ALLEY·POYNER
MACCHIETTO
ARCHITECTURE

ADDENDUM #1

Lincoln Regional Center Building #10 Kitchen
APMA Project #12166
29 May 2013

801 West Prospector Place & Folsom

This addendum is issued by the Owner to all known bidders prior to receipt of Proposal. Bidders shall acknowledge receipt of this Addendum by so indicating on the Proposal Form. All information and instruction given herein shall become a part of the Contract Documents.

This addendum contains the following information:

Addendum #1		02 Sheet
Electrical Sheet E2.1	(24x36)	01 Sheet
Electrical Sheet E3.1	(24x36)	01 Sheet
Electrical Sheet E3.3	(24x36)	01 Sheet
Item 605	(8.5x11)	01 Sheet
Pre-Bid Sign In Sheet	(8.5x11)	01 Sheet
Mechanical Addendum	(vary)	31 Sheet(s)
	Total	**38 sheets**

If this addendum appears incomplete, notify the architect immediately.

GENERAL

1. Exterior sidewalk handrail to be 'By Owner'
2. Existing water heater to be removed 'By Owner'
3. Contractor to provide temporary construction entrance @ new overhead door opening. Entrance must be able to be secured / locked.
4. On the title block, the building address is '801 West Prospector Place & Folsom'

PROJECT MANUAL

1. Section 03 3000-2
    a. 1.4E. – Special Inspection will be provided by the Contractor
2. Section 11 4000
    a. Division III – Equipment Specifications, WALK-IN COOLER/ FREEZER GENERAL SPECIFCATIONS: General Contractor shall seal around all sprinkler piping penetrations through the walk-in cooler and walk-in freezer
    b. Division III – Equipment Specifications, Item 605 – Hose Reel. Hose reel shall be Fisher 29653 self-locking hose reel with stainless steel cover and 35' long hose. Furnish with 2949 (1.15 GPM) low flow spray valve. Mount hose reel to underside of clean dish table. Rotate hose reel bracket so that hose exits at the top front rather than at the bottom, to keep hose off the floor when reel is in its coiled position. Furnish 2955-8000 backflow preventer between hose and nozzle.

PROJECT DRAWINGS

1. The following notes on the Civil Plans are hereby removed from the contract documents
    A. <u>Sheet C3.0: Utility Notes:</u>
    a. Paragraph No. 8

B. Sheet C5.0 Paving and Surfacing:
   a. General: Reference Standards Paragraph No. B.1
   b. Materials: Paragraph No. A.1
   c. Materials: Paragraph No. A.2
   d. Materials: Paragraph No. A.3
   e. Materials: Paragraph No. B
   f. Inspection and Testing: Paragraph D.2

C. Sheet C5.0 Storm and Sanitary Sewer:
   a. General: Paragraph A.1.a
   b. General: Paragraph A.1.c
   c. General: Paragraph C.6
   d. General: Paragraph C.7
   e. General: Paragraph C.8
   f. Products: Paragraph 6
   g. Execution: Paragraph B.6

2. SHEET C2.0 – Adjacent to the intersection of the sidewalks and the new drive, the contractor is to provide (2) 3" Schedule 40 Conduits under the new drive. Extend 2' beyond drive at both ends. Cap ends of pipes and flag for future. Coordinate w/owner.
3. SHEET C3.0 - Dock Lift Pit to connect to trench drain. Coordinate w/Civil
4. SHEET A1.2 – PLAN KEYED NOTE #17 TO SAY 'SEE 1/FS1.0 FOR STAINLESS WALL CLADDING; COORD. W/SPECIFICATIONS'
5. 4/S3.1 – Change notes referencing 'SEE MECH.' to 'SEE CIVIL'
6. SHEET S1.1 – DOCK FOUNDATION PLAN, Detail referencing '8/S3.1' change to reference detail '9/S3.1'
7. SHEET S1.1 – Note 13 referencing '8/S3.1' change to reference detail '9/S3.1'

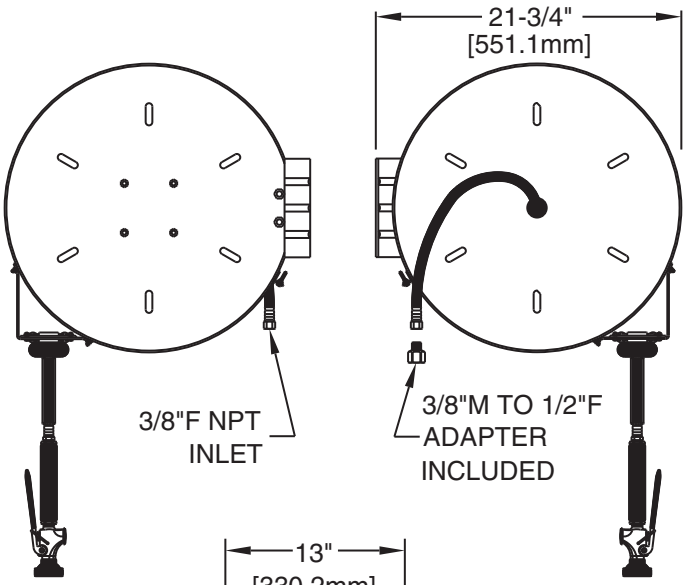
End of Addendum #1

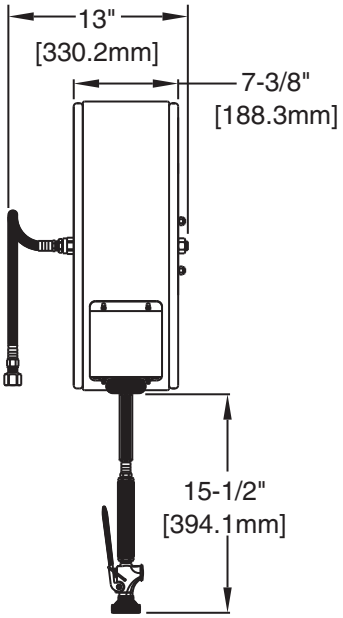
JOB NAME:

QUANTITY:

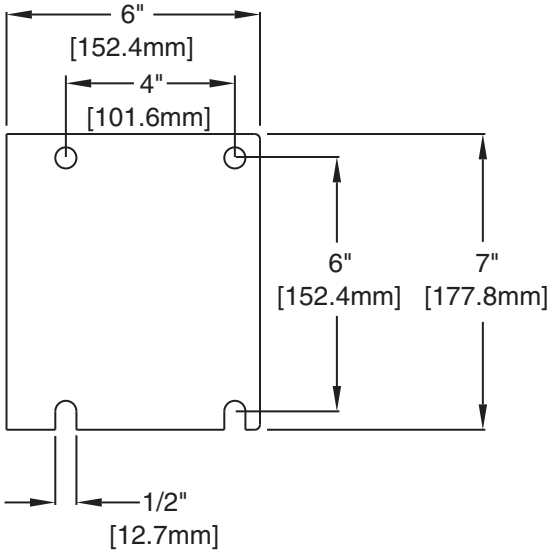
ITEM NO.: ITEM 605

SPEC. 29653





ROUGH-IN: SEE MOUNTING PLATE BELOW



ANSI/A112.18.1M

PRODUCT NAME:

STAINLESS STEEL REEL RINSE CLOSED WITH SPRAY VALVE

☐ _____ SPECIAL CONFIGURATION
(CHECK BASE MODEL AND OPTIONS)

MODEL:

- ☐ 29653 W/ 35' LENGTH HOSE
- ☐ 29645 W/ 50' LENGTH HOSE

OPTIONS OR MODIFICATIONS:

- ☐ BRUSH
- ☐ OTHER _____

FEATURES:

REEL RINSE
* CLOSED DESIGN
* STAINLESS STEEL CONSTRUCTION
* ADJUSTABLE GUIDE SLEEVE
* RATCHED LOCK AND EASY TENSION ADJUST
* STAINLESS STEEL OR BRASS FLUID PATH

HOSE
* 35' OR 50' LENGTH REEL HOSE
* 3/8" ID HIGH TEMPERATURE HOSE
* 3-PLY FIBER REINFORCED
* 1/2"F OR 3/8"F NPT INLET
* 18" LENGTH INLET HOSE
* ADJUSTABLE BALL STOP

STANDARD PRO SPRAY VALVE
* SOLID BRASS SHOWER HEAD - NO "O" RINGS TO LEAK
* BRONZE HANDLE - NOT PLASTIC - MEANS FULL "ON"
* FITS ALL BRANDS
* 2.65 GPM AT 80 PSI
* SHOWER SPRAY PATTERN

SYSTEM LIMITS
* TEMP: 40°F MIN. TO 140°F MAX.
* PRESSURE 150 PSI MAX. STATIC

SHIPPING WEIGHT
* 29653 - 59.0 LBS
* 29645 - 61.0 LBS

FISHER MANUFACTURING COMPANY
1900 SOUTH "O" STREET, TULARE, CALIFORNIA 93274
MAILING ADDRESS: P.O. BOX 60, TULARE, CALIFORNIA 93275
PHONE: (800) 421-6162 FAX: (800) 832-8238
M A D E I N U. S. A.

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Notes

Project LINCOLN REGIONAL CENTER
Project # 12166
Date 5/23/2013

JASON HAVEL — KINDER ELECTRIC
GORDON TEBO — LRC — MAINT.
JEFF COFFEY — BUELER FIXTURE — FOOD SERVICE
Darren Thomas — Dickey & Burcham Inc.
BOB WARKOW — TOM-DON'S Plumbing — Plmg
Anne Regelean — LRC
MARK CRAFT — SBD
BRUCE YODER — ALLEY POYNER MACCHIETTO

Addendum 1

SPECIALIZED ENGINEERING SOLUTIONS

Date: 05/29/13

Project Name: Lincoln Regional Center Building 10 Kitchern **Project #:** 12205

Mechanical Specification Items:

MS1. The following Sections are reissued in their entirety:

A. Section 22 0700 – Mechanical Insulation

B. Section 23 0993 – Sequence of Operation

MS2. The following Sections are issued in their entirety:

A. Section 22 3500 – Domestic Water Heat Exchangers

B. Section 23 3813 – Commercial-Kitchen Hoods.

C. Section 23 5700 – Hydronic and Steam Heat Exchangers

MS3. Section 22 1316 –

A. Article 1.3: Delete Paragraph B.

Mechanical Drawing Items:

MD1. Sheet M1.1 – HVAC Plan:

A. This sheet is reissued in its entirety.

MD2. Sheet M2.1 – HVAC Piping Plan

A. Refer to Sketch Sheet MSK-001.

MD3. Sheet M3.1 – Plumbing Plan

A. Refer to Sketch Sheets MSK-002 and MSK-003.

MD4. Sheet M4.1 – Mechanical Schedules and Details

A. Refer to Sketch Sheets MSK-004 and MSK-005.

Submitted By: Jack Pagel

SECTION 22 0700 - MECHANICAL INSULATION

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.

B. The requirements listed in this document are applicable to Divisions 22 and 23 specifications.

1.2 SUMMARY

A. This Section includes mechanical insulation for duct, equipment, and pipe, including the following:

1. Adhesives.
2. Mastics.
3. Sealants.
4. Factory-applied jackets.
5. Tapes.
6. Securements.

1.3 DEFINITIONS

A. ASJ: All-service jacket.

B. FSK: Foil, scrim, kraft paper.

C. FSP: Foil, scrim, polyethylene.

D. PVDC: Polyvinylidene chloride.

E. SSL: Self-sealing lap.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, identify thermal conductivity, thickness, and jackets (both factory and field applied, if any).

B. Application schedule.

C. Field quality-control inspection reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

B. Material shall be sealed and protected from dirt, debris, and moisture throughout staging and construction.

1.7 COORDINATION

A. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

B. Coordinate installation and testing of heat tracing.

C. Verify all insulation values comply with all local and applicable State energy code.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 INSULATION MATERIALS

A. Products shall not contain asbestos, lead, mercury, or mercury compounds. Products shall be certified no voc and low odor.

B. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

C. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

D. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

1. Products:
   a. Aeroflex USA Inc.; Aerocel.
   b. Armacell LLC; AP Armaflex.
   c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

E. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

1. Products:
   a. CertainTeed Corp.; Duct Wrap.
   b. Johns Manville; Microlite.
   c. Knauf Insulation; Duct Wrap.
   d. Manson Insulation Inc.; Alley Wrap.
   e. Owens Corning; All-Service Duct Wrap.

F. Mineral-Fiber, Preformed Pipe Insulation:

1. Products:
   a. Fibrex Insulations Inc.; Coreplus 1200.
   b. Johns Manville; Micro-Lok.
   c. Knauf Insulation; 1000(Pipe Insulation.
   d. Manson Insulation Inc.; Alley-K.
   e. Owens Corning; Fiberglas Pipe Insulation.
2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

2.3 FIRE-RATED INSULATION SYSTEMS

A. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is tested and certified to provide a 2-hour fire rating by an NRTL acceptable to authorities having jurisdiction.

1. Products: Subject to compliance with requirement, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. CertainTeed Corp.; FlameChek.
   b. Johns Manville; Firetemp Wrap.
   c. Nelson Fire Stop Products; Nelson FSB Flameshield Blanket.
   d. Thermal Ceramics; FIreMaster Duct Wrap.
   e. 3M; Fire Barrier Wrap Products.
   f. Unifrax Corporation; FyreWrap.

2.4 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

E. PVC Jacket Adhesive: Compatible with PVC jacket.

2.5 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II. Color shall match insulation color. Service shall match insulation application vapor permeance and installation environment.

2.6 SEALANTS

A. Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates. Color shall match insulation or jacket color. Service shall match insulation application, vapor permeance, and installation environment.

2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.8 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.

1. Adhesive: As recommended by jacket material manufacturer.
2. Color: Color shall match identification/painting system. Paint exterior systems to match surroundings.
3. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
   a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

C. Self-Adhesive Outdoor Jacket: 60-mil-thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a cross-laminated polyethylene film covered with white aluminum-foil facing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Polyguard Products, Inc.; Alumaguard 60.

2.9 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136 and UL listed.

1. Width: 3 inches.
2. Thickness: 11.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136 and UL listed.

1. Width: 3 inches.
2. Thickness: 6.5 mils.
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.

1. Width: 2 inches.
2. Thickness: 6 mils.
3. Adhesion: 64 ounces force/inch in width.
4. Elongation: 500 percent.
5. Tensile Strength: 18 lbf/inch in width.

2.10 SECUREMENTS

A. Insulation Pins and Hangers:

1. Install pins, hangers, and securements according to manufacturer's installation recommendation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

1. Verify that systems and equipment to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install insulation after completion of pressure testing.

3.3 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.4 COMMON INSTALLATION REQUIREMENTS

A. Where vapor barrier is breeched by fastener, seal to maintain vapor permeance.

B. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.

C. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.

D. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

E. Install insulation with longitudinal seams at top and bottom of horizontal runs.

F. Install multiple layers of insulation with longitudinal and end seams staggered.

G. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

H. Keep insulation materials protected and dry during application and finishing.

I. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

J. Install insulation with least number of joints practical.

K. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

L. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

M. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
   a. For below ambient services, apply vapor-barrier mastic over staples.
4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.

5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.

N. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

O. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

P. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.5 DUCT AND PLENUM INSULATION INSTALLATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure per manufacturer's installation recommendations.

3.6 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this Article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Identify all specialties with labels on exterior of insulation.
2. Install preformed sections or cut, miter, and bond all elbows and tees to provide continuous quality fitting contour.
3. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
4. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
5. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
6. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
7. For services not specified to receive a field-applied jacket except for flexible elastomeric, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and

equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.7 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.8 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 2 inch, and seal joints with flashing sealant.

C. Blanket Insulation Installation on Ducts and Plenums: Secure per manufacturer’s installation recommendations.

1. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
2. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.9 FINISHES

A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

3.10 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Supply-air and return air duct insulation.

1. Mineral-Fiber Blanket: 2 inches thick and 0.75-lb/cu. ft. nominal density.

B. Exhaust-air duct insulation 10' from the roof fan shall be the following:

1. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. ft. nominal density.

C. Kitchen Hood Exhaust (EF-1, EF-2, and EF-3): Fire rated insulation.

D. EF-4 Exhaust Duct: 1-1/2 inch thick and 0.75 lb/cu ft. nominal density (entire duct run).

3.11 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. Insulation shall be any of the following:
   a. Flexible Elastomeric: 3/4 inch thick.
   b. Mineral-Fiber Pipe Insulation, Type I: 1 inch thick.

B. Domestic Hot and Recirculated Hot Water:

1. NPS 1-1/2 and Smaller: Insulation shall be any of the following:
   a. Flexible Elastomeric: 1 inch thick.
   b. Mineral-Fiber Pipe Insulation, Type I: 1 inch thick.
2. NPS 1-1/2 and Larger: Insulation shall be the following:
   a. Mineral-Fiber Pipe Insulation, Type I: 1-1/2 inch thick.

C. Heating-Hot-Water and Chilled Water Supply and Return:

1. Smaller than 1-1/2 inch: Insulation shall be the following:
   a. Mineral-Fiber, Preformed Pipe, Type I: 1-1/2 inch thick.
2. 1-1/2 inch and Larger:
   a. Mineral-Fiber, Preformed Pipe, Type I: 2 inches thick.

D. Refrigerant Suction, Liquid, and Hot-Gas Piping or tubing: Split system units and VFR system piping and component including branch selector boxes.

1. All Pipe Sizes: Insulation shall be the following:
   a. Flexible Elastomeric: 1 inch thick.

E. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for ADA Plumbing Fixtures:

1. All Pipe Sizes: Insulation shall be any of the following:
   a. Polyolefin: 1/2 inch thick.
   b. Factory fitting covers.

F. Steam and Steam Condensate:
1. Mineral-Fiber, Preformed Pipe, Type I or II: 2 inches thick.

3.12 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping and tubing:

1. All Pipe Sizes: Insulation shall be the following:
   a. Flexible Elastomeric: 1 inches thick.

3.13 OUTDOOR, ABOVE GROUND MAKEUP AIR UNIT SUPPLY DUCT SCHEDULE

A. 2 inch thick semi-rigid board insulation with weatherproof field applied jacket.

END OF SECTION 22 0700

SECTION 223500 - DOMESTIC WATER HEAT EXCHANGERS

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 heat exchangers:

1. Domestic-water-in-coil, instantaneous heat exchangers.

1.3 SUBMITTALS

A. Product Data: For each type and size of heat exchanger indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Product Certificates: For each type of instantaneous heat exchanger, signed by product manufacturer.

D. Source quality-control test reports.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For heat exchangers to include in emergency, operation, and maintenance manuals.

G. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain same type of heat exchangers through one source from a single manufacturer.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of heat exchangers and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."

C. 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.

D. ASME Compliance: Where ASME-code construction is indicated, fabricate and label heat-exchanger storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

E. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9" for all components that will be in contact with water.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of heat exchangers that fail in materials or workmanship within specified warranty period.

1. Warranty Period(s): From date of Substantial Completion:
    a. Instantaneous Heat Exchangers:
        1) Tube Coil and Shell: One year(s).
        2) Controls and Other Components: One year(s).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 INSTANTANEOUS HEAT EXCHANGERS

A. Heating-Fluid-in-U-Tube-Coil, Instantaneous Heat Exchangers:

1. Available Manufacturers:
    a. Armstrong International, Inc.
    b. Cemline Corporation.
    c. HESco Industries, Inc.
    d. Leslie Controls, Inc.
    e. Patterson-Kelley.
    f. PVI Industries, LLC.
    g. RECO USA.
    h. Sellers Engineering Co.
2. Description: Tankless, packaged assembly of heat-exchanger coil, controls, and specialties for heating domestic water in shell with heating hot water in coil.
3. Construction: ASME-code, negligible-capacity, copper-lined, carbon-steel or copper-alloy shell with 150-psig minimum working-pressure rating.
    a. Configuration: Horizontal.
    b. Shell Tappings: Factory fabricated of materials compatible with water heater shell. Attach tappings to shell before testing and labeling.
        1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
        2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges, and according to ASME B16.24 for copper and copper-alloy flanges.
    c. Insulation: Complying with ASHRAE/IESNA 90.1, unless otherwise indicated, and suitable for operating temperature. Surround entire shell and nozzle except connections and controls.
    d. Heat-Exchanger Coil: Copper, single-wall, U tubes for heating fluid.
        1) Tube Pressure Rating: Equal to or greater than heating-fluid supply pressure.
4. Temperature Control: Adjustable thermostat that operates steam-control valve and that is capable of maintaining outlet-water temperature within 5 deg F of setting.
5. Safety Control: Automatic, high-temperature-limit cutoff device or system.
6. Relief Valves: ASME rated and stamped and complying with ASME PTC 25.3, for combination temperature and pressure relief valves. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of heat exchanger. Select one relief valve with sensing element that extends into shell.

7. Miscellaneous Components for Steam Unit: Strainers, steam-control valve, steam trap, valves, pressure gage, thermometer, and piping.
8. Stand: Factory fabricated for floor mounting.
9. The instantaneous water heater shall operate on water differential using the feed forward principle and shall not use a feedback temperature control device with capillary system. The tube bundle shall be fixed on one end and free floating on the other for easy removal. The tubes shall be straight with a removable end cap to facilitate cleaning. “U” and helical tubes shall be unacceptable. The water controlling valve shall be mounted integral to the heat exchanger without the use of connecting piping. Only the necessary steam, water, and condensate connections to the instantaneous water heater shall be pre-plumbed.
10. Materials of construction and items included shall be:
    a. Shell of carbon steel with 2-1/2 inch NPT steam inlet and 1 inch NPT condensate exit ports.
    b. Tubes of 5/8 inch 16 gauge admiralty brass expanded into brass tube sheets.
    c. Water control valve body of bronze with stainless steel internals and having 1-1/2 inch NPT water connections.
    d. Steam trap.
    e. Thermostatic air vent.
11. The instantaneous water heater shall be of the horizontal shell and tube design providing easy access to the individual tubes without moving the heater from its installed position. No overhead clearance shall be required for servicing.
12. The instantaneous water heater shall include all of the following capabilities:
    a. Maximum water pressure drop not exceeding 10 psi.
    b. Outlet water temperature control to within +/- 4 deg F.
    c. Operational steam pressure of 2-15 psig.
    d. Maximum allowable steam pressure of 150 psig.
    e. Operational water pressure of 20-150 psig.
    f. Maximum allowable water pressure of 200 psig.
13. Capacity and Characteristics: As scheduled on the drawings.

2.3 SOURCE QUALITY CONTROL

A. Test and inspect heat-exchanger storage tanks, specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

PART 3 - EXECUTION

3.1 HEAT-EXCHANGER INSTALLATION

A. Install unit following manufacturers installation instructions.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to heat exchangers to allow service and maintenance. Arrange piping for easy removal of heat exchangers.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain heat exchangers. "

END OF SECTION 223500

SECTION 23 0993 - SEQUENCE OF OPERATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes control sequences for HVAC systems, subsystems, and equipment.

B. See Division 23 Section "HVAC Instrumentation and Controls" for control equipment and devices and for submittal requirements.

1.2 HVAC SYSTEMS

A. AHU-1 General: Indoor modular air handling unit with VFD, integral mixing box with dampers, hot water heating coil, chilled water cooling coil, flat filter, no economizer.

1. Control unit from BMS with OCC-UNOCC settings to vary return and outside air based on kitchen hood operation.
2. Provide low limit stat set 36 F. (adjustable)
3. Control 3-way valves for each coil. Heating: fail safe flow to coil. Cooling fail safe bypass coil.
4. Space sensor to reset discharge air temperature 60 F. (adjustable)
5. Monitor filter pressure differential
6. Control motorized damper in supply duct at kitchen hood. Close damper during UNOCC (hood off).
7. Control supply air temperature from space sensor to reset discharge temperature.
8. Reduce cfm during UNOCC to compensate for hood off (VFD reset).
9. Control return air and outside air dampers to maintain outside air settings: OCC 2400 cfm; UNOCC 1600 cfm (adjustable).

B. MUA-1 General: Outdoor packaged makeup air system with VFD, gas heat exchanger, DX cooling, outside air damper, filter, remote control panel. Unit operates as 100% OA for kitchen hood makeup

1. Install remote panel and interconnect with unit
2. Interlock unit with three (3) kitchen hood exhaust fans
3. MUA speed varies with exhaust fan speed. Exhaust fans operate based on hood temperature. Electrical contractor responsible for wiring exhaust fans and interlock with hood remote control panel.

C. FCU-1 and HP-1 General: Split system air-source heat pump and indoor ducted fan coil with DX coil and remote sensor

1. Control HP from wall sensor provided with unit. Cycle fan coil unit with HP unit (or run FC constant FAN On)

D. Duct-Mount Heating Coils General: Booster coils in ductwork

1. Control 2-way heating water valves from wall sensor

E. Exhaust Fan EF-4 General: Exhaust fan for pot and cart wash

1. Fan runs 24/7. Monitor fan status and start/stop

F. Heat Exchangers General: Steam-to-water heat exchanger for building hot water heat.

1. Control 2-way low pressure steam valve to maintain hot water discharge temperature

2. Monitor water temperature in and out
3. Monitor pump status and on-off function

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 23 0993

SECTION 233813 - COMMERCIAL-KITCHEN HOODS

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 Type I and Type II commercial kitchen hoods.

1.3 DEFINITIONS

A. Listed Hood: A hood, factory fabricated and tested for compliance with UL 710 by a testing agency acceptable to authorities having jurisdiction.

B. Standard Hood: A hood, usually field fabricated, that complies with design, construction, and performance criteria of applicable national and local codes.

C. Type I Hood: A hood designed for grease exhaust applications.

D. Type II Hood: A hood designed for heat and steam removal and for other nongrease applications.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Standard hoods.
2. Filters/baffles.
3. Fire-suppression systems.
4. Lighting fixtures.

B. Shop Drawings:

1. Shop Drawing Scale: 1/4 inch = 1 foot.
2. Show plan view, elevation view, sections, roughing-in dimensions, service requirements, duct connection sizes, and attachments to other work.
3. Show cooking equipment plan and elevation to confirm minimum code-required overhang.
4. Indicate performance, exhaust and makeup air airflow, and pressure loss at actual Project-site elevation.
5. Show water-supply and drain piping connections.
6. Show control cabinets.
7. Show fire-protection system, piping, actuation devices, and manual control devices.
8. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
9. Design Calculations: Calculate requirements for selecting seismic restraints.
10. Wiring Diagrams: Power, signal, and control wiring.
11. Piping Diagrams: Detail fire-suppression piping and components and differentiate between manufacturer-installed and field-installed piping. Include roughing-in requirements for drain connections. Show cooking equipment plan and elevation to illustrate fire-suppression nozzle locations. Detail hood washdown piping, components, and controls
    a. Piping Diagram Scale: 1/4 inch = 1 foot.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D 1.1M, "Structural Welding Code - Steel," for hangers and supports; and AWS D9.1/D9.1M, "Sheet Metal Welding Code," for joint and seam welding.

B. 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.

C. Preinstallation Conference: Conduct conference at Project site.

1.6 COORDINATION

A. Coordinate equipment layout and installation with adjacent Work, including lighting fixtures, HVAC equipment, plumbing, and fire-suppression system components.

PART 2 - PRODUCTS

2.1 GENERAL HOOD FABRICATION REQUIREMENTS

A. Welding: Use welding rod of same composition as metal being welded. Use methods that minimize distortion and develop strength and corrosion resistance of base metal. Make ductile welds free of mechanical imperfections such as gas holes, pits, or cracks.

1. Welded Butt Joints: Full-penetration welds for full-joint length. Make joints flat, continuous, and homogenous with sheet metal without relying on straps under seams, filling in with solder, or spot welding.
2. Grind exposed welded joints flush with adjoining material and polish to match adjoining surfaces.
3. Where fasteners are welded to underside of equipment, finish reverse side of weld smooth and flush.
4. Coat concealed stainless-steel welded joints with metallic-based paint to prevent corrosion.
5. After zinc-coated steel is welded, clean welds and abraded areas and apply SSPC-Paint 20, high-zinc-dust-content, galvanizing repair paint to comply with ASTM A 780/A 780M.

B. For metal butt joints, comply with SMACNA's "Kitchen Equipment Fabrication Guidelines."

C. Where stainless steel is joined to a dissimilar metal, use stainless-steel welding material or fastening devices.

D. Form metal with break bends that are not flaky, scaly, or cracked in appearance; where breaks mar uniform surface appearance of material, remove marks by grinding, polishing, and finishing.

E. Sheared Metal Edges: Finish free of burrs, fins, and irregular projections.

F. In food zones, as defined in NSF, fabricate surfaces free from exposed fasteners.

G. Cap exposed fastener threads, including those inside cabinets, with stainless-steel lock washers and stainless-steel cap (acorn) nuts.

H. Fabricate pipe slots on equipment with turned-up edges sized to accommodate service and utility lines and mechanical connections.

I. Fabricate enclosures, including panels, housings, and skirts, to conceal service lines, operating components, and mechanical and electrical devices including those inside cabinets, unless otherwise indicated.

2.2 TYPE I EXHAUST HOOD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. 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. Captive-Aire Systems.
2. Gaylord Industries, Inc.
3. Greenheck.

C. Construct hood as detailed on the drawings.

D. Capacities and Characteristics: As detailed on the drawings.

2.3 TYPE II EXHAUST HOOD FABRICATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. 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. Captive-Aire Systems.
2. Gaylord Industries, Inc.
3. Greenheck.

C. Fabricate hoods according to NSF 2, "Food Equipment."

D. Fabricate hoods to comply with SMACNA's "HVAC Duct Construction Standards: Metal and Flexible."

E. Hood Configuration: Exhaust only.

F. Heat/Condensate Hood:

1. Heat/condensate hood is a single vent hood used for no-grease applications for the removal of heat, vapor, etc. Hood shall have the size, shape, and performance specified on the drawings.
2. Construction shall be Type 304 stainless steel on hoods with gutters and 430 stainless steel on hoods without gutters. Finish shall be #3 or #4 polish where exposed. Hood shall be wall or island type with fully welded 10-gauge corner hanging angles. Corner hanging angles have a .625 x 1.500 slot pre-punched at the factory; this allows hanging rods to be used for quick and safe installations. Hanging rod and connection is provided by and installed by others.
3. The hood manufacturer shall supply complete submittal drawings including hood section view(s) and hood plan view(s). These drawings must be made available to the Engineer, Architect, and Owner for their use in construction, operation, and maintenance.
4. Exhaust duct collar to be 4 inch high with 1 inch flanges. Duct sizes, CFM and static pressure requirements shall be as shown on the drawings.
5. Features:
   a. Full perimeter gutter with drain.
   b. Double wall front construction.
   c. Lights, incandescent and fluorescent.

d. Exhaust risers.
e. Removable condensation baffles.

G. Hood Type: Heat and vapor removal.

H. Hood Style: Wall-mounted canopy.

I. Condensate Hood Baffles: Removable, stainless-steel baffles to drain into a hood drain trough, and stainless-steel drain piping.

J. Lighting Fixtures: Fluorescent fixtures and lamps with lenses sealed vaportight. Wiring shall be installed in stainless-steel conduit on hood exterior. Number and location of fixtures shall provide a minimum of 70 fc at 30 inches above finished floor.

1. Light switches shall be mounted on front panel of hood canopy.
2. Lighting Fixtures: Fluorescent complying with UL 1598.

K. Capacities and Characteristics: As shown on the drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before equipment installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Complete field assembly of hoods where required.

1. Make closed butt and contact joints that do not require filler.
2. Grind field welds on stainless-steel equipment smooth, and polish to match adjacent finish. Comply with welding requirements in Part 2 "General Hood Fabrication Requirements" Article.

B. Install hoods and associated services with clearances and access for maintaining, cleaning, and servicing hoods, filters/baffles, grease extractor, and fire-suppression systems according to manufacturer's written instructions and requirements of authorities having jurisdiction.

C. Make cutouts in hoods where required to run service lines and to make final connections, and seal openings according to UL 1978.

D. Securely anchor and attach items and accessories to walls, floors, or bases with stainless-steel fasteners, unless otherwise indicated.

E. Install hoods to operate free from vibration.

F. Install trim strips and similar items requiring fasteners in a bed of sealant. Fasten with stainless-steel fasteners at 48 inches o.c. maximum.

G. Install sealant in joints between equipment and abutting surfaces with continuous joint backing, unless otherwise indicated. Provide airtight, watertight, vermin-proof, sanitary joints.

H. Install lamps, with maximum recommended wattage, in equipment with integral lighting.

I. Set initial temperatures, and calibrate sensors.

J. Set field-adjustable switches.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping with clearance to allow service and maintenance.

C. Install reduced-pressure backflow preventer on washer-water supply. Backflow preventer is specified in Division 22 Section "Domestic Water Piping Specialties."

D. Install washer-water drain piping full size of hood connection to an adjacent floor drain or floor sink.

E. Makeup Water Connection: Comply with applicable requirements in Division 22 Section "Domestic Water Piping Specialties" for valves and accessories on piping connections to water-cooled units.

F. Connect ducts according to requirements in Division 23 Section "Air Duct Accessories." Install flexible connectors on makeup air supply duct. Weld exhaust-duct connections with continuous liquidtight joint.

G. Install fire-suppression piping for remote-mounted suppression systems according to NFPA 17A, "Wet Chemical Extinguishing Systems."

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Test each equipment item for proper operation. Repair or replace equipment that is defective, including units that operate below required capacity or that operate with excessive noise or vibration.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Test water, drain, gas, and liquid-carrying components for leaks. Repair or replace leaking components.
4. Perform hood performance tests required by authorities having jurisdiction.
5. Perform fire-suppression system performance tests required by authorities having jurisdiction.

D. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial kitchen hoods.

END OF SECTION 233813

SECTION 23 5700 - HYDRONIC AND STEAM HEAT EXCHANGERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes shell-and-tube heat exchangers.

1.2 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Coordination Drawings: Equipment room, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Tube-removal space.
2. Structural members to which heat exchangers will be attached.

1.3 QUALITY ASSURANCE

A. ASME Compliance: Fabricate and label heat exchangers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," Division 1.

PART 2 - PRODUCTS

2.1 SHELL-AND-TUBE HEAT EXCHANGERS

A. Manufacturers:

1. ITT Industries; Bell & Gossett.
2. Taco, Inc.
3. Thrush.
4. Armstrong.

B. Configuration: U-tube with removable bundle.

C. Shell Materials: Steel.

D. Head:

1. Materials: Cast iron.
2. Flanged and bolted to shell.

E. Tube:

1. Seamless copper tubes.
2. Tube diameter is determined by manufacturer based on service.

F. Tubesheet Material: Steel.

G. Baffles: Steel.

H. Piping Connections:

1. Inlet and outlet fluid connections, threaded drain, and vent connections.

I. Support Saddles:

1. Fabricated of material similar to shell.
2. Foot mount with provision for anchoring to support.
3. Fabricate attachment of saddle supports to pressure vessel with reinforcement strong enough to resist heat-exchanger movement during a seismic event when heat-exchanger saddles are anchored to building structure.

PART 3 - EXECUTION

3.1 HEAT-EXCHANGER INSTALLATION

A. Install shell-and-tube heat exchangers on saddle supports.

B. Install shell-and-tube heat exchangers on, and anchor to, concrete base.

3.2 CONNECTIONS

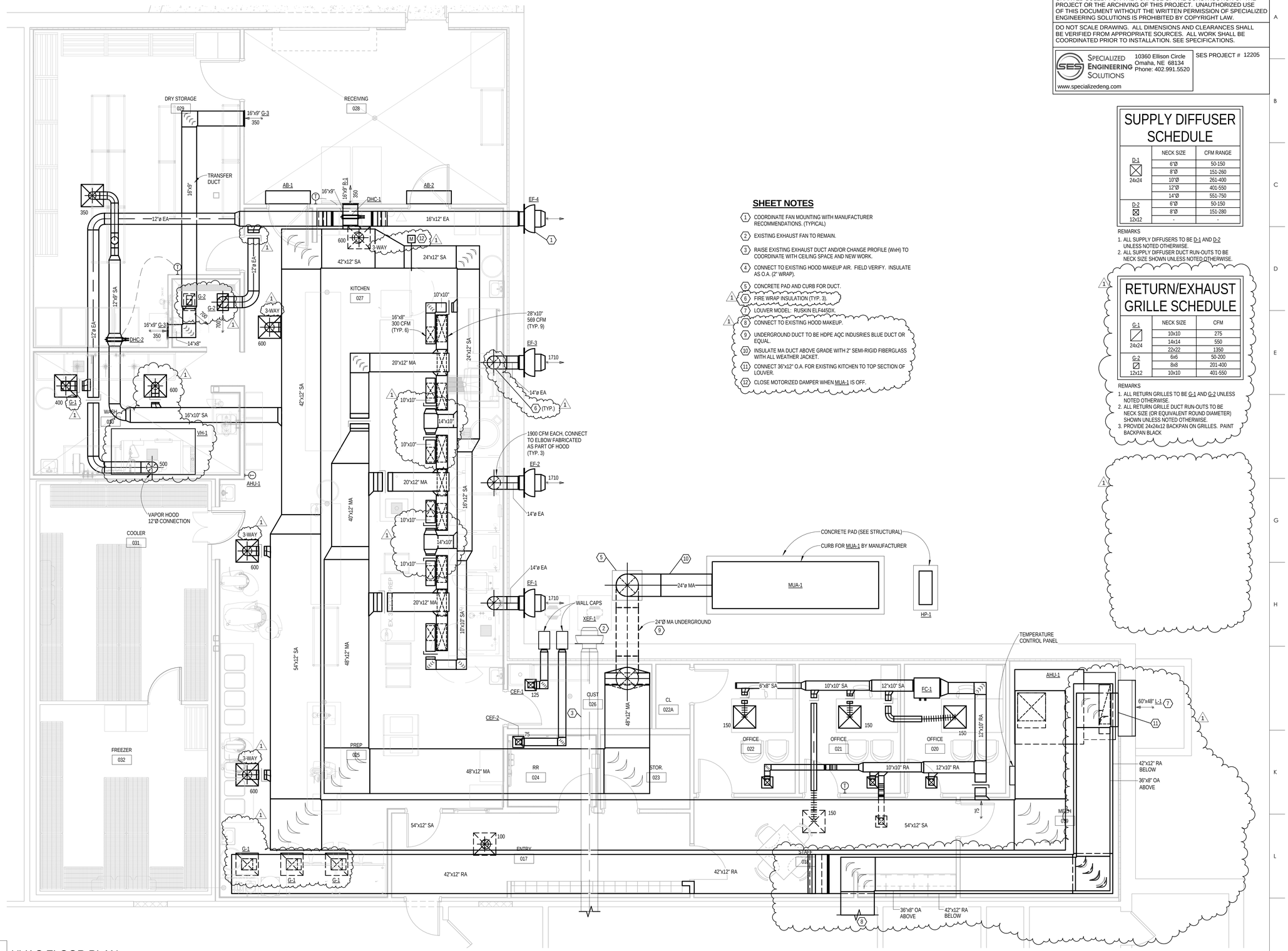
A. Install shutoff valves at heat-exchanger inlet and outlet connections.

B. Install relief valves on heat-exchanger heated-fluid connection and install pipe relief valves, full size of valve connection, to floor drain.

C. Install vacuum breaker at heat-exchanger steam inlet connection.

D. Install hose end valve to drain shell.

END OF SECTION 23 5700



1 HVAC FLOOR PLAN

M1.1 SCALE: 1/4" = 1'-0"

SHEET NOTES

1. COORDINATE FAN MOUNTING WITH MANUFACTURER RECOMMENDATIONS. (TYPICAL)
2. EXISTING EXHAUST FAN TO REMAIN.
3. RAISE EXISTING EXHAUST DUCT AND/OR CHANGE PROFILE (WxH) TO COORDINATE WITH CEILING SPACE AND NEW WORK.
4. CONNECT TO EXISTING HOOD MAKEUP AIR. FIELD VERIFY. INSULATE AS O.A. (2" WRAP).
5. CONCRETE PAD AND CURB FOR DUCT.
6. FIRE WRAP INSULATION (TYP. 3)
7. LOUVER MODEL: RUSKIN ELF445DX.
8. CONNECT TO EXISTING HOOD MAKEUP.
9. UNDERGROUND DUCT TO BE HDPE AQC INDUSRIES BLUE DUCT OR EQUAL.
10. INSULATE MA DUCT ABOVE GRADE WITH 2" SEMI-RIGID FIBERGLASS WITH ALL WEATHER JACKET.
11. CONNECT 36"x12" O.A. FOR EXISTING KITCHEN TO TOP SECTION OF LOUVER.
12. CLOSE MOTORIZED DAMPER WHEN MUA-1 IS OFF.

DO NOT SCALE DRAWING. ALL DIMENSIONS AND CLEARANCES SHALL BE VERIFIED FROM APPROPRIATE SOURCES. ALL WORK SHALL BE COORDINATED PRIOR TO INSTALLATION. SEE SPECIFICATIONS.

SPECIALIZED ENGINEERING SOLUTIONS
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Phone: 402.991.5520
www.specializedeng.com

SES PROJECT # 12205

SUPPLY DIFFUSER SCHEDULE

	NECK SIZE	CFM RANGE
D-1 ☒ 24x24	6"Ø	50-150
	8"Ø	151-260
	10"Ø	261-400
	12"Ø	401-550
	14"Ø	551-750
D-2 ☒ 12x12	6"Ø	50-150
	8"Ø	151-280
	-	-

REMARKS
1. ALL SUPPLY DIFFUSERS TO BE D-1 AND D-2 UNLESS NOTED OTHERWISE.
2. ALL SUPPLY DIFFUSER DUCT RUN-OUTS TO BE NECK SIZE SHOWN UNLESS NOTED OTHERWISE.

RETURN/EXHAUST GRILLE SCHEDULE

	NECK SIZE	CFM
G-1 ◿ 24x24	10x10	275
	14x14	550
	22x22	1350
G-2 ◿ 12x12	6x6	50-200
	8x8	201-400
	10x10	401-550

REMARKS
1. ALL RETURN GRILLES TO BE G-1 AND G-2 UNLESS NOTED OTHERWISE.
2. ALL RETURN GRILLE DUCT RUN-OUTS TO BE NECK SIZE (OR EQUIVALENT ROUND DIAMETER) SHOWN UNLESS NOTED OTHERWISE.
3. PROVIDE 24x24x12 BACKPAN ON GRILLES. PAINT BACKPAN BLACK

LRC BUILDING #10 KITCHEN

ALLEY·POYNER MACCHIETTO ARCHITECTURE
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Omaha, NE 68102
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05/15/2013
STATE OF NEBRASKA

1	Addendum 1	05-2 -2013
RE ISION		DATE

PRO ECT NU BER 12166

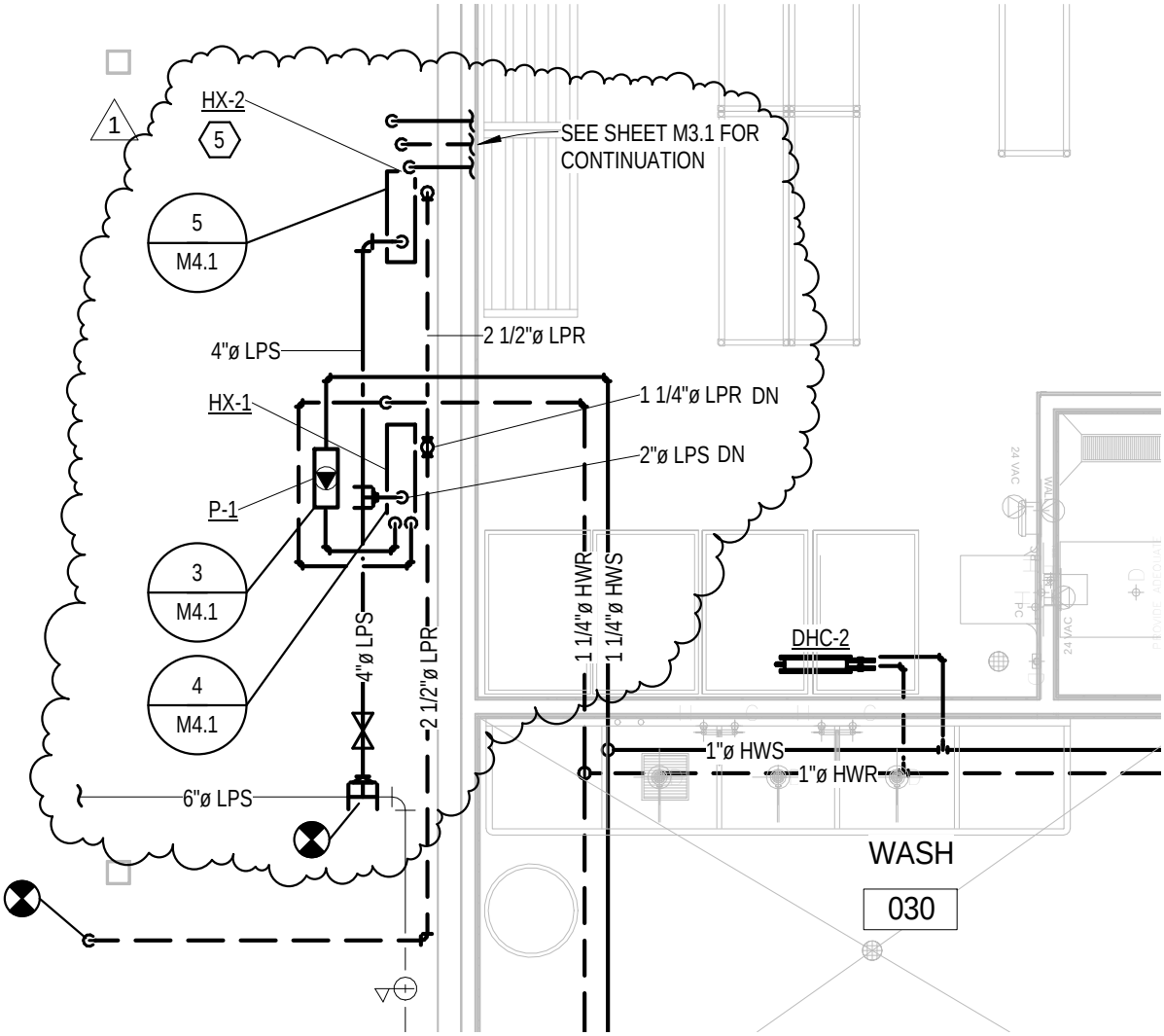
DATE 05 15 2013

H AC PLAN

11

SHEET NOTES

1 (5) CONNECT HX-2 (BOOSTER WATER HEATER) TO 1-1/2" CW, 1-1/2" HW (160°F), AND 1/2" HWC. PROVIDE 1-1/2" RPZ IN CW LINE.



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LRC BUILDING #10 KITCHEN

PROJECT NO.	DATE	DRAWING REF.	M2.1	SKETCH
12205	05-29-2013	TYPE	Addendum #1	MSK-001

GENERAL NOTES

1

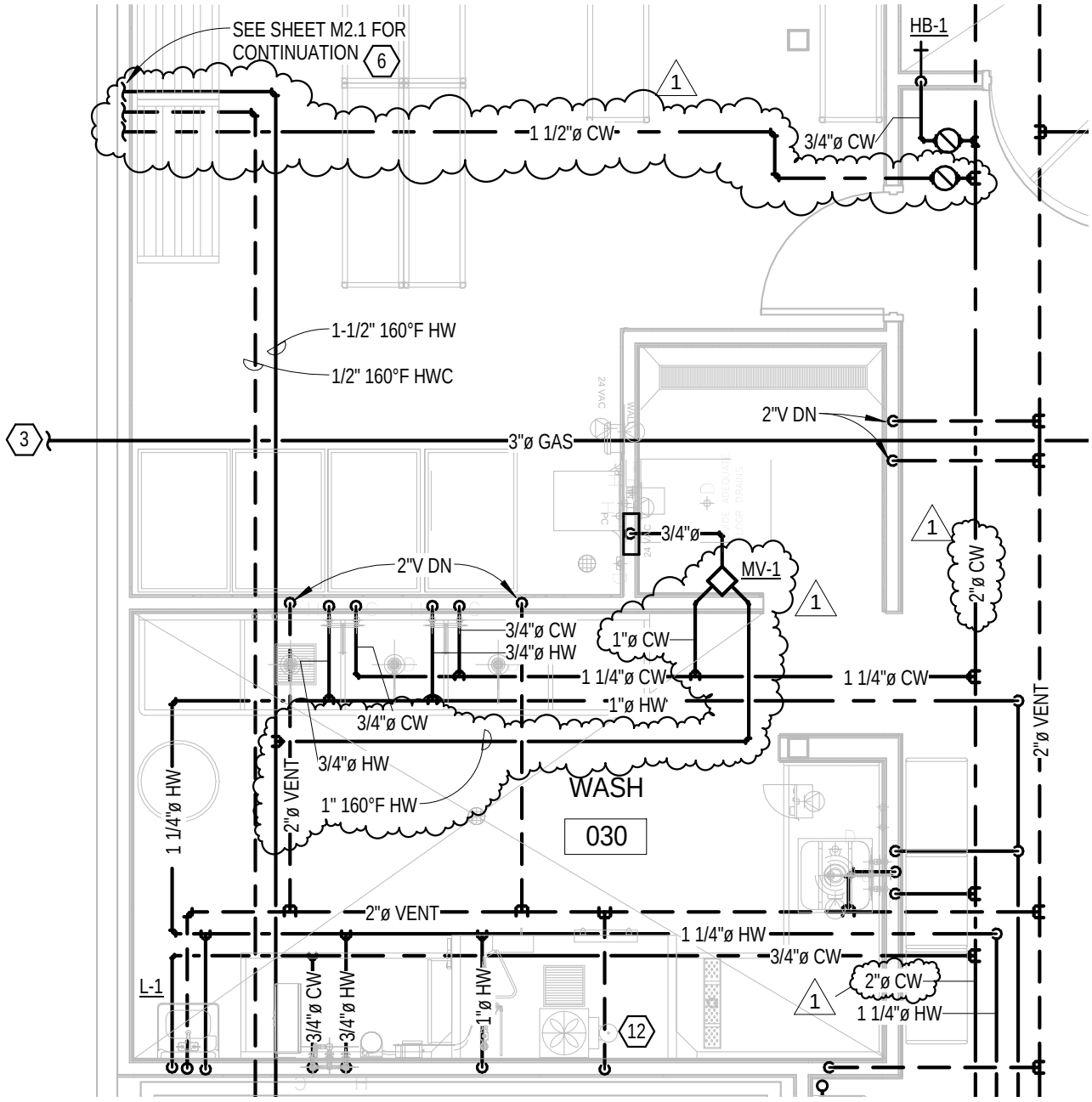
D. REFER TO FOOD SERVICE EQUIPMENT SPECIFICATION 11 4000 TO COORDINATE RESPONSIBILITY FOR PLUMBING WATER AND GAS CONNECTIONS ASSOCIATED WITH FOOD SERVICE EQUIPMENT.

E. ALL EXPOSED WATER LINES TO BE CHROME PLATE COPPER.

SHEET NOTES

1

(10) CONNECT TO MAKEUP AIR UNIT WITH DIRT LEG, UNION, AND GAS COCK. PROVIDE PRESSURE REGULATING VALVE TO MEET PRESSURE REQUIREMENTS OF UNIT.



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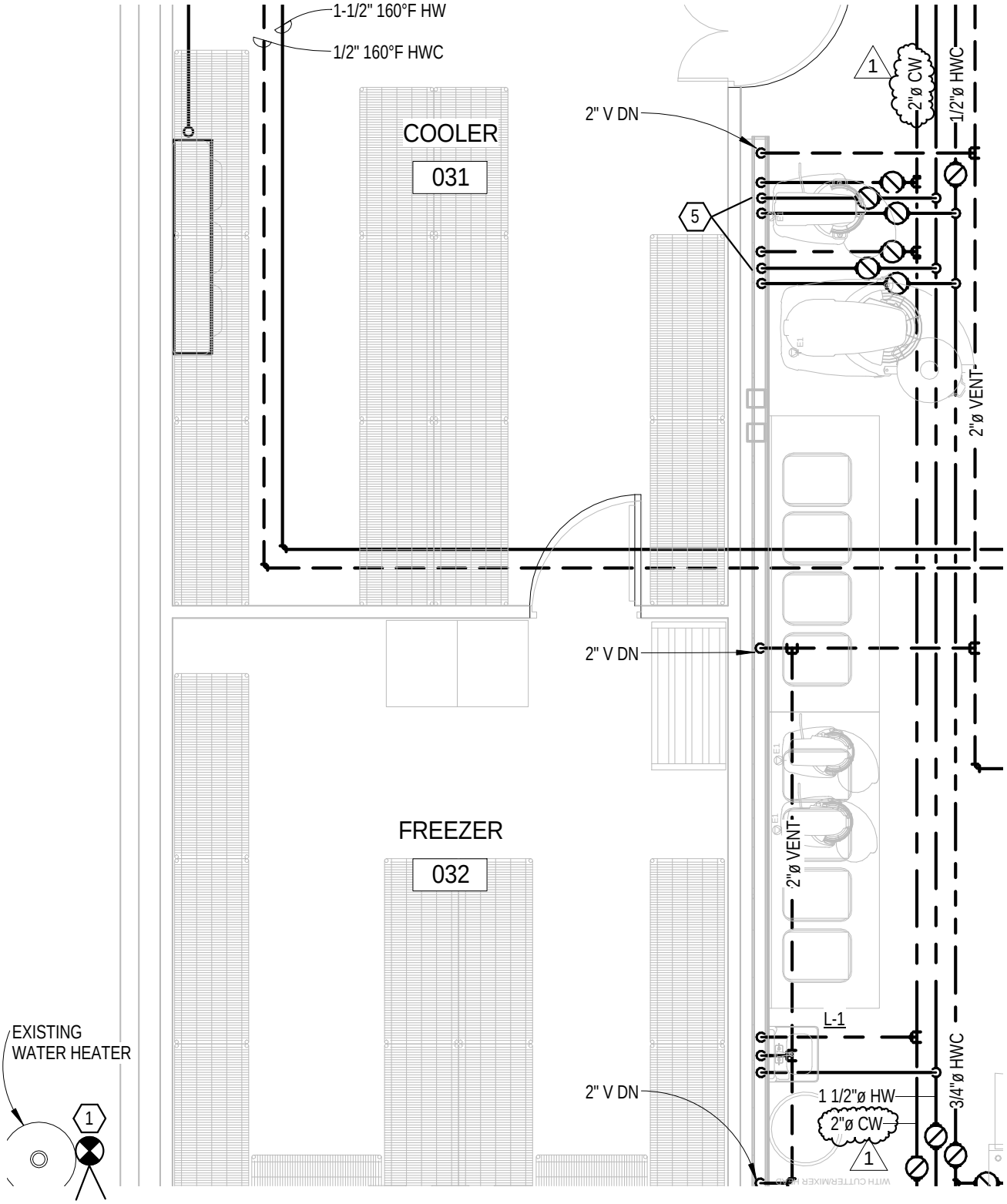
LRC BUILDING #10 KITCHEN

PROJECT NO.	DATE	DRAWING REF.	M3.1	SKETCH
12205	05-29-2013	TYPE	Addendum #1	MSK-002



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PROJECT NO.	DATE	DRAWING REF.	M3.1	SKETCH
12205	05-29-2013	TYPE	Addendum #1	MSK-003

HP-1 system : Serves offices and break room. Daikin split system heat pump with indoor ducted fan coil. Indoor unit: FC-1, Daikin FBQ18PVJU, 1.5 ton total cooling, 17.5 SEER, 20 Mbh heating, 208-1 electrical, 1.6 MCA, 15 MFA. Outdoor unit: HP-1, Daikin RZQ18PVJU9, 208-1 electrical, 16.5 MCA, 20 MFA, R410A, Daikin BRC1E72 Navigation Controller.

Pump P-1: Serves heating system. B&G Series 60 inline, 1.5 x 6.25 impeller, 1750 rpm, 1.5 hp, 208-3 electrical, 25 gpm, 50% propylene glycol, 40' head, 180 F. water

Pump P-2: Serves non-potable domestic water, B&G series 60, 1.5 x 6.25 impeller, 1750 rpm, 1.5 hp, 208-3 electrical, 30 gpm, 40' head. 160 F. water

HX-1: Serves heating system and pump P-1. B&G SU 2-pass shell-tube, 10 psig steam in shell, 180 LWT in tubes, 25 gpm, 50% propylene glycol, limit 36" shell length, vacuum breaker, mounting saddles.

1 HX-2: Serves non-potable water for kitchen hood wash down and cart wash. Armstrong Flo-Rite Temp Instantaneous S5469 single wall steam/water heater, pre-piped recirculating hot water system, 10 psig steam in shell, 50 EWT, 160 LWT, 25 GPM, 1473 lbs/hr steam.

VH-1: Vapor Hood. CaptiveAire VHB, single wall with full perimeter gutter, drain, round collar. See plan for size.

Heating system accessories: 20 gallon removable bladder expansion tank each for HX-1 and HX-2 systems, in-line air separator, automatic air vent, triple duty valve and check valve for each pump, pump suction strainer. Pressurize HX-2 system to 70 psig, pressurize HX-1 system to 20 psig.

MECHANICAL EQUIPMENT SCHEDULE

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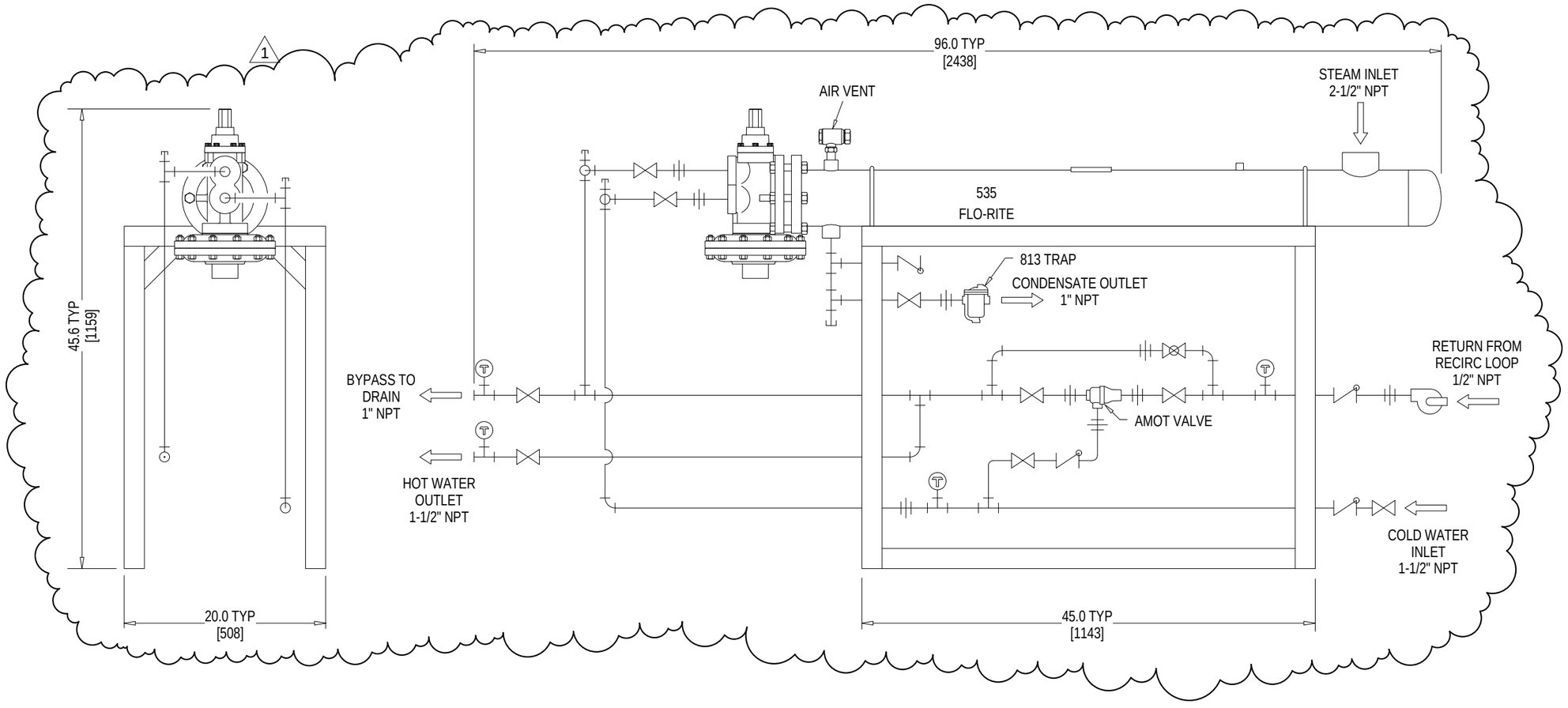
LRC BUILDING #10 KITCHEN

PROJECT NO.	DATE	DRAWING REF.	M4.1	SKETCH
12205	05-29-2013	TYPE	Addendum #1	MSK-004



5 HX-2 ARMSTRONG FLO-RITE-TEMP WATER HEATER DETAIL

MSK-005 SCALE: NONE

LRC BUILDING #10 KITCHEN

SKETCH	MSK-005
DRAWING REF.	M4.1
TYPE	Addendum #1
DATE	05-29-2013
PROJECT NO.	12166

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