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INTRODUCTION

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SECTION 01200
COORDINATION AND PROJECT MEETINGS

PART 1 GENERAL

1.01 COORDINATION

A. Contractor shall be responsible for coordinating between his operation and any other work being done on the same site, by the Owner or the Owner's representatives, or other contractors or agencies, including utility companies. Contractor coordination shall include developing a plan for protecting other work, and sharing the existing facilities to optimize the efficiency of Contractor's Work and any other work being done on the site.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 MEETING SCHEDULE

A. Except as noted below for Preconstruction Meeting, project meetings will be held weekly.

B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

A. Owner’s Representative will establish meeting locations.

3.03 PRECONSTRUCTION MEETING

A. Engineer will schedule a preconstruction conference prior to any work beginning. Conference shall be attended by Contractor, Owner and Engineer.

B. Minimum Agenda

1. Organizational arrangement of Contractor's forces and personnel, those of subcontractors, materials suppliers, Owner, and Owner's Representative.

2. Channels and procedures for communication.

3. Construction Schedule, including sequence of critical work. Review materials that might require long lead times, etc.

4. Contract Documents, including distribution of required copies of original documents and revisions.

5. Processing of shop drawings and other data submitted to Owner's Representative for review.

6. Processing of Design Clarification Requests, field decisions, and Change Orders.

7. Rules and regulations governing performance of Work.

8. Contractor's procedures for safety and first aid, security, quality control, housekeeping, and related matters.

9. Processing of payment requests.

10. Preliminary discussions of future project close-out procedures.

3.04 PROJECT MEETINGS

A. Attendance:

1. As mush as possible, assign the same person or persons to represent the Contractor at project meetings throughout the progress for the Work.

2. Subcontractor, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.

B. Minimum Agenda:

1. Work completed to date.
2. Scheduled work (compliance with approved schedule).
3. Submittals (long lead time items, compliance with approved submittals)

4. Document Clarification Requests and Non-Compliance Requests.
5. Change Orders.
6. Coordination with Owner.
7. Comments.

3.05 CONTRACTOR'S MEETINGS

A. Conduct meetings with own forces as required.

B. Notify Owner's Representative in writing of any impending meetings for which the Owner's Representative's input is needed. Provide minimum one week prior notification of meeting and include meeting topic, agenda, time location, and list of expected attendees.

C. Take minutes of meeting and provide copies to Owner's Representative within 3 calendar days after meeting.

3.05 CLOSE-OUT MEETINGS

A. Approximately two weeks prior to Substantial Completion, weekly Project Meetings will include discussion of closet procedures.

B. Contractor is responsible to invite subcontractors as necessary to review related close-out work.

PART 4-MEASUREMENT AND PAYMENT

4.01 Measurement.

No measurement will be made for work under this section.

4.02 Payment.

Payment for work in this section is subsidiary to other items and no separate payment will be made.

END OF SECTION

SECTION 01300
SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Shop drawings.

E. Product data.

F. Samples.

G. Manufacturer's instructions.

H. Manufacturer's certificates.

I. Construction photographs.

1.02 RELATED SECTIONS

A. Section 01020 - Contract Considerations: Schedule of Values.

B. Section 01400 - Quality Control: Manufacturers' field services and reports.

C. Section 01700 - Contract Closeout: Contract warranty and manufacturer's certificates, closeout submittals.

1.03 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer accepted form.

B. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to Owner's Representative. Coordinate submission of related items.

F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed work.

G. Provide space for Contractor and Owner's Representative review stamps.

H. Revise and resubmit submittals as required, identify all changes made since previous submittals.

I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in duplicate within 15 days after date of Notice to Proceed for review by Owner's Representative.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. Submit a horizontal bar chart with separate line for each major section of Work or operation identifying first work day of each week.

1.05 PROPOSED PRODUCTS LIST

A. Within 20 days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.06 SHOP DRAWINGS

A. Submit in the form of one reproducible transparency and one (1) opaque reproduction.

B. After review, reproduce and distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Closeout.

1.07 PRODUCT DATA

A. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Owner's Representative.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

C. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.

1.08 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 Representatives selection.

C. Include identification on each sample, with full Project information.

D. Submit the number or samples specified in individual specification Sections; one of which will be retained by Owner's Representative.

E. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.09 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up adjusting, and finishing, in quantities specified for Product Data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

C. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

D. Certificates may be recent or previous test results on material or Product, but must be acceptable to Owner's Representative.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Quality assurance and control of installation.

B. References.

C. Field samples.

D. Inspection and testing laboratory services.

E. Manufacturers' field services and reports.

1.02 RELATED SECTION

A. Section 01300 - Submittals: Submission of Manufacturers' Instructions and Certificates.

B. Section 01600 - Material and Equipment: Requirements for material and product quality.

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions con conflict with Contract Documents, request clarification from Owner's Representative before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 REFERENCES

A. Conform to reference standard by date of issue current on date of Contract Documents.

B. Should specified reference standards conflict with Contract Documents, request clarification for Owner's Representative.

C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 FIELD SAMPLES

A. Install field samples at the site as required by individual specifications Section for review.

B. Acceptable samples represent a quality level for the Work.

C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Owner's Representative.

1.06 INSPECTION AND TESTING LABORATORY SERVICES

A. Contractor will appoint, employ, and pay for services of an independent firm to perform inspection and testing.

B. The independent firm will perform inspections, test, and other services specified in individual specification Sections and as required by the Owner's Representative.

C. Reports will be submitted by the independent firm to the Owner's Representative, indicating results of tests and indicating compliance or non-compliance with Contract Documents.

D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, and assistance as requested.

1. Notify Owner's Representative 48 hours prior to expected time for operations requiring services.

2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

E. Retesting required because of non-conformance to specified requirements shall be performed by the independent firm on instructions by the Owner's Representative. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

PART 2-PRODUCTS

Not Used

PART 3-EXECUTION

Not Used

END OF SECTION

SECTION 01500
CONSTRUCTION FACILITIES & TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 TEMPORARY SANITARY FACILITIES

A. Contractor shall provide and maintain temporary sanitary facilities and appurtenances for use by Contractor's personnel, Owner's personnel and Owner' representatives. Sanitary facilities shall be of the "Port-A-Potty" type, and shall meet all local health codes. Contractor shall maintain facilities per OSHA standards in a clean and sanitary condition.

1.02 BARRIERS

A. Provide, erect, and maintain temporary barriers and security devices around Work, per specifications, for protection until all Work in the area is complete. Contractor will be informed by the Engineer of any condition judged to be hazardous, and Contractor shall immediately protect the hazardous area, per this section.

1.03 CONTRACTOR WORK AND STORAGE AREAS

A. The Contractor shall make his/her own arrangements for areas and facilities needed by him/her for the storage of materials, supplies and equipment, parking, and other activities. Contractor may store materials onsite however, security for such areas shall be the sole responsibility of the Contractor. The Contractor shall hold the Owner harmless from all claims or complaints arising from the use of such areas. Public streets in or outside this project shall not be used for any storage activities (equipment and materials) and/or vehicle parking, without prior written approval from the Engineer.

1.04 EXISTING SURVEY MONUMENTS

A. Survey monuments and rebars marking property corners shall be carefully preserved from damage or disturbance by the Contractor. If monuments are disturbed by the Contractor, Contractor shall pay all costs for proper replacement of the monument.

Upon completion of construction the Contractor shall have the survey monuments and property corners reinstalled in their original location under the supervision of an Alaska Registered Land Surveyor, who shall provide a written certification verifying that all such monuments and property corners have been reinstalled in their original location.

1.05 WATER FOR COMPACTION

A. The Contractor shall provide water to be used for construction activities within this project.

1.06 EXISTING UTILITIES IN CONSTRUCTION ZONE

A. The Contractor shall provide all labor, materials, equipment, supervision and other means necessary to work around, protect, and preserve in place, existing utilities including natural gas, telephone, electrical power, and cable television.

B. The following utilities are know to exist within the project site.

1. Buried water mains and service lines for the building, water tank and water treatment plant.
2. Buried sewer line for building.
3. Buried telephone lines.
4. Electrical transformers, electric service, overhead and buried electrical power cables.

C. The Contractor shall contact utility companies prior to construction to obtain field location of existing utilities and additional information regarding requirements of the utility company pertaining to the Contractor's work in the vicinity of the utility, including methods of exposing, shoring and protecting utilities.

D. Field location marks are intended to show the approximate horizontal location of the utility within 3 feet either side of the field location mark. The depth of located utilities is not known. The Contractor is responsible for all damages and/or delays resulting from damage to utilities located within 3 feet horizontally of field marks, no matter what depth the utility is located. Care shall be taken by the Contractor to avoid damage to utilities outside of the field locate also. Plan locations of utilities are diagrammatic only and shall not be scaled to determine actual locations in the field.

E. The Contractor shall protect and preserve all utilities in a manner acceptable to the utility company and shall exercise all possible care to avoid damaging existing utilities unless otherwise approved by the Utility.

F. Contractor shall pay for repairs to all utilities damaged by the Contractor, at no cost to the Owner.

1.07 CONSTRUCTION SURVEYING

A. It shall be the Contractor's responsibility to provide all necessary surveying to layout and define limits of work, and to protect all survey control and provide for its replacement in the event of its loss prior to required work. All in field work requiring surveying, i.e. grade check, pipe alignment, etc., will be the responsibility of the Contractor.

1.08 DISPOSAL AREAS

A. The contractor shall provide a disposal area for unusable excavation, unsuitable materials and other waste materials from this project. The Contractor shall hold the Owner harmless from all claims and complaints arising from the use of any disposal area.

1.09 TRAFFIC MAINTENANCE

A. The Contractor shall maintain traffic control during construction and until the work is accepted. The Contractor shall be liable for all damage or injuries suffered due to the Contractor's failure to provide adequate traffic safety, maintenance or restoration services.

B. Unless otherwise provided, the roadway undergoing improvements shall be kept open to all traffic by the Contractor. All locations requiring redirection or stopping of the traveling public shall be properly signed and/or flagged by the Contractor.

The Contractor's equipment shall stop at all points of intersection with the traveling public unless satisfactory traffic control measures, approved in writing, are installed and maintained at the Contractor's expense.

C. Open trenches, ditches, pavement edge drop-offs and other excavations and hazardous areas shall be protected with barricades and shall be delineated.

D. The Contractor shall furnish and erect, move and remove, as required and directed, series C construction signs, construction barricades and/or temporary guide markers and pavement marking required to adequately and safely inform and direct the traveling public and to satisfy legal requirements.

1.10 SIGNS, MARKERS AND MAILBOXES

A. Existing commercial signs, valve markers, manhole markers, or underground utility markers which lie within areas of excavation shall be carefully removed, protected, saved and reinstalled in their original position by the Contractor, unless directed otherwise, in writing, by the Engineer. All damage to such items resulting from the Contractor's operations shall be repaired at the Contractor's expense.

1.11 TEMPORARY UTILITIES

A. Electric Power

1. The Contractor shall make arrangements for and shall provide temporary power for Contractor's use.

2. The Contractor shall connect to temporary service and provide all equipment necessary for temporary power and lighting

B. Telephone

1. Contractor shall provide telephone for Contractor's use.

C. Heating and Ventilation

1. Contractor shall provide, at his own expense, sufficient temporary heat for proper installation of work; and to protect all work and materials; and shall keep humidity down to extent required to prevent corrosion, dampness, and mildew that may be potentially damaging to materials, equipment, or finishes. Fuel, equipment, and method of temporary heat shall be reviewed by Owner's Representative for appropriateness. Do not overheat spaces or materials. All such heating, ventilation, and services shall be provided and maintained until final acceptance of the Work.

1.12 FIELD OFFICES

A. Contractor. Contractor shall provide a field office for Contractor's use, with heat and electricity. Minimum 10' x 10' with 8' ceiling height.

1.13 MOBILIZATION AND DEMOBILIZATION

A. Work Included. Mobilization and Demobilization includes preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; ; for the purchase of bonding; for the establishment of all offices, buildings, and other facilities necessary for the work on the project; and for all other work and operations which must be performed or costs incurred prior to beginning and completing work on the various items on the project site, and for incidental items of work noted on the drawings.

B. Maximum Allowable Bid.

The amount bid for Mobilization and Demobilization may not exceed ten (10) percent of the total amount of the Basic Bid.

PART 2-PRODUCTS

NOT USED

PART 3-EXECUTION

3.01 MAINTENANCE

A. Maintain temporary facilities and controls as along as needed for safe and proper completion of work and to the owners satisfaction.

B. Remove such temporary facilities and controls as rapidly as progress of Work will permit, or as directed by Owner's Representative.

3.02 USE OF TEMPORARY FACILITIES

A. Temporary facilities shall be made available for use by workmen and subcontractors employed on the Project, and Owner's Representative, subject to reasonable direction by Contractor as to their proper and most efficient utilization.

3.03 WELL RESERVE PROTECTION

A. No fueling, oiling, oil storage, or fuel storage may occur within 150 feet of water wells or surface water supply. No oil fired heaters may be used within 150 feet of water wells. All fuel storage areas shall be within a fuel containment facility provided by the contractor that meets all OSHA standards

B. Do not locate temporary sanitary facilities within 150 feet of water wells and water treatment ponds.

C. Do not store or discharge hazardous or toxic materials on the Site.

3.04 CONSTRUCTION AIDS

A. Provide and operate drainage and pumping equipment, including trench dewatering equipment if necessary.

B. Maintain excavations and Site free of standing water.

3.05 SECURITY

A. Provide temporary security and protection, including but not limited to; barricades, warning signs/lights, personnel security program (theft prevention), environmental protection, and similar provisions intended to minimize property losses, personal injuries, and claims for damages at Site.

B. Unauthorized Entry:

1. Maintain provision for closing and locking building during non-working hours.

3.06 CLEANING

A. Maintain the public road and Site in a clean condition. Remove mud, dirt, rocks, etc. from the tires of vehicles before they exit the site.

END OF SECTION

SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions.

1.02 RELATED SECTIONS

A. Instructions to Bidders: Product options and substitution procedures.

B. Section 01400 - Quality Control: Product quality monitoring.

1.03 PRODUCTS

A. Products: Means new materials, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying erection of the Work. Products may also include existing materials or components required for reuse.

B. All products, including all materials for unit price items are to be provided by the Contractor. Payment for materials shall be included under the materials respective bid item.

1.04 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.05 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above ground.

C. Provide off-site storage and protection when site does not permit on-site storage or protection.

D. Cover products subject to deterioration with impervious sheet covering provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.06. PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

1.07. SUBSTITUTIONS

A. Substitutions may only be made as allowed in the Instructions to Bidders.

PART 2 ——— PRODUCTS

Not Used

PART 3 ——— EXECUTION

Not Used

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project record documents.

E. Operation and maintenance data.

F. Warranties.

G. Spare parts and maintenance materials.

1.02 RELATED SECTIONS

A. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.

B. Section 01650 - Starting of Systems: System start-up, testing, adjusting, and balancing.

1.03 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for inspection by Owner's Representative.

B. Provide submittals to Owner's Representative that are required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.04 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior glass and surfaces exposed to view, remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition.

D. Replace filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.05 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.06 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the following record documents; record actual revisions to the Work:

1. Contract Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed shop drawings, product data, and samples.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and Modifications.

E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured depths of foundations in relation to finish first floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work
4. Field changes of dimension and detail.
5. Details not on original Contract Drawings.

F. Submit documents to Owner's Representative with claim for final Application for Payment.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit two sets prior to final inspection, bound in 8-1/2 inch X 11 inch text pages, three D side ring capacity expansion binders with durable plastic covers.

B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, type on 30 pound white paper.

E. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.

F. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
1. Significant design criteria.
2. List of equipment.
3. Part Certificates.
4. Photocopies of warranties.

H. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection with Owner's Representative comments. Revise content of documents as required prior to final submittal.

I. Submit final volumes revised, within ten days after final inspection.

1.08 WARRANTIES

A. Provide duplicate notarized copies.

B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.

D. Submit prior to final Application for Payment.

E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.09 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

B. Deliver to Owner's Representative obtain receipt prior to final payment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01800
CONSTRUCTION SURVEYING BY CONTRACTOR

PART 1 GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide all surveying and staking essential for completion of the project in conformance with the plans and specifications and shall perform the necessary calculations required to accomplish the work. Staking shall be accomplished in accordance with standard survey and engineering practices.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 02200
EARTHWORK, GRADING AND DRAINAGE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included.
This section covers the furnishing of materials, labor, equipment and supervision required to complete the site earthwork construction for Phase 1 improvements including roads, parking areas and building pad; excavation, fill and backfill and site grading and drainage as shown on the contract drawings.

B. Related Work

1. QA/ Q/C staff will not be required of Contractor however, Contractor will be responsible for compaction testing and soil gradation testing per Section 02200 Earthwork.

1.02 COMPACTION TESTING

A. Method to Determine Maximum Dry Density of Soil.
Where compaction requirements are specified, the maximum soil density, Proctor density, shall be determined by ASTM D-1557 or AASHTO T-180-D.

B. Method to Determine in place field density of soil.

The in-place soil density shall be determined in accordance with any of the following:

1. ASTM D 1556 - Density of soil in-place by the sand cone method;

2. ASTM D 2167 - Density and Unit Weight of Soil In-Place by the Rubber Balloon Method;

3. ASTM D 2922 - Density of Soil and Soil-Aggregate In Place by Nuclear Methods (Shallow Depth) or AASHTO T-238.

C. Frequency of testing to determine in-place density of fill and backfill.

1. In-place density tests shall be taken on each lift of fill or backfill at the rate of one test per 5,000 square feet of area.

2. In-place density tests on each lift of trench backfill shall be taken at the rate of one test per 100 lineal feet, or one test per lift if the trench is less than 100 feet long.

3. Failing test areas shall be re-compacted and retested until the compaction requirements are met.

1.03 GRADATION TESTING

A. Gradation Test Method.
Soil shall be tested in accordance with ASTM C136 and ASTM C117 or AASHTO T27 and AASHTO T11, washed gradation analysis, to determine conformance to specified gradation.

B. Gradation Test Frequency.

1. Gradation Test shall be performed on each type and source of material used in fills and backfills.

2. Gradation test shall be performed for each 10,000 tons of material used in fills and backfills. Gradation samples shall be obtained from the fill or backfill after it has been placed.

1.04 SUBMITTALS

A. Maximum Dry Density.
Contractor shall submit a Proctor density each type and source of material used in fills and backfills.

B. Gradation.
Contractor shall submit a gradation test results used in fills and backfills.

C. Compaction
Contractor shall submit compaction test results at frequency specified on part 1.02 of this section.

1.06 DEFINITIONS

A. Classified Material

1. Classified fill and backfill shall contain no lumps, frozen material, organic matter, or other deleterious material, and shall be durable and sound. It shall have a plasticity index not greater than six (6) as determined by ASTM D-424 and shall conform to one of the following types as required by the Drawings and Specifications. The coarse aggregate material conforming to the requirements specified below shall have a percentage of wear not to exceed thirty (30) after five hundred (500) revolutions, as determined by the current requirements of ASTM C-131. The portion of the

material retained on a #4 sieve shall be known as coarse aggregate. Both coarse and fine aggregates shall conform to the quality requirements of AASHTO M-147.

2. **Type II.** Materials furnished by the Contractor for use as Type II classified fill and/or backfill shall be graded within the limitations delineated below:

Type II

U. S. Std. Sieve Size	Cumulative % Passing By Weight
8"	100
3"	70-100
1 ½"	55-100
3/4"	45 - 85
#4	20 - 60
#10	12-50
#40	4 - 30
#200	2 - 6

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than fifteen percent (15%) of that fraction passing the #4 sieve.

3. **Type IIA.** Materials furnished by the Contractor for use as Type IIA classified fill and/or backfill shall be graded within the limitations delineated below:

Type IIA Classified Fill

U. S. Std. Sieve Size	Cumulative % Passing By Weight
2"	100
3/4"	50 - 100
#4	25 - 60
#10	15-50
#40	4 - 30
#200	2 - 6

In addition to the grading limits listed above, the fraction of material passing the #200 sieve shall not be greater than twenty percent (20%) of that fraction passing the #4 sieve.

4. **Type III.** Materials furnished by the Contractor for use as Type III classified fill and/or backfill shall be approved non frost susceptible sand and gravel with a maximum of ten percent (10%) passing the #200 sieve.

B. Unclassified Excavation: Any excavated material not otherwise classified. Unclassifed excavation may include organic soils, inorganic soils, peat and volcanic ash.

C. Suitable Soils: Excavated soils that conform to the requirements for the intended use as determined by the Owner's Representative.

D. Unsuitable soils: All soils and debris that do not conform to the requirements for Type III classified fill, or which do not meet the requirements for the intended use, as determined by the Owner's Representative.

E. Usable excavation: Inorganic non-frost susceptible sand or gravel soils, free of trash, peat, volcanic ash, debris, or frozen clods, that are excavated from the project site and are approved by the Owner's Representative for incorporation into the backfill.

F. Unusable Excavation: All suitable excavated soils that are surplus to the needs of the project and all unsuitable soils as designated by the Owner's Representative.

G. Over-Excavation: Any excavation beyond limits of the contract that has been done without the written authorization of the Owner's representative.

H. Additional Excavation: Excavation beyond the limits necessary to place classified or unclassified material, where authorized in writing in advance by the Owners Representative.

I. Subgrade: The surface upon which classified material, topsoil, or new improvements are placed.

J. Area Grading: Area grading consists of the excavation and fill work, along the perimeter of the site, necessary for a smooth transition from the design site grades to the grade(s) of the adjacent properties. This work is also commonly called "site grading" or "overlot grading".

K. Non-Frost Susceptible Material (NFS): Granular soils free of organic material and containing less than three (3) percent by weight finer than 0.02 millimeters when compacted in place.

L. Trench Excavation: Excavation for buried utilities.

M. Solid Waste Excavation: Excavation of solid waste materials, either baled or un-baled, from existing Homer landfill.

1.05 WEATHER LIMITATIONS

A. Unless otherwise authorized by the Owner's Representative, fill, backfill, and leveling course shall not be placed when the atmospheric temperature is below 35 degrees

Fahrenheit. When the temperature falls below 35 degrees Fahrenheit, it shall be the responsibility of the Contractor to protect all areas of completed work against any detrimental effects. Any areas of work not completed in accordance to the plans and specifications that are damaged by weather shall be reconditioned, reshaped, and re-compacted by the Contractor in conformance with the requirements of these specifications without additional cost to the owner.

1.06 EXISTING UTILITIES

A. At various stages of the project the Contractor will be required to work in close proximity to existing utilities, including possible removal of material over, under, and adjacent to the lines. It is the Contractor's responsibility to contact the utility owners for locations, scheduling, and additional information.

B. The Contractor shall protect these lines in a manner approved by both the Owner's Representative and the Utility Owner in writing.

C. Compaction density and techniques in the vicinity of existing utilities shall conform to requirements for classified fill.

D. The Contractor is directed to contact the utility companies both prior to bidding and during construction, for information about existing utilities, scheduling, location and other pertinent information.

1.07 RELATED WORK

A. Mobilization and Demobilization-Section 01500.
B. Construction Survey by Contractor-Section 01800.

PART 2-PRODUCTS

2.01 MATERIAL SOURCE

A. When the quantity of classified, unclassified, and screened soils required for the work exceeds that available from excavated materials, the additional material shall be from Contractor-furnished borrow areas. The Contractor shall locate, obtain, develop and process classified and unclassified materials to complete the requirements of work.

B. The source of materials shall be approved by the Owners Representative. Any change in the source of materials during the construction shall be approved by the Owners Representative.

2.02 MATERIAL HANDLING

A. When the soils into which the excavation will penetrate and/or when the backfill soils are sensitive to erosion, sloughing under seepage forces, softening during soaking, and/or repeated loading of heavy equipment, the Contractor shall take all necessary steps to protect the work. These may include, but are not limited to:

1. Sloping the excavation to drain and/or dewatering from inside the excavation with sumps and/or pumps or from outside the excavation with well-points or other means;

2. Limiting construction traffic to designated and maintained construction roads and placing additional temporary fill as necessary to support the traffic loads.

3. Developing alternate access routes.

4. Excavating with a smooth bladed backhoe from outside the excavation.

5. Covering of temporarily stockpiled unclassified fill to protect it from precipitation as directed.

6. Using only dryer unclassified fills for compaction and reuse.

7. The costs to protect the work shall be included in the bid price for earthwork.

B. If the subgrade or backfill soils are disturbed by surface runoff, ponding, seepage, and/or construction traffic, the disturbed soils shall be regraded and densified to the density requirements specified herein or completely removed and replaced with classified materials compacted to the density requirements specified herein. The corrective work shall be performed by the Contractor at no additional expense to the owner.

PART 3 - EXECUTION

3.01 CONSTRUCTION STAKING

A. General
The Contractor shall furnish all vertical and horizontal controls and staking sufficient for Contractor's needs to accurately complete the requirements of this project.

B. Contractor shall furnish Professional Land Surveyor for Measurement of excavation and fill quantities.

3.02 SITE EXCAVATION

A. Unclassified Excavation

1. Unclassified Excavation consists of the removal and reuse or disposal of all materials encountered as required to obtain the required subgrade elevations in accordance with the typical sections shown on the Drawings, and as directed by the Owner's Representative.

2. Suitable excavated materials shall not be removed from the site unless they are surplus to the requirements of the work and then only with the written approval of the Owner's Representative. Excess suitable material that is not incorporated into the work and unsuitable material shall be transported to the Owner furnished disposal site located at the Homer Solid Waste Landfill.

3. The excavation shall conform to the limits shown on the drawings and as directed by the owner's representative, within a tolerance of 0.10 feet. Excavation beyond the limits indicated on the drawings is not permitted without written approval. The Owner's Representative is to be notified 24 hours in advance of Contractors need for after excavation surveys. Payment for excavation will be based on typical sections shown on the drawings, and as directed by the Owner's Representative.

4. Excavation shall be performed in a manner that will not endanger adjacent structures or improvements.

B. Dewatering

1. Surface water and shallow water table are present at the site. The Contractor shall plan his operation in a sequence that will provide drainage at all times. The excavation shall be shaped to drain and shall be maintained in a dry condition, free of puddles or holes where water may accumulate. Any areas that cannot be so drained shall be kept free of standing water by pumping, if necessary.

C. Excavation and Placement of Fill

1. Excavation shall be carried to the subgrade elevations required for the placement of classified material and to such additional depths as required to remove unsuitable material as directed by the Owner's representative.

2. Classified fill to be placed in excavated areas shall only be placed over geotextile on subgrade and shall not be placed until the subgrade has been approved in writing by the Owner's Representative. Where site has been excavated to remove unsuitable materials, the subgrade shall be dewatered prior to placement of fill materials.

3. Classified fill to be placed in non-excavated areas shall be placed over geotextile.

D. Additional Excavation

1. The Owner's Representative will inspect and approve the various subgrade areas as they are excavated. Owner's Representative may direct that soils found to be excessively soft, wet, or otherwise unsuitable below the subgrade elevations shall be removed.

2. The Contractor shall promptly perform all such additional excavation that is authorized in writing.

3. The resulting additional excavation will be measured for unit price payment.

4. Backfill of additional excavation areas shall be Type III classified material.

E. Over Excavation

1. Excavation beyond the approved limits will be considered as over-excavation and shall be restored by the Contractor by backfilling with Type III classified material and compacting to 95% of the maximum density at no cost to the Owner.

F. Stability of Excavations

1. The Contractor shall slope the sides of excavations to the angle required for safety, or shore and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfilling, by scaling, benching, shelving or bracing. Take precautions to prevent slides or cave-ins when excavations are made in locations adjacent to backfilled excavations, and when sides of excavations are subjected to vibrations from vehicular traffic or the operation of machinery, or any other source. In all cases the sides of all excavations shall be constructed to satisfy the requirements set forth in the local, state, and federal safety regulations regarding shoring and slope angle.

G. Cold Weather Protection

1. The subgrade must be kept from freezing from the time earthwork begins until final grades have been achieved or backfill is done, unless specified otherwise, in writing, by the Owner's Representative.

2. All subgrade which is allowed to freeze shall be thawed and compacted to 95% of the maximum density by the Contractor at no expense to the Owner, unless specified otherwise, in writing, by the Owner's Representative.

3.03 FILL AND BACKFILL

A. General

1. Fill and backfill consists of the placement of classified and/or unclassified material in layers to the required elevations.

2. The Contractor shall keep all fills and backfill well-shaped, drained, and maintained.

3. Where fill is designated to be placed over areas that are cleared by not grubbed or excavated, the initial lift of fill may be placed to a depth of 2 feet.

4. The finished surface of fills and backfills shall be smooth with no soft or yielding areas and shall be graded to not more than 0.05 feet above or below the design grade.

5. The Contractor shall backfill excavations as promptly as the work permits, but not until completion of the following:

   a. Owner's acceptance of construction below finish grade such as culverts, subdrains, and other utilities.

   b. Inspection, testing, approval, and recording locations of underground utilities.

   c. Removal of shoring and bracing, and backfilling of any resulting voids with satisfactory materials. Cut off temporary sheet piling driven below the bottom of structures and remove in a manner to prevent settlement of the structure or utilities; or leave in place if required.

   d. Removal of trash and debris.

   e. Placement of permanent or temporary horizontal bracing on earth retaining wall.

B. Compaction

1. Building Pad and Building Driveway.
   Fills and backfills shall be constructed in lifts of twelve (12) inches maximum thickness, (six inches maximum thickness if hand operated compactors are used) and compacted to not less than 95% of maximum density.

2. All areas outside of Building Pad and Parking.

Fills and backfills shall be constructed in lifts of twelve (12) inches maximum thickness and compacted with a minimum of four passes with an 11 ton x 84" wide vibratory drum roller compactor.

C. Cold Weather Protection

1. Building Pad and Building Driveway.

a. The fill and backfill must be kept from freezing from the time earthwork begins until final surfacing is complete.

b. All fill and backfills which is allowed to freeze shall be thawed and compacted to 95% of the maximum density by the Contractor at no expense to the Owner, unless specified otherwise, in writing, by the Owner's Representative.

2. All areas outside of building pad.

a. The fill and backfill must be kept from freezing during haul, placement and compaction process.

b. Fill and backfill may be placed over frozen ground provided all snow and surface ice is removed from the surface upon which fill is to be placed, prior to placement of fill.

3.04 GEOTEXTILES

A. Subgrade preparation.

The subgrade shall be shaped according to the typical section shown on the drawings and as directed. The subgrade shall be free of large rocks, sticks, and deleterious material.

B. Placement.

Fabric shall be installed in full roll widths. All end and side joints shall be overlapped 2 feet minimum. Where indicated on the drawings, side and end seams shall be joined together by sewing. Sewn joints shall be made in accordance with contractors' recommendations.

C. Penetrations.

Where manholes, valve boxes, or other items will penetrate the fabric, the fabric shall be neatly cut in the shape of the penetration. A second piece of fabric shall then be placed on top of the main fabric. The second piece shall extend at least four feet in all directions from the penetration.

D. Fill Placement over Geotextile.

Fill and backfill shall be dumped and spilled over the fabric. No equipment shall operate directly on the filter fabric. Filter fabric must be covered with at least one foot of classified material backfill before equipment is allowed to operate over it.

END OF SECTION

SECTION 03300
CAST IN PLACE CONCRETE

PART 1-GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Cast in place concrete required for this project is shown in the Drawings and includes, but is not necessarily limited to footings, foundation walls, slabs on grade, floor slabs, concrete tanks, concrete reinforcement, curbs and sidewalks.

2. Resurfacing and Repair of Concrete.

1.02 QUALITY ASSURANCE

A. Codes and Standards:

In general, all concrete work on this Project shall comply with current American Concrete Institute Manuals of Concrete Practices. Comply with all applicable codes and regulations and pertinent portions of the following referenced standards and other standard publications referenced in subsequent articles, which shall become a part of these specifications to the extent of their applicability to the particular product, system, assembly, or item specified:

1. ACI 301: "Specifications for Structural Concrete for Buildings".
2. ACI 302: "Guide for Concrete Floor and Slab Construction."
3. ACI 304: "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete."
4. ACI 311: Recommended Practice for Concrete Inspection".
5. ACI 315: "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
6. ACI 318: "Building Code Requirements for Reinforced Concrete".
7. ACI 347: "Recommended Practice for Concrete Formwork".

B. Conflicts:

In the event of conflict or inconsistency between or among referenced standards and any provisions of this specification, or other Contract Documents, the most stringent requirement shall prevail, and shall be enforced.

C. Testing:

1. Conduct tests of the concrete during construction in accordance with ACI 301. Submit results of tests for approval. Remove and replace concrete which fails to achieve minimum 28 day compressive strength shown on the Drawings, at Contractor's expense.
2. Test all concrete for footings, slabs, walls, curbs and sidewalks.
3. Reject concrete which fails to meet specified criteria for slump, air content, and temperature.
4. Contractor shall notify owner at least 48 hours prior to placement of concrete. Owner will be responsible for concrete testing.

D. Frequency of Testing:

1. Slump tests - ASTM C-143:
   Perform one test for each set of compressive strength test specimens.
2. Air content - ASTM C-231:
   Perform one test for each set of compressive strength test specimens.
3. Concrete temperature:
   Test hourly when ambient air temperature is $40^{O}F$ and below, and each time a set of compression test specimens are made.
4. Compression test specimen - ASTM C-31:
   One set of three standard cylinders for each compressive strength test. Field cure.
5. Compressive strength tests - ASTM C-39:
   Samples for strength tests for each class of concrete placed each day shall be taken not less than one a day nor less than once for each 20 cu. yd. of concrete, nor less than once for each 1,000 sq. ft. of surface area for slabs.

1.03 SUBMITTALS

Make all submittals in conformance with applicable section of these specifications. Conform with ACI 315 for nomenclature and conventions used in shop and placement drawings:

A. Concrete Materials:

Submit concrete design specification, laboratory test results, and materials list showing source and gradation of all aggregates, type and brand of portland cement, admixtures source and quality of mixing water, and other aspects of the concrete design.

B. Reinforcing Steel:

Provide Materials Certificates signed by manufacturer and Contractor certifying that each material item complies with, or exceeds, specified requirements.

C. Admixtures:

Provide Materials Certificates signed by manufacturer and Contractor certifying that each material item complies with, or exceeds, specified requirements and that chloride content complies with specification requirements.

D. Provide product literature for epoxy patching mortar.

1.04 PRODUCT HANDLING

A. Delivery and Storage:

Do not permit delivery of any of the products of this section to the project site until proper facilities, away from traffic, are available for their proper storage and which will permit sorting and handling without endangering the materials themselves or materials for installations of other sections. Store all reinforcing steel on wood dunnage to keep it from direct contact with the ground surface.

B. Repairs & Replacements:

In the event of damage make all repairs and replacements necessary to restore to undamaged condition and do not proceed in those areas until all repairs have been made. Repairs and replacements shall be subject to approval of the Contracting Agency and shall be accomplished at no additional expense to the Owner.

1.05 PROJECT CONDITIONS

A. Protection Against Freezing:

Cover work with temporary or permanent cover as required to protect concrete against possibility of freezing during placement of concrete, and for at least 14 days after placement of concrete.

PART 2-PRODUCTS

2.01 FORMS

A. Material:

Provide new, except as permitted in PART 3 of this section for re-use:

1. Plywood:
   U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill oiled and edge sealed, with each piece bearing legible grade mark of a recognized and approved inspection agency.
2. Dimensional lumber:

B. Hem-Fir number two grade, seasoned.

Ties and Spreaders:

1. Provide type providing minimum working strength of 3,000 lbs. when fully assembled, which does not leave open holes through the concrete, and which permits neat and solid patching.
2. Metal shall not be closer than 3/4" to surface when forms are removed.
3. Do not use wire ties and wood spreaders.
4. Ties shall have rubber water stops installed prior to installation.
5. Provide ties with a minimum breakback distance of ¾".

C. Alternate Forming Systems:

Alternate systems will be considered upon submittal.

D. Coatings and Parting Compounds:

Provide commercial fabrication that will not bond with stain or adversely effect concrete surfaces and will not impair subsequent treatment of concrete surfaces to be cured with water or compounds conforming to FSTT-3-001657.

E. Joint Fillers:

Provide premolded, resilient, waterproof, compressible type with minimum 75% recovery conforming to FS HH-F- 341E, Type II; 1/2" thick for interior joints and 1/2" thick for exterior walks.

F. Other Materials:

Provide all other materials required for complete installation as selected by Contractor subject to the approval of the Contracting Agency.

2.02 REINFORCING

All concrete reinforcement shall be new, free from rust, and shall comply with the following reference standards:

A. Reinforcing Bars:

Provide ASTM A-615 grade 40 or 60 except where noted otherwise.

B. Wire:

Provide ASTM A-82 #16 double annealed iron wire.

C. Welded Wire Fabric:

Provide ASTM A-185 in Flat Sheets.

D. Accessories and Supports:

Provide supports, bolsters, chairs, spacers and other devices and accessories conforming to recommended Concrete Reinforcing Steel Institute (CRSI) practices. Provide galvanized accessories within 1-1/2" of surface of concrete with plastic tip chairs for exposed finish surfaces. Concrete dobie or other block, brick, or wood supports will not be permitted, except where specifically noted.

E. Welding Electrodes:

Conform to AWS Code D12.1.

F. Other Materials:

Provide all other materials, not specifically described but required for a complete and proper installation of concrete reinforcement, as selected by the Contractor, subject to the approval of the Contracting Agency.

2.03 CONCRETE

A. General:

Concrete mixes shall be designed to produce the tabulated properties below, and shall be subject to the approval of the Owner's Representative.

B. Footings, Foundations, Walls, Beams and Slabs:

1. Provide concrete having 3**,000 psi** minimum 28 day compressive strengths for footings, walls, slabs, sidewalks, curb and gutter and other concrete.
2. Provide concrete with maximum aggregate of 3/4" for all concrete except concrete for exposed aggregate surfaces, which shall have a maximum aggregate size of 3/8".
3. Slump at placement shall conform to the following:

Location	Concrete Without Super Plasticizer	Concrete with Superplasticizer
a. Slab on Grade	3 inches	6 to 9 inches
b. Footings, Walls, Slabsand Beams	4 inches	6 to 9 inches

4. Entrained air content at placement shall be 6% with 1.5% tolerance.

C. Admixtures

1. Superplasticizer: ASTM C494-Type F, Rheobuild 3000 FC, 8-10 oz/100 lb of cement.

2. Water Reducing: ASTM C-494 Type F, Polyheed 997, 5-6 oz/100# cement.

3. Air Entraining: ASTM C260, Masterbuilders AE-90 or approved equal, if needed to achieve target air entrainment level.

4. Fiber Reinforcement: 'Hi-Tech', ¾" long fibers, 1.5 lb per cubic yard of concrete.

D. Cement:

Provide portland cement conforming to ASTM C-150, type I or II the product of a single manufacturer.

E. Aggregates:

1. Provide aggregates conforming to ASTM C-33, current edition, except as expressly permitted by the Contracting Agency.

2. Course aggregate size shall not exceed one-fifth the narrowest dimension between forms, one-third the depth of slabs, nor three-fourths the minimum clear spacing between individual bars or bundles of bars.

3. Fine aggregates shall be clean, sharp, natural sand, free from loam, clay, lumps, alkali, organic matter, or other deleterious substances.

4. Aggregates shall be well graded, clean, hard gravel and coarse sand, non-frost susceptible material, and free of vegetable matter and coatings of silt or clay. The gradations shall be determined by standard laboratory sieves with square openings. Material retained on a No. 4 screen shall be classified as coarse aggregate, which shall conform to the requirements of AASHTO M-80 and have the following limits of gradation:

COARSE AGGREGATE FOR PCC

Sieve	Percent Passing per AASHTO M43 /M80 And ASTM C33, Size #67
1”	100
¾”	90-100
½”	xx
3/8”	20-55
#4	0-10
#8	0-5
#200	0-1

All material passing a No. 4 sieve shall be classified as fine aggregate and shall conform to the requirements of AASHTO M-6 and have the following gradation:

FINE AGGREGATE FOR PCC

Sieve	Percent Passing per AASHTO M6 and ASTM C 33
3/8”	100
#4	95-100
#8	80-100
#16	50-85
#30	25-60
#50	10-30
#100	2-10
#200	0-3

Fineness Modulus: 2.44-2.84

F. Slab Chemical Hardner/Sealer:
Unitex Solvent Seal 1315

G. Water:
Provide mixing water from an approved source, clean, fresh, and free of acids, alkalis, oil, organic or other deleterious matter.

H. Miscellaneous Inserts:
Provide ASTM A-36 steel.

I. Epoxy Grout:
Provide Master Builder's "Masterflow 713", Sonneborn "Ferrolith", or approved equal.

J. Joint Sealer:
Provide Grace "Daraweld-U Traffic Grade" or approved equal.

K. Latex - cement leveling compound - Laticrete 4237 or approved equal.
Provide a smooth trowel finish to accept finishes as scheduled.

L. Other Materials:
Provide all other materials not specifically described but required for a complete and proper concrete installation, as selected by Contractor and subject to the approval of the Contracting Agency.

M. Calcium chloride additives are not permitted.

2.04 EPOXY MORTAR

A. General:

Unitex Pro-Poxy 2500 multipurpose, high strength, non-shrink epoxy patching mortar. (Anchorage Sand & Gravel)

PART 3-EXECUTION

3.01 JOB CONDITIONS

A. Inspection and Cleaning:

1. Sweep existing slab as required to remove all loose sand, gravel, broken concrete and other debris prior to placing insulation or new concrete.
2. Examine the surface of areas to which the concrete work is to be applied and determine that prior work is complete, that all subgrades have been properly compacted and graded, that all slab embeds and insulation are in place, and that

all previous work is complete and ready for erection of forms, setting of reinforcement, and placement of concrete.

3. Surfaces to receive concrete shall be free from frost, ice, mud, and water. Forms shall be in place, cleaned, coated and adequately supported in accordance with 3.03 FORMWORK. Reinforcing steel shall be in place. Cleaned, tied, and adequately supported in accordance with 3.04 PLACING REINFORCEMENT. Transporting and conveying equipment shall be in-place, ready for use, clean and free of hardened concrete and foreign material. Equipment for consolidating concrete shall be at the placing site and in proper working order. Equipment and material for curing and protecting concrete from weather or mechanical damage shall be at the placing sit, in proper working condition and in sufficient amount for the entire placement.

B. Discrepancies:

In the event of discrepancy, ambiguity, interference, or any other unanticipated condition which might impede the timely execution of the work of this section, promptly notify the Contracting Agency and do not proceed in the area of discrepancy until all questions in regard thereto have been resolved.

C. Certificates:

Obtain written acknowledgment(s) from the subcontractors or installers of the formwork, reinforcement, and concrete placement that the substrates affecting their work have been examined and found satisfactory for subsequent operations. Such acknowledgments countersigned by the Contractor and delivered to the Contracting Agency prior to the final inspection, shall be a condition of the acceptance of the work of this section.

D. Admixtures:

1. Superplasticizers:
   a. Add at concrete plant only through equipment furnished and/or approved by admixture manufacturer.
   b. Equipment shall provide for easy and quick visual verification of admixture amount used for each dose.
   c. Discharge amount to be added to each load of concrete into separate dispensing container, measured verified as to amount, then add to concrete.
   d. Redosing of Concrete: Not permitted except when approved by inspection agency monitoring concrete quality and only after quality tests show this practice does not decrease the quality specified for concrete.

3.02 NOTICE

Notify the Owner's Representative at least 48 hours prior to beginning any pour of concrete, or 24 hours prior to closing any forms.

3.03 FORMWORK

A. Design:

Design forms to support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure, so that they may be readily removed without impact, shock, or damage to in place concrete and adjacent materials.

B. Construction:

1. Construct forms to conform with ACI 347, to sizes, shapes, lines, and dimensions shown or as required to obtain accurate alignment, location, grades, and level and plumb work in finished structure. Forms shall be set straight, plumb and true to within 1/4" in 10' of length.
2. Provide for openings, offsets, recesses, linkages, keyways, moldings, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts and other features required to attain the required configuration.
3. Use materials selected to achieve the indicated finishes. Solidly butt joints and provide back up to prevent leakage of cement paste.
4. Fabricate for easy removal without hammering or prying against concrete surfaces. Provide crush plates where stripping might damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
5. Where interior area of formwork is inaccessible, provide temporary openings for cleanout, inspection prior to concrete placement, and for final placement. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
6. Chamfer exposed corners and edges as shown or required using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

C. Form Ties:

Use factory fabricated, adjustable length, removable or snap-off metal form ties, designed to prevent form deflection, and prevent spalling concrete surfaces upon

removal. Position ties so portion remaining within concrete after removal is at least 1-1/2" inside the concrete and which will not leave holes larger than 1" diameter in the concrete surface.

D. Coordination With Other Trades:

Provide necessary coordination with other trades to determine size and location of openings necessary for work of those trades. Accurately place and securely support items built into forms.

E. Cleaning & Tightening:

Thoroughly clean forms and adjacent surfaces receiving concrete. Remove chips, wood, sawdust, dirt, and other debris prior to placement of concrete. Retighten forms after concrete placement if required to eliminate mortar leaks.

3.04 PLACING REINFORCEMENT

A. General:

1. Comply with specified codes and standards and CRSI recommended placing practices for details and methods of placing reinforcement and supports.
2. Store reinforcing steel on wood dunnage above the ground at all times.

B. Cleaning:

Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

C. Positioning:

1. Support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
2. Place reinforcement to obtain the minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold in position during concrete placement. Set wire ties so ends are directed into concrete, not toward exposed surfaces.
3. Do not place reinforcing bars more than 2" beyond the last leg of continuous bar support. Do not use supports as bases for runways for conveying equipment or similar construction loads.

4. All reinforcing bars shall be securely tied in the correct position prior to placing concrete unless the contractor has written approval from the Owners representative to deviate.

D. Welded Wire Fabric:

1. Install welded wire fabric. Mats only. No rolled material will be acceptable. Lap adjoining mats a minimum of one and one half meshes and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps.
2. Support welded wire fabric with plastic chairs at intervals not exceeding 4 feet measured along both directions of the mesh. Support welded wire fabric to the middle of the slab thickness.
3. The practice of lifting the welded wire fabric off the subgrade as concrete is poured will be allowed only if after lifting the wire it is supported per Item D, 2 above.

3.05 JOINTS

A. Construction Joints:

1. Locate and install construction joints which are not shown on the drawings so as not to impair the strength and appearance of the structure, subject to the approval of the Contracting Agency.
2. Place construction joints perpendicular to the main reinforcement. Continue all reinforcement across construction joints.
3. All vertical and horizontal construction joints shall be water blasted or sand blasted to remove all laitance and loose material, and achieve a surface roughness amplitude of +/-1/8" prior to subsequent concrete placement.
   a. High Pressure water Jet – Use a stream of water under a pressure of not less than 3000 psi for cutting and cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of exposed aggregate particles. If the water jet is incapable of a satisfactory cleaning, the surface shall be cleaned by sandblasting
4. Concrete Surfaces to which other concrete is it be bonded shall be abraded in an approved manner that will expose the sound aggregate uniformly without damaging the concrete. Power wash to remove laitance and loose particles. Surfaces shall be thoroughly washed and shall be moist but without free water when concrete is placed.

B. Keyways:

Provide keyways at least 1-1/2" deep in all construction joints in walls, slabs, and between walls and footings; approved bulkheads designed for this purpose may be used for slabs.

C. Contraction Control Joints:

1. Construct preformed contraction control joints in slabs to form panels of patterns as shown on the drawings.

2. Provide “ZIPSTRIP” control joints in slabs. Provide 2” ZIPSTRIP at 8” nominal floor slab in a pattern as shown on the drawings , maximum 15’ o/c.

D. Expansion Joints.

1. Expansion joints shall be placed where shown on the Drawings.

2. Expansion joint material shall conform to the requirements at ASTM D-994 and AASHTO M-33.

3. Expansion joint material shall extend the full width of the structure and shall be cut to such dimensions that the base of the expansion joint shall extend to the subgrade and the top shall be depressed not less than one-quarter (1/4) inch nor more than one-half (1/2) inch below the finished surface of the concrete.

4. The material shall be of one (1) piece in the vertical dimension and shall be securely fastened in a vertical position to the existing concrete face against which fresh concrete is to be poured.

5. After the concrete has set, the expansion joints shall be filled flush to the finish concrete surface with asphalt cement, two hundred (200) to three hundred (300) penetration. Application temperature of the sealing asphalt shall be between 250 degrees and 350 degrees Fahrenheit.

6. Sealing asphalt shall be applied by pouring from a bucket with a V-shaped spout, equipped with a positive shutoff to prevent spilling or dripping of asphalt. Before sealing, the joint shall be cleaned of all dirt, gravel, concrete mortar or other extraneous material. Sealing shall be done in a neat workmanlike manner. Sloppy work in sealing of expansion joints will not be tolerated.

3.06 EMBEDDED ITEMS

Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast in place concrete. Use approved setting drawings,

diagrams, instructions, and directions provided by suppliers of the items to be attached thereto. No concrete shall be placed prior to installation of all embedded items, and an inspection of the installation.

Before Placement of concrete determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Conduit and other embedded items shall be free oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids.

3.07 PREPARATION OF FORMS

Coat the contact surfaces of forms with an approved coating compound before placement of concrete, and according to manufacturer's instructions. Thin only with approved thinners according to manufacturer's recommendations. Do not permit application of excessive coating compound or allow it to accumulate in the forms or come into contact with concrete surfaces against which fresh concrete will be placed.

Coat steel forms with a non-staining, rust preventative form oil or otherwise protect against rusting. Rust stained steel formwork will not be acceptable and will be rejected.

3.08 CONCRETE PLACEMENT

A. Pre-placement Inspection:

Before placement of concrete, inspect the formwork and reinforcement and verify that all prior work has been completed to the point that placement of the concrete may be executed in complete conformance with the original design, the approved submittals and the referenced standards. Determine that all embedded items, supports, backing, and other provisions for items supported by or attached to the concrete have been provided for. Coordinate with other trades whose work will be affected by the operations of this section. Obtain all written acknowledgments specified in 3.01C above.

B. General:

Comply with ACI 304 and as herein specified.

1. Deposition: Deposit continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as specified in 3.05. Deposit concrete as nearly as practicable to its final location to avoid segregation due to re-handling or flowing.

2. Consolidation: Immediately after placing, consolidate each layer of concrete by internal vibrators, except for slabs 4” thick or less. The vibrators shall at all times be adequate in effectiveness and number to properly consolidate the concrete; keep a spare vibrator at the jobsite during all concrete placing operations. The vibrators shall have a frequency of not less than 10,000 vibrations per minute, and amplitude of at least 0.025 inch, and the head diameter shall be appropriate for the structural member and concrete mixture being placed. Insert vibrators vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1.5 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a reasonable amount. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then withdrawn slowly while operating. Form vibrators shall not be used unless specifically approved and unless forms are constructed to withstand their use. Vibrators shall not be used to move concrete within the forms. Slabs 4 inches and less in thickness shall be consolidated by properly designed vibrating screeds or other approved technique. Excessive vibration of lightweight concrete resulting in segregation or flotation of coarse aggregate shall be prevented. Grate tampers “jitterbugs” shall not be used.

C. Footings and Walls:

1. Deposit in forms in horizontal layers not exceeding 24" in depth and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while previous layer is still plastic to avoid cold joints. Where vertical drop is more than three feet, elephant trunks shall be used.
2. Consolidate by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with the recommended practices of ACI 309 to suit type of concrete and project conditions.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate the placed layer and at least 6" into the previous layer. Do not insert vibrators into lower layers of concrete that have begun to set. Limit the duration of vibration to the time necessary to consolidate the concrete and complete embedment of reinforcement and other embedded items without causing segregation of the mix.

D. Slabs:

1. Deposit and consolidate in a continuous operation within the limits of construction joints, until the placing of a panel or section is completed.
2. Consolidate by previously specified methods, working concrete around reinforcement, embedded items, and into corners.
3. Bring slab surfaces to the correct level with a straight edge and strikeoff. Use bull floats or darbies to smooth the surface, leaving it free of humps and hollows. Do not sprinkle water onto the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.
4. Maintain reinforcing in the proper position during all placement and consolidating operations.

E. Sidewalks, Curb and Gutters:

Concrete shall be handled from transport vehicle to the place of final description in a continuous manner as rapidly as practicable. The rate of placement shall not exceed the rate at which the various placing and finishing operations can be performed in accordance with these specifications. Where the vertical drop is more than three (3) feet, elephant trunks shall be used.

If concrete is to be placed by the extruded method, the Contractor shall demonstrate to the satisfaction of the Contracting Agency that the machine is capable of placing a dense, uniformly compacted concrete to exact section, line and grade.

F. Cold Weather Placement:

Protect placed concrete from physical damage or reduced strength which could be caused by frost, freezing action, or low temperatures, in compliance with ACI 306 and as follows:

1. When ambient temperature has fallen to or is expected to fall below 40^{O}F., uniformly heat water and aggregates prior to mixing to maintain mixture temperature not less than 50^{O}F. and not more than 80^{O}F. at point of placement.
2. Do not use frozen materials or materials containing ice or snow and do not allow concrete to placed on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other material containing anti-freeze agents or chemical accelerators unless specifically permitted by the Contracting Agency for the particular situation encountered.

3.09 FINISHING FORMED SURFACES

A. Rough Form Finish:

For formed surfaces not exposed to view in the finish work or by other construction, unless otherwise indicated, provide a surface having the texture imparted by the form facing material used with tie holes and defective areas repaired and patched and fins and other projections chipped down and rubbed off.

B. Smooth Form Finish:

For formed surfaces exposed to view, or that are to be covered with a coating or covering material applied to or bonded directly to the concrete, such as waterproofing, damp proofing, painting or other similar system, provide a surface obtained by selecting form facing material, arranged symmetrically orderly with a minimum of seams. Repair and patch defective areas with fins and projections completely removed and smoothed.

C. Smooth Rubbed Finish:

Provide smooth rubbed finish which has received smooth form finish treatment not later than the day after removal of the forms. Moisten the surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is attained. Do not apply cement grout other than the created by the rubbing process.

D. Grout Cleaned Finish:

Provide grout cleaned finish as scheduled to surfaces which have received smooth form finish by combining one part of portland cement to 1-1/2 parts fine sand by volume, and mixing with water to the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will closely match adjacent surfaces. Thoroughly wet concrete surfaces and apply grout immediately to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

E. Related Unformed Surfaces:

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

3.10 SLAB FINISHES

A. Scratch Finish:

Where scheduled or shown provide scratch finish on monolithic slab surfaces that are to receive topping or mortar setting beds for tile, terrazzo, or other bonded cementitious finishes.

After placement of slab, plane surface to a tolerance not exceeding 1/4" in 24". Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, rakes, or brooms.

B. Float Finish:

Apply float finish to monolithic slab surfaces that are to receive trowel finish and other finishes described in subsequent paragraphs, and surfaces which are to be covered by membrane or elastic waterproofing, roofing, or other finishes as scheduled.

After screeding and consolidating concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit floating of surface. Consolidate surface with power or hand floats or both, using hand floats in small or inaccessible areas. Float surface to a tolerance not exceeding 1/4" in 10' when tested with a 10' straight edge. Cut down high spots and fill in low spots by floating. Do not apply cement or cement and sand mixture for filling in, use only grout removed from high spots. Uniformly slope to drains. Immediately after leveling refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish:

Apply trowel finish to slab surfaces that are to be exposed to view and surfaces that are to be covered by resilient flooring, paint, or other thin-film finish systems.

After floating, begin first troweling operation with power driven or hand trowels. Begin troweling when surface produces a ringing sound as trowel is moved over surface. Hand trowel as necessary to obtain a smooth surface free of trowel marks and of a uniform texture and appearance, and with a tolerance not exceeding 1/8" in 10' when tested with a 10' straightedge.

D. Broom Finish:

Apply broom finish to exterior and interior platforms, steps, stoops, walks, and ramps, and elsewhere as shown or scheduled.

Immediately after trowel finishing, slightly roughen surface by brooming with a fiber bristle broom perpendicular to direction of travel. Coordinate final finish with Contracting Agency before application.

E. Chemical Hardener/Sealer Finish:

Apply chemical hardener/Sealer finish to interior floors, after complete curing and drying of the concrete surface. Chemical hardeners shall be coordinated with adhesive to be used in conjunction with other flooring materials.

1. Apply uniformly, using a garden-type sprayer, industrial sprayer or roller.
2. Do not add a thinner.
3. When using a short-nap roller, if the rolling action starts to create tiny bubbles on the surface, slow down the rolling motion.
4. Do not overlap; avoid thick applications.
5. Do not "pull" the material when applying.
6. Application rate 350 S.F./gallon.
7. Apply 2 coats, 4 hours apart.

F. Exposed Aggregate:

1. Provide exposed aggregate surface at locations indicated in the Drawings.

2. Concrete with a maximum slump of 3" shall be used in exposed aggregate areas. Air entrainment shall be in accordance with specifications.

3. Aggregate shall be 3/8" maximum.

4. Screed concrete to proper level. Do not jitterbug or tamp concrete.

5. Floating shall be limited to amount required to ensure that aggregate is surrounded and only slightly covered by mortar, leaving no holes in the surface.

6. Shortly after floating, Masterbuilders Confilm surface retarder may be sprayed over the surface to allow sufficient time to elapse before exposing operation begins.

7. Exposing operation should begin as soon as brushing and hosing of the surface can be done without over-exposing or dislodging the aggregate. Finishers are to stay off the newly exposed surface to avoid breaking the aggregate bond. If it is necessary for finishers to move about on the newly exposed surface, kneeboards are to be used. Kneeboards shall be gently placed on the surface, and shall not be slid or twisted when on the surface.

8. Exposed aggregate slabs shall be cured thoroughly.

3.11 CURING & PROTECTION

A. General:

Protect freshly placed concrete from premature drying and excessive cold, and maintain without drying at a relatively constant temperature for a period of time necessary for hydration of cement and proper hardening. Conduct all curing operations in compliance with ACI 301 & ACI 308.

1. Initiate curing process as soon as free water has disappeared from the concrete surface. Weather permitting, keep continuously moist for not less than 72 hours.

2. Begin final curing procedures immediately following initial curing and before concrete has dried.

3. Continue curing for a minimum of 10 days after initial placement unless otherwise permitted in writing by Contracting Agency.

4. Avoid rapid drying at end of curing period.

5. Maintain concrete surface temperature at least 50^{o}F. for 7 days after following placement of concrete. At least once each shift and once per day on non-work days, an inspection shall be made of all areas subject to cold-weather protection. Any deficiencies shall be noted, corrected, and reported.

B. Curing Methods:

1. Moisture Curing:
   a. Keep concrete surface continuously wet by covering with water or continuous fog spray.

   b. Cover concrete surface with specified absorptive cover, thoroughly saturated with water, and keeping continuously wet. Place absorptive cover to provide coverage at edges, with 4" lap over adjacent absorptive covers.

2. Moisture-cover Curing:
   Cover concrete surfaces with moisture retaining cover, placed in widest practicable width with sides and lapped a minimum of 3" and sealed with waterproof tape or adhesive. Immediately repair any holes or tears occurring during curing period using cover material and waterproof tape.

3. Membrane Curing:

Do not use membrane curing compounds on surfaces which are to be covered with a coating material applied directly to the concrete such as liquid floor sealer waterproofing, damp proofing, membrane roofing, flooring paint, or other coatings unless specifically approved by Contracting Agency in writing.

a. Apply membrane forming curing compound to concrete surfaces as shown as final finishing operations are complete (within 2 hours).

b. Apply uniformly in continuous operation by power spray or roller according to manufacturer's instructions.

c. Recoat areas which have been subject to rainfall within 3 hours after application.

d. Maintain continuity of coating and repair damage occurring during curing period.

C. Formed Surfaces:

Cure formed surfaces including undersides of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above as applicable.

D. Unformed Surfaces:

Cure formed surfaces such as slabs, floor topping and other similar flat surfaces by application of the approved curing method.

Use moisture retaining curing method for surfaces which are to receive liquid floor hardener or finish flooring, unless otherwise specifically directed in writing by the Contracting Agency.

3.12 FORM REMOVAL

A. Non-Supporting Forms:

Formwork not supporting concrete, such as sides of footings, may be removed after cumulatively curing at not less than 50^{O}F. for a minimum of 24 hours after placement, provided concrete has sufficiently hardened not to be damaged by removal operations, and providing curing operations are maintained.

B. Supporting Forms:

Formwork supporting weight of concrete such as beam soffits, joints, slabs and other similar structural elements shall not be removed in less than 14 days, and not until design minimum compressive strength for 28 days has been attained, as determined by testing of field cured specimens representative of actual location of the members in question

C. Metal decking forms shall be left in place.

3.13 RE-USE OF FORMS

Re-use of forms will be permitted only under the following conditions, subject to the approval of the Contracting Agency in each instance:

A. Clean and repair all contact surfaces to achieve capability equal to that of new forms.

B. Split, frayed, delaminated, or otherwise deteriorated facing or supporting materials will not be permitted.

C. Apply new coating compound to contact surfaces as specified for new work.

D. Where forms are extended for successive placement, thoroughly clean all surfaces and tighten to close joints. Align and secure joints to avoid offsets.

E. Do not use "Patched" forms for expressed surfaces unless specifically permitted in writing by Contracting Agency in each particular instance.

3.14 SURFACE REPAIRS

A. General:

Repair and patch defective areas with cement mortar immediately after removal of forms, but only when acceptable to Contracting Agency.

1. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete, but in no case greater than 1".

2. Make edges of cuts perpendicular to the concrete surface.

3. Dampen the area to be patched with water and brush coat with neat cement grout or proprietary bonding agent.

B. Exposed to View Surfaces:

1. Blend white portland cement and standard portland cement so that when dry patching mortar will match color of surrounding surface. Provide test areas at inconspicuous location to verify match.
2. Compact mortar in place and stake off slightly higher than surrounding surface.
3. Apply appropriate finish as provided in 3.09.

C. High Areas:

Correct high areas by grinding, after concrete has cured at least 14 days.

D. Low Areas:

Correct low areas during or immediately after completion of surface finishing operations by cutting out the low area and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used upon approval of the Contracting Agency.

E. Other Repairs:

1. Repair defective areas, except random cracks and single holes not exceeding 1" dia. by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete, and brush with neat cement grout coating or concrete bonding agent. Mix patching concrete of same materials to provide concrete of the same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

2. Repair isolated random cracks and single holes not over 1" in dia. by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose cement grout coating or concrete bonding agent. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing #16 screen, using only enough water as required for handling and placing. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

F. Other Methods:

Repair methods not specified may be used, subject to the approval of the Contracting Agency.

END OF SECTION

SECTION 04200
CONCRETE FORM MASONRY UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes form unit masonry assemblies consisting of concrete form masonry units including rigid insulation within the units.

B. Related Sections include the following:

1. Division 6 Section "Rough Carpentry" for rough bucks used at window and other openings.

C. Products installed, but not furnished, under this Section include the following:

1. Steel lintels for form unit masonry, furnished under Division 5 Section "Metal Fabrications."
2. Hollow-metal frames in form unit masonry openings, furnished under Division 8 Section "Steel Doors and Frames."

1.3 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry from net-area compressive strengths of masonry units and mortar types according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1. For Concrete Form Unit Masonry: f'm = 2000psi.

1.4 SUBMITTALS

A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.

B. Shop Drawings: Show fabrication and installation details for the following:

1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
2. Fabricated Flashing: Detail corner units, and other special applications.

C. Samples for Initial Selection: For the following:

1. Unit masonry Samples in small-scale form showing the full range of colors and textures available for each different exposed masonry unit required.
2. Sheet metal flashing colors samples.
3. Color samples of mesh weep vent materials.

D. Samples for Verification: For the following:

1. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
2. Sheet Metal Flashing: 12 inches (300 mm) long. Include fasteners, closures, and other attachments
3. Weep holes/vents in color to match mortar color.
4. Accessories embedded in the masonry.

E. Qualification Data:

F. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:

1. Each type of masonry unit required.
   a. Include test results, measurements, and calculations establishing net-area compressive strength of masonry units.
2. Mortar complying with property requirements of ASTM C-270.
3. Grout mixes complying with compressive strength requirements of ASTM Standard C-476. Include description of type and proportions of grout ingredients.

G. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

H. Letter of Recommendation: Provide a letter of recommendation from the CMU and CFMU manufacturer recommending proprietary cleaners and their use on their products.

1.5 QUALITY ASSURANCE

A. CFMU Installer Qualifications: An experienced installer who employees mechanics who have been licensor trained in the installation of products similar in material, design, and extent to that indicated for this Project; whose work has resulted in CFMU successful installations. All installing personal must have CFMU Systems training in the installation of this product as provided by the licensing entity.

B. CFMU Manufacturer: An experienced and licensed manufacturer in the manufacture of CFMU described for this project with a record of successful in-service performance, as well as sufficient production capacity to produce required units without delay to the project schedule.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1093 to conduct the testing indicated, as documented according to ASTM E 548.

D. Source Limitations for Form Masonry Units: Obtain exposed form masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required. Manufacture materials in concurrent batches to maintain color consistency.

E. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

F. Preconstruction Testing Service: Engage a qualified independent testing agency to perform the following preconstruction testing:

1. Concrete Masonry Unit Test: For each concrete masonry unit indicated, per ASTM C 140.
2. Mortar Test: For mortar properties per ACI 530.1

3. Grout Test: For compressive strength per ACI 530.1.

G. Mockups: Before installing form unit masonry, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Locate mockups in the locations indicated or, if not indicated, as directed by Architect.
2. Build mockup of typical wall area as shown on Drawings.
3. Build mockups for the following types of masonry in sizes approximately 48 inches long by 48 inches high by full thickness, including accessories. Include a sealant-filled joint at least 16 inches long in each mockup.
   a. Typical exterior wall with lower corner of window opening. Make opening approximately 12 inches wide by 16 inches high.
   b. Typical exterior wall with through-wall flashing installed for a 24-inch length in corner of mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
   c. Combine into one test panel
4. Clean exposed faces of mockups with masonry cleaner as indicated.
5. Notify Architect seven days in advance of dates and times when mockups will be constructed.
6. Protect accepted mockups from the elements with weather-resistant membrane.
7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
8. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
   a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
9. Demolish and remove mockups when directed.

H. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store CFMU on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

1. Protect CFMU from moisture absorption so that, at the time of installation, the moisture content is not more than the maximum allowed at the time of delivery.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with

weatherproof cover.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

A. Protection of CFMU: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building CFMU walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of CFMU to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace CFMU damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in Section 2104.3 of the Uniform Building Code.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until CFMU has dried, but not less than 7 days after completing cleaning.
2.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Products: Subject to compliance with requirements provide "Pentstar" CFMU Building Systems manufactured by a Pentstar licensed manufacturer.

2.2 CONCRETE FORM MASONRY UNITS

A. General: Provide concrete form masonry units consisting of two masonry face shells joined with High Strength Polymer (manufactured by Pentstar Corp.) cross members dovetailed into the face shells by the manufacturer with rigid insulation insert positioned to create two cavities

within the concrete form masonry unit, an air space of not less than ¾ inch (20mm) and a form cavity to be grout filled and as follows:

B. Provide shapes indicated and as follows:

1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
2. Provide bullnose units for outside corners, where indicated.
3. Provide square-edged units for outside corners, unless indicated as bullnose.

C. Exposed Exterior Concrete Form Masonry Unit Face Shells: UBC Standard 21-4 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Weight Classification: Normal weight, unless otherwise indicated.
3. Exposed Faces: Type Split-Faced
   a. Color: 5% "Davis Color" at all exterior surfaces.
4. Integral Water Repellent: Provide units made with liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of the test specimen.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) Block Plus W-10; Addiment Inc.
      2) Dry-Block; W. R. Grace & Co., Construction Products Division.
      3) Rheopel; Master Builders.

D. Exposed Interior Concrete Form Masonry Unit Face Shells: ACI 530.1 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
2. Weight Classification: Normal weight.
3. Finish: Exposed faces of the following general description matching color, pattern, and texture of Architect's samples.
      1) Type: Smooth.
      2) Color: Provide 5% "Davis Color" at all exposed CFMU.

E. MORTAR MATERIALS

F. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

G. Hydrated Lime: UBC Standard 21-13, Type S.

H. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

I. Aggregate for Grout: ASTM C 404.

J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.

K. Water: Potable.

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

1. Water-Repellent Admixture:
   a. Mortar Tite; Addiment Inc.
   b. Dry-Block Mortar Admixture; W. R. Grace & Co., Construction Products Division.
   c. Rheopel; Master Builders.

2.3 CONCRETE FILL MATERIALS

A. Portland Cement: ASTM C 150, Type I/II.

B. Fly Ash: ASTM C 618, Class C or F.

C. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:

1. Class: Negligible weathering region, but not less than 1N.
2. Nominal Maximum Aggregate Size: 3/8 inch (9 mm).

D. Water: Potable and complying with ASTM C 94.

2.4 REINFORCING STEEL

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A 617M, Grade 60.

2.5 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Shall be as specified in Division 7

B. Joint Sealant for Flashings: Flashing manufacturer's standard products or products recommended by the flashing manufacturer for sealing flashing sheets to each other and to substrates.

C. Fabrication: Shop fabricate flashings from sheet metal indicated above. Extend into wall, turned up not less than 1 inch behind rigid insulation and 1/2 inch out from exterior face of wall, with a hemmed outer edge bent down 30 degrees.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Bond-Breaker Strips: Manufacturer's standard composite flashing product consisting of a pliable and highly adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of 0.030 inch.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Dur-O-Barrier; Dur-O-Wal, Inc.
   b. Perm-A-Barrier Wall Flashing; W. R. Grace & Co., Construction Products Division.
   c. Textroflash; Hohmann & Barnard, Inc.
   d. Poly-Barrier Self-Adhering Wall Flashing; Polytite Manufacturing Corp.
   e. Polyguard 300; Polyguard Products, Inc.
   f. Everlastic MF-40; Williams Products, Inc.

B. Weep Vents: 2.5 by 4.0 by 0.5 inch, 200 denier 100% recycled polyester open weave mesh designed to allow airflow and to deter migration of insect to inside wall cavity.

1. Color: To match mortar color.
2. Acceptable Product: Mortar Net weep Vents.

C. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Subject to compliance with requirements, provide one of the following:

1. D/A 811; Dur-O-Wal, Inc.
2. D/A 816; Dur-O-Wal, Inc.
3. No. 376 Rebar Positioner; Heckman Building Products, Inc.
4. #RB Rebar Positioner; Hohmann & Barnard, Inc.
5. #RB-Twin Rebar Positioner; Hohmann & Barnard, Inc.
6. Double O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.
7. O-Ring Rebar Positioner; Masonry Reinforcing Corporation of America.

2.7 WALL INSULATION INSERTS

A. Insulation inserts shall be one of three types: Extruded Polystyrene (XPS), Expanded Polystyrene (EPS), Celotex Polyisocyanurate (Polysio).

B. Extruded-Polystyrene Board Insulation: Rigid, cellular, polystyrene thermal insulation with closed cells and integral high-density skin; formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578, Type IV with height and width sufficient to abut adjacent insulation inserts in an assembled CFMU wall.

1. Thickness: 2 inches minimum.
2. Aged R-Value: Minimum R10.4 for overall thickness.

C. Expanded Polystyrene Board Insulation: Rigid Cellular, polystyrene thermal insulation with closed cells and integral high-density skin; formed by the expansion of polystyrene base resin in a molding process to comply with ASTM C-578 Type IX (2#) with height and width sufficient to abut adjacent insulation inserts in an assembled CFMU wall.

1. Thickness: 2 inches minimum
2. Aged R-value: Minimum R10 for overall thickness

D. Tuff R Polyisocyanurate Board Insulation: Rigid insulation with reflective/radiant barrier quality foil facers on both sides, compliant with ASTM C-236/C-518.

1. Thickness: 2 inches minimum
2. Stabilized R-value: Minimum R16 (per manufacturers spec)

2.8 MASONRY FOAM-IN-PLACE INSULATION

A. Masonry Foam-In-Place Insulation: Single or multiple component thermal foam in place insulation produced by combining a plastic resin and catalyst foaming agent specifically designed for use in conjunction with concrete masonry units.

1. Acceptable Manufacturers:
   a. Thermal Corporation of America
   b. Tailored Chemical Products
   c. CP Chemical Company
   d. Fomo Products Inc.

2.9 MASONRY CLEANERS

A. Proprietary Commercial Cleaners: Provide proprietary commercial cleaners as recommended by the masonry manufacturer for use on their products.

2.10 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Form unit masonry: Comply with UBC Standard 21-15, Proportion Specification.

1. Limit cementitious materials in mortar to portland cement, and lime.
2. For masonry below grade, in contact with earth, and where indicated, use Type S or RS.
3. For reinforced masonry and where indicated, use Type S or RS.
4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N or RN.
5. For exposed masonry provide water repellant treated mortar per water repellant manufacturer's recommended rate.

2.11 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:

1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

C. Concrete fill: Proportion normal-weight concrete mix as follows:

1. Compressive Strength (28 Days): 3000 psi (20.7 MPa).
2. Maximum Slump: 8 inches (200 mm) in accordance with ASTM C 143.

2.12 Weather Seal and Graffiti Control

A. Coat interior and exterior CFMU walls with Sherwin Williams Non-Sacrificial Anti-Graffiti Coating B97C00150. Apply coating 8.0 to 12.0 wet mils 8.0-9.0 dry mils thickness per coat. Color: Clear.

2.13 SOURCE QUALITY CONTROL

A. Owner will engage a qualified independent testing agency to perform source quality-control testing indicated below:

1. Payment for these services will be made by Owner.
2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.2 INSTALLATION, GENERAL

A. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed form unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

3.3 CONSTRUCTION TOLERANCES

A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.

C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.

D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.

E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets.

Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

1. One-half running bond with vertical joint in each course centered on units in courses above and below.

C. Stopping and Resuming Work: In each course, rack back one-half-unit length for one-half running bond or one-third-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

E. Fill space between hollow-metal frames and masonry solidly with concrete fill, unless otherwise indicated.

F. Keep cavities clean of mortar droppings and other materials during construction.

G. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

3.5 MORTAR BEDDING AND JOINTING

A. Lay form masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.
2. At exterior face shell, bevel beds away from cavity, to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against the cavity face of the face shell.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless otherwise indicated.

1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

3.6 FOAM-IN-PLACE INSULATION

A. Install foam-in-place insulation where indicated and at voids at control joints, window bucks, window and door frames, thermal breaks and voids between rigid insulation inserts and dissimilar material.

3.7 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by form masonry unit assemblies. Use Setting Drawings,

templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor bolts, accurately located, to elevations required.
2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install vertical control joints in form unit masonry where indicated and at 80' on center maximum. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

B. Form control joints as follows:

1. Fit rigid insulation strips into hollow contour concrete form masonry units at control joint. Fill resultant cores with concrete fill and rake joints in exposed faces.
2. Keep head joints free and clear of mortar or rake joint. Fill head joints with sealant.
3. Extend reinforcing steel continuous through joint.
4.

C. Provide saw cut vertical joints from top of footing to top of wall at 20' on center. Fill Joint with sealant.

3.9 LINTEL FORMS

A. Install steel lintel forms where indicated.

B. Provide minimum bearing of 2 inches (50 mm) at each jamb, unless otherwise indicated.

3.10 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

1. Extend flashing to inside of rigid insulation and turn up not less than 1 inch (25 mm).
2. Extend flashing a minimum of 2 inches into masonry at each end of lintel, shelf angle, heads and sills.
3. Extend sheet metal flashing 1/2 inch beyond face of masonry at exterior and turn flashing down to form a hemmed drip.

B. Install vents in vertical head joints at the top of each continuous cavity at spacing indicated. Use plastic weep hole/vents to form vents.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.11 STEEL REINFORCEMENT

A. Placing Reinforcement: Comply with requirements of Section 2104.5 of the Uniform Building Code.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover of not less than 1/2 inch.

D. Place reinforcement prior to concrete fill placement.

E. Splice lap reinforcement not less than 40 bar diameters. Maintain not less than one reinforcement bar diameter between vertical reinforcement installations.

3.12 CONCRETE FILL PLACEMENT

A. Filling of Concrete Cavity: Do not place concrete fill until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

1. Before placement of concrete fill verify that reinforcing bars are correctly positioned with proper lap and alignment, and that the cavity is free from debris, obstructions, and excessive mortar droppings that would create voids in the concrete pour.
2. Solidly fill cavity with concrete in lifts not to exceed 5 feet in height, with not more than two lifts (10ft) placed in one operation. Stop concrete pour 1-1/2 inch (36 mm) below top of cavity to form key for the next concrete fill operation.
3. If necessary, consolidate concrete immediately after placement of each lift by mechanical vibration to eliminate voids in concrete mass, using a “pencil” vibrator with a diameter of 1 inch or less. DO NOT VIBRATE MORE THAN 6 FEET IN DEPTH INTO ANY CONCRETE LIFT.

3.13 FIELD QUALITY CONTROL

A. Owner will engage a qualified independent testing agency to perform field quality-control testing indicated below.

1. Payment for these services will be made by Owner.
2. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction for each 5000 sq. ft. of wall area or portion thereof.

C. Mortar properties will be tested per ACI 530.1.

D. Concrete fill testing per Division 3 Section "Cast In Place Concrete" for field quality control testing requirements.

3.14 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.

C. In-Progress Cleaning: Clean form unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry per masonry manufacturer's written recommendations.

3.15 MASONRY WASTE DISPOSAL

A. Excess Masonry and Waste: Remove excess masonry and waste and legally dispose of off Owner's property.

END OF SECTION

SECTION 05500
METAL FABRICATIONS

PART 1-GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Shop fabricated ferrous metal items, galvanized and prime painted.

2. Refer to Schedule at end of this Section.

B. Related Work Described Elsewhere:

1. Painting Section 09900

C. References:

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

a) A27-85 Steel Castings, Carbon, for General Application.
b) A36-84a Structural Steel.
c) A47-84 Malleable Iron Castings.
d) A53-86 Hot-Dipped, Zinc-coating Welded and Seamless Steel Pipe.
e) A167-84 Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip.
f) A307-86a Carbon Steel Externally Threaded Fasteners.
g) A123-84 Zinc-Coating (Hot-Dip) on Assembled Steel Products.
h) A500-84 Cold-formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
i) A510-82 General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel
j) C827-87 Early Volume Change of Cementitious Mixtures.
k) D1187-82 Asphalt-Based Emulsions for Use as Protective Coatings for Metal.

2. American Welding Society (AWS) :

a. D1.1 Structural Welding Code.

3. Federal Specifications (FS) :

a. TT-P-31 Paint, Oil: Iron Oxide, Ready Mix, Red and Brown.
b. TT-P-645 Primer, Paint, Zinc Chromate, Alkyd Type.

1.02 QUALITY ASSURANCE

A. Welder's Qualifications:

1. Perform shop and field welds by operators currently certified in tests as prescribed in AWS Qualification Procedure.

2. Submit proof of current certification for each welder employed on Project.

1.03 SUBMITTALS

A. Submit shop drawings under provision of Section 01340.

B. Indicate profiles, sizes, connections, attachments, reinforcing, anchorage, size and type of fasteners and accessories.

C. Include erection drawings, elevations and details where applicable.

D. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.

PART 2- PRODUCTS

2.01 MANUFACTURERS

A. Steel Sections: ASTM A36.

B. Steel Tubing: ASTM A500, Grade B.

C. Steel Pipe: ASTM A53, Grade B, Schedule 40 as indicated.

C. Steel Rod: ASTM A510.

D. Steel Wide Flange Sections: ASTM A992

E. Fasteners:

1. Bolts, Nuts, and Washers: ASTM A307.
2. Lag Bolts: Square head type, FS FF-B-561.
3. Wood screws: Flathead carbon steel, FS FF-S-111.
4. Machine screws: Cadmium plated steel, FS FF-S-92.
5. Plain washers: Round carbon steel, FS FF-W-92.
6. Lock washers: Helical spring type carbon steel, FS FF-W-84.
7. Expansion Bolts: Parabolts, or acceptable substitute.

F. Concrete Inserts: Threaded or wedge type, galvanized castings. Furnish with bolts, washers and shims as required.

1. Malleable Iron: ASTM A47
2. Cast Steel: ASTM A27.

G. Non-Shrink Grout: ASTM C827, US Fire Star grout.

H. Welding Materials: AWS D1.1; type required for materials being welded.

I. Primer: FS TT-P-31, for shop application and field touch-up.

J. Touch-up Primer for Galvanized Surfaces: FS TT-P-645.

K. Protective Coating: Non-fibrated aluminum paint conforming to ASTM D1187, Type A.

L. Stainless Steel Plate: ASTM A167, Type 304.
L. Galvanized Coating: G90, hot dipped.

2.02 ANCHORING DEVICES

A. General: Unless otherwise indicated use self-drilling, flush type anchors for attachment of work to concrete and solid masonry. Diamond "Di-Ex" machine bolt anchors, Parabolt "Drop-Ins" or Phillip's "Red Head".

1. Use powder driven studs and pins only where load is acting in shear on anchor (parallel with surfaces), where there is no possibility of anchor's withdrawal, and where structural stability and strength are not impaired.

2. Design anchors to resist leverage vibration, and shock as conditions require.

3. Use anchors indicated, or where not otherwise indicated, use anchors having ultimate holding capacity in direction of applied load, based on manufacturer's published literature, equal to 4 times load to be supported. Verify loads with Owner's Representative.

2.03 FABRICATION

A. Verify dimension on site prior to shop fabrication.

B. Fabricate items with joints tightly fitted and secured.

C. Fit and shop assembly in largest practical section, 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. Furnish components required for anchorage of metal fabrications. Fabricate anchorage and related components of same materials and finish as metal fabrication, except where specifically noted otherwise.

2.04 FINISH

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Galvanize items to minimum 1.25 oz/sq ft. zinc coating in accordance with ASTM A123.

C. Do not prime surface in direct contact bond with concrete, or where field welding or sprayed fireproofing is required.

D. Prime paint scheduled items with one coat except two coats on surfaces inaccessible after assembly or erection. Change color of second coat to distinguish from first coat.

E. Stainless Steel: Polished and buffed.

PART 3- EXECUTION

3.01 PREPARATION

A. Obtain Owner's acceptance prior to site cutting or making adjustments not scheduled.

B. Clean and strip site primed steel items to bare metal where site welding is scheduled.

C. Make provision for erection loads with temporary bracing. Keep work in alignment.

D. Furnish items required to be cast into concrete with setting templates, to appropriate Sections.

3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion and defects.

B. Perform field welding in accordance with AWS D1.1.

C. After installation, touch-up field welds, scratched or damaged surfaces with primer and touch-up primer as applicable.

3.03 SCHEDULE

A. Provide items listed in Schedule and shown on Drawing with anchorage and attachments necessary for installation. Schedule lists principal items only. Refer to Drawing details for items not specifically scheduled.

B. Steel Wall Ladders: 3/8 x 2 in side rails 20 in. o.c. unless otherwise shown, rungs 1 in. diameter solid rod spaced 12 in. o.c., spaced from wall surface as indicated, with steel mounting brackets and attachments; galvanized finish.

C. Ledge and Shelf Angles and Channels and Plates not Attached to Structural Framing for Support of Metal Decking: Prime paint finish, unless otherwise indicated.

D. Lavatory counter support brackets as shown; A36 steel primed for field finish specified in Section 09900.

END OF SECTION

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Rough carpentry work, including but not limited to the following:

1. Non-structural office partition framing up to 6' high, where occurs.
2. Miscellaneous furring and stripping for wall finishes
3. Plywood wainscot at Tipping Floor walls.
4. In wall wood blocking for support of accessories.
5. Plywood mounting boards for electrical and telephone equipment.
6. Fire Retardant treatment of wood blocking and sheeting where required by local code.

B. Coordination with appropriate sections of all requirements for backing and blocking.

1.2 RELATED SECTIONS

A. Section 06200 - Finish Carpentry: Casing, molding, trim and site fabricated casework.

1.3 REFERENCES

A. SPIB - Southern Pine Inspection Bureau.

B. WCLIB - West Coast Lumber Inspection Bureau.

C. WWPA - Western Wood Products Association.

D. APA - American Plywood Association.

E. AWPA - American Wood Preservers Association.

F. AWPB - American Wood Preservers Bureau

G. PS 1 - Construction and Industrial Plywood.

H. PS 20 - American Softwood Lumber Standard.

I. N.F.P.A. - National Design Specification for Wood Construction.

1.4 QUALITY ASSURANCE

A. All wood materials to bear a visible grade stamp, of agency certified by National Forest Products Association (N.F.P.A.).

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store in weather protected, ventilated areas with a constant, minimum temperature of 60 degrees F maximum relative humidity of 25 to 55 percent.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Dimensions: Specified dimensions are nominal, actual dimensions to conform to PS 20.

B. Surfacing: Surface four sides (S4S), unless specified otherwise.

2.2 MATERIALS

A. Lumber: Provide new, sound and thoroughly seasoned lumber conforming to requirements of PS 20; graded in accordance with established Grading rules; fire retardant treated if required by code; of following species and grades:

1. Non-Structural Light Framing (less than 2 in thick): Hem-Fir (WCLIB or WWPA), SPF (WWPA) or Southern Pine kiln dried (SPIB); moisture content 19% maximum at time of dressing "S-DRY", or 15% maximum "MC-15" or "K-D"; graded as follows:

   a. General framing: No. 2 & Better.

   b. Plates, blocking, curbs, and nailers:

      1) Up to 2 x 4 in. No. 2 & Better
      2) Over 2 x 6 in. No. 2 & Better.

   c. General utility purposes: No. 2 & Better.

B. Softwood Plywood/Sheathing: Conform to requirements of PS-1. Provide panels bearing appropriate APA grade, and trade mark. Provide exterior grade plywood where any face or edge is exposed to the weather.

C.

1. Equipment Backing Panels: Plywood, APA B-C EXT, Plugged, Exterior glue; identification index Group 2; fire-retardant treated if required by code; 5/8 in. min thickness or as shown on plans.

2. Wall Wainscot Panels: APA B-C EXT., Plugged, Exterior glue; identification index Group 2; fire-retardant treated if required by code; 3/4" min. thickness or as shown on plans.

3. F.R.T. Plywood: (location—200-series room interior non-load-bearing partitions.) Plywood, APA B-C EXT, Plugged, Exterior glue, identification index Group 2; Fire Retardant Treated, 5/8 inch thick or as shown on plans. Pressure-treated kiln-dried fire retardant product, type: FR-S. Basis of design: Boise Cascade, Hoover Treated Wood Products, “Exterior Fire-X” F.R.T. plywood.

D. Nails, Spikes and Staples: Galvanized or zinc-coated for unheated locations, high humidity locations and treated wood; plain finish for other interior locations; size and type to suit application and in accordance with manufacturer's recommendations.

E. Bolts, Nuts, Washers, Lags, Pins and Screws: Medium carbon steel; sized to suit application and in accordance with manufacturer's recommendations; galvanized or zinc-coated for unheated locations, high humidity locations and treated wood; plain finish for other interior locations.

F. Joist Hangers and Framing Accessories: Simpson Company or prior approved equal, sized and profiled to suit application and in accordance with manufacturer's recommendations; galvanized finish.

G. Fasteners: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolts or power activated type for anchorage to steel.

H. Building Paper: ASTM D336, 15 lb. asphalt felt.

I. Power Driven Fasteners:

1. Pnuetek, Inc.: Pneumatically driven fastener with .143" shank diameter, .315" head diameter, and .073" head thickness installed with 1-1/2" wide 18 gauge galvanized steel strap, ICBO #3447. Contact local Pnuetek representative or Pnuetek, Inc.; Hudson, NH.; 603/883-1660.

2. Hilti: "DN" powder driven fastener with 1-7/16" diameter by .060" thick washer, ICBO #2388.

2.3 ACCESSORIES

A. Dust and Vapor Barrier (07210): reinforced flame retardant polyethylene sheets, 6 mil minimum thickness.

B. Polypropylene Vapor Barrier Tape (07210): Flame retardant self-adhering type, 2" wide.

2.4 PRESERVATIVE TREATMENT

A. Shop pressure treat and deliver to site ready for installation.

B. Wood Preservative (Pressure Treatment): Apply in conformance with AWPA Standard P5, using water-borne preservatives complying with AWPA Standard C27-93, ASTM D2898-94 and ASTM D3201-94. After treatment, kiln-dry to maximum moisture content of 15%.
1. Apply treatment complying with AWPA Standard C2.

2.5 FIRE RETARDANT TREATMENT

A. Factory treat and deliver to site ready for installation, wood materials requiring UL fire rating. Provide UL approved identification on treated materials.

B. Comply with the applicable AWPA Standard as follows:
1. Plywood: AWPA Standard U1, Doug Fir sheathing, UL data: BUGV R7003, Exterior Type (at interior rooms).

PART 3 - EXECUTION

3.1 BLOCKING

A. Fasten wood blocking to framing with fasteners capable of withstanding loads to be applied to blocking. Install blocking for support of items as required.

B. Install continuous pieces of longest possible lengths, cut to fit and fully bearing on framing.

C. Blocking installed in Installation Bay is to be installed during the Best Buy store fixturing process to insure that the blocking is installed in the proper location. Blocking will be required on any masonry walls of this space. This blocking is to be painted prior to installation. Verify with Best Buy Project Construction Manger for any differences.

3.2 ROOF RELATED WOOD BLOCKING

A. Anchor blocking to metal decking and framing as detailed with 1/2” bolts set a maximum of 4’-0” o.c.

B. Where blocking is more than 6” wide, anchor with 1/2” bolts set at 2’-6” o.c. and stagger alignment.

C. Where blocking is required on roof deck, build-up, shim, or cut as required to set top of blocking flush with the top of the adjacent insulation.

D. Cover wood blocking with temporary waterproof covering until permanent flashing is installed.

3.3 PLYWOOD SHEATHING

A. Install with face grain perpendicular to direction of framing.

B. Allow minimum space 1/16" between end joints and 1/8" at edge joints for expansion and contraction of panels; double these spaces under wet or humid conditions.

C. Fasten 6" o.c. along panel edges and 12" o.c. at intermediate supports with non-corrosive screws.

D. Install telephone and electrical panel backboards with plywood sheathing material where required.

3.4 WAINSCOT

A. Install plywood panels vertically to metal girt substructure with fasteners per structural engineering drawings. Paint plywood wainscot per section 09900.

END OF SECTION

SECTION 06200
FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Finish carpentry work, including but not limited to the following:
   1. Interior Finish Carpentry:
      a. Casing, molding and trim.
      b. Special fabricated casework and hardware.
   2. Fasteners and Accessories.
   3. Coordination with Section 06100 for all requirements for backing and blocking.

1.2 RELATED SECTIONS

A. Section 07900 - Joint Sealers: Joint sealers and fillers.
B. Section 09900 - Painting: Finishing of finish carpentry.

1.3 REFERENCES

A. AWI - Architectural Woodwork Institute Quality Standards and Guide Specifications.
B. NWMA - National Wood Manufacturers Association.
C. PS 20 - American Softwood Lumber Standard.

1.4 QUALITY ASSURANCE

A. Installation and materials: AWI Standards.

1.5 SUBMITTALS

A. Material and Equipment Submittals: Submit the following under provisions of Section 01300:
   1. Shop Drawings: Indicate materials, component profiles, fastening methods, assembly methods, joint details, accessory listings, and schedule of finishes.
   2. Product Data: Submit product data for each item of hardware. Provide data on specified component products.
   3. Samples: Submit two samples representative of each scheduled surface, color and pattern, 4" x 4" in size illustrating color, texture, and finish.

B. Quality Assurance Submittals: Submit the following under provisions of Section 01400:
   1. Manufacturer's Certificate: Indicating that products meet specified burning characteristics.

1.6 JOB CONDITIONS

A. Conditioning: Installer to advise General Contractor of temperature and humidity requirements for woodwork installation areas. Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store indoors, in ventilated areas with a constant, minimum temperature of 60 degrees F, maximum relative humidity of 25 to 55 percent.

PART 2 PRODUCTS

2.1 MATERIALS - WOOD

A. Grade: Custom.
B. Softwood Lumber: PS 20; graded in accordance with the requirements of AWI; maximum moisture content of 6 percent for interior work.
C. Hardwood Lumber: Graded in accordance with AWI; maximum moisture content of 6 percent.

2.2 SHEET MATERIALS

A. Wood Particle Board: Per AWI standard, composed of wood chips, made with high density board with waterproof resin binders; of grade to suit application. All semi-exposed surfaces to have a white melamine finish surface.

2.3 PLASTIC LAMINATE MATERIALS

A. Plastic Laminate General: NEMA LD 3, GP-50 for horizontal surfaces and GP-28 for vertical surfaces. Color and Manufacturer as scheduled.
B. Laminate Backing Sheet: Backing grade, undecorated plastic laminate.
C. Adhesive: Contact type, for shop fabricated work, of type recommended by millwork manufacturer to suit application.

2.4 BATHROOM VANITY

A. Fabricate plastic laminate finished casework using "Flush Overlay" style, "Custom" grade, as defined by AWI standards.
   1. Plastic Laminate 0.050" thick; Color:
      a. Break Room Countertop/ Backsplash: Formica #3512 “Metal Earth”.
      b. Break Room Upper & Base Cabinets: Formica #902 “Platinum”.
      c. Unisex Restroom Countertop/ Backsplash: Formica #3698 Beluga Beige”.

B. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
C. Fit doors and exposed edges with matching plastic laminate edging. Use full-length pieces only. Laminate faces of doors after edges are laminated.
D. Door and Drawer Fronts: 3/4" thick.
E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
F. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Slightly bevel arises.
G. Cabinet Liner and shelving: Melamine.
H. Cap exposed plastic laminate edges with material of same finish and pattern.
I. Mechanically fasten backsplash to countertops with steel brackets at 16" on center.
J. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
K. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.

2.5 ACCESSORIES

A. Adhesive: Contact type complying with ANSI/NWMA 1S-1 Series and recommended by laminate manufacturer to suit application.

2.6 HARDWARE

A. Fasteners: Size and type to suit application.
B. Nails, Spikes and Staples: Galvanized for exterior locations, high humidity locations and treated wood; plain finish for other interior locations; size and type to suit application and in accordance with manufacturers' recommendations.
C. Bolts, Nuts, Washers, Lags, Pins and Screws: Medium carbon steel; sized to suit application and in accordance with manufacturer's recommendations; galvanized for exterior locations, high humidity locations and treated wood; plain finish for other interior locations.

D. Cabinet Hardware Standards: ANSI A 156. 9, Type 2 Institutional quality; US26 brushed chrome finish, unless otherwise noted.
E. Drawer Slides: White Epoxy coated, 150 lb. capacity, extension 4 inches less than length – Blum or equal.
F. Countertop Connectors: Concealed type; KV, #516 or equal.
G. Hinges: Snap closing European style, 35 mm, Clip type – min. 95 degree opening for upper cabinets and min. 165 degree for lower – Blum or equal.
H. Adjustable Shelf Supports: Steel, nickel plated, ¼ inch "L" shape. Provide holes for adjustment, max. 4 inches OC full height of cabinet.
I. Grommets: Doug Mockett & Company, Model No. SG-3. Color to match adjacent surface. Provide cap with 5/8" cord slot.
J. Pulls: 5/16" diameter wire, 4" long Stanley 34-8315 or equal, 26D finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Ensure that substrate is ready to receive work prior to commencement of installation.

3.2 FABRICATION

A. Fabricate finish carpentry items in accordance with recommendations of AWI.
B. Use exposed fastening devices or nails only when unavoidable.

3.3 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.
B. Deliver concrete inserts and similar anchoring devices to be built into substrates, well in advance of time substrates are to be built.
C. Prior to installation of architectural woodwork, examine shop-fabricated work for completion, and complete work as required, including back priming and removal of packing.
D. Coordinate with other trades to ensure that items supplied by others, but required to fit into casework or other fabricated items, will fit.
E. Locate backing devices required for installation of wall supported units. Verify that back plates, extra studs, etc., are properly located to accept woodwork items.

3.4 PREPARATION FOR FINISHING

A. Set or countersink fasteners. Apply wood filler in exposed fastener indentations on material to receive opaque finishes. On material to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.
B. Leave in condition ready to receive applied finish, only requiring light sanding and clean up by finish applicator.

3.5 INSTALLATION

A. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops); and with 1/16" maximum offset in flush adjoining surface, 1/8" maximum offsets in revealed adjoining surfaces.
B. Scribe and cut work to fit adjoining work, refinish cut surfaces and repair damaged finish at cuts.
C. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.

D. Casework: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.
E. Countertops: Anchor securely to base units and other support systems as indicated.
F. Miter inside and outside corners. Scarf joints.
G. Install continuous pieces in longest possible lengths.
H. Carefully scribe work that is against other building materials, leaving gaps of 1/16" maximum. Do not use additional overlay trim for this purpose.
I. Backprime all exterior finish carpentry.

3.6 ADJUSTMENT AND CLEANING

A. Repair damaged and defective woodwork wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
B. Clean hardware, lubricate and make final adjustments for proper operation.
C. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged and soiled areas.
D. Complete the finishing work specified as work of this section, to whatever extent not completed at shop and prior to installation of woodwork.

END OF SECTION

SECTION 07210
BUILDING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Board insulation/ protection board at perimeter foundation wall.
B. Sound attenuation blanket at interior partitions.
C. Blanket batt insulation at exterior warm walls.
D. Sheet vapor and air barrier.

1.2 RELATED SECTIONS

A. Section 07212 – Sprayed Insulation

1.3 REFERENCES

A. ASTM C516 - Vermiculite Loose Fill Insulation.
B. ASTM E84 - Surface Burning Characteristics of Building Materials.
C. FS HH-I-558 - Insulation, Board, Blanket, Felt, Sleeving (Pipe and Tube Coverings) and Pipe Cover Insulation.
D. UL 723 - Surface Burning Characteristics of Building Materials.

1.4 SYSTEM DESCRIPTION

A. Materials of this Section shall provide a continuous thermal, vapor and air barrier where required, at building enclosure elements.

1.5 SUBMITTALS

A. Material and Equipment Submittals: Submit the following under provisions of Section 01300:
   1. Manufacturer's installation instructions.

1.6 REQUIREMENTS OF REGULATORY AGENCIES

A. Surface Burning Characteristics:
   1. Comply with applicable codes for Class I (Class A) flame/smoke ratings of 25 or less/450 or less for insulation types and accessories other than foamed plastic; when tested according to ASTM E84 (UL 723).
   2. Comply with applicable codes for Class II (Class B) flame/smoke ratings of 75 or less/450 or less for foamed plastic insulation types; when tested according to ASTM E84 (UL 723).

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. **INSUL-1**: Expanded Polystyrene Board Insulation (Below Grade): ASTM C578, Type IV, expanded polystyrene; 1.80 pcf density minimum; 25 psi minimum compressive strength; Less than 3% maximum water absorption by volume; square edges, manufacturer's standard board size, thickness per drawings, R-4.6 per inch for 20 years minimum per ASTM C518.

   1. Insulfoam (a Carlisle Company), R-Tech IV, zee-fold, 2” thickness or equivalent with same performance and warranty.

B. **INSUL-2**: Glass Fiber Blanket/Batt Insulation (Unfaced); ASTM C665, Type I, preformed glass fiber blanket without facers, thicknesses per drawings.
   1. CertainTeed Corporation, Unfaced Building Insulation.
   2. Johns Manville, Thermal-Shield Unfaced Insulation Blankets.

3. Owens-Corning Fiberglass Corp., Unfaced Glass Fiber Insulation.
4. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product.

C. **INSUL-3**: FOAM IN PLACE INSULATION
1. Core-fill 500, Tailored Chemical Products
2. Air-Krete, Therma-krete
3. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product.

2.2 ACCESSORIES

A. Vapor/Air Barrier: Flame retardant polyethylene sheets, 6 mil minimum thickness at walls and ceilings where occurs at heated envelope.

B. Polyethylene Tape: Flame retardant self-adhering type, 2" wide minimum.

C. Foil Tape: Flame retardant pressure-sensitive type recommended by insulation manufacturer for application, 2" wide minimum.

D. Adhesive: Type recommended by insulation manufacturer for application.

E. Impaling Pins: Mechanical fasteners recommended by insulation manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify substrate and adjacent materials and insulation boards are dry and ready to receive insulation.

3.2 INSTALLATION - FOUNDATION PERIMETER

A. Install expanded polystyrene boards (INSUL-1) on foundation wall perimeter, vertically from the bottom of concrete slab downward to minimum depth below finished exterior grade, down to building code designated frost line or depth designated on drawings if insulating below grade stories. Butt edges and ends tight to adjacent board and to protrusions. Install per structural drawings and soils report recommendations.

3.3 INSTALLATION - BLANKET/BATT INSULATION

A. Install batt insulation (INSUL-2) in accordance with manufacturer's instructions.
B. Install batt insulation in exterior walls, roof and ceiling spaces without gaps or voids.
C. Trim insulation neatly to fit spaces. Use batts free of damage.
D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
E. Fill cracks and voids around framing and blocking, other voids in exterior walls, and voids around wood cants, curbs, and blocking in and about the roof. Wedge in place, completely filling voids.

3.4 INSTALLATION - FOAM IN PLACE INSULATION

A. Install foam in place insulation (INSUL-3) in accordance with manufacturer's instructions.
B. Install foam in place insulation in exterior walls, roof and ceiling spaces without gaps or voids.
C. Trim insulation neatly overflow.
D. Fill foam in place insulation full into gaps and spaces where air infiltrates around window units and other gaps in thermal envelope. Leave no gaps or voids.

3.5 INSTALLATION - VAPOR AND AIR RETARDERS

A. Place vapor and air barrier on warm side of insulation by taping in place. Provide continuous, fully taped vapor retarder enclosure around upper mezzanine level by sealing tears, penetrations or cuts in vapor barrier with polyethylene 'vapor barrier tape' to prohibit vapor transmission. Vapor retarder in locations not covered by gypsum board is part of insulation specified. Coordinate vapor retarder installation with manufacturers' structural members for metal building selected.

B. Extend vapor and air barrier tight to full perimeter of adjacent window and door frames and other items interrupting the plane of membrane. Seal in place with polyethylene tape.

END OF SECTION

SECTION 07 21 29
SPRAYED INSULATION

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Section 06100 – Rough Carpentry

B. Section 07210 – Thermal Insulation

1.2 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this Specification. The publications are referred to in the text by basic designation only. In case of conflict the most stringent shall apply.

1. American Society of Testing and Materials (ASTM) C177 - Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot-Plate Apparatus.
2. ASTM C518 - Test Method for Steady State Thermal Transmission Properties by means of the heat flow meter apparatus.
3. ASTM C1029 - Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation.
4. ASTM D1621 - Test Method for Compressive Properties of Rigid Cellular Plastics.
5. ASTM D1623 - Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
6. ASTM D2126 - Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
7. ASTM D2842 - Test Method for Water Absorption of Rigid Cellular Plastics.
8. ASTM D2856 – Test Method for Open Cell Content of Rigid Cellular Plastics by the Air Pyenometer
9. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
10. ASTM E96 - Tests Method for Water Vapor Transmission of Materials.
11. International Building Code (IBC), Chapter 26.
12. Underwriters Laboratories Inc (UL) - Fire Resistance Directory.
13. Intertek Testsing Services NA, Inc. (Intertek).

1.3 SYSTEM DESCRIPTION

A. Spray applied (foamed in place) urethane-isocyanurate rigid foam plastic insulation.

1.4 SUBMITTALS

A. Product Data: Indicate product descriptions, performance data, materials, recommended use, application instructions, substrate surface preparation, and special curing temperature requirements.

B. Manufacturer and Installer qualifications.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum of 5 projects similar to material proposed where specified product was used.

B. Applicator Qualifications: Minimum of installing 5 similar sprayed insulation systems in Alaska, and must be approved, in writing, by manufacturers for installation of materials installed.
   1. Same installer shall apply entire insulation and barrier systems.

C. Provide project names, location, date, product used and owner telephone number.

1.6 REGULATORY REQUIREMENTS

A. Completed installation with barrier coatings shall conform to IBC Chapter 26 including:
   1. Foam plastic 75 maximum flame spread rating per ASTM E84.
   2. Foam plastic 450 maximum smoke developed per ASTM E84.
   3. Interior of building separated from foam plastic by thermal barrier per IBC 2603.4.

1.7 PRE-INSTALLATION MEETING:

A. Applicator, CONTRACTOR, and CONTRACTING OFFICER shall hold a pre-construction meeting at least 1 week prior to commencing insulation installation.

1.8 STORAGE AND PROTECTION

A. Deliver products to site in manufacturer's original unopened labeled containers or packages.

B. Store above freezing in dry area away from sparks or open flames and in accord with manufacturer's written recommendations.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Apply insulation, and barrier coatings at ambient temperatures and conditions recommended in writing by the manufacturer's and in no case when ambient and substrate temperatures are below 50 degrees F, or with dirt, frost or water on surfaces to be coated. Maintain temperatures for 24 hours before, during application, and until each coating has cured and dried.

B. Provide insulated tarps, ventilation and heat as necessary. Follow foam and coating manufacturer's instructions not exposing foam to excess heat or open flame.

PART 2 - PRODUCTS

2.1 SPRAY INSULATION

A. Spray applied (foamed-in-place) 2-component polyurethane/isocyanurate type rigid foam plastic insulation formulated for existing climatic conditions in accord with ASTM C1029.

B. Physical and Performance Requirements: Foam shall meet the following minimum in place requirements when tested in accordance with standard indicated:
   1. Thermal Resistance of 1.0 inch thickness: R6 minimum per ASTM C177. Density 1.5 to 3 pounds per cubic foot (24to 48 kg/m3)
   2. Compressive Strength: 15-psi minimum per ASTM D1621.
   3. Water Absorption: 0.1 percent maximum per ASTM D2842.
   4. Tensile Strength: 40-psi minimum per ASTM D1623.
   5. Closed cell content: 90 percent minimum per ASTM D2856.
   6. Meet specified “Regulatory Requirements” for flame, fuel, and smoke.

C. Provide primer for substrate in accord with insulation manufacturer instructions.

2.2 VAPOR BARRIER

A. Vinyl acrylic or styrene latex primer sealer especially recommended by manufacturer for use as interior moisture vapor barrier: Sherwin Williams "moisture vapor barrier-B72WI,” Rodda “Vapor Block” or approved equal.
   1. Maximum perm rate 0.4 per ASTM E96.
   2. Near white color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Drawings and verify field conditions to receive insulation are securely fastened or adhered, clean, dry and free of contaminants that will inhibit insulation adhesion.

B. Verify work within walls and ceiling-roof over is complete and secure prior to insulation application.

C. Beginning of installation shall mean acceptance of substrate and project conditions as capable of producing an acceptable well-adhered job.

3.2 PREPARATION

A. Clean and dry substrate as recommended in writing by insulation manufacturer.

B. Mask and protect adjacent surfaces from overspray and dusting.

3.3 INSULATION APPLICATION

A. Apply insulation in accord with manufacturer's instructions and approved submittals. Prime in accord with spray insulation manufacturer recommendations for substrate.

B. Apply insulation to a uniform monolithic density without soft spongy consistency, free from depressions, pinholes or voids and securely bonded to substrate. Foam surface shall be smooth orange peel or coarse orange peel profile.
   1. Unacceptable surface conditions are smooth hard, "popcorn" or "tree bark" surfaces.
   2. Remove non conforming areas and refoam to acceptable surface as necessary.

3.4 VAPOR RETARDER APPLICATION

A. Apply vapor retarder to completely cover thermal barrier in accord with vapor retarder manufacturer's instructions and approved submittals.

B. Apply two separate coats applied at right angles to achieve film thickness and complete cover for vapor retarder: maximum 300 square foot per gallon or 1.7 to 2.0 mil dry thickness. Back roll to assure complete coverage.

3.5 CLEANING

A. Remove excess materials and debris caused by application as work progresses.

B. Leave adjacent areas free of overspray and clear of soil caused by insulation and coating application.

END OF SECTION

SECTION 07464
FIBER CEMENT SIDING

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry

B. Section 07 27 00 – Air Barriers

C. Section 07 62 00 – Flashing and Trim

D. Section 07 92 00 – Joint Sealants

1.2 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this Specification. Publications may be referred in the text by basic designation only. In case of conflict the most stringent shall govern:
   1. ASTM B117 – Practice for Operating Salt Spray (Fog) Apparatus.
   2. ASTMC 920 – Specifications for Elastomeric Joint Sealants.
   3. ASTM C 1186 – Specification for Flat Non-Asbestos fiber-cement sheets.
   4. ASTM E 136 – Standard Test for Behavior of materials in a Vertical Tube Furnace at 750 C.
   5. International Building Code (IBC) 2003.

1.3 PERFORMANCE REQUIREMENTS

A. Wind loads per IBC chapter 16 for 120 miles per hour, Exposure D, Importance

1.0. B. Limited flammability and combustibility per ASTM E 136.

1.4 SUBMITTALS

A. Manufacturer's literature including dimensions, materials, trim installation instructions, fasteners and finishes.

B. Samples:
   1. Each type of Lap siding: three 6 inch long.
   2. Soffit panels: three 6 inch by 6-inch.
   3. Edge trim: three 6 inch long of each type.

1.5 QUALITY ASSURANCE

A. Manufacturer history of successful manufacturing specified products for at least 25 similar projects.

1.6 STORAGE AND PROTECTION

A. Protect materials from exposure to the weather until permanently installed in construction.

B. Store materials protectively covered from weather and off the ground.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fiber-reinforced cement exterior Lap siding recommended by manufacturer for exterior walls per ASTM C 1186 as manufactured by James Hardie Building Products Inc (800-942-7343), Maxitile Inc., 800-338-8455, or approved.

B. Siding:
1. 5/16 inch thick by 7 1/4 inch wide (for 6 inch exposure) by 12-feet long.
2. Saw textured face: “Hardipanel Cedarmill”, or approved.
3. Factory prime painted.

C. Soffit
1. 5/16-inch thick by 4 feet wide by 8 feet long.
2. Saw textured face: “Hardipanel Cedarmill” or approved.
3. Factory prime painted.

D. Trim Boards
1. 7/16-inch thick by 3 1/2 inch wide by 12-feet long.
2. Saw textured face: “Harditrim Plank” or approved.
3. Factory prime painted.

2.2 FASTENERS

A. Ribbed wafer head screws Number 8’ minimum diameter by 0.323 inch head stainless steel or carbon steel corrosion resistant coated to resist 500 hours of salt spray per ASTM B117 with no more than 5 percent red rust appearing on head or shank. Screws shall completely penetrate materials to be joined: 1 5/8 inch minimum long.

B. Minimum pullout value 200 pounds when tested through ASTM A653 steel or 1/2 inch plywood.

C. Staples or nails not permitted.

2.3 SEALANT

A. As recommended by siding manufacturer, and latex based per ASTM C 920.

PART 3 - EXECUTION

3.1 INSPECTION OF SURFACES

A. Examine substrate surfaces and the Drawing details for defects that will adversely affect the work, and for deviations beyond allowable tolerances.
   1. Windows, doors, penetration and associated flashing shall be installed.
   2. Air barrier shall be installed over sheathing.
   3. Any furring shall be installed per DRAWINGS.

B. Start of work shall mean acceptance of the interfacing surfaces as capable of producing an acceptable job.

3.2 GENERAL WORKMANSHIP

A. Work shall be plumb, level and square, or to alignment shown. Secure members with sufficient fasteners to provide rigidity and permanence in accord with siding manufacturer written instructions and approved submittals.

B. Cut and fit members neatly and together without chipping or splitting with any exposed fasteners evenly spaced. Do not use warped material that cannot be aligned easily.

C. Use one-piece members where possible, to avoid unnecessary splices.

3.3 SOFFIT INSTALLATION

A. Screw and attach at 4 inch spacing maximum along panel joints, and 3/8-inch from panel edges. Screw 8 inch spacing maximum in centers of panels.

B. Evenly space screws in straight rows for consistent appearance.

3.4 LAP SIDING INSTALLATION

A. Face attach through overlap with screws 16 inch spacing maximum, 12 inch spacing within five feet of outside corners: one inch from plank top and 3/8 inch from plank end.

B. Install bottom-first course over 1/4 inch thick furr strip.

C. Lap siding 1 1/4 inch over each lower horizontal course.

D. Leave 1/4 to 3/8 inch gap around windows, doors and penetration for sealant installation.

3.5 TRIM BOARD INSTALLATION

A. Screw attach 16-inch spacing maximum: one-inch from board and 3/4 inch from board side edge.

B. Evenly space screws for consistent appearance.

3.6 SEALANT INSTALLATION

A. Apply sealant in accord with Section 07 92 00 - Joint Sealants around penetrations

B. Sealant not required at siding and board butt joints

3.7 CLEAN UP

A. Upon completion of the work leave surfaces that are exposed in completed work clean, unblemished, and free from excess sealant.

3.8 TOLERANCES (NON-CUMULATIVE)

A. Bowing or Warping: 1/4 inch in 8 feet.

B. Joint Width: evenly gapped zero to 1/8 inch.

C. Window and Door Openings: evenly gapped 1/4 to 3/8 inch.

END OF SECTION

SECTION 07600
FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Architectural flashing and sheet metal work.

B. Related Sections include but are not necessarily limited to:
   1. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
   2. Division 1 - General Requirements.
   3. Section 07900 - Joint Sealants.
   4. Section 09900 – Paint.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. B32, Standard Specification for Solder Metal.
   2. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):
      a. Architectural Sheet Metal Manual, Fifth Edition, 1993.
         1) Including Addendum No. 1 dated October 31, 1997.

B. Qualifications:
   1. Sheet metal fabricator shall have minimum 10 years experience in fabrication of sheet metal items similar to items specified.
   2. Sheet metal installer shall have minimum five (5) years experience installing sheet metal items specified.

1.3 DEFINITIONS

A. Installer or Applicator:
   1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
   2. Installer and applicator are synonymous.

1.4 SUBMITTALS

A. Shop Drawings:
   1. See Section 01340 for requirements for the mechanics and administration of the submittal process.
   2. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
   3. Fabrication and/or layout drawings.
      a. Scaled drawing showing expansion joint locations, special conditions, profile, fastening and jointing details.
         1) Minimum plan scale: 1/8 IN = 1 FT.
         2) Minimum detail scale: 1-1/2 IN = 1 FT.
   4. Fabricator qualifications.
   5. Installer qualifications.

B. Samples:
   1. Finish and color samples for each product specified for Engineer preliminary color selection.
   2. For final color selection, provide {two (2)} 2 IN x 3 IN colored metal samples for each color selected during the initial color selection.

C. Miscellaneous Submittals:
   1. See Section 01340 for requirements for the mechanics and administration of the submittal process.
   2. Warranty: Manufacturer's sample warranty language.

1.5 WARRANTY

A. Furnish five (5) year warranty on sheet metal work, signed jointly by Contractor and sheet metal installer.
   1. Agree to repair or replace work which leaks water or, where applicable, air or deteriorates excessively, including color failure, or otherwise fails to perform as watertight and, where appropriate, airtight flashing.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

B. Submit request for substitution in accordance with Specification Section 01640.

2.2 MATERIALS

A. Fasteners: Non-ferrous compatible with sheet metal.

B. Retainer Clips and Continuous Cleats: Galvanized steel or stainless steel.

C. Solder: ASTM B32.

D. Dissimilar Metal Protection: Comply with Section 09900.

2.3 ACCESSORIES

A. Accessories as required to form a complete water and airtight system.

2.4 FABRICATION

A. Retainer Clips and Continuous Cleats:

   1. Use 16 GA galvanized steel, G60 coating minimum with ferrous steel flashing, coping and counterflashing and standing seam metal roofing wall trim.

   2. Use 0.050 inch stainless steel with aluminum or stainless steel.

B. Shop fabricate items to maximum extent possible.

   1. Fabricate true and sharp to profiles and sizes indicated on Drawings.
      a. Shop fabricate and weld or solder all corners.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide items to be built into other construction to Contractor in time to allow their installation.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions, SMACNA, and as indicated on Drawings.

B. Solder steel and weld aluminum to achieve weathertight joints and required details; do not solder or weld slip joints and prefinished items.

C. Set top edges of membrane flashing and sheet metal flashing into reglets.

D. Fasten materials at intervals recommended by SMACNA.

E. Install slip joints to allow for thermal movement as recommended by SMACNA and manufacturer.
   1. Maximum spacing: 10 FT OC.
   2. Provide slip joint 24 IN from corners.
   3. Provide slip joint at each vertical expansion joint location in wall.
      a. Provide break in continuous cleat at each vertical expansion joint.

F. Caulk slip joints with two (2) beads of sealant on each side of slip joint overlap.
   1. Refer to Section 07900 for sealant.

G. Caulk all exposed joints of coping with sealant to match color of metal being sealed.

H. Form flashings to provide spring action with exposed edges hemmed or folded to create tight junctures.

I. Provide dissimilar metals and materials protection where dissimilar metals come in contact or where sheet metal contacts mortar, concrete masonry or concrete.
   1. Refer to Section 09900 for dissimilar metals protection.

J. Provide all components necessary to create watertight junctures between roofing and sheet metal work.

K. Provide all miscellaneous sheet metal items not specifically covered elsewhere, as indicated or required to provide a weather-tight installation.

END OF SECTION

SECTION 07900
JOINT SEALANTS

PART 1 - GENERAL

1.0 SECTION INCLUDES:

A. Sealant work.

1.1 SPECIFIER:

A. AReference those sections which may significantly impact the work of this Section and always reference Divisions 0 and 1. Do not list those sections impacted by this Section.

1.2 RELATED SECTIONS INCLUDE:

A. Division 0 - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 1 - General Requirements.

1.3 WORK INCLUDED:

A. Sealing all joints which will permit penetration of dust, air or moisture, unless sealing work is specifically required under other sections.
   1. Work may include the following:
      a. Flashing reglets and retainers.
      b. Exterior wall joints.
      c. Masonry control joints, exterior and interior and between masonry and other materials.
      d. Flooring joints.
      e. Isolation joints.
      f. Joints between paving or sidewalks and building.
      g. Concrete construction, control and expansion joints, exterior and interior.
      h. Sawed joints in interior concrete slabs.
      i. Joints between precast roof units, between precast roof units and walls, and all exterior and interior joints between precast wall panels.
      j. Joints at penetrations of walls, floors and decks by piping and other services and equipment.
      k. Exterior and interior perimeters of exterior and interior door and window frames, louvers, grilles, etc.
      l. Thresholds at exterior doors.
      m. Sealing of plumbing fixtures to floor or wall.
      n. Sealing around piping, duct or conduit penetrations through roof, floors, interior and exterior walls.
      o. Sealing perimeter and penetrations of sound insulated walls.
      p. Other joints where calking, sealant, expanding foam sealant or compressible sealant is indicated.

1.4 QUALITY ASSURANCE

REFERENCED STANDARDS:

A. American Concrete Institute (ACI):
   1. 302.1R, Guide for Concrete Floor and Slab Construction.

B. ASTM International (ASTM):
   1. C834, Standard Specification for Latex Sealants.
   2. C920, Standard Specification for Elastomeric Joint Sealants.

C. National Sanitation Foundation International (NSF).

D. Underwriters Laboratories, Inc., (UL).

1.6 QUALIFICATIONS:

A. Sealant applicator shall have minimum five (5) years experience using products specified on projects with similar scope.

1.7 MOCK-UPS:

A. Before calking work is started, a mock-up of each type of joint shall be calked where directed by the Engineer.
   1. The approved mock-ups shall show the workmanship, bond, and color of calking materials as specified or selected for the work and shall be the minimum standard of quality on the entire project.

1.8 DEFINITIONS

A. Specifier: Delete "wet areas" not used on your project or add areas as needed.

B. "CAULK(ING)," AND "SEALANT": JOINT SEALANT WORK.

C. "INTERIOR WET AREAS": TOILETS, SHOWERS, LABORATORIES, {TRUCK WASH BAY} {WET WELLS} AND SIMILAR AREAS. {ENTIRE AREA IS CONSIDERED WET.}

D. Installer or Applicator:
   1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
   2. Installer and applicator are synonymous.

E. Finish sealant: sealant material per this specification applied over face of compressible sealant or expanding foam sealant specified, to provide a finished, colored sealant joint.

F. Defect(ive): failure of watertightness or airtightness.

1.9 SUBMITTALS

A. Shop Drawings:
   1. See Section 01300 for requirements for the mechanics and administration of the submittal process.
   2. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
      b. Manufacturer's installation instructions.
      c. Manufacturer's recommendations for joint cleaner, primer, backer rod, tooling and bond breaker.

B. Warranty.

C. Certification from sealant manufacturer stating product being used is recommended for and is best suited for joint in which it is being applied.

D. Certification of applicator qualification.

1.10 SAMPLES:

A. Cured sample of each color for Engineer's color selection.

B. Color chart not acceptable.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Deliver material in manufacturer's original unopened containers with labels intact: labels shall indicate contents and expiration date on material.

1.12 WARRANTY

A. Material and Labor Warranty:
   1. Sealant work free of defects for a period of three (3) years from date of final acceptance.
   2. Remove any defective work or materials and replace with new work and materials.
   3. Warranty signed jointly by Applicator and sealant manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the contract documents, the following manufacturers are acceptable:

B. Polyurethane sealants:
   1. Pecora.
   2. Sika Chemical Corp.
   3. Sonneborn - Rexnord.
   4. Tremco.

C. Silicone sealants:
   1. General Electric.
   2. Dow Corning Corp.
   3. Tremco.

D. Compressible sealant:
   1. Polytite Manufacturing Corporation.
   2. Emseal.
   3. Norton.
   4. Sandell.

E. Fire-resistant sealant: See Section 07840.

F. Acoustical sealant:
   1. Pecora.
   2. Sonneborn.
   3. Tremco.

G. Polysulfide rubber sealant:
   1. Pecora.
   2. Sonneborn.
   3. Morton Polymer Systems.

H. Expanding foam sealant:
   1. Macklanburg Duncan.
   2. Convenience Products.
   3. FAI International, Inc.
   4. Power Fasteners.

I. Polyurea joint filler:
   1. Dayton Superior Specialty Chemical Corporation.
   2. Euclid Chemical Co.
   3. L & M Construction Chemicals, Inc.
   4. Sonneborn.

J. Backer rod, compressible filler, primer, joint cleaners, bond breaker: As recommended by sealant manufacturer.

K. No like, equivalent or "or-equal" item {or substitution} is permitted.

L. Submit request for substitution in accordance with specification section 01600.

2.2 MATERIALS

A. Sealants - General:
1. Provide colors matching materials being sealed.
2. Where compound is not exposed to view in finished work, provide manufacturer's color which has best performance.
3. Nonsagging sealant for vertical and overhead horizontal joints.
4. Sealants for horizontal joints: Self-leveling pedestrian/traffic grade.

B. Polyurethane Sealant:
1. One (1) or two (2) components.
2. Paintable.
3. Meet ASTM C920 Type S or Type M, Grade NS or P, Class 25, Use NT, T, M, A and O.
   a. Pecora Dynatrol-IXL, Dynatrol II, Urexpan NR-200, NR-201.
   b. Sika Chemical Corporation Sikaflex-1a, Sikaflex-2C NS/SL.
   c. Sonneborn Sonolastic NP-1, NP-II, SL-1 SL-2.
   d. Tremco Dymonic or Dymeric, Vulkem 116,227,45,245.

C. Silicone Sealant:
1. One (1) component.
2. Meet ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, O.
   a. General Electric: Silpruf, Silglaze II.
   b. General Electric: Sanitary 1700 sealant for sealing around plumbing fixtures.
   c. Dow Corning: 786 for sealing around plumbing fixtures.
   d. Dow Corning: 790, 795.
   e. Tremco: Spectrem 1, Spectrem 3, Tremsil 600.
3. Mildew resistant for sealing around plumbing fixtures.

D. Compressible Sealant:
1. Size so that width of material is twice joint width.
2. Specifier: Use Polytite B as backer rod material when sealant is applied over compressible sealant. Most used type.
3. Foamed polyurethane strip saturated with polymerized polybutylene waterproofing coated on front face with nonreactive release agent that will act as bond breaker for applied sealant.
4. Polytite Manufacturing Corp. "Polytite-B."
5. Fire rated where required.

E. Joint cleaner, primer, bond breaker: as recommended by sealant manufacturer.

F. Sealant Backer Rod and/or Compressible Filler:
1. Closed cell polyethylene, polyethylene jacketed polyurethane foam, or other flexible, nonabsorbent, nonbituminous material recommended by sealant manufacturer to:
   a. Control joint depth.
   b. Break bond of sealant at bottom of joint.
   c. Provid e proper shape of sealant bead.
   d. Serve as expansion joint filler.

G. Adhesive, Compressible Sealant: as recommended by sealant manufacturer.

H. Fire-Resistant Sealant:

1. Fire Stop and Joint Sealant Systems: Fire-resistive joint sealing systems as listed in Underwriter's Laboratories Building Material Directory, Through-Penetration Firestop Devices. Materials and systems shall qualify for tests set forth in UBC Standard 43-1. Use only tested-listed assemblies.
   a. FS 2000 Non-Sag and FS 2003 Self Leveling, single component silicone sealant, by 3M.
   b. Biotherm 100/200 Self-Leveling, single component silicone sealant, by Bio Fireshield, Inc.
   c. Fyre Putty ceramic fiber hard setting putty, by Carborundum.
   d. CLK N/S and S/L Firestop Sealant, by Nelson Fire Stop Products.
   e. Rectoseal Metacaulk 835+.
   f. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product.

I. Expanding Foam Sealant:
1. One (1) or two (2) component fire rated moisture cured expanding urethane.
2. Shall not contain formaldehyde.
3. Density: Minimum 1.5 pcf.
4. Minimum 70 percent closed cell content.
5. R-value minimum 5.0/IN.
6. Flame spread: Less than 25.
7. Smoke developed: Less than 25.

J. Acoustical Sealant:
1. One (1) component siliconized acrylic latex sealant.
2. Non-staining, non-bleeding.
3. Compatible with paints specified for adjoining materials.
   a. See Section 09905.
4. Meet ASTM C834.
   a. Pecora - AC20+.
   b. Sonneborn - Sonolac.
   c. Tremco - Tremflex 834.

K. Polysulfide Rubber Sealant:
1. One (1) or two (2) component.
2. Meet ASTM C920.
   a. Pecora Synthacalk GC2+.
   b. Sonneborn - Sonolastic - two-part polysulfide sealant.
   c. Morton Polymer Systems - Thiokol Sealants.

L. Polyurea Joint Filler:
1. Two (2) component, semi-rigid material for filling control, sawcut and construction joints in interior concrete floors.
   a. Dayton Superior Specialty Chemical Corp. "Joint Fill, Joint Seal, Joint Saver II" as required for condition and recommended by manufacturer.
   b. Euclid Chemical Co. "EUCO QWIK" joint.
   c. L & M Construction Chemicals, Inc. "Joint Tite 750".
   d. Sonneborn "TF-100" control joint filler.
2. Comply with ACI 302.1R performance recommendations regarding control and construction joints.
3. Color: GraySpecifier: Utilize this Article to specify spare parts or products and extra materials.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before use of any sealant, investigate its compatibility with joint surfaces, fillers and other materials in joint system.

B. Use only compatible materials.

C. Where required by manufacturer, prime joint surfaces.
1. limit application to surfaces to receive calking.
2. mask off adjacent surfaces.

D. Provide joint depth for joints receiving polyurea joint filler in accordance with manufacturer's recommendations.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions and ul requirements.

B. Clean all joints.

C. Make all joints water and airtight.

D. Make depth of sealing compounds, except expanding foam and polyurea sealant, not more than one-half width of joint, but in no case less than 1/4 in nor more than 1/2 in unless recommended otherwise by the manufacturer.

E. Provide correctly sized backer rod, compressible filler or compressible sealant in all joints to depth recommended by manufacturer:
1. take care to not puncture backer rod and compressible filler.
2. provide joint backer rod as recommended by the manufacturer for polyurea joint filler.

F. Apply bond breaker where required.

G. Tool sealants using sufficient pressure to fill all voids.

H. Upon completion, leave calking with smooth, even, neat finish.

I. Where piping, conduit, ductwork, etc., penetrate wall, seal each side of wall opening.

J. Install compressible sealant to position at indicated depth.
1. Take care to avoid contamination of sides of joint.
2. Protect side walls of joint (to depth of finish sealant).
3. Install with adhesive faces in contact with joint sides.
4. Install finish sealant where indicated.

K. Install expanding foam sealant to minimum 4 in depth or thickness of wall being penetrated if less than 4 in or as indicated on drawings.
1. Provide adequate fire rated backing material as required.
2. Hold material back from exposed face of wall as required to provide backer rod and finish sealant.
3. Allow expanding foam sealant to completely cure prior to installing backer rod and finish sealant.
4. Material shall be minimum of 70 DegF prior to and during installation.
5. Trim off excess material flush with surface of the wall if not providing finished sealant.

3.3 SCHEDULE

A. Furnish sealant as indicated for the following areas:
1. Exterior areas: {Polyurethane} {Silicone}.

2. Interior wet areas: {Polyurethane} {Silicone}.
3. Interior wet, corrosive areas: {Polyurethane} {Polysulfide}.
4. Interior nonwet, corrosive areas: {Polyurethane} {Silicone}.
5. Interior nonwet, noncorrosive areas: {Polyurethane} {Silicone}.
6. Fire-rated construction: See Section 07840.
7. Compressible sealant: Where indicated.
8. Sealant which will be subject to prolonged contact with or submersion in water (except wastewater and sewage):
   a. Polysulfide or polyurethane: NSF approved for use in potable water tanks.
9. Penetrations exterior wall above grade:
   a. For non-corrosive areas, provide expanding urethane foam, with polyurethane finish sealant.
   b. For corrosive areas, provide expanding urethane foam, bond breaker and polysulfide finish sealant on corrosive side with polyurethane finish sealant on non-corrosive side.
10. Sealant exposed to or having the potential of being exposed to concentrated chlorine gas or chlorine liquid: Polysulfide.
11. Sealant which will be immersed in wastewater or sewage: Polysulfide.
12. Interior concrete floor control joints or sawed joints: Polyurea joint filler.
13. Sealing around plumbing fixtures: Silicone.
14. Plastic laminate casework, plastic laminate countertops and solid surface materials: Silicone.

END OF SECTION

SECTION 08220
Fiberglass Reinforced Plastic (FRP) Doors and Frames

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Fiberglass Reinforced Plastic (FRP) Doors

B. Fiberglass Reinforced Plastic (FRP) Frames

1.2 RELATED SECTIONS

A. Division 1 - General Conditions, Supplementary Conditions

B. Division 4 - Unit Masonry

C. Division 8 - Finish Hardware

D. Division 8 - Glass and Glazing

1.3 QUALITY ASSURANCE

A. General Qualifications:
1. Manufacturer Qualifications: A company that specializes in manufacturing FRP doors and frames with a minimum of 30 years experience.
2. Quality Assurance: Obtain all FRP doors and FRP frames from a single manufacturer to ensure consistent quality.
3. Quality Assurance: Hardware and accessories for all FRP doors and FRP frames shall exactly adhere to the Architect's specification.
4. Quality Assurance: Glass for windows in doors shall be furnished per the Architect's instructions and specifications.

B. Regulatory Requirements:
1. Fire-rated door, panel and frame construction conforms to products tested under ASTM E152, UL10C & NFPA 252.
2. Install doors, panels and frames conforming to NFPA 80 for fire-rated class, ANSI A117.1 specifications for handicap accessibility, ADA requirements, ANSI A250.4-2011 cycle swing in excess of 1,000,000 cycles with no failure of any design features of the door.
3. Flame Spread: All rated FRP component parts, including the finish, shall have a flame spread classification of 25 or less per ASTM E84 and shall be self extinguishing per ASTM D635, unless operating conditions dictate otherwise.
4. Resins and coatings to meet with USDA standards for incidental food contact, if applicable to this project.
5. Products manufactured—if so specified—that have passed the Florida Building Code (FBC), including Miami-Dade High Velocity Hurricane Zone (HVHZ).

C. Warranty:
To include ten (10) years free from defects in material and workmanship from date of shipment, and lifetime from corrosion from date of shipment, provided that the structural integrity of the

doors and frames have not been violated or compromised.

1.4 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Shop Drawings – Include the following:
   1. Elevation of each door type including door size, handing and finish
   2. Cutout locations for lites and hardware
   3. Internal reinforcement
   4. Frame configuration, anchor types and spacing

C. Product data including manufacturer's literature, fabrication descriptions and installation instructions.

D. Construction and/or color samples as requested.

1.5 DELIVERY, STORAGE AND PROTECTION

A. Doors and frames will be individually packaged in cardboard cartons. Cartons will be clearly labeled with project information and will include fasteners and installation instructions, if required. Only remove cartons upon arrival if cartons are wet or damaged.

B. Deliver and store doors and frames at the job site in such a manner as to prevent damage; out of weather and/or extreme temperatures. The doors shall be stored in a vertical position on blocking, clear of the floor and with blocking between the doors to permit air circulation between the doors.

C. All damaged or otherwise unsuitable doors and frames, when so ascertained, shall be immediately removed from job site.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Products manufactured by the following companies complying with these specifications will be acceptable:
   CORRIM Company,
   Fib-R-Dor, a Div. of Chase Doors, Inc

B. Substitutions may be considered provided the manufacturer can comply with the specifications as written and the products are manufactured in the United States of America. Requests for substitutions must be submitted in writing no less than ten (10) business days prior to the bid date. Substitution requests shall include a physical sample and written documentation that the product meets the specific manufacturing methods as stated herein.

2.2 FRP DOORS

A. Door Fabrication:
   1. Total door thickness to be a nominal 1-3/4 inches thick.

2. Lock stiles on non-rated and rated active leaves shall be factory beveled 1/8" in 2".
3. Provide doors with completely seamless construction on all six (6) surfaces.

B. Face Sheets: FRP face sheets shall be manufactured using a corrosion resistant resin system with light stabilizing additives. The resin shall be reinforced with fiberglass, 50% average by weight for enhanced strength. Face sheets shall be a minimum of 0.125 inch thick fiberglass. Face sheets will be Architect's choice of smooth, pebble or woodgrain seamless finish.

C. Stiles and Rails: Stiles and rails shall be 1-1/2 inch square pultruded fiberglass tubes. Pultrusion is a fiberglass fabrication process that results in a much stronger, more durable product. Non-rated and 20 minute doors will have a full width horizontal 1-1/2 inch square pultruded fiberglass tube every 24 inches in height for internal reinforcement. A 1-1/2 inch square solid fiberglass block shall be used at all hardware reinforcements and corner intersections. A minimum of 1,150 pounds screw withdrawal force shall be required per screw. The bottom rail shall allow for 1-1/4 inches of height alterability without loss of the panel's integrity. Absolutely no metal or wood reinforcements, including #2 SPF (Spruce Pine Fir), will be allowed in any part of the stile and rail configuration.

D. Core Options:
1. Polyurethane Foam Core: A 1-1/2 inch thick rigid block of polyurethane shall be laminated to the interior of the panels. The "R" factor shall be 12. The polyurethane insulation shall be Class A and CFC free. Foam properties comply with ASTM E-84 and The International Building Code (IBC).
2. Balsa Core: 1-1/2 inches thick Balsa core, of end grain construction for enhanced strength, shall be laminated to the interior of the panels. The balsa shall have a density of 8.5 – 9.0 lbs/cu. Ft. Compressive strength, perpendicular to the door panel surface shall be 1400 psi.
3. Honeycomb Core: Phenolic impregnated resin paper honeycomb.
4. Mineral Core: for 30 minute to 90 minute fire rated FRP doors.

E. Hardware Preparations: Doors shall be reinforced and mortised for hardware with 1-1/2 inches x 1-1/2 inches of solid fiberglass to allow application of hinges and locks, in accordance with the hardware schedule, hardware manufacturer's instructions and templates.
1. Reinforcement Blocking: Non-swelling polymer or firestop blocking will be used for all lockset, surface mounted hardware and thru-bolted hardware blocking.
2. Pilot holes for full mortise butt hinges will be pre-drilled by factory.
3. All hardware shall be attached / installed by using pilot hole and stainless steel wood screws.

F. Door Accessories
1. Glazing: Glazing support structures shall ensure that the glass area is weather sealed as not to permit moisture from entering the core of the door. This is to be accomplished by utilizing pultruded 1-1/2 inch square FRP tubes to fabricate the window opening. Glazing must allow for ready access for repair in the event of damage or replacement, without affecting the sealed integrity of the cutout in the door panel itself. Openings cut directly into the core material will not be allowed.
2. Louvers: Louvers shall be fabricated with pultruded FRP material of an inverted "V" design, and shall be subject to the same performance guarantee as the door panel. The louver opening will be fabricated in the same method as for glazing above.
3. Fasteners: Provide countersunk stainless steel fasteners as required for glazing openings and louvers.
4. Transoms: All transom panels will be identical to the doors in construction, materials, thickness, color and reinforcement.

5. Astragals: Astragals for pairs of doors to be fabricated with FRP material of manufacturer's standard flat design.

2.3 FRP FRAMES

A. Fabrication: FRP frames shall be rigid, neat in appearance, free from defects and the finish shall match the doors. Fabricate FRP doors and frames as shown on the drawings and in accordance with best shop practices. Field measurements shall be taken as required for coordinating with adjoining work.
1. Provide frames for doors, transoms, sidelites and borrowed lites, as required.
2. All frames shall be 100% pultruded fiberglass with an average 50% glass content by weight which results in an industrial fiberglass frame as strong as a 14 gauge hollow metal frame.
3. Non-rated and 20 minute UL labeled: Standard one piece FRP profile with integral stop: 5-3/4" x 2" equal rabbet
4. 30 – 90 minute UL labeled FRP Frames: Standard one piece FRP profile with integral stop: 5-3/4" x 2" equal rabbet. Frames that must be grouted solid with mortar in the field to achieve label are not acceptable.
5. Head and jamb members shall be standard 45 degree miter, providing a neatly mitered corner connection, fabricated for Knocked Down (KD) field assembly.

B. Reinforcements and Braces / Supports
1. Frames shall be reinforced and mortised for hardware in accordance with the hardware schedule, manufacturer's instructions and templates. Absolutely no metal reinforcements will be allowed in any part of the FRP frame configuration.
2. Corner Reinforcement: 4 inches x 4 inches x 5-3/8 inches x 1/4 inch thick pultruded fiberglass angle. Attached to head bar at factory using stainless steel screws.
3. Mortise Hinge Reinforcement: 3 inches x 7 inches x 9/16 inch (or 3/8 inch) thick FRP material attached to frame by means of bonding and stainless steel countersunk screws.
4. Closer Reinforcement: 1-1/2 inches x 19 inches x 3/16 inch thick FRP material attached to frame by means of bonding.
5. Strike Reinforcement: 1-1/2 inches x 9 inches x 3/4 inch thick FRP material attached to frame by means of bonding and stainless steel countersunk screws.
6. Anchoring Systems - Furnish at least three (3) anchors in each jamb of frames up to 90 inches high and one (1) additional anchor for each 30 inches in height above 90 inches, in shapes, sizes and spacing shown or required for anchorage into adjoining wall construction.
   a. New Masonry: T-Strap or Wire Anchor (stainless steel T-Strap)
   b. New Stud (before sheathing): New Stud Anchor
   c. Butt Existing Wall: Existing Opening Anchor; Masonry, Steel or Wood (concealed)
   d. Wrap Existing Wall: Compression Anchor
   e. Consult factory for additional anchoring options.

2.4 FINISH

A. Seamless 25 mil matte gelcoat (smooth faces only), selected by Architect, from manufacturer's full range of colors

B. Finish on door and frame units will match

PART 3 – EXECUTION

3.1 INSPECTION

Installer shall examine the substrate and conditions under which fiberglass reinforced plastic work is to be installed and notify the General Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 INSTALLATION

A. Doors and frames will be delivered in individual cartons with the identifying mark number listed on each carton.
B. Install FRP doors, frames and accessories in accordance with manufacturers printed instructions, final shop drawings, NFPA 80 standards at fire rated openings and / or HVHZ standards for FBC labeled openings.
C. Provide clearance for doors of 1/8 inch at jambs and heads; 1/4 inch clearance above threshold.
D. Fire labeled doors, frames and accessories must be installed by qualified, licensed installers adhering to the latest version of NFPA 80.

3.3 ADJUSTING

At substantial completion, adjust all operable components to ensure proper installation. Doors shall function smoothly and swing freely without binding. Doors shall remain open at any angle without being affected by gravitational influence.

3.5 CLEANING

Remove dirt and excess sealant from exposed surfaces. Follow the manufacturer's recommended cleaning techniques and procedures for cleaning all surfaces. Only use cleaning products that will not scratch or damage the surfaces and are recommended by the manufacturer.

END OF SECTION

SECTION 08710

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 80 - Fire Doors and Windows.
4. NFPA 101 - Life Safety Code.
5. State Building Codes, Local Amendments.

D. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series

1.2 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to project site.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.3 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

1.4 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturers, agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Ten years for manual door closers.

1.5 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Continuing Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous six months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

1. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

a. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

2. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.

a. Permanent cylinders, cores, and keys to be installed by Owner.

B. Substitutions: Requests for substitution and product approval for door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:

a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.
d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, stainless steel, bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Heavy or Standard weight, stainless steel material, bearing hinges as indicated in Hardware Sets.

4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:

1) Out-swinging lockable doors.

5. Acceptable Manufacturers:

    a. Hager Companies

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified manual flush bolts. Manual flush bolts to be furnished with top rod of sufficient length to allow bolt location approximately six feet from the floor. Furnish dust proof strikes for bottom bolts. Surface bolts to be minimum 8" in length. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

1. Acceptable Manufacturers:

    a. Door Controls International
    b. Rockwood Manufacturing (RO)
    c. Trimco

2.4 CYLINDERS AND KEYING

A. General: Master key or grand master key locks to Owner's existing system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
2. Mortise cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.

D. Keying System: Cylinders to be factory keyed. Conduct specified "Keying Conference" to define and document keying system instructions and requirements. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner. Incorporate decisions made in keying conference, and as follows:

1. Master Key System: Cylinders are operated by a change key and a master key.
2. Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
3. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
4. Keyed Alike: Key all cylinders to same change key.

E. Key Quantity: Provide the following minimum number of keys:

1. Top Master Key: One
2. Change Keys per Cylinder: Two
3. Master Keys (per Master Key Group): Two
4. Grand Master Keys (per Grand Master Key Group): Two

5. Construction Control Keys (where required): Two
6. Permanent Control Keys (where required): Two

F. Construction Keying: Provide construction master keyed cylinders or temporary keyed construction cores where specified. Provide construction master keys in quantity as required by project Contractor. Replace construction cores with permanent cores. Furnish permanent cores for installation as directed under specified "Keying Conference".

G. Key Registration List: Provide keying transcript list to Owner's representative in the proper format for importing into key control software.

2.5 MECHANICAL LOCKS

A. Mortise Locksets: Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified mortise locksets furnished in the functions as specified in the Hardware Sets. Locksets to be manufactured with a corrosion resistant, stamped 12 gauge minimum formed steel case and be field-reversible for handing without disassembly of the lock body. Lockset trim (including knobs, levers, escutcheons, roses) to be the product of a single manufacturer. Furnish with standard 2 3/4" backset, 3/4" throw anti-friction stainless steel latchbolt, and a full 1" throw stainless steel bolt for deadbolt functions.

1. Provide mortise lock bodies functionally compatible with a rose-less lever trim option.

2. Acceptable Manufacturers:

   a. Schlage L – Series Commercial Heavy Duty Mortise Locks L900 Full Face escutcheons and #6 Handles

B. Exit Devices: Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified mortise locksets furnished in the functions as specified in the Hardware Sets. Locksets to be manufactured with a corrosion resistant stainless steel, stamped 12 gauge minimum formed steel. Lockset trim to be the product of a single manufacturer.

1. Acceptable manufacturers: Yale Model 2100 or approved equal.

C. Lock Trim Design: As specified in Hardware Sets.

2.6 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Dustproof Strikes: BHMA A156.16.

2.7 DOOR CLOSERS

A. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units and high impact, non-corrosive plastic covers standard.

1. Acceptable Manufacturers:

    a. LCN Model - 4040XP Series Aluminum Finish

2.8 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Acceptable Manufacturers:

    a. Rockwood Manufacturing (RO)
    b. Trimco

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Acceptable Manufacturers:

    a. Rixson Door Controls (RF)
    b. Rockwood Manufacturing
    c. Sargent Manufacturing

2.9 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated.

B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

C. Acceptable Manufacturers:

1. Pemko Manufacturing (PE)
2. Reese Enterprises, Inc.

2.10 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.11 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of hardware to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Architect will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.8 DOOR HARDWARE SCHEDULE

A. The hardware sets represent the design intent and direction of the Owner and Architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the Architect with corrections. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. Manufacturer's Abbreviations:

MK - McKinney
PE – Pemko
RO - Rockwood
RF - Rixson
SA – Sargent
HA - Hager
SL – Schlage
LCN – LCN
VD – Von Duprin
DJ – Don-Jo

Hardware Schedule

Set: 1.0- Restroom Doors

*	Continious Hinge (heavy weight)		
1	Cylindrical Deadbolt	B600 SERIES 6 PIN GRADE 1 SS	SL
1	Door Pull	1158 12" tall w/ Offset SS	DJ
1	Door Closer	4040XP Aluminum finish	LCN
1	Overhead Door Stop	9 Series	RF
2	Kick Plates	190S Stainless Steel	HA
1	Push Plate	15"x6" Stainless Steel	

Set: 2.0 Mechanical Room

*	Hinge (heavy weight)	BB1199 4.5"x4.5" Stainless Stl	32D	HA
1	Storeroom Lock	L-Series Stainless	32D	SL

1	Door Closer	4040XP Aluminum finish		LCN
1	Threshold	252x3AFG		PE
1	Gasketing	S88D		PE
1	Rain Guard	346C		PE
1	Door Bottom	216APK		PE
1	Sweep	90100CNB		PE
3	Silencer	608		RO
1	Latch Protector	325	26D	RO
1	Kick Plates	190S Stainless Steel		HA

END OF SECTION

SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. STC-Rated Assemblies: Provide materials and construction identical to assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

C. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to assemblies tested according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide framing at interior partitions capable of withstanding loads within limits and under conditions indicated.
   1. Interior Design Load: 5 psf.
   2. Interior Non-Load Bearing Partition Wall Framing: Horizontal deflection of 1/120 of the framing member span.

PART 2 - PRODUCTS

2.1 BOARD

A. Gypsum board products in maximum lengths available to minimize end-to-end butt joints.

   1. Gypsum Wallboard: ASTM C 36, with manufacturer's standard edges, 5/8 inch thick, Type X, unless otherwise indicated.

   2. Moisture Resistant Gypsum Board: ASTM C 630, 5/8 inch thick, Regular type, unless otherwise indicated. Type X where required for fire-resistance-rated assemblies and where indicated. “Gyroc Moisture-Guard” manufactured by Georgia-Pacific Corp. or equal.

   3. Fiberglass Faced Gypsum Board: Provide DensShield Tile Backer

2.2 ACCESSORIES

A. Trim Accessories: Cornerbead, edge trim, and control joints complying with ASTM C 1047, formed from steel sheet zinc coated by hot-dip process or rolled zinc. Use steel sheet zinc coated by hot-dip process or rolled zinc at exterior soffits.

B. Gypsum Board Joint Treatment Materials: Comply with ASTM C 475. Paper reinforcing tape and setting-type taping compound and drying-type, ready-mixed, compounds for topping.

C. Glass-Fiber Sheathing Tape for Glass-Mat Gypsum Sheathing: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 threads per inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing board and with a history of successful in-service use.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Perma-Tite Tape--PGM 207A; PermaGlas-Mesh, Inc.
    b. Quik-Tape; Quik-Tape, Inc.

D. Silicone Emulsion Sealant for Glass-Mat Gypsum Sheathing: Product complying with ASTM C 834, compatible with sheathing tape and gypsum sheathing, recommended by sheathing and tape manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Product: Subject to compliance with requirements, provide "Elmer's Siliconized Acrylic Latex Caulk" by Borden, Inc.

E. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834.

F. Sound-Attenuation Blankets: Unfaced mineral-fiber-blanket insulation complying with ASTM C 665 for Type I.

G. Access Panels: See Spec 08310

H. Miscellaneous Materials: Auxiliary materials for gypsum board construction that comply with referenced standards.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install and finish gypsum panels to comply with ASTM C 840 and GA-216.

1. Isolate the perimeter of non-load-bearing gypsum board partitions where they abut structural elements, except floors, by providing a 1/4- to 1/2-inch wide space between gypsum board and the structure. Trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

2. STC-Rated Assemblies: Comply with ASTM C 919 for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies.

3. Fire-Resistance-Rated Assemblies: Comply with requirements of listed assemblies.

4. Light Fixture Protection: Provide gypsum wallboard enclosure over recessed lighting fixtures in ceilings when required in fire-rated construction.

5. Fire Taping: Comply with manufacturers printed instructions for fire resistance where fire rated assemblies are indicated.

6. Single-Layer Fastening Methods: Fasten gypsum panels to supports with screws.

7. Multilayer Fastening Methods: Fasten base layers with screws and face layers to base layers with adhesive and supplementary fasteners.

B. Finishing Gypsum Board Assemblies:

1. Level 4 smooth finish, at exposed walls and ceilings to receive paint as final surface treatment.

2. Level 3 at walls and ceilings to receive additional covering such as decorative wall paper.

3. Level 1 finish for concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies.

4. Level 2 finish where panels form substrates for tile or rigid sheet covering such as fiberglass reinforced plastic (FRP) panels.

5. Trim all exposed gypsum board edges.

END OF SECTION

SECTION 09770

DECORATIVE FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Prefinished polyester glass reinforced plastic sheets and adhered to unfinished gypsum wallboard.
   1. PVC trim.
   2. PVC Wall base.

B. Products Not Furnished or Installed under This Section:
   1. Gypsum substrate board.
   2. Resilient Base.

1.2 RELATED SECTIONS

A. Section 09260 – Gypsum substrate board.

1.3 REFERENCES

A. American Society for Testing and Materials: Standard Specifications (ASTM)
   1. ASTM D 256 - Izod Impact Strengths (ft #/in)
   2. ASTM D 570 - Water Absorption (%)
   3. ASTM D 638 - Tensile Strengths (psi) & Tensile Modulus (psi)
   4. ASTM D 790 - Flexural Strengths (psi) & Flexural Modulus (psi)
   5. ASTM D 2583- Barcol Hardness
   6. ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
   7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.

C. Selection Samples: Submit manufacturer’s standard color pattern selection samples representing manufacturer's full range of available colors and patterns.

D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
   1. Submit complete with specified applied finish.
   2. For selected patterns show complete pattern repeat.
   3. Exposed Molding and Trim: Provide samples of each type, finish, and color.

E. Manufacturers Material Safety Data Sheets (MSDS) for adhesives and sealants prior to their delivery to the site.

1.5 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
   1. ASTM E 84 (Method of test for surface burning characteristics of building Materials)
      a. Wall Required Rating – Class C.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials factory packaged on strong pallets.

B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (70°) for 48 hours prior to installation.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work

B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
   1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.8 WARRANTY

A. Furnish one year guarantee against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Marlite, Symmetrix style; or approved equal.

B. Product:
   1. Symmetrix with sani-coat.

2.2 PANELS

A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
   1. Coating: Multi layer print, primer and finish coats.
   2. Dimensions:
      a. Thickness – 0.090 inch (2.29mm) nominal
      b. Width - 4'-0" (1.22m) nominal
      c. Length – 10'-0" nominal
   3. Tolerance:
      a. Length and Width: +/-1/8 inch (3.175mm)
      b. Square - Not to exceed 1/8 inch for 8 foot (2.4m) panels or 5/32 inch (3.96mm) for 10 foot (2.4m) panels

B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
   1. Flexural Strength - 1.0×10^4 psi per ASTM D 790. (7.0 kilogram-force/square millimeter)
   2. Flexural Modulus - 3.1×10^5 psi per ASTM D 790. (217.9 kilogram-force/square millimeter)
   3. Tensile Strength - 7.0×10^3 psi per ASTM D 638. (4.9 kilogram-force/square millimeter)
   4. Tensile Modulus - 1.6×10^5 psi per ASTM D 638. (112.5 kilogram-force/square millimeter)
   5. Water Absorption - 0.72% per ASTM D 570.
   6. Barcol Hardness (scratch resistance) of 35 55 as per ASTM D 2583.
   7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256

C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

D. Front Surface: Symmetrix FRP Tile pattern.

E. Front Finish: C145-G44 Silver.
   a. Color C145-G44 Silver.
   b. Surface: Tile Pattern.
   c. Fire Rating: Class C (III) Fire Rating.
   d. Size: 4' x 9' [1.2m x 2.7m] x .120"

2.3 BASE

A. Marlite Base Molding for 0.090 inch (2.29mm) thick FRP Panels
   1. Color: [Black] [Quarry Red].
   2. Profiles:
      a. M 612 FRP Base Molding
      b. M 651 Inside Corner
      c. M 660 Outside Corner
      d. M 620 LH End Cap
      e. M 625 RH End Cap

2.4 MOLDINGS

PVC: Extruded PVC Trim Profiles for .090 inch thick panels.
   1. M 350 Inside Corner
   2. M 360 Outside Corner

3. M 365 Division
4. M 370 Edge
   a. Color: __145 Silver

B. Outside Corner Guard:
1. M 961 PVC
   a. 145 Silver

2.5 ACCESSORIES

A. Fasteners: None- Panels adhesive applied

B. Adhesive: Either of the following construction adhesives complying with ASTM C 557.
1. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive
2. Marlite C-375 Construction adhesive flexible, water-resistant, solvent based adhesive formulated for fast, easy application.

C. Sealant:
1. Marlite Brand MS-250 Clear Silicone Sealant
2. Marlite Brand MS-251 White Silicone Sealant
3. Marlite Brand - Color Match Sealant,

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
1. Verify that stud spacing does not exceed 24 inch (61cm) on-center.

B. Repair defects prior to installation.
1. Level wall surfaces to panel manufacturer’s requirements. Remove protrusions and fill indentations.

3.2 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.

B. Cut sheets to meet supports allowing 1/8” inch (3 mm) clearance for every 8 foot (2.43m) of panel.
1. Cut with carbide tipped saw blades, or cut with shears.

C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
1. Install panels with manufacturer's recommended gap for panel field and corner joints.
   a. Adhesive trowel and application method to conform to adhesive manufacturer’s recommendations.

D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.

1. All moldings must provide for a minimum 1/8 inch (3.18mm) of panel expansion at joints and edges, to insure proper installation.
2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.3 CLEANING

A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.

B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION

SECTION 09900
PAINTING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Installation of finish as scheduled.

1.2 REFERENCES

A. ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

1.3 DEFINITIONS

A. Conform to ASTM D16 for interpretation of term used in this Section.

1.4 QUALITY ASSURANCE

A. Applicator: Company specializing in commercial painting and finishing with 3 years experience.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame, fuel, smoke rating requirements for finishes.

1.6 SUBMITTALS

A. Material and Equipment Submittals: Submit the following under provisions of Section 01300:
   1. Product data.
   2. Samples: Submit two 6" x 6" samples illustrating range of colors and textures available for each surface finishing product scheduled for selection and approval.
   3. Manufacturer's application instructions.

B. Closeout Submittals: Submit the following under provisions of Section 01300
   1. Extra Materials: Provide 1 gallon of each product used on the project. Paint to be in clean 1 gallon cans neatly marked, showing manufacture, application instructions, color name, number and/or formula and product type.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and protect products to site under provisions of Section 01600.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.

C. 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.

D. Store paint materials at minimum ambient temperature of 45° F and a maximum of 90° F, in well ventilated area, unless required otherwise by manufacturer's instructions.

E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 ° F for 24 hours before and during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperatures for Latex Paints: 50 °F unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65 ° F for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 – PRODUCTS

2.1 APPROVED MANUFACTURER AND MATERIAL SUPPLIER

Acceptable Manufacturers:
1. Benjamin Moore & Co.
2. ICI Paint Stores, Inc.
3. Sherwin-Williams Company, Stores Division
4. Or approved equal with same performance and warranty.

B. Painting contractor shall perform all required material take off and purchase specified paint products.

C. Painting contractor may select manufacturer of paint from one of the above listed or proposed substitution for review.

D. All materials specified in this section must be from one and only one of the selected manufacturers.

2.2 PRIMERS

A. Inhibitive Metal and Galvanized Metal Primer:
1. Sherwin-Williams, Pro Industrial Series Pro-Cryl Universal Acrylic Primer B66-310 series.
2. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product performance.

B. Interior Primer/Sealer:
1. Sherwin-Williams, manufacturer’s recommended primer for paint P-1.
2. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product performance.

C. Interior Wood/MDO Primer:
1. Benjamin Moore.
2. ICI Ultra Hide Interior Wood Undercoater.
3. Sherwin-Williams Prep Rite Classic Primer B28W101
4. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product performance.

2.3 FINISH PAINTS

A. Interior Acrylic Latex, satin finish (P-1):
Paint locations: General paint for interior walls and ceilings where P-3 is not used.
1. Sherwin-Williams, Pro Classic Interior Acrylic Latex.
2. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product performance.

B. Industrial Enamel, gloss finish (P-2):
Paint locations: General paint for interior and exterior, non-factory finished miscellaneous steel, such as railings, stair stringers, etc.
1. Sherwin-Williams Pro Industrial series Industrial Enamel 100.
2. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product performance.

C. Interior High Performance Epoxy, gloss finish (P-3):
Paint locations @ Room 200-201 fire retardant treated wood walls: Tipping floor side of mezzanine walls & soffit, 8' high plywood wainscot and as noted on drawings.
1. Benjamin Moore, Super Spec HP Epoxy (Polyamide).
2. Sherwin-Williams Pro Industrial High-Performance Epoxy.
3. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product performance.

D. Exterior & Interior Traffic Marking Paint:
Paint locations: Floor slab & site paving traffic markings.
1. Sherwin-Williams Hotline Traffic Marking Paint TM215/TM2153.
2. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product performance.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
1. Plaster and Gypsum Wallboard: 12 percent.
2. Masonry: 12 percent
3. Interior Located Wood: 15 percent, measured in accordance with ASTM D2016

C. Beginning of installation means acceptance of substrate

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 that affect the work of this section.

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 or commercial mildew removers. Rinse with clean water and allow surface to dry.

E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing.

F. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.

G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

H. 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.

I. 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.

J. Interior Wood Items Scheduled to Receive 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.

K. 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. Apply products in accordance with manufacturer's instructions or more stringent requirements specified herein.

B. Do not apply finishes to surfaces that are not dry.

C. Apply each coat to uniform finish.

D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.

E. Sand lightly between coats to achieve required finish.

F. Allow applied coat to dry before next coat is applied.

G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

H. Prime back surfaces of interior and exterior woodwork with primer paint.

I. Prime back surfaces of interior wood work scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

3.5 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Paint shop primed equipment.

B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

C. Prime and paint equipment visible in exposed finished areas, including insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are pre-finished.

D. Replace identification markings on mechanical or electrical equipment when painted accidentally.

E. Paint exposed conduit and electrical equipment occurring in finished areas.

F. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

G. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

3.6 CLEANING

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.

PART 4 – SCHEDULES

4.1 INTERIOR PAINT SYSTEM SCHEDULE

A. Interior walls:
   1. 1 coat Interior Primer/Sealer
   2, 2 coats Interior Acrylic Latex, satin finish (P-1)

B. Interior gypsum board ceilings:
   1. 1 coat Interior Primer/Sealer
   2. 2 coats Interior Acrylic Latex, satin finish (P-1)

C. Hollow Metal Doors, Hollow metal door and window frames and other Interior un-galvanized Ferrous Metal.
   1. 1 coat Rust Inhibiting Primer (if unprimed)
   2. 2 coats Industrial Enamel, gloss finish (P-2)

D. Interior Galvanized Ferrous Metal:
   1. 1 coat Galvanized Metal Primer.
   2. 2 coats Waterborn Acrylic Semi-Glass

E. PT-8: Interior Floor Striping:
   1. 1 coat Traffic Paint

4.2 EXTERIOR PAINT SYSTEM SCHEDULE

A. Exterior Ungalvanized Ferrous Metal:
   1. 1 coat Inhibitive Metal and Galvanized Metal Primer (if unprimed).
   2. 2 coats Exterior Gloss Enamel

B. Exterior Galvanized Ferrous Metal:
   1. 1 coat Inhibitive Metal and Galvanized Metal Primer (if unprimed).
   2. 2 coats Exterior Gloss Enamel

C. Roof Panels
   1. Factory Finish

D. Striping:
   1. 1 coat Traffic Paint.

4.3 COLOR SCHEDULE

A. C1 Warning stripes
   1. Benjamin Moore OSHA Yellow
   2. ICI
   3. Sherwin Williams Safety Yellow 4084

B. C2 Traffic Paint
   1. 1 coat
   2. Site: White
   3. Tipping Floor: Safety Yellow 4084

C. C3 Interior walls
   1. Benjamin Moore match.
   2. ICI by color match.
   3. Sherwin Williams color to match: per schedule on drawings.

END OF SECTION

SECTION 10520
FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fire extinguishers.

B. Accessories.

1.2 RELATED SECTIONS

A. Section 09900 - Painting: Field paint finish.

1.3 REFERENCES

A. NFPA 10 - Portable Fire Extinguishers.

B. ADAAG - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities.

1.4 QUALITY ASSURANCE

A. Conform to NFPA 10 requirements for extinguishers.

B. Provide fire extinguishers, cabinets and accessories by a single manufacturer.

1.5 SUBMITTALS

A. Material and Equipment Submittals: Submit the following under provisions of Section 01300:

B. Closeout Submittals: Submit the following under provisions of Section 01700:
1. Maintenance Data: Include test, refill or recharge schedules, procedures, and re-certification requirements.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperatures may cause freezing.

PART 2 - PRODUCTS

2.1 GENERAL

A. It is the intention of the designers that the system meets the requirements of ADAAG.

2.2 EXTINGUISHERS

A. (**FE-1**) Multipurpose Mono-Ammonium Phosphate Type ABC extinguishers: UL-rated 6A-120B:C, 20 lb., nominal capacity, enameled steel tank with pressure gauge.

1. Basis of Design: J.L. Industries, Extinguisher Type: Cosmic 20E (tipping floor and vehicle tunnel).
   J.L. Industries, Inc., 4450 West 78th Street Circle, Bloomington, MN 55435, (952) 835-6850, Fax: (952) 835-2218
2. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product.

B. (**FE-2**) Halotron 1 Type: UL-rated 10B:C, 11 lb. nominal capacity, aluminum tank with pressure gauge.
1. Basis of Design: J.L. Industries, Extinguisher Type: Mercury Halotron11 (office area)
   J.L. Industries, Inc., 4450 West 78th Street Circle, Bloomington, MN 55435, (952) 835-6850, Fax: (952) 835-2218
2. Or equivalent with same performance and warranty. Sub-contractor takes responsibility for product.

2.3 FIRE EXTINGUISHER CABINETS

A. Basis of Design: J.L. Industries, Ambassador Series, model to fit approved extinguisher type at Vehicle Tunnel and Tipping Floor. Cold rolled steel with red painted finish. Surface mounted, rolled edge, full glazed cabinets.
B. Basis of Design: J.L. Industries, Academy Series, model to fit approved extinguisher type at office suite. Cold rolled steel with red painted finish. Semi-recessed wall mounted, full glazed cabinets.

2.4 ACCESSORIES

A. Manufacturers recommended fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install extinguisher mounting brackets plumb and level, 48” maximum inches from finished floor to handle of extinguisher.

B. Secure fire extinguishers rigidly in place at mounting heights indicated, in accordance with manufacturer's instructions.

C. Mount the equipment in accordance with the requirements of ADAAG for reach range and protruding objects.

D. Verify all quantities, extinguisher types and locations with the Fire Marshal prior to installation.

END OF SECTION

SECTION 10800
TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Toilet and bath accessories listed herein.

B. Attachment hardware.

1.2 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: Wood anchor reinforcement in walls.

1.3 REFERENCES

A. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

B. ADAAG - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities

C. Applicable State and Local Accessibility Codes regarding toilet accessory mounting heights and mounting locations.

1.4 SUBMITTALS

A. Material and Equipment Submittals: Submit the following under provisions of Section 01300:

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.

B. Pack accessories individually in a manner to protect accessory and its finish.

1.6 PROTECTION

A. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this Section.

1.7 GUARANTEE

A. Provide manufacturer's 15 year guarantee against silver spoilage for mirrors.

PART 2 - PRODUCTS

2.1 GENERAL

A. It is the intention of the designers that the system meets the requirements of ADAAG and match satin finish and style where possible.

2.2 TOILET AND BATH ACCESSORIES

A. Toilet Tissue Dispenser: Bobrick #B-2892, Stainless steel. Double Jumbo Roll

B. Paper Towel Dispenser: Automatic motion sensor dispenser. Georgia Pacific, enMotion wall mounted automated touchless towel dispenser, hard-wired AC with battery backup.

C. Air Freshener Dispenser: Rubbermaid #5114.

D. Hand Soap Dispenser: Kutol Wall mounted soft and silky bag in box model # 9950ZPL, off white.

E. Sanitary Napkin/Tampon Dispenser: Bobrick #B-3706 25

F. Toilet Seat Cover Dispenser: Bobrick #B-221

G. Channel framed Mirror: Bobrick #B-165-2436, surface mounted, once piece mirror frame and No.1 quality electrolytically copper-plated glass mirror; or approved equal.

H. Grab Bars: Concealed mounting, 1-1/4" diameter, 18 gage, Type 304 stainless steel satin finish. Bobrick B-5806 series, bar lenghts per plans;

2.3 FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from one sheet of stock, free of joints.

C. Provide steel anchor plates and anchor components for installation on building finishes.

D. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

E. Back paint components where contact is made with building finishes to prevent electrolysis.

F. Hot dip galvanize ferrous metal anchors and fastening devices.

G. Key all accessories alike.

H. Shop assemble components and package complete with anchors and fittings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify site conditions are ready to receive work and dimensions are as instructed by manufacturer.

B. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to jobsite at appropriate time for building-in.

B. Provide templates and rough-in measurements as required.

C. Before starting work notify Architect in writing of any conflicts detrimental to installation or operation of units.

3.3 INSTALLATION

A. Install fixtures, accessories and items in accordance with manufacturer's instructions and all applicable Building and Accessibility Codes. Verify and obtain direction from Local Building Code Official in regards to any and all discrepancies between mounting heights indicated on the drawings, and applicable Building Codes.

B. Install true, plumb, and level, securely and rigidly anchored to substrate.

C. Use tamper-proof fasteners.

END OF SECTION