

Project Specifications



7300 W 129th St
Overland Park, KS 66209

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DOCUMENT 00500 - PROJECT FORMS

- 1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS
 - A. Owner/Contractor Agreement: AIA Document or Owner's document.
 - B. General Conditions: AIA Document A201, "General Conditions of the Contract for Construction."
 - 1. The General Conditions are incorporated by reference.
- 1.2 NOTICE TO PROCEED
 - A. Notification to Proceed with Construction: Owner's document bound following this Document.
- 1.3 ADMINISTRATIVE FORMS
 - A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
 - B. Copies of AIA standard forms may be obtained from the American Institute of Architects; <http://www.aia.org/contractdocs/purchase/index.htm>; docspurchases@aia.org; (800) 942-7732.
 - C. Preconstruction Forms:
 - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312, "Performance Bond and Payment Bond."
 - 2. Form of Certificate of Insurance: AIA Document G715, "Supplemental Attachment for ACORD Certificate of Insurance 25-S."
 - D. Information and Modification Forms:
 - 1. Form for Requests for Information (RFIs): AIA Document G716, "Request for Information (RFI)."
 - 2. Form of Request for Proposal: AIA Document G709, "Work Changes Proposal Request."
 - 3. Change Order Form: AIA Document G701, "Change Order."
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 - 5. Form of Change Directive: AIA Document G714, "Construction Change Directive."
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 - 2. Payment Application: AIA Document G702/703, "Application and Certificate for Payment and Continuation Sheet."
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 - 4. Form of Affidavit of Release of Liens: AIA Document G706A, "Contractor's Affidavit of Payment of Release of Liens."
 - 5. Form of Consent of Surety: AIA Document G707, "Consent of Surety to Final Payment."

END OF DOCUMENT

NPC International, Inc.

Notification to Proceed with Construction

Date:

GC:

Address:

RE: (Site Number)
(Entity Number)

Dear _____:

Enclosed is a fully executed Construction Contract with respect to the above Project. The purpose of this letter is to provide you ("Contractor") with an authorization to proceed with construction of the Project immediately. It is imperative, however, that you provide this office on behalf of Owner/Developer (as defined and identified in the enclosed Construction Contract) with the following documents before construction begins.

1. Performance and Labor/Material Payment/Bonds unless waived by Owner/Developer.
2. Certificates of Insurance evidencing the following insurance coverage:
 - a. Commercial General Liability Insurance with limits not less than \$3,000,000 Combined Single Limit, identifying Owner/Developer as an additional insured.
 - b. Workers' Compensation Insurance in accordance with applicable state requirements, with a waiver of subrogation in favor of Owner/Developer.
 - c. Employers' Liability Insurance in an amount not less than \$1,000,000, with a waiver of subrogation in favor of Owner/Developer.
 - d. Comprehensive Automobile Liability Insurance, including owned, non-owned and hired coverage in an amount not less than \$1,000,000 Combined Single Limit, identifying Owner/Developer as an additional insured.
 - e. Such other insurance required by law, ordinance, rule or regulation, identifying Owner/Developer as an additional insured, if applicable.

Construction should not commence, and in no event will any Application for Payment against the Project be accepted by Owner/Developer, until the above items have been provided to this office.

NPC International, Inc. ASSET DEMO DATE: _____
(N/A if not applicable)

GROUND BREAK DATE: _____

SUBSTANTIAL COMPLETION DATE: _____

Thank you for your prompt attention to these matters.

Very truly yours,

Project Coordinator

cc: Construction Manager

SECTION 01100

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Work covered by Contract Documents.
 - 2. Identification
 - 3. Purchase contracts.
 - 4. Access to site.
 - 5. Coordination with occupants.
 - 6. Work restrictions.
 - 7. Specification and drawing conventions.
- B. Related Requirements:
 - 1. Section 01500 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. Interior construction for a delivery and carry out restaurant space in a single story, multi-tenant building.
- B. Type of Contract.
 - 1. Project will be constructed under a single prime contract.

1.3 IDENTIFICATION

- A. Owner's Representative: Throughout the specifications, the terms "Owner" or "Owner's Representative" have been used instead of "Architect." In some cases the Owner will provide services and responsibilities normally provided by the Architect. The Owner will clarify if the Architect is acting as the Owner's Representative for this project.

1.4 PURCHASE CONTRACTS

- A. National Account Agreements: Owner has negotiated purchase contracts with suppliers of material and equipment to be incorporated into the Work. Owner will assign these purchase contracts to Contractor. Include costs for purchasing, receiving, handling, storage if required, and installation of material and equipment in the Contract Sum, unless otherwise indicated.
 - 1. Contractor's responsibilities are same as if Contractor had negotiated purchase contracts, including responsibility to renegotiate purchase and to execute final purchasing agreements.

1.5 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.6 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.7 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01310

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 DESCRIPTION

- A. Coordinate scheduling, submittals, and work of the various sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

1.2 GENERAL COORDINATION PROVISIONS

- A. Carefully study and compare Contract Documents before proceeding with fabrication and installation of Work. Promptly advise Owner's Representative of any error, inconsistency, omission, or apparent discrepancy discovered.
- B. Allot time in construction scheduling for liaison with Owner's Representative, establish procedures for handling queries and clarifications. Use standard "Request for Interpretation", form as approved by Owner's Representative for requesting information.
- C. In addition to meetings specified herein, hold coordination meetings and conferences with personnel and subcontractors to ensure coordination of Work.
- D. Coordinate scheduling, submittals, and Work of various Specification sections to avoid conflicts and ensure efficient and orderly sequence of installation of interdependent construction elements.
- E. Coordinate Work of various Specification sections having interdependent responsibilities for installation, connection, and operation.
- F. Verify that characteristics of operating equipment are compatible with building utilities and services.
- G. Except as otherwise indicated, conceal pipes, ducts, conduit and wiring in construction. Coordinate locations of fixtures and outlets with finish elements.
- H. Make provision to accommodate items scheduled for later installation.

1.3 MEETINGS

- A. In addition to progress meetings, hold coordination meetings and pre-installation conferences with personnel and subcontractors to assure coordination of Work.

1.4 COORDINATION OF SUBMITTALS

- A. Schedule and coordinate submittals specified in Section 01330.
- B. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate requests for substitutions to assure compatibility of space, of operating elements, and effect on work of other sections.

1.5 COORDINATION OF SPACE

- A. Coordinate use of Project space and sequence of installation of mechanical, and electrical work which is indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduits as closely as practicable, with due allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- B. In finished areas except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.
- C. In finished areas except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.
- D. Layout of plumbing, fire protection, mechanical, and electrical systems, equipment, fixtures, piping, ductwork, conduit, specialty items, and accessories indicated on Drawings is diagrammatic. Variations in alignment, elevation, and details required to avoid interferences and satisfy architectural and structural limitations are not necessarily shown.

- E. Prior to installation of material and equipment, review and coordinate Work with Architectural and Structural Drawings to establish exact space conditions. Where available space is inadequate or where reasonable modifications are not possible, request information from Owner's Representative before proceeding.
 - F. Coordinate installation to prevent conflicts and cooperate in making, without extra charge, reasonable modifications in layout as needed.
 - G. Provide clear access to control points, valves, strainers, control devices, and specialty items of every nature related to such systems and equipment to obtain maximum head room. Provide adequate clearances as necessary for operation and maintenance.
- 1.6 COORDINATION OF CONTRACT CLOSEOUT
- A. Coordinate completion and cleanup of work of separate sections in preparation for Substantial Completion of portions of Work designated for Owner partial occupancy.
 - B. After Owner occupancy of premises, coordinate access to site by various sections for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
 - C. Assemble and coordinate closeout submittals specified in Section 01780.
- 1.7 PRECONSTRUCTION CONFERENCE
- A. Owner's Representative will schedule conference within 15 days after notice of award.
 - B. Attendance: Architect, Contractor, Owner's Representative, and representatives of major subcontractors, and others as appropriate.
 - C. Owner's Representative presides over meeting and is responsible for recording and distributing minutes.
- 1.8 PROGRESS MEETINGS
- A. Schedule and administer bi-weekly construction progress meetings, throughout progress of Work.
 - 1. Prepare agenda and distribute notice of each meeting to participants.
 - 2. Make physical arrangements.
 - 3. Preside at meetings, record minutes, and distribute copies after meeting to participants, and to entities affected by decisions at meetings.
 - 4. Distribute one copy of minutes to Owner's Representative.
 - 5. Maintain in field office one copy of agenda and minutes for each conference and meeting.
 - B. Location of Meetings: Contractor's field office.
 - C. Attendance: Contractor, job superintendent, subcontractors, and suppliers as appropriate to agenda; Owner's Representative, and professional consultants as appropriate.
- 1.9 PRE-INSTALLATION CONFERENCES
- A. Schedule pre-installation conferences required in individual Specification sections. Convene at Project site prior to commencing Work of the section.
 - B. Review conditions of installation, preparation and installation procedures, and coordination with related work.

PART 2 PRODUCTS and PART 3 EXECUTION

Not Used

END OF SECTION

REQUEST FOR INTERPRETATION

Contractor:

Project:

Question to:

From: Contractor

Date: _____

☐ Other

Signed: _____ RFI Number: _____

RE:

Specification Section Reference

Paragraph Number

Drawing References

Details

Response:

Answer as
Above

From: Owner

To: Contractor

Date Transmitted: _____ Date Received: _____

☐ Other

Signed: _____

Copies:
Owner

☐ ☐ _____ ☐ _____ ☐ _____ ☐ _____

SECTION 01320

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 PROGRESS SCHEDULES

- A. Format:
 - 1. Submit a computer generated horizontal bar chart with separate line for each section of Work, identifying first workday of each week.
- B. Sequence of Listings: The chronological order of the start of each item of Work.
- C. Scale and Spacing: To provide space for notations and revisions.
- D. Sheet Size: Minimum 11 by 17 inches.
- E. Content:
 - 1. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
 - 2. Identify each item by major Specification section number.
 - 3. Indicate the early and late start. Early and late finish, float dates and duration.
 - 4. Show delivery dates for Owner furnished products and products specified under Allowances, if applicable.
- F. Revisions to Schedules:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
- G. Distribution:
 - 1. Distribute copies of Schedules reviewed by Owner's Representative to job site file, subcontractors, suppliers, and other concerned entities.
 - 2. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in Schedules.

1.2 CONSTRUCTION PHOTOGRAPHS

- A. Provide digital photographs of site and construction throughout progress of Work.
- B. Take photographs on cutoff date for each Application for Payment, and delivery electronically to Owner's Representative and Owner via email.
- C. Take a minimum of 20 photographs at maximum 2 week intervals throughout the progress of the work,
- D. Identify each photo electronically by listing name of project, phase, orientation of view, and date and time of view.

1.3 SUBMITTALS

- A. Progress Schedule:
 - 1. Submit initial Schedules within 15 days from Notice to Proceed. After review, resubmit required revised data within 15 days.
 - 2. Submit revised Progress Schedules with each Application for Payment.
- B. Construction Photographs:
 - 1. Deliver prints with application for payment with transmittal letter specified under Section 01330.

PART 2 PRODUCTS and PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Submit number of copies of product data and manufacturer's instructions Contractor requires, plus 2 copies which will be retained by Owner's Representative and 1 copy for the Owner.
- B. Submit under Owner's Representative accepted form transmittal letter. Identify Project by title and number. Identify Work and product by Specification section and Article number.
- C. Provide complete submittals for each specified product, system or equipment. Partial or incomplete submittals will be returned, without review, for re-submission.
- D. Schedule submittals to expedite Project and in such sequence as to cause no delay in the Work or in the activities of Owner or of separate contractors. No extension of contract time will be authorized due to failure to transmit submittals in sufficient advance of the Work to permit processing.
- E. Deliver submittals to Owner's Representative's office. Submittals accepted only from Contractor.
- F. Apply Contractor's stamp, sign or initial and date certifying that review, verification of products, field dimensions, adjacent construction Work, and coordination of information, is in accordance with requirements of Work and Contract Documents.
- G. Submittals will be returned without processing if they have not been reviewed and stamped by Contractor for coordination of work and conformance with the Drawings and Specifications prior to submission to Owner's Representative, if they are not initialed or signed by authorized person, if they are not dated, or if it becomes evident that they have not been properly reviewed. Delays resulting therefrom are not responsibility of Owner's Representative.
- H. Clearly identify on submittals, or in writing at time of submission, deviations in submittals from requirements of Contract Documents.
- I. Do not perform Work on any element requiring submittal and review of shop drawings, product data, samples, or other similar submittals until respective submittal has been approved by Owner's Representative.
- J. Maintain in field office a copy of submittal schedule and log of submittals indicating current status of each item.

1.2 SHOP DRAWINGS

- A. Coordinate submittals into logical groupings to facilitate interrelation of the several items.
 - 1. Finishes which involve Owner's Representative selection of colors, textures, or patterns.
 - 2. Associated items which require correlation for efficient function or for installation.
- B. Present in a clear and thorough manner original drawings which illustrate the portion of the work showing fabrication, layout, setting, or erection details, prepared by a qualified detailer. Title each drawing with Project and Contract name and number; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.
- C. Check and coordinate shop drawings of any section or trade with requirements of other sections or trades and as necessary for proper coordination and complete installation of Work.
- D. Show layout, details, materials, dimensions, thicknesses, methods of assembly, attachments, relation to adjoining Work, wiring diagrams, rough-in requirements, and other pertinent data and information. Submit detail drawings of special accessory components not included in manufacturer's product data.
- E. Identify field dimensions; show relation to adjacent or critical features of Work or products.

- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
- G. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- H. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.3 CALCULATIONS

- A. When specified in individual Sections, submit calculations.
- B. Submit engineering calculations for component sizes, deflections, and connections.
- C. Submit calculations bearing seal and signature of registered professional engineer responsible for design.
- D. Where existing conditions deviate from Contract Documents or shop drawings, submit calculations for existing condition, including calculations for anticipated corrective action required, and changes to loads transferred to "base building" structure.

1.4 PRODUCT DATA

- A. Submit only pages which are pertinent.
 - 1. Mark each copy of standard printed data to identify pertinent products, models, options, and other data referenced to Specification Section and Article number.
 - 2. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
 - 3. Modify manufacturer's standard data, schematic drawings, and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.
- B. After review, distribute copies of reviewed product data to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.5 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Owner's Representative selection.
- C. Where custom colors are specified, submit samples illustrating colors, textures, patterns, and finishes for Owner's Representative's review. Owner's Representative will advise colors required or furnish samples for color matching.
- D. Submit samples to illustrate functional characteristics of products, including parts and attachments.
- E. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

1.6 INFORMATIONAL SUBMITTALS

- A. Informational submittals upon which Owner's Representative is not expected to take responsive action may be so identified in Contract Documents. When professional certification of performance criteria of materials, systems, or equipment is required by Contract Documents, Owner's Representative shall be entitled to rely upon accuracy and completeness of such certifications.
- B. Types of Informational Submittals:
 - 1. Design data: Submit with shop drawings.
 - 2. Test reports: Submit within 2 weeks of testing.
 - 3. Certifications
 - 4. Engineering Certifications:
 - 5. Qualification Data
 - 6. Manufacturer's Instructions:
 - 7. Manufacturer's Certificates:
 - 8. Manufacturer's Field Reports:

1.7 CONTRACTOR REVIEW

- A. Review submittal prior to transmittal; determine and verify field measurements, field construction criteria, quantities and details, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.
- B. Coordinate submittal with requirements of Work and of Contract Documents.
- C. Sign or initial in a rubber-stamped review block format, each sheet of shop drawings and product data, and each sample label to certify compliance with requirements of Contract Documents. Notify Owner's Representative in writing at time of submittal of any deviations from requirements of Contract Documents.
- D. Do not fabricate products or begin work which requires submittal until return of submittal with Owner's Representative acceptance.
- E. Responsibility for errors and omissions in submittal is not relieved by Owner's Representative's review of submittal.
- F. Responsibility for deviations in submittal from requirements of Contract Documents is not relieved by Owner's Representative's review of submittal, unless Owner's Representative gives specific written acceptance of deviations. Owner's Representative will review submittal for general conformance to design intent only.

1.8 OWNER'S REPRESENTATIVE AND ENGINEER REVIEW

- A. Owner's Representative will review construction progress schedules, and submittal schedules. Owner's Representative will review product lists, shop drawings, product data, and samples and return within 15 working days of receipt.
- B. Informational submittals and other similar data are for Owner's Representative's information and do not require Owner's Representative's responsive action.
- C. Owner's Representative's review of submittals is for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents. Owner's Representative's review is not conducted for purpose of determining accuracy and completeness of items such as dimensions and quantities, which remain responsibility of Contractor.
- D. Owner's Representative's review and approval of submittals does not relieve Contractor of responsibility for deviations from Contract Document requirements, unless Owner's Representative is informed in writing of deviations and approval is received in writing from Owner's Representative for such deviation.
- E. Owner's Representative's review and acceptance of submittals does not indicate acceptance of changes in Contract time or cost.
- F. Submittals stamped "No Exception Taken": No corrections or resubmittal required; fabrication may proceed.
- G. Submittals stamped "Make Corrections Noted": Comply with noted corrections and modifications; and resubmit. Fabrication may proceed. If for any reason noted corrections and modifications can not be fully complied with, resubmit for review requesting clarification; do not proceed with fabrication.
- H. Submittals stamped "Rejected" or "Revised/Resubmit": Revise and resubmit for review; do not proceed with fabrication. Clearly indicate revisions, including corrections, to previous submittal. Disapproved submittals will not be considered valid cause for construction delay.
- I. Submittal approval does not authorize changes to Contract requirements unless accompanied by a Change Order, Owner's Representative's Supplemental Instruction, or Construction Change Directive.
- J. Owner's Representative will transmit 1 copy of Approved or Approved as Noted submittals to Owner.

END OF SECTION

SUBMITTAL REGISTER

Project: _____

Project Number: _____

Owner: _____

Contractor: _____

[illegible]

SECTION 01420

REFERENCES

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- A. Comply with association, trade, federal, commercial, standards generating organization (such as ANSI and ASTM), and other similar standards referenced within Specification sections, except where more explicit or stringent requirements are indicated or required by Specification or applicable codes.
- B. Reference standards include their associated amendments and supplements.
- C. Except where a specific date is indicated, date of standard is latest edition in effect at date of Contract Documents, or date of standard required by code.
- D. Reference standards have same force and effect as if bound into or copied directly into Contract Documents; standards are made a part of Contract Documents by reference.
- E. Contractual relationship of parties to the Contract shall not be altered from Contract Documents by mention or inference otherwise in reference standards.

1.2 CONFLICTING REQUIREMENTS

- A. Referenced Standards: Should specified reference standards conflict with Contract Documents, request clarification from Owner's Representative before proceeding.
- B. Minimum Quality and Quantity: Quality level or quantity shown or specified is intended to be minimum for Work to be performed or provided. Except as otherwise specifically indicated, actual Work may either comply exactly with that minimum within specified tolerances, or may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are either minimums or maximums as noted, or as appropriate for context of requirements. Refer instances of uncertainty to Owner's Representative for decision before proceeding.

1.3 DEFINITIONS

- A. Custom Color: Refers to color selection by Owner's Representative that is not limited to a manufacturer's standard color or a manufacturer's color that is designated by the manufacturer as "custom", "premium" or any other designation. Custom color means any color selected by Owner's Representative.
- B. Directed, Requested: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Architect," "requested by Architect," and similar phrases. However, no such implied meaning shall be interpreted to extend Owner's Representative's responsibility into area of construction supervision.
- C. Finish: The manner or method of completion. The final appearance of a surface, including texture, smoothness, sheen, and color, after finishing operations have been performed. Finishing operations include preparation of substrate and application, curing, and protection of specified finish materials.
- D. Furnish: Means to supply, purchase, procure and deliver complete with related accessories, ready for assembly, application, installation, and similar operations, as applicable in each instance.
- E. Indicated: Refers to graphic representations, notes, or schedules on Drawings, or other paragraphs or Schedules in Specifications, and similar requirements in Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help reader locate the reference. Location is not limited.
- F. Install: Means to construct, assemble, erect, mount, anchor, place, connect, apply and similar operations, complete with related accessories, as applicable in each instance, connected, operable, and ready for service or intended use.
- G. Installer: Entity (person or firm) engaged to perform a particular unit of Work at Project site, including installation, erection, application, repair, patching, and similar required operations. Such entities must be experienced in operations they are engaged to perform.

- H. Or: Used to introduce any of the possibilities in a series. Items in the series are not required to be taken jointly. It does not mean that individual items in the series are optional requirements.
- I. Product: Includes natural and manufactured materials, components, machinery, fixtures, equipment, devices, furnishings, systems, and their associated accessories to be incorporated into the Work.
- J. Provide: Means to furnish and install, complete and ready for operations and use for purpose intended.
- K. Regulations: Includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within construction industry that control performance of the Work.
- L. Similar: Interpreted in its general sense and not as meaning identical. Elements defined as "similar" shall be coordinated in relationship to their location and connection with other parts of the Work.
- M. True To Line, Plumb, Level, and Flat: Install Work within following tolerances, except where indicated otherwise:
 - 1. True to line: Allowed deviation from straight line within plus or minus 1/16 inch in 1 foot; plus or minus 1/8 inch in 10 feet; plus or minus 1/4 inch in 20 feet; and plus or minus 3/8 inch in lengths over 20 feet.
 - 2. Level: Allowed deviation from horizontal plane within plus or minus 1/16 inch in one foot; plus or minus 1/8 inch in 10 feet; plus or minus 1/4 inch in 20 feet; and plus or minus 1/2 inch in lengths over 20 feet.
 - 3. Plumb: Allowed deviation from vertical plane within plus or minus 1/16 inch in one foot; plus or minus 1/8 inch in 10 feet; plus or minus 1/4 inch in 20 feet; and plus or minus 1/2 inch in lengths over 20 feet.
 - 4. Flat: Allowed deviation from flat plane in any planar direction within plus or minus 1/16 inch in 1 foot; plus or minus 1/8 inch in 10 feet; plus or minus 1/4 inch in 20 feet; and plus or minus 3/8 inch in lengths over 20 feet.
 - 5. Tolerances are not accumulative.

PART 2 PRODUCTS and PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01450

QUALITY CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

- A. Maintain quality control over supervision, subcontractors, suppliers, manufacturers, products, services, workmanship, and site conditions, to produce Work in accordance with Contract Documents.

1.2 DEFINITIONS

- A. Field Samples: Partial installation of selected materials installed at Project site for Owner's Representative's review and approval of visual features and workmanship.
- B. Mock-ups: Full size assemblies that incorporate several materials or elements of construction erected for Owner's and Owner's Representative's review and approval of visual features and workmanship. Mock-ups represent quality of materials and workmanship required for Work.

1.3 PERFORMANCE REQUIREMENTS

- A. Workmanship:
 - 1. Comply with industry standards of the region except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
 - 2. Provide suitably qualified personnel to produce Work of specified quality.
 - 3. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
 - 4. Provide finishes to match approved samples.
- B. Manufacturer's Instructions:
 - 1. Require compliance with instructions in full detail, including each step in sequence. Do not omit preparatory steps or installation procedures unless specifically modified or exempted by Contract Documents.
 - 2. Maintain one complete set of instructions at Project Site during installation and until completion.
 - 3. Should instruction conflict with Contract Documents, request clarification from Owner's Representative/Engineer before proceeding.
- C. Manufacturer's Certificates:
 - 1. When required in individual Specifications section, submit manufacturer's certificate, in duplicate, certifying that products meet or exceed specified requirements, executed by responsible officer.
- D. Manufacturer's Field Services and Reports:
 - 1. Submit reports in accordance with Section 01330.
 - 2. Submit qualifications of field observer 30 days in advance of required observations; observer is subject to approval of Owner's Representative.
 - 3. When specified in individual Specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces, quality of workmanship, and conditions of installation as applicable, and to initiate instructions when necessary.
 - 4. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.
 - 5. Submit reports within 7 days of observation. Distribute copies to Owner's Representative, Owner, Project site file, subcontractor, and other entities requiring information.
 - 6. Provide one additional copy of reports for record documents file; refer to Section 01780.

1.4 QUALITY ASSURANCE

- A. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.
- B. Ensure that persons performing Work are qualified to produce workmanship of specified quality.
- C. Monitor quality control over products, suppliers, manufacturers, services, site conditions, and workmanship to ensure Work complies with Contract Documents.
- D. Comply with specified reference standards as minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.5 EXAMINATION OF CONDITIONS

- A. Examine substrates and conditions under which Work is to be performed. Do not commence work over unsatisfactory conditions detrimental to proper and timely execution of Work.
- B. Do not proceed with Work until unsatisfactory conditions have been corrected.
- C. Commencement of installation constitutes acceptance of conditions and cost of any corrective measures are responsibility of Contractor.

1.6 MOCKUPS

- A. General:
 - 1. Use materials, fabrication and installation methods identical with those indicated for Work. Simulate actual construction conditions as accurately as possible.
 - 2. Provide mock-ups required by individual Specification sections.
 - 3. Approval:
 - a. Obtain Owner's Representative's written approval for each mock-up.
 - b. Do not start production of materials for final Project site erection until Project Manager's approval of mock-ups has been obtained.
 - c. Approved mock-ups will serve as standard of quality and workmanship of Work; maintain mock-ups until completion of relevant Work.
 - 4. Upon completion of relevant Work or when directed by Project Manager, demolish and remove mock-ups.

1.7 FIELD SAMPLES

- A. General:
 - 1. Provide field samples at site required by individual Specification sections.
 - 2. Erect at location acceptable to Owner's Representative; perform Work in accordance with applicable Specification sections.
 - 3. Construct complete, including Work of related trades required in finished Work.
 - 4. Make adjustments necessary to obtain approval from Owner's Representative. Do not proceed with further work until sample installation has been approved by Owner's Representative.
 - 5. Approved samples will serve as standard of quality and workmanship of Work; maintain samples until completion of relevant Work.
 - 6. Upon completion of Work or when directed by Owner's Representative, demolish field samples and remove from site, unless accepted by Owner's Representative as part of completed Work.

1.8 TESTING LABORATORY SERVICES

- A. General:
 - 1. Where terms "Laboratory", "Inspector", "Inspection Laboratory", "Laboratory" or "Testing Laboratory" are used, they mean and refer to officially designated and accredited testing laboratory.
 - 2. Provide testing laboratory with one set of Contract Documents and relevant approved submittals.
- B. Selection and Payment:
 - 1. Owner will employ services of an independent testing laboratory to perform specified inspection and testing.

2. Employment of testing laboratory in no way relieves obligation to perform Work in accordance with requirements of Contract Documents. Contractor will pay testing required by local authorities having jurisdiction.
 3. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.
- C. Laboratory:
1. Cooperate with Owner's Representative, Owner, and Contractor.
 2. Comply with requirements of ANSI/ASTM E 329 and ANSI/ASTM D 3740.
 3. Maintain a full-time registered Engineer on staff to review services.
 4. Authorized to operate in State where the project is located.
 5. Calibrate testing equipment once each year with devices of an accuracy traceable to either NBS Standards or accepted values of natural physical constants.
 6. Test samples of mixes submitted by Contractor.
 7. Provide qualified personnel at site. Cooperate with Contractor and Owner's Representative in performance of services.
 8. Perform specified inspection, sampling, and testing of products in accordance with specified standards.
 9. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 10. Promptly notify Owner's Representative, Owner, and Contractor of observed irregularities or non-conformance of Work or products.
 11. Perform additional inspections and tests required by Owner's Representative.
 12. Attend Preconstruction Conference.
- D. Laboratory Reports:
1. After each inspection and test, promptly submit 2 copies of laboratory report to Owner's Representative and one to the applicable consultant and one to Contractor.
 2. Include: Date issued, project title and number, name of inspector, date and time of sampling or inspection, identification of product and Specifications section, location in the Project, type of inspection or test, date of test, results of tests, and conformance with Contract Documents.
 3. When requested by Owner's Representative, provide interpretation of test results.
- E. Limits on Testing Laboratory Authority:
1. May not release, revoke, relax, alter, or enlarge on requirements of Contract Documents.
 2. May not approve or accept any portion of the Work.
 3. May not assume any duties of Contractor.
 4. Has no authority to stop Work.

1.9 CONTRACTOR RESPONSIBILITIES

- A. Deliver to laboratory at designated location adequate samples of materials proposed to be used which require testing, together with proposed mix designs.
- B. Cooperate with laboratory personnel, and provide access to Work and to manufacturer's facilities.
- C. Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, and for storage and curing of test samples.
- D. Notify laboratory of material sources and furnish necessary quantities of representative samples of materials proposed for use which are required to be tested.
- E. Notify Owner's Representative and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.
- F. Advise laboratory in a timely fashion to complete required inspection and testing prior to subsequent work being performed.
- G. Pay for subsequent re-testing of products or systems found to be defective or otherwise not in accordance with specification requirements. Remove rejected products and replace with products of specified quality.
- H. Furnish copies of product tests or mill test reports as specified or required.

- I. Furnish incidental labor and facilities:
 - 1. To provide access to Work to be tested.
 - 2. To obtain and handle samples at Project site or at source of product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- J. Notify Owner's Representative, Owner, and laboratory 48 hours prior to expected time for operations requiring inspection and testing services.
- K. When inspections or tests can not be performed after proper notification and at no fault of laboratory, reimbursement costs for laboratory expenses incurred will be charged to Contractor by deducting charges from Contract Sum.

1.10 SUBMITTALS

- A. Provide submittals in accordance with Section 01330.
- B. Laboratory Reports:
 - 1. Submit test reports within 2 weeks of test date.
 - 2. After each inspection and test, promptly submit copies of written reports as follows:
 - a. Owner: One copy.
 - b. Owner's Representative: 3 copies.
 - c. Code Officials: One copy.
 - d. Contractor: 3 copies.
 - 3. When requested by Owner's Representative, provide interpretation of test results and suggested remedies.

1.11 FAILURES AND RETESTING

- A. When initial inspections and tests indicate Work does not comply with Contract Documents, subsequent testing will be performed by same Testing Agency and will be done at Contractor's expense and deducted from Contract Sum.
- B. Removal and replacement of Work necessitated by such non-compliance of Contract Documents shall be at Contractor's expense.

PART 2 PRODUCTS and PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from Utility source.
- B. Provide temporary electric feeder from electrical service at location as directed.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.
- D. Permanent convenience receptacles may be utilized during construction.
- E. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
- F. Provide 20 ampere duplex outlets, single phase circuits for power tools.
- G. Provide 20 ampere, single phase branch circuits for lighting.

1.2 TEMPORARY LIGHTING

- A. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 2 watt/sq. ft.
- B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails and lamps as required.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be utilized during construction.
- F. Provide a minimum of 80 f.c. of lighting on surfaces to receive finished materials.

1.3 TEMPORARY HEAT

- A. Provide and pay for heat devices and heat as required to maintain specified conditions for construction operations.
- B. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.4 TEMPORARY VENTILATION

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.5 TEMPORARY TELEPHONE SERVICE

- A. Provide telephone service to field office.
- B. Cellular phone of superintendent may be used in lieu of field office phone.

1.6 TEMPORARY WATER SERVICE

- A. Provide service required for construction operations. Extend branch piping with outlets located so that water is available by use of hoses.

1.7 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures.

1.8 TEMPORARY FIRE PROTECTION

- A. Observe and enforce throughout the work all requirements of City, State and Insurance authorities to minimize fire hazards.
- B. Remove combustible refuse from within each building daily.
- C. Provide fire extinguishers as required by the local fire department and city ordinances.

1.9 BARRIERS

- A. Provide as required to prevent public entry to construction areas.
- B. Provide 6 foot high commercial grade chain link fence around construction site; equip with vehicular and pedestrian on outside gates with locks.
- C. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water. Protect from staining on trunk and branches. Do not disturb existing soil at base or within drip line in any manner.

1.10 ENCLOSURES

- A. Provide temporary weather-tight closures of openings in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

1.11 PROTECTION OF INSTALLED WORK

- A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- B. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects, and storage.
- C. Prohibit traffic and storage on waterproofed and roofed surfaces, on lawn and landscaped areas.

1.12 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment. Protect site from ponding or running water.

1.13 FIELD OFFICES AND SHEDS

- A. Office:
 - 1. Weather-tight, with lighting, electrical outlets, telephone, heating, and air conditioning equipment.
 - 2. Equip with minimum of one layout table, one desk, file cabinet, plan rack and 2 chairs.
- B. Storage Sheds for Tools, Materials, and Equipment:
 - 1. Weather-tight, with heat and ventilation for Products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.

PART 2 PRODUCTS AND PART 3 EXECUTION - not used

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Sign: Construct and install to withstand 60 mph wind velocity.
- B. Graphics Painter: Professional sign painter, minimum 2 years experience.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.
- D. Permit: Obtain and pay for permit that may be required to display sign on Project site. Coordinate requirements with local jurisdiction.

PART 2 PRODUCTS

2.1 SIGN MATERIALS

- A. Support Structure and Framing: Mount 4 by 4 inch posts, set 3 feet into ground, with 4 feet clearance from ground to bottom of sign. Brace each post back to ground with 2 by 4 inch brace and brace both sides of "V" to each other.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 23/32 inch thick, sized to minimize joints.
- C. Nails, Bolts, and Fasteners: Types and sizes as required, galvanized or corrosion resistant.
- D. Primers and Paints: Exterior type, colors as selected by Owner's Representative, 2 coats consisting of an appropriate primer followed by one coat of paint for support structure, framing and sign surfaces.
- E. Graphics:
 - 1. Design, sizes, colors, and styles of lettering as selected by Owner's Representative.

2.2 FABRICATION

- A. Sign: One painted surface.
- B. Sign Size: 4 x 8 feet.
 - 1. Refer to Drawings for further information.
- C. Required Information:
 - 1. Title of Project and Name of Owner.
 - 2. Names and titles of Owner's Representative and Contractor, painted in black letters on white background.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install project identification sign within 10 days after commencement of construction.
- B. Install assembly plumb and level, rigidly braced, framed, and anchored to resist wind load.
- C. Maintain signs; repair deterioration and damage.
- D. Remove signs, framing, supports, and foundations at completion of Project and restore area.

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.
 - 1. When specified products are available only from sources that do not or cannot produce a quantity adequate to complete project requirements in a timely manner, consult with the Owner's Representative for a determination of the most important product qualities before proceeding. Qualities may include attributes relating to visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources whose products possess these qualities, to the fullest extent possible.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Matching of Colors:
 - 1. When a product is listed in the specifications with an accompanying color, pattern, texture, or sheen, provide only that product, or one that is identical in color, pattern, texture, and sheen to the product specified, regardless if the color, pattern, texture, or sheen of the alternate manufacturer's product is a standard or option.
 - 2. On finished materials and products, verify that colors, patterns, textures, and sheens are identical for the entire project and that there are no visual differences between batches, packages, bundles, or shipments, due to differing production runs. Owner's Representative reserves the right to reject products and materials installed, which have, in the sole opinion of the Owner's Representative, a significant enough difference in color, pattern, texture, or sheen, from other products on the project, so as to be visually distracting.

1.2 SUBSTITUTIONS

- A. Limitations:
 - 1. During Bidding period, Instructions to Bidders govern times for submitting requests for substitutions under requirements specified in this Section.
 - 2. Requests for substitutions of products will be considered only within 30 days after date established in Notice to Proceed. Subsequent requests will be considered only in case of product unavailability or other conditions beyond control of Contractor.
 - 3. Substitutions will not be considered:
 - a. When indicated on shop drawings or product data submittal without separate formal request.
 - b. When requested directly by subcontractor or supplier.
 - c. When acceptance will require substantial revision of Contract Documents.
 - 4. Do not order or install proposed substitute products without written acceptance.
 - 5. Only one request for substitution for each product will be considered. When substitution is not accepted, provide specified product.
 - 6. Owner's Representative will determine acceptability of substitutions.
- B. Requests for Substitutions:
 - 1. Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents. Utilize substitution request form attached.
 - 2. Identify product by Specifications section and Article numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.
 - 3. Attach product data as specified in Section 01330.

4. List similar projects using product, dates of installation, and names of Owner's Representative and Owner.
 5. Give itemized comparison of proposed substitution with specified product, listing variations, and reference to Specifications section and Article numbers.
 6. Give quality and performance comparison between proposed substitution and the specified product.
 7. Give cost data comparing proposed substitution with specified product, and amount of net change to Contract Sum.
 8. List availability of maintenance services and replacement materials.
 9. State effect of substitution on construction schedule, and changes required in other work or products.
- C. Contractor Representation:
1. Request for substitution constitutes a representation that Contractor has investigated proposed product and has determined that it is equal to or superior in all respects to specified product or that the cost reduction offered, if any, is ample justification for accepting the offered substitution.
 2. Provide same warranty for substitution as for specified product.
 3. Coordinate installation of accepted substitute, making such changes as may be required for Work to be complete in all respects.
 4. Certifies that cost data presented is complete and includes related costs under this Contract.
 5. Waives claims for additional costs related to substitution which may later become apparent.
- D. Submittal Procedures:
1. Submit 3 copies of request for substitution.
 2. Owner's Representative will review Contractor's requests for substitutions with reasonable promptness.
 3. During the bidding period, Owner's Representative will record acceptable substitutions in Addenda.
 4. After award of Contract, Owner's Representative will notify Contractor, in writing, of decision to accept or reject requested substitution, generally within 14 days.
 5. For accepted products, submit shop drawings, product data, and samples under provisions of Section 01330.

PART 2 PRODUCTS

2.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.
1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:
1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide the product indicated. No substitutions will be permitted.
 2. Semi-Proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
 - a. Where products or manufacturers are specified by name, comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 3. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not

restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.
 - a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.
6. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
7. Visual Matching: Where Specifications require matching an established Sample, the Owner's Representative's decision will be final on whether a proposed product matches satisfactorily.
 - a. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.
8. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Owner's Representative will select the color, pattern and texture from the product line selected.

PART 3 EXECUTION

3.1 PACKAGING AND TRANSPORTATION

- A. Require supplier to package products in boxes or crates for protection during shipment, handling, and storage. Protect sensitive products against exposure to elements and moisture.
- B. Protect sensitive equipment and finishes against impact, abrasion, and other damage.

3.2 DELIVERY, RECEIVING, AND HANDLING

- A. Deliver, receive, and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft
- B. Delivery:
 1. Arrange deliveries of products in accordance with construction progress schedules. Allow time for inspection prior to installation.
 2. Coordinate deliveries to avoid conflict with Work and conditions at site; limitations on storage space; availability of personnel and handling equipment, and Owner's use of premises.
 3. Schedule delivery to minimize long-term storage at site and to prevent overcrowding of construction spaces.
 4. Deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
 5. Clearly mark partial deliveries of component parts of equipment to identify equipment and contents to permit easy accumulation of parts and to facilitate assembly.

- C. Receiving and Handling:
 - 1. Provide equipment and personnel to handle products, including those provided by Owner, by methods to prevent soiling and damage.
 - 2. Provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.
 - 3. Handle product by methods to avoid bending or overstressing. Lift large and heavy components only at designated lift points.
 - 4. Immediately on delivery, inspect shipment to assure:
 - a. Product complies with requirements of Contract Documents and reviewed submittal.
 - b. Quantities are correct.
 - c. Accessories and installation hardware are correct.
 - d. Containers and packages are intact and labels legible.
 - e. Products are protected and undamaged.

3.3 STORAGE

- A. General:
 - 1. Store products, immediately on delivery, in accordance with manufacturer's instructions, with seals and labels intact. Protect until installed.
 - 2. Arrange storage in a manner to provide access for maintenance of stored items and for inspection.
 - 3. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
- B. Enclosed Storage:
 - 1. Store products, subject to damage by the elements, in substantial weathertight enclosures.
 - 2. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
 - 3. Provide humidity control and ventilation for sensitive products as required by manufacturer's instructions.
 - 4. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
- C. Exterior Storage:
 - 1. Provide substantial platforms, blocking, or skids, to support fabricated products above ground; slope to provide drainage. Protect products from soiling and staining.
 - 2. For products subject to discoloration or deterioration from exposure to the elements, cover with impervious sheet material. Provide ventilation to avoid condensation.
 - 3. Store loose granular materials on clean, solid surfaces such as pavement, or on rigid sheet materials, to prevent mixing with foreign matter.
 - 4. Provide surface drainage to prevent erosion and ponding of water.
 - 5. Prevent mixing of refuse or chemically injurious materials or liquids.

END OF SECTION

Attachment: Substitution Request Form

SUBSTITUTION REQUEST FORM

DATE: _____

Owner's Representative's Project No: _____

Project: _____

To: _____ From: _____

=====

Contractor (Bidder) hereby request acceptance of the following product or system as substitution in accordance with provisions of Section 01600 of the Specifications:

1. SPECIFIED PRODUCT OR SYSTEM:

Substitution request for : _____

Specification Section No : _____ Article: _____

2. SUPPORTING DATA:

_____ Product data adequate for evaluation of the request for proposed substitution is attached (description of product, reference standard, performance and test data, specifications, drawings, photographs).

_____ Sample is attached.

_____ Sample will be sent if requested.

3. QUALITY COMPARISON

	SPECIFIED PRODUCT	SUBSTITUTION
Name, Brand:	_____	_____
Catalog No.:	_____	_____
Manufacturer:	_____	_____
Vendor:	_____	_____
Significant Variations:	_____	_____

(Add Additional Sheets If Necessary)

Maintenance Service Available: Yes _____ No _____

Spare Parts Source: _____

Warranty Provided: Yes _____ No _____ Years _____

By Whom: _____

4. PREVIOUS INSTALLATIONS:

Identification of similar projects on which proposed substitution was used:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

5. REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS:

6. EFFECT OF SUBSTITUTION:

Does the proposed substitution affect other work (adverse or otherwise):

No _____ Yes _____ (if yes, explain)

Substitution Changes Contract Time: No _____ Yes _____
Add/Deduct _____ Days

Substitution requires dimensional revisions or redesign of the work: No _____ Yes _____ (if yes, attach explanation data)

Saving of credit to Owner: \$ _____

Extra Cost to Owner: \$ _____

7. CONTRACTOR'S (BIDDER'S) STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT DOCUMENTS:

I/we have investigated the proposed substitution. I/we:

- believe that it is equal or superior in all respects including function, appearance and quality to specified product, except as stated above;
- will provide same warranty and servicing requirements as specified for specified product;
- have included complete cost data and implications of the substitution;
- will pay for changes to the building design and special inspection costs caused by the use of this product;
- will coordinate the incorporation of the proposed substitution in the work;
- waive future claims for added cost to Contract caused by the substitution.

Contractor (Bidder): _____

Date: _____ By: _____

Answer all questions and complete all blanks - use "NA" if not applicable. Unresponsive or incomplete request will be rejected.

=====

OWNER'S REPRESENTATIVE'S REVIEW AND ACTION

_____ Resubmit substitution request

_____ Provide more information in the following areas:

_____ Sign Contractor's (Bidder's) Statement of Conformance

_____ Substitution is accepted.

_____ Substitution is accepted, with the following comments:

_____ Substitution rejected.

_____ Substitution Request received too late.

Owner's Representative

Date: _____

SECTION 01731

CUTTING AND PATCHING

PART 1 GENERAL

1.1 PAYMENT FOR COSTS

- A. Costs resulting from ill-timed or defective work, or work not conforming to Contract Documents, including costs for additional services of Owner's Representative, or other consultants shall be borne by the party responsible for ill-timed, rejected or non-conforming Work.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Products: Those required for original installation.

PART 3 EXECUTION

3.1 GENERAL

- A. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other work.
 - 2. Uncover work to install ill-timed work.
 - 3. Remove and replace defective and non-conforming work.
 - 4. Remove samples of installed work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical work.

3.2 INSPECTION

- A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- B. After uncovering, inspect conditions affecting performance of work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

3.3 PREPARATION

- A. Provide temporary supports to assure structural integrity of surroundings; devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.
- C. Provide materials and control operations to prevent spread of dust in surrounding area. Provide drop cloths or other suitable barriers.
- D. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- E. Avoid cutting in service pipes, ducts, or conduit until provisions have been made to bypass them.

3.4 CUTTING AND PATCHING

- A. Execute cutting, fitting, and patching (including excavation and fill) to complete work.
- B. Fit products together, to integrate with other work.
- C. Uncover work to install ill-timed work.
- D. Remove and replace defective or non-forming work.
- E. Remove samples of installed work for testing when requested.
- F. Provide openings in the work for penetration of mechanical and electrical work.

- G. Uncover work to allow for Owner's Representative's observation of covered work which has been covered up prior to required observation by Owner's Representative.

3.5 PERFORMANCE

- A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
 - 1. Use hand or small power tools designed for sawing or grinding, not hammering or chopping.
 - 2. Cut holes and slots as small as possible, neatly to size required, with minimum disturbance of adjacent surfaces.
 - 3. Temporarily cover openings when not in use.
 - 4. To avoid marring existing finished surfaces, cut or drill from exposed or finished side into concealed surfaces.
 - 5. Cut through concrete and masonry using cutting machine, such as Carborundum saw or diamond-core drill.
- B. Execute in manner which does not void required or existing warranties.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- D. Restore work with new products in accordance with requirements of Contract Documents.
- E. Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- G. Execute excavating and backfilling by methods in accordance with applicable Sections of Division 2 which will prevent settlement or damage to Project.
- H. Execute fitting and adjustment to produce finished installation complying with specified products, functions, tolerances, and finishes.
- I. Install products and materials to complete Work in accordance with requirements of Contract Documents.
- J. Do not cut and patch structural elements in manner that would result in reduction of load carrying capacity or of load deflection ratio.
- K. Do not cut and patch operational elements or safety related components in manner that would result in reduction of their capacity to perform in manner intended, including energy performance, that would result in increased maintenance, decreased operational life, or decreased safety.
- L. Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- M. Except where indicated otherwise, restore exposed finishes of patched areas to match existing and where necessary extend finish restoration into retained adjoining surfaces in manner which will eliminate evidence of patching and refinishing. Thoroughly clean surfaces prior to application of paint and other finishes.
- N. Where patching occurs in previously painted surface, provide appropriate prime coat followed by first finish coat of paint. Provide final finish coat over entire area containing patch; for continuous surface extend to nearest vertical break or intersection, for an assembly refinish entire unit. Except where indicated otherwise, finish in sheen and color to match existing.

3.6 CLEANING

- A. Restore damaged surfaces to its original condition.

END OF SECTION

SECTION 01732

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- D. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

3.2 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Section 01500 "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.3 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 5. Dispose of demolished items and materials promptly.
- B. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
- C. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.5 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 01740

CLEANING

PART 1 GENERAL

1.1 CLEANING DURING CONSTRUCTION

- A. Control accumulation of waste materials and rubbish; periodically dispose of off-site.
- B. Keep site and construction areas clean on a weekly basis.
- C. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.2 FINAL CLEANING

- A. Execute cleaning prior to inspection for Substantial Completion of the Work.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.

PART 3 EXECUTION

3.1 CLEANING

- A. In addition to removal of debris and cleaning specified in other sections, clean interior and exterior exposed-to-view surfaces.
- B. Remove waste, foreign matter, and debris from roofs, gutters, area ways, and drainage systems.
- C. Cleaning during Construction:
 - 1. Execute periodic cleaning to keep building, site, and adjacent properties free of accumulations of waste materials, debris, rubbish, and wind blown debris resulting from construction operations.
 - 2. Prior to Substantial Completion remove construction tools, scaffolding, equipment, machinery, and surplus materials.
 - 3. Broom clean and vacuum interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
 - 4. Schedule cleaning operations so that dust and other contaminants will not fall on or adhere to wet or newly-coated surfaces.
 - 5. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing space.
 - 6. Store volatile wastes in covered metal containers and remove from premises daily. Prevent accumulation of waste which creates hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.
 - 7. Collect and remove waste materials, debris, and rubbish from site weekly until execution of final cleaning and dispose off site in lawful manner.
 - 8. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 9. Do not burn or bury rubbish and waste materials on Project site. Do not dispose of volatile wastes or hazardous materials such as mineral spirits, oil, or paint thinner in storm or sanitary drains. Do not dispose of wastes into streams or waterways.
 - 10. Maintain cleaning until Final Completion.

- D. Final Cleaning: In addition to cleaning during construction, prior to Substantial Completion provide the following:
1. Remove temporary protection and labels not required to remain.
 2. Clean finishes free of dust, stains, films and other foreign substances.
 3. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.
 4. Clean, damp mop, wax, and polish resilient and hard- surface floor as specified.
 5. Clean surfaces of equipment; remove excess lubrication.
 6. Clean plumbing fixtures, and food service equipment, to a sanitary condition.
 7. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.
 8. Clean light fixtures and lamps.
 9. Remove waste, debris, and surplus materials from site. Clean grounds; remove stains, spills, and foreign substances from paved areas and sweep clean. Rake clean other exterior surfaces.

END OF SECTION

SECTION 01750

STARTING AND ADJUSTING

PART 1 GENERAL

1.1 QUALITY CONTROL

- A. When specified in individual Sections, require manufacturer to provide authorized representative to be present at site to:
 - 1. Inspect, check, and approve equipment installation prior to start-up.
 - 2. Supervise placing equipment in operation.
 - 3. Provide a written report that equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting lines or anchor bolts, and has been satisfactorily operated under full load conditions.

1.2 SUBMITTALS

- A. Submit preliminary schedule listing times and dates for start-up of each item of equipment in sequence 2 weeks prior to proposed dates.
- B. Submit manufacturer's representative reports within one week after start-up, listing satisfactory startup dates.

1.3 PROJECT CONDITIONS

- A. Building enclosure is complete and weathertight.
- B. Excess packing and shipping bolts are removed.
- C. Interdependent systems have been checked and are operational.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 INSPECTION

- A. Verify that Project conditions comply with requirements.
- B. Verify that status of Work meets requirements for starting of equipment and systems.

3.2 PREPARATION

- A. Coordinate sequence for start-up of various items of equipment, including Owner-provided equipment.
- B. Have Contract Documents, shop drawings, product data, and operation and maintenance data at hand during entire start-up process.
- C. Verify that each piece of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence, and other conditions which may cause damage.
- D. Verify control systems are fully operational in automatic mode.
- E. Verify that tests, meter readings, and specific electrical characteristics agree with those specified by electrical equipment manufacturer.
- F. Verify wiring to motors and controls required by mechanical work for operational smoke and fire protection demonstrations is complete.
- G. Verify wiring and support systems for equipment installed under separate contracts is complete and checked.
- H. Bearings: Inspect for cleanliness; clean and remove foreign matter. Verify alignment; take corrective measures.
- I. Drives: Inspect for tension on belt drives, adjustment of variable pitch sheaves and drives, alignment, proper equipment speed, and cleanliness. Take corrective action.

- J. Motors: Verify that motor amperage agrees with nameplate value. Inspect for conditions which produce excessive current flow and which exist due to equipment malfunction. Take corrective action.

3.3 STARTING SYSTEMS

- A. Execute start-up under supervision of responsible Contractor personnel.
- B. Place equipment in operation in proper sequence.

END OF SECTION

SECTION 01820

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstrations and instructions have been completed.
- B. Owner will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

1.2 SUBMITTALS

- A. Submit preliminary schedule for Owner's approval, listing times and dates for demonstration of each item of equipment and each system, 2 weeks prior to proposed dates.
- B. Submit reports within one week after completion of demonstrations, that demonstrations and instructions have been satisfactorily completed. Give time and date of each demonstration, with a list of persons present.

PART 2 PRODUCTS – not used

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify equipment has been inspected and put into operation in accordance with Section 01750; testing, adjusting, and balancing has been performed in accordance with Division 15 and 16, and equipment and systems are fully operational.
- B. Have copies of completed operation and maintenance manuals at hand for use in demonstrations and instructions.

3.2 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of equipment and systems to Owner's personnel 2 weeks prior to date of final inspection. For equipment requiring seasonal operation, perform instructions for other seasons within 6 months.
- B. Use operation and maintenance manuals as basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.1 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.

1.2 COORDINATION

- A. Coordinate and verify required access door sizes and locations with applicable trades.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Sections: ASTM A 36; ASM A992 for wide flanges.
- B. Steel Tubing: ASTM A 500, Grade B.
- C. Steel Pipe: ASTM A 53, Grade B, Schedule 40.
- D. Bolts, Nuts, and Washers: ASTM A 307, Grade A.
- E. Welding Materials: AWS D1.1; type required for materials being welded.

2.2 FABRICATION

- A. Verify dimensions on site prior to shop fabrication.
- B. Fabricate items with joints tightly fitted and secured.
- C. Fit and shop assemble in largest practical sections, for delivery to site.
- D. Grind exposed welds flush and smooth with adjacent finished surface. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of structure, except where specifically noted otherwise.
- F. Make exposed joints butt tight, flush, and hairline.
- G. Supply components required for anchorage of metal fabrications. Fabricate anchorage and related components of same material and finish as metal fabrication, except where specifically noted otherwise.

2.3 UNIVERSAL PRIMER

- A. Manufacturer's standard, lead free primer, capable of providing sound foundation for field applied top coats despite prolonged exposure.
- B. Standard: FS TT-P-645.
- C. Maximum Allowable Dry Time: 4 hours to touch; 24 hours to re-coat.
- D. Compatible with finish paint system specified in 09900 or 09965, as scheduled or noted.
- E. Acceptable Products (subject to compatibility with finish coating):
 - 1. Tnemec, Chem Prime 37H-77, Tnemec, Kansas City, MO.
 - 2. Valspar 13-Y-5, Valspar, Baltimore, MD.
 - 3. Carboline Multi-Bond 150, by Carboline Company, St. Louis, MO.

2.4 ZINC-RICH PRIMER

- A. Inorganic, zinc-rich, capable of providing sound foundation for field applied top coats despite prolonged exposure, cathodic protection and corrosion resistance.
 - 1. Pigment Content: Minimum 80 percent zinc in dry film by weight.
 - 2. Compatible with finish paint system specified in Section 09910.
- B. Acceptable Products:
 - 1. Valspar MZ-7 (13-F-12) by Ameron, Baltimore, MD.
 - 2. Tnemec N90-392 Tneme-Zinc, Tnemec Co., Kansas City, MO.

2.5 GALVANIZING

- A. Provide hot-dip galvanized coating in accordance with:
 - 1. ASTM A 153 - Iron and Steel Hardware.
 - 2. ASTM A 123 - Rolled, pressed and forged steel shapes, plates, bars and strips 1/8 inch thick and heavier.
- B. Galvanizing Repair Paint:
 - 1. Standard: MIL-P-21035 or SSPC-Paint-20.
 - 2. Acceptable Products:
 - a. Valspar M-Z-2 (13-F-2), Valspar, Baltimore, MD.
 - b. Tnemec 90-93, Tnemec Co., Kansas, MO.

2.6 FINISH

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact bond with concrete or where field welding is required.
- C. Prime paint interior steel items scheduled with two coats of primer.
- D. Galvanize exterior steel items and those touching exterior masonry walls to minimum 2.0 ounces per square foot zinc coating in accordance with ASTM A 386. Finish coating surface to be smooth, without irregularities, drip marks, or other roughness, ready for priming with minimal preparation required.

2.7 STEEL LINTELS

- A. Provide at wall opening and recesses.
- B. Weld multiple loose lintels to form a single unit.
- C. Provide a minimum of 8 inches of bearing at ends unless noted otherwise.
- D. Finish: Prime painted.

2.8 PIPE BOLLARDS

- A. Type: Standard steel pipe.
- B. Fill with standard weight concrete; set in concrete foundations. Ensure concrete at top of pipe is rounded and smooth.
- C. Finish: Galvanized.

2.9 VERTICAL LADDERS

- A. Type: Vertical steel ladders consisting of following components:
 - 1. Side Rails: 3/8 inch by 2-1/2 inches flat steel bars with eased edges spaced as detailed on Drawings or not less than 18 inches between.
 - 2. Rungs: 1 inch minimum solid round steel bars spaced 12 inches maximum on center, punched through stringers and plug welded.
 - 3. Provide non-slip surface on top of each rung, either by coating rung with aluminum oxide granules set in epoxy resin adhesive, or by using type of manufactured rung which is filled with aluminum oxide grout.
 - 4. Angle Supports: Support ladders by steel angles bolted to walls and floors to provide minimum of 7 inches from face of wall to centerline of rungs. Locate at 5 feet on center and within 16 inches of top and bottom.
 - 5. Safety Handrails: Extend rails 42 inches above top rung and anchor to structure, if adjacent structure does not extend above top rung, gooseneck extended rails back to structure.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects. Adequately reinforce and anchor work in place. Form exterior joints to exclude water.
- B. Perform field welding in accordance with AWS D1.1, D1.2 or D1.3 depending on substrate involved.
- C. After installation, touch-up field welds, scratched or damaged surfaces with primer.

- D. Install stock manufactured items in accordance with manufacturer's directions.
- 3.2 ERECTION TOLERANCES
- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
 - B. Maximum Offset From True Alignment: 1/4 inch.
- 3.3 SCHEDULE
- A. Provide and install items listed in Schedule and shown on Drawings with anchorage and attachments necessary for installation.
 - B. The Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
 - C. Items of Work Custom Fabricated
 - 1. Bumper bollards and guard rails; schedule 40 steel: Galvanized finish.
 - 2. Lintels, ledges, shelf angles, channels and plates not attached to structural framing, for support of metal decking and masonry: Prime paint finish.
 - 3. Miscellaneous Steel Shapes: Channels, wide flange shapes, angles, plates, tubing, connections, and bolts where shown and detailed on Drawings. Hot dip galvanize where exposed to weather or touching exterior masonry after fabrication.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Lumber Grading: Lumber Grading Rules and Wood Species in accordance with Voluntary Product Standards. Grading rules of following associations apply to materials furnished.
 - 1. Southern Pine Inspection Bureau (SPIB).
 - 2. West Coast Lumber Inspection Bureau (WCLIB).
 - 3. Western Wood Products Association (WWPA).

1.2 DELIVERY, STORAGE AND HANDLING

- A. Store products above ground, on platforms or skids, and covered with waterproof coverings. Provide for adequate air circulation.
- B. Do not store seasoned materials in damp or wet locations.
- C. Support products in such a way as to prevent warping and distortion.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

- A. General: Where stress rating values are given in lieu of grades, select any quality which will meet structural requirements.
- B. Lumber
 - 1. Grading Rules: PS 20.
 - 2. Moisture Content: 19 percent maximum moisture content after treatment for fire retardant and preservative treated woods.
 - 3. Surfacing: Surface four sides (S4S), unless noted otherwise.
 - 4. Uses, Grades, and Stress Ratings
 - a. Non-structural Framing (2 to 4 inch thick, 2 to 4 inch wide):
 - 1) Plates, Blocking, Bracing, Nailers: Utility grade.
 - b. Structural Framing: Refer to structural drawings and structural calculations.
- C. Plywood
 - 1. Grading Rules: PS 1, using group 1 to 4 species as required for rating.
 - 2. Exposures: Provide exposure ratings as indicated.
 - 3. Thickness: As detailed or noted, or otherwise as required to maintain span capability.
 - 4. Uses, Grades, Ratings
 - a. As indicated in drawings.
 - 5. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.2 ACCESSORIES

- A. Fasteners
 - 1. Provide fasteners in sizes, spacings, and locations to suit applications. Hot dip galvanize unless noted otherwise.

2.3 WOOD TREATMENTS - SHOP PREPARED

- A. Preservative Treated Wood
 - 1. Preservative treat all wood in contact w/grade steel or concrete.
 - 2. Use waterborne salt preservatives as follows:
 - a. AWPB LP-2 above ground.
 - b. AWPB LP 22 ground contact.

PART 3 EXECUTION

3.1 INSTALLATION

A. General

1. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Scribe and cope as required.

3.2 TOLERANCES

- A. Framing members: 1/4 inch maximum from true position.
- B. Surface flatness of floors/roofs: 1/4 inch in 10 feet maximum.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 GENERAL

1.1 DELIVERY, STORAGE AND HANDLING

- A. Protect materials from damage, soiling and deterioration.
- B. Do not deliver finish carpentry materials until job site conditions and operations which could damage, soil or deteriorate work are complete.
- C. Store products and materials in ventilated, interior locations under constant minimum temperature of 60 degrees F. and relative humidity not to exceed 55 percent.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General
 - 1. Comply with quality and grading standards contained herein for each material.
 - 2. Sizes noted on drawings or indicated herein for lumber are nominal unless detailed by specific dimensions of actual size.
 - 3. Plywood and particleboard 3/4 inch thickness unless noted or detailed otherwise.
 - 4. Products surfaced four sides, unless noted otherwise.
- B. Softwood Plywood
 - 1. Quality standard: PS 1.
 - 2. Grading standard: AWI custom.
 - 3. Core material: C-D Plugged INT-APA.
 - 4. Face quality: A-B INT-APA.
- C. Particleboard:
 - 1. ANSI A208.1, Grade M-2 made with phenol-formaldehyde resins.
- D. Laminate Materials
 - 1. High pressure laminate surface
 - a. Thickness: 0.050 inch for horizontal grade; 0.028 to 0.032 inch for vertical grade.
 - b. Finish and Color: Refer to finish schedule on Drawings.
 - 2. Laminate Backing Sheets
 - a. Composition: High pressure laminate of paper and melamine, without decorative finish, 0.020 inch thick minimum.
 - b. Acceptable Manufacturers: Same as for high pressure laminate surfacing.

2.2 ACCESSORIES AND TREATMENT

- A. Contact Adhesive: FS MMM-A-130B, of type recommended by millwork manufacturer to suit application.
- B. Wall Adhesive: Solvent release cartridge type, compatible with substrate, capable of achieving durable bond.
- C. Nails, Bolts, Nuts, Washers, Lags, Pins, Nails, and Screws: Size and type to suit application.
- D. Hardware:
 - 1. Shelf Standards:
 - a. Heavy Duty: K&V no. 87 and 187, double slotted, in bright zinc plated finish.
 - b. Key Board Drawer: Fully articulated keyboard arm, black steel with painted black finish.
 - 1) Acceptable Product: Catalog No. 639.96.305 by Hafele.

PART 3 EXECUTION

3.1 PREPARATION

- A. Prime paint or seal concealed surfaces and items or assemblies which will be in contact with cementitious materials or surfaces.

3.2 INSTALLATION

- A. Install using skilled workmen in accordance with manufacturer's printed instructions and recommendations.
- B. Install work in accordance with AWI Custom Quality Standards. Handle materials to avoid dents and other damages.
- C. On field applied laminate plastic work
 1. Apply plastic laminate finishes where indicated.
 2. Adhere with adhesive over entire surface. Make joints and corners hairline.
 3. Match patterns. Slightly bevel joints.
 4. Cap exposed edges with plastic laminate of same finish and pattern.
 5. Apply laminate backing sheet on reverse side of plastic laminate finished surfaces.

3.3 TOLERANCES FOR FIELD ASSEMBLIES/JOINED ITEMS

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06640

FIBERGLASS REINFORCED PLASTIC PANELS

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm with minimum three years experience specializing in manufacturer of glass reinforced panels.
- B. Installer: Approved by manufacturer and having successfully completed five projects of similar scope and complexity.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following:
 - 1. Kemlite.
 - 2. Lasco.
 - 3. Marlite.
- B. Substitutions: Submit in accordance with Section 01600.

2.2 PRODUCTS

- A. Fire Resistance Rating per ASTM E-84:
 - 1. Flame Spread: Class A.
 - 2. Smoke Developed: 200.
- B. Physical characteristics:
 - 1. Flexural strength: 15,000 psi.
 - 2. Tensile strength: 9,000 psi.
- C. U.S.D.A. approved.
- D. Thickness: 1/8", minimum, weighing 1-1/2 lbs/sq.ft.
- E. Color: White.
- F. Adhesive: As recommended by manufacturer.
- G. Accessories: Batten strips and related items as required and as recommended by manufacturer.
- H. Acceptable Product: Refer to finish legend on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install using skilled workmen in accordance with manufacturer's printed instructions and recommendations.

3.2 ADJUSTING

- A. Fasten or adhere for tight connections and joints.

3.3 CLEANING

- A. Perform final cleaning in accordance with Section 01740.

END OF SECTION

SECTION 07920

JOINT SEALANTS

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Certifications:
 - 1. Manufacturer's certification that products:
 - a. Furnished for the specific project meet or exceed specified requirements.
 - b. Assembled for each joint are compatible with each other and with joint substrates under conditions of service and application.
 - c. Are suitable for the indicated use.
 - 2. Manufacturer's certification that sealants, primers, and cleaners, comply with local regulations controlling the use of volatile organic compounds.
 - 3. Contractor's and installer's certification that products are installed in accordance with Contract Documents, based on inspection and testing specified as part of Field Quality Control.

1.2 SEQUENCING

- A. Coordinate installation of sealants with substrates to which they are applied.

1.3 WARRANTY

- A. Provide warranties under provisions of Section 01780.
- B. Warrant installed products to be free from defects in material, labor, or installation techniques for 2 years.
- C. Include coverage for installed sealants and accessories which:
 - 1. Fail to achieve air tight seal.
 - 2. Fail to achieve watertight seal.
 - 3. Exhibit loss of adhesion.
 - 4. Exhibit loss of cohesion.
 - 5. Do not cure.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Acrylic Latex (Designation AL):
 - 1. Description:
 - a. ASTM C 834.
 - b. Non-sag; non-staining; non-bleeding.
 - c. Joint movement range without cohesive/adhesive failure: Plus 7.5 percent to minus 7.5 percent of joint width.
 - d. Color: As selected by Owner's Representative from manufacturer's full color range.
 - 2. Acceptable Products:
 - a. Pecora Corporation; AC-20+.
 - b. BASF Building Systems; Sonolac.
 - c. Tremco Incorporated; Tremflex 834.
- B. Silicone - General Purpose (Designation S-GP):
 - 1. Description:
 - a. ASTM C 920:
 - 1) Type: S
 - 2) Grade: NS
 - 3) Class: 50
 - 4) Uses: NT, M, G, A, O

- b. Low modulus, single component, neutral curing, non-staining, non-bleeding silicone sealant.
 - c. Joint movement range without cohesive/adhesive failure: Plus 50 percent to minus 50 percent of joint width.
 - d. Color: Selected by Owner's Representative from manufacturer's full color range.
 - 2. Acceptable Products:
 - a. Dow Corning Corporation; 795.
 - b. Momentive Performance Materials - GE Silicones; SilPruf NB SCS9000.
 - c. Pecora Corporation; 864.
 - d. Tremco Incorporated; Spectrem 2.
- C. Silicone - Sanitary (Designation S-S):
 - 1. Description:
 - a. ASTM C 920:
 - 1) Type: S
 - 2) Grade: NS
 - 3) Class: 25
 - 4) Uses: NT, M, G, A, O
 - b. Neutral or acid curing, non-staining, non-bleeding, fungicide-containing.
 - c. Color: Selected by Owner's Representative from manufacturer's full color range.
 - d. Complying with United States Food and Drug Administration Regulation 21CFR-177-6000.
 - 2. Acceptable products:
 - a. Dow Corning Corporation; 786 Mildew Resistant.
 - b. May National Associates, Inc.; Bondaflex Sil 100 WF.
 - c. Momentive Performance Materials - GE Silicones; Sanitary SCS1700.
 - d. Pecora Corporation; 898.
 - e. Tremco Incorporated; Tremsil 200 Sanitary.
- D. Silicone - Adhesive Sealant (Designation S-AS):
 - 1. Description: One-component, RTV adhesive sealants that are NSF approved for food contact, in white, black or translucent:
 - a. Dow Corning Corporation; 732 Multi-Purpose Sealant.
 - b. ITW Devcon; Silite RTV.
 - c. Momentive Performance Materials, Inc.; RTV102, RTV103, or RTV108.
- E. Urethane - Traffic-Bearing (Designation U-TB):
 - 1. Description:
 - a. ASTM C 920:
 - 1) Type: M
 - 2) Grade: P or NS
 - 3) Class: 25
 - 4) Uses: T, M, O
 - b. Chemical curing, non-staining, non-bleeding.
 - c. Joint movement range without cohesive/adhesive failure: Plus 25 percent to minus 25 percent of joint width.
 - d. Shore A hardness: 35 minimum, when tested in accordance with ASTM D 2240.
 - e. Color: Selected by Owner's Representative from manufacturer's full color range
 - 2. Acceptable Products:
 - a. Pecora Corporation; Dynatred.
 - b. Sika Corporation, Construction Products Division; Sikaflex - 2c NS.
 - c. Tremco Incorporated; Vulkem 227 or 245.

2.2 ACCESSORIES

- A. Joint Cleaner, Primer, Backing Rods: As recommended by sealant manufacturers.
- B. Masking Tape: Non-staining, non-absorbent material compatible with sealants and surfaces adjacent to joints.

2.3 MIXES

- A. Comply with manufacturer's instructions.
- B. Mix thoroughly with mechanical mixer without mixing air into sealants.
- C. Continue mixing until sealant is uniform in color and free from streaks of unmixed materials.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Ensure that concrete and masonry have cured minimum of 28 days.
- B. Verify that sealant backing is compatible with sealant.
- C. Verify that substrate surface:
 - 1. Is within manufacturer's moisture content range.
 - 2. Complies with manufacturer's cleanliness and surface preparation requirements.
- D. Joint Width:
 - 1. Verify joints are greater than minimum widths required by manufacturer.
 - 2. If joints are narrower than minimum required widths, widen narrow joints to indicated width.
 - 3. Do not place sealant in joints narrower than manufacturer's required minimum.

3.2 PREPARATION

- A. Prepare, clean, and prime joints in accordance with manufacturer's instructions.
- B. Remove loose materials and matter which might impair adhesion of primer and sealant to substrate.
- C. Remove form release agents, laitance, and chemical retarders, which might impair adhesion of primer and sealant to concrete and masonry surfaces.
- D. Comply with ASTM C 1193.
- E. Protect elements adjoining and surrounding work of this Section from damage and disfiguration.
- F. Priming:
 - 1. Prime joint substrates unless priming is not required by manufacturer's sealant-substrate compatibility and adhesion test.

3.3 APPLICATION

- A. General:
 - 1. Comply with results and recommendations from:
 - a. Manufacturer's compatibility and adhesion test.
 - 2. Provide compatible sealant system between dissimilar assemblies and adjacent construction.
 - 3. Seal locations necessary to create and secure continuous enclosure even though Drawings may not indicate all locations; do not seal weep holes.
 - 4. Seal to prevent migration of water, vapor, and air through joints.
 - 5. Comply with manufacturer's required application temperature and relative humidity ranges. Consult manufacturer when sealant cannot be applied within these ranges.
- B. Sealant Backing Bond Breaker:
 - 1. Measure joint dimensions and size materials to achieve manufacturer-required width-to-depth ratios.
 - 2. Install to achieve sealant depth and sealant contact depth no greater than distance required by manufacturer for sealant material, joint width, and joint movement range.
 - 3. Install using blunt instrument to avoid puncturing.
 - 4. Install to provide optimum joint profile and in manner to provide not less than 6 mm (1/4 inch) sealant depth when tooled.
 - 5. Install tape where insufficient joint depth makes use of rod not possible. Match tape width to joint width to prevent three-side adhesion. Do not wrap tape onto sides of the joint.
- C. Sealant:
 - 1. Install sealants at same time as installation of backing bond breaker materials.

2. Comply with manufacturer's requirements for applying different sealant materials in direct contact with each other.
 3. Install sealant with pressure-operated devices to form uniform continuous bead.
 4. Use sufficient pressure to fill voids and joints full.
 5. Install to adhere to both sides of joint.
 6. Install to not adhere to back of joint; provide sealant backing.
 7. Install sealant free of air pockets and embedded matter.
 8. Recess sealant 3 mm (1/8 inch) from surface of pavements and horizontal surfaces.
- D. Sealant Tooling:
1. Comply with manufacturer's tooling method requirements.
 2. Tool sealant within manufacturer's tooling time limits.
 3. Remove excess sealant from surfaces adjacent to joint.
 4. Allow acrylic latex sealant to achieve firm skin before paint is applied.

3.4 SCHEDULE

- A. Sealant Schedule:
1. Interior Joints:
 - a. Wall and ceiling joints subject to movement: Designation U-MC.
 - b. Wall and ceiling joints not subject to movement: Designation AL.
 - c. Floor joints: Designation U-TB.
 - d. Wall and ceiling joints between frames and their rough opening: Designation AL.
 - e. Wall and ceiling joints between frames and adjoining surfaces: Designation AL.
 - f. Interior Sanitary Joints; Joints Between Plumbing Fixtures and Adjoining Floor, Wall, and Ceiling Surfaces; Joints in Dietary and Food Preparation Areas, Kitchens, Food Storage Areas, and Areas Subject to Frequent Wet Cleaning, including joints between walls and floors, Joints Between Back Splashes and Wall Substrates: Designation S-S.
 - g. Food Service Equipment; where equipment abuts other equipment or construction: Designation S-AS.

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Conform to requirements of SDI-100.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers – Welded Unit Frames: Subject to compliance with requirements indicated, provide products of one of the following:
 - 1. Republic Builders Products.
 - 2. Ceco Corporation
 - 3. Fenestra Technologies Corp.
- B. Substitutions: Under provisions of Section 01600.

2.2 HOLLOW METAL FRAMES

- A. Interior Frames: Welded steel, 16 gage thick material.
- B. Construction: Welded required; knocked-down not allowed.
- C. Corners of mitered design; stops coped and butted, or mitered.
- D. Guard Box: Closed box design, 26 gage minimum, welded to frame. Provide at:
 - 1. Mortise hardware cutouts for assemblies installed within masonry walls or where assemblies have frame grouted with mortar or similar material at time of installation.
- E. Spreader: Manufacturer's standard temporary channel or angles tack welded at bottom of jamb members.
- F. Floor Anchor Clips: Provide at each jamb and mullions which extend to floor.
 - 1. In areas where concrete topping or other similar construction occurs, provide adjustable design to permit securing to depressed subfloor construction. In lieu of adjustable design, frames may extend to subfloor.
- G. Jamb Anchors
 - 1. Wood Stud Wall Systems: Anchor strap, type or design compatible with stud system. Locate at top of frame, 12 inches from top and, 24 inches on centers maximum intermittently, minimum 4 per jamb.

2.3 FABRICATION

- A. Fabricate frames as welded unit.
- B. Prepare frame for silencers.

2.4 FINISH

- A. Interior Units: Baked on primer.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install frames in accordance with SDI-105.
- B. Coordinate with gypsum board construction for anchor placement.
- C. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.
- D. Set frames plumb, level, and true alignment, securely fastened to the floor and adjoining walls.

3.2 TOLERANCES

- A. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

END OF SECTION

SECTION 08210

FLUSH WOOD DOORS

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Quality Standard, Custom Grade.

1.2 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01600.
- B. Deliver to site after wet construction operations are completed and dried-in building has reached average prevailing relative humidity.
- C. Storage:
 - 1. Store in clean, dry, ventilated area protected from sunlight.
 - 2. Avoid extreme heat, cold, dryness or humidity.
 - 3. Store flat over level surface above floor on wood blocking.
 - 4. Under bottom door and over top of stack, furnish plywood or corrugated cardboard for protection.
- D. Handling: Do not drag doors across one another or across other surfaces.

1.3 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.4 COORDINATION

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.5 WARRANTY

- A. Provide warranty under provisions of Section 01770 to the following term:
- B. Life of Installation: Interior doors.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, telegraphing core construction.
- D. Include hanging, installation of hardware and refinishing which may be required due to repair or replacement of defective doors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements indicated, provide products of one of the following:
 - 1. Locknet.
- B. Substitutions: Under provisions of Section 01600.

2.2 DOOR TYPES

- A. Flush Interior Doors: 1-3/4 inches thick; solid core construction.

2.3 DOOR CONSTRUCTION

- A. Core (Solid, Non-Rated): AWI Section 1300, Type PC Particleboard.

2.4 FLUSH DOOR FACING

- A. Plastic Laminate Facing: NEMA LD-3, General Purpose Type, 0.050 inch thick.
 - 1. Color, Pattern, and Texture: Refer to Finish Schedule.

2.5 ACCESSORIES

- A. Glazing Stops: Wood, of same species as door facing; prepared for countersink style screws.

2.6 FABRICATION

- A. Fabricate doors in accordance with AWI Quality Standards requirements.
- B. Provide lock blocks at lock edge and top of door for closer for hardware reinforcement.
- C. Vertical Exposed Edge of Stiles: Of same species as veneer facing for transparent finish.
- D. Fit door edge trim to edge of stiles after applying veneer facing.
- E. Bond edge banding to cores.
- F. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.
- G. Factory pre-fit doors for frame opening dimensions identified on shop drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.
- B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Install doors in accordance with AWI Quality Standard and to Warnock Hersey requirements.

3.3 INSTALLATION TOLERANCE

- A. Conform to AWI requirements for fit and clearance tolerances.
- B. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taught string, corner to corner, over an imaginary 36 by 84 inch surface area.
- C. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taught string, top to bottom, over an imaginary 36 by 84 inch surface area.
- D. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taught string, edge to edge, over an imaginary 36 by 84 inch surface area.

3.4 ADJUSTING

- A. Adjust work under provisions of Section 01770.
- B. Adjust door for smooth and balanced door movement.

END OF SECTION

SECTION 08710

DOOR HARDWARE

1.1 QUALITY ASSURANCE

- A. Hardware Supplier: Company specializing in supplying commercial door hardware with 2 years experience, with AHC designation.
- B. Hardware Installer: Employ a qualified carpentry person to perform the work of this Section.

1.2 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for requirements applicable to fire rated doors and frames.
- B. Comply with provisions of Americans with Disabilities Act Accessibility Guidelines (ADAAG), ANSI A117.1, and applicable state and local requirements for accessibility, whichever is most stringent, to accommodate handicapped persons.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide hardware complete with necessary screws, bolts, anchors or other fastenings for proper application of suitable size and type, and match hardware as to materials and finish.

2.2 CYLINDERS

- A. Provide cylinders for locksets, deadlocks, exit devices, and other control and locking devices indicated in Hardware Sets.
- B. Equip cylinders with appropriate rings.
- C. Finish cylinders and rings to match trim.

2.3 LOCKING AND LATCHING DEVICES

- 1. Manufacturers: Refer to Drawings.
- 2. Bored Locksets and Latchsets: ANSI A156.13, Grade 2.
- 3. Acceptable Products: Refer to Drawings.
- 4. Backset: 2-3/4 inches.
- 5. Latch Bolt: Two piece anti-friction, 3/4 inch throw.
- 6. Strike: ANSI standard 4-7/8 inch height, 1-1/4 inch curved lip.
- 7. Trim lever and rose: Refer to schedule at end of section.

2.3 EXIT DEVICES

- A. Acceptable Manufacturers: Refer to Drawings.
- B. Basis for Design; Acceptable Products: Refer to Drawings.
- C. Standards: ANSI A156.3, Grade 1.
- D. UL listed for "Fire Exit Hardware" at labeled assemblies.
- E. Touch Bar: Modern design, recessed to provide proper clearance at door openings, full width of door.
- F. Dogging Feature: Equip for keyed cylinder at non-label assemblies.

2.4 SURFACE MOUNTED CLOSERS

- A. Acceptable Manufacturers: Refer to Drawings.
- B. Acceptable Products: Refer to Drawings.
- C. Standard: ANSI A156.4, Grade 1.
- D. Required Features: Manufacturer's standard cast iron or cast aluminum construction.
 - 1. Regular or parallel arm mounting.
 - 2. Rack and pinion construction with compression spring, fully hydraulic.
 - 3. Closing speed and latching speed controlled by independently operated valves.
 - 4. Adjustable spring power allowing adjustment up to 50 percent in field to suit individual door conditions.

5. Adjustable backcheck for interior and exterior units.
6. Maximum operating force of 8.5 pounds for exterior doors, 5 pounds for interior doors, and 15 pounds for label doors.
7. Size as recommended by manufacturer for door size and weight.
8. Hold open and deadstop features where indicated in Hardware Sets.
9. Accessories: Manufacturer's standard full size non-metallic cover.
10. Furnish with necessary arms, tracks, brackets, plates, shoes, and other accessories to suit door and frame conditions.
11. Finish accessories to match cover.

2.5 HINGES

- A. Acceptable Manufacturers: Refer to Drawings.
- B. Butt Hinges:
 1. Comply with ANSI A156.1 and A156.7.
 2. Five knuckle design with square corners.
 3. Full mortise type.
 4. Flat button tip and matching plug.
 5. Non-removable pins for out-swinging exterior doors and for interior reverse bevel doors equipped with locking device; safety stud also acceptable. Non-rising pin for other doors.
 6. Non-ferrous construction at locations exposed to exterior atmosphere.
 7. Heavy weight for doors 3'-4" width and over and for fire rated doors over 8'-0" height. Standard weight at other doors.
 8. Anti-friction or ball bearing type for doors equipped with closers.
 9. Anti-friction or ball bearing type for doors (3'-0") width and over which are not equipped with closers.
 10. Plain bearing type for doors less than 3'-0" width which are not equipped with closers.
- C. Minimum Number Hinges:
 1. Doors 5'-0" or less in height: One pair.
 2. Doors over 5'-0" and not over 7'-6": 1-1/2 pair.
 3. Doors over 7'-6": One for each additional 2'-6" height or fraction thereof.
 4. Dutch doors: 2 pair.
- D. Minimum Size and Gage:
 1. Doors 3'-0" width or less: 4-1/2 by 4-1/2 inches, 0.134 gage
 2. Doors over 3'-0" up to 3'-4": 5 by 4-1/2 inches, 0.146 gage.
 3. Doors over 3'-4": 5 by 4-1/2 inches, 0.190 gage.
 4. Fire rated doors over 8'-0" height: Sized as indicated above, except not less than 0.180 gage.

2.6 PUSH/PULL TRIM AND PLATES

- A. Acceptable Manufacturers: Refer to Drawings.
- B. Pulls and Push Plates:
 1. Acceptable Product: Refer to Drawings.
- C. Protection Plates:
 1. Type: Stainless steel, square corner design, 0.050 inch thickness.
 2. Size: When mounted on push side of door, 1 inch less than door width at pair of doors and 2 inches less than door width at single doors. When mounted on pull side of door, 1 inch less than door width.
 3. Kick Plates: Beveled 3 edges, 12 inch height unless indicated otherwise in Hardware Sets.
 4. Armor Plates: Beveled 3 edges, 42 inch height unless indicated otherwise in Hardware Sets.
 5. Mop Plates: Beveled 3 edges, 4 inch height.

2.7 MISCELLANEOUS HARDWARE

- A. Acceptable Manufacturers: Refer to Drawings.
- B. Lock Guards: Prime coated steel, equivalent to Ives 184.
- C. Silencers:

1. Type: Preformed neoprene or rubber.
2. Location and quantities:
 - a. Pairs of Doors: Two at header.
 - b. Single Doors: Three at strike jamb.
 - c. Weatherstripped Doors: Not required.

2.8 WEATHERSTRIPPING, SEALS AND THRESHOLDS

- A. Acceptable Manufacturers and Products: Refer to Drawings.
- B. Thresholds:
 1. Type: Extruded aluminum.
 2. Size: 5 inch width, 1/2 inch height.
- C. Weatherstripping:
 1. Type: Extruded aluminum with neoprene bulb.
- D. Sweep Strips:
 1. Type: Extruded aluminum with neoprene seal.
- E. Door Bottom Seals:
 1. Type: Extruded aluminum housing with polyurethane seal.
- F. Rain Drips:
 1. Type: Extruded aluminum.
- G. Astragals:
 1. Type: Steel, prime coated.

2.9 DOOR STOPS

- A. Acceptable Manufacturers: Refer to Drawings.
- B. Provide door stops at each door leaf, except not required at doors equipped with overhead stops/holders, or doors equipped with closers having deadstop feature.
- C. Door stops consist of floor stops or wall stops to prevent doors from striking building components or equipment.
- D. Wall Stops:
 1. Equipped with expandable anchor for use at gypsum board/stud or with machine screw and expansion shield for use at concrete or masonry walls.
- E. Floor Stops:
 1. Equip with machine screw and expansion shield, and appropriate riser where scheduled for areas indicated to receive carpet or thresholds.

2.10 KEYING

- A. Door Locks: Keyed, master-keyed, and grand master-keyed as directed by Owner's Representative with control keying for core removable cylinders.
- B. Supply 2 keys for each lock.
- C. Provide bitting list locks.
- D. Supply keys in the following quantities:
 1. 10 master keys.
 2. 10 construction keys.

2.11 FINISHES

- A. Finishes:
 1. US32D, brushed stainless steel, unless noted otherwise in schedule.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install hardware plumb, level, and true to line in accordance with manufacturer's templates, Section 01600, and Project conditions.
- B. Install fire rated hardware in accordance with NFPA 80.

- C. Where cutting and fitting is required on substrates to be field painted or similarly finished, install, fit, remove and store hardware prior to finishing. Reinstall hardware after finishing operations are completed.
 - D. Do not install surface mounted items until finishes have been completed on substrate.
 - E. Reinforce attachment substrates as necessary for installation and operation.
 - F. For substrates which are not factory prepared for hardware:
 - 1. Mortise work to correct size and location without gouging, splintering or causing irregularities in exposed finish work.
 - 2. Fit faces of mortised components snug and flush without excessive clearance.
 - G. Set thresholds at exterior doors in bed of sealant. Remove excess sealant.
- 3.2 ADJUSTING
- A. Check and adjust each operating hardware item to ensure correct operation and function.
 - B. Ensure weatherstripping and seals do not inhibit closing and positive latching of door.
 - C. Lubricate moving or operating components as recommended by hardware manufacturer. Use graphite type lubrication if none other is recommended.
 - D. Replace defective materials or units which cannot be adjusted to operate as intended. Reinstall items found improperly installed.
 - E. Prior to date of Substantial Completion, readjust and re-lubricate hardware items as necessary.
- 3.3 SCHEDULE – Refer to Drawings

END OF SECTION

SECTION 09250

GYPSUM BOARD

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C 840, GA-201, GA-216 and GA-600.

1.2 DELIVERY, STORAGE, HANDLING

- A. Deliver, store, handle, and protect products in conformance with manufacturer's instructions and in accordance with Section 01600.
- B. Store inside building, on sleepers, and out of water.

PART 2 PRODUCTS

2.1 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized.
- B. Steel Studs and Runners: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.018 inch.
 - 2. Depth: As indicated on Drawings.
- C. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.018 inch.
 - 2. Depth: 7/8 inch.
- D. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

2.2 GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corp.
 - 3. Georgia-Pacific Gypsum LLC.
 - 4. National Gypsum Company.
 - 5. USG Corporation.
- B. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Core: 5/8 inch, Type X.
 - 2. Long Edges: Tapered.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
 - 4. Substitutions: Under provisions of Section 01600.

2.3 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; GlasRoc Tile Backer.
 - b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
 - c. National Gypsum Company; e2XP Tile Backer.
 - 2. Core: 5/8 inch, Type X.
 - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

4. Application: Unless indicated as cement board, use for tiled areas, non-tiled wet or high humidity areas, and where moisture-resistant gypsum board is indicated.
- B. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, with glass-fiber-reinforced fronts, backs, and long edges.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. National Gypsum Company, Permabase Cement Board.
 2. Thickness: 5/8 inch, unless otherwise indicated.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
 4. Substitutions: Under provisions of Section 01600.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper.
 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.
- D. Joint Compound for Tile Backing Panels:
 1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
 2. Cementitious Backer Units: As recommended by backer unit manufacturer.

PART 3 EXECUTION

3.1 CEILING FRAMING INSTALLATION

- A. Install in accordance with ASTM C 754, GA-201, GA-216, and GA-600 and manufacturer's instructions.
- B. Coordinate location of hangers with other work. Use 9 gage wire for single layer wall board, and 8 gage wire for double layer. Space at maximum 48 inches on center each way, unless ceiling framing occurs at more frequent intervals.
- C. Install ceiling framing independent of walls, columns, and above-ceiling work. Locate members within 6 inches of walls. Unless shown otherwise, use 1-1/2 inch cold-rolled channels, 2 inch on double layer board, at 48 inches off center main framing with furring channels at 24 inches on center, 16 inches on center for double layer board.

- D. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches past each end of openings.
- E. Laterally brace entire suspension system.

3.2 GYPSUM BOARD INSTALLATION

- A. Install gypsum board in accordance with GA 201, GA 216, GA-600 and U.S.G. "Gypsum Construction Handbook".
- B. Erect board vertically, except that board may be erected horizontally for curved walls, with ends and edges occurring over firm bearing. Stagger end joints to occur at different locations on opposite sides of wall. Apply board to suspended ceilings with long dimension at right angles to framing.
- C. Use screws when fastening gypsum board to metal furring or framing and nails to wood studding. Stagger fasteners opposite each other on adjacent ends and edges. Space fasteners as recommended in U.S.G., "Gypsum Construction Handbook".
- D. Double Layer Applications: Use gypsum backing board for first layer, placed perpendicular to framing or furring members. Use fire rated gypsum backing board for fire rated partitions. Place second layer parallel to first layer. Offset joints of second layer from joints of first layer.
- E. Install cementitious backing board over stud framing in accordance with manufacturer's instructions.
- F. Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum ceiling board with sealant.
- G. Place control joints at changes in back-up material, at maximum 20'-0" off center in exterior walls, and at maximum 30'-0" off center at interior partitions. In ceilings, install at maximum 30'-0" off center each way. Provide fire resistant protections behind control joints in fire rated assemblies.
- H. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
- I. Thicken partitions to eliminate wall surface jogs for the full length of the wall within a room to conceal structural members, pipes, panels, specialty items, and accessories.
- J. Coordinate door and other frame thicknesses as required.

3.3 JOINT TREATMENT

- A. Tape, fill, and sand exposed joints, edges, and corners to produce surface ready to receive finishes. The intent is to provide the highest quality of joint treatment work consistent with commercial construction. Leave surfaces smooth, uniform, and free of fins, depressions, ridges, cracks, and other imperfections.
- B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.
- C. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - 4. Level 5: Where indicated on Drawings.

3.4 TOLERANCES

- A. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09300

TILE

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Conform to ANSI- Recommended Standard Specifications for Ceramic Tile - A137.1.
- B. Conform to TCA Ceramic Tile: The Installation Handbook.

PART 2 PRODUCTS

2.1 TILE

- A. Acceptable Products: Indicated in the Finish Schedule on Drawings.

2.2 TRIM

- A. Provide necessary caps, stops, returns, trimmers and other shapes to complete installation.
- B. Color and finish to match wall tile or as indicated on drawings.

2.3 MORTAR AND ADHESIVE MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following manufacturers.
 - 1. Custom Building Products, Seal Beach, CA.
 - 2. MAPEI Corporation, San Bernardino, CA
 - 3. Laticrete International, Inc., Bethany, CT.
 - 4. Bostik, Middleton, MA.

2.4 MORTAR MATERIALS - THIN SET BEDS

- A. Latex Modified:
 - 1. Description: Two component system; premium high strength mortar and Liquid Latex additive; complying with ANSI A118.4.
 - 2. Acceptable Products:
 - a. MAPEI Keracrete System consisting of Keracrete Crete mortar and Keralastic latex admixture.
 - b. Approved Equal.
- B. Quick Setting Thin-Set Mortar:
 - 1. Description: Fast setting, second generation, two-component mortar consisting of latex additive and mortar; comply with ANSI A118.4. Cures completely with no residual moisture in 24 hours.
 - 2. Acceptable Products:
 - a. MAPEI Grani/Rapid System consisting of Grani/Rapid powder and PRP318 latex additive.
 - b. Approved Equal.

2.5 GROUT

- A. Manufacturer: as scheduled
- B. Polymer-Modified Hydraulic Grout (for tile in areas other than "D" below):
 - 1. Description: Latex-modified, containing a factory blended antimicrobial, sanded, grout consisting of Portland cement, and additives; comply with ANSI A118.6.
 - 2. Color: As indicated in the Finish Schedule on Drawings.
 - 3. Acceptable Products:
 - a. Ultracolor Grout by MAPEI
 - b. Custom Building products
 - c. Approved Equal.
- C. Unsanded Latex-Modified Grout for Wall Tile (for tile in areas other than "D" below):

1. Description: Latex-modified, containing a factory blended antimicrobial, non-sanded, grout consisting of portland cement and additives; comply with ANSI A118.6.
2. Color: As indicated in the Finish Schedule on Drawings.
3. Acceptable Products:
 - a. Keracolor U Grout by MAPEI
 - b. Custom Building Products
 - c. Approved Equal.
- D. Epoxy Grout (quarry tile floors in kitchen and cooler):
 1. Multi-component, factory prepared, 100 percent epoxy resin and hardener with sand or mineral filler material.
 2. Comply with ANSI A118.3.
 3. Colors:
 - a. Floors: as scheduled.
 4. Acceptable Products:
 - a. Kerapoxy by MAPEI.
 - b. Approved Equal.

PART 3 EXECUTION

3.1 PREPARATION

- A. Prepare surfaces in strict accordance with instructions of manufacturer whose setting materials or additives are being used.

3.2 INSTALLATION

- A. Tile Installation, General
 1. Install tile materials in accordance with ANSI A137.1, other referenced ANSI and TCA specifications, and TCA "Handbook for Ceramic Tile Installation", except for more stringent requirements of manufacturer or these Specifications.
- B. Layout
 1. Lay out work to pattern indicated so that full tile or joint is centered on each wall and no tile of less than half width need be used. Do not interrupt pattern through openings. Lay out tile to minimize cutting and to avoid tile less than half size.
 2. For heights stated in feet and inches, use courses of full tile to produce nearest attainable heights without cutting tile.
 3. No staggered joints will be permitted.
 4. Align joints in tile in both directions.
 5. Align joints between floor and base tile.
 6. Make joints between sheets of tile exactly same width as joints within sheet.
 7. File edges of cut tile smooth and even.
 8. Cut and fit tile at penetrations through tile. Do not damage visible surfaces. Carefully grind edges of tile abutting built-in items. Fit tile at outlets, piping and other penetrations so that plates, collars, or covers overlap tile.
 9. Extend tile work into recesses and under or behind equipment and fixtures, to form complete covering without interruptions, except as otherwise indicated. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
 10. Accurately form intersections and returns.
 11. Form internal angles coved and external angles bull nosed.

- C. Thin Set Method, Floors and Walls
 - 1. Apply mortar or adhesive with notched trowel using scraping motion to work material into good contact with surface to be covered. Maintain 90 percent coverage on back of tile and fully bed corners.
 - 2. Apply only as much mortar or adhesive as can be covered within allowable windows as recommended by mortar or adhesive manufacturer or while surface is still tacky.
 - 3. When installing large tiles, ceramics or mosaics, trowel small quantity of mortar or adhesive onto back of each tile or sheet of tiles.
 - 4. Set tiles in place and rub or beat with small beating block.
 - 5. Beat or rap tile to ensure proper bond and also to level surface of tile.
 - 6. Align tile to show uniform joints and allow to set until firm.
 - 7. Clean excess mortar or adhesive from surface of tile with wet cheese cloth (not a sponge) while mortar is fresh.
 - 8. Allow face mounted tile to set until firm before removing paper and before grouting.
 - 9. Sound tile after setting. Replace hollow sounding tiles.
 - D. Grouting
 - 1. Install in accordance with grout manufacturer's recommendations and ANSI A108.10.
 - E. Control Joints and Other Sealant Usage
 - 1. Install in accordance with TCA Installation Handbook.
- 3.3 CLEANING
- A. Clean excess mortar from surface with water as work progresses. Perform cleaning while mortar is fresh and before it hardens on surfaces.
 - B. Remove grout haze following recommendation of mortar additive manufacturer. Do not use acids for cleaning.
- 3.4 PROTECTION
- A. Prohibit traffic from floor finish for 72 hours after installation.
 - B. Where temporary use of new floors is unavoidable, supply large, flat boards or plywood panels for walkways over Kraft paper.
 - C. Protect work so that there is no evidence of damage or use at the time of acceptance.

END OF SECTION

SECTION 09515

SUSPENDED ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 PROJECT CONDITIONS

- A. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Schedule installation of acoustic units after interior wet work is dry.
- C. Humidity: 20 to 40 percent prior to, during, and after installation.
- D. Temperature: 61 degrees F minimum, prior to, during, and after installation.

1.2 EXTRA STOCK

- A. Provide extra quantity of acoustic panel under provisions of Section 01780.
- B. Provide extra panels equal to 2 percent of total for each type used.
- C. Store in designated location as directed by Owner.

1.3 COORDINATION

- A. Coordinate installation with other trades and make provisions for their work to prevent cutting and patching.

PART 2 PRODUCTS

2.1 MANUFACTURERS - SUSPENSION SYSTEM

- A. Acceptable Manufacturers: Subject to compliance with requirements indicated, provide products of one of the following:
 - 1. Chicago Metallic.
 - 2. USG Interiors, Inc.
 - 3. Armstrong World Industries.
- B. Substitutions: Under provisions of Section 01600.
- C. Products specified herein are those of USG Interiors as a standard of quality.

2.2 SUSPENSION SYSTEM MATERIALS

- A. Standard Exposed Tee Grid
 - 1. Intermediate duty system, complying with ASTM C 635, non-fire rated.
 - 2. Commercial quality cold-rolled aluminum.
 - 3. Components: Die cut and interlocking.
 - 4. Exposed Grid Surface Width: 15/16 inch.
 - 5. Cope cross runners to lay flush with main runners, except at edge moldings.
 - 6. Finish on Exposed Surfaces: Baked-on enamel, satin finish matching ceiling panel color. Refer to drawings - Finish Schedule for color.
 - 7. Acceptable Product: USG Environmental ZXA.
- B. Grid Accessories: Stabilizer bars, furring clips, splices, edge moldings hold down clips and closure strips as necessary to complete and complement suspended ceiling grid system.
 - 1. Components: Die-cut and interlocking.
- C. Support Channels and Hangers: Galvanized steel; size and type to suit application, to rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

2.3 MANUFACTURERS – VINYL COATED UNITS

- A. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products from one of the following:
 - 1. Armstrong World Industries.
 - 2. Celotex Corp.
 - 3. USG Interiors, Inc.
- B. Substitutions: Under provisions of Section 01600.

2.4 VINYL COATED UNIT MATERIALS

- A. Vinyl Panels: Conforming to the following:
 - 1. Size: Refer to finish schedule on Drawings.
 - 2. Thickness: 3/4 inches.
 - 3. Composition: Refer to finish legend on Drawings.
 - 4. Edge: Square.
 - 5. Surface Color: Refer to drawings - Finish Schedule for color.
 - 6. Acceptable Products Refer to finish schedule on Drawings.

2.5 ACCESSORIES

- A. Hanger Wire: Minimum 12 gage, galvanized, self-annealed, mild steel wire.
- B. Touch-up Paint: Type and color to match acoustical and grid units. Refer to drawings - Finish Schedule for color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing conditions are ready to receive work.
- B. Verify that layout of hangers will not interfere with other work.
- C. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM

- A. Install system in accordance with ASTM C 636, manufacturer's instructions and as supplemented in this Section, to produce a ceiling true to lines and levels, free from warp and soiled or damaged grid or panels.
- B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.
- C. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
- D. Hang system independent of walls, columns, ducts, pipes and conduit. Hang wires directly from structure, not from fireproofing, fireproofing suspension members, bridging or roof decks. Locate first hanger 6 inches from wall and space 48 inches along carrying channel. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- F. Center system on room axis leaving equal border units, unless shown otherwise on the drawings. Do not leave panels less than 1/2 length or width.
- G. Do not support fixtures or other components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
- H. Do not eccentrically load system, or produce rotation of runners.
- I. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions. Field rabbet panel edges. Where round obstructions occur, provide preformed closers to match edge molding. Provide prefabricated radius edge moldings around radius wall corners. Use maximum lengths, straight, true to line, and level.

- J. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.
- K. Lateral Bracing: Provide four 12 gage wires at 90 degrees as indicated on Drawings; minimum 12 feet on center where required for seismic loading conditions.

3.3 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units one way with pattern parallel to shortest room axis. Fit border neatly against abutting surfaces.
- D. Install units after above ceiling work is complete.
- E. Install acoustic units level, in uniform plane, and free from twist, warp and dents.
- F. Cut panels to fit irregular grid and perimeter edge trim.
- G. Install hold-down clips to retain panels tight to grid system within 20 feet of an exterior door.

3.4 TOLERANCES

- A. Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Variation from Plumb of Grid Members Caused by Eccentric Loads: Two degrees maximum.

3.5 ADJUSTING AND PATCHING

- A. Replace damaged members of exposed suspension system. Replace ceiling board and panel that is damaged, installed improperly, or shows visible signs of sagging.

END OF SECTION

SECTION 09910

PAINTS

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to applicable building code for flame spread/fuel contribution/smoke development rating requirements for finishes.
- B. Comply with applicable city, county, state, and federal requirements and ordinances regarding maximum VOC (Volatile Organic Compound) content of coatings.

1.2 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
- B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
- C. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
- D. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.3 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the ranges required by paint manufacturer.
- B. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is above 75 percent, unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 foot candles measured mid- height at substrate surface.

1.4 PRECAUTIONS

- A. Do not store paints, oils, thinners and other flammable items inside the building. Store in approved containers when not in actual use during painting. Keep fire hazard at a minimum.
- B. Take precaution to protect public and construction workers during progress of work.
- C. Furnish a temporary fire extinguisher of suitable chemicals and capacity, located near flammable materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Acceptable Manufacturers: Subject to compliance with requirements indicated, provide products of one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Glidden Professional (ICI Paints).
 - 3. Sherwin-Williams Company (The).
 - 4. PPG Architectural Finishes, Inc.
 - a. Pittsburgh Paints.
 - b. Porter Paints.
 - 5. Vista Paint.
 - 6. Substitutions: Under provisions of Section 01600.

- B. Acceptable Products: Refer to schedule at end of section.
- C. Materials selected for coating systems for each type surface shall be product of a single manufacturer unless otherwise specified and approved by manufacturers of products used.
- D. Secondary Products such as Linseed Oil, Turpentine and Shellacs: First quality products of a reputable manufacturer.
- E. Products specified in the Schedule are provided as a standard of quality unless noted otherwise.
- F. Substitutions: Submit in accordance with Section 01600.

2.2 MATERIALS

- A. Coatings: Ready mixed. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating with good flow and brushing properties; capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- C. Patching Materials: Latex filler.

2.3 FINISHES

- A. Refer to schedule at end of Section.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report to Owner's Representative any condition that may potentially affect proper application.
- C. Test shop applied primers for compatibility with subsequent cover materials.

3.2 PREPARATION

- A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.
- B. Correct minor defects and clean surfaces which affect work of this Section. Remove existing coatings which exhibit loose surface defects.
- C. Shellac and seal marks which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.
- F. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- G. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- H. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- I. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- J. Interior Wood Items Schedule to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- K. Shop Finished Items: Finish in accordance with AWI standards and guide lines.
- L. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.3 PROTECTION

- A. Protect elements surrounding the work of this Section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.

3.4 APPLICATION

- A. The intent of these Specifications is to produce the highest quality appearance of paint and finish surfaces. Employ skilled mechanics only. The proper preparation of all surfaces will be strictly enforced and wherever finished surfaces show any defects due to improper preparation, workmanship, etc., the defects shall be removed and the work refinished at the expense of the Contractor.
- B. Apply products in accordance with manufacturer's instructions. Final finish coats shall have visual evidence of solid hiding and uniform appearance, and shall be free and smooth of brush marks, streaks, sags, runs, laps, or skipped areas.
- C. Do not apply finishes to surfaces that are not dry.
- D. Apply each coat to uniform finish and thickness.
- E. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- F. Sand lightly between coats on wood and metal items to achieve required finish.
- G. Allow applied coat to dry before next coat is applied.
- H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Prime back surfaces of interior and exterior woodwork scheduled to be painted with primer paint.
- J. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.
- K. Edges of paint adjoining other materials or colors shall be sharp and clean with no overlapping.

3.5 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint shop primed equipment. Paint shop prefinished items where exposed to view in finished spaces.
- B. Paint exposed air handlers, roof ventilators, goose necks, exhaust fans and other items on the roof with 2 coats exterior enamel. Prepare surfaces in accordance with the base metal or primer as specified herein.

3.6 CLEANING AND TOUCH-UP

- A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.
- D. Spot painting will be allowed to correct soiled or damaged paint surfaces only when touch-up spot will blend into surrounding finish and is invisible to normal viewing as determined by the Owner's Representative. Otherwise, re-coat entire section to corners or visible stopping point.

3.7 VOC (VOLATILE ORGANIC COMPOUND) COMPLIANCE

- A. Products listed in following schedule and substitutes proposed for use must be formulated to meet applicable ordinances and regulations regarding maximum VOC content. Utilize products which have been specially formulated to need such requirements.

3.8 INTERIOR COATING SCHEDULE

- A. Gypsum Board - Semi-gloss
 - 1. Sherwin-Williams
 - a. One coat roller applied latex texturing compound.

- b. One coat ProMar 200 Latex Wall Primer, 1.1 mils DFT.
 - c. Two coats Everclean Latex Semigloss, 1.4 mils DFT/coat.
- B. Ferrous Metal Items - Eggshell (including interior hollow metal doors, frames, access doors and frames):
 - 1. Sherwin-Williams
 - a. One coat Kem Kromik Universal Metal Primer.
 - b. Two coats Incredicoat Latex Semi-Gloss Enamel, 1.5 mils DFT/coat.
- C. Dining Room Block Walls
 - 1. Benjamin Moore
 - a. Prime: One (1) coat Benjamin Moore Block Filler #M-88.
 - b. Finish: Two (2) coats Benjamin Moore Super Spec Acrylic Semi Gloss Enamel #276.
- D. Kitchen Block Walls
 - 1. Benjamin Moore
 - a. Prime: One (1) coat Benjamin Moore Block Filler #M-88.
 - b. Finish: Two (2) coats Benjamin Moore Acrylic Epoxy High Gloss Coating #M43/M44.
- E. Bathroom Walls
 - 1. Benjamin Moore
 - a. Prime: One (1) coat Benjamin Moore Acrylic Primer Sealer #253.
 - b. Finish: Two (2) coats Benjamin Moore Acrylic Epoxy High Gloss Coating #M43/M44.
- F. All Ceilings
 - 1. Benjamin Moore
 - a. Prime: One (1) coat Benjamin Moore Acrylic Primer Sealer #253
 - b. Finish: Two (2) coats Benjamin Moore Acrylic Flat #282.
- G. Miscellaneous Items Exposed to View and Not Otherwise Scheduled: Finish with compatible paint to match adjacent surface finish and color.

3.9 EXTERIOR COATING SCHEDULE

- A. Ferrous Metal Items:
 - 1. Sherwin-Williams
 - a. Touch up shop primer as required.
 - b. First Coat: Sherwin-Williams, DTM Acrylic B66W1.
 - c. Second Coat: Same as first.
- B. Galvanized Metal Items:
 - 1. Sherwin-Williams
 - a. Primer: Sherwin-Williams, Galvite Paint No. B50W3.
 - b. Second Coat: Sherwin-Williams, DTM Acrylic B66W1.
 - c. Third Coat: Same as second.
- C. Synthetic Masonry Surfaces:
 - 1. Benjamin Moore
 - a. Primer: One (1) coat Benjamin Moore Acrylic Pigmented Sealer #066 01, tinted ½ finish coat color.
 - b. Finish: Two (2) Coats Benjamin Moore Super Spec Acrylic Low Lustre #185.
- D. Cedar Siding, Trim:
 - 1. Benjamin Moore
 - a. Prime: One (1) coat Benjamin Moore Fresh Start Alkyd Primer #094, tinted ½ finish coat color.
 - b. Finish: Two (2) coats Benjamin Moore Impervex High Gloss Acrylic Enamel #309.
- E. Pressure Treated Lumber:
 - 1. MoorWood
 - a. Prime: Not necessary.
 - b. Finish: One (1) or two (2) coats MoorWood Solid Color Acrylic Stain #089.
- F. Shop Finishes: Refer to individual sections.

3.10 COLOR SCHEDULE

- A. Refer to Room Finish Schedule and Exterior Paint Schedule on Drawings.

END OF SECTION

SECTION 10265

IMPACT-RESISTANT WALL PROTECTION

PART 1 - GENERAL

- 1.1 SUMMARY
 - A. Section Includes:
 - 1. End wall guards.
- 1.2 ACTION SUBMITTALS
 - A. Product Data: For each type of product indicated.
- 1.3 INFORMATIONAL SUBMITTALS
 - A. Material certificates.
- 1.4 CLOSEOUT SUBMITTALS
 - A. Maintenance data.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. Stainless-Steel Sheet: ASTM A 240/A 240M.
 - B. Adhesive: As recommended by impact-resistant wall protection manufacturer for bonding to substrates indicated and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- 2.2 END WALL GUARDS
 - A. Surface-Mounted, Metal, End-Wall Guards: Fabricated from one-piece, formed or extruded metal that covers entire end of wall; with formed edges.
 - 1. Material: Stainless steel, Type 304.
 - a. Thickness: Minimum 0.0500 inch.
 - b. Finish: Directional satin, No. 4.
 - 2. Wing Size: 1-1/2 to 2-1/4 inches.
 - 3. Corner Radius: 1/8 inch.
 - 4. Mounting: Adhesive.
- 2.3 METAL FINISHES
 - A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Remove tool and die marks and stretch lines, or blend into finish.
 - 2. Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 3. Run grain of directional finishes with long dimension of each piece.
 - 4. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

- 3.1 INSTALLATION
 - A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions.

1. Install impact-resistant wall protection units in locations and at mounting heights indicated on Drawings.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

SECTION 10525

FIRE EXTINGUISHERS

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Certifications
 - 1. Conform to NFPA-10 requirements for extinguishers.
 - 2. Provide units conforming with ANSI/UL 711 and ANSI/UL 92.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements indicated, provide products of one of the following:
 - 1. JL Industries.
 - 2. Larsens Manufacturing Co.
- B. Substitutions: Submit under provisions of Section 01600.

2.2 FIRE EXTINGUISHERS

- A. Multi-purpose dry chemical type U.L. 299, (ammonium phosphate), with pressure gauge
 - 1. Capacity: 10.0 lbs.
 - 2. U.L. Rating: 4A:60B:C
 - 3. Acceptable Product: MP10 by Larsens.
- B. Mounting bracket: Manufacturer's standard.

2.3 FINISHES

- A. Extinguisher: Red enamel.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install using skilled workmen in accordance with manufacturer's printed instructions.

END OF SECTION

SECTION 10801

TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

- 1.1 SUMMARY
 - A. Section Includes:
 - 1. Public-use washroom accessories.
- 1.2 SUBMITTALS
 - A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.
- 1.3 COORDINATION
 - A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
 - B. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- 2.2 ACCESSORIES
 - A. Products: Provide products scheduled on Drawings.
- 2.3 FABRICATION
 - A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
 - B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

- 3.1 INSTALLATION
 - A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.
- 3.2 ADJUSTING AND CLEANING
 - A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
 - B. Remove temporary labels and protective coatings.
 - C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION

SECTION 15060
HANGERS AND SUPPORTS

PART 1 GENERAL

- 1.1 REGULATORY REQUIREMENTS
 - A. Conform to applicable code for support of plumbing.

PART 2 PRODUCTS

- 2.1 PIPE HANGERS AND SUPPORTS
 - A. Piping:
 - 1. Conform to ASTM F 708.

PART 3 EXECUTION

- 3.1 INSTALLATION
 - A. Install in accordance with manufacturer's instructions.
- 3.2 SUPPORTS
 - A. Support horizontal and vertical piping against movement.

END OF SECTION

SECTION 15081

PIPING INSULATION

PART 1 GENERAL – REQUIREMENTS

- 1.1 Confirm to Applicable codes.

PART 2 PRODUCTS

2.1 INSULATION

- A. Insulation: ASTM C 547 [and ASTM C 795]; rigid molded, noncombustible.
 - 1. 'K' ('Ksi') value: ASTM C 177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 850 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- B. Acceptable Manufacturers:
 - 1. Manville.
 - 2. Owens-Corning.
- C. Vapor Barrier Lap Adhesive:
 - 1. Compatible with insulation.
- D. Insulating Cement/Mastic:
 - 1. ASTM C 195; hydraulic setting on mineral wool.
- E. Fibrous Glass Fabric:
 - 1. Cloth: Untreated; 9 oz/sq yd weight.
 - 2. Blanket: 1.0 lb/cu ft density.
 - 3. Weave: 5x5.
 - 4. Thickness: 1"
- F. Indoor Vapor Barrier:
 - 1. FRK self-sealing jacket.
 - 2. Vinyl emulsion type acrylic, compatible with insulation.
- G. Flexible Foam Insulation
 - 1. 1/2 inch thick flexible foam plastic insulation.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with NAIMA National Insulation Standards.
- B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
- C. Insulated pipes conveying fluids below ambient temperature:
 - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive.
 - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- D. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- E. Insulated pipes conveying fluids above ambient temperature:
 - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
 - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

- F. Inserts and Shields:
 - 1. Application: Piping 1-1/2 inches diameter or larger.
 - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 - 3. Insert location: Between support shield and piping and under the finish jacket.
 - 4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
- G. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions..

3.2 SCHEDULES

- A. Plumbing Systems:
 - 1. Thickness per this section

END OF SECTION

SECTION 15083

DUCTWORK INSULATION

PART 1 GENERAL – Duct insulation shall comply with adopted codes.

PART 2 PRODUCTS

2.1 GLASS FIBER, FLEXIBLE

- A. Insulation: ASTM C 553; flexible, noncombustible blanket.
 - 1. 'K' ('Ksi') value : ASTM C 518, 0.045 at 0.31 at 75 degrees F.
 - 2. Maximum service temperature: 250 degrees F.
 - 3. Maximum moisture absorption: 0.20 percent by volume.
- B. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture vapor transmission: ASTM E 96; 1.3 perm.
 - 3. Secure with pressure sensitive tape.
- C. Vapor Barrier Tape:
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

2.2 GLASS FIBER RIGID BOARD

- A. Insulation: Fiberglass semi-rigid board, 1 inch thick.
- B. Rectangular or Square Duct Insulation: ASTM C 612, Type II.
 - 1. K-value: 0.23 at 75 degrees F mean temperature.
 - 2. All service jacket in compliance with ASTM C 1136, field installed.
 - 3. Secure with pressure sensitive tape.
- C. Round Duct Insulation: ASTM C 547, Tpe I.
 - 1. K-Value: 0.23 at 75 degrees F mean temperature.
 - 2. All service jacket in compliance with ASTM C 1136, factory installed.
 - 3. Secure with pressure sensitive tape.

2.3 EXHAUST HOOD DUCT WRAP

- A. See drawings

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with NAIMA National Insulation Standards.
- B. Insulated ductwork conveying air below ambient temperature:
 - 1. Provide insulation with vapor barrier jackets.
 - 2. Finish with tape and vapor barrier jacket.
 - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 - 4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- C. Insulated ductwork conveying air above ambient temperature:
 - 1. Provide with or without standard vapor barrier jacket.
 - 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

3.2 SCHEDULES

- A. Exhaust: 1 inch aluminized film.
- B. Outside Air Intake Ducts: 2 inch aluminized film.
- C. Supply Plenums: 1 inch aluminized film.
- D. Supply Ducts: 1 inch aluminized film or 1 inch rigid insulation with service jacket.

- E. Exhaust Hood Duct: Provide installation, clearances, and thickness to meet required fire rating.

END OF SECTION

SECTION 15145

PLUMBING PIPING

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Perform Work in accordance with authority having jurisdiction standards. Utilize products as indicated in drawings and as allowed by authorities having jurisdiction.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Welding Materials and Procedures: Conform to ASME SEC IX and applicable state labor regulations.
- D. Welders Certification: In accordance with ASME SEC IX.
- E. Identify pipe with marking including size, ASTM material classification, ASTM specification, and water pressure rating.

1.2 REGULATORY REQUIREMENTS

- A. Perform Work in accordance with authority having jurisdiction plumbing code.
- B. Conform to applicable code for installation of backflow prevention devices.
- C. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

PART 2 PRODUCTS

2.1 BALL VALVES

- A. Up To and Including 3 Inches:
 - 1. Acceptable Products:
 - a. Crane Model 9200 Series.
 - b. Stockham Model 5206 Series.

2.2 GLOBE VALVES

- A. Up To and Including 3 Inches:
 - 1. Acceptable Products:
 - a. Milwaukee Model 572.
 - b. Crane Model 1702.
 - c. Stockham Model B-16.

2.3 WATER PRESSURE REDUCING VALVES

- A. Up to 2 Inches:
 - 1. Acceptable Products: Watts Model 223.
- B. Over 2 Inches:
 - 1. Acceptable Products: Watts Model 127W.

2.4 RELIEF VALVES

- A. Pressure Relief:
 - 1. Acceptable Products: Watts Model 40.
- B. Temperature and Pressure Relief:
 - 1. Acceptable Products: Watts Model 40.

2.5 STRAINERS

- A. Size 2 inch and Under:
 - 1. Acceptable Products: Watts Model 77S.
- B. Size 1-1/2 inch to (4 inch):
 - 1. Acceptable Products: Watts Model 77F.

- 2.6 SANITARY SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING
- A. Cast Iron Pipe: ASTM A 74 service weight, hub and spigot.
 - 1. Fittings: Cast iron.
 - 2. Joints: Caulked joints, lead and oakum.
 - B. Cast Iron Pipe: ASTM A 888, no hub.
 - 1. Fittings: Cast iron.
 - 2. Joints: ASTM C 564, neoprene gasket.
 - C. PVC Pipe: ASTM D 3034 SDR 35 or ASTM D 2665, SCH where allowed by code.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM F 477, elastomeric gaskets.
- 2.7 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING
- A. Cast Iron Pipe: ASTM A 74 service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C 564 neoprene gaskets or lead and oakum.
 - B. PVC Pipe: ASTM D 2665 or ASTM D 3034 where allowed by code.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM D 2855, solvent weld with ASTM D 2564 solvent cement.
- 2.8 SANITARY SEWER PIPING, ABOVE GRADE
- A. Cast Iron Pipe: ASTM A 74, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: ASTM C 564, lead and oakum.
 - B. Cast Iron Pipe: ASTM A 888, no hub.
 - 1. Fittings: Cast iron.
 - 2. Joints: ASTM C 564, neoprene gasket.
 - C. PVC Pipe: ASTM D 2665, Schedule 40, DWV.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM D 2855, solvent weld with ASTM D 2654, solvent cement.
- 2.9 WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING
- A. Ductile Iron Pipe: AWWA C151.
 - 1. Fittings: AWWA C110, ductile or gray iron, standard thickness.
 - 2. Joints: AWWA C111, rubber gasket with 3/4 inch diameter rods.
 - B. CPVC Pipe: ASTM D 2846, Schedule 80.
 - 1. Fittings: CPVC ASTM F493, Schedule 80.
 - 2. Joints: ASTM F 493, solvent weld, or ASTM D 2840.
- 2.10 WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING
- A. Copper Tubing: ASTM B 42, annealed.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22 wrought copper and bronze.
 - 2. Joints: AWS A5.8, BCuP silver braze, lead free.
 - B. CPVC: ASTM D 2846, Schedule 80.
 - 1. Fittings: CPVC, ASTM F 493.
 - 2. Joints: ASTM F 493 or ASTM D 2846, solvent weld.
- 2.11 WATER PIPING, ABOVE GRADE
- A. Copper Tubing: ASTM B 88, Type L, hard drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B 32, solder, lead free, Grade 95TA.
 - B. CPVC: ASTM D 2846, Schedule 80.
 - 1. Fittings: CPVC, ASTM F 493.

- 2. Joints: ASTM F 493 or ASTM D 2846, solvent weld.
- 2.12 STORM WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING
 - A. Cast Iron Pipe: ASTM A 74 service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: ASTM C 564, neoprene gasket system or lead and oakum.
 - B. Concrete Pipe: ASTM C 76.
 - 1. Fittings: Concrete.
 - 2. Joints: ASTM C 443 (ASTM C 443M), rubber gaskets.
 - C. PVC Pipe: ASTM D 2665 or ASTM D 3034 where allowed by code.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM D 2855, solvent weld with ASTM D 2564 solvent cement.
- 2.13 STORM WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING
 - A. Cast Iron Pipe: ASTM A 74 service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: ASTM C 564, neoprene gasket system or lead and oakum.
 - B. PVC Pipe: ASTM D 2665 or ASTM D 3034 where allowed by code.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM D 2855, solvent weld with ASTM D 2564 solvent cement.
- 2.14 STORM WATER PIPING, ABOVE GRADE
 - A. Cast Iron Pipe: ASTM A 74 service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: ASTM C 564, neoprene gasket system or lead and oakum.
 - B. PVC Pipe: ASTM D 2665 or ASTM D 3034 where allowed by code.
 - 1. Fittings: PVC.
 - 2. Joints: ASTM D 2855, solvent weld with ASTM D 2564 solvent cement.
- 2.15 NATURAL GAS PIPING, BURIED BEYOND 5 FEET OF BUILDING
 - A. Polyethylene Pipe: ASTM 1248-65T
 - 1. Fittings: ASTM D 2683 or ASTM D 1248 socket type.
 - 2. Joints: Fusion welded.
- 2.16 NATURAL GAS PIPING, BURIED WITHIN 5 FEET OF BUILDING
 - A. Steel Pipe: ASTM A 53 Schedule 40 black.
 - 1. Fittings: ASTM A 234/A 234M, forged steel welding type.
 - 2. Joints: ASME B31.2, welded.
 - 3. Jacket: AWWA C105 polyethylene jacket or double layer, half-lapped 0.25 mm polyethylene tape.
- 2.17 NATURAL GAS PIPING, ABOVE GRADE
 - A. Steel Pipe: ASTM A 53 Schedule 40 black.
 - 1. Fittings: ASME B16.3, malleable iron, or ASTM A 234/A 234M, forged steel welding type.
 - 2. Joints: NFPA 54, threaded or welded to ANSI B31.1.
 - B. Copper Tubing: ASTM B 88, Type L, hard drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B 32, solder, lead free, Grade 95TA.
- 2.18 FLANGES, UNIONS, AND COUPLINGS
 - A. Pipe Size 3 Inches and Under:
 - 1. Ferrous pipe: Class 150 malleable iron threaded unions.
 - 2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

- B. Pipe Size Over 1 Inch:
 - 1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
 - 2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
 - C. Grooved and Shouldered Pipe End Couplings:
 - 1. Housing: Malleable iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; steel bolts, nuts, and washers; galvanized for galvanized pipe.
 - 2. Sealing gasket: "C" shape composition sealing gasket.
 - D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
- 2.19 GLOBE VALVES
- A. Up To and Including 3 Inches:
 - 1. MSS SP-80, Class 125, bronze body, bronze trim, handwheel, bronze disc, solder ends.
 - B. 2 Inches and Larger:
 - 1. MSS SP-85, Class 125, iron body, bronze trim, handwheel, outside screw and yoke, renewable bronze plug-type disc, renewable seat, flanged ends.
- 2.20 BALL VALVES
- A. Construction, 4 Inches and Smaller: MSS SP-110, bronze, two piece body, chrome plated brass ball, regular port, Teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder ends.
- 2.21 PLUG VALVES
- A. Construction 2-1/2 Inches and Larger: MSS SP-78, cast iron body and plug, pressure lubricated, Teflon or Buna N packing, flanged ends. Provide lever operator with set screw.
- 2.22 WATER PRESSURE REDUCING VALVES
- A. Up to 2 Inches:
 - 1. MSS SP-80, bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, [threaded] [and] [double union] ends.
 - B. Over 2 Inches:
 - 1. MSS SP-85, cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.
- 2.23 RELIEF VALVES
- A. Pressure Relief:
 - 1. AGA Z21.22 certified, bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated.
 - B. Temperature and Pressure Relief:
 - 1. AGA Z21.22 certified, bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME SEC IV certified and labeled.
- 2.24 STRAINERS
- A. Size 2 inch and Under:
 - 1. Class 150, threaded bronze body 300 psi CWP, Y pattern with 0.8 mm (1/32 inch) stainless steel perforated screen.
 - B. Size 1-1/2 inch to 4 inch:
 - 1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 15060.
- H. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08311.
- I. Establish elevations of buried piping outside the building to ensure installed depth is below maximum frost depth.
- J. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.
- K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- L. Provide support for utility meters in accordance with requirements of utility companies.
- M. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09910.
- N. Excavate in accordance with Section 02300 for work of this Section.
- O. Backfill in accordance with Sections 02300 for work of this Section.
- P. Install bell and spigot pipe with bell end upstream.
- Q. Install valves with stems upright or horizontal, not inverted.
- R. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- S. Install water piping to ASME B31.9.
- T. Sleeve pipes passing through partitions, walls and floors.
- U. Inserts: Provide inserts for placement in concrete formwork.

3.3 APPLICATION

- A. Use grooved mechanical couplings and fasteners only in accessible locations.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Install globe valves for throttling, bypass, or manual flow control services.
- E. Provide plug valves in natural gas systems for shut-off service.

3.4 ERECTION TOLERANCES

- A. Establish invert elevations, slopes for drainage to per 1/4 inch per foot (2 percent) minimum. Maintain gradients.
- B. Slope water piping minimum 0.25 percent and arrange to drain at low points.

3.5 SERVICE CONNECTIONS

- A. Provide new sanitary and storm sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

- B. Provide new water service complete with approved backflow preventer and water meter with by-pass valves.
 - 1. Provide sleeve in wall for service main and support at wall. Calk enlarged sleeve and make watertight with pliable material. Anchor service main inside to wall.
- C. Provide new gas service complete with gas meter and regulators.

END OF SECTION

SECTION 15410

PLUMBING FIXTURES

PART 1 PRODUCTS

1.1 ACCEPTABLE PRODUCTS

- A. Refer to schedule on Drawings.

PART 2 EXECUTION

2.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

2.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

2.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall carriers and bolts.
- E. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07920, color to match fixture.
- F. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

2.4 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

2.5 CLEANING

- A. Clean plumbing fixtures and equipment.

2.6 PROTECTION OF FINISHED WORK

- A. Do not permit use of fixtures during construction.

END OF SECTION

SECTION 15430

PLUMBING SPECIALTIES

PART 1 GENERAL – not used

PART 2 PRODUCTS

- 2.1 ROOF DRAINS (when applicable)
 - A. Assembly: ANSI A112.21.2.
 - B. Body: Lacquered cast iron with sump.
 - C. Strainer: Removable cast iron dome.
 - D. Accessories: Coordinate with roofing type, refer to Section 07550.
 - 1. Membrane flange and membrane clamp with integral gravel stop.
 - 2. Adjustable under deck clamp.
 - 3. Roof sump receiver.
 - 4. Waterproofing flange.
 - 5. Controlled flow weir.
 - 6. Leveling frame.
 - 7. Adjustable extension sleeve for roof insulation.
 - 8. Perforated or slotted ballast guard extension for inverted roof.
 - 9. Perforated stainless steel ballast guard extension.
 - E. Acceptable Product: Josam Model 21500.
- 2.2 ROOF OVERFLOW DRAINS
 - A. Lacquered cast iron body and clamp collar [and bottom clamp ring]; pipe extended to 2 inches above flood elevation.
 - B. Acceptable Product: Josam Model 21500.
- 2.3 FLOOR DRAINS
 - A. Floor Drain:
 - 1. ANSI A112.21.1; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.
 - 2. Acceptable Products: Refer to Drawings.
- 2.4 FLOOR SINKS
 - A. Floor Sink:
 - 1. Square PVC body with integral seepage pan, PVC interior, aluminum or PVC dome strainer, and loose set PVC grate.
 - 2. Acceptable Product: Refer to Drawings.
- 2.5 CLEANOUTS
 - A. Exterior Surfaced Areas:
 - 1. Round cast nickel bronze access frame and non-skid cover.
 - 2. Exterior Surfaced Areas (CO-1):
 - 3. Acceptable Product:
 - a. Josam Model 56000.
 - B. Exterior Unsurfaced Areas:
 - 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.
 - 2. Acceptable Product:
 - a. Josam Model 56010.

- C. Interior Finished Floor Areas:
 - 1. Lacquered cast iron body with anchor flange, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
 - 2. Acceptable Products: Refer to Drawings.
 - D. Interior Finished Wall Areas:
 - 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.
 - 2. Acceptable Product: Refer to Drawings.
- 2.6 HYDRANTS
- A. Wall Hydrant:
 - 1. ANSI/ASSE 1019; non-freeze, self-draining type with chrome plated wall plate hose thread spout, handwheel, and integral vacuum breaker.
 - 2. Acceptable Products: Refer to Drawings.
- 2.7 BACKFLOW PREVENTERS
- A. Refer to schedule on Drawings.
- 2.8 WATER HAMMER ARRESTORS
- A. ANSI A112.26.1; copper construction, piston type sized in accordance with PDI WH-201, precharged suitable for operation in temperature range 34 to 250 degrees F and maximum 150 psi working pressure.

PART 3 EXECUTION

- 3.1 INSTALLATION
- A. Install in accordance with manufacturer's instructions.
 - B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
 - C. Encase exterior cleanouts in concrete flush with grade.
 - D. Install floor cleanouts at elevation to accommodate finished floor.
 - E. Pipe relief from backflow preventer to nearest drain.
 - F. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories and sinks.
 - G. Install air chambers on hot and cold water supply piping to each fixture or group of fixtures (each washroom). Fabricate same size as supply pipe or 3/4 inch minimum, and minimum 18 inches long.

END OF SECTION

SECTION 15485

WATER HEATERS AND CONDITIONING EQUIPMENT

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to AGA, NFPA 54 requirements for water heaters.
- B. Conform to ASME Section 8D for manufacture of pressure vessels for heat exchangers.
- C. Conform to ASME Section 8D for tanks.
- D. Products Requiring Electrical Connection: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.2 WARRANTY

- A. Refer to Section 01780.

PART 2 PRODUCTS

2.1 GAS FIRED WATER HEATERS

- A. Acceptable Product: Refer to schedule on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install water heaters in accordance with manufacturer's instructions and to AGA and NFPA 54 requirements. Refer to drawing Sheet P6.0.
- B. Coordinate with plumbing piping and related electrical work to achieve operating system.

END OF SECTION

SECTION 15500

HEATING, VENTILATION AND AIR CONDITIONING

PART 1 - GENERAL

1.1 SUMMARY OF WORK

Furnishing of all labor, materials, tools, transportation, services, and related items necessary to complete the installation of the HVAC system as illustrated on the drawings, together with all necessary auxiliaries and appurtenances.

A. Items include but are not limited to the following:

1. Packaged rooftop unit.
2. Heat exchanger.
3. Refrigeration components.
4. Unit operating controls.
5. Air filters.
6. Roof curb.
7. Electrical power connections.
8. Operation and maintenance service.
9. Ductwork.
10. Ductwork specialties.
11. Access panels and doors.
12. Ductwork insulation.

B. Submit Product Data.

C. Submit Shop Drawings, including mounting and installation details for roof curbs and coordination with roofing system.

D. References

1. ASHRAE 90.1-2001 - Energy Standard for Buildings. Establishes minimum efficiencies for equipment.
2. NFPA 90 A & B - Installation of Air Conditioning and Ventilation Systems and Installation of Warm Air Heating and Air Conditioning Systems.
3. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.
4. ARI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard. Applies to Gas/Electric Units above 135,000 BTU.
5. ANSI/ASHRAE 37 - Testing Unitary Air Conditioning and Heat Pump Equipment.
6. ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.
7. ARI 210/240 - Unitary Air Conditioning Equipment and Air- Source Heat Pump Equipment. Applies to all units below 135,000 BTU.
8. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
9. ARI 370 - Sound Rating of Large Outdoor Refrigerating and Air Conditioning Equipment.
10. ANSI/NFPA 70-1995 - National Electric Code.

E. EER: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Building, except Low-Rise Residential Buildings."

1.3 NATIONAL ACCOUNT

A. NPC has entered into a national account agreement with Trane for furnishing the HVAC roof top units specified in this section. Complete installation shall be by the Contractor. For pricing quotations, placing orders, and further information, contact Trane at number indicated on the drawings.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Install packaged units, as indicated in the Drawings, in accordance with the Manufacturer's instructions and requirements. Provide related products and accessories from one manufacturer. Store materials in accordance with manufacturer recommendation protecting from dirt, moisture, contaminants and weather.

B. Codes and Standards: Perform all installations in accordance with the latest standards as recognized by ASHRAE, SMACNA and all applicable state and local codes and ordinances.

C. Workmanship: Experienced, well-trained workers competent to complete the work as specified shall perform Labor in conformance with generally accepted trade standards. Install all equipment square and plumb allowing access for proper operation, adjustment and service.

1.5 STRUCTURAL AND SPACE CONDITIONS

A. All work shall avoid obstructions and interference with other trades, preserve headroom and keep openings and passageways clear and free.

1.6 VIBRATION AND NOISE

A. Install each of the various pieces of equipment to operate without objectionable vibration or noise.

1.7 BALANCING AND TESTING

General –

Building air systems shall be balanced per data included on the drawings to achieve relative air volumes with a grade of 6 or higher as indicated on the drawings and scheduled herein.

Performance –

The contractor shall engage an independent air balancing agency subsequent to the approval of the owner's representative. The T&B agency can only act as his own reporting agency if suitable instruments hereinafter required are demonstrated to be part of his normal procedure to the satisfaction of the owners representative. The T&B agency shall be AABC or NEBB certified.

Measuring Techniques –

A pitot tube traverse shall be performed to determine the total flow of all HVAC systems and hood make up air fans.

All diffusers, registers and grilles with a face dimension of 24" or less shall be measured by utilizing a hood axial vane velometer.

Use volume dampers located in ducts and balance diffusers.

Submittals –

It shall be the responsibility of this T&B agency to provide the local building department and owner with proper test & balance data on AABC or NEBB forms.

Contractor shall be responsible for providing test reports to the local jurisdiction as required for Certificate of Occupancy.

1.8 CLEAN-UP

A. At the completion of the work, clean the area of all debris such that the Project is left in a neat and clean manner as deemed acceptable by the Owner.

PART 2 - PRODUCTS

2.1 ROOF TOP AIR CONDITIONING UNITS, FANS AND AIR OUTLETS

A. Equipment shall be as indicated on the Drawings. Air conditioning unit shall include hard-start kit for low ambient temperature operation.

B. The manufacturer shall include the following items:

1. 5-year compressor warranty - parts only.
2. 10-year heat exchanger warranty - parts only.
3. Factory installed two-position motorized damper.
4. Factory installed hard start kit for low ambient to zero degree operation.
5. Factory installed hinged access panels.
6. Through the base gas and electrical connections to minimize roof penetrations.
7. Factory installed circuit breaker.
8. Factory installed unpowered convenience outlet.
9. Factory supplied / field installed supply air smoke detector.

C. The contractor shall furnish manufacturer complete submittal wiring diagrams of the packaged unit as applicable for field maintenance and service.

2.2 DUCTWORK

A. Rectangular Ducts Fabrication, General: Except as otherwise indicated, fabricate rectangular ducts with galvanized sheet steel, in accordance with SMACNA - HVAC Duct Construction Standards, Tables 1-3 through 1-19, including their associated details. Conform to the requirements in the referenced standard for metal thickness, reinforcing types and intervals, tie rod applications, and joint types and intervals.

B. Kitchen Hood Exhaust Ducts Fabrication, General: Fabricated using 16-gage, carbon steel sheets for concealed ducts. Weld and flange seams and joints. Conform to NFPA Standard 96.

C. Flexible Ductwork Fabrication, General:

1. Factory preinsulated, spiral helix steel spring permanently bonded to an interior liner, and sheathed in an exterior reinforced laminated vapor barrier jacket.
2. Precut lengths of flexible duct with continuous inner liner, factory installed female collars and fastening devices at each end.
3. Provide spin-in extractor/ balancing damper assembly complete with a level position indicator and positive locking device, as indicated on the Drawings, round duct takeoffs from rectangular main ducts.

D. Label entire assembly in accordance with UL 181 Class 1 air duct requirements and not have a flame and smoke spread rating in excess of 25/50 respectively.

E. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Indoor, Supply-Air Ducts: Seal Class A.
2. Indoor, Exhaust Ducts: Seal Class B.
3. Indoor, Return-Air Ducts: Seal Class B.

2.3 DUCT ACCESS PANELS AND DOORS

A. In sheet metal work, hollow core double construction of same or heavier gage material as duct in which installed, products by CESCO, Vent Products, Air Balance, or equivalent.

1. Provide Ventlok or approved hinges and latches on all doors; 100 Series hinges and latches on low pressure system doors up to 18-inches maximum dimension, 200 Series on larger low pressure system doors and 333 Series on high pressure systems.
2. Construct doors up to 18-inches maximum dimension with one inch overlap fit and gasket with 3/4-inch by 1/8-inch sponge rubber, fit larger doors against 1-1/2 inches by 1/8-inch flat stock or angle frame and gasket with 3/4-inch by 1/8-inch sponge rubber or felt.
3. Door swing to be opposite airflow direction.

2.4 DUCTWORK SPECIALTIES

A. Volume and Splitter Dampers

1. Galvanized sheetmetal blade and frame with Ventfabrics Inc., Ventlok operating hardware.
2. For accessible dampers, provide #641 self-locking dial regulators and #644 self-locking dial regulators for insulated ductwork, #637 square end bearing, and #635 spring end bearing, as applicable.
3. For inaccessible dampers, provide #666 or #677 concealed locking damper regulator with bearings as above. For static pressures above 3-inch W.G., provide #640 HiVel dial regulator and #609 HiVel end bearing for accessible dampers.

B. Multi-Louver Volume Dampers

1. 16-gauge galvanized steel frame. Opposed, 6-inch wide, 16-gauge galvanized steel blades. Concealed linkage in frame.
2. Titus #AG-35-B, Ruskin #CD35/OBD or equal.

C. Flexible Connections

1. Provide flexible connectors at the discharge and inlet of fans, air handlers, rotating mechanical equipment, and where shown on the Drawings for proper vibration isolation.
2. Neoprene impregnated glass cloth with 24-gauge galvanized metal frame. Minimum dimensions: 3-inch metal, 3-inch fabric, 3-inch metal.
3. Duro Dyne #MFN4, Ventfabrics "Ventglas", Q Industries, Consolidated Kinetics, Elgen, or equal.

D. Backdraft Dampers

1. Provide counterweight type complete with frame, end bearings, counterbalance assembly, blades, and linkage.
2. Install at outside air intakes, exhaust outlets, and where shown on Drawings.
3. Pacific Air Products #PRD-100AL, Ruskin #CBS-7 or equal by Swartwout, American Warming, or Vent Products.

2.5 DUCT INSULATION

A. Acceptable Manufacturers: Provide products of the following manufacturers, complying with specified requirements. Equivalent products of other manufacturers will be considered in accordance with the "or equal" provision specified in Section 01000 - Supplemental General Requirements, and the Construction Contract.

1. Owens-Corning Fiberglas Corp.
2. Johns Manville Corp.
3. Certainteed Corp.

B. All insulation material shall comply with applicable energy conservation regulations for Project location.

C. Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread index of 25 or less, and smoke-developed index of 50 or less, as tested by ASTM E84 (NFPA 255) method.

D. Provide staples, bands, wires, tape, anchors, corner angles and similar accessories as recommended by insulation manufacturer for applications indicated.

E. Provide cements, adhesives, coatings, sealers, protective finishes and similar compounds as recommended by insulation manufacturer for applications indicated.

2.6 HVAC CONTROLS

A. Shall be as indicated on the Drawings.

B. Electric and electronic HVAC Controls: Components and operating features as indicated on the Drawings.

2.7 ROOF CURB

A. Manufacturer's standard corrosive-resistant-coated, insulated curb with nailer strip, flashing and counterflashing and cadmium-plated hardware.

PART 3 - EXECUTION

3.1 HVAC SYSTEM INSTALLATION, GENERAL

A. Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements

1. Coordinate mechanical systems, equipment, and materials installation with other building components.
2. Verify all dimensions by field measurements.
3. Arrange for chases, slots, and openings in other building components during progress of, to allow for mechanical installations.
4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

8. Install systems, materials, and equipment to conform with drawings and specs, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Construction Manager for resolution prior to installation.

9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.

10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

11. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.2 AIR CONDITIONING UNIT INSTALLATION

A. Install in accordance with manufacturer's instructions and comply with the following requirements:

1. Provide layout drawings of units, locations and power requirements to electrical installer.

2. Install minimum 30 percent efficiency air filters in unit during installation phase. Do not operate the unit without filters in place.

3. Mount rooftop unit on factory built roof-mounting frame. Install roof mounting frame level. Secure frame to structural framing and rooftop unit on frame as indicated on the Drawings.

4. Install 3-inch long flexible duct connection at inlets and outlets of units.

5. Install condensate drain piping and traps in accordance with manufacturer's instructions and as shown on the Drawings. All metal piping and supports shall be of same material to prevent electrolysis.

6. Control installers shall install thermostat and all wiring associated with control signals into the units. All thermostats shall be located in manager's office with remote sensors located in appropriate locations in return ductwork.

7. Install all line voltage power wiring and conduit as indicated on the Drawings and as specified in Division 16 - Electrical.

8. Coordinate with Electrical Contractor to install a new set of filters three days prior to Substantial Completion review.

3.4 EXHAUST/SUPPLY FAN INSTALLATION, GENERAL

A. Install fans level and plumb, in accordance with manufacturer's written instructions. Secure roof-mounted fans to roof curbs with cadmium-plated hardware.

B. Provide access space around fans for service and maintenance, as indicated on the Drawings and in compliance with applicable Mechanical Code.

C. Clean unit cabinet interiors to remove foreign material and construction dirt and dust.

D. Coordinate with Electrical Contractor to provide electrical power wiring as specified in Division 16 - Electrical.

3.4 DUCTWORK INSTALLATION

A. Ductwork Installation, General:

1. Ductwork is generally diagrammatically indicated on the Drawings and shall be generally installed as indicated. Do not scale Drawings for exact location of ducts.

2. Install ducts to best suit field conditions and to coordinate with other building components. Do not cut Structural members without consent of Construction Manager. Check with Structural Drawings prior to locating penetrations.

3. Duct sizes are indicated as net inside dimensions on the Drawings. The indicated dimensions shall be altered at the job site for the purpose of avoiding interference and clearance difficulties to other dimensions producing the same air handling characteristics, provided such altered dimensions are approved by the Construction Manager.

B. Hangers and Supports

1. Securely fasten all ducts to building construction by means of hangers, supports, guides, anchors, and sway braces to maintain duct alignment, to prevent sagging, and to prevent noise and excessive strain on ducts due to movement under operating conditions.

2. Adequately mount and anchor all material and equipment as required. Include lateral bracing as required to prevent horizontal, seismic movement. Refer to applicable Mechanical Code requirements and details on Drawings for seismic requirements.

3. Do not support ducts from fans or other equipment.

4. Power-driven fasteners shall not be used to support ducts.

5. Support round duct, 30-inch and larger, with two hangers at each support point.

6. Hangers and supports shall conform to SMACNA section, "Hangers and Supports". Support horizontal ducts with in 2 feet of each elbow and within 4 feet of each branch intersection using double strap hangers on each side of fitting.

7. Support vertical ducts, passing through roofs with two continuous angles screwed to the duct and bearing to the roof structure, and conforming to SMACNA section "Riser Support-From Floor."

C. Seismic Supports and Bracing

1. Where required, all ductwork and equipment shall be seismically supported and braced per the SMACNA "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems", including Appendix E.

D. Joints Sealing, General

1. Duct tape shall not be used on duct joints.

2. Transverse joints: All transverse joints including Ductmate type joints on all supply, return, exhaust and outside air intake ducts, sealed using Hardcast Arabol.

3. Interior exposed joints: Seal using water based sealer, Hardcast Iron Grip.

4. Interior concealed joints (above 1-inch W.G. pressure ductwork): Seal using gypsum impregnated tape and adhesive.

5. Interior concealed joints (to 1-inch W.G. pressure ductwork): Seal using water based sealer, Hardcast Iron Grip.

6. Exterior joints (above 1-inch W.G. pressure ductwork): Seal using gypsum impregnated tape and adhesive.

7. Exterior joints (to 1-inch W.G. pressure ductwork): Seal using oil based sealer, Hardcast Galva Grip or equal.

8. Exterior joints: Seal water and to air-tight condition with sealant.

E. Ductwork Painting, General - Where the interior surfaces of ductwork are visible through the blades of supply outlets, return inlets, and exhaust inlets, paint interior visible surfaces with one coat of flat black paint. See Section 09905 - Painting.

F. Cleaning - Clean the inside of plenums, casings, enclosures, fans, and accessible ductwork before starting fans.

3.5 DUCTWORK ACCESSORIES, INSTALLATION

- A. Provide duct-mounted balancing dampers or attached opposed blade dampers so that each diffuser, grille and register may be individually balanced.
- B. Provide unit opposed blade damper where individual duct mounted balancing dampers are not provided.
- C. Provide turning vanes in all mitered elbows in all ducts, so that tips are parallel with the sides of the ducts. Vanes shall be single thickness type with extended trailing edge. Tips of acoustical turning vanes on outside radius shall be flush with acoustical lining.
- D. Provide flexible connections to completely isolate fans from direct contact with all sheet metal work.
- E. Provide access panels or doors, as required, for access to valves, controllers, fire dampers.

3.6 DUCT INSULATION, INSTALLATION

A. Wrapped Ductwork Insulation

- 1. Application Requirements: Insulate the following ductwork as follows:
 - a. HVAC supply ductwork between fan discharge, or HVAC unit discharge, and room terminal outlet.
 - b. HVAC return ductwork between room terminal inlet and return fan inlet, or HVAC unit inlet.
- 2. Insulate each ductwork system specified above with 1-1/2 inches thick insulation and vapor barrier jacket, application limited to concealed locations.

B. Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose and as follows:

- 1. Install insulation on pipe and ductwork systems subsequent to painting, testing, and acceptance of tests.
- 2. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with a single cut piece to complete run. Do not use cut pieces or scraps abutting each other.
- 3. Clean and dry pipe or duct surfaces prior to insulating. Butt insulation joints firmly together to ensure a complete and tight fit over surfaces to be covered.
- 4. Maintain integrity of vapor-barrier jackets on pipe and ductwork insulation, and protect to prevent puncture or other damage.
- 5. Extend pipe and ductwork insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.
- 6. Protect outdoor insulation from weather by installing outdoor protective finish or jacketing as recommended by manufacturer.
- 7. Replace damaged insulation that cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- 8. Insulation installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

3.7 CONTROL SYSTEMS, INSTALLATION

A. Installation

- 1. Install systems and materials in accordance with manufacturer's instructions and recommendations, rough-in drawings, and details indicated on the Drawings.
- 2. Coordinate with Electrical Contractor to install electrical components and use electrical products complying with requirements of applicable requirements specified in Division 16 - Electrical.

3. Mount controllers at convenient locations and heights.

B. Control Wiring - The term "control wiring" shall be defined to include providing of wire, conduit and miscellaneous materials as required for mounting and connecting electric control devices.

C. Wiring System

1. Install complete control wiring system for electric control systems.
2. Conceal wiring except in mechanical rooms and areas where other conduit and piping are exposed.
3. Provide multi-conductor instrument harness (bundle) in place of single conductors where number of conductors can be run along common path.
4. Fasten flexible conductors bridging cabinets and doors, neatly along hinge side, and protect against abrasion. Tie and support conductors neatly.

D. Start-Up - Start, test and adjust electric control systems in presence of manufacturer's authorized representative. Replace damaged or malfunctioning controls and equipment.

E. Cleaning - Clean factory-finished surfaces. Repair marred or scratched surfaces with manufacturer's touch-up paint.

F. Final Adjustment - After completion of installation, adjust thermostats, control valves, motors and similar equipment specified in this Section. Final adjustment shall be performed by specially trained personnel in direct employ of manufacturer of primary temperature control system.

G. Control Sequences

1. Rooftop Packaged Units
 - a. Occupied: Energize rooftop units during occupied cycle via manufacturer supplied thermostat. Modulate outside air and return air dampers in sequence and in conjunction with unit's mechanical refrigeration to maintain desired room temperature via manufacturer supplied thermostat.
 - b. Unoccupied: Maintain outside air damper closed. Cycle unit fan and unit's heating to maintain reduced room temperature of 60 degrees F with unoccupied thermostat.
2. Power Ventilators
 - a. Energize exhaust fans during occupied cycle and de-energize during unoccupied cycle via electronic time clock control.

END OF SECTION

SECTION 15810

DUCTWORK

PART 1 GENERAL – Not Used

PART 2 PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Ducts: ASTM A 525 and ASTM A 527 galvanized steel sheet, lock-forming quality, having G90 zinc coating of in conformance with ASTM A 90.
- B. Insulated Flexible Ducts:
 - 1. Two ply vinyl film supported by helically wound spring steel wire; fiberglass insulation; aluminized vapor barrier film.
 - 2. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
 - 3. Maximum Velocity: 4000 fpm.
 - 4. Temperature Range:-10 degrees F to 160 degrees F.
 - 5. Acceptable Products:
 - a. Thermaflex Model M-KE.
 - b. Flexmaster.
- C. Fasteners: Rivets, bolts, or sheet metal screws.
- D. Sealant:
 - 1. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- E. Hanger Rod: ASTM A 36; galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide[air foil] turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

2.3 MANUFACTURED DUCTWORK AND FITTINGS

- A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- C. Duct Sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.

- D. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- F. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- G. Use double nuts and lock washers on threaded rod supports.
- H. Connect terminal units to supply ducts [directly or] with one foot maximum length of flexible duct. Do not use flexible duct to change direction.
- I. Connect flexible ducts to metal ducts with draw bands.
- J. Provide residue traps in kitchen hood exhaust ducts at base of vertical risers with provisions for clean out. Use stainless steel for ductwork exposed to view and stainless steel or carbon steel for ducts where concealed.
- K. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 CLEANING

- A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

3.3 SCHEDULES

A. DUCTWORK MATERIAL SCHEDULE

AIR SYSTEM	MATERIAL
Low Pressure Supply	Galvanized Steel
Return and Relief	Galvanized Steel
General Exhaust	Galvanized Steel
Kitchen Hood Exhaust	Galvanized Steel
Dishwasher Exhaust	Stainless Steel
Outside Air Intake	Galvanized Steel
Combustion Air	Galvanized Steel

END OF SECTION

SECTION 15820

DUCT ACCESSORIES

PART 1 GENERAL – not used

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with radius blades attached to pivoting frame and bracket, galvanized steel construction, with push-pull operator strap.

2.2 BACKDRAFT DAMPERS

- A. Gravity Backdraft Dampers, Size 18 by 18 inches or smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturers standard construction.
- B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: 16 gage thick galvanized steel, with blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 DUCT ACCESS DOORS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch thick insulation with sheet metal cover.
 - 1. Less Than 12 Inches Square: Secure with sash locks.
 - 2. Up to 18 Inches Square: Provide two hinges and two sash locks.
 - 3. Up to 24 by 48 Inches: Three hinges and two compression latches [with outside and inside handles].
 - 4. Larger Sizes: Provide an additional hinge.
- C. Access doors with sheet metal screw fasteners are not acceptable.

2.4 FLEXIBLE DUCT CONNECTIONS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- B. Connector: Fabric crimped into metal edging strip.
 - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
 - 2. Net Fabric Width: Approximately 2 inches wide.
 - 3. Metal: 3 inches wide, 24 gage galvanized steel.

2.5 VOLUME CONTROL DAMPERS.

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- B. Splitter Dampers:
 - 1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
 - 2. Blade: Fabricate of double thickness sheet metal to streamline shape, secured with continuous hinge or rod.
 - 3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.
- C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch. 12 by 48 inch.

- D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- E. End Bearings: Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.
- F. Quadrants:
 - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
 - 3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 15810 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ductwork in accordance with NFPA 96. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated. Provide 4 x 4 inch for balancing dampers only. Review locations prior to fabrication.
- D. Demonstrate re-setting of fire dampers to Owner's representative.
- E. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
- F. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- G. Use splitter dampers only where indicated.
- H. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 15850

AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. Acceptable Manufacturers:
 - 1. Titus.
 - 2. Krueger.
 - 3. Metalaire.
- B. Substitutions: Submit in accordance with Section 01600.

2.2 ROUND CEILING DIFFUSERS

- A. Type: Round, stamped or spun, multi-core diffuser to discharge air in 360 degree pattern, with sectorizing baffles where indicated. Diffuser collar shall project not more than one inch above ceiling. Core shall be adjustable for vertical or horizontal throw.
- B. Fabrication: Steel with baked enamel off-white finish.
- C. Accessories: Radial opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.
- D. Acceptable Product: Refer to schedule on Drawings.

2.3 RECTANGULAR CEILING DIFFUSERS

- A. Type: Square, stamped, multi-core diffuser to discharge air in 360 degree pattern with sectorizing baffles where indicated.
- B. Frame: Inverted T-bar type.
- C. Fabrication: Aluminum with baked enamel off-white finish.
- D. Accessories: Opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.
- E. Acceptable Products: Refer to schedule on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09910.

END OF SECTION

SECTION 16060

GROUNDING AND BONDING

PART 1 GENERAL

1.1 GROUNDING SYSTEM DESCRIPTION

- A. Motor Frames.
- B. Metal frame of the building.
- C. Noncurrent-carrying metallic parts of electrical equipment.
- D. Rod electrode.
- E. Buried metallic water piping.

1.2 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 25 ohms maximum.

1.3 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 and applicable local codes.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 ROD ELECTRODES

- A. Per drawings.

2.2 WIRE

- A. Material: Stranded copper.
- B. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install rod electrodes at locations indicated.
- B. The minimum size of grounding conductors shall be in accordance NFPA 70 or local code requirements.

END OF SECTION

SECTION 16070

HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 and applicable local codes.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 PRODUCT REQUIREMENTS

- A. Materials and Finishes: Corrosion resistant, galvanized or powder coated.
- B. Select materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit, including weight of wire in conduit.
- C. Anchors and Fasteners:
 - 1. Concrete Structural Elements: Use precast inserts, expansion anchors, and powder actuated anchors.
 - 2. Steel Structural Elements: Use beam clamps and welded fasteners.
 - 3. Concrete Surfaces: Use expansion anchors.
 - 4. Hollow Masonry, and Gypsum Board Partitions: Use toggle bolts.
 - 5. Sheet Metal: Use sheet metal screws.
 - 6. Wood Elements: Use wood screws.

2.2 FORMED STEEL CHANNEL

- A. Description: Galvanized or Powder Coated steel.
- B. Acceptable Product:
 - 1. Unistrut Model P 1000.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Locate and install anchors, fasteners, and supports in accordance with NFPA 70 "Standard of Installation".
 - 1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
 - 2. Do not use spring steel clips and clamps.
 - 3. Do not use perforated strap, wire ties, plumbers strap or similar items.
 - 4. Obtain permission from the Architect before using powder-actuated anchors.
 - 5. Obtain permission from the Architect before drilling or cutting structural members.
- B. Fabricate supports from structural steel or formed steel members. Rigidly weld members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- C. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.
- E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- F. Rigid steel, IMC and EMT raceways shall be supported at intervals not over 10 feet and within 3 feet of each box, cabinet or fitting. Provide one support not over 12 inches from each change in direction.

END OF SECTION

SECTION 16075

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 and applicable local codes.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 NAMEPLATES AND LABELS

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- B. Locations:
 - 1. Each electrical distribution and control equipment enclosure.
 - 2. Communication cabinets.
 - 3. Starters.
 - 4. Disconnect Switches.
- C. Letter Size:
 - 1. 3/8-inch letters for identifying equipment.
- D. Note: Embossed adhesive tape shall not be used.
- E. Panelboard directory shall be typed and placed in sleeve on inside of door.

2.2 WIRE MARKERS

- A. Description: Tubing type wire markers.
- B. Locations: Each conductor at panelboard gutters, pull boxes, and junction boxes and each load connection.
- C. Legend:
 - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated.
 - 2. Control Circuits: Control wire number indicated on shop drawings.

2.3 UNDERGROUND WARNING TAPE

- A. Description: 2-inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.
- B. Location: Along length of each underground conduit.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.2 INSTALLATION

- A. Install nameplate parallel to equipment lines.
- B. Secure nameplate to equipment front using rivets.
- C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

END OF SECTION

SECTION 16120

CONDUCTORS AND CABLE

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories Inc. As suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: NFPA 70; Type THW insulation for feeders and branch circuits larger than 4/0 AWG; Type THHN/THWN insulation for all others.

2.2 METAL CLAD CABLE

- A. Description: NFPA 70, Type MC.
- B. Conductor: Copper.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.
- C. Verify that raceway installation is complete and supported.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 WIRING METHODS

- A. Concealed Dry Interior Locations, Exposed Dry Interior Locations, Above Accessible Ceilings, Wet or Damp Interior Locations and Exterior Locations use only building wire, Type THHN/THWN insulation, in raceway.

3.4 INSTALLATION

- A. Route wire and cable as required to meet Project Conditions.
- B. Install cable in accordance with the NECA "Standard of Installation."
- C. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
- D. Use stranded conductors for control circuits and all motor connections.
- E. Use conductor not smaller than 12 AWG for power and lighting circuits.
- F. Use conductor not smaller than 14 AWG for control circuits.
- G. Pull all conductors into raceway at same time.
- H. Use suitable wire pulling lubricant for building wire.
- I. Protect exposed cable from damage.
- J. Support cables above accessible ceiling, using plastic cable ties to support cables from structure. Do not rest cable on ceiling panels.
- K. Use suitable cable fittings and connectors.
- L. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- M. Clean conductor surfaces before installing lugs and connectors.

- N. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- O. Identify all wire and cable. Identify each conductor with its circuit number or other designation indicated.

3.5 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NFPA 70 and applicable local codes.

END OF SECTION

SECTION 16130

RACEWAY AND BOXES

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to requirements of the National Electrical Code.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc., or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 CABINETS, BOXES, AND FITTINGS, GENERAL

- A. Electrical Cabinets, Boxes, and Fittings: Of indicated types, sizes, and NEMA enclosure classes. Where not indicated, provide units of types, sizes, and classes appropriate for the use and location. Provide all items complete with covers and accessories required for the intended use. Provide gaskets for units in damp or wet locations.

2.2 OUTLET, DEVICE, AND SMALL WIRING BOXES

- A. General: Conform to UL 514A, "Metallic Outlet Boxes, Electrical," and UL 514B, "Fittings for Conduit and Outlet Boxes." Boxes shall be of type, shape, size, and depth to suit each location and application.
- B. Steel Boxes: Conform to NEMA OS 1, "Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports." Boxes shall be sheet steel with stamped knockouts, threaded screw holes and accessories suitable for each location including mounting brackets and straps, cable clamps, exterior rings and fixture studs.
- C. Service Fittings for Floor Outlet Boxes: Surface mounted horizontal, cast aluminum type 3 inches high, suitable for finished spaces and finished in satin aluminum, except as otherwise indicated. Provide duplex receptacle or 1 inch bushed opening for telephone or other communications service as indicated. Equip fitting for attaching flat to floor box cover.

2.3 PULL AND JUNCTION BOXES

- A. General: Comply with UL 50, "Electrical Cabinets and Boxes", for boxes over 100 cubic inches volume. Boxes shall have screwed or bolted on covers of material same as box and shall be of size and shape to suit application.
- B. Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing.
- C. Hot-Dipped Galvanized Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing. Hot-dip galvanized after fabrication. Cover shall be gasketed.
- D. Boxes Approved for Classified Locations: Cast metal or cast nonmetallic boxes conforming to UL 886, "Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations," listed and labeled for use in the specific location classification, and with the specific hazardous material encountered. Conduit entrances shall be integral threaded type.
- E. In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting:
 - 1. Material: Cast aluminum.
 - 2. Cover: Nonskid cover with neoprene gasket and with suitable stainless steel cover screws.
 - 3. Cover Legend:
- F. Fiberglass Handholes: Die molded glass fiber hand holes:
 - 1. Cable Entrance: Pre-cut 6 inch x 6 inch cable entrance at center bottom of each side.

2. Cover: Glass fiber weatherproof cover with nonskid finish.

PART 3 EXECUTION

3.1 INSTALLATION OF OUTLET BOXES

- A. Install boxes in accordance with NEC "Standard of Installation."
- B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- C. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
- D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
- E. Orient boxes to accommodate wiring devices oriented as specified in Section 16140.
- F. Maintain headroom and present neat mechanical appearance.
- G. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- H. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- I. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- J. Locate outlet boxes to allow luminaries positioned as shown on reflected ceiling plan.
- K. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- L. Use flush mounting outlet box in finished areas.
- M. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
- N. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
- O. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
- P. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- Q. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- R. Use adjustable steel channel fasteners for hung ceiling outlet box.
- S. Do not fasten boxes to ceiling support wires.
- T. Support boxes independently of conduit.
- U. Use gang box where more than one device is mounted together. Do not use sectional box.
- V. Use gang box with plaster ring for single device outlets.
- W. Use cast outlet box in exterior locations [exposed to the weather] and wet locations.
- X. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- Y. Set floor boxes level.

3.2 INSTALLATION OF PULL AND JUNCTION BOXES

- A. Box Selection: For boxes in main feeder conduit runs, use sizes not smaller than 8 inches square by 4 inches deep. Do not exceed 6 entering and 6 leaving raceways in a single box. Cable Supports: Install clamps, grids, or devices to which cables may be secured. Arrange cables so they may be readily identified. Support cable at least every 30 inches inside boxes.
- B. Mount pull boxes in inaccessible ceilings with covers flush with the finished ceiling.
- C. Size: Provide pull and junction boxes for telephone, signal, and other systems at least 50 percent larger than would be required by Article 370 of NEC, or as indicated. Locate boxes strategically and provide shapes to permit easy pulling of future wires or cables of types normal for such systems.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Provide Products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 WALL SWITCHES

- A. Color: Stainless steel cover plate and grey device.
- B. Specification Grade.
- C. Manufacturers:
 - 1. Single Pole Switch:
 - a. Pass & Seymour Model 20 AC1-I.
 - 2. Double Pole Switch:
 - a. Pass & Seymour Model 20 AC2-I.
 - 3. Three-way Switch:
 - a. Pass & Seymour Model 20AC3-I.
 - 4. Four-way Switch:
 - a. Pass & Seymour Model 20AC4-I.
 - 5. Indicator Switch Pilot Gang:
 - a. Pass & Seymour Model 20AC1/3-CPL.
 - 6. Key Switch:
 - a. Pass & Seymour Model 20AC1/2/4-L.
 - 7. Momentary Switch:
 - a. Pass & Seymour Model 1250-I.

2.2 RECEPTACLES

- A. Color: Stainless steel cover plate and grey device.
- B. All devices to have 20A at 125V rating.
- C. Specification Grade.
- D. Manufacturers:
 - 1. Single Convenience Receptacle:
 - a. Pass & Seymour Model 5361
 - 2. Duplex Convenience Receptacle:
 - a. Pass & Seymour Model 5362.
 - 3. GFCI Receptacle:
 - a. Pass & Seymour Model 2091-S.
 - 4. Isolated Ground Receptacle:
 - a. Pass & Seymour Model IG6300.
 - 5. Telephone Jack:
 - a. Hubbell Model CX244.

2.3 WALL PLATES

- A. Decorative Cover Plate: Stainless steel.
- B. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device cover.
- C. Shall be furnished and installed for the type of service involved.
- D. Manufacturers:
 - 1. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device cover.

- a. Hubbell Model WP826MP.

2.4 FLOOR MOUNTED SERVICE FITTINGS

- A. Flush Cover Convenience Receptacle:
 - 1. Material: Brass plate with steel box.
 - 2. Configuration: Duplex threaded opening.
 - 3. Manufacturers: Hubbell Model 132529 W/SF2525.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that outlet boxes are installed at proper height.
- B. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify that floor boxes are adjusted properly.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.2 INSTALLATION

- A. Install in accordance with NECA "Standard of Installation."
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install receptacles with grounding pole on bottom.
- E. Connect wiring device grounding terminal to outlet box with bonding jumper.
- F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- G. Connect wiring devices by wrapping conductor around screw terminal.
- H. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- I. Install protective rings on active flush cover service fittings.

3.3 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

END OF SECTION

SECTION 16150

WIRING CONNECTIONS

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 and applicable local codes.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. for testing firm acceptable to the authority having jurisdiction, as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 CORDS AND CAPS

- A. Attachment Plug Construction: Conform to NEMA WD 1.
- B. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
- C. Cord Construction: NFPA 70, Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 16210

ELECTRICAL UTILITY SERVICES

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

- A. For Utility Supplied Services - System Characteristics: 120/208 volts, three phase, four-wire, 60 Hertz. System voltages shall match utility service.
- B. Self-generated voltages shall match system standard voltages.

1.2 QUALITY ASSURANCE

- A. Perform Work in accordance with Utility Company written requirements.
- B. Maintain one copy of each document on site.

1.3 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 and IEEE 141.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 PAD FOR UTILITY TRANSFORMER

- A. Description: Transformer pad sized as required by utility company.

PART 3 EXECUTION

3.1 PREPARATION

- A. Arrange with Utility Company to obtain permanent electric service to the Project. Pay for all required permits and fees.

3.2 INSTALLATION

- A. Install meter base as required by Utility Company. All wire, conduits, pads, meter bases, weatherheads, and meter not installed by utility company and required for a complete and functional electrical service.

END OF SECTION

SECTION 16220

ENCLOSED MOTOR CONTROLLERS

PART 1 GENERAL

1.1 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing enclosed motor controllers with minimum 3 years documented experience.
- B. Acceptable Manufacturers:
 - 1. Square D.
 - 2. General Electric.
 - 3. Siemens.
 - 4. Cutler Hammer.

1.2 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 and NEMA ICS1, 2 and 6.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 MANUAL CONTROLLERS

- A. All motor controllers shall have an overall unit short circuit current rating that equals or exceeds of maximum fault current at the point of application.
- B. Manual Motor Controller: NEMA ICS 6, AC general-purpose, Class A, manually operated, full-voltage controller with overload element, red pilot light, N.O. auxiliary contact, and push button operator.
- C. Fractional Horsepower Manual Controller: NEMA ICS 6, AC general-purpose, Class A, manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload unit, red pilot light and toggle operator.
- D. Motor Starting Switch: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, without thermal overload unit, with red pilot light and toggle operator.
- E. Enclosure: NEMA ICS 6, Type as required to meet conditions of installation.

2.2 AUTOMATIC CONTROLLERS

- A. Magnetic Motor Controllers: NEMA ICS 6, AC general-purpose Class A magnetic controller for induction motors rated in horsepower.
- B. Coil operating voltage: 120 or 208 volts, 60 Hertz.
- C. Overload Relay: NEMA ICS; melting alloy.
- D. Enclosure: NEMA ICS 6, Type as required to meet conditions of installation.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Refer to Section 01780 for manufacturer's instructions.
- B. Provide warranty and installation as directed by owner.
- C. Install enclosed controllers where indicated, in accordance with NECA "Standard of Installation."
- D. Install enclosed controllers plumb. Provide supports in accordance with Section 16070.
- E. Provide fuses for fusible switches.

- F. Select and install overload heater elements in motor controllers to match installed motor characteristics.
- G. Neatly type label inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place label in clear plastic holder.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.16.2.

END OF SECTION

SECTION 16410

DISTRIBUTION PANELBOARDS

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Square D
- B. Siemens
- C. GE.

2.2 SWITCHBOARD

- A. Description: NEMA PB 2 switchboard with electrical ratings and configurations as indicated and specified.
- B. Ratings:
 - 1. Voltage: 208Y/120 volts.
 - 2. Configuration: Three phase, four wire, grounded.
 - 3. Main Bus: As required for the facility.
 - 4. Integrated Equipment Rating: 200,000 rms amperes symmetrical.
- C. Main Section Devices: Individually mounted.
- D. Distribution Section Main Device: Individually mounted and compartmented.
- E. Auxiliary Section Devices: Panel mounted.
- F. Bus Material: Aluminum with tin plating, standard size.
- G. Bus Connections: Bolted, accessible from front for maintenance.
- H. Fully insulate load side bus bars. Do not reduce spacing of insulated bus. Use factory applied tape wrapping or spray applied 105 degrees C minimum insulating material.
- I. Ground Bus: Extend length of switchboard.
- J. Molded Case Circuit Breakers: NEMA AB 1, integral thermal and instantaneous magnetic trip in each pole.
 - 1. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
 - 2. Include shunt trip, undervoltage release, and auxiliary contact where required.
- K. Line and Load Terminations: Accessible from the front only of the switchboard, suitable for the conductor materials and sizes indicated.
- L. Pull Section: Arrange as required for the facility.
- M. Enclosure: Type 1 - General Purpose NEMA 3R.
 - 1. Align sections at front and rear.
 - 2. Switchboard Height: 90 inches, excluding floor sills, lifting members and pull boxes.
 - 3. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.
 - 4. Mimic Bus: Show bussing, connections and devices in single line form on the front panels of the switchboard using black color lines on a white plastoid laminated panel, fastened flat against the panel face with rivets.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install switchboard in locations shown on Drawings, according to NEMA PB 2.1.
- B. Tighten accessible bus connections and mechanical fasteners after placing switchboard.

3.2 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.1.

END OF SECTION

SECTION 16510

INTERIOR LUMINAIRES

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Conform to requirements of NFPA 101.
- C. Products: Listed and classified by Underwriters Laboratories, Inc.

PART 2 PRODUCTS

2.1 LUMINAIRES

- A. Refer to Lighting Fixture Schedule in Drawings. All fixtures are Owner furnished; Contractor installed.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install suspended luminaires using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- B. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.
- C. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- D. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- E. Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure. Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires. Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.
- F. Install recessed luminaires to permit removal from below.
- G. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- H. Install clips to secure recessed grid-supported luminaires in place.
- I. Install wall mounted luminaires and exit signs at height as indicated on Drawings.
- J. Install accessories furnished with each luminaire.
- K. Connect luminaires, emergency lighting units and exit signs to branch circuit outlets provided under Section 16130 using flexible conduit.
- L. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- M. Bond products and metal accessories to branch circuit equipment grounding conductor.
- N. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

3.2 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

- A. Refer to Section 01750 for adjusting installed work.
- B. Aim and adjust luminaires as directed by construction manager.

END OF SECTION

SECTION 16520

EXTERIOR LUMINAIRES

PART 1 GENERAL

1.1 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 LUMINAIRES AND ACCESSORIES

- A. General: Furnished by Owner; installed by Contractor.
- B. Wiring: Provide electrical wiring within fixtures which is suitable for connection to branch circuit wiring as follows:
 - 1. NEC Type AF for 120 volt, minimum No. 18 AWG.

2.2 POLES

- A. General: Furnished by Owner; installed by Contractor.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install poles plumb. Provide double nuts to adjust plumb. Grout around each base.
- B. Install lamps in each luminaire.
- C. Bond luminaires, metal accessories and metal poles to branch circuit equipment grounding conductor. Provide supplementary grounding electrode at each pole.
- D. All perimeter lighting shall be automatically controlled.

3.2 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for improper connections and operation.
- B. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

3.3 ADJUSTING

- A. Aim and adjust luminaires to provide illumination levels and distribution as directed by construction manager.

END OF SECTION