SPECIFICATIONS TABLE OF CONTENTS

DIVISION 09 – FINISHES

DIVISION 10 – SPECIALTIES

DIVISION 11 – EQUIPMENT

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

VOLUME 4 OF 4: DIVISIONS 26 – 33

DIVISION 26 – ELECTRICAL

END OF SECTION 000002

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 033000 - CAST-IN-PLACE CONCRETE

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. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.
4. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: for each type of product.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
2. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

    a. Location of construction joints is subject to approval of the Architect.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Ready-mixed concrete manufacturer.
3. Testing agency: Include copies of applicable ACI certificates.

B. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

C. Preconstruction Test Reports: For each mix design.

D. Field quality-control reports.

E. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician with experience installing and finishing concrete.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.

1. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Field Quality Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1. Personnel conducting field tests shall be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

1.10 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
2. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
3. Do not use frozen materials or materials containing ice or snow.
4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I/II.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Silica Fume: ASTM C1240 amorphous silica.

C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4-inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C260/C260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

F. Water and Water Used to Make Ice: ASTM C94/C94M, potable.

2.3 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products:

a. W.R Meadows, Inc; Perminator 15 mil.
b. Steel Industries, LCC; Stego Wrap, 15 mil.
c. ISI Building Products; Viper II 15 mil.

2.4 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

B. Penetrating Liquid Floor Treatment, Sallyport Garage: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dayton Superior; Pentra-Hard EDH Exterior Densifier.
b. Approved Equal.

C. Penetrating Liquid Floor Finish, Typical:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dayton Superior; Pentra-Hard Guard.
b. Scofield Formula One Guard W.
c. Approved Equal.

2.5 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

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

a. BASF Corporation; Construction Systems.
b. ChemMasters, Inc.
c. Dayton Superior.
d. Euclid Chemical Company (The); an RPM company.
e. L&M Construction Chemicals, Inc.

f. Sika Corporation.
g. W. R. Meadows, Inc.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:

a. Ambient Temperature Below 50 deg F: Black.
b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
c. Ambient Temperature Above 85 deg F: White.

D. Water: Potable or complying with ASTM C1602/C1602M.

2.6 RELATED MATERIALS

A. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.7 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8-inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M Portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4-inch or coarse sand, as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M Portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4-inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.8 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash or Other Pozzolans: 25 percent by mass.
2. Slag Cement: 50 percent by mass.
3. Silica Fume: 10 percent by mass.
4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs concrete for parking structure slabs, and concrete with a w/cm below 0.50.

2.9 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings and Foundation Walls: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum W/C Ratio: 0.42.
3. Slump Limit: 4 inches, plus or minus 1-inch.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

B. Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum W/C Ratio: 0.42.
3. Minimum Cementitious Materials Content: 540 lb/cu. yd.
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

C. Concrete Toppings: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water/Cement Ratio: 0.35.
3. Slump Limit: 8 inches, plus or minus 1 inch.
4. Air Content: Do not allow air content of trowel-finished toppings to exceed 3 percent.

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94 and ASTM C1116, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
2. Face laps away from exposed direction of concrete pour.
3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
4. Lap joints 6 inches and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.

    a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.5 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
2. Place joints perpendicular to main reinforcement.

    a. Continue reinforcement across construction joints unless otherwise indicated.
    b. Do not continue reinforcement through sides of strip placements of floors and slabs.

3. Form keyed joints as indicated. Embed keys at least 1-1/2-inches into concrete.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

5. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2-inch or more than 1-inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.

a. Do not use vibrators to transport concrete inside forms.
b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.

a. Patch voids larger than 1-1/2-inches wide or 1/2-inch deep.

b. Remove projections larger than 1-inch.
c. Tie holes do not require patching.
d. Surface Tolerance: ACI 117 Class D.
e. Apply to concrete surfaces not exposed to view.

2. ACI 301 Surface Finish SF-3.0:

a. Patch voids larger than 3/4-inch wide or 1/2-inch deep.
b. Remove projections larger than 1/8-inch.
c. Patch tie holes.
d. Surface Tolerance: ACI 117 Class A.
e. Locations: Apply to concrete surfaces exposed to view.

B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:

1. Grout-Cleaned Rubbed Finish:

a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
b. Do not clean concrete surfaces as Work progresses.
c. Mix 1-part Portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white Portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
d. Wet concrete surfaces.
e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.

C. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish:

1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4-inch in one direction.
3. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish and resinous terrazzo finish.

D. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:

    a. Slabs on Ground:

        1) Specified overall values of flatness, F_F 25; and of levelness, F_L 20; with minimum local values of flatness, F_F 17; and of levelness, F_L 15.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 4-inches high unless otherwise indicated on Drawings, and extend base not less than 6-inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.

    a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Cast anchor-bolt insert into bases.
    c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 and ACI 305.1for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.

4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:

    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.

C. Curing Unformed Surfaces: Comply with ACI 308.1as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:

    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

        1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

            a) Lap edges and ends of absorptive cover not less than 12-inches.
            b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

        2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12-inches, and sealed by waterproof tape or adhesive.

            a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
            b) Cure for not less than seven (7) days.

        3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven (7) days, utilizing one, or a combination of, the following:

            a) Water.
            b) Continuous water-fog spray.

    b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

   a) Lap edges and ends of absorptive cover not less than 12-inches.
   b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven (7) days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.

   a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
   b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

   a) Water.
   b) Continuous water-fog spray.

4)

c. Floors to Receive Urethane Flooring:

   1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
   2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6-inches and sealed in place.
   3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
   4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

3.11 TOLERANCES

A. Conform to ACI 117.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than seven days' old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
4. Rinse with water; remove excess material until surface is dry.
5. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s).
2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2-inches deep in formed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1-part Portland cement to 2-1/2 parts fine aggregate passing a No. 16sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2-inch in any dimension to solid concrete.

a. Limit cut depth to 3/4-inch.
b. Make edges of cuts perpendicular to concrete surface.

c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
d. Fill and compact with patching mortar before bonding agent has dried.
e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement, so that, when dry, patching mortar matches surrounding color.

a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
b. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.

a. Correct low and high areas.
b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.

a. Finish repaired areas to blend into adjacent concrete.

5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.

a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
b. Feather edges to match adjacent floor elevations.

6. Correct other low areas scheduled to remain exposed with repair topping.

a. Cut out low areas to ensure a minimum repair topping depth of 1/4-inch to match adjacent floor elevations.

b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

7. Repair defective areas, except random cracks and single holes 1-inch or less in diameter, by cutting out and replacing with fresh concrete.

   a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
   b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
   c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
   d. Place, compact, and finish to blend with adjacent finished concrete.
   e. Cure in same manner as adjacent concrete.

8. Repair random cracks and single holes 1-inch or less in diameter with patching mortar.

   a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
   b. Dampen cleaned concrete surfaces and apply bonding agent.
   c. Place patching mortar before bonding agent has dried.
   d. Compact patching mortar and finish to match adjacent concrete.
   e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

1) Project name.
2) Name of testing agency.
3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
4) Name of concrete manufacturer.
5) Date and time of inspection, sampling, and field testing.
6) Date and time of concrete placement.
7) Location in Work of concrete represented by samples.
8) Date and time sample was obtained.
9) Truck and batch ticket numbers.
10) Design compressive strength at 28 days.
11) Concrete mixture designation, proportions, and materials.
12) Field test results.
13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.

C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

D. Inspections:

1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

    a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    b. Perform additional tests when concrete consistency appears to change.

3. Slump Flow: ASTM C1611/C1611M:

    a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    b. Perform additional tests when concrete consistency appears to change.

4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.

    a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C1064/C1064M:

    a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.

6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.

    a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

7. Compression Test Specimens: ASTM C31/C31M:

    a. Cast and laboratory cure two sets of two 6-inch by 12-inch cylinder specimens for each composite sample.
    b. Cast, initial cure, and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C39/C39M.

    a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
    b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
    c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests:

    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

        1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.

13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.16 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

SECTION 034100 - PRECAST STRUCTURAL CONCRETE

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. Section Includes:

1. Structural design, fabrication and erection of precast structural concrete work including wall panels with an architectural finish. Also included are accessories for anchoring to the building framework and the design, installation and fabrication for permanent and temporary anchors and brackets for these panels and planks.

B. Related Sections:

1. Section 033000 - “Cast-in-Place Concrete” for concrete topping and placing connection anchors in concrete.
2. Section 034130 - “Precast Prestressed Hollow-Core Slab Units” for floor composition at mezzanine levels attaching to precast wall panels.
3. Section 051200 - “Structural Steel Framing” for furnishing and installing connections attached to structural-steel framing.
4. Section 055000- “Metal Fabrications” for kickers and other miscellaneous steel shapes.
5. Section 072119 “Foamed-In-Place Insulation for insulating exterior vertical joints between precast structural concrete wall panels.
6. Section 076200 - “Sheet Metal Flashing and Trim” for flashing receivers and reglets.
7. Section 078413 - “Penetration Firestopping” for joint-filler materials for fire-resistance-rated construction.
8. Section 078443 “Joint Firestopping” for firestopping vertical joints between fire-rated precast structural concrete wall panels.
9. Section 079200 - “Joint Sealants” for elastomeric joint sealants and sealant backings.
10. Section 079513 - “Expansion Joint Cover Assemblies” for building expansion joints within the precast concrete panels.
11. Section 099113 – “Exterior Painting” for painting troweled finish precast concrete panel.
12. Section 099123 – “Interior Painting” for painting troweled finish interior precast concrete panel.
13. Division 22 - “Plumbing” for plumbing embed items and openings including piping, hose bibbs, downspout nozzles and any other miscellaneous items located on the interior and exterior faces of the precast panels.

14. Division 26 - “Electrical” for electrical embed items and openings relating to conduit, lighting control devices, receptacles and lighting located on the interior and exterior faces of the precast concrete panels.
15. Division 27 - “Communications” for communications embed items relating to cable, controls, devices and equipment located on the interior and exterior faces of the precast concrete panels.
16. Division 28 - “Electronic Safety and Security” for embed security items relating to wire, cable and equipment located on the interior and exterior faces of the precast panels.

1.3 DEFINITION

A. Design Reference Sample(s): Sample(s) of approved precast structural concrete color, finish, and texture, pre-approved by Architect and Owner which all fabricators must match.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design precast structural concrete, including comprehensive engineering analysis by a qualified State of Indiana professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Precast structural concrete units and connections shall withstand design criteria indicated within limits and under conditions indicated.

C. Structural Performance: Provide precast structural concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated:

1. Dead Loads: See drawings.
2. Concrete Topping Load: See drawings.
3. Live Loads: See drawings.
4. Roof Loads: See drawings.
5. Snow Loads: See drawings.
6. Seismic Loads: See drawings.
7. Wind Loads: See drawings.
8. Design precast structural concrete framing system and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements. Maintain precast structural concrete deflections within limits of ACI 318.

    a. Thermal Movements: Allow for in-plane thermal movements resulting from annual ambient temperature changes of minus 18 to plus 120 deg F.

9. Design Standards: Comply with ACI 318 (ACI 318M) and the design recommendations of PCI MNL 120, “PCI Design Handbook – Precast and Prestressed Concrete”.

a. The precast concrete panels shall be a minimum nominal thickness 4-inches, minimum strength of 5,000 psi and reinforced with minimum W4.0 (MW 26) welded wire fabric at 4-inches on center in both directions conforming to ASTM A185.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

C. Shop Drawings: Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement. Detail fabrication and installation of precast structural concrete units.

1. Indicate joints, reveals, and extent and location of each surface finish.
2. Indicate separate face and backup mixture locations and thicknesses.
3. Indicate welded connections by AWS standard symbols. Show size, length, and type of each weld.
4. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints.
5. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
6. Include and locate openings larger than by 10-inches.
7. Indicate location of each precast structural concrete unit by same identification mark placed on panel.
8. Indicate routing and placement of embed items and openings for conduit, cable, wiring, equipment, controls, devices, light fixtures, etc. within the precast concrete panels in areas designated on the drawings to be concealed. All trades must submit coordinated drawings.
9. Indicate relationship of precast structural concrete units to adjacent materials.
10. Indicate estimated camber for precast floor slabs with concrete toppings.
11. Indicate shim sizes and grouting sequence.
12. Indicate electrical, security and low voltage devices, boxes and conduit to be embedded in precast concrete.
13. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.

D. Samples:

1. For each type of finish indicated on exposed surfaces of precast structural concrete units with architectural finish, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 24 by 24 by 2-inches.

a. Where other faces of precast concrete unit are exposed, include Samples illustrating workmanship, color, and texture of backup concrete as well as facing concrete.

E. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Welding certificates.

C. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Reinforcing materials.
3. Admixtures.
4. Bearing pads.
5. Structural-steel shapes and hollow structural sections.

D. Material Test Reports: For aggregates.

E. Source quality-control reports.

F. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Listed Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Installer Qualifications: A precast concrete erector qualified, as evidenced by PCI's Certificate of Compliance, to erect Category S1 - Simple Structural Systems and Category S2 - Complex Structural Systems.

C. Installer Qualifications: An experienced precast concrete erector who, before erection of precast concrete, has retained a "PCI-Certified Field Auditor" to conduct a field audit of a project installed by erector in Category S1 - Simple Structural Systems and Category S2 - Complex Structural Systems and who produces an Erectors' Post Audit Declaration, according to PCI MNL 127, "PCI Erector's Manual - Standards and Guidelines for the Erection of Precast Concrete Products."

D. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

E. Design Standards: Comply with ACI 318 and design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.

F. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."

G. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D.1.1M, "Structural Welding Code - Steel."
2. AWS D1.4, "Structural Welding Code - Reinforcing Steel."

H. Sample Panels: After sample approval and before fabricating precast structural concrete units with architectural finish, produce a minimum of two (2) sample panels approximately 32 sq. ft. in area for review by Architect. Incorporate full-scale details of all architectural features, finishes, textures, and transitions in sample panels.

1. Locate panels where indicated or, if not indicated, as directed by Architect.
2. Damage part of an exposed-face surface for each finish, color, and texture, and demonstrate adequacy of repair techniques proposed for repair of surface blemishes.
3. After approval of repair technique, maintain one sample panel at fabricator's plant and one at Project site in an undisturbed condition as a standard for judging the completed Work.
4. Demolish and remove sample panels when directed.

I. Mockups: After sample panel approval but before production of precast structural concrete units with architectural finish, construct mockup to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups showing all the various precast panel architectural treatments and elements including textures, patterns, colors, window openings and details for both exterior and interior faces. Mockups shall also include anchors, connections, flashings, and joint fillers.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
4. If necessary, the mockup foundation and support frame are to be by others.

J. Preinstallation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Support units during shipment on non-staining shock-absorbing material in same position as during storage.

B. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

1. Store units with dunnage across full width of each bearing point unless otherwise indicated.
2. Place adequate dunnage of even thickness between each unit.
3. Place stored units so identification marks are clearly visible, and units can be inspected.

C. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses that would cause cracking or damage.

D. Lift and support units only at designated points shown on Shop Drawings.

1.9 COORDINATION

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

B. Embedded Item and Opening Coordination:

1. Identify and locate all embedded items and openings within the panels including but not limited to, receptacles, conduits, wiring, cable, devices, controls, equipment and light fixtures. Coordinate all embedded items and openings with the various trades as required in all the areas designated on the drawings to be concealed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Fabricators: Subject to compliance with requirements, available fabricators offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ATMI Precast.
2. Coreslab Structures, Inc.
3. Fabcon Precast.
4. Gate Precast Company.
5. High Concrete Group, LLC.
6. International Precast Solutions, LLC.
7. Kerkstra Precast, Inc.

2.2 MOLD MATERIALS

A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.

1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

B. Multi-use, Acrylonitrile-Butadiene Styrene (ABS) Plastic Form Liners: Low use (2-5) units of face design, texture, arrangement, and configuration indicated. Furnish with manufacturer's recommended liquid-release agent that will not bond with, stain, or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

1. Basis-of-Design Product: Subject to compliance with requirements provide ”408 Bush Hammer” by Architectural Polymers or a comparable product by the following:

a. Fitzgerald Formliners. #17998 Bush Hammer.
b. CustomRock Formliner. #2510 Bush Hammer.

2. Formliner Description:

a. Material: ABS Plastic (2-5) reuses.
b. Texture: 1/4-inch medium texture.
c. Maximum Depth: 1/4 to 3/8-inch.

C. Not Used

2.3 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.

D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from wire into flat sheets.

E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

F. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, white or gray, unless otherwise indicated below.

1. For exterior wythe on exterior walls or use white cement with white silica sand, of same type, brand, and mill source.
2. For the interior wythe on exterior walls and both sides of all interior walls use gray cement.

B. Supplementary Cementitious Materials:

1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
2. Metakaolin Admixture: ASTM C 618, Class N.
3. Silica Fume Admixture: ASTM C 1240, with optional chemical and physical requirement.
4. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

D. Lightweight Aggregates: Except as modified by PCI MNL 116, ASTM C 330, with absorption less than 11 percent.

E. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.

F. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

H. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

1. Water-Reducing Admixtures: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M.

I. Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

2.5 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 116.

C. Carbon-Steel Plate: ASTM A 283/A 283M.

D. Malleable-Iron Castings: ASTM A 47/A 47M.

E. Carbon-Steel Castings: ASTM A 27/A 27M, Grade 60-30.

F. High-Strength, Low-Alloy Structural Steel: ASTM A 572/A 572M.

G. Carbon-Steel Structural Tubing: ASTM A 500, Grade B.

H. Wrought Carbon-Steel Bars: ASTM A 675/A 675M, Grade 65.

I. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.

J. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563; and flat, unhardened steel washers, ASTM F 844.

K. High-Strength Bolts and Nuts: ASTM A 325, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563; and hardened carbon-steel washers, ASTM F 436.

1. Do not zinc coat ASTM A 490 bolts.

L. Zinc-Coated Finish: For exterior steel items, steel in exterior walls, and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123/A 123M.

1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03 percent or to between 0.15 and 0.25 percent or limit sum of silicon and 2.5 times phosphorous content to 0.09 percent.
2. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035B or SSPC-Paint 20.

M. Shop-Primed Finish: Prepare surfaces of nongalvanized-steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3, and shop apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in MPI 79 according to SSPC-PA 1.

N. Welding Electrodes: Comply with AWS standards.

O. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install precast structural concrete units.

2.6 BEARING PADS

A. Provide one of the following bearing pads for precast structural concrete units as recommended by precast fabricator for application:

1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 60 to 70 Shore, Type A durometer hardness, ASTM D 2240; minimum tensile strength 2250 psi, ASTM D 412.
2. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. 70 to 90 Shore, Type A durometer hardness, ASTM D 2240; capable of supporting a compressive stress of 3000 psi with no cracking, splitting, or delaminating in the internal portions of pad. Test 1 specimen for every 200 pads used in Project.
3. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer; 80 to 100 Shore, Type A durometer hardness, ASTM D 2240; complying with AASHTO's "AASHTO Load and Resistance Factor Design (LRFD) Bridge Specifications," Division II, Section 18.10.2; or with MIL-C-882E.
4. Frictionless Pads: Tetrafluoroethylene, glass-fiber reinforced, bonded to stainless- or mild-steel plate, of type required for in-service stress.
5. High-Density Plastic: Multi-monomer, non-leaching, plastic strip.

2.7 GROUT MATERIALS

A. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, non-staining grout containing selected silica sands, Portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time.

2.8 INSULATED FLAT WALL PANEL ACCESSORIES

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.60 lb/cu. ft. square edges; with R-value of 20 and thickness of 4-inches.

1. Maximum flame-spread and smoke developed indexes of 75 and 450 respectively per ASTM E 84.

B. Wythe Connectors: Non-conductive type metal connectors-conductive types are prohibited.

1. Basis-of-Design Types: Provide low-conductivity connectors from one of the following:

a. HK Composites.
b. Thermomass Connector System.

2.9 CONCRETE MIXTURES

A. Basis-of-Design Control Panel Sample: Subject to compliance with requirements provide 'Mix #69" as manufactured by Coreslab Structures or a comparable product approved by Architect for all exterior wall faces.

1. Composition:

a. Coarse Aggregate: MM #9 Limestone.
b. Fine Aggregate: MM #23 River Sand.
c. Cement: White.
d. Coloring: BASF liquid, 20.0Y, 4.0 BL, 3.0 LR.
e. Finish: Light Acid Etch

B. Prepare design mixtures for each type of precast concrete required.

1. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of Portland cement, which would otherwise be used, by not less than 40 percent.
2. Limit use of fly ash to 25 percent replacement of Portland cement by weight and granulated blast-furnace slag to 40 percent of Portland cement by weight; metakaolin and silica fume to 10 percent of Portland cement by weight.

C. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

D. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C 1218/C 1218M.

E. Normal-Weight Concrete Mixtures: Proportion face mixtures or face and backup mixtures or full-depth mixture or face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi
2. Maximum Water-Cementitious Materials Ratio: 0.45.

F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 116.

G. Lightweight Concrete Backup Mixtures: Proportion mixtures by either laboratory trial batch or field test data methods according to ACI 211.2, with materials to be used on Project, to provide lightweight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi
2. Unit Weight: Calculated equilibrium unit weight of 115 lb/cu. ft., plus or minus 3 lb/cu. ft., according to ASTM C 567.

H. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.

I. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

J. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.10 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for pre-stressing and de-tensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

1. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during concrete placement. Coat form liner with form-release agent.

B. Maintain molds to provide completed precast structural concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Form joints are not permitted on faces exposed to view in the finished work.
2. Edge and Corner Treatment: Uniformly chamfered.

2.11 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast structural concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.

D. Cast-in openings larger than 10-inches in any dimension. Do not drill or cut openings or reinforcement bars without Architect's approval.

E. Cast-in electrical, security and communication services conduit and receptacles in areas as indicated on the drawings where surface-mount conduit, devices, controls and receptacles are not acceptable. Surface mounted, exposed conduit and plumbing is not acceptable on the building exterior. Conduit and receptacles are to be provided to the precast fabricator. Refer to electrical, communications, electronic safety and security drawings for conduit and receptacle locations in these areas.

F. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcement exceeds limits specified, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
3. Place reinforcement to maintain at least 3/4-inch minimum coverage. Increase cover requirements according to ACI 318 when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
4. Place reinforcing steel and pre-stressing strand to maintain at least 3/4-inch minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
5. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.

G. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses.

H. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

I. Place face mixture to a minimum thickness after consolidation of the greater of 1-inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.

J. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.

1. Place backup concrete mixture to ensure bond with face-mixture concrete.

K. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 116.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

L. Comply with ACI 306.1 procedures for cold-weather concrete placement.

M. Comply with PCI MNL 116 procedures for hot-weather concrete placement.

N. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that will not show in finished structure.

O. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

P. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Architect's approval.

Q. Panel Composition: Panels will be a 12-inches total thickness comprised as follows:

1. Interior Wythe: Minimum 5-inches solid concrete with minimum strength of 5,000 psi W4 (MW26) welded wire fabric at 4-inches o.c. both directions. Conforming to ASTM A185 and noted as Security walls on the drawings. Steel Trowel finish on exposed face.
2. Insulation: Minimum 4-inches Extruded Polystyrene (R 5 per inch, R 20 total)
3. Exterior Wythe: Minimum 3-inches reinforced concrete with the mix ingredients per section 2.10 “Concrete Mixtures” A.1

R. Panel Details:

1. Outside Corners: 1-1/2-inch quirk miter joint.
2. Inside Corners: Butt joint.
3. Panel Returns: Smooth.

2.12 CASTING INSULATED WALL PANELS

A. Cast and screed wythe supported by mold.

B. Place insulation boards abutting edges and ends of adjacent boards. Insert wythe connectors through insulation, and consolidate concrete around connectors according to connector manufacturer's written instructions.

C. Cast and screed top wythe to meet required finish.

2.13 FABRICATION TOLERANCES

A. Fabricate precast structural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 116 product dimension tolerances.

2.14 INTERIOR FINISHES

A. Finish exposed back surfaces of architectural precast concrete units with smooth, two-pass steel-trowel finish.

2.15 ARCHITECTURAL FINISHES

A. Manufacture member faces free of joint marks, grain, and other obvious defects with corners, including false joints, uniform, straight, and sharp. Finish exposed-face surfaces of precast concrete units to match approved design reference sample and as follows:

1. Textured-Surface Finish: Impart by form liners or inserts to provide surfaces free of pockets, streaks, and honeycombs, with uniform color and texture.
2. Acid-Etched Finish Main Body: Use acid and hot-water solution, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attach.
3. Provide two-sided finishes at exposed perimeter wall surfaces:

    a. Outside Finish: Acid etched with and without formliner finishes as indicated per section 2.2 “Mold Finishes” B.1.
    b. Inside Finish: Two-pass, steel troweled finish for painting.

4. Provide two-sided finishes at exposed interior wall surfaces.

    a. One Side Finish: Two-pass, steel troweled finish for painting.
    b. Other Side Finish: Smooth-form finish for painting.

2.16 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate precast structural concrete fabricator's quality-control and testing methods.

1. Allow testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with testing agency and provide samples of materials and concrete mixtures as may be requested for additional testing and evaluation.

B. Testing: Test and inspect precast structural concrete according to PCI MNL 116 requirements.

1. Test and inspect self-consolidating concrete according to PCI TR-6.

C. Strength of precast structural concrete units will be considered deficient if units fail to comply with ACI 318 requirements for concrete strength.

D. If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, employ a qualified testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M.

1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
2. Cores will be tested in an air-dry condition or, if units will be wet under service conditions, test cores after immersion in water in a wet condition.
3. Strength of concrete for each series of three cores will be considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
4. Test results will be made in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:

    a. Project identification name and number.
    b. Date when tests were performed.
    c. Name of precast concrete fabricator.
    d. Name of concrete testing agency.
    e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

E. Patching: If core test results are satisfactory and precast structural concrete units comply with requirements, clean and dampen core holes and solidly fill with same precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces per manufacturer’s standard.

F. Defective Units: Discard and replace exposed finish precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Architect's approval. Architect reserves the right to reject precast units that do not match approved samples, sample panels, and mockups.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance of the Work.

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

C. Do not install precast concrete units until supporting, cast-in-place, building structural framing has attained minimum allowable design compressive strength or until supporting steel or other structure is complete.

3.2 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.

B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, supports, and bracing as required to maintain position, stability, and alignment of units until permanent connection.

1. Install temporary steel or plastic spacing shims or bearing pads as precast structural concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
4. For hollow-core slab voids used as electrical raceways or mechanical ducts, align voids between units and tape butt joint at end of slabs.

C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

1. Do not permit connections to disrupt continuity of roof flashing.

D. Field cutting of precast units is not permitted without approval of the Architect.

E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.

F. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

1. Protect precast structural concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
2. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and apply a minimum 4.0-mil-thick coat of galvanized repair paint to galvanized surfaces according to ASTM A 780.
3. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and reprime damaged painted surfaces.
4. Remove, reweld, or repair incomplete and defective welds.

G. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot. For friction connections, apply specified bolt torque and check 25 percent of bolts at random by calibrated torque wrench.

H. Grouting: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled.

1. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces.
2. Fill joints completely without seepage to other surfaces.
3. Trowel top of grout joints on roofs smooth and uniform. Finish transitions between different surface levels not steeper than 1 to 12.
4. Place grout end cap or dam in voids at ends of hollow-core slabs.
5. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.
6. Keep grouted joints damp for not less than 24 hours after initial set.

3.3 ERECTION TOLERANCES

A. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Architect.

B. Erect architectural precast structural concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

C. Erect architectural precast concrete units level, plumb, square, and in alignment, without exceeding the following noncumulative erection tolerances:

1. Plan Location from Building Grid Datum: Plus or minus 1/2-inch.
2. Plan Location from Centerline of Steel: Plus or minus 1/2-inch.
3. Top Elevation from Nominal Top Elevation: As follows:

    a. Exposed Individual Panel: Plus or minus 1/4-inch.
    b. Non-Exposed Individual Panel: Plus or minus 1/2-inch.
    c. Exposed Panel Relative to Adjacent Panel: 1/4-inch.

d. Non-Exposed Panel Relative to Adjacent Panel: 1/2-inch.

4. Support Elevation from Nominal Support Elevation: As follows:

a. Maximum Low: 1/2-inch.
b. Maximum High: 1/4-inch.

5. Maximum Plumb Variation over the Lesser of Height of Structure or 100 Feet: 1-inch.
6. Plumb in Any 10 Feet of Element Height: 1/4-inch.
7. Maximum Jog in Alignment of Matching Edges: 1/4-inch.
8. Joint Width (Governs over Joint Taper): Plus or minus 1/4-inch.
9. Maximum Joint Taper: 3/8-inch.
10. Joint Taper in 10 Feet: 1/4-inch.
11. Maximum Jog in Alignment of Matching Faces: 1/4-inch.
12. Differential Bowing or Camber, as Erected, between Adjacent Members of Same Design: 1/4-inch.
13. Opening Height between panels: Plus or minus 1/4-inch.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: The Owner will engage a qualified special inspector to perform the following special inspections:

1. Erection of load bearing precast concrete members.

B. Testing Agency: The Owner will engage a qualified testing agency to perform tests and inspections.

C. Field welds will be visually inspected and nondestructive tested according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.

D. Testing agency will report test results promptly and in writing to Contractor and Architect.

E. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

G. Prepare test and inspection reports.

3.5 REPAIRS

A. Repair precast structural concrete units if permitted by Architect.

1. Repairs may be permitted if structural adequacy, serviceability, durability, and appearance of units has not been impaired.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet. Architect will determine final acceptance of panel repair.

C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780.

D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

E. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Architect.

3.6 CLEANING

A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034100

SECTION 061600 - SHEATHING

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:

1. Wall sheathing.
2. Plywood backing panels.

B. Related Requirements:

1. Section 42200 – “Concrete Unit Masonry” for anchoring plywood backing panels to CMU wall.
2. Section 092216-- "Non-Structural Metal Framing" for anchoring plywood backing panels.
3. Section 092900 – “Gypsum Board” for anchoring plywood backing panels.

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Wall sheathing.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

1. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corporation or E2XP Extended Exposure Sheathing by Gold Bond (National Gypsum).
2. Type and Thickness: Regular, 5/8-inch thick.
3. Size: 48 by 96-inches for vertical installation.

2.2 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

2.3 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Application: Treat all plywood backing panels.

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing less than 0.0329-inch thick, attach sheathing to comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112-inch thick, attach sheathing to comply with ASTM C 954.

2.5 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing Board: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing, and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

B. Sheathing Tape for Glass-Mat Gypsum Sheathing Board: Self-adhering glass-fiber tape, minimum 2-inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing board and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

C. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

D. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

E. Provide plywood backing behind soffits.

3.2 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to cold-formed metal framing with screws.
2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing boards but do not cut into facing.

C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8-inches o.c. and set back a minimum of 3/8-inch from edges and ends of boards.

3.3 SHEATHING JOINT-AND-PENETRATION TREATMENT

A. Seal sheathing joints according to sheathing manufacturer's written instructions.

3.4 PROTECTION

A. Sheathing: Comply with manufacturers written instructions.

END OF SECTION 061600

SECTION 074243- MODULAR METAL WALL, ROOF AND SOFITT PANELS

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. Section Includes:

1. Modular metal wall, roof and soffit panels over framed wall system and roof system.
2. Modular metal fascia and soffit panels over framed wall system at the main entrance canopy

B. Related Requirements:

1. Section 051200 – “Structural Steel Framing” for attaching and supporting panels to building structure.
2. Section 052100 – Steel Joist framing” for attaching and supporting panels to building structure.
3. Section 054000 - "Cold-Formed Metal Framing" for wall and soffit substrate framing.
4. Section 055000 – “Metal Fabrications” – for miscellaneous steel shapes for attaching and anchoring metal panels.
5. Section 061600 - "Sheathing" for exterior wall, roof and soffit sheathing.
6. Section 072100 – “Thermal Insulation” for wall and roof assembly insulation.
7. Section 075423 – “Thermoplastic Polyolefin (TPO) Roofing” – for roofing membrane system under the modular metal roof panels.
8. Section 076200 - “Sheet Metal Flashing and Trim” for sheet metal copings, flashings and reglets.
9. Section 0779200 - “Joint Sealants” for field-applied joint sealants.

1.3 REFERENCES

A. ASTM E283-84, Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.

B. ASTM E331-86, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Pressure Difference.

C. ASTM E330, Structural Performance

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal composite material panel Installer, metal composite material panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal composite material panels, including installers of storefront, entrance doors and curtain wall.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delay
3. Review methods and procedures related to metal composite material panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal composite material panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal composite material panel assembly during and after installation.
8. Review procedures for repair of panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 DESIGN CRITERIA

A. The design, fabrication and erection of a complete aluminum building panel system is the responsibility of this subcontractor and is based on the performance criteria specified. The system shall be a dry joint system which shall incorporate a pressure equalized “rainscreen” system on a complete air and vapor seal, not only allowing air and vapor which enters the panel chamber to drain to the exterior of the wall, but will also allow air into the pressuring chamber to provide instantaneous pressure equalization. Vents and drain holes shall be inconspicuously located and in such positions as not to contribute to staining, streaking or marking of the panel face. Emphasis shall be placed upon the prime integrity of the critical inner air/ vapor seal.

B. Design and install specified Aluminum building panel system and all connections to withstand earthquake forces in accordance with the requirements of Governing Building Code.

B. The specified Aluminum building panel assembly shall be designed to accommodate the structural inter-story drifts and other movements without breakage, dislodgment or connection failure.

D. Wind and suction loads normal to the plane of the assembly shall be calculated in accordance with the Governing Building Code.

E. Perimeter Framing Deflection: Deflection of panel perimeter framing member shall not exceed L/175 normal to plane of the wall where L is the unsupported span of the perimeter framing member

F. Panel Deflection: Deflection of the panel face shall not exceed L/60 at design load where L is the unsupported span of the panel

G. Provide for free noiseless thermal movement of components as may be caused by a temperature variation.

H. Allow for movement in cladding caused by deflection in structure.

I. Design wall system to allow for the unobstructed movement of air between the exterior and interior sides of metal cladding in accordance with industry accepted Rain Screen Principles.

J. Ensure panel exhibits no permanent deformation when subject to design criteria specified.

K. The system shall provide clear internal paths of drainage in order to drain any trapped moisture to the exterior, discharging moisture in a manner avoiding staining of architectural finishes, collecting in puddles, formation of unsafe icicles and dripping onto pedestrians.

L. Fasten panel assembly to building structure in a manner which transmits all loads to the main structure without exceeding the capacity of any fastener.

M. Individual panels shall be removable without disturbing adjacent panels.

N. Panels shall not warp or buckle when under full design loads.

O. All fastenings and connectors shall be concealed. Connection and attachment devices shall not cause staining to cladding or other adjoining materials. The anchorage system shall be designed so that the panels are secured yet “free-floating”, to accommodate expansion and contraction.

P. The system shall not incorporate sealant between panel joints.

Q. Anchor assemblies or connection hardware, including all related connections, tracks, girts, fasteners, etc., for and related to the cladding panels shall be designed, engineered, furnished and installed as required in compliance with the specified design and performance criteria. All such items are schematic and do not necessarily indicate the exact required scope, type, shape or profile. Location and methods of anchoring panels shall be the subcontractor’s responsibility, who shall design the cladding panels and connections to suit each specific condition in an acceptable manner complying with requirements specified.

R. Panel system shall be in compliance with the Governing authorities having jurisdiction.

S. Pressure Equalized Rainscreen System: Provide Systems that have been tested and passed in accordance with AAMA 508-7

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2-inches per 12-inches.
3. Include all materials, recommendations and details describing the proposed use, design and erection procedures for all anchorage shall be documented and fully described on the shop drawings.

D. Samples for Verification: For each type of exposed finish required, prepared on samples of size indicated below.

1. Metal Composite Material Panels: Submit two (2) 24 by 24-inches finished sample of each finish selected by Architect. Include fasteners, closures, and other metal composite material panel accessories.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each product, tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal composite material panels to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and shall have a minimum of five (5) years in on-site panel installation and proven experience in this type of work.

B. Manufacturers Qualifications: Approved manufacturer listed in this Section with minimum ten (10) years experience in manufacturer of similar products in n similar applications.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical metal composite material panel assembly, including corner, soffits, supports, attachments, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.

B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or another surface damage.

D. Retain strippable protective covering on metal composite material panels during installation.

1.11 FIELD CONDITIONS

A. Field Measurements: Panel installer’s responsibility to verify locations of structural members, adjoining construction and wall openings dimensions by field measurement before panel fabrication and indicate measurements on final shop drawings.

B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.

1.12 COORDINATION

A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.13 WARRANTY

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

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.
c. Warranty Period: Two (2) years from date of Substantial Completion.

D. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 ALUMINUM PLATE MATERIAL WALL, ROOF AND SOFITT PANELS

A. Metal Wall Panel Systems: Provide factory-formed and -assembled, metal wall and soffit panels fabricated from single skin aluminum plate; formed into profile for installation method indicated. Include attachment assembly components, panel stiffeners, and accessories required for rainscreen system.

1. Basis-of-Design Product: Subject to compliance with requirements provide “SL 2000P” aluminum panel as manufactured by Sobotec Ltd. or a comparable product by one of the following:

a. Centria.
b. Firestone Building Products
c. Keith Panels, Inc.
d. Pohl, Inc.
e. Castle Metal Products.

B. Aluminum Wall, Roof and Soffit Panels: Factory-formed, aluminum dry-joint rain screen panels.

1. Panel joints: Extruded aluminum perimeter frame
2. Extrusion Finish: Shall be mill finish aluminum on concealed side.
3. Panel Clips: As recommended by manufacturer.
4. Subgirts: Minimum .050-inch Z275 galvanized steel as per manufacturer’s requirements for panel attachment system.
5. Panel Thickness: 3MM (.125)
6. Panel Sizes: As indicated on drawings.
7. Exterior Finish: Two-coat fluoropolymer system; 0.2-mil primer with 0.8-mil 70 percent PVDF fluoropolymer color coat AAMA 620.

a. Color: As selected by the Architect from manufacturer’s standard colors.

8. Unexposed Finish: Manufacture’s standard nominal 0.5-mil nominal DFT backer coating.
9. Exposed Trim, flashings and Fastener Finish: Match panel finish.

a. Thickness: 0.040-inch nominal.
b. Refer to Section 076200 “Sheet Metal Flashing and Trim”.

2.3 SUPPORT MEMBERS, FASTENERS, CONNECTORS

A. Type, size quantity and spacing of all connectors, supporting track, girts, fasteners and other hardware and anchorage devices for panels as required to suit specified standards.

B. Fastening devices between aluminum or aluminum and other materials shall be aluminum or stainless steel that will not permit staining.

C. Self-locking fasteners shall be stainless steel with nylon inserts or patches.

D. Shims shall be metal to match adjacent surfaces. Do not use plastic shims.

2.4 FLASHING AND TRIM

A. Provide custom factory-fabricated integral companion flashing, trims, end caps and finishing components from same material as the aluminum building panels.

B. Finish: Shall be of matching color with the Aluminum building panels.

C. Flashing and Trims: Prefinished in accordance with Section 076200 – “Sheet Metal Flashing and Trim”.

D. Color: As selected by the Architect from manufacturer’s standard colors.

2.5 MATERIALS

A. Aluminum Sheet: Smooth surface coil-coated sheet, ASTM B209, 3105-H14 Alloy.

1. Aluminum Material: Tension-leveled.
2. Thickness: 0.040-inch nominal.

B. Aluminum Extrusions: ASTM B 221, 3105 Aluminum.

2.6 SECONDARY METAL FRAMING (if required)

A. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM C645, Grade 50 with ASTM A 653/A 653M, G90 (Z180) hot-dipped galvanized zinc coating.

1. Hat Channels: 0.0451-inch (16 gage) minimum.
2. Sill Channels: 0.0451-inch (16 gage) minimum.

2.7 MISCELLANEOUS MATERIALS

A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal composite material panels unless otherwise indicated.

B. Extruded Trim: Aluminum, minimum thickness 0.060-inch for trim and .090-inch for structural units. Include manufacturer provided extruded trim for the following locations and as indicated on the Drawings:

1. Base trim.
2. Coping.
3. Panel installation perimeter.
4. Opening perimeters.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance.

D. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fascia, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.

E. Splines: Match panel material and finish.

F. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

G. Panel Sealants: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal composite material panels and remain weathertight; and as recommended in writing by metal composite material panel manufacturer.

2.8 ALUMINUM METAL PANEL FABRICATION

A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Machine fabricated all material in accordance with reviewed shop drawings with straight lines, square corners or smooth bends, free from twists, kinks, warps, dents, and other imperfections which may affect appearance or serviceability.

C. Provide reinforced panels as required to meet the tolerances specified above.

D. System shall have a flush appearance from the exterior with no reveal other than module joint width.

E. Panels shall be aligned with no lap or reveal other than joint width to permit expansion and contraction.

F. Thickness of the metal and details of assembly and support shall provide sufficient strength and stiffness to resist distortion of finish surface. Exposed edges and ends of metal shall be dressed smooth, free from sharp edges and with no uniform minimum radius corners. Connections and joints exposed to weather shall be constructed to exclude water.

G. Fasteners shall be concealed.

H. All necessary holes shall be drilled with clip attachments applied before application of finish.

I. Trim and flashing shall be factory-fabricated ready for assembly.

J. Design and fabricate appropriate type, size, quantity and spacing of all sub-connectors, girts, fasteners and other anchorage devices as required to suit the specified standards.

K. Subgirts may require perforations at regular intervals to permit drainage of cavity.

2.9 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Aluminum Panels and Accessories:

1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2.10 SEALANT

A. Silicone Sealant: In accordance with Section 079200 – “Sealants”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal composite material wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material wall panel manufacturer.

a. Verify that air or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.

C. Maximum deviations acceptable to modular metal panel system manufacturer:

1. 1/4-inch in 20 feet vertically or horizontally from face plane of framing.
2. 1/2-inch maximum deviation from flat substrate on any building elevation.
3. 1/8-inch in 5 feet.

D. Confirm presence of acceptable framing members to match installation requirements of modular metal panel system.

1. Confirm framing minimum .0451-inch/18 gage at maximum 24-inch spacing.

E. Verify that storefront, entrance doors and curtain wall and or other penetrations match layout on shop drawings.

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

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal composite material panel manufacturer's written recommendations.

1. Soffit Framing: Wire tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

3.3 ALUMINUM PANEL INSTALLATION

A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal composite material panels.
2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air or water-resistive barriers and flashings that will be concealed by metal composite material panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal composite material panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: All fasteners exposed to the exterior to be concealed.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.

D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.

1. Horizontal Joinery: Working from base of installation to top, connect upper panel to lower panel at dry seal joinery utilizing field-applied attachment clip.
2. Vertical Joinery: Provide reveal between vertical ends of panels as shown on shop drawings using hardware furnished by manufacturer.

a. Install splines where indicated on drawings.

3. Galvanic Action: Where elements of metal composite wall system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24-inches of corner or intersection. Where lapped expansion provisions cannot be used, or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4-inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing agency to perform field tests and inspections.

B. Water-Spray Test: After installation, test area of assembly for water penetration according to AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal composite material wall panel installation, including accessories.

D. Metal composite material wall panels will be considered defective if they do not pass test and inspections.

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.

B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures per Architect's instruction.

END OF SECTION 074243

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

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. Section Includes:

1. Fully adhered thermoplastic polyolefin (TPO) roofing system.
2. Substrate board.
3. Vapor retarder.
4. Roof insulation.
5. Cover board.
6. Walkways.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 077100 "Roof Specialties" for manufactured copings and roof edge flashings.
3. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Flashing details at penetrations.
4. Tapered insulation layout, thickness, and slopes.
5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
7. Tie-in with adjoining air barrier.

C. Samples for Verification: For the following products:

1. Roof membrane and flashings.
2. Walkway pads and rolls.

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer manufacturer and testing agency.

B. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

a. Submit evidence of compliance with performance requirements.

2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

D. Evaluation Reports: For components of roofing system, from ICC-ES.

E. Field Test Reports:

1. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

F. Field quality-control reports.

G. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, vapor retarder, substrate board, and other components of roofing system.
2. Warranty Period: Thirty (30) years from date of Substantial Completion.
3. Warranty Compliance: It shall be the roofing contractor and manufacturer’s full responsibility to provide all components required, whether specified or not, for the roof system to meet the specified warranty

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): 60 psf.
2. Zone 2 (Roof Area Perimeter): 90 psf.
3. Zone 3 (Roof Area Corners): 120 psf.

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail-Resistance Rating: SH.

E. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

F. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A. TPO Sheet: ASTM D 6878/D 6878M, internally fabric- or scrim-reinforced, TPO sheet.

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

a. Carlisle SynTec Incorporated.
b. Firestone Building Products.
c. GAF.
d. Johns Manville; a Berkshire Hathaway Company.

2. Source Limitations: Obtain components for roofing system from manufacturers approved by roof membrane manufacturer.
3. Thickness: 60 mils, nominal (or as required for a 30 year warranty).
4. Exposed Face Color: White.

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils thick, minimum, of same color as TPO sheet.

C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

D. Roof Vents: As recommended by roof membrane manufacturer.

1. Size: Not less than 4-inch diameter.

E. Bonding Adhesive: Manufacturer's standard.

F. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8-inch thick; with anchors.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 VAPOR RETARDER

A. Laminated Sheet: Polyethylene laminate, two layers, reinforced with cord grid, with maximum permeance rating of 0.62 perm.

1. Air/Vapor Barrier - a 40-mil composite consisting of 35-mils of self-adhering rubberized asphalt laminated to a 5-mil woven polypropylene film.
2. Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.5 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by TPO roof membrane manufacturer.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. Compressive Strength: 20 psi.
2. Size: Manufacturers standard.

C. Tapered Insulation: Provide factory-tapered insulation boards.

1. Material: Match roof insulation.
2. Minimum Thickness: 1/4-inch.
3. Slope:

a. Roof Field: 1/4-inch per foot unless otherwise indicated on Drawings.
b. Saddles and Crickets: 1/2-inch per foot unless otherwise indicated on Drawings.

4. Minimum thickness at drains: 3-inches.

2.6 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.

B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Modified asphaltic, asbestos-free, cold-applied adhesive.
2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum board or ASTM C 1278/C 1278M fiber-reinforced gypsum board.

1. Thickness: 1/2-inch.
2. Surface Finish: Unprimed.

2.7 TPO WALKWAY PADS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 0.156-inch thick and acceptable to roofing system manufacturer.

1. Size: 30-inches wide continuous roll at metal roof and TPO roof transition for protection from falling water and snow onto the TPO membrane.
2. Color: White.

B. Molded EPDM Walkway Pads: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads approximately 0.375-inches thick and acceptable to roofing system manufacturer.

1. Size: 30-inches by 30-inches long.
2. Location: Refer to drawings.
3. Color: White.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

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

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition.

3.4 VAPOR RETARDER INSTALLATION

A. Laminate Sheet: Loosely lay laminate-sheet vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6-inches, respectively.

1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
2. Continuously seal side and end laps with tape.

B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

3.5 INSULATION INSTALLATION

A. Coordinate installing roofing system components, so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.

C. Install insulation under area of roofing to conform to slopes indicated. Roof to be at least 1/4-per foot slope.

D. Install insulation under area of roofing to achieve required thickness of at least 4-inches. Where overall insulation thickness is 2.7-inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6-inches in each direction.

1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4-inch with insulation.

1. Cut and fit insulation within 1/4-inch of nailers, projections, and penetrations.

3.6 INSTALLATION OF COVER BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6-inches in each direction.

1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
2. At internal roof drains, conform to slope of drain sump.

a. Trim cover board so that water flow is unrestricted.

3. Cut and fit cover board tight to nailers, projections, and penetrations.
4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:

a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 ADHERED ROOFING INSTALLATION

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

E. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

F. Apply roof membrane with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.

C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.11 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner:
2. Address:
3. Building Name/Type:
4. Address:
5. Area of Work:
6. Acceptance Date: _____.
7. Warranty Period:
8. Expiration Date: _____.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

    a. lightning;
    b. peak gust wind speed exceeding
    c. fire;
    d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    f. vapor condensation on bottom of roofing; and
    g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075423

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 114000 – FOOD SERVICE EQUIPMENT

PART 1 -GENERAL

1.0 SUMMARY:

A. The enclosed list of manufacturers, are the approved manufacturers based on experience and failure rate for such a facility. Any deviation from the enclosed list without written approval will not be accepted and may cause said bid to be dismissed. Alternate submissions filing period will be within 5 working days of the bid release date.

B. The request must be summited in writing to the Architect of record. Such requests must give: Manufacturer name, correctional facilities currently with said manufacturer and model listed product. Fabrication shall be submitted as detailed and with the design intent, remaining in place. Any deviation from the listed Specification as noted in each item of fabrication and outlined in the Stainless Innovations or South Jersey Metal Fabricators or Carbone Fabrication specification outline will not be accepted.

C. All fabricated items must be fully welded in place and counters will be mounted to CMU walls by way of “Z” Clips. Any Fasteners used must be Tamper proof and listed for Correctional. All listed accessories and Correctional Proof (C.P.) notation will be strictly enforced.

1.1 SCOPE:

A. Work includes the furnishings and setting in place Food Service equipment as shown on the Drawings and per the specifications as hereinafter specified ready for connections by “Contractor” under Plumbing, Heating and Ventilation and Electrical sections.

1.2 GENERAL REQUIREMENTS:

A. All items shall be delivered to the site, uncrated, set in place, and leveled under these specifications. Items shall be kept dry and clean.

B. Provide all labor, materials, equipment, appliances, tools, articles, and all operations required to provide a complete food facilities equipment installation ready for continuous and satisfactory service in accordance with specifications and applicable Drawings.

C. The specifications and Drawings are intended to cover the furnishing and installation of all itemized equipment including hood and walk in refrigerators.

D. The Contractor shall be responsible for each item of equipment complying with the requirements of and being approved by the local and state health departments.

E. All equipment shall be complete with all usual wiring, switches, controls, valves, vacuum breakers, regulating valves, Required Seismic Attachments and/or Restraints, etc., to conform to the requirements of:

1. National Sanitation Foundation, Inc.
2. National Fire Protection Association.
3. American Gas Association.
4. Public Health Service.
5. Office of Local Fire Marshal.
6. Underwriter's Laboratories, Inc. (Chicago, Ill.)
7. Air Conditioning and Refrigeration Institute.
8. National Electrical Code.
9. Board of Fire Underwriters.
10. American Welding Society.
11. SMACNA Guidelines.

1.3 SUBMITTALS:

A. Shop Drawings Submit complete, detailed shop Drawings and manufacturer's catalog showing all dimensions and rough in requirements for fabrication and installation of each item of kitchen equipment in accordance with the procedure specified and obtain approval of the Architect before fabrication is begun. The Architect’s shop drawing approval does NOT absolve the fabricator of the obligation to insure that all items fit within their assigned space and work as designed or intended.

B. All equipment to be custom fabricated is to be fully detailed and dimensioned to a minimum scale of 3/4-inch to the foot for plan and elevation views and 1 1/2-inch to the foot for sectional views.

1.4 PRODUCT HANDLING:

A. All equipment shall be received at the building crated and fully protected. It will be the responsibility of the Food Service Contractor to protect the equipment until completely installed and accepted.

1.5 PERMITS AND REGULATIONS:

A. The Food Service Contractor shall procure and pay for all permits and licenses necessary for execution of his work.

B. The Food Service Contractor shall comply with all laws, ordinances, rules, orders and regulations relating to the performance of the work, the protection of adjacent property and the maintenance of passageways, guard fences and other protective facilities, as required.

C. The Food Service Contractor shall supply any and all certificates of compliance required by local government agencies prior to acceptance of equipment.

1.6 CORRECTION OF WORK:

A. All work, all materials, whether incorporated in the work or not, all process of manufacture, and all methods of construction shall be at all times and places subject to the inspection of Architect who shall be the final judge of the quality and suitability of the work, materials, processes of manufacture and methods of construction for the purposes for which they are used. Should they fail to meet his approval they shall be forth with reconstructed, made good, replaced and/or corrected, as the case may be, by the Food Service Contractor at his own expense. Rejected material shall immediately be removed from the site.

1.7 FIELD DIMENSIONS:

A. All sizes given are approximate and are as accurate as can be determined at this time. Food Service Contractor shall check all measurements at the building prior to fabrication of equipment. All equipment must conform to the finished building conditions. Where obstructions occur, equipment must be neatly scribed, fitted to and around same resulting in a sanitary, homogeneous fixture.

1.8 CHANGES IN THE WORK:

A. Architect reserves the right to require the Contractor to make reasonable modification in the routing of work and relocation of equipment.

This specifically refers to conditions where interference occurs or where more desirable accessibility can be obtained or whose materials cannot be installed because of structural or mechanical conditions encountered.

1.9 TESTING AND REGULATING:

A. The Food Service Contractor must test and regulate all equipment in the presence of the Architect proving it to be operating properly and also provide instruction in the use of any item requested, after the final installation.

PART 2 – PRODUCTS

2.0 MATERIALS:

A. All materials and equipment shall be new and of best commercial grade. Use product of one manufacturer where two or more items of same kind of equipment are required.

B. Workmanship throughout shall be of the highest grade, in accordance with the best practice and most modern methods. All parts shall fit together securely and accurately. Field joints are to be provided only for the convenience of installation and shipping and shall be held to a minimum. Joints shall be provided with butt straps on the underside of the top so that tops can be pulled together tightly forming a hairline, watertight connection. All field joints shall be welded, ground and polished to a #4 finish. There shall be no exposed bolts or rivets on the top except where construction necessitates, and approval is obtained.

C. Stainless-steel (S/S) shall be type 304, extra low carbon nonmagnetic, austenitic 18% chrome 8% nickel corrosion resisting alloy steel. Sheets shall be flat, free of all buckles and surface imperfections. Type 300 and 400 grade S/S will not be accepted.

D. Galvanized iron (GI) shall be an approved grade copper bearing steel. Zinc coating shall be applied after fabrication (brake or die forming, drilling, fitting, welding or other operations). Finish of G.I. to be two coats of epoxy based gray hammertoe paint on prime undercoat over thoroughly cleaned surfaces.

E. All gauges for sheet iron and sheet steel shall be U.S. Standard gauges and finished equipment gauge thickness shall not very more than 5% plus or minus from thickness indicated below:

Gauge Thickness Gauge Thickness

#10 0.1406 #16 0.0625

#12 0.1094 #18 0.050

#14 0.0781 #20 0.0375

F. Unless otherwise specifically called for herein, no material lighter than #20 gauge shall be incorporated into the work.

G. Stainless-steel pipe and tubing shall be seamless steel sheets.

H. Structural sheet members used for framing consisting of angles, bands, bars, channels, etc., shall be ductile in quality, free of hard spots, runs, checks, cracks and other surface defects. They shall be smooth, galvanized by the hot dip process with all surplus removed and free of runs, blisters, excess shelter and uncoated spots or patches.

I. White metal shall consist of corrosion resistant metal containing not less than 30% nickel. All castings shall be rough ground, polished and buffed to bright luster, free from pit marks, runs, checks, burrs and other imperfections. In lieu of white metal castings, 18 X 8 stainless-steel die stamped or cast will be acceptable.

J. All welding shall be done by the Heli arc method. All welding shall be done in a thorough manner with welding rod of the same composition as sheets or parts welded. Welds shall be complete welds, strong and ductile with excess metal ground off and joints finished smooth to match adjoining surfaces. Welds are to be free of mechanical imperfections, such as gas holes, pits, runs, cracks, etc. All joints in tops, sides and ends of fixtures, tables, drain boards, over shelves, sinks, etc. shall be continuously welded so that the fixtures shall appear as one-piece construction. Butt welds made by spot welding straps under seams, filling in the voids with solder, and finished by grinding, will not be acceptable. Welding shall conform to American Welding Society (AWS) requirements.

K. Spot welds shall have a maximum spacing between welds of 3 inches. Tack welds shall have at least 1/4-inch length of welding material at a maximum spacing of 4 inches. Welds at the ends of channel battens shall not exceed 2 inch centers.

L. All Exposed surfaces shall be free from bolt, screw and rivet heads. When bolts are required they shall be of concealed type and be of similar composition as the metal to which they are applied. Where bolt or screw threads on the interior of fixtures are visible or may come in contact with heads or wiping cloth they must be capped with a acorn nut with a lock washer.

M. Where screw threads are not visible or readily accessible, they may be capped with a standard lock washer and steel nut treated to prevent rusting or corroding. Where bolts or screws are welded to the underside of trim or tops, the reverse side of the weld shall be neatly finished uniform with the adjoining surface of the trim or the top. Depressions at these points will not be acceptable. Rivets shall not be used as a method of fastening in any location.

N. All welds, bolts, screws, nuts, washers and rivets shall be steel except where brass or is fastened, in which case they shall be brass or respectively. Where dissimilar metals are fastened, the fastenings shall be of higher grade metal. Spacing and extent of welds, bolts, screws and rivets shall insure suitable fastenings and prevent bulging of metals fastened.

O. In no case shall soldering, riveting, tack or spot welding at any time be considered as a replacement for welding, nor shall any soldering operation be done where dependence is placed on stability and strength of the joint or fixture proper.

P. In general, fixtures shall be shop fabricated of one-piece construction, shipped to the job completely assembled. Equipment too large to transport or enter the building as one piece shall be constructed so that welded field joints can be made at the job site.

Q. Joints welded at the job site shall be equal to construction as specified above.

R. Trim is not an acceptable substitute for accuracy and neatness; and when trim is required and accepted by the Architect in lieu of rejection of items of equipment, it is the Food Service Contractor's responsibility to provide same at no additional cost.

S. All equipment that rests on masonry bases shall be set level into a bed of silicone rubber sealant and it is the responsibility of the Food Service Contractor to coordinate his equipment to the base.

T. All equipment that butts or is adjacent to a wall shall be scribed and sealed to the wall with silicone rubber sealant and suitably fastened to wall with fasteners a minimum of 48-inches on center.

2.2 GRINDING, POLISHING, FINISHING:

A. All Exposed, welded joints shall be suitably ground flush with adjoining material and neatly finished to harmonize therewith. Wherever material has been sunken or depressed by welding operation, such depressions shall be suitable hammered and peened flush with the adjoining surface and, if necessary, again ground to eliminate low spots.

In all cases the grain of rough grinding shall be removed by successive fine polishing operations. All shall have a No. 4 finish on all exposed surfaces and a No. 2 finish on all concealed surfaces.

B. All unexposed welded joints on under shelves of tables or counters in construction shall be suitable coated at the factory by means of metallic base point to prevent possible corrosion at such locations.

C. After galvanized iron members have been welded, all welds and areas where galvanizing has been damaged shall be re coated to prevent oxidation. Submit a sample of re coated area complete with a detailed explanation of the method to be used for approval before proceeding.

D. Butt joints and contract joints, wherever they occur, shall be close fitting and shall not require solder as a filler. Wherever break bends occur they shall be free of undue extrudence and shall not be flaky, scaly or cracked in appearance of the material all such marks shall be removed by suitable grinding, polishing and finishing. Wherever sheared edges occur they shall be free of burrs, fins or irregular projections and shall be finished to obviate all danger of cutting or laceration when the hand is drawn over such sheared edges. In no case are overlapping materials to be acceptable where miters or bull nosed corners occur.

E. The grain of polishing shall run in the same direction on all horizontal and on all vertical surfaces of each individual item of fabricated equipment, except in the case where table or sink tops join at right angles, where the finish of the horizontal sections of each terminating in a mitered edge shall be acceptable. Where sinks and adjacent drain boards are equipped with splash back, the grain of polishing shall be consistent in direction throughout the length of the splash back and sink compartment.

F. Where surfaces are disturbed by the fabricating process, such surfaces shall be finished to match the adjoining surfaces.

G. Final Polishing: At the completion of the installation work, all shall be gone over with a portable polishing machine and buffed to perfect surfaces. All painted surfaces shall be carefully gone over and retouched as required.

2.3 FABRICATION: Correctional Package

A. Metal Table Tops: Construct of 14-gauge with front, sides and backs finished in 1 1/2-inch diameter rolled edge or fully detailed bullnose edges. Bullnose edge must be fully detailed in the submittal shop drawings for approval. Round all corners, weld, grind and polish.

Reinforce underside of top with hat channels welded in place. Stud Screws Will Not Be accepted. Arrange reinforcing so that gussets for legs hereinafter specified can be welded to full flat surfaces of reinforcing.

B. Dish Table Tops: Construct of 14-gauge with all edges turned up 3-inch and terminating in a 1 1/2-inch diameter rolled rim. Round all corners, weld, grind and polish. Reinforce underside of top with #14-gauge 4-inch X 1-inch channels plug welded to top and 1-inch X 3-inch inverted hat channels except where indicated differently. Close ends of all channels with neatly welded cap of same material.

C. Tubular Frame Base: Construct of 1 5/8-inch O.D. #16-gauge legs with longitudinal and lateral cross braces of 1 ¼-inch. Weld between legs and bracing shall be ground smooth and polished to a uniform finish. Fit each leg with a fully enclosed circular gusset and stainless-steel adjustable bullet foot with modified toe portion to receive 5/16-inch floor pin when specified. Legs shall be provided as indicated in the details.

D. Cabinet Bases: Constructed with tops as specified except when adjacent to wall, turn edges up 4-inch and back 2-inch on 45 degrees angle to wall with ends boxed. Also maintain 3/4-inch clearance for cleaning where rolled table top bottom edge turns back to cabinet body. Cover corners of raised edge both vertically and horizontally as specified. Secure tops to understructure by welded and concealed studs with washers and nuts. Construct understructure entirely of #16 or #18-gauge as specified.

1. Completely enclose vertical corner members with #18-gauge . Attach all trim so that no bolt, screw or rivet heads are visible from the exterior. Extend the body enclosure sheets around the front to trim the front opening, with all seams welded ground and polished. Provide with fixed bottom and one intermediate #16 or #18-gauge fixed or removable shelf as specified.
2. When indicated or specified provide sliding doors constructed with #18-gauge , double walled and sound deadened. Mount doors on case hardened ball bearing type rollers sliding on dust proof channel tracks overhead fastened in such a manner as to eliminate vibration and jarring when doors are operated. Provide door bumpers and a bottom center pin guide. Provide doors with recessed handle. In general, cabinet bases are to rest on legs.
3. Legs shall be equipped with adjustable bullet type feet. Bottom construction shall be completely enclosed. Open end channels, leg supports with openings and similar openings resulting from the addition of structural shapes for support or mounting will not be accepted unless all joints are closed with metal sheets or weld.

E. Drawers: Drawers shall be indicated on the Drawings. Drawers shall be constructed of Drawer front shall be #16-gauge double pan construction having a die stamped pull. Drawers shall operate in a pair of double slides equal to Knipe and Vogt No. 1500 equipped with metal roller bearing slides and automatic stops, and front recessed pull. Drawers in refrigerated bases to have 14-gauge extensions slides with 2-inch diameter wheels and bearings grease packed before assembly and corrosion resistant. Refrigerated drawers shall be properly insulated, and shall properly seal for an air tight, non-sweating seal. Provide heater strips where needed to prevent freeze up. Drawers to be self-closing and removable for easy cleaning. Provide two full-size stainless-steel steam table pans for each. Drawer face to be double wall #18-gauge No. 4 finish with insulation and recessed pull and full perimeter gasket.

F. Overhead Shelves for Tables: Construct of #16 gauge polished with all edges turned down and finished in a 1 1/2-inch diameter 180 degrees roll, with corners welded, ground and polished. Shelves shall be supported by 1-inch O.D. #16 gauge polished tubular uprights, tapered at top and flared at the bottom and secured to top with concealed inset tie rods, bolts and nuts. Uprights shall be spaced approximately 42-inches on center.

G. Wall Shelves: Construct of #18 gauge polished with the back and side edges turned up 2 inches and the front turned down in a 1 1/2-inch diameter 180 degrees' integral role. Shelves shall be supported by #14-gauge brackets. Undersides of shelves shall be secured to brackets by means of concealed welded studs, nuts and washers. Brackets shall be spaced no more than 60 inches on center.

H. Under shelves: Construct of #18-gauge . Roll shelves in 1 1/2-inch diameter rolled edge or up 2 inches as detailed. Notch shelves and weld to fit legs. Reinforce the underside as required with cross channels constructed of #16 gauge. All signs of welding on shelf surface shall be removed, ground and polished smooth to a uniform finish.

I. Removable Shelves: Construct removable shelves in cabinet base units, sectional of #18-gauge . Turn up edges of shelves 1-inch against cabinet walls. 1 inch turn down front edge of shelves 1 1/2-inch and hem 3/4-inch to stiffen them.

J. Sinks: Construct of #16-gauge with all interior corners rounded to a 3/4-inch radius both horizontally and vertically, forming a cove in the bottom. All joints shall be butt edged, electrically welded, ground and polished so no evidence of welding will appear. All sink sizes established in the specifications to be inside measurements. Bottom of each compartment shall be creased to the center and fitted with a 2-inch rotary operated waste outlet (Example: Krowne Metal #22-404) with a stainless-steel flat strainer and overflow assembly. Overflow shall consist of a 1 1/2-inch strainer plate, fitted in back of each compartment at proper level and directly connected to the lever handled waste outlet.

Sinks to be attached to drain boards shall be finished on the front and back edges only and left with a straight edge on the ends so that the drain boards may be continuously electrically welded thereto forming integral units with the top edge of the rolled rim curbing formed on one horizontal plane across the front of the unit through the surfaces of the drain boards. The drain boards shall be pitched to the sinks.

K. Multiple compartment sinks shall be divided with double wall #16-gauge partitions, having all corners rounded the same as other corners in sinks, continuously electrically welded in place with welds ground smooth and polished. The back, bottom and front shall be of one continuous piece with no overlapping joints or open spaces between the compartments.

1. Faucets shall be as manufactured by Krowne Metal, Wayne, NJ; T & S Brass and Bronze Works, Co., Westbury Long Island. or Fisher Faucet Company.
2. Waste outlets shall be as manufactured by Krowne Metal Wayne NJ, T & S Brass and Bronze Works, Co., Westbury Long Island; Kenco Products Corporation, Englewood, New Jersey; or equal as approved by consultant.

L. Inset Sinks: Construct as specified above for sinks and make an integral part of the top. Tabletop behind sinks shall be punched to receive a deck type combination faucet, unless splash mount has been specified.

M. Drain boards: Construct of #14-gauge full width of sink having a 3-inch-high curbing at front, back and end. All corners shall be continuously electrically welded to sinks and the welds ground smooth and polished to appear as one continuous unit. Drain boards over 24 inches long shall be provided with legs and cross bracing as specified for tubular frame bases.

N. Trough Drains: Construct of #16-gauge integral with top 4 1/2-inches wide by 1-inch-deep by length required with coved corners. Box type construction will not be accepted. For standard duty installations, Correctional troughs will have lock nut type security feature. The lock nut feature will have the appropriate tool for removal supplied as a part of the trough completion and will not be charge as an extra, but yet a part to the trough.

O. For heavy duty installations where load weights may be an issue, use the product of IMC Teddy SG ADA type 304 grating, or a submitted and approved equal. If Grating is not factory cut, finish cut edges as per manufacturer’s recommendations. Provide 1- 1/2-inch chrome plated or stainless-steel strainer plate and 1-inch O.D. tubing drain.

P. After Fabrication of food service equipment, apply peel off adhesive type heavy protection reinforced paper to all stainless-steel surfaces. Equipment shall be wrapped, padded and crated when shipped. Dented, scratched or otherwise defaced surfaces shall be removed and replaced.

Doors:

1. Cabinet doors to be double cased with #18-gauge No. 4 finish exterior and #20-gauge interior. Correctional Door shall be feature with a Lock “Heavy Duty Type” All stainless.
2. Hinged doors to be mounted on piano hinges, and to have latches equal to Magnetite No. 592. Provide recessed stainless-steel pulls.
3. Side sliding doors to be double cased , same as hinged doors, but mount on concealed overhead track with large diameter ball bearing rollers.
4. Refrigerated doors fabricated as above with insulation and mounted on standard Keli "Edgemont” hinges and latches. Said doors to be properly sealed for a “Sweat proof” seal, and heater strips used where necessary to prevent freeze up.

Q. Ducts: Verify size and position of all exhaust duct connection required for hoods, ventilators, washers and appliances; furnish and install #16-gauge all welded ducts to ceiling connection location. Welds on seams shall be continuous. Include duct collar at exposed connection. All work is to be completed by a licensed contractor.
All work must meet all Local Codes.

R. Undercounted Refrigerators:

1. Outer casing shall be constructed, of #18-gauge , inner liner shall be of #22-gauge with #2B finish unless shown otherwise.
2. Refrigerator shall be fully insulated with 2-inch minimum thickness of urethane or Styrofoam between outer casing and inner liner at top, bottom, and sides including doors.
3. Entire perimeter of door opening shall be faced with a 1/8-inch black Bakelite thermal breaker strip approximately the width of the mullion. Breaker strip at door sill shall be faced with #16-gauge .
4. Door shall be constructed with #18-gauge outer casing and #20-gauge , #2B finish, inner lining, unless shown otherwise. Molded grey vinyl latex door gasket shall be attached to perimeter of doors with concealed fasteners.
5. Drawer fronts shall be of same materials as specified for doors. Insulation shall be of same material as used in refrigerator walls and shall be a minimum of 1-inch in thickness, and shall prevent sweating. Provide heater strips where necessary to prevent freeze up.
6. Where cut outs in refrigerator top are specified or shown on detail Drawings, raw edges of cut metal and insulation shall be covered with sleeve. Counter top shall be turned down into opening to overlap sleeve with thermal barrier installed between.
A stainless-steel expanded metal guard shall be furnished for the full length and width of opening with sides to underside of refrigerator interior with closed bottom of guard located 6 1/2- inches below counter top.

S. Ice Bins and Cold Pans:

1. Inner lining shall be constructed of #18-gauge and outer casing shall be of #18-gauge galvanized iron, unless shown otherwise.
2. All ice bins and cold pans shall be fully insulated with 2-inch minimum thickness of urethane or Styrofoam between outer casing and inner liner.
3. Furnish #18-gauge perforated false bottom raised one inch above bin or pan bottom.
4. Furnish a one-inch drain and extend to floor sink.

T. Wall Flashing:

1. Wall flashing shall be of #22-gauge affixed to wall with heavy duty, heat resistant adhesive.
2. Flashing shall be fabricated from maximum width sheets for minimum amount of vertical joints and shall be sealed with silicone and capped with hem strips without exposed screws or fasteners.
3. When wall flashing includes capping of wall ends, capping shall be fabricated from #18-gauge .

U. Corner Guards and Wall Caps

1. Corner guards and wall caps shall be fabricated from #14-gauge stainless-steel.

PART 3 – EXECUTION

3.0 Warranty

1. All equipment is to be covered by a 1-year warranty cover by the equipment supplier
2. All manufactured equipment it to be covered by a 2-year warranty for parts and labor which is to include overtime rates if needed. There shall be no pre-authorization for sending of the service company.
3. All custom equipment shall have a 1-year warranty on workmanship.

3.1 Installation Cleaning and Commissioning

1. All equipment shall be wiped clean upon initial completion of installation.
2. All equipment protected till such time that the commissioning of equipment is ready.

3. All equipment is to final polished with S/S polish.

4. Demonstrations of equipment scheduling shall be the responsibility of the supplier.

END OF DETAIL SECTION

Item 1 - SHELVING UNIT, T-BAR (5 REQ'D)

All welded T-bar style, 4 shelf unit, 60"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1067TB OR KELMAX

Correctional Package Tamper Proof

(1) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each,72” x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

(2) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each,42” x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 2 – BUN PAN RACK (8 REQ'D)

Universal Pan Rack, full height, open sides, universal stepped angle slides, slides on 6" centers, holds 10 pans, all-welded aluminum construction, front & rear loading, 69-1/4" high, 5" stem bolted casters. Pan Stop, mounted to rear, prevents accidental push through of pans. Push Handle, w/donut bumpers for racks. (KEC to Verify Fit into Roll-in Units)

Correctional Package Tamper Proof

Advance UR10 or Carter Hoffman or CresCor

Item 3 - SHELVING UNIT, T-BAR (1 REQ'D)

Dunnage Rack, 60"W x 24"D x 12"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 3000 lbs., NSF

Correctional Package Tamper Proof

New Age Model 2010 OR KELMAX

Item 4 – WALK-IN COOLER/FREEZER (1 REQ'D)

23'-8" x 33'-7 1/2" x 9'-3 1/4" A.F.F. indoor "custom" L-shape, 5'-0"ID x 5'-2"ID misc frzr (w/flr), 6'-9"ID x 5'-2"ID misc co (w/flr), 10'-7"ID x 11'-0 1/2"ID frzr (w/flr), 21'-7"ID x 10'-11"ID co (w/flr), 4" Recess

Exterior finish EXPOSED AREAS: S/S Finish — Interior finish: STUCCO WHITE GALVALUME, 4" urethane NSF panels Connection to ceiling: CAMLOCK — Connection to floor: CAMLOCK — Ceiling caps: MOUNTED

FRAME: 4" urethane door section, 3-sided

LEAF: 4" thick, 3-sided, standard non-heated sweep,

LEAF WILL NOT BE RAISED UNLESS SPECIFIED OTHERWISE

HARDWARE: (3) 1248 hinge, (1) 27C deadbolt handle, (1) 27C knob inside release, (1) 1094 closer

FINISH: 22 ga. 304 #4 (ext.) Where Exposed / Stucco white galvalume (int.) / 24 ga. 430 (magnetic) liners, w/ (1) ea. 14" x 14" non-heated view window, w/ (2) ea. 7 1/2" x 3" x 1 3/4" door anchor bracket, 1 ea. 34" x 79" flush model G3t self-closing cooler swing door (Left hinge), w/ (1) ea. Modular 75LC multi-monitor temperature alarm, w/ IP-1 illuminated push button, w/ (2) ea. 3/4" concealed PVC conduit w/ terminal J-box, Kick plates for (1) 34" x 79" flush model G3t door36" high, .100 aluminum diamond tread (ext. leaf) / 36" high, .100 aluminum diamond tread (int. leaf)Lights: 2) - 4' LED light fixture w/ (2) LED lamps for Ea. cooler & freezer application (18W, 120V, .15A), CEILING TRIM: To be field fitted 304 #4

PLEASE NOTE ABOVE DESCRIPTION INFORMATION CARRIES ITEM# 9 INCLUSIVELY.

Refer to Manufacture Shop Drawings for coordinating information

Correctional Package

Imperial-Brown or ThermoKool or American Panel

Item 4.1/4.2 – WALK-IN COOLER REFRIGERATION (1 REQ'D)

Large Cooler 12x22 - Outdoor R404a split system w/ QRC, 1-year refrigeration system labor warranty (Large Cooler 12x22), w/ liquid line assy. 208-230V/3ø/60Hz/1.5HP Hermetic compressor, MCA=15, MOPD =15, 37.75W x 28.25D x 17.25H x 230lbs. 13471 BTU/H @ 9.8ºF TD with 13.9 hr runtime @ 35ºF inside/85ºF outside room, 95ºF @ cond. unit, 498ft altitude. (1) Heatcraft R404a air cooled condensing unit #MOH015X63-LLA, w/ (2) EC motors (1.82A) & air defrost w/ mounted parts, 115V/1ø/60Hz, 45.5W x 14.84D x 14.94H x 45lbs. (1) Climate Control R404a low profile evaporator model #LSC070AEK-QRC, w/ (2) EC motors (1.82A) & air defrost, w/ mounted parts, 115V/1ø/60Hz, 45.5W x 14.84D x 14.94H x 45lbs.

(1) Climate Control R404a low profile evaporator model #LSC070AEK-QRC, 4-year extended compressor warranty (Large Cooler 12x22)

Correctional Package. To be set in location as shown on Engineering plans.

Imperial Brown or ThermoKool or American Panel

Item 4.3/4.4 – WALK-IN FREEZER REFRIGERATION (1 REQ'D)

Freezer 12x12 - Outdoor R404a split system w/ QRC, 1-year refrigeration system labor warranty (Freezer 12x12), w/ liquid line assy. 208-230V/3ø/60Hz/3HP Hermetic compressor, MCA=15, MOPD =25, 37.75W x 28.25D x 19.75H x 260lbs. 9785 BTU/H @ 11.1ºF TD with 16.4 hr runtime @ -10ºF inside/85ºF outside room, 95ºF @ cond. unit, 498ft altitude. 1) Heatcraft R404a air cooled condensing unit #MOH031L63-LLA, w/ (2) EC motors (0.96A) & electric defrost (7.8A), w/ mounted parts, 208-230V/1ø/60Hz, 45.5W x 14.84D x 14.94H x 48lbs. (1) Climate Control R404a low profile evaporator model #LSF090BEK-QRC, 4-year extended compressor warranty (Freezer 12x12)

Correctional Package. To be set in location as shown on Engineering plans.

Imperial Brown or ThermoKool or American Panel

Item 5 - SECURITY FLOOR TROUGH (3 REQ'D) 8" x 44"

14 gas all welded construction, perimeter channel edge at top with offset for grate, slope bottom to drain Provide integral 6" die box pattern sump drain(s) with removable s/s strainer basket and removable s/s strainer plate, 14 gas s/s sleeve welded to bottom of sump for attaching to building drain(s), Removable sash sectional bar grate - 1" x 3/16" flat bar, construction with 1/2" die s/s reinforcing rods, Use tamper resistant fasteners as required.

Correctional Package

SHOP DRAWINGS WITH ALL DETAILS TO BE SUBMIITED FOR APPROVAL.

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 6 - SHELVING UNIT, T-BAR (3 REQ'D)

All welded T-bar style, 4 shelf unit, 60"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1067TB OR KELMAX

Correctional Package Tamper Proof

(2) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each,42” x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 7 - SHELVING UNIT, T-BAR (1 REQ'D)

Dunnage Rack, 42"W x 24"D x 12"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 3000 lbs., NSF

Correctional Package Tamper Proof

New Age Model 2064 OR KELMAX

Item 8 - SPARE NO.

Item 9 – WALK-IN COOLER/FREEZER (1 REQ'D)

PLEASE NOTE DESCRIPTION INFORMATION CARRIES WITHIN ITEM# 4 INCLUSIVELY.

Refer to Manufacture Shop Drawings for coordinating information

Correctional Package

Imperial-Brown or ThermoKool or American Panel

Item 9.1/9.2 – WALK-IN COOLER REFRIGERATION (1 REQ'D)

Misc Cooler - Outdoor R404a split system w/ QRC,1-year refrigeration system labor warranty (Misc Cooler), w/ liquid line assy. 208-230V/1ø/60Hz/0.5HP Hermetic compressor, MCA=15, MOPD =15 3.75W x 28.25D x 17.25H x 176lbs. (1) Heatcraft R404a air cooled condensing unit #MOH005X62-LLA, w/ (1) EC motors (0.91A) & air defrost, w/ mounted parts, 115V/1ø/60Hz, 29.5W x 14.84D x 14.94H x 31lbs. (1) Climate Control R404a low profile evaporator model #LSC052AEK-QRC. 4-year extended compressor warranty (Misc Cooler)

Correctional Package. To be set in location as shown on Engineering plans.

Imperial Brown or ThermoKool or American Panel

Item 9.3/9.4 – WALK-IN FREEZER REFRIGERATION (1 REQ'D)

Misc Freezer - Outdoor R404a split system w/ QRC

3394 BTU/H @ 9.9ºF TD with 17.4 hr runtime @ -10ºF inside/85ºF outside room, 95ºF @ cond. unit, 498ft altitude, 1-year refrigeration system labor warranty (Misc Freezer) w/ liquid line assy. 208-230V/3ø/60Hz/1HP Hermetic compressor. MCA=15, MOPD =15, 23.75W x 28.25D x 17.25H x 166lbs. (1) Heatcraft R404a air cooled condensing unit #MOH011L63-LLA, w/ (1) EC motors (0.48A) & electric defrost (3.9A), w/ mounted parts, 208-230V/1ø/60Hz, 29.5W x 14.84D x 14.94H x 24lbs. (1) Climate Control R404a low profile evaporator model #LSF035BEK-QRC. 4-year extended compressor warranty (Misc Freezer)

Correctional Package. To be set in location as shown on Engineering plans.

Imperial Brown or ThermoKool or American Panel

Item 10 - SHELVING UNIT, T-BAR (1 REQ'D)

All welded T-bar style, 4 shelf unit, 60"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1067TB OR KELMAX

Correctional Package Tamper Proof

(1) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each,48” x 20"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 11 - SHELVING UNIT, T-BAR (1 REQ'D)

All welded T-bar style, 4 shelf unit, 48"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1066TB OR KELMAX

Correctional Package Tamper Proof

(1) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each,42” x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 12 – CUSTOM WORKTABLE (1 REQ'D)

Work Table, 60"W x 30"D, 14ga 304 top with heavy supports below, without backsplash, 18-gauge under shelf & stainless-steel legs & adjustable stainless-steel Flanged feet, all-welded construction, NSF. Underbody of S/S top to be full enclosed

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 13 – CUSTOM WORKTABLE “L” Shaped (1 REQ'D)

Work Table, 14ga 304 top without backsplash, 18-gauge under shelf & legs & adjustable Flanged feet, all-welded construction, NSF. Length and shape as shown on plans. Underbody of S/S top to be full enclosed.

Correctional Package Tamper Proof

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 14 - SPARE NO.

Item 15 - SHELVING UNIT, T-BAR (2 REQ'D)

Dunnage Rack, 48"W x 24"D x 12"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 3000 lbs., NSF

Correctional Package Tamper Proof

New Age Model 2009 OR KELMAX

Dunnage Rack, 60"W x 24"D x 12"H, all welded aluminum construction, 1-1/2" x 1-3/4" x 0.070 tubing, welded aluminum caps on feet, weight capacity 3000 lbs., NSF

Item 16 – CAN STORAGE RACK (2 REQ'D)

Can Storage Rack, stationary design with adjustable feet, sloped glides for automatic can retrieval, aluminum construction, holds 162-#10 cans or 216-#5 cans, NSF

Correctional Package, Tamper Proof Screws.

New Age Model 1250 OR Deselect OR KAMAX

All New Age products are made in the USA, Lifetime warranty against rust & corrosion, 5-year construction warranty.

Item 17 - SHELVING UNIT, T-BAR (6 REQ'D)

All welded T-bar style, 4 shelf unit, 72"H x 24"W x 72"L, aluminum construction, weight capacity 1000 lbs. per shelf, NSF

New Age Model 1068TB OR KELMAX

Correctional Package Tamper Proof

(2) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each,60” x 24"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

(2) T-Bar Series Shelving Unit, 4-tier, 1500 lbs. capacity each,48” x 20"D x 72"H, 1000 lbs. shelf capacity, 18-1/2" shelf clearance, all welded 1-1/2" aluminum tube construction, adjustable feet, NSF

Item 18 - FOOD SLICER, ELECTRIC (2 REQ'D)

Manual Slicer, 13" dia. Precise Edge™ knife, top mounted knife sharpener, construction, gear-driven, antimicrobial protection, knife cover interlock, dual gear thickness adjustment, EZ-Glide™ system, open base design, ETL, NSF, 1/2 Hp, 115v/60/1, 7 amps, 2 year parts and 1 year labor warranty plus 15 years on the knife drive gears, standard, Correctional package, FACTORY INSTALLED, (pricing applies only at time of equipment purchase)

Globe Model 4600N or Hobart or Berkel

Item 19 – PREP TABLE W/2 COMPARTMENT SINK & WORKSINK

2 Compartment Prep Counter with 2) Sinks 22" x 18" x 12" & (1) Work Sink 20" x 18" x 12" Full welded 14Ga S/S top with Welded 18 Ga S/S Under shelf, W/ Cross rails below area of Sink. Length and shape to be as shown on plans. Backsplash needs to be enclosed at bottom and tight to wall. 6” high backsplash. Unit supplied with Flanged Feet. Flat section to be provided for Can opener.

Select Stainless or South Jersey Metal or Keas Fabrication

Accessories: 2) Krowne Metal 15-812L Royal Series Faucet, deck-mounted, 8" centers, swing spout, 12" long, 1/4 turn ceramic cartridge valve, NSF, CSA (Best), low lead compliant. 3) Krowne 22-404 Lever wastes.

Item 20 – MANUAL CAN OPENER (1 REQ'D)

Can Opener, manual, #1 with plated base (for cans up to 11" tall), "Old Reliable"

Edlund Model 1 or No Equal

Item 21 – CUSTOM WORKTABLE (1 REQ'D)

Work Table, 96"W x 30"D, 14ga 304 top with heavy supports below, without backsplash, 18-gauge stainless-steel under shelf & stainless-steel legs & adjustable Flanged feet, all-welded construction, NSF. Underbody of S/S top to be full enclosed

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 22 - FOOD MIXER (1 REQ'D),

Planetary Mixer, floor model, 30 qt. 304 bowl, #12 attachment hub, (3) fixed-speeds, digital controls with 60- minute timer & batch recall, permanently lubricated gear-driven transmission, removable bowl guard with built-in ingredient chute, interlocking bowl lift, thermal overload protection, cast iron body with enamel gray paint, non-slip rubber feet, includes: wire whip, aluminum spiral dough hook,& flat beater, 1 HP, 120/60/1-ph, 16.0 amps, 3-wire cord with NEMA 15-20L, cETL us, NSF

Correctional Package

Globe Model SP30 or Hobart or Berkel

2 year parts (excludes wear/expendable parts), Correctional Package, FACTORY INSTALLED (pricing applies only at time of equipment purchase), Bowl Truck, heavy-duty, for SP30 30 quart mixer.

Item 23- SPARE NO.

Item 24 – SINK, HAND (2 REQ'D)

Hand Sink, 17" x 15" OA, wall mount with bracket, 14" x 10" front-to-back x 6" deep, splash mount gooseneck spout operated with foot pedals, 1-1/2" drain, soap dispenser, stainless-steel construction, NSF

Correctional Package Tamper Proof

Krowne Metal Model HS-14 - *UPGRADE* Low Lead Commercial Faucet Upgrade 2 ea.

Side Splashes for hand sink, pair 2 ea.

Item 25 - ICE MACHINE (1 REQ'D)

Ice Maker, Cube-Style, 30"W, air-cooled, self-contained condenser, production capacity up to 1087 lb/24 hours at 70°/50° (935 lb AHRI certified at 90°/70°), finish, crescent cube style, R-404A refrigerant, 208-230v/60/1-ph, 12.5 amps, NSF, UL.

Correctional Package

Hoshizaki Model KM-1100MAJ or Manitowoc or Scotsman

Tamper Proof Kit, 30" W x 32-1/2" D, front panel, tamper proof Torx® fasteners, (2) Torx® bits, perforated air vents for 30" W air-cooled machines

Item 25.1 – Filter System (1 REQ'D)

Everpure® High Flow CSR Triple-XCLM+ Fountain Filtration System, 3-6 gpm flow rate, rated capacity 27,900 to 57,900 gallons, chloramines reduction, NSF

Everpure Model EV976133

Item 26 - ICE BIN (1 REQ'D)

Ice Bin, 52"W, top-hinged front-opening door, 900-lb ice storage capacity, for top-mounted ice makers, exterior, painted legs included, protected with H-GUARD Plus Antimicrobial Agent, ETL, ETL-SanitationCorrectional Package

Hoshizaki Model B-900SF or Manitowoc or Scotsman

Item 27 - SECURITY FLOOR TROUGH (1 REQ'D) 12" x 50"

Floor Trough, 12" x 50", grate & removable basket, 14GA. , NSF

Correctional Package supplied with Key tool to remove grates.

SHOP DRAWINGS WITH ALL DETAILS TO BE SUBMIITED FOR APPROVAL.

Stainless Innovations or South Jersey Metal or IMC Teddy

Item 28– SINK HEATER

Sink Heater, electric, under sink design, electric operation, front, for over 21" square sink area, 9.0 kW, NSF, cUL us, Made in USA. 480v/50/60/3-ph (Not for retrofit), Security package (Torx® screws and control cover) (Not for retrofit)

Correctional Package

Hatco Model no. 3CS-9 or Hubbell or Allpoints

Item 29– PRE-RINSE FAUCET

Krowne Royal Series, pre-rinse Assembly, with add-on faucet, wall mount, 8" centers, spring action flexible gooseneck, 38"H hose with 15" overhang & 1.2 GPM spray head, built in check valves, 2.0 GPM add-on faucet with 12" swing spout, quarter-turn ceramic cartridge valves, includes wall bracket & mounting kit, chrome plated brass base, low lead compliant, includes internal check valves to prevent backflow and cross contamination, NSF (interchangeable with most brands) (ships pre-assembled)Correctional Package

KROWNE Model no. 17-109WL or Fisher Faucet or T&S Brass

Item 30– SPLASH MOUNT FAUCET

Krowne Royal Series Faucet, splash-mounted, 8" centers, 14" swing spout, quarter-turn ceramic cartridge valve, low lead compliant, NSF, Includes internal check valves to prevent backflow and cross contamination.

Correctional Package

KROWNE Model no. 14-814L or Fisher Faucet or T&S Brass

Item 31 – 3 COMPARTMENT SINK

3 Compartment sink w/ 3 Compartment Sink W/ 2) 22" x 28" Sinks and 1) 26" x 28" All 14" deep. Length and shape as shown on plans. Legs to be removable and will get welded to gusset in field. 8” high Backsplash, 2) 8” o.c. holes for splash mounted faucets. Supplied with flanged feet. 14ga S/S top 304. W/fully welded Cross rails at sides and front. Sanitize Sink to receive Item No. 28 Sink Heater

Stainless Innovations or South Jersey Metal or Carbone Fabricators

Item 32 – TRAY DRYING RACK

Tray-Drying Rack, mobile, 3 tray levels, (40) 18" x 26" trays per level, 1.4" angle spacing, heavy duty aluminum construction, (4) 5" platform casters, KD, NSF, Caster Lock, for 5" platform caster

Correctional Package

New Age Model 1067TB OR Kelmax

Item 33 – CUSTOM WORKTABLE (1 REQ'D)

Work Table, 60"W x 30"D, 14ga 304 stainless-steel top with heavy supports below, with 6” backsplash, 18-gauge under shelf & stainless-steel legs & adjustable stainless-steel Flanged feet, all-welded construction, NSF. Underbody of S/S top to be full enclosed. Unit to “Z” Clip to wall.

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 34 - SPARE NO.

Item 35 - HEATED CABINET, ROLL-IN (2 REQ'D)

Designer Line Warmer, roll-in, two-section, front, aluminum interior & ends, standard depth cabinet, full-height solid doors, electronic control with digital display, hi-low alarm, cETLus, NSF, Made in USA Correctional Package

Continental Refrigeration Model DL2WI or Traulsen (R-Series) or Victory (Ultra-Spec Series)

Accessories: One way security screws, Locking hasp (lock not included), mesh security cover, Coverless hinges

Item 36 - REFRIGERATOR, ROLL-IN (3 REQ'D)

Designer Line Refrigerator, roll-in, two-section, self-contained refrigeration, stainless-steel front, aluminum interior & ends, standard depth cabinet, full-height solid doors, electronic control with digital display, hi-low alarm, removable stainless-steel ramps, 1/2 HPCorrectional Package

Continental Refrigeration Model DL2RI or Traulsen (R-Series) or Victory (Ultra-Spec Series)

Accessories: One-way security screws, Locking hasp (lock not included), Stainless-steel mesh security cover, Coverless hinges

Item 37 - FREEZER, ROLL-IN (1 REQ'D)

Designer Line Freezer, roll-in, two-section, self-contained refrigeration, stainless-steel front, aluminum interior & ends, standard depth cabinet, full-height solid doors, electronic control with digital display, hi-low alarm, removable ramps, 1 HP, Correctional Package

Continental Refrigeration Model DL2FI or Traulsen (R-Series) or Victory (Ultra-Spec Series)

Accessories: One-way security screws, Locking hasp (lock not included), mesh security cover, Coverless hinges

Item 38 -Chef's Counter (1 REQ'D)

14 gauge stainless-steel top w/ 10” chamfer edges. 1-1/2" x 1-1/2" x 1/8" galv. angle frame & reinforcement, 18 ga. Stainless-steel body panels, 6" high with flanged feet., Provide a 12" x 14" x 12" - 14 ga. Stainless-steel integral welded sink, One (1) lever waste drain with overflow and handle bracket. Length and shape as shown on plans.

Sink area shall be a cabinet section with fully welded curb base. Base shall notch out for floor sink. Access to cabinet shall be through full body length double pan access panel held in place with fitted security screws. Screws shall not be removable from panel section. Cabinet section shall be approximately 24” wide by the depth of the counter.

Stainless Innovations or South Jersey Metal or Carbone Fabricators

Accessories: Krowne 15-801 Royal Series Faucet, deck-mounted, 8" centers, gooseneck

Item 39 – CUSTOM WORKTABLE (1 REQ'D)

Work Table, 96"W x 30"D, 14ga 304 top with heavy supports below, without backsplash, 18-gauge under shelf & stainless-steel legs & adjustable stainless-steel Flanged feet, all-welded construction, NSF. Underbody of S/S top to be full enclosed

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 40– EXHAUST HOOD W/MAKE-UP AIR SUPPLIED WITH FAN UNITS

6030ND-2-PSP-F - 11ft-0" Long Exhaust-Only Wall Canopy Hood with Front Perforated Supply Plenum with Built-in 3" Back Standoff, 100% 430 SS, Fire Cabinet Wall Mounted 12.00" Width x 60.00" Length x 30.00" Height, FILTER - 20" tall x 16" (19.625" by 15.625") wide Stainless-Steel Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 85% efficient at 9 microns, 76% efficient at 5 microns. Used on hoods shipped AFTER 7/27/17.

12" x 12" Recessed LED Light, 3K warm output. EXHAUST RISER - Factory installed 10" X 24" X 4", SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers, 1/2 Pint Grease Cup New Style, Flanged Slotted, BACK STANDOFF (FLAT) 12" Wide 132" Long, Prison Package - Replacement hood screws, Prison Package - Burglar Bars in Exhaust Riser, Prison Package - Lockable Filters.

Hood #2 - Job #3871812

6030ND-2-PSP-F - 11ft 0" Long Exhaust-Only Wall Canopy Hood with Front Perforated Supply Plenum with Built-in 3" Back Standoff, 100% 430 SS, FILTER - 20" tall x 16" (19.625" by 15.625") wide

Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 85% efficient at 9 microns, 76% efficient at 5 microns. Used on hoods shipped AFTER 7/27/17. 12" x 12" Recessed LED Light, 3K warm output. EXHAUST RISER - Factory installed 10" X 24" X 4", SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers, 1/2 Pint Grease Cup New Style, Flanged Slotted, BACK STANDOFF (FLAT) 12" Wide 132" Long, Prison Package - Replacement hood screws, Prison Package - Burglar Bars in Exhaust Riser, Prison Package - Lockable Filters.

Fire System #1 - Job #3871812

ANSUL-3.0/3.0/3.0/3.0-WC Ansul 12 gallon Fire System in Wall Mounted Utility Cabinet (includes pre-piped hood(s) with detection, tank(s), release mechanism, microswitches and pull station).

Includes piping for hoods: 1, 2, 3, 4.

- GAS VALVE - 2" Mechanical Shutoff Valve (Ansul)(28-55610) - Includes Upstream Strainer assembly; SUPPLIED BY DISTRIBUTOR.

Fan #1 USBI36DD-RM-S - Exhaust Fan - Job #3871812

USBI36DD-RM Direct Drive Exhaust Only Unit With 37.250" Steel Wheel. Utility Set Exhaust Fan w/ 2" Grease Drain. Clockwise Rotation When Looking At Inlet. Exhaust Fan handles 10400 CFM @ -2.000" wc ESP, Fan runs at 727 RPM. EXHAUST Motor: 15.000 HP, 3 Phs, 208 V, 60Hz, 42.3 FLA, ODP, Premium (E-Plus3) Eff. - BI - Discharge Orientation - Vertical Upper Left - CW Looking At Inlet. Grease Cup for Utility Sets. Option for Utility Sets. BI36 - Rain Cap Assembly. BI36 - Inlet Ring. Floor Mount Spring Vibration Isolators. Option for the BI33 thru BI36, USBI36 (6 required) Utility Set units. Max Weight = 260 lbs. 1" Deflection. 3/8" bolt diameter. (5C129 X 6). "Yellow" (5C129) - Mason C-A-310. - Curb RAILS-BI30-36 12H(Set of 2) On Fan #1 Flat Curb.

Fan #2 A4-D.1000-30D - Heater - Job #3871812

A4-D.1000-30D Direct Gas Fired Heated Make Up Air Unit with 30" Direct Drive Fan and 24" Burner.

Supply Fan handles 8800 CFM @ 1.000" wc ESP, Fan runs at 1098 RPM. Heater supplies 643978 BTUs. 70°F Temperature Rise. [Fuel: Natural Gas]. Supply Motor: 7.500 HP, 3 Phase, 208 V, 60Hz, 22.3 FLA, ODP, Premium (E-Plus3) Eff.

Down Discharge - Air Flow Right -> Left - Sloped Filtered Intake for Size #4 Modular Direct Fired Make-Up Air Units. 45.81" Wide x 70.05" Long x 44.00" High. Includes 2" MV EZ Kleen Metal Mesh FIlter.

Maxitrol 14 • 40-80°F Discharge Temp Control - Gas Manifold for DF4 GM - BTU 0 - 1100000 - 7 in. w.c. - 14 in. w.c., No Insurance Requirement (ANSI), BV250-1010 - Cooling Interlock Relay. 24VAC Coil. 120V Contacts. Locks out burner circuit when AC is energized. - Motorized Back Draft Damper 34" X 36" for Size 4 Standard & Modular Heater Units w/Extended Shaft, Standard Galvanized Construction, 3/4" Rear Flange, Low Leakage, NFBUP-S Actuator Included, - Low Fire Start.

Allows the burner circuit to energize when the modulation control is in a low fire position. - Gas Pressure Gauge, 0-35", 2.5" Diameter, 1/4" Thread Size, - Gas Pressure Gauge, -5 to +15 Inches Wc., 2.5" Diameter, 1/4" Thread Size, - Separate 120VAC Wiring Package for Make-Up Air Units. Option must be selected when mounting VFD in prewire panel or with DCV package. Provides separate 120VAC input to supply fan. This 120V signal must be run by electrician from DCV to mua switch. - Curb CRB42x20INS Insulated On Fan #2 Flat Curb - Rail RAIL-42" x 6" x 20"H On Fan #2

Electrical System #1 - Job #3871812

DCV-1111 Demand Control Ventilation, w/ control for 1 Exhaust Fan, 1 Supply Fan, Exhaust on in Fire, Lights out in Fire, Fans modulate based on duct temperature. INVERTER DUTY 3 PHASE MOTOR REQUIRED FOR USE WITH VFD. Room temperature sensor shipped loose for field installation.Verify distance between VFD and Motor; additional cost could apply if distance exceeds 50 feet. Includes 4 Duct Thermostat kits. - 15.000 HP 3 phs 208 V Upgrade, - ESV552N02TXB571 - Variable Frequency Drive - 7-1/2 HP Max., 200/240 V, Three Phase, 23.0 A Max., NEMA 1 Enclosure, with 2RJ-45 FOR MODBUS, - ESV153N02TXB571 - Variable Frequency Drive - 20 HP Max., 200/240 V, Three Phase, 54.0 A Max., NEMA 1 Enclosure, (Default is Shipped Loose for Field Installation)

PART NEEDS PROGRAMMING - VERIZON CELLULAR KIT, WIRED ANTENNA AND VERIZON DATA FOR 1 YEARS. - PSP thermostat kit, includes 1x duct thermostat, quick seal, and j-box for monitoring of PSP discharge temperature. - Digital Prewire Lighting Relay Kit. Includes hood lighting relay & terminal blocks. Allows for up to 1400W of lighting each. - CAT-5E CABLE - 50 Foot. UV rated. - Thermistor CABLE - 18/2 AWG GREEN WHITE, plenum rated. USED for thermistor duct stat. Per Foot Price. - CAT-5E CABLE - 50 Foot. UV rated.

CASLink Monitoring

DUCTING SYSTEM

Shall consisted of the enclosed or a variation of such based-on coordination of duct run with the architect / engineers drawings. Final needs may vary at no additional cost to Owner. All Information enclosed is subject to change and requires KEC coordination.

Duct Run #1

(RC1) DW22DWRISER-3R-S Double Wall Riser Cover - Used On 16" Inner Riser, 4" long - 3 Layers Reduced Clearance - 22" Outer Riser Shell Assembly. Includes Insulation & Single V Clamps For Inner & Outer Connections. (RC2) DW22DWRISER-3R-S Double Wall Riser Cover - Used On 16" Inner Riser, 4" long - 3 Layers Reduced Clearance - 22" Outer Riser Shell Assembly. Includes Insulation & Single V Clamps For Inner & Outer Connections. (RC3) DW22DWRISER-3R-S Double Wall Riser Cover - Used On 16" Inner Riser, 4" long - 3 Layers Reduced Clearance - 22" Outer Riser Shell Assembly. Includes Insulation & Single V Clamps For Inner & Outer Connections. (RC4) DW22DWRISER-3R-S Double Wall

Riser Cover - Used On 16" Inner Riser, 4" long - 3 Layers Reduced Clearance - 22" Outer Riser Shell Assembly. Includes Insulation & Single V Clamps For Inner & Outer Connections. (P1) DW1645DWASY-3R-S Double Wall Duct - 16" Inner 45 Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P2) DW16DWTEASY-3R-S Double Wall Duct - 16" Inner Tee Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P3) DW16DWACCDOORCOV-3R-S Double Wall Duct - 16" Inner Access Door & 22" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 22" Outer Shell. (P4) DW1620DWRNDADPEC3ASY-3R-S Double Wall Duct - 16" X 20" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 22" X 26" Outer Shell. (P5) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Outer Shell. (P6) DW20DWYTEASY-3R-S Double Wall Duct - 20" Inner Y Tee Duct - 3 Layers Reduced Clearance - 26" Outer Shell. (P7) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Outer Shell. (P8) DW2047DWAJD-3R-S Double Wall Adjustable Duct - 20" Inner Duct, 47" long - 3 Layers Reduced Clearance - 26" Outer Shell. Min Length = 11" / Max Length = 48.5" / Adjustment = 30.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P9) DW2630SADKIT Duct - Horizontal Saddle Support Kit, Used With 26" OD - Includes Uni-Strut Cut To Length, DW2630SAD, & Hardware Bag 4. (P10) DW1620DWRNDADPEC3ASY-3R-S Double Wall Duct - 16" X 20" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 22" X 26" Outer Shell. (P11) DW16DWTEASY-3R-S Double Wall Duct - 16" Inner Tee Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P12) DW1645DWASY-3R-S Double Wall Duct - 16" Inner 45 Duct - 3 Layers Reduced Clearance - 22" Stainless-Steel Outer Shell. (P13) DW16DWACCDOORCOV-3R-S Double Wall Duct - 16" Inner Access Door & 22" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 22" Outer Shell. (P14) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Outer Shell.

(P15) DW2024DWRNDADPEC3ASY-3R-S Double Wall Duct - 20" X 24" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 26" X 30" Outer Shell. (P16) DW2427DWAJD-3R-S Double Wall Adjustable Duct - 24" Inner Duct, 27" long - 3 Layers Reduced Clearance - 30" Outer Shell. Min Length = 11" / Max Length = 24.5" / Adjustment = 13.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P17) DW1645DWASY-3R-S Double Wall Duct - 16" Inner 45 Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P18) DW16DWTEASY-3R-S Double Wall Duct - 16" Inner Tee Duct - 3 Layers Reduced Clearance - 22" Outer Shell. (P19) DW16DWACCDOORCOV-3R-S Double Wall Duct - 16" Inner Access Door & 22" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 22" Outer Shell. (P20) DW1620DWRNDADPEC3ASY-3R-S Double Wall Duct - 16" X 20" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 22" X 26" Outer Shell. (P21) DW2047DWAJD-3R-S Double Wall Adjustable Duct - 20" Inner Duct, 47" long - 3 Layers Reduced Clearance - 26" Outer Shell. Min Length = 11" / Max Length = 48.5" / Adjustment = 30.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P22) DW2630SADKIT Duct - Horizontal Saddle Support Kit, Used With 26" OD - Includes Uni-Strut Cut To Length, DW2630SAD, & Hardware Bag 4. (P23) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Stainless-Steel Outer Shell. (P24) DW20DWYTEASY-3R-S

Double Wall Duct - 20" Inner Y Tee Duct - 3 Layers Reduced Clearance - 26" Stainless-Steel Outer Shell. (P25) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Stainless-Steel Outer Shell. (P26) DW1620DWRNDADPEC3ASY-3R-S Double Wall Duct - 16" X 20" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 22" X 26" Stainless-Steel Outer Shell. (P27) DW16DWTEASY-3R-S Double Wall Duct - 16" Inner Tee Duct - 3 Layers Reduced Clearance - 22" Stainless-Steel Outer Shell. (P28) DW1645DWASY-3R-S Double Wall Duct - 16" Inner 45 Duct - 3 Layers Reduced Clearance - 22" Stainless-Steel Outer Shell. (P29) DW16DWACCDOORCOV-3R-S Double Wall Duct - 16" Inner Access Door & 22" Access Door Cover with Clamps - 3 Layers Reduced Clearance - 22" Stainless-Steel Outer Shell. (P30) DW2045DWASY-3R-S Double Wall Duct - 20" Inner 45 Duct - 3 Layers Reduced Clearance - 26" Stainless-Steel Outer Shell. (P31) DW2024DWRNDADPEC3ASY-3R-S Double Wall Duct - 20" X 24" RND2RND Eccentric Adapter - 3 Layers Reduced Clearance - 26" X 30" Stainless-Steel Outer Shell.

(P32) DW2427DWAJD-3R-S Double Wall Adjustable Duct - 24" Inner Duct, 27" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. Min Length = 11" / Max Length = 24.5" / Adjustment = 13.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P33) DW24DWYTEASY-3R-S Double Wall Duct - 24" Inner Y Tee Duct - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P34) DW24DWTEASY-3R-S Double Wall Duct - 24" Inner Tee Duct - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P35) DW24DWACCDOORCOV-3R-S Double Wall Duct - 24" Inner Access Door & 30" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P36) DW2435DWLT-3R-S Double Wall Duct - 24" Inner Duct, 35" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell.

(P37) DW2447DWAJD-3R-S Double Wall Adjustable Duct - 24" Inner Duct, 47" long - 3 Layers Reduced Clearance - 30" Stainless- Steel Outer Shell. Min Length = 11" / Max Length = 48.5" / Adjustment = 30.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P38) DW2490DWASY-3R-S Double Wall Duct - 24" Inner 90 Duct - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P39) DW24DWTEASY-3R-S Double Wall Duct - 24" Inner Tee Duct - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P40) DW2435DWLT-3R-S Double Wall Duct - 24" Inner Duct, 35" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. (P41) DW2447DWAJD-3R-S Double Wall Adjustable Duct - 24" Inner Duct, 47" long - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. Min Length = 11" / Max Length = 48.5" / Adjustment = 30.5" / Adjustable Section May Need To Be Cut. Includes single and double wall "V" Clamps. (P42) DW24DWACCDOORCOV-3R-S Double Wall Duct - 24" Inner Access Door & 30" Access Door Cover With Clamps - 3 Layers Reduced Clearance - 30" Stainless-Steel Outer Shell. 3M-2000PLUS Duct - 3M Fire Barrier 2000 Plus Silicone - Used as sealant to Seal Duct Joints. DW16DWCLASY-3R-S Duct - 16" Duct - 22" Double "V" Clamp - 3R Insulation & Single "V" Clamp Included - Reduced Clearance. DW20DWCLASY-3R-S Duct - 20" Duct - 26" Double "V" Clamp - 3R Insulation & Single "V" Clamp Included - Reduced Clearance. DW24DWCLASY-3R-S Duct - 24" Duct - 30" Double "V" Clamp - 3R Insulation & Single "V" Clamp Included - Reduced Clearance.

MAKE-UP AIR DUCT WORK SHALL BE INCLUDED UNDER 11400

To be coordinated with architect / engineer drawings.

Correctional Package

Captive Air Systems or Gaylord or Caddy Air

Item 41 - SECURITY FLOOR TROUGH (2 REQ'D) 108" x 24" x 6”

ASFT Anti-Spill Floor Trough, 108"W x 24"D, 6" deep receptacle, (2) 4" OD tailpieces, stainless-steel beehive strainer, 14/304 stainless-steel, brushed satin finish, (SG) subway grating, NSF, Made in USA.

Correctional Package

SHOP DRAWINGS WITH ALL DETAILS TO BE SUBMIITED FOR APPROVAL.

IMC TEDDY Model ASFT-24108-SG or South Jersey Metal or Stainless Innovations

Item 42 - 40 Gal. TILTING SKILLET (2 REQ'D)

Tilting Skillet, gas, 40 gallon capacity, manual tilt, electronic ignition, crank tilt with self-locking positive stop, removable lip strainer, stainless steel construction, open leg frame base, adjustable feet front, adjustable flanged feet rear, 100,000 BTU, CSA-Star, CSA-Flame, NSF Correctional Package

Crown Model GTS-40 or Groen or Market Forge

ACESSORIES: Standard two year limited warranty, Natural Gas, 115v/50/60/1-ph, standard, 12" single pantry faucet, Correctional screws & tack welds , S/S hinged cover over control panel w/locking provisions GMS-30 Permanent etched interior markings, for 30 gallon braising pan (specify gallon or liter markings) PC-3 Pan Carrier, SF-12 12" single pantry faucet,

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1” inside dia., 48” long, Heavy duty stainless steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr minimum flow capacity.

Item 43 - UTILITY DISTRIBUTION SYSTEM (1 REQ'D)

UDS - 22' LONG ISLAND RACEWAY

To be coordinated with architect / engineer drawings.

Correctional Package

Captive Air Systems or Gaylord or Caddy Air

Item 44 – 40 Gal. STATIONARY KETTLE (2 REQ'D)

Stationary Kettle, gas, 40 gallon capacity, full jacket, thermostatic control, electronic ignition, 2" draw-off, includes: perforated strainer, hinged cover & faucet bracket, 316 stainless steel interior liner, stainless steel exterior, tri-leg, 130,000 BTU, CSA-Star, CSA-Flame, NSF Correctional Package

Crown Model GL-40FE or Groen or Market Forge

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1” inside dia., 48” long, Heavy duty stainless steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr

Item 45 – CONVECTION STEAMER (1 REQ'D)

Convection Steamer, gas, (2) compartment, (8) 12" x 20" pan capacity per compartment, 36" cabinet base, electronic ignition, automatic blowdown, 60 minute timer per compartment, removable pan supports & drip trough, CSD-1 code package, includes water filter system, stainless steel interior & exterior, 6" legs, adjustable flanged feet, 300,000 BTU, CSA, NSF

Correctional Package

CROWN GCX-16 or Groen Smart Steam or Market Forge

Accessories: Stainless steel hinged cover over control panel, Cabinet base doors with locking provisions, Correctional screws & tack welds.

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1” inside dia., 48” long, Heavy duty stainless steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hR

Item 46 - SPARE NO.

Item 47– EXHAUST HOOD W/MAKE-UP AIR SUPPLIED WITH FAN UNITS

Hood #3 - Job #3871812 6030ND-2-PSP-F - 11ft 0" Long Exhaust-Only Wall Canopy Hood with Front Perforated Supply Plenum with Built-in 3" Back Standoff, - 100% 430 SS, FILTER 20" tall x 16" (19.625" by 15.625") wide Stainless Steel Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 85% efficient at 9 microns, 76% efficient at 5 microns. Used on hoods shipped AFTER 7/27/17. - 12" x 12" Recessed LED Light, 3K warm output. - EXHAUST RISER - Factory installed

10" X 24" X 4", - SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers, - 1/2 Pint Grease Cup New Style, Flanged Slotted, - Prison Package - Replacement hood screws, - Prison Package - Burglar Bars in Exhaust Riser, - Prison Package - Lockable Filters

Hood #4 - Job #3871812

6030ND-2-PSP-F - 11ft 0" Long Exhaust-Only Wall Canopy Hood with Front Perforated Supply Plenum with Built-in 3" Back Standoff - 100% 430 SS - FILTER - 20" tall x 16" (19.625" by 15.625") wide Stainless-Steel Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 85% efficient at 9 microns, 76% efficient at 5 microns. Used on hoods shipped AFTER 7/27/17. - 12" x 12" Recessed LED Light, 3K warm output. - EXHAUST RISER - Factory installed 10" X 24" X 4" - SUPPLY RISER - 12"x 28" Supply Riser with Volume Dampers - 1/2 Pint Grease Cup New Style, Flanged Slotted - Prison Package - Replacement hood screws - Prison Package - Burglar Bars in Exhaust Riser - Prison Package - Lockable Filters

DUCTING SYSTEM

Shall consisted of the enclosed or a variation of such based on coordination of duct run with the architect / engineers drawings. Final needs may vary at no additional cost to Owner. (P1) DW1645ASY Single Wall Duct 45 Degree Elbow, 16" Duct, Assembly.

(P2) DW1622ADP Single Wall Duct Adapter, 16" Duct Dia to 22" Duct Dia, Standard Part. (P3) DW22TEASY Single Wall Duct Tee, 22" Duct, Assembly. (P4) DW22TEASY Single Wall Duct Tee, 22" Duct, Assembly. (P5) DW2290ASY Single Wall Duct 90 Degree Elbow, 22" Duct, Assembly. (P6) DW22455LT Single Wall Duct 22" diameter, 45.5" long, flange at both ends. Stainless-Steel. (P7) DW2260AJDKIT Single Wall Duct Adjustable, 22" diameter, 59.5" long, flange at one end with a 22" Diameter - 4" Tall - Adjustable Collar – Stainless-Steel. (P8) DW3122TP Duct to Curb Transition, 31-1/2" Curb to 22" Duct, 16 GA Aluminized. Used on BDU24. (P9) DW2223ADKIT Duct Access Door with Handle & Grease Dam, for 22" duct use 23" door. Stainless-Steel. (P10) DW1622ADP Single Wall Duct Adapter, 16" Duct Dia to 22" Duct Dia, Standard Part. (P11) DW164125LT Single Wall Duct 16" diameter, 41.25" long, flange at both ends. Stainless-Steel. (P12) DW1648AJDKIT Single Wall Duct Adjustable, 16" diameter, 47.5" long, flange at one end with a 16" Adjustable Collar – Stainless-Steel. (P13) DW16SUBRASY Duct Support Bracket Assembly, 16" Duct, Used for Hanging Duct. 12 GA Steel, Clear Zinc Coating. - 2 Rings, 4 Brackets Plus Hardware. (P14) DW16SUBRASY Duct Support Bracket Assembly, 16" Duct, Used for Hanging Duct. 12 GA Steel, Clear Zinc Coating. - 2 Rings, 4 Brackets Plus Hardware. (P15) DW16SUBRASY Duct Support Bracket Assembly, 16" Duct, Used for Hanging Duct. 12 GA Steel, Clear Zinc Coating. - 2 Rings, 4 Brackets Plus Hardware. (P16) DW16TEASY Single Wall Duct Tee, 16" Duct, Assembly. (P17) DW16085LT Single Wall Duct 16" diameter, 8.500" long, flange at both ends. Stainless-Steel. (P18) DW1615AJDKIT Single Wall Duct Adjustable, 16" diameter, 15" long, flange at one end With a 16" Adjustable Collar – Stainless-Steel. (P19) DW1645ASY Single Wall Duct 45 Degree Elbow, 16" Duct, Assembly. (P20) DW1617ADKIT Duct Access Door with Handle & Grease

Dam, for 16" duct use 17" door. Stainless-Steel. (P21) DW1213ADKIT Duct Access Door with Handle & Grease Dam, for 12" duct use 13" door. Stainless-Steel. 3M-2000PLUS Duct - 3M Fire Barrier 2000 Plus Silicone - Used as sealant to Seal Duct Joints. DW12CLASY Duct "V" Clamp With new design 14 Ga Brackets, 12" Duct, Assembly. DW16CLASY Duct "V" Clamp With new design 14 Ga Brackets, 16" Duct, Assembly. DW22CLASY Duct "V" Clamp With new design 14 Ga Brackets, 22" Duct, Assembly.Service Design Verification Building Surcharge, Service Design, Verification for CASLink Ethernet. Service Design Verification for Demand Control Ventilation. Service Design Verification for Direct Fired Heater. Service Design Verification for Exhaust Fan. Service Design Verification for Hood. Service Design Verification for Modular Package Unit.

MAKE-UP AIR DUCT WORK SHALL BE INCLUDED UNDER 11400

To be coordinated with architect / engineer drawings.

Correctional Package

Captive Air Systems or Gaylord or Caddy Air

Item 48 – CONVECTION OVEN (3 REQ'D)

Silver Star Convection Oven, gas, double-deck, cook-&-hold, deep oven, solid state controls, stainless-steel front, top & sides, aluminized steel rear, interior light, 6" stainless-steel legs, 144,000 BTU, 120v/60/1-ph, NEMA 5-15P, (2) 1/2 HP, CSA, NSF, 2 year parts & labor, 5 years warranty on doors (parts only, excluding door glass), (2) 120v/60/1-ph, 7.9 amps, NEMA 5-15P,

Correctional Package

Southbend Model SLGS/22SC or Blodgett DFG-200 DBl or Imperial Heavy Duty

Accessories: 6" Casters in lieu of legs, Stainless-steel drip pan, Expanded metal on flue/vent, Correctional fasteners, Door locking clasp, Secured light cover, Control panel cover, Top & bottom enclosure for rear jacket.

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1” inside dia., 48” long, Heavy duty stainless-steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr minimum flow capacity.

Item 49 – CONVECTION STEAMER (1 REQ'D)

Convection Steamer, gas, (2) compartments, (7) pan capacity total, manual controls, electronic ignition, Delime mode & automatic blow down, single drain with temperature control, split water connections, includes water filter system, stainless-steel interior, exterior & cabinet base, 6" legs, adjustable bullet

feet front, flanged feet rear, 140,000 BTU, CSA Star, CSA Flame, NSF Correctional Package

Crown GXS-7HE or Groen Smart Steam or Market Forge

Accessories: Stainless-steel hinged cover over control panel, Cabinet base doors with locking provisions, Correctional screws & tack welds.

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1” inside dia., 48” long, Heavy duty stainless-steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr minimum flow capacity.

Item 50 –HEAVY DUTY RANGE (2 REQ'D)

Platinum Heavy Duty Range, gas, 36", (4) 45,000 BTU open burners, manual controls, (1) convection oven, includes (3) racks, stainless-steel front, sides, rear, exterior bottom & 6" adjustable legs, 225,000 BTU, CSA, NSF (Note: Qualifies for Southbend's Service First™ Program, see Service First document for details) Correctional Package

Southbend Model P36A-XX or Montague Heavy Duty or Jade Range (Heavy Duty)

Standard (2) years limited parts and labor warranty

Accessories: NOTE: 5" flue riser, Natural Gas, Bolt-down/flanged feet in lieu of std. legs, Correctional fasteners, Door locking clasp, Knob control, Control panel cover (oven base only),

Krowne C10024K Gas Connector Kit, Royal Series Moveable Gas Connection Kit, 1” inside dia., 48” long, Heavy duty stainless-steel radial wrap with Green antimicrobial PVC coating, Quick Disconnect, (1) full port gas valve, (2) 90° elbows, Restraining Cable with mounting hardware, 334,000 BTU/hr minimum flow capacity

Item 51 - SPARE NO.

Item 52 - UTILITY CART (2 REQ'D)

Utility Cart, 18-1/2"W x 39"H x 32-1/2"D (3) solid shelves (3 sides up, 1 side down), aluminum construction, (4) 5" platform casters (2 swivel, 2 rigid), 550 lbs. capacity, NSF

Correctional Package Tamper Proof

New Age Model 97769 or Lakeside or Stainless Innovations

All New Age products are made in the USA, Lifetime warranty against rust & corrosion, 5-year construction warranty, std. Corner bumpers, set of 4.

Item 52 - UTILITY CART (2 REQ'D)

Utility Cart, 18-1/2"W x 39"H x 32-1/2"D (3) solid shelves (3 sides up, 1 side down), aluminum construction, (4) 5" platform casters (2 swivel, 2 rigid), 550 lbs. capacity, NSF

Correctional Package Tamper Proof

New Age Model 97769 or Lakeside or Stainless Innovations

All New Age products are made in the USA, Lifetime warranty against rust & corrosion, 5-year construction warranty, std. Corner bumpers, set of 4.

Item 53 -Chef's Counter (1 REQ'D)

14 gauge stainless steel top w/ 10” chamfer edge. 1-1/2" x 1-1/2" x 1/8" galv. angle frame & reinforcement, 18 ga. Stainless steel body panels, 6" high stainless steel with flanged feet., Provide a 12" x 14" x 12" - 14 ga. stainless steel integral welded sink, One (1) lever waste drain with overflow and handle bracket. Length and shape as shown on plans.

(2) 3 Well dry moist electric hot food unit(s) complete with individual controls (ITEM 54), Energy Efficient wells. Provide a Stainless Steel Hinged Protective Cover, For Hot Food Well Controls with provisions for padlock hasp, PADLOCK FURNISHED & INSTALLED IN FIELD BY OTHERS. Sink area shall be a cabinet section with fully welded curb base. Base shall notch out for floor sink. Access to cabinet shall be through full body length double pan access panel held in place with fitted security screws. Screws shall not be removable from panel section. Cabinet section shall be approximately 24” wide by the depth of the counter.

Stainless Innovations or South Jersey Metal or Carbone Fabricators

Accessories: Krowne 15-801 Royal Series Faucet, deck-mounted, 8" centers, gooseneck, 6" wide, mounting kit.

Item 54 –HOT WELLS (2 REQ'D)

Drop-In Hot Food Well Unit, Electric, individual pans, wet/dry type with drain & manifold, 3-pan size for 12" x 20" pans, individual infinite temperature controls, stainless steel top & wells, galvanized outer liner, (44-5/8" x 25" cutout required), cUL, UL, NSF

DELFIELD Model N8745-D or Alto Shaam or Hatco

Item 55 -Plating Counter (1 REQ'D)

14 gauge 304 stainless steel top w/ 10” chamfer edges. 18 ga. Stainless steel Undershelf throughout, 6" high stainless steel with flanged feet. Length and shape as shown on plans.

Stainless Innovations or South Jersey Metal or Carbone Fabricators

Item 56 – SINGLE DOOR ROLL-IN REFRIGERATOR (1 REQ'D)

Designer Line Refrigerator, roll-in, one-section, self-contained refrigeration, stainless steel front, aluminum interior & ends, standard depth cabinet, full-height solid door, electronic control with digital display, hi-low alarm, removable stainless steel ramp, 1/3 HP

Continental Refrigeration Model DL1RI or Traulsen (R-Series) or Victory (Ultra-Spec Series)

Accessories: One way security screws, Locking hasp (lock not included), Stainless steel mesh security cover, Coverless hinges

Item 57 – SINGLE DOOR ROLL-IN FREEZER (1 REQ'D)

Designer Line Freezer, roll-in, one-section, self-contained refrigeration, stainless steel front, aluminum interior & ends, standard depth cabinet, full-height solid door, electronic control with digital display, hi-low alarm, removable stainless steel ramp, 3/4 HP

Continental Refrigeration Model DL1FI or Traulsen (R-Series) or Victory (Ultra-Spec Series)

Accessories: One way security screws, Locking hasp (lock not included), Stainless steel mesh security cover, Coverless hinges

Item 58 – INMATE TRAY DELIVERY CART (3 REQ'D)

Heated cabinet to hold,72- 10x14 serving trays with 3in spacing between each row. Cabinet to hold (4)18x26 serving Trays with 6in spacing between each. Also to have securable pull out drawer with perforated top for ice packs (not supplied). Cabinet also will have holder for 3- 4.5gal. Cambro drink containers (Cambros by other), Both cabinets to have correctional package. All interior metal to be 20ga s/s. All exterior metal to be 18ga s/s. Unit to have (4)-5 in swivel casters & perimeter bumper.

SecoSelect Model CMP-CCJ-80 or Stainless Innovations or Keas Fabrication

Item 59 – TRAY DRYING RACK (3 Required)

Tray-Drying Rack, mobile, 3 tray levels, (40) 18" x 26" trays per level, 1.4" angle spacing, heavy duty aluminum construction, (4) 5" platform casters, KD, NSF, Caster Lock, for 5" platform caster

Correctional Package

New Age Model 1067TB OR Kelmax

Item 60 – SOILED DISHTABLE

Soiled Dish table W/Pre-rinse Sink 20" x 20" x 5" deep. Length and shape as shown on plans. Welded Bridge Bars for Racks guides. Legs to be removable and will get welded to gusset in field. 8” high Backsplash to be enclosed at bottom to wall, to “Z” Clip to wall, Supplied with Flanged Feet. 14ga. S/S top Fully Welded Cross rails. Unit supplied with Flanged Feet.

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Accessories: Krowne Metal 17-108WL Royal Series Pre-Rinse Assembly with Wall Bracket, Wall-Mounted, 8" Centers, Spring Action Flexible Gooseneck, 35" High with 15" Overhang, 1/2" NPT Female Inlets, 1.2GPM spray head, chrome plated brass base, built in check valves. Krowne Metal 22-404 Lever Waste Drain

Item 61 - DISHWASHER, DOOR HOOD TYPE (1 REQ'D)

Pro Series, 66”W rack conveyor dishwasher, with 22” pre-wash, Vent-less Heat Recovery technology, Proportional Rinse, Progressive anti-jam drive system, top mounted Prodigy series HMI user interface, Proactive maintenance software, 100 gallons per hour with energy sentinel (idle pump shut-off), (209) racks per hour, built-in 70° rise booster, electric tank heat, single-piece hood design, single-piece stainless-steel upper & lower wash arms manifolds, internal removable scrap basket & dual-piece scrap screens, 20” standard vertical clearance which accommodate 18” x 26” sheet pans, full 90° opening leak proof insulated hinged access doors, automatic tank fill, door safety switches, leak-proof ball valve drains, lower front & side enclosure panels, heavy gauge construction including base & legs, electric tank heat, 2 HP wash pump, single point machine & separate booster connection, vent fan control, rear manifolds, NSF, CULus, Made in USA (consult factory for price)

Champion Model 66-PRO-VHR OR HOBART OR Mieko

Item 62– CLEAN DISHTABLE

Custom fabricated 'L' shaped clean table 8'-7"" long x 6'-7" long x 2'-6" wide x 2'-10" high. Refer to manufacturer's drawings for additional information. 8” high Backsplash with enclosed lower area to wall, to “Z” Clip to wall, Supplied with Flanged Feet. 14ga. S/S top, with fully welded cross rails on base.

Stainless Innovations or South Jersey Metal or Carbone Fabrication

Item 63 – SHADOW BOX (1 REQ'D)

Wall Cabinet - Security Shadow Box approx. 42" x 15" x 36" high – stainless-steel body, and shelving – Top to slope down 4" to 24" height in front – stainless-steel hinged doors with wire mesh welded inside – doors to have cylinder locks, Peg Board mounted inside cabinet with U shaped holders (15). Use tamper resistant fasteners as required (Not Shown On Plan, Size & Location to be Verified within Office)

Stainless Innovation or South Jersey Metal or Carbone Fabrication

Item 64 – WASH DOWN STATION (1 REQ'D)

Washdown Faucet, wall mount, with recessed cabinet, 3/4" mixing valve, stainless-steel thermometer, 50' hose, rear trigger stainless-steel water gun & hose rack. Correctional Package

KEC to coordinate with field on location and recess for control Cabinet.

T&S BRASS Model MV-07771-12R or SMT or Fisher Faucet

END OF SECTION 114000

SECTION 115313 - LABORATORY FUME 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. Section Includes:

1. Bench-top laboratory fume hoods.
2. Fume hood base cabinets.

B. Related Requirements:

1. Section 061053 - "Miscellaneous Rough Carpentry" for wood blocking for anchoring fume hoods.
2. Section 092216 "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring fume hoods.
3. Section 096513 "Resilient Base and Accessories" for resilient base applied to fume hood base cabinets.
4. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for field quality-control testing of fume hoods.
5. Section 230923 "Direct Digital Control (DDC) System for HVAC" for VAV controls for fume hood exhaust.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 COORDINATION

A. Coordinate layout and installation of framing and reinforcements for lateral support of fume hoods.

B. Coordinate installation of fume hoods with laboratory casework and other laboratory equipment.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For laboratory fume hoods.

1. Include plans, elevations, sections, and attachment details.
2. Indicate details for anchoring fume hoods to permanent building construction including locations of blocking and other supports.
3. Indicate locations and types of service fittings together with associated service supply connection required.
4. Indicate duct connections, electrical connections, and locations of access panels.
5. Include roughing-in information for mechanical, plumbing, and electrical connections.
6. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from the above items.
7. Include layout of fume hoods in relation to lighting fixtures and air-conditioning registers and grilles.
8. Include coordinated dimensions for laboratory equipment specified in other Sections.

C. Delegated-Design Submittal: For fume hoods indicated to comply with seismic performance requirements and design criteria.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Showing compliance with specified performance requirements for as-manufactured containment and static pressure loss, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency.

B. Source quality-control reports.

C. Field quality-control reports.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish complete touchup kit for each type and color of fume hood finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged fume hood finish.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install fume hoods until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Locate concealed framing, blocking, and reinforcements that support fume hoods by field measurements before being enclosed, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Bypass Fume Hoods with Steel Exterior:

1. Manufacturers: Subject to compliance with requirements, provide a 48-inch basic laboratory hood with integral blower by one of the following:

a. Air Master Systems Corporation.
b. Bedcolab Ltd.
c. BMC Manufacturing.
d. Cole-Parmer.
e. Hanson Lab Solutions.
f. Iroquois Hoods.
g. Jamestown Metal Products.
h. Keur Industries, Inc.
i. Kewaunee Scientific Corporation.
j. Lab Crafters, Inc.
k. Lab Fabricators.
l. Labconco Corporation.
m. Laboratory Equipment Manufacturers, LLC.

B. Product Designations: Drawings indicate sizes, types, and configurations of fume hoods by referencing designated manufacturer's catalog numbers. Other manufacturers' fume hoods of similar sizes, types, and configurations, and complying with the Specifications, may be considered. See Section 016000 "Product Requirements."

C. Dimensions: 48-inches wide by 26-inches depth.

D. Power Requirements:

1. Power (PAC): 115 volts.
2. Power (Hz): 60.

E. Blower Motor: 1/3 HP.

2.2 PERFORMANCE REQUIREMENTS

A. Containment: Provide fume hoods that comply with the following when tested according to ASHRAE 110:

1. Average Face Velocity: 100 fpm plus or minus 10 percent with sashes fully open.

2. 4 ft. Hood Face-Velocity 100 fpm Sash at 18-inches Open: Shall not exceed 440 CFM @ 0.10-inches.
3. 4 ft. Hood Face-Velocity 100 fpm Sash at 28-inches Open: Shall not exceed 705 CFM @ 0.26-inches.

B. Static-Pressure Loss: Not more than 1/2-inch wg at 100-fpm face velocity with sash fully open when measured at four locations 90 degrees apart around the exhaust duct and at least three duct diameters downstream from duct collar.

C. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design fume hoods for seismic performance.

D. Seismic Performance: Fume hoods, including attachments to other work, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.3 FUME HOODS

A. Product Standards: Comply with SEFA 1, "Laboratory Fume Hoods - Recommended Practices." Provide fume hoods UL listed and labeled for compliance with UL 1805.

B. Bypass Fume Hoods: Provide bypass fume hoods. Compensating bypass above the sash opens as sash is closed. Provide sufficient bypass capacity so that face velocity with sash opening of 6 inches does not exceed 3 times the face velocity with sash fully open.

2.4 MATERIALS

A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications.

1. Side panels and access panels 20-gage (or heavier) sheet steel.
2. Hood corner posts are 18-gage sheet steel.
3. Ceiling enclosure panels are 18 gage sheet steel.

B. Glass-Fiber-Reinforced Polyester: Polyester laminate with a chemical-resistant gel coat on exposed faces, and having a flame-spread index of 25 or less according to ASTM E84.

C. Epoxy: Factory molded, modified epoxy-resin formulation with smooth, non-specular finish.

1. Physical Properties:

a. Flexural Strength: Not less than 10,000 psi (70 MPa).
b. Modulus of Elasticity: Not less than 2,000,000 psi (1400 MPa).
c. Hardness (Rockwell M): Not less than 100.
d. Water Absorption (24 Hours): Not more than 0.02 percent.
e. Heat Distortion Point: Not less than 260 deg F (127 deg C).
f. Flame-Spread Index: 25 or less according to ASTM E84.

2. Chemical Resistance: As follows when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:

   a. No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
   b. Slight Effect: Chromic acid (60 percent) and sodium hydroxide (50 percent).

3. Color: As selected by Architect from manufacturer's full range.

D. Polypropylene: Unreinforced polypropylene complying with ASTM D4101, Group 01, Class 1, Grade 2.

E. Glass: Clear, laminated tempered glass complying with ASTM C1172, Kind LT, Condition A, Type I, Class I, Quality-Q3; 3/16-inches thick and with clear, polyvinyl butyral interlayer.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Fasteners: Provide stainless steel fasteners where exposed to fumes.

2.5 FABRICATION

A. General: Assemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations. Fume hoods shall be capable of being partly disassembled as necessary to permit movement through a 35-by-79-inch door opening.

B. Steel Exterior: Fabricate from steel sheet, 0.048-inch thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to plumbing lines and service fittings. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.

C. Ends: Fabricate with double-wall end panels without projecting corner posts or other obstructions to interfere with smooth, even airflow. Close area between double walls at front of fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.

D. Splay top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.

E. Interior Lining: Provide the following unless otherwise indicated:

1. Durable powder-coated 16 gage steel liner.

F. Lining Assembly: Unless otherwise indicated, assemble with stainless steel fasteners or epoxy adhesive, concealed where possible. Seal joints by filling with chemical-resistant sealant during assembly.

1. Punch fume hood lining side panels to receive service fittings and remote controls. Delete "Rear Baffle" Paragraph below if only molded glass-fiber-reinforced polyester linings are used, because they include integral rear baffle.

G. Rear Baffle: Unless otherwise indicated, provide baffle, of same material as fume hood lining, at rear of hood with openings at top and bottom. Secure baffle to cleats at rear of hood with stainless steel screws. Fabricate baffle for easy removal for cleaning behind baffle.

1. Provide two-piece adjustable baffles.

H. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining, and with duct stub for exhaust connection.

I. Bypass Grilles: Provide grilles at bypass openings of fume hoods.

J. Sashes: Provide operable sashes of type indicated.

1. Fabricate from 0.048-inch- thick steel sheet, with chemical-resistant finish. Form into four-sided frame with bottom corners welded and finished smooth. Make top member removable for glazing replacement. Set glazing in chemical-resistant, U-shaped gaskets.
2. Glaze with laminated safety glass.

K. Airfoil: Unless otherwise indicated, provide airfoil at bottom of fume hood face opening with 1-inch space between airfoil and work top. Sash closes on top of airfoil, leaving 1-inch opening for air intake. Airfoil directs airflow across work top to remove heavier-than-air gases and to prevent reverse airflow.

L. Light Fixtures: Provide vaporproof, acid-resistant, incandescent light fixtures complete with 100-W, Type A, long-life bulbs instead of fluorescent fixtures at perchloric acid and radioisotope fume hoods.

M. Comply with requirements in other Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings. Securely anchor fittings, piping, and conduit to fume hoods unless otherwise indicated.

2.6 FUME HOOD BASE CABINETS

A. Comply with Section 123553.13 "Metal Laboratory Casework fume hood exterior finish.

B. Work Tops: Stainless steel.

2.7 CHEMICAL-RESISTANT FINISH

A. General: Prepare, treat, and finish welded assemblies after welding. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.

B. Preparation: Clean steel surfaces, other than stainless steel, of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.

C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply fume hood manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8M. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
2. Colors for Fume Hood Finish: As selected by Architect from manufacturer's full range.

2.8 ACCESSORIES

A. Airflow Indicator and Alarm: Provide fume hood with manufacturer's standard airflow indicator with audible and visual alarm that activates when airflow sensor reading is outside of preset range.

B. Sash Alarm: Provide fume hoods with audible and visual alarm that activates when sash is opened beyond preset position.

1. Provide with silence and test switches.

2.9 SOURCE QUALITY CONTROL

A. Demonstrate fume hood performance before shipment by testing fume hood according to ASHRAE 110 as modified in "Performance Requirements" Article. Provide testing facility, instruments, equipment, and materials needed for tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fume hoods.

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

3.2 INSTALLATION

A. General: Install fume hoods according to manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building and adjacent laboratory casework.

Securely attach access panels but provide for easy removal and secure reattachment. Where fume hoods abut other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

B. Comply with requirements in Section 123553.13 "Metal Laboratory Casework**"** for installing fume hood base cabinets, work tops, and sinks.

C. Comply with requirements for installing water and laboratory gas service fittings and electrical devices.

1. Install fittings according to Shop Drawings, installation requirements in SEFA 2.3, and manufacturer's written instructions. Set bases and flanges of sink and work top-mounted fittings in sealant recommended by manufacturer of sink or work-top material. Securely anchor fittings to fume hoods unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Field test installed fume hoods according to ASHRAE 110 as modified in "Performance Requirements" Article to verify compliance with performance requirements.

1. Adjust fume hoods, hood exhaust fans, and building's HVAC system, or replace hoods and make other corrections until tested hoods perform as specified.
2. After making corrections, retest fume hoods that failed to perform as specified.

3.4 ADJUSTING AND CLEANING

A. Adjust moving parts for smooth, near silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.

B. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 115313

SECTION 123216 - MANUFACTURED PLASTIC-LAMINATE-FACED CASEWORK

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. Section includes:
   1. Plastic-laminate-faced cabinets of stock design.
   2. Plastic laminate slotted mail sorter.

B. Related Requirements:

   1. Section 061053 - "Miscellaneous Rough Carpentry" for wood blocking for anchoring casework.
   2. Section 092216 - "Non-Structural Metal Framing" for reinforcements in metal-framed partitions for anchoring casework.
   3. Section 096513 - "Resilient Base and Accessories" for resilient base applied to plastic-laminate-faced casework.
   4. Section 123661 - “Solid Surfacing Countertops and Window Sills” for countertops and window sills.

1.3 DEFINITIONS

A. Definitions in the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" apply to the work of this Section.

B. MDF: Medium-density fiberboard.

C. Hardwood Plywood: A panel product composed of layers or plies of veneer, or of veneers in combination with lumber core, hardboard core, MDF core, or particleboard core, joined with adhesive, and faced both front and back with hardwood veneers.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

B. Keying Conference: Conduct conference at Project site Incorporate keying conference decisions into final keying requirements.

1.5 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show fabrication details, including types and locations of hardware. Show installation details, including field joints and filler panels. Indicate manufacturer's catalog numbers for casework.

C. Samples: For cabinet finishes.

D. Samples for Initial Selection: For cabinet finishes.

E. Samples for Verification: 8-by-10-inch samples for each type of finish.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

C. Sample Warranty: For special warranty.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation of units required for this Project.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver casework only after painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions meet requirements specified in "Project Conditions" Article.

B. Keep finished surfaces covered with polyethylene film or other protective covering during handling and installation.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period. Maintain temperature and relative humidity during the remainder of the construction period in range recommended for Project location by the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards".

B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

C. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of components or other failures of glue bond.
b. Warping of components.
c. Failure of operating hardware.

2. Warranty Period: Five (5**)** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide casework by one of the following:

1. Cal-Dak Cabinets;
2. CampbellRhea.
3. Diversified Fixture.
4. Hausmann Industries, Inc.
5. LSI Corporation of America; a Sagas International Company.
6. R.C. Smith Company.
7. Stevens Industries, Inc.
8. Techline USA, LLC.
9. TMI Systems Design Corporation.

10. Euronique, Inc.

B. Source Limitations:

1. Obtain plastic-laminate-faced cabinets from single manufacturer.
2. FSC Certified wood components.
3. No Added Urea Formaldehyde (NAUF) in materials or fabrication.

2.2 CASEWORK, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.

1. Grade: Custom.
2. Provide Certificates from AWI certification program indicating that casework complies with requirements of grades specified.

B. Product Designations: Drawings indicate sizes, configurations, and finish materials of manufactured plastic-laminate-faced cabinets by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."

C. Product Designations: Drawings indicate configurations of manufactured plastic-laminate-faced cabinets by referencing designations of Casework Design Series numbering system in Appendix A of the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards".

2.3 CASEWORK

A. Design:

1. Reveal overlay, with doors and drawer fronts overlapping case front with minimum reveal.

B. Grain Direction for Wood Grain Plastic Laminate:

1. Vertical on both doors and drawer fronts, with continuous vertical matching.
2. Vertical on doors, horizontal on drawer fronts.
3. Lengthwise on face frame members.
4. Vertical on end panels.
5. Side to side on bottoms and tops of units.
6. Vertical on knee-space panels.
7. Horizontal on aprons.

C. Exposed Materials:

1. Plastic Laminate: Grade HPDL

2. Unless otherwise indicated, provide specified PVC edgebanding on all exposed edges, machine applied using waterproof hot melt adhesive. Machine profile exposed edges with 1/8-inch radius:

    a. Edges of Doors and Drawer Fronts: 3 mm PVC edge banding.
    b. Edges of Case Body panels: 1mm PVC edge banding.
    c. Edges of Shelves: 1mm PVC edge banding (four sides).

D. Semi-Exposed Materials:

1. Plastic Laminate: Grade LPDL unless otherwise indicated. Provide plastic laminate for semi-exposed surfaces unless otherwise indicated.

    a. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.

2. Thermoset Decorative Panels: Provide thermoset decorative panels for semi-exposed surfaces unless otherwise indicated.

    a. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.

3. Hardboard: Use only for cabinet backs where exterior side of back is not exposed.
4. Unless otherwise indicated, provide specified edgebanding on all semi-exposed edges.

E. Concealed Materials:

1. Solid Wood: Any hardwood or softwood species, with no defects affecting strength or utility.
2. Plywood: Hardwood plywood.
3. Plastic Laminate: Grade BKL.
4. Particleboard.
5. MDF.
6. Hardboard.

2.4 MATERIALS

A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.

B. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.

C. Softwood Plywood: DOC PS 1.

D. Particleboard: ANSI A208.1, Grade M-2.

E. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade M-2, except for density.

F. MDF: ANSI A208.2, Grade 130; made with binder containing no urea formaldehyde.

G. Hardboard: ANSI A135.4, Class 1 Tempered.

H. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3.

1. Manufacturers: Basis of design Wilsonart or comparable product by one of the following:

a. Abet Laminati Inc.
b. Arborite.
c. Formica Corporation.
d. Lamin-Art, Inc.
e. Nevamar; a Panolam Industries International, Inc. brand.
f. Pionite, a Panolam Industries International, Inc. brand.

I. Edgebanding for Plastic Laminate: Plastic laminate matching adjacent surfaces for cabinet body and Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors and drawer fronts, 1 mm thick elsewhere.

J. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

K. Edgebanding for Thermoset Decorative Panels: PVC or polyester edgebanding matching thermoset decorative panels.

2.5 COLORS AND FINISHES

A. Thermoset Decorative Panel Colors, Patterns, and Finishes: As selected by Architect from casework manufacturer's full range.

B. Plastic-Laminate Colors, Patterns, and Finishes:

1. As selected by the Architect from manufacturer’s standard colors and patterns.

C. PVC Edgebanding Color: As selected from casework manufacturer's full range.

2.6 FABRICATION

A. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:

1. Bottoms and Ends of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch particleboard. Provide exterior grade plywood for cabinet base in contact with floor.

2. Shelves: 3/4-inch-thick particleboard**.**
3. Backs of Cabinets: 1/2-inch thick particleboard or MDF where exposed, Drawer Fronts: 3/4-inch particleboard.
4. Drawer Sides and Backs: 1/2-inch hardwood plywood, with glued dovetail or multiple-dowel joints.
5. Drawer Bottoms: 1/4-inch hardwood plywood glued and dadoed into front, back, and sides of drawers. Use 1/2-inch material for drawers more than 24-inches wide.
6. Drawer Bodies: Steel drawer pans formed from 0.0359-inch thick metal, metallic phosphate treated, and finished with manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of 1 mil for topcoat and 2 mils for system.
7. Doors 48-Inches High or Less 3/4-inch thick, with particleboard or MDF cores and solid-wood stiles and rails.
8. Doors More Than 48-Inches High: 1-1/16-inches thick, with honeycomb cores and solid hardwood stiles and rails.
9. Doors More Than 48-Inches High: 1-1/8-inches thick, with particleboard cores.

B. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.

2.7 CASEWORK HARDWARE AND ACCESSORIES

A. Hardware, General: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.

1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.

B. Butt Hinges: Stainless-steel, semi--concealed, five-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two hinges for doors less than 48-inches high, and provide three hinges for doors more than 48-inches high.

C. Pulls: Solid stainless-steel wire pulls, fastened from back with two screws. For sliding doors, provide recessed stainless-steel flush pulls. Provide two pulls for drawers more than 24-inches wide.

D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide two catches on doors more than 48-inches high.

E. Drawer Slides: BHMA A156.9, Type B05091.

1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated, steel ball-bearing slides.

F. Label Holders: Stainless-steel, sized to receive standard label cards approximately 1/2 by 2-inches, attached with screws or brads.

1. Provide label holders where indicated.

G. Drawer and Hinged Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with BHMA A156.11, Grade 1.

1. Provide a minimum of two keys per lock and six master keys.
2. Provide locks where indicated on all doors and drawers.

H. Sliding-Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding-door units.

I. Adjustable Shelf Supports: Two-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of the Work.

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

3.2 CASEWORK INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Install casework level, plumb, and true; shim as required, using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16-inch of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16-inch. Bolt adjacent cabinets together with joints flush, tight, and uniform.

D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16-inch of a single plane. Fasten to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of 1/16-inch.

E. Fasten cabinets to adjacent cabinets and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI's, AWMAC's, and WI's "Architectural Woodwork Standards".

F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

G. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 CLEANING

A. Repair or remove and replace defective work as directed on completion of installation.

B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123216

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 135500 – PREFABRICATED MODULAR STEEL CELLS

PART 1 – GENERAL

Note: The supply and installation of Manufactured Steel Detention Modules shall be the responsibility of the Detention Equipment Contractor (DEC). The steel module manufacturer is providing material (modules) to the DEC at the job site only. The DEC is responsible for supplying, coordination of drawing submittal and equipment with other trades, scheduling, taking delivery, installation, protection of the modules during construction, and warranty of the modules in addition to any manufacturer's warranty.

1.1 SCOPE

A. The Detention Module Manufacturer must submit all data as required in 1.1D, items 1 thru 7. All of the documentation must be complete and accurate with bid. Any deviations from, or omissions of, the required information will disqualify the Detention Module Manufacturer (DMM) from this project.

B. This specification covers the requirements, including labor, materials, services and equipment for the manufacturing, delivering and installing of pre-engineered, prefabricated Steel Detention Modules. Modules are defined as a factory built completely fabricated five sided galvannealed or galvanized steel unitized assembly furnished, finished, equipped and shipped to the project jobsite ready for immediate installation.

C. The following Detention Module Manufacturer is approved:

1. Steel Cell of North America, Inc., Baldwin, Ga.

D. Bid submittal requirements for bidders seeking to gain pre-qualification: The owner wants to confirm that the Detention Module Manufacturer has the experience, ability, testing, engineering, quality control and ability to adequately perform prior to award. *Failure to submit all data noted in items below with the Detention Module Manufacturer's (DMM) bid shall cause Detention Equipment Sub-Contractor's (DEC) total inclusive bid to be deemed non-responsive and thus disqualified.*

1. Detention Module Manufacturer (DMM) Experience: Modular modules are life/safety devices that protect the inmates, jail staff, and the general public. The detention module manufacturer shall submit a total list of projects, in its entirety, attesting to their experience to perform and a body of work that proves ability.

a. The list shall be from the manufacturer's own experience and shall not be the experience of other entities.
b. Each project listed shall include the following information:

1) The name and location of project.
2) The name of the architectural firm.
3) The name and number of the DMM's direct customer for project.

2. Detention Performance Testing: Performance testing provides confidence that the DMM's products adequately perform to established minimum industry standards. Submit current reports as proof of performance testing:

    a. ASTM F2322-12; Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities,
    b. ASTM F2697-15; Physical Assault on Horizontal Fixed Barriers for Detention and Correctional Facilities
    c. ASTM F1450-12; Hollow Metal Swinging Door Assemblies for Detention Facilities.
    d. Provide testing in compliance with ASTM F-33 committee's draft test (ASTM WK57116) for impact and static load testing of detention module furniture.

        1) Wall mounted module bunk.
        2) Wall mounted module desk.
        3) Wall mounted module seat.

    e. Provide STC *(Sound Transmission Coefficient)* test report in compliance with specified rating of 53 between adjoining modules.

        1) Testing shall be certified by a reputable acoustical engineering company.
        2) Testing shall be on acoustical materials in compliance with the specification herein.

3. Corrosion Protection: Corrosion is a short and long term concern. Submit a letter on DMM's company letterhead to the Detention Equipment Contractor that all steel materials used will only be corrosion resistant galvannealed, galvanized, or stainless steel.
4. Coating Testing**:** The coatings specification herein requires a ten (10) year warranty. Submit coating system performance testing as proof that the polyurea coating system will adequate perform as specified.

    a. Adhesion to prepared galvannealed steel: ASTM D-4541, 850 PSI.
    b. Tensile Strength: ASTM D-638, 3000 PSI.
    c. Elongation ASTM D-638, 425%.
    d. Hardness: ASTM D-2240, Shore D-51.
    e. Tear Strength: ASTM D-624, 495 PLI.
    f. Abrasion Resistance: ASTM D-4060, 1000 g 1000 cycles CS-17: 6 mg loss.
    g. Accelerated Weathering: ASTM G-53, 3,000 Hrs.
    h. Gardner Impact: ASTM 2794, 160 in. lbs.
    i. Salt Fog Resistance: ASTM B117-90, 3,000 Hrs.
    j. To confirm coating experience and material durability the DMM must submit a list of at least twenty-five (25) other similar projects that are in operation in the last ten (10) years using this coating system.

        1) Provide the name of the project and location of the project, and the date of completion of each project, based on the owner taking occupancy of each

project.
2) This information shall be from the detention module manufacturer and not from any other entity.

5. Seismic Performance: Modules are structural elements within the building shell. Modules shall safely withstand an acceleration, *Ss*, equal to 300% of gravity. Submit engineering calculations to confirm that modules meet this requirement.

6. Quality Control: Only the highest quality products available that meet all applicable building codes are desired.

   a. Provide proof that the DMM is registered with the Indiana Board of Building Standards (BBS) as a modular manufacturer.
   b. DMM Shall provide a letter from a BBS approved third party inspection company that it has been retained to inspect the modules per BBS building code and quality stipulations.

7. Project Schedule: The project construction schedule is important and should proceed without unwarranted delays. The DMM shall submit the following information:

   a. State in writing the number of weeks needed to submit a complete submittal package for approval and anticipated fabrication schedule.
   b. State in writing the amount of time required to install product once received on job site.

1.2 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. Section includes labor, materials, services and equipment for the manufacturing, delivering and installation of engineered, prefabricated modular steel detention cells.

C. Related Sections:

1. Section 033000 - “Cast-in-Place Concrete” for slab quality.
2. Section 034100 – “Precast Structural Concrete” for interior walls within the housing units.
3. Section 034500 – “Precast Prestressed Hollow Core Slab Units” for mezzanine floor system within the housing units.
4. Section 050553 - “Security Metal Fastenings” for anchoring or attaching building elements, furniture, equipment, accessories and fixtures within the secure perimeter.
5. Section 079200 - “Joint Sealants” for security sealants.
6. Section 087163 - “Detention Door Hardware” for specialty hardware coordination.
7. Section 088853 - “Security Glazing” for glazing located within the secured enclosure.
8. Section 099123 - “Interior Painting” for finish painting cell fronts.

9. Division 21 - Sections for fire suppression system.
10. Section 224600 - “Security Plumbing Fixtures”.
11. Division 23 - Sections for HVAC systems.
12. Division 26 - Sections for electrical systems.
13. Division 28 - Sections for electronic safety and security systems.

1.3 REFERENCES

A. The publications listed in this section form a part of this specification to the extent referenced. The publications are referenced herein by basis designation only.

1. ASTM A653/A653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
2. ASTM D-638
3. ASTM D-638
4. ASTM D-2240
5. ASTM D-624
6. ASTM D-4060
7. ASTM G-53
8. ASTM 2794
9. ASTM B117 - Standard practice for Operating Salt Spray (Fog) Testing Apparatus
10. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
11. ASTM F33 Committee - Draft test method for steel Bunks, Seats, Tables used in detention facilities.
12. ASTM F2322-12 - Test Methods for Physical Assaults on Fixed Barriers for Detention Facilities.
13. ASTM F2697-15 - Physical Assault on Horizontal Fixed Barriers for Detention and Correctional Facilities.
14. ASTM F1450-12- Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
15. ANSI/AWS D1.1 – Structural Welding Code Steel
16. ANSI/AWS D1.3 – Structural Welding Code – Sheet Steel
17. ANSI/NAAMM HMMA 863 – Guide Specifications for Detention Security Hollow Metal Doors and frames

1.4 DEFINITIONS

A. ANSI American National Standards Institute, Inc.
11 West 42nd Street
13th Floor
New York, NY 10036
Telephone: 212/642-4900
www.ansi.org

B. ASTM American Society for Testing and Materials
100 Barr Harbor Drive

West Conshohocken, PA 19428-2959
Telephone: 610/832-9585
www.astm.org

C. NAAMM National Association of Architectural Metal Manufacturers
800 Roosevelt Rd.
Bldg. C, Suite 312
Glen Ellyn, IL 60137
Telephone: 630/942-6591
www.naamm.org

1.5 SUMMARY

A. The Steel Detention Module Manufacturer (DMM) shall provide the following; and as indicated in PART 5 - DIVISION OF RESPONSIBILITY.

Factory Built Five-sided Cell Modules:

1. Security Doors and Frames
2. Security Glazing
3. Embedded Electrical Lighting and Security Electronics
4. Embedded Fire Protection
5. Plumbing Fixtures, and Accessories
6. Integral HVAC Grilles
7. Factory installed Furnishings and Accessories
8. High performance interior coatings and exterior primers
9. Bulkhead closeout panels above walkway and stairs
10. Supply required coverplates

1.6 SUBMITTALS

A. General: Submit the following according to conditions of Contract and Division 1 Specifications Sections.

1. Product data and instructions for manufactured materials and products. Include Manufacturers' certifications and independent laboratory test reports as required.
2. Submittal drawings prepared showing complete design information for fabrication and installation of Steel Detention Module units. Indicate module dimensions, cross-section, elevations, material specifications, and installation details. Coordinate shop drawings with other trades to ensure compatibility of required service connections.
3. The maximum dead loads of the modular steel modules, including all equipment, shall not exceed the maximum allowance for the slab or building assembly on which the modules are anchored.
4. Submit drawings of recommended bearing pads and/or special anchoring devices.
5. Provide shipping, lifting and handling diagrams indicating point loads and net and gross loads.
6. Provide catalog data with full performance criteria and dimension for specified

components purchased from outside sources.

7. Provide structural calculations and structural analysis as needed along with as-built drawings after receipt of approved as noted drawings.
8. Submittal Information.

    a. Name and location of Project
    b. Order number
    c. Name of Manufacturer
    d. Name of Architect
    e. Name of Contractor
    f. Cell dimensions including width, length and height
    g. Cell equipment, furnishings, and equipment
    h. Cell coatings and primers
    i. Governing modular building code and year of edition
    j. Building-Use Category: Indicate category of building use
    k. Installation details and interface with other building components

1.7 CLOSEOUT DOCUMENTS

A. Maintenance Data: For prefabricated modular steel cells to include in maintenance manuals.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Basis-of- Design Product: Subject to compliance with requirements, provide “Modular Steel Cells” as manufactured by SteelCell of North America, Baldwin, GA

2.2 ENGINEERING AND DESIGN

A. The DMM shall provide Professional certification to the architect for the design of the Steel Detention Modules to support superimposed dead loads, live loads and wind loads as indicated on the contract drawings and the specifications herein. The DMM shall certify the design for compliance with applicable governing code and local seismic requirements.

B. The design shall include integration of Steel Detention Modules into the physical floor plan, sections, elevations, and structural design of the facility and shall assure that all systems specified in the contract documents are interfaced completely with Steel Detention Modules for a fully installed, fully working facility.

2.3 WORKMANSHIP

A. All units shall be tightly fitted and securely fastened with no through seams or cracks.

B. All panels and assemblies shall be inspected for correct dimensions, joint configuration, straightness, plumb and square.

C. All exposed edges shall be chamfered or bent for finger contact.

D. Out-to-out length, width and height dimensions of individual module units shall be a tolerance of +/- 1/4-inch. (6.4mm). The cumulative tolerance in any direction shall not exceed the available horizontal or vertical dimension for the entire assembly of module units. Module suppliers shall inform the Architect prior to construction, of any dimensional conflicts which may adversely affect the installation of modules.

E. All panel joints, ceiling joints, and module corner joints exceeding 1/16-inch. (1.6mm) wide and 1/8- inch. (3.2mm) deep shall be filled with high strength epoxy caulk appropriate to application in Detention Environments.

F. Joints to be welded shall be cleaned and prepared as necessary to assure quality welds.

G. Welding shall be controlled and sequenced to reduce warpage and distortion.

H. All welds shall be free of deleterious porosity, pinholes, and cracks.

I. Finished welds shall be smooth with weld spatter and flux removed.

J. Provide a permanent label with a cell identification number on the back side of each cell.

2.4 MODULE WALL CONSTRUCTION & STRUCTURAL COMPONENTS

A. Framing, floors, walls, and ceilings, as required, shall be constructed of galvanneal steel, galvanneal steel shapes and tubing, conforming to design requirements noted herein to provide adequate structural strength including the ability to support loading as specified.

B. All walls and ceiling face panels shall be 0.100-inch (12 gage) minimum thickness A-60 galvannealed steel conforming to ASTM A 653-CS requirements. All structural or stiffening members shall be 0.058-inch (16 gage) minimum thickness A-60 galvannealed steel conforming to ASTM A 653-LFQ requirements. All structural tubing stall be 0.115-inch (11 gage) minimum thickness steel conforming to ASTM A 653-CS and ASTM A-525, G-90 galvanized requirements.

C. All welders shall be certified to, and all welding shall be in conformance with, the ANSI/AWS D1.1, Structural Welding Code - Steel and/or ANSI/AWS D1.3, Structural Welding Code - Sheet Steel, as applicable.

D. Tamper resistant fasteners shall be used for all exposed fasteners where required for accessories.

E. Mounting and bearing pads, anchorage’s, shims, or spacers, shall be manufactured of

stainless steel.

F. Smoke Rated Steel Units: Where units are shown or scheduled as requiring smoke rated classification, provide units of design or assemblies tested in accordance with applicable building code approved assemblies or construction materials.

2.5 MODULE MEZZANINE LEVEL FLOOR & SECURITY CEILINGS.

A. Framing for lower and mezzanine level module ceiling as required, shall be constructed of galvanneal steel, steel shapes and tubing, conforming to design requirements noted herein to provide adequate structural strength including the ability to support dead and live loading as specified including the support of the mezzanine level walkway.

B. All floor face panels shall be 0.140 in. (10 gage) minimum thickness A-60 galvannealed steel conforming to ASTM A 653-CS requirements. All structural or stiffening members shall be 0.058 in. (16 gage) minimum thickness A-60 galvannealed steel conforming to ASTM A 653-LFQ requirements.

C. All ceiling face panels shall be 0.100 in. (12 gage) minimum thickness A-60 galvannealed steel conforming to ASTM A 653-CS requirements. All structural or stiffening members shall be 0.058 in. (16 gage) minimum thickness A-60 galvannealed steel conforming to ASTM A 653-LFQ requirements.

D. Embedded electrical boxes and conduit for module electrical devices and electronics shall be concealed within the ceiling/floor structure routed from the device to the mechanical chase.

E. All cavities or voids shall be acoustically insulated with the relevant materials noted herein.

2.6 DOORS & DOOR FRAMES AT THOSE MODULES WITH SWING DOORS.

A. All door, door fame, and window construction shall be in accordance with ANSI/NAAMM HMMA 863-04.

B. All module doors: Face sheets shall be 0.093 in. (12 gage) minimum thickness conforming to ASTM A653/A653M (A60, / Z180) steel.

C. All doors must satisfy the same performance requirements in accordance with ASTM F1450-12, Grade #1.

D. Glass and Glazing: Refer to the door schedule and the glazing section of these specifications.

E. Doors shall be pre-installed by the DMM, with all final adjustments completed by the module installer.

2.7 ELECTRICAL

A. The DMM shall provide the light fixture for each type of Steel Detention Module.

B. Light Fixture:

1. The light fixture shall be equal to a Kenal SDSA-4-1/1-45L50K-120-1/9-1-DLN with LED lamps and one (1) LED night light with light level control and shall be corner mounted type. The housing shall be 14 gage steel.
2. The frame shall be 14 gage with 0.250 polycarbonate and 0.125 prismatic acrylic overlay. The finish shall be baked-on white enamel. All fixtures will provide a minimum of 20-foot candles of light at the desk and the mirror per ACA standards.

C. The DMM shall submit photometric's to confirm placement of light fixtures and the correct lumens at the specified locations as per ACA standards.

D. The DMM shall caulk any cracks and or joints between the light fixture and the ceiling with a tamper resistant caulk to prevent contraband concealment.

E. The DMM shall provide a wiring pig tail or whip from the module light to a junction box at the module mechanical chase.

F. The DMM shall provide conduit terminated at a junction box on the mechanical chase wall for all module electrical equipment.

G. The DMM shall provide pull tape in all conduits that are not pre-wired.

H. The Division 26 contractor shall make all permanent connections from the termination point at the module mechanical chase.

I. All security hardware, security electronics and associated wiring, shall be supplied and installed by others. This includes but is not limited to:

1. Module Door and Pass Locks or Slider Devices
2. Module Door Position Switches
3. Module Intercoms
4. Module Surveillance Cameras

2.8 PLUMBING

A. The DMM shall provide and install the plumbing fixtures and valve mounting plates for the Module Modules and Shower Unit and Lavatory/Toilet Combination Unit Modules.

The DMM shall caulk any cracks and or joints between the fixtures and the walls with a tamper resistant caulk to prevent contraband concealment.

B. Lavatory/Toilet Combination Unit: See plumbing schedule and Division 22 specifications.

C. Handicap Lavatory/Toilet Combination Unit: See plumbing schedule and Division 22 specifications.

1. 42" Horizontal wall mounted grab bar with anti-suicide plate and weeps.
2. 18" Vertical wall mounted grab bar with anti-suicide plate.
3. Toilet paper holder shall be recessed wall mounted.

D. Shower Unit: See plumbing schedule and Division 22 specifications for shower head and controls information. Unit shall consist of a ceiling-mounted all stainless-steel showerhead, electronic single temperature valve and stainless-steel pushbuttons and escutcheon, and 30” x 30” raised stainless steel shower-base with integral p-trap.

E. Handicap Shower Unit: See plumbing schedule and Division 22 specifications for shower head and controls information. Unit shall consist of a ceiling-mounted all stainless-steel showerhead, electronic single temperature valve and stainless-steel pushbuttons and escutcheon and a wall mounted accessible showerhead. To facilitate access, a sloped floor and drain shall be supplied by others.

1. Wall mounted 32" x 18" L-shape grab bar with anti-suicide plate and weeps.
2. Wall mounted 18” vertical grab bar with anti-suicide plate.
3. Wall mounted collapsible handicap seat equal to Willoughby FCC HC

F. The flush valves, water control manifolds, p-traps and other plumbing accessories for the plumbing fixtures shall be provided by the DMM separately and installed by the Division 22 Contractor.

1. The Division 22 Contractor is responsible for installing devices per the manufacturer’s installation instructions.
2. The Division 22 Contractor is responsible for startup and any all required adjustments.
3. The DMM shall provide a voucher from the fixture supplier to the plumber for all plumbing controls and devices.
4. The plumber shall send the voucher to the plumbing supplier, which will send all specified devices to the project site to the plumber to receive.

G. DCM shall provide the shower curtains for the shower stalls in the Cell Modules.

1. The shower curtain shall be equal to the Secure Shower Curtain System as manufactured by Imperial Fasteners or Derby Industries.
2. The shower curtain shall be suicide resistant with attachment via Velcro tabs.
3. The shower curtain shall be flame and mildew resistant, anti-bacterial.

2.9 MODULAR SECURITY CONTROLS

A. DMM shall provide the modular security electronics system and hardware as noted in the Electronic Safety & Security Section 280500.

B. The Steel Detention Cell shall include a factory installed self-contained modular control system (MCS) that controls and monitors the cell door, day light, night light and intercom. The system shall utilize Ethernet to distribute control and monitoring commands

between a System Integrator's security network and touch screen application and the factory installed modular control system (MCS). The Steel Detention Cell manufacturer shall also provide an Modular Control Interface server (MCI) to be located in each security equipment room. The Modular Control Interface (MCI) will receive and transmit commands from the System Integrator's SCADA software, PLC system and audio system. In addition the Modular Control Interface server (MCI) will distribute 24Vdc power, audio commands, audio paths and control commands to the MCS as required to provide a fully functional system.

C. The Steel Detention Cell manufacturer shall provide the following:

1. NEMA 4x security back box with monitored door. The Steel Detention Cell Manufacturer shall coordinate with all trades to provide the required NEC clearances.
2. Factory installed weather rated raceway system, intercom station and intercom wire harness.
3. Factory installed weather rated raceway system, detention door lock and door position switch including door control and monitoring wire harness.
4. Factory installed weather rated raceway system, lighting control module and lighting control wire harness.
5. Factory installed weather rated raceway system, lighting control push button and lighting push button control wire harness.
6. Factory installed weather rated raceway system lateral cable distribution wire harnesses.
7. Provide all miscellaneous components, cables and devices to provide a complete and operational modular control system.

2.10 HVAC

A. Each Steel Detention Module shall be designed, manufactured and equipped to receive the required HVAC fixtures specified in other divisions of this specification.

B. The DMM shall provide the HVAC grilles. The supply and exhaust security grilles shall be integral pre-punched into the wall panel in compliance with the specified Mechanical CFM requirements. A flange suitable for the attachment of the HVAC duct shall also be provided.

C. Security grills shall with 3/16" diameter holes on 9/32" staggered centers. Exhaust CFM shall be a minimum of 300 with a static pressure of 0.03. Supply shall be a minimum of 280 with a static pressure of 0.24.

D. HVAC Security Grille Testing: The CFM for the DMM's security HVAC grilles shall meet the following minimums

1. Exhaust CFM shall be a minimum of 300 with a static pressure of 0.03.
2. Supply shall be a minimum of 280 with a static pressure of 0.24.
3. The DMM shall submit testing report by an AABC or NEBB certified testing engineer confirming that DMM security grilles meet these minimum requirements.

2.11 THERMAL AND ACOUSTICAL INSULATION

A. Insulation Material: Materials shall be approved by applicable IBC codes and governing authorities and in compliance with the manufacture's application procedures and recommendations including the application of compatible thermal barriers.

1. All exposed insulation shall be a closed cell polyurethane foam equal to NCFI 11-24.

B. Foam shall meet ASTM E-84 FS≤25, SD ≤ 450 at 2-inches thickness.

C. All cavity type insulation shall be open cell polyurethane foam equal to NCFI 23-010.

D. Foam shall meet ASTM E-84 FS≤25, SD ≤ 450 at 2-inches thickness.

E. Thermal Insulation: Walls, floors, and ceilings shall be insulated to R-values as follows:

1. Interior Walls: R14 minimum.
2. Exterior Walls: R14 minimum.
3. Floor and Ceiling: R8.

F. Acoustical Insulation: The walls and floors between modules and adjacent modules shall have a Sound Transmission Classification (STC) of 53. Module Fronts shall have a STC of 35. Back of modules to rear mechanical chase and front chase walls to mechanical chase shall have a STC of 40.

2.12 FURNISHINGS, AND ACCESSORIES

A. Steel Detention Module Furniture: Where shown on the contract drawings as module furniture to be so provided, the DMM shall provide and install wall mounted bunks, tables and stools. Bunks, tables, and stools shall be fabricated of ASTM 653 steel ASTM 525 grade A60 galvannealed, 0.106-inch (2.7mm) minimum thickness and of the sizes shown. DMM shall include drawings which detail materials, construction, and attachment.

These drawings shall be a part of the submittals as outlined in Section 1.6 herein. Fabrication of these items shall not begin prior to the Architect's approval.

B. Fixtures, Furnishings and Accessories Load Test: Reinforce walls, stiffen furnishings, and provide connections as required to support dead loads plus single point (concentrated) static live loads as indicated, at maximum distance on each from wall and from supports for each of the following in accordance with the ASTM draft standard test method for wall mounted steel bunks, seats, and tables used in detention and correctional facilities.

1. Top impact test
2. Static force test
3. Cantilever load test

4. Uplift load test
5. Wall mounted lavatory - 1000 lbf (4.45 kN)

C. All furniture and equipment shall be designed and installed so as to be flush to the modular walls that leaves no seams or voids for the concealment of contraband. Thus, there shall be no cracks, seams or voids that can be exploited by the inmates to conceal contraband. This includes all seams at cell security equipment including but limited to the following:

1. One-piece stainless steel mirror
2. Anti-ligature clothes hook strips
3. Detention light fixture
4. Penal plumbing fixtures

D. All seams at equipment noted above that do not comply with ACA standards shall be filled with a pick resistance caulk.

2.13 AUTOMATIC FIRE PROTECTION SYSTEMS

A. The DMM shall provide a prepared location for the installation of the sprinkler head by the fire protection contractor.

1. The sprinkler head shall be provided, installed and tested by fire protection contractor.
2. When ceiling mounted sprinkler heads are required, the DMM to provide a straight section of pipe with no intermediate fittings and a welded 90-degree elbow for connection to the sprinkler head provided and installed by the fire protection contractor. Requirements applicable to all prefabricated cells.
3. Piping and associated welded elbow to be provided for all prefabricated units. If pipe is located outside of the cell, the pressure tested section shall be strapped to the cell for shipping.
4. Piping and sprinkler head opening to be provided by the DMM required for front mounted sprinkler heads required to protect beneath the metal grate walkway.
5. Connection of the cell fire protection piping and front mounted sprinkler heads to the fire protection system shall be made at the mechanical chase by the fire protection contractor.

    a. The DMM shall provide a threaded pipe connection for attachment.

B. The DMM and fire protection contractor shall coordinate to confirm the type and location of the sprinkler head to ensure the proper interface of work.

C. Refer to specification 211313 “Wet Pipe Sprinkler Systems” for piping materials.

2.14 FINISH

A. Prior to application of coatings, all surfaces shall be cleaned and prepared in accordance with SSPC-SP1, SP6, or SP7 as required or as specified by the coating manufacturer.

B. All interior steel surfaces of the Steel Detention Module shall be prime coated with a Polyurea Elastomer 26 to 36 mils dft. The coating shall be certified to ASTM E84, Class II for surface burning characteristics and shall meet or exceed the following:

1.	Adhesion:	ASTM D-4541	850 PSI.
2.	Tensile Strength:	ASTM D-638	3000 PSI.
3.	Elongation:	ASTM D-638	425%.
4.	Hardness:	ASTM D-2240	Shore D-51.
5.	Tear Strength:	ASTM D-624	495 PLI
6.	Abrasion Resistance:	ASTM 4060, 1000g,1000 cycles CS-17: 6 mg	
7.	Accelerated Weathering:	ASTM G-53	3,000 Hrs.
8.	Gardner Impact:	ASTM 2794	160 in. lbs.
9.	Salt Fog Resistance:	ASTM B117-90	3,000 Hrs.

C. All module interior steel surfaces shall be finish coated for UV protection with a Polyester Urethane Enamel, 3 to 4 mils dft, and shall meet or exceed the following:

1.	Abrasion Resistance:	ASTM D4060	90 mg loss
2.	Adhesion:	ASTM D4541	825 psi
3.	Corrosion Weathering;	ASTM D5894	15 cycles

a. ASTM D714 10 rating
b. ASTM D610 10 rating

4.	Flexibility:	ASTM D522	Passes
5.	Salt Fog Resistance:	ASTM B117	3,000 hours

D. The exterior of the module fronts and module door along with the cover plates shall be prime painted only with a Catalyzed Epoxy 3 to 4 mils dft, and shall meet or exceed the following:

1.	Adhesion:	ASTM D4541	500 psi
2.	Corrosion Weathering:	ASTM D5894	3360 hours
3.	Direct Impact Resistance:	ASTM D2794	>140 in. lbs.
4.	Moisture Condensation:	ASTM D4585 100 F, 1250 hours	
5.	Salt Fog Resistance	ASTM B117, 1250hrs, Passes	

E. The finish paint of the module front and both sides of module door shall be by the others.

F. Steel Detention Modules shall be of a single standard color as selected by the Owner from samples submitted by the manufacturer. Available color shall be included with module product data Submittals.

2. 15 MEZZANINE WALKWAY, RAILINGS AND STAIRS.

A. Mezzanine level walkways, hand-railings, and stairs shall be constructed and installed by others. Mezzanine walkways shall be galvanized.

B. DMM and fabricator/installer shall coordinate thru the DEC in order to ensure proper interface of work.

PART 3 - DELIVERY AND INSTALLATION

3.1 DELIVERY SEQUENCING AND SCHEDULING

A. The DEC and DMM shall coordinate the scheduling and sequencing of the module delivery to the project site. A mutually approved schedule shall be determined by the DEC and DMM at the pre-construction meeting. The sequencing of the module units shall conform to this schedule to properly interface the delivery and installation of modules at the proper time during the construction period.

B. DMM shall deliver Steel Detention Modules to the designated project site, properly protected from shipping damage. The DEC shall provide suitable protective coverings, devices or such methods and procedures to protect the modules from damage from the weather, other trades and vandalism. Protective measures shall remain throughout the construction period. Unloading and handling of the module units shall be the responsibility of the module installer. Final module door adjustments shall be completed by the module installer.

3.2 SITE INSPECTION

A. The installer of the Steel Detention Modules shall examine areas and conditions under which the units are to be installed. The installer is to notify the construction manager in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the module installer

3.3 INSTALLATION

A. The DEC shall provide the DMM a proposed schedule of module delivery and installation sequence before the project bid date in order for the DMM to properly bid the installation of the modules.

B. The DEC shall be a pre-qualified factory trained and certified module installer to install the Steel Detention Modules. The DMM shall provide as needed a qualified on-site representative for initial module installation to verify proper module offloading and installation procedures.

C. The DEC shall provide adequate access for the DMM’s tractor-trailer transport trucks and the module installer’s installation equipment. This access shall be suitable for the DMM’s trucks, and the module installer’s equipment to maneuver under their own power.

D. The DEC shall provide adequate space and maneuvering room to install the modules. There shall be no barriers or work of others that restrict or prevent the adequate movement of the modules or the installer's installation equipment.

E. Steel Detention Modules shall be set in place by the module installer and shall be checked for correct alignment and level.

Shims shall be installed as necessary and securely fastened to the foundation. Complete all connections, trim and touch up, meeting the acceptable industry standards and the DMM's installation instructions.

F. The DEC shall install trim plates as provided by the DMM per the installation instructions to cover the joint between the modules. All other joints are to be trimmed or caulked by others.

G. Fill all voids between the bottom of the modules' walls and the floor with security caulk. This shall be completed by others.

PART 4 – WARRANTY

4.1 BY THE DMM

A. The DMM shall provide a signed warranty agreeing to repair defective materials and workmanship of the Steel Detention Module. The module warranty shall be conditional upon normal use of the modules. Abuse, such as riots are not considered normal use. The Warranty shall be for a period of ten (10) years after substantial completion.

PART 5 - DIVISION OF RESPONSIBILITY

5.1 BY THE DMM

A. Engineer, design, fabricate, transport deliver for erection by the DEC prefabricated steel detention modules as required for a complete installation. Provide module specific products, system components of other related sections for a complete functionally operational module.

B. Provide for any structural components needed for support of work including, but not limited to, support for the mezzanine walkway.

C. For those units with slider doors provide cased opening prepped to receive sliding door device, locking and receiver columns.

D. For those units with swinging doors provide security hollow-metal framed opening and security door prepped for the specified security hardware and electronic devices.

E. Provide high build high performance seamless coating system for all interior surfaces and

coated components.

F. Provide wall mounted detention furnishings as specified, welded in place and coated for a seamless finish.

1. Furnishings shall be statically and dynamically tested to ASTM standards as specified.
2. Bunks to include rails on bottom bunk to fit Norix “PB300 – Tank Box” property boxes. One set of rails per sleeping surface. Coordinate with DEC.
3. Towel Hook – use Norix model #ITH-110 and/or #S565-529. Two towel hooks per sleeping surface.

G. Provide suicide resistant equipment and accessories as specified, secured with tamper resistant fasteners and security caulked as necessary to prevent the concealment of contraband.

H. Provide stainless steel plumbing fixtures and grab-bars as specified, secured with tamper resistant fasteners and security caulked as necessary to prevent the concealment of contraband.

1. Provide control valves and accessories as specified for field installation by others.

I. Provide electrical conduit, boxes, and fittings for the light fixtures as specified.

1. The light fixture shall be secured in place and security caulked.
2. Provide a wiring whip from the light to the pull box at the mechanical chase.

J. Provide electrical conduit, boxes and fittings for security electronics and locks.

1. Provide pull tape from the prep to the pull box at the mechanical chase.

K. Security caulk at the crack between the bottom of the module and slab on grade shall be supplied and installed by others.

L. Provide a prep for the sprinkler head that will be supplied and installed by others.

M. All modules shall be inspected by approved third party inspection company for code and quality compliance.

N. Provide module to module and module to adjacent wall cover-plates to cover open cracks or joints.

O. Mezzanine walkways (galvanized), handrails, and stairs assemblies by others.

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
1.0	**Manufacture module units**	X	X		
2.0	**Module Security Doors**				
2.1	Door Frames	X	X		
2.2	Doors	X	X		
2.3	Hinges	X	X		
2.4	Locks			X	X
2.5	Slider Devices			NA	NA
2.6	Door Closer			X	X
2.7	Pulls			X	X
2.8	Door Window Frame	X	X		
2.9	Door Window Glazing	X	X		
2.10	Food Pass	X	X		
2.11	Food Pass Lock			X	X
2.12	Food Pass Hinge	X	X		
3.0	**Module Chase Front**				
3.1	Chase Door	X	X		
3.2	Hinges	X	X		

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
3.30	Chase Front and Frame	X	X		
3.4	Locks			X	X
4.00	**Module Windows**				
4.10	Window Frames	X	X		
4.20	Window Glazing	X	X		
5.00	**Module Insulation**				
5.10	Insulation	X	X		
6.00	**Module Finish Coatings**				
6.10	Module Interior Finish Coatings	X	X		
6.20	Dayroom Side of Module (Prime Painted)	X	X		
6.30	Module Door (Prime Painted)	X	X		
7.00	**Module Furnishings**				
7.10	Module Bunks	X	X		
7.30	Module Mirrors	X	X		
7.40	Module Shelf, Hooks, Seat, Desk	X	X		
7.50	Day Room Furniture			X	X
7.60	CCTV Monitor Frame and Glazing			X	X
7.70	CCTV Monitor Bracket			X	X
7.80	Camera and Wiring			X	X

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
8.00	**Plumbing Equipment and Fixtures**				
8.10	Module Combination Toilet/Lavatory Units	X	X		
8.20	Handicap Cell Toilets and Lavatories T4	X	X		
8.3	Supply of, or Connection to Building Plumbing			X	X
8.4	Module Mechanical Chase Pressure Piping			X	X
8.5	Module Fixture Flush Valves			X	X
8.6	Module Fixture Manifold Valves and Tubing	X			X
8.7	Dayroom Penal Plumbing Fixtures			X	X
8.8	Dayroom Shower Fixtures			X	X
8.9	Module Sprinkler Heads			X	X
8.9a	Prep for Sprinkler	X	X		
8.9b	Sprinkler System Piping	X	X		
9.00	**Electrical and Lighting**				
9.1	Surface Mounted Module Light Fixtures	X	X		
9.2	Module Light Fixtures LED Lamps	X	X		
9.3	Electrical back boxes and Conduit Terminated in Junction Boxes in Access Chase	X	X		
9.4	Electrical Wiring from Light Fixtures Junction Boxes	X	X		
9.5	Final Connection to Building Electrical			X	X

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
9.6	Communication System Conduit and Back Boxes	X	X		
9.7	Communication Equipment and Wiring			X	X
10.0	**HVAC**				
10.2	Sleeve at Module Grilles for Duct Connection	X	X		
10.3	Sleeve at Module Roof for Duct Connection			N/A	N/A
10.4	Module Chase HVAC Duct			X	X
11.0	**Mezzanine**				
11.1	Front Module Mezzanine Walkway			X	X
11.2	Rear Module Mezzanine Walkway			N/A	N/A
12.0	**Module Installation**				
12.1	Shim Packs for Module Setting/Leveling	X			X
12.2	Provision of Suitable Site Surface Preparation for Access of Module Transportation Trucks			X	X
12.3	Deliver Modules	X	X		
12.4	Crane to Off-Load Cells			X	X
12.5	Rigging to Off-Load Cells			X	X
12.6	Off-Load Modules			X	X
12.7	Install Modules			X	X
12.8	Weld Modules to Anchors/Shims			X	X

DIVISION RESPONSIBILITY		CELL MFR		OTHER TRADES	
		Materials	Labor	Materials	Labor
12.9	Masonry Anchors/Brackets			NA	NA
12.10	Installation of Module to Wall Closure Plates	X			X
12.11	Installation of Module to Module Closure Plates	X			X
12.12	Installation of Chase Front and Door	X	X		
12.13	Security Sealant between Module and Floor			X	X
12.14	On-Site Protection of Modules			X	X
13.0	**Taxes and Bonding**				
13.1	Taxes			X	X
13.2	Bond			X	X

END OF SECTION 135500