threaded Ends.
   SP-72-99 Ball Valves With Flanged or Butt Welding For General Purpose
   SP-80-08 Bronze Gate, Globe, Angle and Check Valves.
   SP-110-96 Ball Valve Threaded, Socket Welding, Solder Joint, Grooved and Flared Ends

F. American Society of Sanitary Engineers (ASSE):

   1013-2005 Reduced Pressure Principle Backflow Preventers
   1015-2005 Double Check Backflow Prevention Assembly
1.5 RELATED DOCUMENTS AND OTHER INFORMATION

A. 019113 - Commissioning

PART 2 - PRODUCTS

2.1 VALVES

A. Asbestos packing is prohibited.

B. See Plumbing Fixture Schedule for further information.

C. Shut-off:

1. Cold, Hot and Recirculating Hot Water:
   a. Ball, MSS SP-110, Type II, Style 1, two-piece bronze, full ported, full flow, with threaded end connections, Stainless steel vented ball with stainless steel stem. 150 SWP & 600 CWP

2. Acceptable manufacturers, contingent upon compliance with the contract documents, are as listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) elsewhere in the bid documents and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.
   a. Apollo 77C 140 Series.
   b. NIBCO T-585-70-66.
   c. Milwaukee BA 400S.
   d. Or approved equal.

D. Balancing:

1. Hot Water Recirculating, 50 mm (2 inches) and smaller: Combination type, calibrated, bronze with bronze disc, equipped with readout valves with integral check valve, indexing position pointer and calibrated name plate, internal EPT 0-ring seals and factory molded insulating enclosures.

2. Acceptable manufacturers, contingent upon compliance with the contract documents, are as listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) elsewhere in the bid documents and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.
   a. Apollo.
   b. NIBCO.
c. Milwaukee.
d. Or approved equal.

E. Check:

1. Class 125 Iron Swing check valve with metal seats. MSS SP-71, Type I, NPS 2-1/2 to NPS 13, 200 CWP. Body shall be gray iron with bolted bonnet in conformance with ASTM A126. Disc shall be bronze in conformance with ASTM B 584.

2. Acceptable manufacturers, contingent upon compliance with the contract documents, are as listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) elsewhere in the bid documents and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.
   a. NIBCO F-918-B.
   b. Milwaukee F-2974-A.
   c. Crane 373.
   d. Kitz Corporation - #78.
   e. Or approved equal.

F. Double Check:


2. Acceptable manufacturers, contingent upon compliance with the contract documents, are as listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) elsewhere in the bid documents and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.
   a. Watts 007QTS.
   b. Febco.
   c. Zurn.
   d. Or approved equal.

2.2 WATER PRESSURE REDUCING VALVE AND CONNECTIONS

A. Single-seated, for dead end service for 30 to 125 pounds range on low pressure side. Composition diaphragm and stainless steel springs, bronze body with threaded connections for sizes 1/2 to 2 inch, cast iron or semi-steel body with brass or bronze trimmings and flanged connections for sizes 2-1/2 to 4 inch.

B. Operation: Diaphragm and spring to act directly on valve stem. Delivered pressure shall vary not more than one pound for each 10 pounds variation on inlet pressure.
C. Setting: Entering water pressure, discharge pressure, capacity, size, and related measurements shall be as shown on the drawings.

D. Connections Valves and Strainers: Install shut off valve on each side of reducing valve and full sized bypass with globe valve. Install strainer on inlet side of, and same size as pressure reducing valve. Install pressure gage on low pressure side of line.

E. Acceptable manufacturers, contingent upon compliance with the contract documents, are as listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) elsewhere in the bid documents and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.
   1. Watts Series 223-S with separate strainer.
   2. Apollo.
   3. Zurn.
   4. Or approved equal.

2.3 BACKFLOW PREVENTERS

A. Provide a backflow prevention device at any point in the plumbing system where the potable water supply comes in contact with a potential source of contamination. Device shall be certified by the American Society of Sanitary Engineers. Listed below is a partial list of connections to the potable water system which shall be protected against backflow or back siphonage.

B. Atmospheric Vacuum Breaker: ASSE 1001

C. Hose bibs and sinks w/threaded outlets.

D. Double Check Detector Backflow Prevention Assembly: Fire service. ASSE 1015.

E. Make up water to Hydronic Piping Systems.

F. Acceptable manufacturers, contingent upon compliance with the contract documents, are as listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) elsewhere in the bid documents and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.
   1. Watts Series 909QTS.
   2. Febco.
   3. Zurn.
4. Or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with the 2009 International Plumbing Code and the following:

1. Install valves with stem in horizontal position whenever possible. All valves shall be easily accessible. Install valve in each water connection to fixture.
2. Install union and shut-off valve on pressure piping at connections to equipment.
3. Backflow prevention device shall be installed in an accessible location as indicated on drawing details.

END OF SECTION 220523
SECTION 232113.13 - UNDERGROUND DIRECT BURIED HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY:

A. All underground chilled water and heating hot water lines shall be designed per ANSI B31.1 for and shall be a factory preinsulated pipe system. Installation of the piping system shall be in accordance with the manufacturer’s instructions. Factory trained field technical assistance shall be provided for critical periods of installation, field joint instruction and hydrotesting testing.

B. The manufacturer shall design systems for 40°F chilled water and 180°F heating hot water and shall provide and design a complete and operable system including piping expansion joints, anchors, guides, supports and all necessary appurtenances.

C. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/ OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.

   1. PERMA-PIPE
   2. Rovanco
   3. ThermaCor
   4. Or approved equal

D. All piping and associated fittings shall be manufactured in the USA. Non-Domestically manufactured piping and fittings are not acceptable.

1.2 SUBMITTALS:

A. The manufacturer shall submit the following information prior to release for production;
   1. Complete pipe system layout drawings including sizes and locations of all expansion loops, guides, supports and anchors.
   2. Complete details of all components being used.
   3. Certificate of factory field service personnel performing site field service.
   4. Insulation foam testing procedures used in project.
   5. Insulation bonding procedures used in project.
   6. Zinc rich primer data sheet and application procedures in project.
   7. Insulation test reports for each pipe size and production run with pipe shipment.

1.3 QUALITY ASSURANCE:

A. The piping system manufacturer shall provide a factory trained technical support person on site during the installation of the piping system, field joint assembly instruction (all joints must remain exposed by the Contractor for inspection by the factory-trained field service
inspector), shrink sleeve installation and final system testing. The support person cannot be
the contractor trained on the installation. Only factory trained and certified support personnel
shall provide written reports signed by the contractor that the installation was in accordance
with the manufacturer’s installation instructions.

PART 2 - PRODUCT

2.1 SERVICE PIPE

A. The service pipe shall be standard weight ASTM A53 Gr. B ERW carbon steel. All joints
shall be butt-welded for 2 1/2" and larger, and socket or butt-welded for 2" and smaller.
Where possible, straight sections shall be supplied in 40-foot random lengths with piping
exposed at each end for field joint fabrication. All carrier pipe and fittings shall be factory
coated with zinc rich paint 2-4 mils minimum to a SSPC 10 shot blasted surface.

2.2 INSULATION:

A. The service pipe insulation shall be polyurethane foam with 2 lb/ft³ minimum density, 90%
minimum closed cell content, minimum compressive strength of 40 psig and initial thermal
conductivity of 0.16 Btu-in/hr/ft²/°F. The insulation shall completely fill the annular space
between the service pipe and jacket and shall be bonded to both. Systems using open cell
insulation or a non-bonded design shall not be allowed. The polyurethane foam insulation
shall be tested by pipe size and shipment by the preinsulated pipe manufacturer for
mechanical and thermals to assure compliance with the above values. All test samples will
be taken from production material, identified, tagged and tested in accordance with the table
below. Test reports showing results will be furnished to the engineer when material is
shipped. Material may be tested in field all insulation found to be out of specification will be
rejected and returned to vendor at their cost. Data supplied by the polyurethane foam
chemical supplier shall not be acceptable.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>ASTM STD</th>
<th>Sample Frequency</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation Density</td>
<td>D 1622</td>
<td>Once per shift</td>
<td>≥ 2 lb/ft³</td>
</tr>
<tr>
<td>Insulation Compression</td>
<td>D 1621</td>
<td>Once per shift</td>
<td>≥ 40 psi</td>
</tr>
<tr>
<td>Strength</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation Closed Cell</td>
<td>D 2856</td>
<td>Once per shift</td>
<td>≥ 90%</td>
</tr>
<tr>
<td>Content</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation Thermal</td>
<td>C 518</td>
<td>Once per shift</td>
<td>&lt; 0.18 Btu-in/hr/ft²/°F</td>
</tr>
<tr>
<td>Conductivity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B. The insulation shall be provided to the minimum thickness specified below:

<table>
<thead>
<tr>
<th>Pipe Size (in.)</th>
<th>Minimum Insulation Thickness (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 8</td>
<td>1</td>
</tr>
<tr>
<td>10 to 18</td>
<td>1.5</td>
</tr>
</tbody>
</table>

2.3 INSULATION JACKET:
A. The outer protective insulation jacket shall be seamless high-density polyethylene (HDPE) in accordance with ASTM D3350, minimum cell classification PE345444C. PVC or tape materials are not allowed. The minimum thickness of the HDPE jacket shall be as follows:

<table>
<thead>
<tr>
<th>Jacket OD (in.)</th>
<th>Minimum Jacket Thickness (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD ≤ 12</td>
<td>0.125</td>
</tr>
<tr>
<td>OD &gt; 12</td>
<td>0.150</td>
</tr>
</tbody>
</table>

2.4 FITTINGS:

A. All elbows shall be factory preinsulated and molded outer jacket or chop sprayed fiberglass, tees shall be preinsulated, with extrusion welded jacket or chop sprayed fiberglass, anchors shall be factory preinsulated and sealed to prevent moisture no metal shall be exposed to concrete or earth. No shrink wrap or tape shall be allowed on fittings. All carrier pipe fittings shall be zinc coated prior to insulation and jacket.

2.5 UNDERGROUND WARNING TAPE

A. Minimum 3 inch wide polyethylene detectable type marking tape. The tape shall be resistant to alkalis, acids and other destructive agents found in soil and impregnated with metal so that it can be readily recognized after burial by standard locating equipment.

1. Lamination bond of one (1) layer of Minimum 0.35 mils thick aluminum foil between two (2) layers of minimum 4.3 mils thick inert plastic film.

2. Minimum tensile strength: 63 LBS per 3 IN width.


4. Provide continuous yellow with black letter printed message repeated every 16 to 36 inches warning of pipe buried below (e.g.: "CAUTION CHILLED WATER LINE BURIED BELOW" or “CAUTION HEATING HOT WATER LINE BURIED BELOW”). Tape shall be manufactured by Reef Industries “Terra Tape” or approved equal.

PART 3 - EXECUTION

3.1 FIELD JOINTS:

A. The service pipe shall be hydrostatically tested to 150 psig or 1 1/2 times the design pressures whichever is greater. Contractor shall paint all exposed pipe prior to foaming joint area, Insulation shall then be poured in place into the field joint area and visually inspected to insure no voids. No joints shall be insulated unless visually inspected, No pouring of foam into sleeves will be allowed. All field-applied insulation shall be placed only in straight sections of pipe. The installer shall seal the field joint area with a heat shrinkable adhesive backed sleeve. Backfilling shall not begin until the heat shrink sleeve has cooled.
B. All insulation and jacketing materials for the field joint shall be furnished by manufacturer. All field joint areas must be visually inspected after foaming of joints to insure the joint area is void free. No sleeves or shrink-wrap shall be applied without visual inspection.

C. The manufacturer of the piping system must supply the pipe welding equipment and train contractor personnel on procedures. All field joints shall be insulated after testing with kits supplied by the pipe manufacturer complete with 36” wide shrink wrap.

3.2 WARNING TAPE

A. Buried Utility Warning and Identification Tape:
   1. Provide detectable aluminum foil plastic backed tape or detectable magnetic plastic tape manufactured specifically for warning and identification of buried piping.
   2. Tape shall be detectable by an electronic detection instrument.
   3. Provide tape in rolls, 6” minimum width, color, yellow, with warning and identification imprinted in big black letters continuously and repeatedly over entire tape length.
   4. Warning and identification shall read CAUTION BURIED CHILLED DISTRIBUTION PIPING BELOW, CAUTION BURIED HEATING HOT WATER DISTRIBUTION PIPING BELOW or similar wording.
   5. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material.
   6. Tape shall be installed 1-foot above each pipe in trench.

3.3 BACKFILL

A. A 4-inch layer of sand, stone dust or fine gravel shall be placed and tamped in the trench to provide uniform bedding for the pipe. The entire trench width shall be evenly backfilled with a similar material as the bedding in 6 inch compacted layers to a minimum height of 6 inches above the top of the insulated pipe. The remaining trench shall be evenly and continuously backfilled and compacted in uniform layers with suitable excavated soil.

B. Pipe in trench shall be placed on sand bags for welding or bell holes at field joints, no wood shall hold pipe up in trench.

C. Top of pipe jackets shall be 3’-0” below grade (minimum) across the site, unless special circumstances occur and the A/E is informed for his review and approval for change.

END OF SECTION 232113.13
SECTION 232114 - HYDRONIC SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the requirements for the following:
   1. Air vents.
   2. Air purgers.
   3. Strainers.
   4. Pump Connectors.
   5. Pressure Reducing Valves.
   6. Pressure Relief Valves.
   7. Thermometers.
   8. Balancing Valves

1.2 REFERENCE STANDARDS

A. ASME (BPV VIII, 1) - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; The American Society of Mechanical Engineers; 2007.

1.3 SUBMITTALS

A. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description, model and dimensions. Include performance curves and rated capacities.

B. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 PRODUCT CONDITION

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 - PRODUCTS
2.1 AIR VENTS

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.

1. ITT Bell & Gossett.
2. Amtrol
3. Taco, Inc.
4. John Wood
5. Armstrong
6. Or approved equal

B. Float Type:
   1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for maximum system operating temperature of 240 degrees and maximum working pressure of 75 psig; with isolating valve.
   2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for maximum system operating temperature of 240 degrees and maximum work pressure of 75 psig; with isolating valve.

2.2 AIR PURGERS

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.

1. Amtrol
2. John Wood
3. Wessels
4. Taco
5. ITT Bell & Gossett
6. Or approved equal

B. Carbon steel shell with exterior grey primer finish, non-ASME, 150 lb. RF ANSI flanges, NPT vent and drain connection, integral flow baffle, maximum working pressure of 150 psig and a maximum design temperature of 550°F.

2.3 STRAINERS

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract
documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.

1. NIBCO
2. Conbraco
3. Mueller Steam Specialty
4. Titan
5. Or approved equal

B. Y-Type Strainers:
   1. Iron 3” and smaller
      Strainer to be Class 250 threaded, tapped screw-in bonnet with plug and SS screen. Body and bonnet to be ASTM A126. Screen must be accessible without removing the strainer from the line. (Nibco T-751-A)
   2. Iron 2 ½” and larger
      Strainer to be class 125 flanged, tapped bolted bonnet with plug and SS steel screen. Body and bonnet to be ASTM A126. Screen must be accessible without removing the strainer from the line. (Nibco F-721-A)
   3. Bronze 3” and smaller
      Strainer body ASTM B584 or B62 bronze with threaded or solder end connections and .033 inch perforated type 304 SS screen and 20 mesh type 304 SS screen accessible without removing the strainer from the line. (Nibco T-221-A threaded or S-221-A Solder.)

2.4 THERMOMETERS

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.

1. Weksler
2. Trerice
3. Weiss
4. Or approved equal

B. Description:
   1. Type: 7” Adjustable Angle, solar powered
   2. Case: Cast Aluminum, Blue epoxy finish
   3. Stem: Industrial, Bimetal or Air-Duct
   4. Connection
      a. Industrial: 1¼ -18 UNEF-2A coupling nut
b. Bimetal: 304 Stainless steel ¼” diameter
5. Sensor: Glass passivated thermistor
6. Range: -40 to 300°F
7. Display: 9/16” LCD digits switchable between F/C. Push button min/max readings with reset
8. Accuracy: 1% or 1°F, whichever is greater
9. Resolution: 1/10°
10. Update Interval: 10 seconds
11. Lux Rating: 10 Lux (one foot candle)
12. Ambient Operating Temperature: 0-140°F
13. Ambient Temperature Error: None
14. Humidity: Maximum: 95 RH, non condensing
15. Manufacturers/Model: Trerice SX9
16. Accessories: Provide brass or 304SS thermowells with lagging extensions and stem length suitable for pipe size, Trerice or equal.

2.5 BALANCING VALVES

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.
1. Nibco
2. Tour and Anderson
3. Armstrong
4. Bell & Gossett
5. Taco
6. Griswold
7. Or approved equal

B. Valves shall be the ball type, orifice or globe type, with low loss/high signal venturi flow measuring element and a ball type balancing valve with grid and memory stops. Valves shall be metal construction rated at 240 psig with threaded or flanged connections. Provide two test plugs with portable readout meter for system balancing.

2.6 PRESSURE REDUCING VALVES

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information
required to allow the A/E the ability to make a fully informed decision.

1. Bell & Gossett
2. Taco
3. Armstrong
4. Or approved equal

B. Valves shall be bronze construction engineered in accordance with the requirements of Section IV of the ASME Boiler and Pressure Vessel Code for Heating Boilers. Capacities shall be certified by the National Board of Boiler and Pressure Vessel Inspectors.

2.7 PRESSURE RELIEF VALVES

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.

1. Bell & Gossett
2. Taco
3. Armstrong
4. Or approved equal

Valves shall be bronze construction engineered in accordance with the requirements of Section IV of the ASME Boiler and Pressure Vessel Code for Heating Boilers. Capacities shall be certified by the National Board of Boiler and Pressure Vessel Inspectors

2.8 BLADDER EXPANSION TANKS:

A. Furnish and install as shown on plans pre-charged steel expansion tanks with replaceable heavy duty butyl rubber bladders.

B. Each tank shall have a system connection, drain, and a .302”-32 charging valve connection (standard tire valve) to facilitate the on-site charging of the tank to meet system requirements.

C. The tanks shall be fitted with lifting rings and floor mounting skirts for vertical installation.

D. Each tank shall be constructed in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code and stamped 125 PSI working pressure.

E. Sizes and capacities shall be as indicated on drawing schedules.

F. Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed elsewhere in the Bid Documents and approved by the A/E:

1. ITT Bell & Gossett.
HYDRONIC SPECIALTIES

2.9 PUMP CONNECTORS:

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.

1. Flex-Hose Co. FLEXZORBER NNS
2. Metraflex
3. Proco
4. Or approved equal

B. Furnish/Install the molded single arch spherical connector/expansion joints. The molded spherical body shall be manufactured using multiple plies of nylon tire cord fabric bonded within the neoprene elastomer (to avoid exposure to atmosphere or media) and shall be reinforced with a spring steel wire. Floating/rotatable flanges shall be zinc-coated plate steel and shall have drilled bolt holes in accordance with ANSI 150# standard. The rated design pressure of the molded body shall have a minimum 3:1 safety factor (burst to operating pressure) based on a maximum operating temperature of 220°F, and shall also be capable of 26" Hg vacuum. Provide control units for each pump connector. Pump connector sizes shall be as indicated on PID and plan drawings.

2.10 SUCTION DIFFUSERS:

A. Manufacturers: Acceptable manufacturers, contingent upon compliance with the contract documents, are listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing Substitutions are submitted in accordance with requirements listed in the “Instructions to Bidders” and “Supplemental Instructions to Bidders” (AIA A701 and modified by the OSE 00201) and approved by the A/E. Bidders shall carefully review the front end documents (A701/OSE 00201) and submit all information required to allow the A/E the ability to make a fully informed decision.

1. Armstrong
2. Bell & Gossett
3. Taco
4. Flo Fab
5. Or approved equal
B. Contractor shall furnish and install a suction diffuser on the suction side of pumps as indicated on the drawings. Suction diffusers shall meet sizes and characteristics as specified in the following and as scheduled on drawings.

C. Units shall consist of an angle type body with internal straightening vanes that run the full length of the diffuser and a combination diffuser/strainer/orifice cylinder with 3/16” diameter openings for pump protection. The orifice cylinder shall be equipped with a disposable bronze fine 16-mesh strainer, which shall be removed after system start-up. Orifice cylinder shall be designed to withstand pressure differential equal to pump shutoff head and shall have a free area equal to five times cross section area of pump suction opening. Vane length shall be no less than 2 1/2 times the pump connection diameter. Units shall be provided with a connection point where a field fabricated support foot can be attached to carry weight of suction piping.

D. Diffuser manufacturer shall be responsible for any reduction in pump performance or damage due to high pressure drops, internal failures of components or harmonic oscillations caused by the diffuser.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install specialties in accordance with manufacturer's instructions.

B. Provide manual air vents at system high points and as indicated. Provide drains at all low points.

C. For automatic air vents, provide vent tubing to nearest drain.

END OF SECTION 232114