

SPECIFICATIONS

Project Manual

MIRAMAR HOUSING STAIRS REPAIR

**Texas A&M University – Corpus Christi
Corpus Christi, Texas**

TAMUCC PROJECT NO. 157323FY23

For Construction

June 07, 2023

Cocompetitive Sealed Proposal

**The Texas A&M University Corpus Christi
Office of Administrative Operations**

Owner



**TEXAS A&M UNIVERSITY
CORPUS CHRISTI**

**Costa Brava
Engineering LLC**

710 Buffalo St. STE 705
Corpus Christi, Texas 78401
956-572-2728

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Work covered by Contract Documents.
- B. Contract Method.
- C. Starting Work.
- D. Work by Others.
- E. Contractor's Use of Premises.
- F. Owner Occupancy.

1.02 WORK COVERED BY CONTRACT DOCUMENTS:

- A. The Work of this Contract comprises the general repair of stairs at Miramar Housing buildings located on the Corpus Christi for the Board of Regents of The Texas A&M University System.
- B. The Drawings and Specifications do not necessarily indicate or describe all Work required for completion of Project.
- C. The Contract Documents describe the essential elements sufficiently to determine the scope of the Project.
- D. Provide all items required for complete operating systems including items not necessarily shown in these Contract Documents, but that can be reasonably inferred as being required for a complete operating system.
- E. The Drawings and Specifications indicate the basic quality of material and quality of construction required for the entire Project.

1.03 CONTRACT METHOD:

- A. Construct the Work under a single lump sum contract.

1.04 STARTING WORK:

- A. The Contractor shall not start work until the Notice to Proceed has been issued and all insurance certificates have been reviewed and accepted by The Texas A&M University -Corpus Christi.
 - 1. The Contractor shall furnish the required Insurance Certificates to the

Contract Compliance Coordinator. (UGSC, Article 5).

2. The Contractor shall notify the ODR prior to commencing any Work.
3. Work Detail:
 1. No work Wednesday August 23 through Sunday August 27.
 2. Normal work hours 0800am to 0800pm Monday through Sunday. Work outside those hours must be submitted for approval in writing 48 hours in advance.
 3. Primary staging area and contractor parking Hammer Head parking lot.
 4. Possible TAMUCC can provide two (2) permits for up close parking at the building.
 5. Possible to locate a connex box near buildings with prior approval.
 6. Smoking only in designated smoking areas
 7. Contractors can eat in dining hall and Cove.
 8. All vendors required to pass background check.
 9. All personnel to secure new vendor Sand dollar id.
 10. Some stairs can be closed fully but not all at one time on a building. Contractor to submit sequence for EHS approval.
 11. Stairs to be fully enclosed with visqueen, or visqueen like material, to contain paint and debris while work is performed.
 12. All stairs at one building must be completed prior to moving to another building.
 13. Stairs requiring limited repair or only painting can be worked simultaneously with larger repairs so as to streamline the schedule. Contractor to submit sequence and time line.

1.05 WORK BY OTHERS (see UGSC 3.3.12):

- A. Contractor shall cooperate and coordinate its Work with Work provided under other contracts. Separate Contracts will include, but not necessarily be limited to the following:
 1. Owner's Testing Laboratory Services (Quality Assurance).
 2. Owner's independent HVAC balancing, testing and adjusting.
 3. Owner's commissioning agent.
 4. Owner's movable furnishings.
 5. Owner supplied equipment.
 6. N.I.C. (Not In Contract) Work.

1.06 CONTRACTOR'S USE OF PREMISES (see UGSC 3.1.4 and 3.3.11):

- A. Contractor shall have complete and exclusive use of premises within the construction limits indicated on the Drawings, for execution of Work.
 1. Where it is necessary for the Contractor to use portions of existing buildings and/or grounds for operations, such use shall be strictly in

accordance with requirements and approval of the Owner. Contractor shall provide proper and safe access to the Owner occupied areas at all times.

2. All interruptions of mechanical and electrical underground services shall be only at such time and for the lengths of time as approved by Owner. Where modifications to existing facilities or utility services are required, Contractor shall organize its work in order that inconvenience to the Owner is minimized. Give a minimum fourteen (14) days notice to ODR prior to interruption of services.
3. Unless otherwise indicated or specified, or unless otherwise directed by the Owner; water, gas, lighting, power and telephone conduits and wires, sewer lines, and other surface and subsurface structures and lines, shall be maintained by Contractor and shall not be disturbed, disconnected or damaged by the Contractor during progress of Work. Should Contractor in performance of the Work disturb, disconnect or damage any of the above, any cost arising from such disturbance or in replacing or repair shall be borne by the Contractor.

B. Contractor shall:

1. Not unreasonably encumber the Project site with materials and equipment.
2. Not load structure with weight that will endanger the structure.
3. Assume full responsibility for protection and safekeeping of stored materials.
4. Move stored materials which interfere with operations of Owner and other contractors.
5. Obtain and pay for use of additional storage land work areas needed for operations.

C. Upon receipt of notice that the Contractor is ready to commence the Work, Owner will make the Project site available to the Contractor to execute the Work.

D. The Contractor shall coordinate use of the premises with the ODR and must comply with the Owner's requirements concerning the Contractor's operations and use of the premises, parking, loading and unloading.

1.07 OWNER OCCUPANCY (see UGSC 12.2)

- A. The Owner will occupy the area surrounding the Project site during the entire period of construction for the conduct of its normal operations. The Contractor shall cooperate with ODR in all construction operations to minimize conflict, and to facilitate the Owner's usage.
- B. The Contractor shall at all times conduct its operations to ensure the least inconvenience to the general public.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Identification of Alternates.
- B. Description of Alternates.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Divisions 2 through 35: Specific sections could be affected by any Alternate.

1.03 IDENTIFICATION OF ALTERNATES:

- A. Alternates will be selected at the option of Owner. Alternates accepted by Owner for incorporation into the Work are identified in the Contract.
- B. Coordinate related Work and modify surrounding Work as required to complete the Work, including changes required by each Alternate, designated in the Contract.

1.04 DESCRIPTION OF ALTERNATES: NONE

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. General requirements for product options and substitution procedures.
- B. Material and product options.
- C. Substitutions.
- D. Coordination.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 31 00 - Project Management and Coordination
- C. Section 01 33 00 - Submittal Procedures
- D. Section 01 60 00 - Product Requirements.
- E. Section 01 77 00 - Closeout Procedures.

1.03 GENERAL:

- A. In addition to Uniform General Conditions, Article 8 (UGC 8.3.5), comply with product option and substitution requirements specified in this Section. Contractor shall request substitutions through the e-Builder Substitution process.

1.04 MATERIAL AND PRODUCT OPTIONS:

- A. Materials and Products Specified by Reference Standards, by Performance, or by Description Only: Any product meeting specified requirements.
- B. Materials and Products Specified by Naming Products of One or More Manufacturers with a Provision for an Equivalent Product: Submit one of the products listed which complies with specified requirements or submit a request for substitution for a product of manufacturer not specifically named which complies with specified requirements.
- C. Materials and Products Specified by Naming Products of Several Manufacturers Meeting Specifications: Submit one of the products listed which complies with specified requirements or submit a request for substitution for a product of manufacturer not specifically named which complies with specified requirements.

1.05 SUBSTITUTIONS (UGC 8.3.5)

- A. Within sixty (60) days after date of Owner's Notice to Proceed or the approval of the buyout package on CMAR and DB projects, A/E will consider requests from

Contractor for substitutions. Subsequently, substitutions will be considered only when a material or product becomes unavailable due to no fault of Contractor or as follows:

1. Lockouts,
 2. Strikes,
 3. Bankruptcy,
 4. Discontinuation of product,
 5. Proven shortage,
 6. Other similar occurrences.
- B. Each proposed substitution of materials or products for that one specified is a representation by Contractor that it has personally investigated the substitution and determined that the proposed substitution is equivalent or superior to that specified in quality, durability and serviceability, design, appearance, function, finish, performance, and of size and weight which will permit installation in spaces provided and allow adequate service access. Additionally, Contractor agrees that it will provide and/or do the following:
1. Same warranty on substitution as for specified product or material,
 2. Coordinate installation and make other changes that may be required for Work to be complete in all respects,
 3. Waive claims for additional costs which may subsequently become apparent,
 4. Verify that proposed materials and products comply with applicable building codes and governing regulations and, where applicable, has approval of governing authorities having jurisdiction.
- C. The A/E will review requests from Contractor for substitutions with the ODR. Contractor shall not purchase or install substitute materials and products without written approval. The A/E will give written notice to Contractor and the ODR of acceptance or rejection within a reasonable time.
- D. Document each request for substitution with complete data substantiating compliance of proposed substitution with Contract Documents. As appropriate include:
1. Reason for the proposed substitution,
 2. Change in Contract Sum and Contract Time, if any,
 3. Effect on WPS and completion date,
 4. Changes in details and construction of related work required due to substitution,
 5. Drawings and samples,
 6. Product identification and description,
 7. Performance and test data,
 8. Itemized comparison of the qualities of the proposed substitution to the product specified including durability, serviceability, design, appearance, function, finish, performance, size and space limitations, vibration, noise, and weight,

- 9. Availability of maintenance service, source and interchangeability of parts or components,
 - 10. Additional information as requested
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- E. In the event of credit change in the cost, the Owner shall receive all benefit of the reduction in cost of the proposed substitution. Credit shall be established prior to final approval of the proposed substitution and will be adjusted by Change Order.
 - F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request, without having been reviewed and approved by Contractor, or when acceptance will require substantial revision of Contract Documents without additional compensation to A/E.
 - G. In the event that the Contractor or Subcontractor has neglected to place an order for specified materials and products to meet the WPS, specified requirements, color schemes or other similar provisions, such failure or neglect shall not be considered as legitimate grounds for an extension of completion time nor shall arbitrary substitutions be considered to meet completion date.
 - H. Only one request for substitutions will be considered for each product. When substitutions are not accepted, the Contractor shall provide specified product.
 - I. Should substitution be accepted and subsequently is defective or otherwise unsatisfactory, replace defective material with specified material at no cost to Owner.

1.06 COORDINATION:

- A. When a specified, optional, specified by reference standard, or proposed substitution item of equipment or material is submitted which requires minor changes or additions to the designed structure, finishes or to mechanical and/or electrical services due to its requirements being different from those shown on the Contract Documents, itemize the changes required and attach to submittal. Do not proceed with changes without written approval from the A/E and ODR.
- B. Contractor shall make adjustments and changes required to coordinate Work for installation of optional materials and products, approved substitutions and materials and products specified by reference standards without additional costs to Owner or A/E.

PART 2 – PRODUCTS - NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

07/22

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SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART I - GENERAL

1.01 SECTION INCLUDES:

- A. The Uniform General Conditions (UGC) specify that the Owner through the Owner's Designated Representative (ODR) can modify the construction contract.

1.02 CONTRACT CHANGES:

- A. UGC, Article 11 states that the Owner may order changes in the Work within the general scope of the Contract, consisting of additions, deletions or other changes. Changes to the contract will be accomplished through e-Builder utilizing a construction change order approval process.
 - 1. The construction change order approval process can be started by either the ODR or the Contractor. After a Change Order is approved, the Contractor can add the work to the schedule of values.
 - 2. The Contractor shall record the actual material and labor cost of the proposed work utilizing the supplied Form C-15 (Adjustment for Changes in Work) along with all supporting documentation. (A Microsoft Excel copy of Form C-15 can be found in e-Builder documents module, folder 02.09 GC COs) The cost breakdown shall consist of labor and materials. Materials shall be itemized by easily identifiable components such as linear footage, square footage, cubic yardage, pounds, etc. All subcontractor pricing shall be broken down using the same format. If the Contractor requests a time extension for the work, adequate justification must be provided to validate the impact on the construction schedule (refer to UGC Article 9 and Section 01 32 00). Any bond and insurance cost shall be accompanied by documentation supporting the cost from the bonding and insurance companies. If the labor rate represents overtime or premium time that shall be included in the documentation along with documentation that the rates were preapproved by the ODR.
 - 3. The Owner and A/E will review the Contractor's cost and time proposals and make a decision whether to proceed, void, or negotiate all or certain items with the Contractor. If a price cannot be agreed to the ODR may require the Contractor to proceed with the change on a time and materials basis. The Contractor shall document all costs daily using Form C-14 (A Microsoft Excel copy of Form C-14 can be found in e-Builder documents module, folder 02.09 GC COs) along with all supporting documentation. Profit and overhead shall not be included on the C-14. When the work is

completed the daily C-14s shall be consolidated into C-15s to calculate profit and overhead.

4. When an action is taken by an actor, the e-Builder process will automatically notify the next actor in the process by email. When the process is complete, the Contractor will be notified of the action by email.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Payment requests.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 77 00 - Closeout Procedures.

1.03 PAYMENT REQUESTS:

- A. Progress payments will be accomplished through e-Builder utilizing a payment application approval process.
- B. At the earliest convenient time and not less than 21 days prior to the first payment request, the Contractor shall develop a Schedule of Values (SOV), utilizing a supplied form, to reflect the value of the categories of work (A Microsoft Excel copy of the SOV template can be found in e-Builder documents module, folder 02.10 GC Pay Apps). The breakdown shall follow the trade divisions of the specifications and shall be itemized by submittal, floor, area, elevation or other building systems, as a minimum. The breakdown shall include a labor and material breakdown for each activity and be of such detail as may be required by the Owner and/or Architect, but in general shall limit each line item to less than \$100,000, or as approved by the Owner. If more than one building is involved, the breakdown shall be by building as well.
 - 1. The initial SOV shall be submitted to the ODR for review and approval. It is, therefore, recommended that this schedule be prepared and submitted as soon as possible to prevent delay of the initial payment to the Contractor.
 - 2. The ODR's review of the SOV is to assure that the breakdown is in sufficient detail to meet the above requirements and to assure that reasonable dollar values are assigned to the various items of work.
- C. The e-Builder payment application approval process can be started by the contractor. The process routes the payment application through all review and

approval steps.

All required supplemental information is indicated by a red asterisk or indicated on the screen. Only one file can be uploaded into each field. The naming convention for supplemental information is indicated when hovering over the blue circle next to the attachment name.

1. Progress payments will not be approved if the job site record drawings maintained in Owner's project management information system (PMIS) Autodesk Build are not up to date (UGC 6.2). Payments will also not be approved if other periodic requirements are not completed.
 2. Historically Underutilized Business Progress Reports will be prepared and submitted with the pay request each month (UGC, Article 4). Pay requests will not be approved without this completed form.
 3. All approved Change Orders shall be added to the Schedule of Values in the same level of detail as all other items of work.
 4. Contractor shall maintain a breakdown in Excel of the project cost by componentization code by subcontractor/supplier. Contractor shall utilize the componentization code tab on the Owner supplied application of payment spreadsheet for this breakdown.
 5. The Current Payment Due on the summary tab of the Excel file must exactly match the Current Payment Due indicated in e-Builder. Otherwise, the payment process will be returned as incorrect.
- D. Contractor shall base each application for payment on value of work installed, and materials and equipment suitably stored at Site. Materials and equipment suitably stored off site in an insured or bonded warehouse may be included, if approved in writing by ODR. See UGC 10.5 for additional requirements when requesting payment for materials stored off site.
- E. Payment for Stored Materials: The ODR shall be the sole authority for approval (proof of insurance or bond will be required).
1. Where the Schedule of Values separates items into labor amounts and material amounts, payment will be made for materials delivered and suitably stored on Site provided said material is required for installation according to the Contractor's Work Progress Schedule (WPS).

Invoices for stored materials will be submitted when required by the ODR. Stored material invoices will be accepted only after an approved shop drawing or sample has been received by the ODR.

Invoices for stored materials will only be considered when they exceed five hundred dollars (\$500) for each individual item. There will be no invoices accepted that contain tools, or expendable materials.

Invoices will only be considered that are referenced to the materials in the SOV. Invoices that are not legible will not be considered for payment.

All stored materials will be checked by the Project Superintendent and verified by the ODR before being incorporated into the payment application.

2. Materials stored at an off-site location which are eligible for inclusion on progress payments are defined as finished goods made specifically for the Project, provided said material is required for installation according to the Contractor's WPS. Raw materials, work in progress at fabrication plants, and commodity items readily available for purchase are not eligible for inclusion in Contractor's Application for Payment.
3. Payment will be made under following provisions:
 - a. Items are listed separately on Application for Payment.
 - b. Include with Application for Payment:
 - (1) Paid receipts showing Contractor is unconditional owner.
 - (2) Fully executed Transfer of Title on photocopy of form provided herein.
 - (3) Location where materials are stored if off site, and method used to store.
 - (4) Identify items in offsite storage as property of Owner and furnish description of identification method.
 - (5) Inventory of items and methods used to verify inventory, including Contractor's certification that quantities have been received in good order.
 - (6) Proof of insurance for materials stored off site, in Owner's name.
 - (7) Proof of transportation arranged for delivery of material stored off site.
 - (8) Material delivered and stored on site or off site needs to parallel WPS.
 - c. ODR reserves right to verify storage by physical inspection at any time.
 - d. Payment does not relieve Contractor's obligations to protect, transport and install materials.
 - e. Title of materials upon which partial payments are made shall transfer to Owner. Partial payment does not constitute acceptance by ODR nor a waiver of any right or claim by ODR. Any costs incurred by Owner shall be paid by Contractor.

- F. Final Payment Application (see UGC 12.3): Administrative actions and submittals must precede or coincide with submittal of Contractor's final payment application.
1. Complete project closeout requirements specification in Section 01 77 00 and 01 78 00.
 2. A final Change Order will be prepared if required, reflecting approval adjustments to Contract Sum not previously made by Change Orders.
 3. After final acceptance of the work, the Contractor shall submit their final payment application in the same manner as a progress payment application and indicating that it is the final payment application. When Federal Funds or other grant funds are included, approval of that agency may also be required.
- G. Cash Flow Schedule: A Cash Flow Schedule will be required within 21 days after approval of the SOV. This schedule shall show monthly payment requirements for the duration of the Contract. The schedule shall include a graphic analysis showing anticipated total completed to date accounts versus actual completed to date amounts. This Cash Flow Schedule is required to be updated monthly and submitted with each payment application.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Coordination of Contract Work.
- B. Correspondence.
- C. Meetings.
- D. Coordination of Submittals.
- E. Coordination of Contract Closeout.
- F. Coordination with Local Personnel.

1.02 RELATED SECTIONS:

- A. Uniform General Conditions Article 3
- B. Section 01 11 00 - Summary of Work.
- C. Section 01 25 00 - Substitutions Procedures.
- D. Section 01 31 50 - Project Meetings.
- E. Section 01 32 00 - Construction Progress Documentation
- F. Section 01 33 00 - Submittal Procedures
- G. Section 01 60 00 - Product Requirements.
- H. Section 01 73 50 - Cutting and Patching.
- I. Section 01 77 00 - Closeout Procedures.
- J. Section 01 78 00 - Closeout Submittals.
- K. All Divisions of Facility Services Subgroup

1.03 COORDINATION, GENERAL:

- A. Coordinate all portions of the Work under the Contract. Require each Subcontractor to coordinate their portion of the Work and provide their requirements for coordination of their Work with other related Work. (UGC 3.3.6)

Contractor shall require and be responsible for cooperation and coordination between various trades and Subcontractors whose work is dependent upon one another. Schedule such work so as to prevent delays in dependent work and so that all related work will progress together. Fully inform each trade or Subcontractor of the relation of its work to other work, and require each to make necessary provisions for the requirements of such other work. No additional compensation for extra work incurred through the lack of cooperation and coordination between various trades and Subcontractors will be allowed.

- B. Coordinate mechanical and electrical Work with that of other trades in order that

various components of systems are installed at proper time, fit available space, and allow proper service access to those requiring maintenance, including equipment specified in other Divisions.

Coordinate all work located in the above ceiling area including the area one foot below the suspended ceiling or light fixture plane, whichever is lower. Coordinate all work associated with the building envelope (exterior walls and roof). Include all required maintenance access requirements in coordination.

- C. Coordinate Work of sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate use of Project space and sequence of installation of mechanical, plumbing, and electrical Work that is indicated diagrammatically on Drawings. Follow routings shown for pipes, ducts, and conduits as closely as practicable, with proper allowance for available physical space; make runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas, except as otherwise shown, conceal pipes, ducts, conduit, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements. Provide escutcheon plates at penetrations through finished walls and ceilings with finish appropriate to adjacent finished surface.
- F. Coordination Drawings: Before materials are fabricated or installation of the Work, prepare coordination drawings (Section 01 34 00). Prepare drawings including plans, elevations, sections, and details as required to clearly define relationships between all building trades including HVAC, Electrical, Plumbing, Fire Sprinkler Systems and the structural components of the building such as ceilings, beams, columns, walls and floors. The drawings shall clearly define locations of sleeves, floor penetrations, Plumbing and HVAC piping, ductwork, equipment, light fixtures, electrical and control wiring conduits, panels, and their relationship to building structural components.
 - 1. In preparation of the coordination drawings the Contractor is required to hold coordination meetings with all trades providing the above Work for each building level and each mechanical and electrical room.
 - 2. Resolve conflicts between trades and prepare coordination drawings and upload to Autodesk Build for review by A/E and ODR. Contractor can utilize Owner's Autodesk Collaborate model coordination site to coordinate the work of trades. Allow sufficient time for review, in accordance with submittal procedures, prior to proceeding with fabricated or installation of the Work.

- a. Prepare digital coordination drawings for each floor level and for each mechanical and electrical room. The drawings shall indicate all work items located on each level shown on the drawing.
 - b. All piping and ductwork larger than 2½" in diameter shall be drawn two lines; smaller piping and ductwork shall be drawn double thickness single line.
 - c. Show access space around equipment as directed by Specifications.
 - d. The superintendent for each trade and the Contractor shall sign the drawing indicating that he has reviewed the drawing for accuracy.
- 3. When conflicts cannot be resolved, Contractor shall request clarification from the A/E prior to proceeding with that portion of the Work affected by such conflicts or discrepancies. Prepare interference Drawings to scale and include plans, elevations, sections, and other details as required to clearly define the conflict between the various systems and other components of the building such as beams, columns, and walls, and to indicate the Contractor's proposed solution.
- G. Remove and relocate items that are installed without regard to proper access, as directed by the A/E and ODR, at no additional cost to the Owner.

1.04 CORRESPONDENCE:

Correspondence relating to this Project should occur within Autodesk Build. Correspondence outside of Autodesk Build must show the Project name, Project number and Contract number and be uploaded to Autodesk Build.

1.05 MEETINGS:

- A. In addition to project meetings specified in Section 01 31 50, hold coordination meetings and pre-installation conferences with appropriate personnel to assure coordination of Work.

1.06 COORDINATION OF SUBMITTALS:

- A. Schedule and coordinate submittals specified in Sections 01 25 00, 01 32 00, 01 33 00, and 01 78 00 and other Sections of Divisions 2 through 35.
- B. Coordinate requests for substitutions to assure compatibility of space, of operating elements, and effect on Work of other sections.

1.07 COORDINATION OF CONTRACT CLOSEOUT:

07/22

- A. Coordinate completion and cleanup of Work of separate sections in preparation for Substantial Completion.
- B. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.08 COORDINATION WITH LOCAL PERSONNEL:

- A. Problems concerning traffic, parking or blocking streets must be referred to the appropriate campus personnel. Confine truck route egress and exit to Site as indicated on Drawings. Coordination is to be through the ODR.
- B. Any exterior problems, including the moving of utilities is to be referred to the campus facilities department. Coordination is to be through the ODR.
- C. The scheduling of utility outages must be coordinated with the campus facilities department at least fourteen (14) days in advance. This coordination is to be arranged through the ODR. Contract shall request an outage of existing utilities services through the e-Builder Outage process.

1.09 PROTECTION:

- A. Contractor shall assume responsibility for initiation and maintenance of protective requirements specified in Section 01 50 00, Temporary Facilities and Controls.

1.10 REPAIR OF DAMAGE:

- A. Damage: Restore accidental or careless damage to the Work to a condition as good as or better than existed before work was commenced and at no cost to the Owner.

1.11 SECURITY:

- A. Conform to requirements of public laws, ordinances and regulations and requirements of insurance carriers concerning security of Site while Work is in progress as well as when it has been suspended, if this occurs.

1.12 CONSTRUCTION LOADING:

- A. General: Concrete slabs on grade and suspended floors have not been designed for heavy loading.
- B. Slabs On Grade: Do not subject slabs on grade to excessive loading by shoring, storage of materials or operation of construction equipment unless adequately

protected by planking. Maintenance of slabs in good condition is the responsibility of the Contractor, who shall remove all damaged areas of such slabs and replace them with new work at no cost to Owner.

- C. **Suspended Floors:** Do not subject suspended slabs to construction loads beyond 40 pounds per square foot unless adequately shored. Such shoring shall be designed for the Contractor by a registered (Texas) Structural Engineer, who shall certify prior to imposing construction loads on slabs, that the shoring as installed conforms with the shoring as designed. Submit three prints, for record only, of the shoring drawings to the A/E, signed by the Contractor's design engineer.

1.13 SPECIAL REQUIREMENTS:

- A. **Existing Utilities:** Schedule shut downs if needed in order to minimize inconvenience to Owner. Notify ODR in writing fourteen (14) days in advance of any anticipated shutdowns. Utility shutdowns will only be scheduled at a time mutually agreeable to the Owner and Contractor.
- B. **Existing Valves and Switchgear:** Owner will be responsible for opening and closing all valves and switches on all utility services. This will be done by campus facilities department personnel without cost, except when overtime work is required.
- C. **Damaged Utilities and Services:** When existing utilities are damaged, campus facilities department shall make repairs or permit Contractor to make repairs under supervision of facilities department personnel. If repairs are to utilities shown on Contract Documents, all costs or repairs incurred by Owner will be borne by Contractor.
- D. **No additional compensation will be made to Contractor for reasons of premium time, after hours, overtime or for inefficiency of operation.**
- E. **Parking:** Restricted to areas indicated on Drawings for Contractor's use. Contractor shall make arrangements and pay for any additional parking required off Project site.
- F. **Deliveries and Removals:** All deliveries of construction material, equipment, supplies, and similar operations, and removals shall be performed only in areas designated and approved by ODR.
- G. **Circulation:** Confine construction operations to designated areas avoiding any interruption of vehicular circulation to existing facilities. Should these requirements become unavoidable, submit a request to ODR in writing at least two weeks prior to anticipated interruption, stating predicted time, location and duration of interruption.

- H. Construction Scheduling: The Work shall be conducted in such a way as to cause a minimum of interference with the use of adjacent existing facilities during regular school and/or work hours.
- I. Noise Control: The Contractor shall execute the Work in this Contract as quietly as practical to avoid unnecessary disturbances.
 - 1. Any complaints duly registered by Owner of unacceptable noise levels shall be cause for use of special precautions and methods of operation by Contractor to reduce noises to acceptable levels at no additional cost to the Owner.
 - 2. The ODR shall be sole judge of tolerability of noise levels.
- J. Dust Control: Control all dust, to Owner's satisfaction, in working area and involved portions of the Project Site including access roads or drives.

PART 2 – PRODUCTS

NOT USED

PART 3 – PRODUCTS

NOT USED

END OF SECTION

SECTION 01 31 26

ELECTRONIC COMMUNICATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Project Management Communications.

1.02 RELATED SECTIONS:

- A. Uniform General Conditions
- B. All Section of Division 1 – General Requirement.

1.03 GENERAL:

- A. Project Management Communications: The Contractor and Architect/Engineer shall use the Internet web-based project management information system, E-Builder® and Autodesk Build software, and protocols included in these software tools during this project. E-Builder and Autodesk Build shall be the primary project management tools on the project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.

Project management communications is available through E-Builder® and Autodesk Build in the form and manner required by the Owner.

The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited.

- B. Training: Owner will provide a group training session. Users are required to attend the scheduled training sessions they are assigned to; requests for specific scheduled classes will be on a first come first served basis for available spaces. Companies may also obtain group training from E-Builder at their own expense, please contact E-Builder® for availability and cost.
- C. Support: E-Builder® will provide on-going support through on-line help files.
- D. Copyrights and Ownership: Nothing in this specification or the subsequent

communications supersedes the parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD and BIM files, processes or design information distributed in this system is intended only for the project specified herein.

- E. Purpose: The intent of using E-Builder® and Autodesk Build is to improve project work efforts by promoting timely initial communications and responses. Secondly, to reduce the number of paper documents while providing improved record keeping by creation of electronic document files.
- F. Authorized Users: Access to the web site will be by individuals who are licensed users.
 - 1. Contractor shall determine number of user licenses required.
 - 2. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.
- G. Owner's Administrative Users: Administrative users have access and control of user licenses and all posted items. DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE! Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s).
- H. Communications: The use of fax, email and courier communication for this project is discouraged in favor of using E-Builder® and Autodesk Build to send messages. Communication functions are as follows:
 - 1. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
 - 2. The system shall make it easy to identify revised or superseded documents and their predecessors.
 - 3. Server or Client-side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.
 - 4. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties' communication except for Administrative Users. DO NOT POST

PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!

5. Documents of various types shall be logically related to one another and discoverable. For example, requests for information, daily field reports, supplemental sketches and photographs shall be capable of reference as related records.
6. The system shall be capable of generating reports for work in progress, and logs for each document type. Summary reports generated by the system shall be available for team members.
7. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.
8. The following items are accomplished in e-Builder:
 - a. Payment Application
 - b. All changes to the contract amount
 - c. All contingency/allowance expenditure approvals (CMAR & DB Only)
 - d. Authorization for the expenditure of allowances (CMAR & DB Only)
 - e. 811 Utility Locates
 - f. Changes to the HUB Subcontracting Plan
 - g. Contractors Daily Logs
 - h. Contractor Buy Outs (CMAR & DB Only)
 - i. Utility Outage requests
 - j. Substitution Requests
 - k. Substantial Completion
 - l. Worker Wage Rate Information
 - m. Request for Information (RFI)
 - n. Architect Supplemental Instructions (ASI)
 - o. Submittals
9. The following items are accomplished in Autodesk Build
 - a. Contractor Record Drawings and Specification
 - b. Model review
 - c. Construction Coordination Drawings
 - d. Meeting Minutes
 - e. Quality Testing Reports
 - f. Quality Checklists and Inspection Punch Lists
 - g. All design and construction related correspondence, reports and certification

- h. Schedules
- i. Construction Photos

The software tool used for the above tasks may change.

All information provided in E-Builder and Autodesk Build shall be the original information or data. The use of “see attached” and attaching another company form is not allowed.

PART 2 – PRODUCTS

NOT USED

PART 3 – PRODUCTS

NOT USED

END OF SECTION

SECTION 01 31 50

PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. General Project Meeting Information.
- B. Pre-Construction Meeting.
- C. Progress Meetings.
- D. Pre-Installation Meetings.
- E. Lockset Hardware/Key Conference.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 25 00 - Substitutions Procedures
- C. Section 01 32 00 - Construction Progress Documentation
- D. Section 01 33 00 - Submittal Procedures
- E. Section 01 60 00 - Product Requirements.
- F. Section 01 73 50 - Cutting and Patching.
- G. Section 01 77 00 - Closeout Procedures.
- H. Section 01 78 00 - Closeout Submittals.

1.03 GENERAL:

- A. Contractors, Subcontractors and suppliers representatives attending the meetings/conferences of this section shall be qualified and authorized to act on behalf of the entity each represents.
- B. Contractor shall comply with the following meeting requirements during performance of the Contract.
 - 1. Arrangements: Arrange for a convenient, comfortable room in which to conduct the progress meetings, furnished as necessary to accommodate the people involved and to accomplish the purpose of the meeting. Owner will provide the room for the pre-construction meeting.
 - 2. Provide meeting notice to all attendees at least seven (7) days in advance of the meeting date.
 - 3. Records: Minutes of all project meetings shall be kept in Autodesk Build and available to all concerned within four (4) days after the adjournment of the meeting.
 - 4. Schedule Updating: Immediately following each progress meeting, where revisions to the Work Progress Schedule (WPS) have been made or recognized, revise the progress schedule. Reissue revised colored copies of the WPS concurrently with minutes of each meeting.

1.04 PRE-CONSTRUCTION CONFERENCE (see UGSC 3.1.1):

- A. Chairman: The meeting will be presided over by the ODR.

B. Attendance: The following persons will be expected to attend:

1. Owner's Representatives.
Project Manager
User Coordinator
Physical Plant representative
2. A/E's Construction Administrator.
3. A/E's Consultants for Mechanical, Electrical and Structural Engineering.
4. A/E's special consultants as maybe required.
5. Contractor's General Superintendent and Project Manager.
6. Major Subcontractors including at least those for mechanical, plumbing and electrical work if selected.

C. Agenda: Subjects shall include, but are not limited to the following:

1. Review of submittals.
2. Sequence of critical work.
3. Relation and coordination by the Contractor.
4. Designation of responsible personnel.
5. Processing of Change Orders.
6. Access to Work to permit inspection.
7. Maintaining project Record Documents.
8. Use of the premises, access to the Site, office and storage areas, and Owner's requirements.
9. Major equipment deliveries and priorities.
10. Safety and first aid procedure.
11. Security procedures.
12. Housekeeping procedures.
13. Additional subjects as requested by the Owner, the Architect/Engineer or the Contractor.
14. List of major Subcontractors and suppliers.

1.05 PROGRESS MEETINGS:

A. Chairman: Contractor's Project Manager or Project Superintendent shall preside over the meeting; prepare agenda and record minutes in Autodesk Build.

B. Attendance: The following persons will be expected to attend:

1. Owner's Representatives.
Project Manager
User Coordinator
Physical Plant representative
2. Architect/Engineer's Construction Administrator.
3. Architect/Engineer's Consultants for mechanical, electrical and structural engineering until excused from attendance.
4. A/E's special consultants as maybe required.
5. Contractor's General Superintendent, Project Superintendent and Project Manager.

6. Subcontractors who have work in progress.
 7. Subcontractor who will start work within the next month.
 8. Others as requested by ODR, A/E, or Contractor.
- C. Agenda: The Contractor will provide an agenda including but not necessarily limited to the following items:
1. Present a brief narrative of construction progress since the last monthly meeting containing:
 - a. General description of work performed.
 - b. Expectation of meeting scheduled dates.
 - c. Description of current or anticipated delaying factors or problems, if any.
 2. Review the updated WPS and present a schedule analysis.
 3. Review the Submittal Schedule/Log.
 4. Review of changes.
 5. Review of Requests for Information.
 6. Review of project Record Documents.
 7. Review/approval of the Progress Payment.
 8. General discussion: Other outstanding/current business.
- D. Review of Pre-Installation Meetings
- E. Number of Meetings: A minimum of one progress meeting shall be held each month. Other weekly or biweekly progress meetings shall be held as determined by the ODR and shall cover those subjects as required by the ODR.

1.06 PRE-INSTALLATION MEETINGS:

- A. Provide a list of all pre-installation meetings anticipated.
- B. Convene a pre-installation meeting at the Project field office prior to commencing any work.
- C. Require attendance of entities directly affecting, or affected by, work of Section.
- D. Notify A/E and ODR ten (10) days in advance of meeting date.
- E. Contractor shall prepare agenda, preside at meeting and record minutes in Autodesk Build.
- F. Review conditions of installation, preparation and installation procedures, and coordination with related work. Review submittals for all Work to be installed.
- G. The Contractor shall maintain an adequate inspection system and perform such inspection to insure that the work called for by this contract conforms to the contract specifications and requirements.
- H. The Contractor shall maintain complete inspection records and make them available to the ODR.

I. Subcontractor foreman or project manager are required to attend this meeting.

1.07 LOCKSET HARDWARE/KEY CONFERENCE:

A key conference shall be conducted after approval of hardware submittal prior to the ordering of lock hardware. The Contractor shall, in conjunction with the ODR, A/E, User Coordinator and campus facilities department representative, establish a date for the key conference to be held. A key conference is required to review the function of the locks and to insure that all security requirements of the Using Agency will be met.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Work Progress Schedule (WPS) and Baseline Schedule.
- B. Daily reports.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 31 00 - Project Management and Coordination.
- C. Section 01 33 00 - Submittal Procedures.
- D. Section 01 77 00 - Closeout Procedures.

1.03 WORK PROGRESS AND BASELINE SCHEDULES (see UGSC 9.3):

Coordination: Comply with Uniform General and Supplementary Conditions Article 9. Coordinate both the listing and timing of reports and other activities required by provisions of this Section and other Sections, so as to provide consistency and logical coordination between the reports. Maintain coordination and correlation between separate reports by updating at monthly or shorter time intervals. Make appropriate distribution of each report and updated report to all parties involved in the Work including the A/E and the Owner. In particular, provide close coordination of the WPS and Baseline Schedule, contract price breakdown, listing of subcontracts, schedule of submittals, progress reports, and payment requests.

- A. Work Progress Schedule: Design Build (DB) and Construction Manager at Risk (CMAR) delivery within ten (10) Days after the NTP and Competitive Sealed Proposal (CSP) delivery within twenty-one (21) days after the NTP, the Contractor shall prepare and submit a detailed "Work Progress" Construction Schedule, both in hard copy and electronically, for the Owner's information and approval. The Work Progress Schedule will be submitted for Owner's review and approval based on the criteria defined herein and will be assessed based on completeness, feasibility and quality using industry established scheduling guidelines such as but not limited to the PMI (Project Management Institute).
- B. Major Trade Procurement Plan shall be included in the WPS. Major Trades are defined as, but not limited to, earthwork, utilities, foundation/structural, steel, waterproofing, roofing, doors/hardware, glass/glazing, envelope, and trades required for mock up completion, MEP, fire sprinkler, fire alarm, A/V, elevators, equipment and any other specialty contractors deemed necessary or if trade is on the critical path. Review and provide buyout status, in writing, monthly at OAC

meeting.

- C. Baseline Schedule: Design Build (DB) and Construction Manager at Risk (CMAR) delivery within ninety (90) Days after the NTP and Competitive Sealed Proposal (CSP) delivery within twenty-one (21) days after the NTP, submit a comprehensive Work Progress Schedule. Once approved, this WPS will be designated as the Baseline Schedule. This schedule shall address and include all comments received from the ODR and the A/E in reference to the preliminary Work Progress Schedule and Major Trade Procurement Plan.

1.04 REQUIREMENTS OF WORK PROGRESS & BASELINE SCHEDULES (see UGSC 9.3)

- A. General: The Work Progress and Baseline Schedules shall be in accordance with the Critical Path Method (CPM) consisting of a time scaled diagram and related computer generated analysis reports.
- B. The contractor shall prepare the schedule using a Critical Path Method Scheduling Software such as either Primavera P6 or Microsoft Project. Electronic schedules shall be submitted as “native” files in either Primavera P6 (.XER) or Microsoft Project (.MPP) formats. All Construction Schedules shall in all respects conform to and be consistent with the time requirements for the Project as set forth in this Construction Contract.
- C. WPS and Baseline Schedule Format: The Construction Schedule shall be in the form of a critical path progress schedule showing, in graphic form, a plan for performance of the Work within the Contract Time. The Construction Schedule shall be prepared, using Primavera P6 or Microsoft Project, as a time-scaled bar chart showing: (1) continuous flow from left to right of activities and milestones critical to, Substantial Completion, Owner Occupancy, and Final Completion of the Work; (2) identification of “float”; and (3) a clearly highlighted critical path. The Construction Schedule shall be organized with a defined work breakdown structure (WBS) or Activity Code structure which adequately describes and organizes the scope of work, key milestones, and associated tasks/activities to meet the project objectives. Durations and specific calendar days shall be clearly and legibly shown for the early and late start and finish of each activity. Unless approved by Owner, the following schedule parameters shall apply:
 - 1. No Activity duration shall exceed 20 working days unless approved by Owner;
 - 2. Finish-to-Start (FS) logical relationships shall represent a minimum of 90% of total relationships in the schedule
 - 3. All interim Activities and milestones, excluding the first and last activities of the schedule, shall have at least 1 predecessor and at least 1 successor relationship, unless approved by Owner.

4. There shall be no more than 1% of total activities or milestones with an assigned “start on”, “start on or after”, or a “mandatory start” constraint
5. There shall be no finish constraints assigned to any activity or milestone in the project schedule.
6. All activities, if required by ODR, shall have both manpower and cost resources assigned to them in such a way the total manpower and costs across the entire schedule align with project budget and collective manpower estimate(s).
7. There shall be no excessive float for physical construction activities, which is defined as more than 20 calendar days. This would not apply to activities such as delivery lead times, submittals or fabrication durations.
8. Required 10% project float must be an identified activity named “Contract Float” and tied to the substantial completion date in the project schedule. When contract float duration is consumed an additional activity must be created to document and offset the usage of this float in the schedule.

D. WPS and Baseline Schedule Detail: Activities shown in the Construction Schedule shall be in sufficient detail to demonstrate a practical plan to complete the fabrication and construction within the Contract Time and shall, at a minimum, include the following:

1. Task/Activity ID Number and Task/Activity Description,
2. Predecessor/successor relationships,
3. The planned start and finish date of each activity;
4. The anticipated percentage of completion of each activity at the end of each month;
5. If requested by Owner prior to the effective date, the final manpower curves by trade;
6. The anticipated dates for the purchase and delivery of major materials and equipment;
7. The anticipated dates for the receipt and incorporation of Owner-furnished materials, equipment or other items (if any);
8. Governmental Authority Review Periods;
9. The activities identified as being on the critical path Substantial Completion, Owner Occupancy, and Final Completion of the Work;
10. All major milestones tied to liquidated damages; “NTP”, Phased Substantial Completion, Dry In, Substantial Completion, and Final Completion.
11. The WPS and Baseline Schedule shall show the following Major Milestone Target Finish Dates:
 - a. Completion of main structure foundation piers or footings.
 - b. First or ground floor slab complete.
 - c. Structure top out.
 - d. Building dry-in or enclosed. This is defined as the roof, exterior walls, exterior windows and openings closed in.
 - e. Start of conditioned air. This is defined as the building is ready to

- hold environmental conditions.
- f. BAS Graphics Approval
- g. Mock Up Approval
- h. Major Trade Buyout and Contract Execution
- i. Any Early Occupancy required by the Contract.
- j. Project phases as outlined in the Construction Documents.
- k. Permanent Power Required
- l. Required inspections such as: above ceiling inspections, wall inspections and pre-final inspections.
- m. Sufficient time to correct the items listed in the above inspections.
- n. Other milestones as appropriate to the Project
- 12. Application of Major Milestones Requirement:
 - a. Contractor is expected to implement a recovery action plan reestablishing the original project progress schedule within thirty (30) calendar days of the missed milestone target date.
 - b. Actions taken to restore the progress schedule within this 30 day work cycle will entitle the Contractor to recover the assessed additional retainage amount for this occurrence.
 - c. All costs to recover lost time will be borne solely by the contractor.

E. Network Diagram: Activities shown on the WPS and Baseline Schedule shall be categorized and described as follows:

- 1. Each individual construction activity;
- 2. A concise description of the work;
- 3. An activity duration shall not exceed 20 work days. Durations of greater than 20 work days are acceptable for non-construction activities or as required by the type of construction activity;
- 4. Each activity shall be coded with an activity code or hammock relating to an activity or an item on the Schedule of Values;
- 5. Each activity shall be coded with an activity code which relates to a phase or building. This subdivision of the Project shall be mutually agreed upon between the ODR and the Contractor;
- 6. Items requiring fabrication and delivery longer than 90 days;
- 7. Times anticipated for shutdown and tying-in to existing services. Note: This does not serve as an official request to the ODR and each individual request for an outage shall be submitted in writing fourteen (14) calendar days prior to the anticipated outage, as described in Section 01 31 00 Project Management and Coordination.
- 8. Before Substantial Completion, the Contractor shall include the following activities:
 - a. Completion of pre-final punchlist (Suggested duration 30 days minimum).
 - b. Substantial Completion Inspection (Suggested duration 5 days).
 - c. The above activities are to be Finish to Start.

9. Each activity shall be represented by a graphical horizontal line, as follows;
 - a. Each line clearly and briefly described.
 - b. Estimated duration.
 - c. Early start, late start, early finish, late finish, actual start and actual finish.
 - d. Each activity shall have its own number.
 - e. Each activity, except for start and finish activities shall have one or more preceding and succeeding activity.
 - f. Line shall be drawn to the length as dictated by the item scale to indicate the activity's duration including both target duration and percent complete to date.
 - g. Each activity shall be placed at its proper calendar location as determined by the time scale.
 - h. Float shall be shown in its proper time scale for all activities. Float on specific activities shall be defined as the late finish date minus the early finish date. Total Float shall be the Contract Time less the duration of the critical path, or the amount of time non-critical activities can be delayed without causing the Contract Time to be exceeded.
 - i. The path of critical activities shall be illustrated or accented in red, thereby easily distinguished from non-critical activities. There should only be one defined critical path.
 - j. Milestones or intermediate completion dates shall be clearly shown.
 - k. Substantial Completion Date on the WPS and Baseline Schedule shall coincide with time of completion indicated in the Contract Documents.
 - l. The duration of each activity shall include anticipated days lost due to inclement weather based on the Rainfall Table in Special Conditions 9.6.2.1.1.
 - m. Upon review and acceptance of the WPS and Baseline Schedule by the A/E and the ODR, the target bars shall be locked showing comparison between anticipated schedule and actual schedule.
 - n. The original schedule shall be saved as the baseline schedule and each monthly update shall be saved as a different name or version.
- F. Submittals: Submit two (2) color copies each of the Network Diagram and/or bar chart and two (2) copies each of the computer generated reports to the A/E and to the ODR. Also, submit a digital copy (both native file and pdf) of the WPS and Baseline Schedule to the ODR. The ODR and A/E will request revisions, if necessary, and return to the Contractor.
- G. Distribution: Following the initial submittal to and response by the A/E and ODR, distribute WPS and Baseline Schedule to A/E, ODR, the principal subcontractors, suppliers or fabricators, and others with a need-to-know schedule-compliance

requirement. Post copies in the project meeting room and temporary field office. When revisions are made, distribute updated issues to the same entities and post updated issues in the same locations. As major revisions occur during construction, distribute current issues to the same entities listed above and make postings accordingly.

- H. Reports: Computer generated with data regarding each activity shown on the Network Diagram shall include the following:
 - 1. Description of the activity.
 - 2. Activity number.
 - 3. Duration.
 - 4. Early start, late start, early finish, late finish, actual start and actual finish dates.
 - 5. Float.
 - 6. Show dates as calendar dates.
 - 7. Target start and target finish dates.
- I. Report format shall be sorted in accordance with the following format with “a” being the highest priority:
 - 1. List of activities in order according to early start date.
 - 2. List of activities by amount of total float with activities having lowest float listed first, followed by activities with next lowest float.
- J. Submit two (2) color copies each of the updated WPS and Baseline Schedule to the ODR and the A/E and an electronic copy (current/active version native file and pdf) to the ODR at the Monthly Progress Meeting each month, illustrating the following:
 - 1. Show progress on all active items.
 - 2. Show actual completed Work as contrasted to estimated Work (i.e. target bar schedule).
 - 3. Show critical path activities marked to distinguish them from non-critical path activities.
 - 4. Show target bars from the baseline schedule.
- K. Submit a detailed, written analysis describing deviations from the previous month's schedule as follows: Construction Schedule Updates. The Contractor shall use the construction schedule as a management tool in gauging progress. At regular monthly intervals the Contractor shall issue to the Owner an updated schedule with project status; (i) identify all activities individually for each component of the site improvements and buildings with start and/or completion dates, (ii) identify interim milestone dates as established in this Agreement, and (iii) show actual starts and progress for each activity through the date of the update. In addition to a digital pdf format, schedule updates shall be submitted in electronic native format in either Primavera P6 (.XER) or Microsoft Project (.MPP) format. Schedule updates shall

adhere to formatting and detail requirements outlined in the above schedule sections.

1. Description of the critical path with changes from the previous month.
 2. Changes in the network diagram and logic from the previous month.
 3. Addition/deletion of activities.
 4. Activities not finishing on the late finish date, the reason for the delay, the impact on the project and corrections to the project timeline.
 5. Activities impacting meeting the Contract completion date and the reason and the actions taken to correct the situation.
 6. Any other items deviating from or impacting the WPS and Baseline Schedule in relation to the previous month's update which have an adverse effect on the Project.
 7. Change Orders causing modifications in the Work, which affect the duration, start or finish date of activities to the extent the critical path is changed.
 8. Each of the above items shall be addressed monthly in this report.
 9. Any time the substantial completion date exceeds 30 calendar days beyond the contracted substantial completion date reported in the monthly schedule update (WPS), or as directed by the ODR, the contractor is required to provide a recovery schedule for review within 10 calendar days.
- L. Revisions to the schedule, including those created by Change Orders, shall be made at no cost to the Owner.
- M. Project Summary Schedule: A summary project bar chart schedule shall be submitted monthly. The summary activities will match the construction items found on the Schedule of Values. The recommended method of producing this schedule is through the use of hammock activities. All of the underlying construction activities should be linked to a hammock activity and the scheduled value for each item should be loaded onto the hammock activity. The monthly submittal of this schedule should include the Baseline Schedule and the current status of each activity. If required, resource weighted plan versus actual overall project progress curve should be submitted. Immediately after the Baseline Schedule has been accepted by the ODR a projected cash flow chart shall also be developed from this target schedule and transmitted to the ODR. This cash flow chart shall show graphically projected total billings versus actual total billings. This chart shall be updated monthly and submitted along with the Payment Application. It is a requirement for approval of the Payment Application.

1.05 CONTRACTOR DAILY LOG:

- A. Prepare a daily log using the Contractor Daily Log process in e-Builder, recording the following information concerning events at the Site:

1. List of Subcontractors at the Site with a brief description of the work being performed.
2. Approximate count of personnel at the Site.
3. High/low temperatures, general weather conditions.
4. Accidents (refer to accident reports).
5. Meetings and significant decisions.
6. Unusual events (refer to special reports).
7. Stoppages, delays, shortages, losses.
8. Meter readings and similar recordings, as required.
9. Emergency procedures, field orders.
10. Orders/requests by governing authorities.
11. Visitors.
12. Services connected, disconnected.
13. Equipment or system test and/or start-ups.
14. Partial completions, occupancies.
15. Status of long lead items affecting the critical path.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. General requirements.
- B. List of proposed subcontractors and suppliers.
- C. List of proposed materials.
- D. Field mock-ups and field samples
- E. Color schedules
- F. Brick selection.
- G. Precast architectural concrete and cut stone approvals.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 25 00 - Substitution Procedures.
- C. Section 01 31 00 – Project Management and Coordination
- D. Section 01 32 00 - Construction Progress Documentation.
- E. Section 01 60 00 - Product Requirements.
- F. Section 01 77 00 - Closeout Procedures.
- G. All Divisions of Facility Services Subgroup - Additional submittal requirements

1.03 GENERAL REQUIREMENTS (see UGC 8.3):

- A. General: As indicated in UGC 8.3.1.1 prepare a complete submittal register in ~~e-~~ Autodesk Build within twenty-one (21) days after the effective date of the Notice to Proceed with construction. The submittal register shall contain the submittal title, description, specification section and submittal category at a minimum. The entire review and approval process for all submittals with the exception of physical samples and colors shall occur in Autodesk Build. Correlate this submittal register with the listing of subcontractors and with the "list of materials" as specified in the Contract Documents.
- B. If the project includes multiple buildings then include the building number in the filename of submittals specific to a building. During the review and approval process for submittals do not change the file names for any attached files. E-Builder versions each file as notations and/or changes are made.
- C. The Contractor shall submit to the A/E for review all shop drawings, product data, samples and other submittals for all items required in the Technical Sections of the Specifications and for all items proposed for use in the Work. Do not combine submittals for specified work with requests for substitutions. Submit

requests for substitutions in accordance with Section 01 25 00. Individual submittals from the submittal register shall be grouped into submittal packages before forwarding to the A/E for review.

- D. The Contractor shall review and stamp approval and submit, with reasonable promptness and in orderly sequence, all shop drawings, product data and samples required.
- E. Submit shop drawings, product data and samples far enough in advance to allow ample time for A/E's review, resubmittal if required, and fabrication without creating any delay in the Work, or the work of any other contractor or subcontractor. No extensions of contract time will be authorized because of failure to submit submittal enough in advance to permit processing including resubmittals.
 - 1. Make all submittals a minimum of thirty (30) days prior to needed return date.
 - 2. Allow more review time for requests of substitutions.
- F. Submittal Content Requirements:
 - 1. Shop drawings shall be completely detailed and dimensioned with types, sizes, and gauges of materials noted. Where shop coat of paint is required on materials, brand name, and chemical content shall be noted on the drawings.
 - 2. Shop drawings shall be neatly, accurately, and legibly drawn, noted and referenced.
 - 3. Each item contained in the submittal shall be clearly referenced and noted establishing the item's location in the finished work.
 - 4. Member and item designations shall be the same as those used on the A/E's drawings, except that, where the A/E's has used the same designation for more than one member or item, the Contractor may add a suffix to the designation to differentiate between these members.
 - 5. Where published standard exist (such as ACI Standard 315 Details and Detailing of Concrete Reinforcement), these shall be followed in the preparation of shop drawings. Where no such standards are published by the industry or trade concerned, the shop drawings shall be prepared in a suitable form acceptable to the A/E.
- G. Submittal Format Requirements:
 - 1. Submittal Preparation: Mark each submittal with a permanent label or title block, as appropriate, for identification with the following information on the label or title block for proper processing and recording of action taken.
 - a. Title of submittal and date submitted.

- b. Sheet number and number of sheets included (as applicable).
Number drawings consecutively.
- c. Project Name, Project Number, and location of Project.
- d. Name of Architect and Architect's Project Number.
- e. Name of Contractor, subcontractor, fabricator supplier, and manufacturer, as appropriate.
- f. Name of drawing and scale (as applicable).
- g. Name and date of each revision.
- h. Cross reference to A/E's Drawings and Specification Sections, as appropriate.
- i. Provide a space on the label or adjacent to title block for the Contractor's review and approval markings, and appropriate space for the Architect's or Engineer's "Action" stamp.
- j. Name of each item on each sheet submitted and indicate its location in the Project Work.

H. Contractor Duties and Responsibilities:

- 1. Coordinate requirements for submission of each shop drawing, product data and sample as required to properly execute the Work and as necessary to maintain satisfactory progress of the Work in accordance with the WPS and Submittal Schedule.
- 2. Review shop drawings, product data, and samples prior to submission to A/E. By submitting shop drawings, product data, and samples, Contractor represents that it has verified field measurements, field construction criteria, catalog numbers and similar data, and has coordinated each submittal with requirements of the Work and of the Contract Documents. Contractor's responsibility for errors and omissions in submittals is not relieved by A/E's review of submittals. Submittals received from sources other than Contractor will be returned to sender without A/E's review "action".
- 3. Contractor shall certify by stamped, signed, and dated notation on each submittal that "Submittal is in compliance with requirements of Contract Documents without deviation." Submittals without Contractors stamp and submittals which, in A/E's or ODR's opinion, are incomplete, contain numerous errors, have not been checked, or have been checked only superficially, will be returned without disposition. Delays resulting there from shall be Contractor's responsibility.
- 4. Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by A/E's review of shop

drawings, product data, and samples unless Contractor has specifically informed the A/E in writing of such deviation at time of submission and A/E has given written acceptance to the specific deviation.

5. Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data or samples, to revisions other than those requested by A/E on previous submittals.
6. Contractor shall give prompt written notice to A/E of inability to comply with exceptions noted on the returned submittals or if unsatisfactory results are anticipated. Document specific reasons for inability to comply or specific unsatisfactory results that are anticipated. Propose substitution to comply with intent of the Contract Documents and produce satisfactory results in accordance with the substitution requirements of Section 01 25 00.
7. No portion of the Work requiring submission of a shop drawing, product data or sample shall be commenced until submittal has been reviewed with "Approved" or "Approved as Noted" status by A/E.
8. All portions of the Work shall be in accordance with approved submittals.

I. Architect's and Engineer's Action (UGSC 8.3.2):

1. Upon receipt of submittals requiring review, the A/E will review submittals and return them to the Contractor with results of the review indicated as follows:
Approved: Submittal has been reviewed for the limited purpose of checking for conformance information given and design concept expressed in the Contract Documents and no exceptions are taken; Contractor may proceed with work represented in submittal, provided no deviation to Contract Documents.
Approved as Noted: Submittal has been reviewed as stated above and certain exceptions are noted on the submittal. Contractor may proceed with work represented in submittal, unless otherwise noted.
Revise and Resubmit: Submittal has been reviewed as stated above, Contractor may not proceed with work represented in submittal, and submittal is not acceptable.
Rejected: Submittal has been reviewed as stated above; work represented in submittal has not been accepted.
For Record Only - Allows a record to be closed but isn't something that needs approval.

J. Shop Drawings:

1. Definition: The term Shop Drawings refers to original drawings prepared by the Contractor, Subcontractor, supplier, fabricator or distributor illustrating a portion of the Work including fabrication drawings, manufacturing drawings, erection drawings, setting drawings, patterns, coordination drawings, schedules, design mix formulas,

Contractor's engineering calculations, and layout drawings including ceiling layouts if different from the Contract Documents. Do not submit Contract Documents for Shop Drawings.

2. Submit shop drawings in PDF electronic file format.
3. Contractor shall also develop and coordinate shop drawings into building information model
3. Content: Shop Drawings shall include, but not be limited to the following:
 - a. The size thickness of members.
 - b. The method of anchoring and securing parts.
 - c. The quantity and location of each item.
 - d. Other pertinent data necessary to show the work to be done, where, and how it is to be done.
 - e. Materials and finishes.
 - f. How item fits to abutting work and requirements for related construction.
 - g. Required connections.
 - h. Overall size and weight.
 - i. Clearances and tolerances.
 - j. Verification of field conditions prior to fabrication.
 - k. Coordination of Shop Drawings and data with requirements for related construction.

K. Product Data:

1. Definition: Manufacturer's standard product specifications, installation instructions, rough-in diagrams and templates, standard wiring diagrams, printed performance and operational range diagrams, mill reports, operating and maintenance manuals, color charts, data sheets, brochures, drawings and diagrams, and other standard illustrative and descriptive data to clearly identify pertinent data, models and materials, uses, limitations, actual dimensions and clearances required, and technical performance data including wiring diagrams and controls. Specific item must be identified on catalog cut sheets.
2. Mark out information not applicable to this Project and supplement standard product data to show compliance with requirements.

L. Samples:

1. Definition: Samples include:
 - a. Partial sections of manufactured or fabricated work.
 - b. Small cuts or containers of materials.
 - c. Complete units of repetitively-used materials.
 - d. Swatches showing full range of color, texture and pattern.
 - e. Color range sets.
 - f. Units of work to be used for independent inspection and testing.

- g. Units of work to be used as a standard to judge materials and workmanship.
- 2. Provide samples for items where specified and for items requiring a choice of color, texture or finish. Samples shall illustrate the materials and workmanship and establish standards by which to judge the completed work.
- 3. Typical office samples shall be approximately 12" square or 12" long unless otherwise noted and shall clearly illustrate the applicable function, corners, joints, related parts, attachment devices, specified finish and full range of colors. Full size approved samples may be incorporated into the Work unless otherwise noted.

1.04 LIST OF PROPOSED SUBCONTRACTORS AND SUPPLIERS:

- A. General: Not later than sixty (60) days after award of Contract, submit the names of Subcontractors and material suppliers tabulated by each portion of the Work, in addition to the requirements set forth in UGC 3.3.6.2. Performance or non-performance of any Subcontractor or material supplier will not relieve the Contractor of its responsibility for Work as called for in the Contract Documents.

1.05 LIST OF PROPOSED MATERIALS:

- A. Submit list of materials within forty-five (45) days after issuance of Notice to Proceed in accordance with UGC 8.3.
- B. Materials List: Submit a list of the following types of materials proposed for installation:
 - 1. Material(s) not specified. (Refer to Section 01 25 00, Substitution Procedures).
 - 2. Material(s) selected from a Specification naming more than one manufacturer or supplier.
 - 3. Material(s) selected to conform to a reference specification when no manufacturer has been named.
- C. It will be assumed that materials omitted from the list will be furnished as specified when only one manufacturer has been specified. When more than one manufacturer has been named or when reference specifications have been used the A/E's selection will govern.
- D. The list shall be complete and tabulated by, each Specification section and/or portion of the Work. Include name of manufacturer of each material. For materials specified by reference standards, also include the following with the listing of each such product:
 - 1. Address of manufacturer.

2. Trade name.
3. Model or catalogue designation.
4. Manufacturer's data, including performance and test data and referenced standards.

1.06 FIELD MOCK-UPS AND FIELD SAMPLES (UGC 8.4):

- A. The Contractor shall erect and maintain mock-ups and field samples as required by the various sections of the specifications. Mock-ups and field samples are required for, but not limited to the following:
 1. Concrete sidewalk finishes.
 2. Exterior face brick wall complete with required tooled mortar, sealants, related stonework, windows, glazing, roofing systems, flashings and other related exterior building materials. (see UGC 8.4.1.1)
- B. Field samples and job site mock-ups shall be erected at the Project Site at a mutually agreed location. Contractor shall request approval for location on which to construct mock-up of field sample prior to proceeding. Each field sample or mock-up shall be complete and illustrate the range of finish and workmanship required in the completed Work and will be used by A/E and ODR, upon approval, as a standard to judge subsequent work.
- C. Where several mock-ups of alternate construction techniques or finishes are required and prepared, each shall be labeled for clear identification indicating base construction finish material, special techniques used and where important for duplication of effect line pressures, grit classification, lengths of exposure, surface preparation, undercoats, strength of reagents, etc.
- D. Contractor shall request review of mock-up or field sample upon completion prior to proceeding with actual construction work.
- E. Contractor shall protect mock-up or field samples from damage, dirt and discoloration after A/E's and Owner's approval. Retain on the job as a standard reference for materials, workmanship and appearance until removal is authorized. Do not alter, move or destroy mock-up or field sample until so authorized. Remove and dispose of mock-up only after approval is given by the ODR.

1.07 COLOR SCHEDULES:

- A. After receipt of all samples, A/E will present to the ODR a proposed comprehensive color schedule for review and approval.
 1. Once approved, the color board will be sent to and kept at the job site for reference. A copy of the color finish schedule compiled after the colors are approved must be provided to the ODR.

2. The Contractor must insure that required submittals for all items requiring color selection are accomplished in a timely manner. The A/E cannot prepare the color board for approval by the ODR until all items requiring color selection have been submitted.
- B. The approved color schedule will then be released to the Contractor for ordering materials.
- C. No color selection will be released until all colors are approved in the comprehensive color schedule. Any "early" selections requested, and acted upon by the Contractor, shall be at its own risk and understanding that material of color differing from the approved color schedule will be rejected.
- D. If the Contractor is unable to submit all exterior color selections/samples within sixty (60) days or all interior color selections/samples within ninety (90) days after "Notice to Proceed", the A/E may proceed with preparation of the color schedule using the color selections of a specified product. The Contractor shall be required to match the selected colors at no additional cost to the Owner of the specified product selected by the A/E.

1.08 BRICK SELECTION

Brick selection is a very important item from the Owner's perspective and timely submittals by the Contractor are important to prevent delay.

1.09 PRECAST ARCHITECTURAL CONCRETE AND CUT STONE APPROVALS (if applicable)

Contract may require a project sample of precast architectural concrete or cut stone to be constructed. After the project sample is erected, the ODR will arrange for appropriate personnel to inspect and approve the sample.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Reference Requirements.
- B. Governing Regulations and Authorities.
- C. Definitions

1.02 REFERENCE REQUIREMENTS:

- A. Materials, equipment and operations specified by reference to published standards and specifications of a technical society, trade association, or other agency standard, shall comply with the requirements of the current edition of the listed document that is in effect on the issue date of the Specifications or Addendum page making reference thereto, unless otherwise specified. Make copies of referenced documents available at site, as the ODR or A/E may request.
- B. No provision of a reference standard, specification, manual, or code shall change the duties and responsibilities of the Owner, the Contractor, the A/E and their consultants, their agents and employees from those duties and responsibilities set forth in the Contract Documents.
- C. Acronyms for names of technical societies, associations, and agencies referenced in the Contract Documents shall be interpreted as follows:

AA Aluminum Association
 900 19th St., NW, Suite 300; Washington, DC 20006;
 202-862-5100
 www.aluminum.org

AABC Associated Air Balance Council
 1518 K Street, NW, Suite 503; Washington, DC 20005
 202-737-0202
 www.aabchq.com

AAMA American Architectural Manufacturers Association
 1827 Walden Office Square, Ste 550; Schaumburg, IL 60173-4268
 847-303-5664
 www.aamanet.org

ANLA American Nursery & Landscape Association

1000 Vermont Ave., NW, Ste 300; Washington, DC 20005-4914
202-789-2900
www.anla.org

- ACI American Concrete Institute
38800 Country Club Drive; Farmington Hills, MI, 48331;
248-848-3700
www.concrete.org
- ACIL American Council of Independent Laboratories
1629 K Street, NW, Suite 400; Washington, DC 20006-1633
202-887-5872
www.acil.org
- ADC Air Diffusion Council
1000 E. Woodfield Road, Suite 102; Schaumburg, IL 60173-5921
847-706-6750
www.flexibleduct.org
- AGC Associated General Contractors of America
333 John Carlyle Street, Suite 200; Alexandria, VA 22314
703-548-3118
www.agc.org
- AIA America Institute of Architects
1735 New York Avenue, NW; Washington DC 20006
202-626-7300
www.aia.org
- AIC American Institute of Constructors
466 94th Avenue North; St. Petersburg, FL 33702
727-578-0317
www.aicnet.org
- AISC American Institute of Steel Construction, Inc.
One East Wacker Drive, Suite 3100; Chicago, IL 60601-2001
312-670-2400
www.aisc.org
- ASI American Iron and Steel Institute
1140 Connecticut Avenue, Suite 705; Washington, DC 20036
202-452-7100
www.steel.org
- AMCA Air Movement and Control Association
30 West University Drive; Arlington Heights, IL 60004-1893

	847-394-0150 www.amca.org
ANSI	American National Standards Institute 1819 L. Street, NW, 6 th Floor; Washington, DC 20036 202-293-8020 www.ansi.org
APA	American Plywood Association P.O. Box 11700; Tacoma, WA 98411-0700 253-565-6600 www.apawood.org
ARI	Air Conditioning and Refrigeration Institute 4100 North Fairfax Drive, Suite 200; Arlington, VA 22203 703-524-8800 www.ari.org
ASHRAE	American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc. 1791 Tullie Circle, NE; Atlanta, GA 30329 404-636-8400 www.ashrae.org
ASME	American Society of Mechanical Engineers 3 Park Avenue; New York, NY 10016 212-591-7000 www.asme.org
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive; West Conshohocken, PA 19428-2959 610-832-9500 www.astm.org
AWI	Architectural Woodwork Institute 1952 Isaac Newton Square West; Reston, VA 20190 703-733-0600 www.awinet.org
AWPA	American Wood Preservers' Association P.O. Box 388; Selma, Alabama 36702-0388 www.awpa.com
AWS	American Welding Society, Inc. 550 Le Jeune Road, NW; Miami, FL 33126 305-443-9353

www.aws.org

AWWA	American Water Works Association 6666 West Quincy Avenue; Denver, CO 80235 303-794-7711 www.awwa.org
BHMA	Builders' Hardware Manufacturers Association 355 Lexington Ave., 17 th Floor; New York, NY 10017 212-297-2122 www.buildershardware.com
BIA	Brick Institute of America 11490 Commerce Park Drive, Suite 300; Reston, VA 20191 703-620-0010 www.bia.org
BICSI	Building Industry Consulting Services International 8610 Hidden River Parkway; Tampa, FL 33637 800-242-7405 www.bicsi.org
CPA	Composite Panel Association 18922 Premiere Court; Gaithersburg, MD 20879 301-670-0604 www.pbmdf.com
CPSC	Consumer Product Safety Commission National Injury Information Clearinghouse 4330 East-West Hwy.; Bethesda, MD 20814-4408 301-504-6816 www.cpsc.gov
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road; Schaumburg, IL 60173-4758 847-517-1200 www.crsi.org
DHI	Door and Hardware Institute 14150 Newbrook Drive, Suite 200; Chantilly, VA 20151-2223 703-222-2010 www.dhi.org
FM	Factory Mutual Engineering and Research Organization 1151 Boston-Providence Turnpike; Norwood, MA 02062-5001 781-762-4300

FS	Federal Specification (General Services Administration) Specifications Unit (WFSIS)
GA	Gypsum Association 810 First Street, NE, Suite 510; Washington, DC 20002 202-289-5440 www.gypsum.org
IEEE	Institute of Electrical and Electronics Engineers 445 Hoes Lane; Piscataway, NJ 08854 732-981-0660 www.ieee.org
IESNA	Illuminating Engineering Society of North America 120 Wall Street, Floor 17; New York, NY 10005 212-248-5000 www.iesna.org
IGCC	Insulating Glass Certification Council c/o ETL Testing Labs, P.O. Box 9, Henderson Harbor, NY 13651 315-646-2234 www.igcc.org
ILI	Indiana Limestone Institute of America 400 Stone City Bank Building, Bedford, IN 47421 812-275-4426 www.iliai.com
LPI	Lightning Protection Institute 3335 N. Arlington Hts. Road, Suite E; Arlington Hts., IL 60004 847-577-7200 www.lightning.org
MIL	Military Standardization Documents (U.S. Dept. of Defense)
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry 127 Park Street, NE; Vienna, VA 22180-4602 703-281-6613 www.mss-hq.com
NAAMM	National Association of Architectural Metal Manufacturers 8 South Michigan Avenue, Suite 1000; Chicago, IL 60603 312-332-0405 www.naamm.org

NCMA	National Concrete Masonry Association 13750 Sunrise Valley Drive; Herndon, VA 20171-4662 703-713-1900 www.ncma.org
NEC	National Electric Code (by NFPA)
NEI	National Elevator Industry, Inc. 1677 County Route 64, P.O. Box 838; Salem, NY 12865-0838 518-854-3100 www.neii.org
NEMA	National Electrical Manufacturers Association 1300 North 17 th Street; Rosslyn, VA 22209 703-841-3200 www.nema.org
NFPA	National Fire Protection Association One Batterymarch Park; Quincy, MA 02269-9101 617-770-3000 www.nfpa.org
NIST	National Institute of Standards and Technology (formerly National Bureau of Standards; U.S. Dept. of Commerce) Gaithersburg, MD 20899-3460 301-975-6478 www.nist.gov
NPCA	National Paint and Coatings Association 1500 Rhode Island Ave., NW; Washington, DC 20005 202-462-6272 www.paint.org
NRCA	National Roofing Contractors Association 10255 W. Higgins Road, Suite 600; Rosemont, IL 60018-5607 847-299-9070 www.nrca.net
NSF	National Sanitation Foundation P.O. Box 130140, 789 N. Dixboro Rd; Ann Arbor, MI 48113-0140 734-769-8010 www.nsf.org
NTMA	The National Terrazzo and Mosaic Association, Inc. 201 N. Maple Avenue, Suite 208; Purcellville, VA 20132

	800-323-9736 www.ntma.com
NWWDA	National Wood Window and Door Association (formerly NWMA) 1400 E. Touhy Avenue #G54; Des Plaines, IL 60018 708-299-1286 www.nwwda.org
OSHA	Occupational Safety & Health Administration 200 Constitution Avenue, NW; Washington, DC 20210 www.osha.gov
PCA	Portland Cement Association 5420 Old Orchard Road; Skokie, IL 60077 847-966-6200 www.portcement.org
PCI	Precast/Prestressed Concrete Institute 209 W. Jackson Blvd, Suite 500.; Chicago, IL 60606-6938 312-786-0300 www.pci.org
PS	Product Standard of NBS (U.S. Department of Commerce)
RFCI	Resilient Floor Covering Institute 401 E. Jefferson Street, Suite 102; Rockville, MD 20850 301-340-8580 www.rfci.com
RIS	Redwood Inspection Service (Grading Rules) 405 Enfrente Drive, Suite 200; Novato, CA 94949 415-382-0662
SDI	Steel Deck Institute P.O. Box 25; Fox River Grove, IL 60021 847-458-4647 www.sdi.org
SDI	Steel Door Institute 30200 Detroit Road; Cleveland, OH 44145-1967 440-899-0010 www.steeldoor.org
SIGMA	Sealed Insulating Glass Manufacturers Association 401 N. Michigan Avenue, Suite 2400; Chicago, IL 60611 312-644-6610

SMACNA	Sheet Metal & Air Conditioning Contractors National Association, Inc. 4201 Lafayette Center Drive; Chantilly, VA 20151-1209 703-803-2980 www.smacna.org
SPIB	Southern Pine Inspection Bureau (Grading Rules) 4709 Scenic Highway, Pensacola, FL 32504-9094 850-434-2611 www.spib.org
SSPC	The Society for Protective Coatings 40 24 th Street, 6 th Floor; Pittsburgh, PA 15222-4656 877-281-7772 www.sspc.org
TCA	Tile Council of America, Inc. 100 Clemson Research Blvd.; Anderson, SC 29625 864-646-8453 www.tileusa.com
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance 2500 Wilson Blvd., Suite 300; Arlington, VA 22201 703-907-7700 www.tiaonline.org
UL	Underwriter's Laboratories 333 Pfingsten Road; Northbrook, IL 60062 847-272-8800 www.ul.com
WWPA	Western Wood Products Association 522 SW 5 th Avenue, Suite 500; Portland, OR 97204-2122 503-224-3930 www.wwpa.org

1.03 GOVERNING REGULATIONS/AUTHORITIES:

- A. The A/E has contacted the appropriate authorities having jurisdiction for the listed regulations and codes to obtain information for preparation of the Contract Documents. The Contractor may contact authorities having jurisdiction directly for information and decisions having bearing on the Work.

1. Life Safety Code, NFPA 101, edition approved by State Fire Marshall, and all referenced codes.
2. International Building Code, edition matching Life Safety Code, International Code Council, Inc., (for all items not covered by Life Safety Code).
3. Other applicable National Fire Codes, NFPA.
4. State Energy Conservation Design Standard (ASHRAE 90.1), edition approved by State Energy Conservation Office (SECO).
5. State Energy Conservation Office (SECO) Suggested Water Efficiency Guidelines for Buildings and Equipment at Texas State Facilities.
6. Other applicable ASHRAE Standards
7. International Plumbing Code and International Mechanical Code, edition matching building code, International Code Council, Inc.
8. Building Service Piping, ASME/ANSI B31.9.
9. Applicable ANSI, ASTM and ASME codes and standards
10. Applicable OSHA, EPA and Texas Commission on Environmental Quality (TCEQ) regulations
11. Texas Accessibility Standards (TAS), Texas Department of Licensing and Regulations, Architectural Barriers Act, Ch. 469, Government Code.
12. Americans with Disabilities Act, Public Law 101-336, July 26, 1990
13. Safety Code for Elevators and Escalators, ASME A17.1 & A17.3.
14. TIA/EIA Standards.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 43 00

QUALITY ASSURANCE

PART I - GENERAL

1.01 SECTION INCLUDES:

- A. General Requirements and Qualifications for Owner's Quality Assurance Testing.
- B. Below Grade Inspections.
- C. Concrete Inspections.
- D. Wall Closure and Above Ceiling Inspections.
- E. Pre-final Inspection.
- F. Final Inspection
- G. Final Acceptance
- H. One-Year Inspection.

1.02 RELATED SECTIONS:

- A. Section 01 33 00 - Submittal Procedures

1.03 GENERAL REQUIREMENTS FOR OWNERS QUALITY ASSURANCE TESTING (UGSC 8.2.2):

- A. The Owner will employ a testing laboratory and/or geotechnical engineering service to perform quality assurance tests and to transmit copies of test reports to Contractor. Sampling and testing that the Owner may require is specified in this section and in the various technical sections requiring quality assurance testing. Cooperate with Owner's testing laboratory personnel, provide access to the Work, to manufacturer's and fabricator's operations, furnish incidental labor and facilities, and samples for test and inspections, as specified.
 - 1. Employment of testing laboratory to perform quality assurance tests is for benefit of Owner in confirming that performance and quality of the Work is in conformance with the Contract Documents.
 - 2. Employment of a testing laboratory by Owner in no way relieves Contractor's obligation to perform the Work in accordance with Contract Documents.
 - 3. Owner's testing laboratory shall not be the same as Contractor's testing laboratory used for design and certification testing unless otherwise acceptable to the A/E and Owner.
 - 4. Where the terms "Inspector" and "Laboratory" are used, they mean and refer to an officially designated and accredited inspector of the testing laboratory engaged by the Owner.
 - 5. The testing firm shall make all inspections and perform all tests in

accordance with the rules and regulations of the building code, local authorities, the Specifications of the ASTM and these Contract Documents.

6. Commercial Testing Laboratories: In general, all Contracts awarded by The Texas A&M University System will require that testing not performed by the Contractor (i.e., hydrostatic testing of piping) or by the A/E (i.e., spot checking of air flow by the Engineer) will be performed by a commercial testing laboratory selected by the Owner. The cost of such commercial testing will be paid directly by The Texas A&M University System. Retesting will also be paid by the Owner, but will be reinvoiced at cost to the Contractor. All test reports shall be uploaded to Autodesk Build. Employment of the testing laboratory is for the benefit of the Owner for confirming that performance and quality of the Work is in conformance with the Contract Documents.
7. The engagement of a testing laboratory by the Owner in no way relieves the Contractor of its responsibility, for full compliance of the Contract. The Contractor remains liable for the quality of the materials, products/equipment installed, and satisfactory work performance.

B. Owner's quality assurance testing and sampling may include the following testing and other services to ensure Contract performance.

1. Compacted Fill and Backfill: Perform field density tests.
2. Footing Subgrades: Perform tests and visual comparisons of footing subgrades to verify design bearing capacities.

C. Limits of Testing Laboratory Authority: Laboratory is not authorized to:

1. Approve or reject any portion of the Work.
2. Perform any duties of the Contractor and Subcontractors.
3. Revoke, alter, relax, expand, or release any requirement of the Contract Documents or to approve or accept any portion of the Work, except where such approval is specifically called for in the Specifications.
4. Laboratory technicians do not act as foremen, or perform other duties for Contractor. Work will be checked as it progresses, but failure to detect any defective work or materials shall not, in any way, prevent later rejection when such defect(s) are discovered.

1.04 QUALIFICATIONS:

A. Laboratory Qualifications and Procedures:

1. Meet "Recommended Requirements for Independent Laboratory Qualification," latest edition published by American Council of Independent Laboratories. Testing firms shall meet the requirements of ASTM E 329, "Recommended Practice for Inspection and Testing Agencies

for Concrete, Steel and Bituminous Materials as Used in Construction" and ASTM E 543, "Determining the Qualification of Nondestructive Testing Agencies."

2. Testing firms shall each be insured against errors and omissions by a professional liability insurance policy having a limit of liability not less than \$500,000.00.
3. The inspection and testing services of the testing firm shall be under the direction of a Registered Engineer licensed in the State of Texas and having at least five years engineering experience in inspection and testing of construction materials.
4. Inspecting personnel monitoring concrete work shall be ACI certified inspectors.
5. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection. Include memorandum of remedies of deficiencies reported by this inspection.
6. Testing Equipment: Calibrated at reasonable intervals by devices of accuracy traceable to National Bureau of Standards.
7. Tests and inspections shall be conducted in accordance with specified requirements and if not specified, in accordance with applicable standards of the American Society for Testing and Materials and other recognized authorities, as approved.
8. Primary inspectors performing structural steel inspection shall be currently certified AWS Certified Welding Inspectors (CWI), in accordance with the provisions of AWS QCI, "Standard and Guide for Qualification and Certification of Welding Inspectors." The inspector may be supported by assistant inspectors who may perform specific inspection functions under the supervision of the inspector. Assistant inspectors shall be currently certified ASW Certified Associate Welding Inspectors (CAWI). The work of assistant inspectors shall be regularly monitored by the inspector.

B. Contractor's Quality Assurance

1. Prior to any inspection by the Owner, the Contractor shall utilize Autodesk Build checklists for their inspections of the work.

1.05 BELOW GRADE INSPECTIONS

- A. Before the covering or backfilling of any improvement below grade, cover up inspections will be conducted to see that all items meet the plans and specs. Only after all the deficiencies have been corrected will the Contractor be allowed to install any backfill.

1.06 CONCRETE INSPECTIONS

- A. Before the placing of any cast-in-place concrete structure, an inspection will be conducted to see that all items meet the intent of the plans or specs. Only after all

the deficiencies have been corrected will the Contractor be allowed to proceed.

1.07 WALL CLOSURE/ABOVE-CEILING INSPECTIONS

- A. Before the installation of any ceiling or the closing of walls and chases, the Contractor's QA personnel will perform an inspection to verify that all items fully meet the plans and specs. The Contractor shall utilize Autodesk Build checklists for their inspection. Following the verification inspection, a request for a TAMUS inspection shall be requested before being covered. Only after all the deficiencies have been corrected will the Contractor be allowed to install the ceiling or close-up the wall.
- B. As a minimum, the following should be in place before an above-ceiling inspection is scheduled:
 - 1. All light fixtures installed and working;
 - 2. All plumbing installed and insulation complete;
 - 3. All rigid and flexible ducts installed;
 - 4. All required valve identification tags installed;
 - 5. All air devices installed and connected;
 - 6. All controlled air tubing installed; and
 - 7. The ceiling support structure installed.
- C. Walls and chases will be inspected to verify the presence of blocking and bridging, and to verify all MEP systems are installed per Codes and Contract Documents..
- D. Those in attendance at these inspections shall include the A/E, selected personnel from the FPC, the General Contractor, plumbing, electrical and mechanical subcontractors and representatives from campus facilities department or Using Agency.
- E. A minimum of fourteen (14) days notice shall be given to the ODR prior to these inspections.

1.08 A/E AND PROJECT INSPECTOR'S SUBSTANTIAL COMPLETION INSPECTION (UGSC 12.1.1)

- A. When the Contractor feels that the Work is complete and ready for the Owner's use, it will notify the A/E and the ODR in writing fourteen (14) days prior to the date that the Work is anticipated to be complete and ready for a Substantial Completion Inspection. The A/E, along with representatives of FPC, User Coordinator, and members of the campus facilities department will make a detailed inspection of all Work included in the Contract and the A/E will furnish to the Contractor a list of incomplete items. When all these items have been completed by the Contractor, the A/E and the ODR will be notified that all items of the Substantial Completion Inspection have been completed.

1.09 FINAL INSPECTION (UGSC 12.1.2)

- A. Upon verification by the A/E and the ODR that the deficiencies found during the Substantial Completion Inspection have been corrected, and the Work is ready for Final Inspection and Acceptance, the ODR will, within ten (10) calendar days after receiving written verification by the A/E, make a Final Inspection. When the Work

is found acceptable under the Contract Documents without any exceptions and the Contract is fully performed, then final payment will be made to the Contractor. Those in attendance at the Final Inspection will include the A/E, representatives of FPC, campus facilities department and User Coordinator.

1.10 FINAL COMPLETION (12.3)

- A. When the Work is fully complete, FPC will issue a Certificate of Final Completion.

1.11 ONE YEAR INSPECTION

- A. All Contracts awarded by The Texas A&M University System contain a one (1) year workmanship and material guarantee as stated in Uniform General Conditions, Articles 13.2 and 13.5. Campus facilities department is responsible for administering any warranty issues. Prior to the expiration of the one year warranty FPC will establish a date for a warranty inspection to be attended by A/E, representatives of FPC, campus facilities department and User Coordinator.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.01 PIER DRILLING OPERATION

- A. Provide services herein specified.
- B. A representative of the soils testing laboratory shall witness and document all test piles/piers including test methods, forces, and measurements. Provide documentation as required below.
- C. A representative of the soils testing laboratory shall make continuous inspections to determine that proper bearing stratum is obtained and utilized for bearing and that shafts as are properly clean and dry before pouring concrete.
- D. Soils testing laboratory shall furnish complete pier log showing the diameter, top and bottom elevations of each pier, casing required or not required, bell size, actual penetration into bearing stratum, elevation of top of bearing stratum, and volume of concrete used.
- E. Request probe holes when deemed necessary to confirm safe bearing capacity.

3.02 REINFORCING STEEL MECHANICAL SPLICES

- A. Visually inspect and report on the completed condition of each mechanical splice

07/22

of reinforcing steel.

- B. Each mechanical splice shall be visually inspected to ensure compliance with building code and the manufacturer's published criteria for acceptable completed splices.
- C. Special emphasis shall be placed on inspection of the end preparation of each bar to be spliced, as required by the building code.
- D. Submit copies of manufacturer's published criteria for acceptable completed splices prior to observing mechanical splices.
- E. Reports on each mechanical splice shall indicate location of the splice, size of bars spliced, and acceptability or rejection of splice. Reasons for rejection shall be shown on each report.

3.03 CONCRETE REINFORCING STEEL AND EMBEDDED METAL ASSEMBLIES

- A. Inspect all concrete reinforcing steel prior to placing of concrete for compliance with Contract Documents and approved shop drawings. All instances of noncompliance with Contract Documents and approved shop drawings shall be immediately brought to the attention of the Contractor for correction and then, if uncorrected, reported to the A/E.
- B. Observe and Report on the Following:
 - 1. Number and size of bars.
 - 2. Bending and lengths of bars.
 - 3. Splicing.
 - 4. Clearance to forms including chair heights.
 - 5. Clearance between bars or spacing.
 - 6. Rust, form oil, and other contamination.
 - 7. Grade of steel.
 - 8. Securing, tying, and chairing of bars.
 - 9. Excessive congestion or reinforcing steel.
 - 10. Installation of anchor bolts and placement of concrete around such bolts.
 - 11. Fabrication of embedded metal assemblies, including visual inspection of all welds.
 - 12. Visually inspect studs and deformed bar anchors on embedded assemblies for compliance with Contract Documents. Check number, spacing and weld quality. If, after welding, visual inspection reveals that a sound weld or a full 360 degree fillet has not been obtained for a particular stud or bar, such stud or bar shall be struck with a hammer and bent 15 degrees off perpendicular and then bent back into position. Anchors failing this test shall be replaced.

3.04 CONCRETE INSPECTION AND TESTING

- A. Receive and evaluate all proposed concrete mix designs submitted by the Contractor. If the mix designs comply with the Drawings and Specifications, the laboratory shall submit a letter to the A/E certifying compliance. Mix designs not complying with the Drawings and Specifications shall be returned by the laboratory as unacceptable.
- B. Secure composite samples of concrete at the jobsite in accordance with ASTM C 172.
- C. Mold and cure three specimens from each sample in accordance with ASTM C 31. Supervise the curing and protection provided (by others) for test specimens in the field, and the transportation from the field to the laboratory. The test cylinders shall be stored in the field 24 hours and then be carefully transported to the laboratory and cured in accordance with ASTM C 31.
- D. Test specimens in accordance with ASTM C 39. Two specimens shall be tested at 28 days for acceptance and one shall be tested at seven days for information.
- E. Make one strength test (three cylinders) for each 100 cubic yards or fraction thereof, of each mix design of concrete placed in any one day.
- F. Make one slump test for each set of cylinders following the procedural requirements of ASTM C 143 and ASTM C 172. Make additional slump tests whenever the consistency of concrete appears to vary. Do not permit placement of concrete having a measured slump outside the limits given on the Drawings, except when approved by the A/E. Slump tests corresponding to samples from which strength tests are made shall be reported with the strength test results. Other slump tests need not be reported.
- G. Determine total air content of air entrained normal-weight concrete sample for each strength test in accordance with ASTM C 231.
- H. Determine temperature of concrete sample for each strength test.
- I. The testing agency shall furnish and maintain a competent inspector at the mixing plant at the start of each day's mixing. The inspector shall examine concrete materials for compliance with Specifications and approved mix design, weighing and measuring devices, proportioning and mixing of materials, the water and cement content of each batch, the general operation of the plant and the transportation of concrete to the jobsite. The inspector shall verify that the amount of free surface moisture contained in the fine and coarse aggregate has been properly accounted for in the concrete mixing to achieve the required consistency and water cement ratio.

- J. The testing laboratory shall monitor the addition of water to the concrete at the jobsite and the length of time the concrete is allowed to remain in the truck before placement. The personnel shall compare the mixture with the criteria on the approved mix design and report any significant deviation to the A/E, ODR, Contractor and concrete supplier. Do not permit the addition of water which will exceed the maximum water/cement ratio for the mix as given on the approved mix design.
- K. Observe the placing of all concrete, except non-structural slabs-on-grade and sitework. Observe and report on placing method, consolidation, cold joints, length of drop, and displacement of reinforcement. Report deficiencies to the Contractor immediately for corrective action. Inspections may be reduced to a periodic basis when all procedures have been deemed satisfactory by the laboratory.
- L. The testing laboratory shall certify each delivery ticket indicating class of concrete delivered (or poured), amount of water added and the time at which the cement and aggregate was dispensed into the truck, and the time at which the concrete was discharged from the truck.
- M. Evaluation and Acceptance:
1. If the measured slump, or air content of air entrained concrete, falls outside the specified limits, a check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered to have failed to meet the requirements of the specifications, and shall not be used in the structure.
 2. The strength level of the concrete will be considered satisfactory if the averages of all sets of three consecutive strength test results are equal to, or exceed specified strength and no individual test result (average of two cylinders) is below specified strength by more than 500 psi.
 3. Completed concrete work will be accepted when the requirements of "Specifications for Structural Concrete for Buildings," ACI 301, Chapter 18, have been met.
- N. Concrete Test Reports:
1. Reports shall be made and uploaded immediately after the respective tests or inspections are made.
 2. Where reports indicate deviations from the Contract Documents, they shall also include a determination of the probable cause of the deviation and, where applicable, a recommendation for corrective action.
 3. Whenever the testing laboratory recognizes a trend of decreasing quality in the concrete due to changing seasons, conditions of curing, or other cause; this shall be brought to the attention of the A/E and the ODR, along with a

recommendation for corrective action to be taken before the materials fall below the requirements of these Specifications.

- O. Comply with ACI 311, "ACI Manual of Concrete Inspection".
- P. Inspect the application of curing compound and monitor all curing conditions to assure compliance with specification requirements. Report curing deficiencies to the Contractor immediately and submit a written report to the A/E and the ODR.

3.05 POST-TENSIONING OF CONCRETE

- A. Verify certification of calibration of jacking equipment used in post-tensioning operations.
- B. Observe and report on placement and anchorage of tendons immediately prior to concreting.
- C. Provide a Registered Professional Engineer experienced in post-tension operations to observe and report on the placement, post-tensioning and elongation measurement of each tendon.
- D. The Contractor shall log and submit detailed reports of the stressing and elongation of each tendon. The laboratory representative shall observe the recording of information by the Contractor and make such spot checks as are necessary to verify the accuracy of the post-tensioning reports.
- E. Receive and review final stressing and elongation reports prepared by the Contractor. Compare the actual and required elongation of each tendon and the actual and required load on each tendon. Grant permission to cut the tails of tendons which are within specified tolerance, unless otherwise noted on the Drawings, and submit reports of those which are not within specified tolerance along with recommended corrective action, to the Architect for further evaluation. Forward a copy of all stressing reports to the Architect for record.
- F. Observe and report on grouting of tendons noted to be bonded.

3.06 MASONRY

- A. Inspection:
 - 1. Provide a qualified inspector to inspect all structural masonry work on a periodic basis. Masonry requiring inspection includes load bearing walls and other grouted and reinforced masonry shown on the Drawings. Inspect the Work in progress at least once for each 5000 square feet of wall laid, but not less than once each day, to check compliance with the Contract Documents and applicable building code.

2. Inspect the following:
 - a. Preparation of masonry prisms for testing.
 - b. Placement of reinforcing
 - c. Grout spaces (prior to grouting and prior to closing cleanouts, if any).
 - d. Mortar mixing operations.
 - e. Bedding of mortar for each type of unit and placing of units.
 - f. Grouting operations.
 - g. Condition of units before laying for excessive absorption.
3. Provide a report of each inspection.

B. Field Compressive Test for Mortar:

1. Secure composite samples of mortar at the jobsite in accordance with ASTM C 780.
2. Mold and cure three cube specimens in accordance with ASTM C 109 and ASTM C 780. Supervise the curing protection provided (by others) for test specimens in the field and the transportation from the field to the laboratory. The specimens shall be stored in the field 24 hours and then be carefully transported to the laboratory and cured in accordance with ASTM C 780.
3. Test specimens in accordance with ASTM C 780. Two specimens shall be tested in 28 days for acceptance and one shall be tested at 7 days for information.
4. Make one strength test (three cubes) for each 5000 square feet of wall area.

C. Field Compressive Tests for Grout:

1. Secure composite samples of grout at the jobsite in accordance with ASTM C 172.
2. Mold and cure three, 3" x 6", cylindrical specimens from each sample in accordance with ASTM C 31. Supervise the curing protection provided (by others) for test specimens in the field and the transportation from the field to the laboratory. The test cylinders shall be stored in the field 24 hours and then be carefully transported to the laboratory and cured in accordance with ASTM C 31.
3. Test specimens in accordance with ASTM C 39. Two specimens shall be tested at 28 days for acceptance and one specimen shall be tested at 7 days for information.
4. Make one strength test (three cylinders) for each 10 cubic yards of grout poured but not less than one strength test for each 5000 square feet of wall area.

D. Prism Tests:

1. Prism tests are required for load bearing brick masonry only.
2. Make prism tests in advance of operations using materials under same conditions, and with same bonding arrangement, as for structure. In building prisms, moisture content of unit at time of laying, consistency of mortar and width and thickness of mortar joints shall be same as used in the structure.
3. Cure and test prisms in accordance with applicable provisions of ASTM E 447. Test five specimens of each type of masonry unit before delivering material to jobsite and submit results for approval. During construction, test three specimens of each type of masonry unit for each 5000 square feet of wall placed.
4. The standard age of test specimens is 28 days, but 7 day tests may be used, provided relation between 7 day and 28 day strengths is established by test for materials used.
5. Build brick prisms one brick width and length in plan and five bricks high, using full bed joints as specified. Compute ultimate compressive strength by dividing ultimate load by gross area of masonry units.
6. Build prisms on job using same materials and methods as for wall construction. Store prisms in a place where they will be undisturbed for 2 days and have approximately same curing conditions as wall construction. After 2 days, transport to laboratory in a manner which will not disturb mortar bond and then cure and test as set forth under ASTM E 447.
7. When the average strength of a set of prisms falls below the specified compressive strength, the masonry corresponding to the test shall be deemed unacceptable. In such case, notify the Architect and Contractor immediately.

E. Absorption Tests:

1. Perform a field test of water absorption on three representative clay units, at least once for each 5000 square feet of wall, before laying.
2. The field test shall consist of drawing a 1 inch diameter circle with a wax pencil (the diameter of a quarter). Place 20 drops of water from a medicine dropper in rapid succession within the circle. If all of the water is absorbed into the brick in less than 90 seconds, the units are too dry and should be prewetted.

3.07 STRUCTURAL STEEL

- A. Inspect all structural steel during fabrication and during and after erection for conformance with Contract Documents and Shop Drawings. Any cases of insufficient bracing or guying, or other unsafe conditions shall be immediately called to attention of the Contractor and reported to A/E and the ODR.
- B. Shop Inspection:

1. Examination of all steel for straightness and alignment.
2. Examination of all fabricated pieces and checking of same with erection plans and detail drawings.
3. Visual examination of welding.
4. Ultrasonic testing of all full penetration welds.
5. Examination of galvanizing.
6. Examination of installation of shop welded shear studs.
7. Examination of shop painting.

C. Field Inspection:

1. Proper erection of all pieces.
2. Proper installation of all bolts.
3. Plumbness of structure and proper bracing.
4. Proper field painting.
5. Visual examination of all field welding.
6. Inspect all shop fabricated members, upon their arrival at the jobsite, for defects incurred during transit and handling.

D. Qualifications of Welders: Fabricator and erector shall provide the testing laboratory with names of welders to be employed to work, together with certification that each of these welders has passed qualification tests within the last year using procedures covered in the American Welding Society "Structural Welding Code - Steel," latest edition. Verify all welder qualifications.

E. Inspections of shop and field welding shall be "verification inspection," in accordance with the AWS Structural Welding Code and as follows:

1. Visually inspect the welding of all shop fabricated members and note the location of all cover plates, connectors, bearing stiffeners, splices, and fillet welds for proper return around ends and check for seams, folds and delaminations.
2. Warped or out-of-plumb connectors shall be reported prior to any further welding.
3. Ultrasonically test all penetration welds in accordance with ASTM # 164.
4. Surfaces to be welded and all filler metal shall be carefully inspected. Surface preparations, fit-up and cleanliness of surface shall be noted. Electrodes shall be checked for size, type and condition.
5. Welds shall be sound, clean metal, free of slag inclusions and porosity. Filler metal shall be completely fused with base metal and shall completely penetrate the joint. Root passes shall be checked for penetration from the back side of joint. Welds showing inclusions, porosity, lack of fusion, incomplete penetration or uneven contour (sagging or overlaps) shall be ordered gouged out and rewelded. Welds showing any undercut shall have a small stringer bead ordered to be run in along the toe of undercut using a

smaller diameter electrode than that which made the original weld. No craters shall be left in welds. Any welding defects, including porosity, fusion and undercuts in excess of that allowed, shall be cause for rejection. Where craters occur, the inspector shall order them to be filled out with weld metal.

6. The inspector shall check that all welds have been marked with the welder's symbol. The inspector shall mark the welds requiring repairs and shall make a reinspection. The inspector shall maintain a written record of all welds. Work completed and inspected shall receive an identification mark by the inspector. Unacceptable material and work shall be identified by the word "reject" or "repair" marked directly on the material.
7. The testing agency shall advise the ODR and the A/E of any shop and/or field conditions which, in its opinion, may require further tests and examination by means other than those specified. Such further tests and examinations shall be performed as authorized by the ODR and the A/E.
8. The Owner reserves the right to use ultrasonic or radiographic inspection to verify the adequacy of all welds. Testing procedures and acceptance criteria shall be as specified in AWS D1.1.

F. Inspection of bolted construction shall be in accordance with AISC Specification for Structural Steel Buildings and as follows:

1. All bolts shall be visually inspected to ensure that the plies have been brought into snug contact.

G. Inspection of stud field welding shall be in accordance with the AWS Structural Welding Code, latest edition and as follows:

1. A minimum of two shear studs shall be welded at the start of each production period in order to determine proper generator, control unit, and stud welder setting. These studs shall be capable of being bent 45 degrees from vertical without weld failure.
2. Visually inspect studs for compliance with contract documents. Check number, spacing, and weld quality. If, after welding, visual inspection reveals that a sound weld or a full 360 degree fillet has not been obtained for a particular stud, such stud shall be struck with a hammer and bent 15 degrees off perpendicular to the nearest end of the beam. Studs failing under this test shall be replaced.

3.08 EXPANSION BOLT INSTALLATION

- A. Inspect the drilling of each hole and installation of each expansion bolt for compliance with the Contract Documents and shop drawings.
- B. Verify the installation torque for each expansion bolt for compliance with

manufacturer's installation instructions.

3.09 METAL FLOOR DECK

- A. Field inspection shall consist of the following:
1. Checking types, gauges and finishes for conformance with Contract Documents and Shops Drawings.
 2. Examination for proper erection of all metal deck, fastenings, reinforcing of holes, deck reinforcing, miscellaneous deck supports, hanger tabs, shear studs, deck closures, painting or other coating.
 3. Certification of welders.
 4. Field welded shear studs used to fasten metal floor decking to supporting steel shall be inspected and tested as described in the paragraph addressing structural steel.

3.10 METAL ROOF DECK

- A. Field inspection shall consist of the following:
1. Checking types, gauges, and finishes for conformance with Contract Documents and Shop Drawings.
 2. Examination for proper erection of all metal deck, including fastenings at supports and side laps, reinforcing of holes, and miscellaneous deck supports.
 3. Certification of welders.
 4. Visual inspection of at least 25 percent of all welds.

END OF SECTION

SECTION 01 45 00

QUALITY CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. General Requirements and Qualifications for Contractor's Testing Laboratory Services.
- B. Submittals.
- C. Reference Standards.

1.02 RELATED SECTIONS:

- A. Section 01 33 00 - Submittal Procedures

1.03 GENERAL REQUIREMENTS FOR CONTRACTOR'S LABORATORY SERVICES (UGSC 8.2):

- A. Contractor's Design and Certification Testing: Provide services of an independent testing laboratory or facility acceptable to the A/E and the ODR to perform design and certification testing services.
 - 1. Submit written description of testing laboratory giving qualifications of personnel, laboratory facilities and equipment, and other information as may be requested by A/E and ODR.
 - 2. Contractor's testing laboratory shall not be the same as Owner's testing laboratory used for quality assurance testing unless otherwise acceptable to the A/E and ODR.
- B. Contractor's design testing and certification testing includes:
 - 1. Earthwork: Identify suitable soil material at borrow material location, sampling soil material, and testing of soil material samples.
 - 2. Performing certified welding procedure qualification and requalification testing specified.
 - 3. Testing of materials when mill certificates are unavailable.
 - 4. Additional testing when source of material is changed after initial tests have been performed.
 - 5. Other testing required by other Sections of the Specifications.

1.04 QUALIFICATIONS:

- A. Laboratory Qualifications and Procedures:

1. Meet "Recommended Requirements for Independent Laboratory Qualification," latest edition published by American Council of Independent Laboratories. Testing firms shall meet the requirements of ASTM E 329, "Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction" and ASTM E 543, "Determining the Qualification of Nondestructive Testing Agencies."
2. Testing firms shall each be insured against errors and omissions by a professional liability insurance policy having a limit of liability not less than \$500,000.00.
3. The inspection and testing services of the testing firm shall be under the direction of a Registered Engineer licensed in the State of Texas and having at least five years engineering experience in inspection and testing of construction materials.
4. Inspecting personnel monitoring concrete work shall be ACI certified inspectors.
5. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection. Include memorandum of remedies of deficiencies reported by this inspection.
6. Testing Equipment: Calibrated at reasonable intervals by devices of accuracy traceable to National Bureau of Standards.
7. Tests and inspections shall be conducted in accordance with specified requirements and if not specified, in accordance with applicable standards of the American Society for Testing and Materials and other recognized authorities, as approved.
8. Primary inspectors performing structural steel inspection shall be currently certified AWS Certified Welding Inspectors (CWI), in accordance with the provisions of AWS QCI, "Standard and Guide for Qualification and Certification of Welding Inspectors." The inspector may be supported by assistant inspectors who may perform specific inspection functions under the supervision of the inspector. Assistant inspectors shall be currently certified ASW Certified Associate Welding Inspectors (CAWI). The work of assistant inspectors shall be regularly monitored by the inspector.

B. Laboratory Duties: Cooperate with A/E, ODR and Contractor. Upon notice, provide qualified personnel to perform required tests and inspections. In performing tests and inspections, Laboratory shall:

1. Comply with specified standards. Comply with building code requirements for "Special Inspection" whether or not such inspections are specified herein.
2. Ascertain compliance of materials with requirements of Contract Documents. If the material furnished and/or work performed fails to meet requirements of Contract Documents, laboratory inspector shall promptly notify the Contractor, A/E and the ODR of such failure.

3. Promptly notify ODR, Contractor and A/E of observed irregularities or deficiencies in the Work.
4. A representative of the Owner's testing laboratory, who has reviewed and is familiar with the Project and Specifications, shall participate in all preconstruction conferences. The testing firm shall coordinate material testing and inspection requirements with the Contractor and its Subcontractors consistent with the planned construction schedule. The laboratory personnel shall attend, throughout the course of the Project, such conferences as may be required or requested to address quality control issues.
5. Laboratory personnel shall inspect and/or test materials, assemblies, specimens, and work performed, including design mixes, methods and techniques and furnish report(s) to the A/E and the ODR of the progress thereof.

C. Contractor's Responsibilities:

1. Cooperate with laboratory personnel, provide access to the Work, and to manufacturer's and fabricator's operations wherever the Work is in preparation or progress.
2. Secure and deliver to the laboratory, without cost to Owner, adequate quantities of representative samples of materials proposed to be used and which require testing.
3. Furnish Incidental Labor and Facilities:
 - a. To provide access to work to be tested.
 - b. To obtain and handle samples at the Project Site or at the source of the product to be tested.
 - c. To facilitate inspections and tests. Furnish such labor as required to assist laboratory personnel in obtaining and handling samples at the Project Site.
 - d. For safe storage and curing of concrete test cylinders at Project Site and other test samples as required for field curing by ASTM C31.
4. Costs of tests, samples, and mock-ups of substitute material, where the substitution is requested by the Contractor and the tests are necessary in the opinion of the A/E to establish equality with specified items, shall be borne by the Contractor.
5. Costs of tests, samples, and mock-ups performed solely for the benefit or convenience of the Contractor shall be borne by the Contractor.
6. Notify laboratory sufficiently in advance of construction operations to allow laboratory to make assignment of personnel and scheduling of tests to complete any required checks or tests.
7. Owner's testing laboratory will conduct additional tests at Contractor's expense when initial quality control testing indicates work is defective or does not conform to requirements. Materials and workmanship not meeting the required standards or performance obligations are to be

removed and replaced. Replacement and subsequent testing shall be at the expense of the Contractor.

8. Furnish concrete mix designs, in accordance with ACI 301, made by an independent testing laboratory or qualified concrete supplier. When mix designs by an independent testing laboratory are required, the laboratory shall be selected by the Contractor, approved by the A/E and ODR, and paid by the Contractor.
9. Obtain required inspections or approvals of the building official when required. All inspection requests and notifications required by the building code are the responsibility of the Contractor.
10. Provide current welder certifications for each welder to be employed.
11. Furnish fabrication/erection inspection and testing of all welds in accordance with AWS D1.1, Chapter 6.
12. Prequalification of all welding procedures to be used in executing the Work.

1.05 SUBMITTALS:

- A. General: Testing laboratory shall promptly submit written report of each test and inspection. Each report shall include:
 1. Date issued.
 2. Project title and number.
 3. Testing laboratory name, address, and telephone number.
 4. Name and signature of laboratory personnel.
 5. Date and time of sampling or inspection.
 6. Record of temperature and weather conditions.
 7. Identification of product and Specification section.
 8. Date of test.
 9. Location of sample or test in the Project.
 10. Type of inspection or test.
 11. Results of tests and observation regarding compliance with Contract Documents.
 12. Interpretation of test results, when requested by Architect.
- B. State in report all details of each inspection and test. Indicate compliance or noncompliance with requirements of the Contract Documents. Also state in report any and all unsatisfactory conditions.
- C. In addition to furnishing a written report, notify the A/E, the ODR and the Contractor verbally of any uncorrected conditions or failures to comply with the requirements of the Contract Documents.
- D. At completion of each trade or branch of the Work requiring inspecting and testing, submit a final certificate attesting to satisfactory completion of the Work and full compliance with requirements of Contract Documents.

- E. Upon completion of building, testing laboratory shall furnish, to ODR and A/E, statement that all required tests and inspections were made in accordance with requirements of Contract Documents.

1.06 REFERENCED STANDARDS

- A. The latest edition of all standards references in this section shall apply, unless noted otherwise. In case of conflict between these Contract Documents and a referenced standard, the Contract Documents shall govern. In case of conflict between these Contract Documents and the building code, the more stringent shall govern.

PART 2 – PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. General Requirements.
- B. Temporary Utilities and Services
- C. Construction Aids
- D. Barriers and Enclosures.
- E. Security.
- F. Parking, Access Roads and Traffic
- G. Temporary Controls.
- H. Project Identification and Signs
- I. Field Offices and Sheds

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 74 00 - Cleaning.
- C. Section 01 77 00 - Closeout Procedures

1.03 GENERAL REQUIREMENTS:

- A. Contractor shall provide all construction facilities and temporary controls specified in this Section and as necessary for the proper and expeditious prosecution of the Work.
- B. Contractor shall make or have made and pay all charges for all connections to and distribution from existing services and sources of supply.
- C. Requirements of service and utility companies relating to the Work shall be ascertained by Contractor. Comply with all requirements, including those relating to continued protection and maintenance until completion of Work.
- D. Materials and construction for construction facilities and temporary controls may be new or used, must be adequate in capacity for required usage, and must not create unsafe conditions. Comply with requirements of federal, state and local authorities having jurisdiction.
- E. Construction facilities and temporary controls shall be maintained by Contractor in usable condition at all times until completion of Work or when their removal is authorized by the A/E or the ODR.

- F. Relocate temporary services and facilities as required by progress of construction, by storage or work requirements, to accommodate legitimate requirements of the Owner and other contractors employed at the Site, and when directed by the ODR.
- G. When any portions of permanent systems are in operating condition, that part of the system may be used for construction purposes provided that the Contractor:
 - 1. Obtains the ODR's approval,
 - 2. Assumes full responsibility for the system used,
 - 3. Pays all costs for operation, maintenance, cleaning, and restoration of the system to as new condition,
 - 4. Operates the system under the supervision of the Subcontractor responsible for system installation and ultimate performance, and provided that such use does not affect specified warranty.
- H. Completely remove temporary services and facilities when their use is no longer required and/or at completion of Project, when directed by the ODR.
- I. Clean and repair damage caused by temporary services and facilities to new condition for new Work and to a condition as good as or better than existed prior to start of Work for existing construction, services, and facilities.

1.04 TEMPORARY UTILITIES AND SERVICES:

- A. General: Arrange and pay for connections, materials and appurtenances required to provide temporary utilities and services.
- B. Payment: Pay the cost of services used (gas, water, sanitary sewer, chilled water, heating water, steam and electricity) monthly. When charges are made to a Contractor for Owner-furnished utilities, it is suggested the charges be examined promptly and either pay the amount or notify the ODR, if discrepancies are found. Final payment to the Contractor will not be processed until all utility bills are paid.
- C. Temporary Utilities and Services: The Contractor shall provide for the following temporary utilities and services for proper execution and protection of the Work.
- D. Temporary Electrical Service: Owner will provide temporary electrical for the project
- E. Temporary Water: Procedures for requesting temporary water service. Owner will provide temporary for the project.

- I. Temporary Toilets and Sanitation: Provide, service, clean, and maintain sanitary conveniences with proper enclosures, in conformance with requirements of local laws and ordinances governing such installations. Post notices, take such precautions as may be necessary, and do cleaning necessary to keep the building and the premises in a sanitary condition. From start of the Work, provide suitable temporary toilets and enclosures for the use of the workmen on the Project. Maintain these facilities in a sanitary condition. Use of Owner's existing toilet facilities will not be permitted.
- J. Temporary Fire Protection: Construction practices, including cutting and welding, and fire protection during construction shall be in accordance with applicable requirements of federal, state, and local authorities having jurisdiction. Provide prominently located multi-purpose portable fire extinguishers, with at least one in each wing on each floor.
1. Gasoline and other flammable liquids shall be stored in Underwriter's Laboratories listed safety containers. Storage shall not be permitted within the building.
 2. Do not light fires of any kind in or about the premises. The use of salamanders is prohibited.
 3. Schedule the Work so that the permanent fire protection system is installed and made operable at the earliest possible date. At such time, the Contractor shall furnish sufficient hose to provide adequate coverage of each floor.
 4. All tarpaulins that may be used for any purpose during the construction of the Work shall be made of material that is resistant to fire, water, and weather.
- K. Elevators: Temporary use of elevators will be permitted only if acceptable to the ODR and elevator installer. Prior to such approved temporary use, provide the following:
1. Arrange and pay for necessary approvals, elevator manufacturer's acceptance, and temporary use permits.
 2. Install temporary protection over hoistway entrances and doors, car doors and frames, car front returns and enclosures so that elevator work will be without damage at completion of Project. Repair or replace damaged work prior to Final Inspection.
 3. Provide and pay for power, operators, necessary signaling and safety devices, lights and other equipment, temporary protection and enclosures required for safe elevator operation.
 4. After temporary elevator use is discontinued, remove temporary protections and enclosures.
 5. Refer to appropriate section in Division 14 of these Specifications for additional requirements.

1.05 CONSTRUCTION AIDS:

- A. Material and Personnel Hoists: The Contractor shall provide material hoists as required for normal use by all trades, without charge. The Contractor shall also provide a personnel hoist for the transportation of all workers as required for normal use, without charge.
 - 1. Employ qualified, skilled operators for the material and personnel hoists.
 - 2. Provide all necessary guards, signals, safety devices, required for safe operation, and suitable runways from hoists to each floor level and roof.
 - 3. The construction and operation of the hoists shall conform to all applicable requirements for the American Standard Safety Code for Building, the "Manual of Accident Prevention in Construction" of the AGC, and shall be approved by the insurance underwriters.
- B. Temporary Stairs, Ladders, Scaffolds, Runways, and Similar Facilities:
 - 1. Provide and maintain all temporary equipment and construction such as temporary stairs, ladders, ramps, scaffolds, hoists, runways, derricks, chutes, and similar facilities as necessary for the proper execution of the Work. Derricks, cranes, and similar facilities shall comply with local airport restrictions.
 - 2. Provide temporary protective treads, handrails, and wall coverings at stairways.
 - 3. Scaffolding shall be furnished, installed, maintained, and removed as necessary for proper execution of the Work and shall be erected on the side of the wall on which facing work occurs. Scaffolding shall not be built into any finish facing material.

1.06 BARRIERS AND ENCLOSURES:

- A. General: Construct temporary barricades, warning signs, hazard and warning lights, walks, passageways, and similar temporary barriers and enclosures that are necessary to protect persons and property from hazards or damage due to construction operations, and required by university, city, state or federal laws, ordinances or codes.
- B. Construction Fences: Contractor shall furnish and install construction fences and gates within the "limits of construction", prior to beginning of the Work so as to maintain area free of unauthorized personnel and which includes Project working area and storage locations allocated by the Owner to the Contractor. Keep adjacent property free from disturbance, dust, and noise as much as feasible.
- C. Non-Movable Fences: Fencing and gates shall be minimum 6'-0" high, new material, chain link fabric tightly stretched between line posts (1-5/8" O.D. galvanized iron) at not more than 10 foot centers. Tree protection posts shall be

on 8 foot centers. Posts in earthen areas shall be plumbed and aligned, and firmly anchored in the ground at least 24" deep. Corner and gateposts (2-3/4" O.D. galvanized iron) shall have line posts within 6' and braced using clamps at posts. Posts that are machine pounded must be cut off flush and level at top. Gates shall be substantially constructed of materials similar to fence, equipped with hinges of adequate size and strength for operation and to maintain the gate level. Provide security chain and padlock at each gate with 2 keys furnished to the ODR. In sensitive and high visibility areas, and where noted on the Drawings, install redwood slats vertically in the fence fabric to reduce public view of unsightly areas. Fence posts in permanently paved and sidewalk areas shall be set in 4" thick concrete bases, 24" square or 30" round.

- D. Movable Fences: Fences that need to be moved frequently for access to the Site or to be movable tree protection shall be 6' high posts, using 5" non-climb wire fabric, 12.5 gauge galvanized wire, 2" wide x 4" high openings, attached to posts set in concrete within an old tire to prevent post bases from marring pavements and sidewalks.
- E. Tree and Plant Protection: Provide barricades, fences, and guards as necessary to prevent damage to existing trees and shrubs indicated to remain including, but not limited to, the following construction operations:
 - 1. Compaction of root area by equipment or material storage,
 - 2. Trunk damage by moving equipment, material storage, nailing or bolting,
 - 3. Strangling by tying ropes or guy wires to trunks or large branches,
 - 4. Poisoning by pouring solvents, gas, paint and other toxic materials on or around trees and roots,
 - 5. Cutting roots by excavating, ditching and similar operations,
 - 6. Damaging branches by improper pruning; notify the ODR for required pruning,
 - 7. Drought damage from failure to water or by cutting or changing normal drainage pattern past roots,
 - 8. Changes in soil pH factor by disposal of lime and other alkali based materials such as plaster, concrete, mortar and grout,
 - 9. Machine excavating within the drip line of trees; conduct all excavating within drip line by hand. Do not cut roots 1-1/2" in diameter and over.
- F. Tree Damage: When trees other than those indicated or approved for removal are destroyed, killed or badly damaged as a result of construction operations, the Contract Sum will be reduced by the amount determined from the following International Shade Tree Conference formula: $D \times D \times 0.7854 \times \28.00 , where D is the diameter of the trunk measured 12" above grade.
- G. Fence Maintenance and Removal: All fencing and gates shall be maintained

deep, straight and level, having a neat and uniform appearance during the construction period and upon completion, before acceptance of the Work, shall be removed from the Site and posthole filled to original condition.

H. Temporary Enclosures and Protection:

1. Provide temporary weather-tight enclosure at exterior walls for successive areas of the building as work progresses, as necessary to provide acceptable working conditions, provide weather protection for interior materials, allow for effective temporary heating, and to prevent entry of unauthorized persons.
2. Temporary Partition and Ceiling Enclosures: Framing and sheet materials that comply with structural and fire rating requirements of applicable codes and standards.
 - a. Close joints between sheet materials, and seal edges and intersections with existing surfaces, to prevent penetration of dust or moisture.
 - b. Provide temporary doors with self-closing hardware and padlocks as required for security.
 - c. Provide removable portions of enclosures as necessary for work and for handling of materials.
3. Protection of Installed Work: Provide protection for installed Work so that it will be without damage at time of acceptance by the ODR. Control traffic to minimize damage. Provide protective coverings at walls, projections, jambs, sills and soffits of openings. Protect finish floors and stairs from traffic, movement of heavy objects, storage and similar construction operations. Prohibit traffic and storage on waterproofed and roofed surfaces, on lawn and landscaped areas.
 - a. Concrete, cement, mortar, grout, sludge, plaster and similar materials shall not be placed in or washed down storm and sanitary sewers, plumbing lines or fixtures.
4. Protect improvements on Owner's and adjoining properties.

I. Site: Unless otherwise specified or directed, carefully protect existing walks, lawns, other buildings, and other work on Site, whether specifically indicated on the Drawings or not. Damaged areas of curbs, walks and paving will not be permitted to be patched; remove entire section between expansion joints in which the damage occurs and replace with construction to match existing adjacent work.

J. The Contractor is responsible for damage to the Work and injury to persons due to failure of barriers and enclosure of the Work to adequately protect it; and wherever evidence is found of such damage, the Owner may order the Work so damaged to be immediately removed and replaced by the Contractor. All costs and expenses for such occurrences shall be the responsibility of the Contractor at

no additional expense to Owner. The Contractor's responsibility for maintenance of barriers and enclosure of the Work, shall not cease until the Project has been completed and is accepted by the Owner.

1.07 SECURITY:

- A. The Contractor shall provide a security program and facilities to protect the Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, and theft. Coordinate with Owner's security program. Project security within "limits of construction" is Contractor's responsibility.

1.08 PARKING, ACCESS ROADS AND TRAFFIC (UGSC 3.3.11.1):

- A. Parking: Parking for workmen employed on the Site may be provided within construction limits or at a remote location, if needed, to the extent that space for that purpose may be available without interference with the activities related to performance of the Work. On campus parking, other than within construction limits, shall only be as approved by the ODR. Contractor shall pay all associated parking fees.
 - 1. Reserved Parking: Allocate four (4) spaces convenient to the Project offices for use of the Owner and the A/E.
- B. Provide temporary roads as required to bring vehicles onto the Site. Restore paving used for construction operations to new condition prior to acceptance of Work by Owner.
 - 1. Restrict vehicles from doing unnecessary damage to the Site and any existing paving.
 - 2. Restore all new or existing improvements damaged by this Work to original condition, as acceptable to Owner or other parties having jurisdiction.
- C. Traffic Control: Prior to start of Work, examine construction vehicle routing, and establish safeguards and procedures necessary to carry out the Work. In addition, be responsible for and observe the following:
 - 1. Be responsible for controlling construction traffic within and adjacent to the Site.
 - 2. Provide all entrances, lifts and safeguards required or necessary to the progress of the Work, and effectively control such traffic to provide minimum hazard to the Work and all persons.
 - 3. Route all construction equipment, trucks, and similar vehicles on existing public streets to and from the Site as approved by the ODR or as indicated

- on the Drawings.
4. Construct and maintain temporary walks for pedestrians. Keep streets adjacent to the Site open to vehicular and pedestrian traffic.
 5. Maintain constant access for police, fire and ambulance service.
 6. Provide and maintain for proper control of traffic and safety:
 - a. All necessary barricades, suitable and sufficient lights, reflectors, and danger signals,
 - b. Warning and closure signs, directional, and detour signs,
 - c. All traffic control devices furnished and installed in compliance with the Texas Manual on Uniform Traffic Control Devices as prepared by the State Department of Highways and Public Transportation.
 7. The Contractor shall provide on a 24 hour basis for all restricted and dangerous conditions existing on or adjacent to the Site:
 - a. For nighttime safety illuminate barricades, danger signals, warning signs and obstructions,
 - b. Keep warning lights burning from sunset until sunrise.

1.09 TEMPORARY CONTROLS:

- A. Cleaning During Construction: Contractor at all times shall keep the premises free from accumulation of waste materials and rubbish caused by operations for the Work. Provide a collection can at each area used for eating. Pick up garbage daily. Keep Project Site free of garbage, trash, vermin and rodent infestation. Contractor, by agreement, shall require each Subcontractor to collect and deposit waste and rubbish caused by Subcontractor operations at pre-designated location. Clean interior areas prior to start of finish Work. Maintain areas free of dust and other contaminants during finishing operations.
- B. Noise Control: In and around occupied areas, minimize use of noise producing equipment. Work with noise producing is subject, at all times, to the ODR's approval of entire procedure. Use only on a scheduled basis as agreed with the ODR prior to start of Construction operations.
- C. Water Control: Provide methods to control surface water to prevent damage to the Project and adjoining properties. Control fill, grade and ditch to direct surface drainage away from excavations, pits, tunnels and other construction areas. Direct drainage to proper runoff.
 1. Provide, operate and maintain hydraulic equipment of adequate capacity to control surface and water.
 2. Dispose of drainage water in a manner to prevent flooding, erosion or other damage to any portion of Site or to adjoining areas.
 3. Refer to the appropriate section in Division 2 of these Specifications for

TPDES requirements.

D. Pollution Control:

1. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by discharge of noxious or hazardous substances from construction operations.
2. Provide equipment, personnel and perform emergency measures required to contain any spillages, and to remove contaminated soil or liquids. Excavate and dispose of contaminated earth off site and replace with suitable compacted fill and topsoil.
3. Take special measures to prevent harmful substances from entering public waters. Prevent disposal of wastes, effluents, chemicals or other such substances adjacent to streams or in sanitary or storm sewers.
4. Provide systems for control of atmospheric pollutants. Prevent toxic concentrations of chemicals. Prevent harmful dispersal of pollutants into atmosphere.

E. Erosion Control:

1. Plan and execute construction and earthwork by methods sufficient to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation in accordance with the Texas Commission on Environmental Quality SWPPP as submitted and approved.
 - a. Hold areas of bare soil exposed at one time to minimum.
 - b. Provide temporary control measures such as berms, dikes, and drains.
2. Construct fills and waste areas by selective placement to eliminate surface silts or clays that will erode.
3. Periodically inspect earthwork to detect any evidence of start of erosion, apply corrective measures as required to control erosion.

- F. Dust Control: Provide positive methods and apply dust control materials to minimize raising dust from construction operations and provide positive means to prevent air-borne dust from dispersing into atmosphere. Continuously clean all public and private streets, parking lots, and drive ways to assure that no rock or sediment is tracked off the Project Site.

1.10 PROJECT IDENTIFICATION AND SIGNS:

- A. Provide one construction sign shown on Contract Drawings and as specified below. No other signs may be installed anywhere on the Site (except delivery route signs deemed necessary by the ODR), including signs advertising the sale of

salvage.

1. Face Size: 8'-0" wide x 8'-0" high x 3/4" thick, located approximately 3'-0" above grade.
2. Sign Faces: New 3/4" exterior grade medium density overlay plywood.
3. Location of Sign, and Layout: By the A/E. ODR shall provide sign template with guidelines and shall review and approve prior to fabrication.
4. Sign faces shall be painted a white background color. All lettering shall be accomplished by a professional sign painter and shall be in Helvetica Medium style, upper and lower case, in black color and shall include, but not be limited to the following information:
 - (1) Project Rendering.
 - (2) TAMUS and System Member(s) logos.
 - (3) Project Name.
 - (4) System Member
 - (5) College/Department (optional)
 - (6) Project Manager (Then Texas A&M University System)
 - (7) Architect's Name (per contract)
 - (8) General Contractor's Name (per contract)

1.11 FIELD OFFICES AND SHEDS:

- A. The Contractor shall provide its own field office and storage sheds on the Site and shall maintain until removal upon completion of the Work.
 1. Provide weather tight construction office for Contractor with sufficient light, heating, air conditioning, ventilation, and insulated roof. General arrangement, construction, and equipment for office shall be reviewed with the A/E and approved by the ODR prior to starting construction. Provide adequate tables, plan racks, desk chairs, file cabinets of sufficient capacity to accommodate a copy of submittals and correspondence concerning the Project, and non-pay telephone.
 2. ODR Office: In a separate field office, provide a minimum of 672 sq. ft. with a minimum dimension of 12 feet for the exclusive use of the ODR and the A/E. Minimum interior finish shall be vinyl covered wall panels, lay-in ceiling, with vinyl composition tile floor. Walls, floor and ceiling shall be insulated with full thickness batt insulation. Exterior doors shall have locks with one key for each occupant. All exterior doors and windows shall also be secured with approved burglar type bars. General arrangement, construction and equipping of office must meet with the approval of the ODR. The office shall be equipped with the following:
 - a. Separate High Speed Internet: Contractor shall arrange for and pay for the best available internet provider service for the exclusive use of the owner. Coordinate with the ODR for the number and

- locations of data jacks. Provide a minimum of four (4) data jacks with at least one (1) in each office. Also, provide a dual-band wireless AC router with four ports.
- b. Heating, Ventilating and Cooling shall be accomplished through a central type unit that shall maintain 70 degrees F while heating and 75 degrees F while cooling. Maintenance and filter changes shall be by the Contractor.
 - c. Contractor shall provide a networkable LaserJet combination printer/scanner with wireless capabilities for the exclusive use of the ODR including service and printer cartridges.
 - d. Two (2) each office desks: 30" x 60" minimum size with swivel chairs.
 - e. Layout Counter: 30" x 60" minimum size with drafting stool.
 - f. 1 Mini refrigerator with freezer.
 - g. Lighting shall be of sufficient quantity to provide for proper office atmosphere.
 - h. Convenience Outlets: A minimum of two duplex convenience outlets per office.
 - i. Window: Operable windows minimum equal in size to 10% of the floor area, located to provide view to construction area.
 - j. Waste Baskets: Four (4).
 - k. Shelving: Six feet of 10" deep shelving.
 - l. Maintenance: Keep office weather-tight, warm, cool, comfortable, and swept clean and remove refuse twice weekly. Provide soap, paper towels, toilet paper.
 - m. Provide within Owner's Field Office, a toilet room with door and one (1) lavatory equipped with hot water and one (1) water closet.
 - n. Provide electric water cooler with bottled water and appropriate service.
 - o. Provide two (2) each 30 inch by 72 inch folding tables with ten (10) each folding chairs.
 - p. Provide a minimum 8' x 8' covered landing with steps and handrails at both doors of the trailer as required by ODR.
 - q. Provide a wall mounted 55 inch LED TV with HDMI inputs and a minimum 10 foot HDMI cable.
3. Provide and maintain suitable, substantial, weather-tight storage facilities of acceptable appearance in which to store materials that would be damaged by the weather. Storage space shall be of sufficient size to hold all such materials required on Site at one time, and if the storage space is outside the building, it shall have floors raised at least 6" above the ground on heavy joists or sleepers. Provide fenced areas for storage of materials and workers' parking of the sizes and of locations designated on the drawings. Should the Contractor require additional storage area beyond that indicated on the Site, Contractor shall arrange for such storage

facilities off-campus, at no additional cost to the Owner. Contractor may use areas within the immediate construction area for storage only with the approval of the ODR. However, such approval will not be given if such storage encumbers the working space, loads the structure prematurely, or exceeds the design live load for the specified area of the structure.

4. Building materials, Contractor's equipment and similar items necessary for prosecution of the Work may be stored on the premises, the placing and handling of same shall be such that they can be inspected at all times.
5. When any area in the building is used for a storeroom, shop or similar use, the Contractor shall be responsible for repairs, patching, and cleaning arising from such use. All such replacement costs and expenses shall be borne by Contractor at no additional expense to Owner.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. General Requirements.
- B. Manufacturer's Instructions
- C. Transportation and Handling.
- D. Storage and Protection.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 25 00 - Substitution Procedures.
- C. Section 01 31 00 - Project Management and Coordination.
- D. Section 01 33 00 - Submittal Procedures: List of Materials.
- E. Section 01 50 00 - Temporary Facilities and Controls: Material Storage Facilities.
- F. Section 01 77 00 - Closeout Procedures.

1.03 GENERAL REQUIREMENTS:

- A. In addition to Uniform General and Supplementary Conditions, Article 8 (UGC 8.1), Contractor shall use materials and equipment that are:
 - 1. New, unless otherwise specified, and that are of good quality, free from faults and defects, and in conformance with the requirements of the Contract Documents.
 - 2. Suitable for use and function intended.
 - 3. Corresponding in quality to related materials in the absence of a complete specification.
 - 4. Of quality appearance where exposed to view.
 - 5. Of one manufacturer or source for the same specific purpose, with uniform appearance and physical properties.
 - 6. Interchangeable and be the same, when required to be supplied in quantity.
 - 7. Free of name, trademark, or other insignia, which is intended to identify the manufacturer, vendor, or other source(s) that is surface applied or affixed to any manufactured articles, materials, and items of equipment in any public area or similar locations within the Project. Any manufactured articles, materials, and items of equipment, which bears evidence that an insignia, name, or trademark has been removed, shall not be used. Code required labels, such as Underwriters Laboratory labels, and other identification required by the Contract Documents are accepted.

- B. Product Color, Texture, or Pattern Selection: No work requiring the A/E's review for color, texture and pattern selection shall be fabricated, delivered or installed prior to review and selection by the A/E.
1. Contractor shall select products of a named manufacturer that complies with the specified requirements and submit the full range of available colors, textures, patterns, including custom colors, textures and patterns for the A/E's selection. All subsequently approved products of other manufacturers are approved contingent upon availability of equivalent colors, textures, and patterns available to the A/E for selection.
 2. When "match existing color" is indicated or specified, Contractor shall, in addition to material and construction requirements specified elsewhere, match existing color, texture, and pattern in every respect, as approved by the A/E.
 3. When materials have a natural range of color, texture, and pattern such as natural stone, brick, tile, anodized aluminum finish and other exposed materials and finishes, the Contractor shall submit required number of sets of ranges of color, texture, and pattern, including representative naturally occurring defects as appropriate, for the A/E's review. All work fabricated and installed shall be within range of samples approved by the A/E. In addition, Contractor shall refer selection of raw materials containing defects within limits of the A/E's approved range of samples, to the A/E to provide distribution of such throughout required work so as to avoid patterns and concentrations of such defects.
- C. Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each item of the Work.
1. When specified products are available from only sources that do not or cannot produce an adequate quantity to complete Project requirements in a timely manner, consult with the A/E for a determination of what product qualities are most important before proceeding. The A/E will designate those qualities, such as visual, structural, durability, or compatibility, that are most important. When Architect's determination has been made, select products from those sources that produce products that possess the most important qualities, to fullest extent possible.
- D. Compatibility of Options: Where product options are permitted, select products that are compatible with other products to be incorporated into the Work, including products previously selected.

1.04 MANUFACTURER'S INSTRUCTIONS:

- A. Install products in accordance with manufacturer's printed instructions. Obtain and distribute copies of such instructions to installer, including one copy to the A/E and one to the ODR. Maintain one set of complete instructions at the Site

during installation and until completion.

- B. Manufactured articles, materials, and items of equipment shall be handled, stored, applied, installed, connected, erected, used, cleaned, adjusted, conditioned, and protected in accordance with manufacturer's printed instructions and specifications for the Project conditions indicated, within manufacturer's published limitations, and requirements specified.
- C. Should any manufactured articles, materials, and items of equipment be found to be damaged, deteriorated, or otherwise contrary to the requirements of the Contract Documents, remove and replace such damaged or deteriorated articles, materials, and items of equipment, no matter in what stage of completion and replace with new materials.
- D. Should Project conditions or specified requirements be in conflict with manufacturer's instructions, request written clarification from the A/E before proceeding. Do not proceed with work without clear instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.05 TRANSPORTATION AND HANDLING (UGC 3.3.4):

- A. Arrange deliveries of materials and products in accordance with Construction Progress Schedule.
- B. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.
- C. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- D. Promptly inspect shipments to ensure that products comply with requirements of the Contract Documents and approved submittals, that quantities are correct, and products are undamaged.

1.06 STORAGE AND PROTECTION:

- A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products, including factory-finished items and similar work, in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions. Comply with applicable laws, ordinances and regulations for protective storage of potentially dangerous materials.

- B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
- C. Store loose granular materials on solid surfaces in a well-drained area and prevent mixing with foreign matter.
- D. Arrange storage to provide access for inspection at all times. Periodically inspect to assure products are free from damage or deterioration, and are maintained under required conditions.
- E. At end of each day's work, cover new work likely to be damaged. Provide substantial coverings necessary to protect installed products from damage, traffic, and subsequent construction operations. Refer to Section 01 50 00 for additional requirements, including removal of temporary protections.
- F. Contractor shall provide inspection of Subcontractor's material for compliance with submittals on proper storage.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01 72 50

FIELD ENGINEERING

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Performance requirements.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 78 00 - Closeout Submittals.

1.03 PERFORMANCE REQUIREMENTS:

- A. General: Provide and pay for field engineering services including survey, layout, civil, structural or other licensed professional engineering services specified, or required to execute the Work.

PART 2 – PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Verify locations of design survey control points prior to starting Work. Check control to verify any movement or change and document difference.
- B. Verify all dimensions and compare to existing conditions prior to laying out the Work. Promptly notify the A/E of discrepancies discovered. Extra compensation will not be allowed because of differences between actual measurements and indicated dimensions.

3.02 SURVEY AND LAYOUT REQUIREMENTS:

- A. Establish a minimum of two (2) permanent benchmarks on the Site, referenced to data established by survey control points. Record locations, with horizontal and vertical data, on Project record documents. Data to be verified by licensed surveyor.
- B. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.
 - 1. Make no changes or relocations without prior written notice by ODR.

2. Report to A/E and ODR when any reference point is lost or approval destroyed, or requires relocation because of necessary changes in grades or locations.
 3. Require Contractor surveyor to replace Project control points, which may be lost or destroyed. Establish replacements based on original survey control.
 4. Maintain a complete, accurate log of all control and survey Work as it progresses.
- C. Establish adequate and clearly defined reference lines and levels required for execution of Work; locate and lay out, by instrumentation and similar appropriate means, controlling lines and levels required for the various trades.
- D. Periodically, verify layouts by the same methods.
- E. Underground Obstructions:
1. Pipelines, existing underground installations and underground structures in vicinity of Work are diagrammatically shown on Drawings according to best information available. Accuracy of information is not warranted.
 2. Verify location of underground pipelines, conduits and structures with Owner and by prospecting in advance of excavation.
 3. Repair damage to existing utilities made during construction process as part of Work to satisfaction of Owner.

3.03 SURVEY:

- A. On completion of foundation walls and major site improvements, prepare survey by licensed surveyor showing dimensions, locations, angles, and elevations of construction.

END OF SECTION

SECTION 01 73 50

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Submittals required.
- B. Materials required.
- C. Procedures for cutting and patching.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 25 00 - Substitutions Procedures.
- C. Section 01 31 00 - Project Management and Coordination.
- D. Section 01 60 00 - Product Requirements.
- E. Other Technical Sections:
 - 1. Cutting and patching required being performed incidental to Work of the Section.
 - 2. Advance notification to trades responsible for Work of other Sections
 - 3. Coordination of trades responsible for Work of other Sections.

1.03 SUBMITTALS:

- A. Submit written request sufficiently in advance to allow ODR and A/E time to adequately review and make a determination of approval of cutting, drilling, or alteration which affects:
 - 1. Work of Owner or any separate Contractor.
 - 2. Structural value or integrity of any element of Project.
 - 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4. Efficiency, operational life, maintenance, or safety of Project equipment elements.
 - 5. Visual qualities of sight-exposed elements.
 - 6. Damage to existing Work or utilities.
- B. Include in request:
 - 1. Identification of Project.
 - 2. Location and description of affected Work.
 - 3. Necessity for cutting, drilling, alteration, or excavation.
 - 4. Effect on Work of Owner or any separate Contractor, or on structural or

- weatherproof integrity of Project.
- 5. Description of proposed Work:
 - a. Scope of cutting, patching, alteration or excavation.
 - b. Trades who will perform the Work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
- 6. Alternative to cutting, drilling, patching, and excavation.
- 7. Written permission of separate contractors who's work is affected.
- 8. Date and time Work will be performed.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Provide materials and procedures required for original installation.
- B. For any change in materials, submit request for substitution under provision of Section 01 25 00 - Substitution Procedures.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Field Conditions: Check and verify Contract Documents and field conditions before proceeding with Work. If there are any questions regarding these or other coordination questions, the Contractor is responsible for obtaining clarification from the A/E before proceeding with Work or related Work in question.
- B. Execute cutting, drilling, and patching, including excavation and fill as required to complete the Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical work.
 - 6. Uncover Work to allow for A/E's and ODR's observation of Work which has been covered prior to observation by A/E and ODR.

3.02 INSPECTION:

- A. Inspection: Carefully examine the premises to determine the extent of Work and the condition under which it must be done, including elements subject to movement or damage during cutting, patching, excavating and backfilling. No extra payments will be allowed for claims for additional work that could have

been determined or anticipated by such inspection. After uncovering Work, inspect conditions affecting installation of new products.

- B. Beginning of cutting, drilling, or patching means acceptance of existing conditions.

3.03 PREPARATION:

- A. Preparation Prior to Cutting: Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work. Provide protection from elements for that portion of the Project that may be exposed by cutting and patching work, and maintain excavations free from water.
- B. Protection: Provide barricades, coverings, fences, supports, and similar temporary protections necessary to protect persons and property from injury or damage as a result of Work of this Section. Confine operations to required limits and take reasonable precautions to protect remainder of property from damage.
- C. Dust Control: Control dust resulting from cutting and patching to prevent the spread of dust to adjacent occupied areas and to avoid creation of a nuisance in the adjacent surrounding area. Use of water will be permitted as indicated. Provide drop cloths or other suitable barriers to prevent dust from traveling to adjacent areas. Seal off return air registers or other mechanical systems to prevent dust from entering such systems.

3.04 PERFORMANCE:

- A. Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- B. Employ original installer to perform cutting and patching for weather-exposed, moisture-resistant elements, sight-exposed surfaces, and to preserve Owner's warranties and bonds for Work of this Contract and related work of other contracts.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior written approval by the ODR.
- D. Restore Work which has been cut or removed using new products in accordance with requirements of Contract Documents.
- E. Fit and seal interior Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. Fit and seal for water tightness all penetrations through exterior envelope and through slabs.
- F. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal

all voids with fire stopping and sealant material, full thickness of the construction element to provide a smoke seal and penetration rating equivalent to adjacent rated construction. Refer to appropriate sections of Division 7 in these Specifications for requirements.

- G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit as follows:
 - 1. Walls: From floor to ceiling and between the nearest corner. New gypsum board construction meeting existing construction in same plane shall be flush with no visible joint showing,
 - 2. Ceiling: The complete surface,
 - 3. Floor: The complete surface unless otherwise shown or unless a matching patch in applied finishes can be made acceptable to A/E and ODR,
 - 4. Openings: The entire unit including frame,
 - 5. Painted Cabinets: The entire painted surface,
 - 6. Transparent Finish Cabinets: Finish new surfaces to match existing,
 - 7. Base: Between the nearest corners.
- H. Excavation: Refer to appropriate sections of these Specifications.
- I. Damage: Restore accidental or careless damage to Work to a condition as good as or better than existed before Work was commenced and at no additional cost to the Owner.

END OF SECTION

SECTION 01 74 00

CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. General requirements for cleaning.
- B. Materials for cleaning.
- C. Procedures for cleaning.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 33 00 - Submittal Procedures.
- C. Section 01 50 00 - Temporary Facilities and Controls.
- D. Section 01 77 00 - Closeout Procedures.

1.03 GENERAL REQUIREMENTS:

- A. General: In addition to Uniform General Conditions, Article 3 (UGC 3.3.9), provide progress and final cleaning as specified in this section.
- B. Progress Cleaning: Keep premises and public properties free from accumulations of waste, debris and rubbish, caused by operations. Maintain Project in accord with State and local safety, health, and insurance standards.
- C. Final Cleaning: At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed surfaces of building and Project Site, including crawl spaces; leave Project clean and ready for occupancy.
- D. Final Inspection: Prior to final inspection, clean all surfaces and remove all debris from project.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS:

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

PART 3 - EXECUTION

3.01 CLEANING:

- A. In addition to removal of debris and cleaning specified in other sections, clean interior and exterior exposed-to-view surfaces affected by Work of this Contract.
- B. Hazards Control: Store volatile waste in covered metal containers and remove from premises daily. Prevent accumulation of wastes that create hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.
- C. Clean permanent filters of ventilating equipment and replace disposable filters when units have been operated during construction; in addition, clean ducts, blowers, and coils when units have been operated without filters during construction.
- D. Remove waste, debris, and surplus materials from site. Clean paving areas, walks, drives and streets in the vicinity of the building; remove mud, rubbish, waste, stains, spills, and foreign substances from paved areas and sweep clean. Immediately clean any mud tracked out of the construction area to adjacent drives and streets by vehicles and equipment.
- E. Keep the entire construction area clean and at least weekly conduct a general clean-up operation.
- F. Keep grass/weeds cut at all times within the limits of construction; maximum time interval in growing season is two weeks.
- G. Periodically inspect, tighten and realign construction/tree protection fencing.
- H. Do not burn or bury rubbish and waste materials on the Project site.
- I. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm, sanitary drains or into the soil.
- J. Do not dispose of rubbish and wastes into streams or waterways.
- K. Do not dispose of excess concrete on the Project Site or campus.
- L. Wet down rubbish and waste to subdue dust and prevent it from blowing.
- M. Provide on Site containers for collection of waste, debris and rubbish. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Do not fence, block, cover, and otherwise make inaccessible, for Owner's use, any waste containers located inside or outside

construction limits.

- N. Remove temporary protection and labels not required to remain.
- O. Just prior to painting and similar finishing operations, clean interior areas ready to receive finish, and continue cleaning as needed, until building is ready for Substantial Completion.
- P. Disposal: Remove waste materials, debris and rubbish from the Project Site and provide for legal disposal at a Texas Department of Health (TDH) permitted solid waste facility. In hauling material from the Project Site, Contractor shall prevent debris from dropping from vehicles and littering the campus or area streets and roads. Contractor shall promptly remove any debris that falls from vehicles.

3.02 FINAL CLEANING

- A. Employ experienced workers or professional cleaners and perform cleaning in accordance with manufacturer's written recommendations, using products approved by the manufacturer for material being cleaned.
- B. Prior to final inspection and the Owner's acceptance of the Work, perform final cleaning of all areas of the building and Project Site, performing all operations specified in the various Sections of Project Specifications. Final cleaning operations include, but are not limited to:
 - 1. Remove waste, debris, and surplus materials of any nature from Site. Clean paving areas in the vicinity of the building; remove stains, spills, and foreign substances from paved areas and sweep paved areas clean and rake clean other surfaces of grounds,
 - 2. Broom cleaning of all exposed concrete floors,
 - 3. Cleaning all stonework,
 - 4. Cleaning all exposed painted and unpainted metals,
 - 5. Cleaning all architectural woodwork,
 - 6. Cleaning all doors and polish hardware; removing excess paint and stains,
 - 7. Cleaning all glass areas, exterior and interior,
 - 8. Cleaning all storefront framing and doors, and glazed wall system members, exterior and interior,
 - 9. Cleaning all walls and floors,
 - 10. Cleaning of resilient flooring, ready for waxing by campus personnel,
 - 11. Vacuum all carpeted floors,
 - 12. Cleaning all toilet partitions, fixtures, and accessories,
 - 13. Cleaning all exposed surfaces of light fixtures, including removal of construction dust, paint overspray, finger prints, and similar soiling from light fixture bodies, reflectors, and both sides of light fixture lenses,
 - 14. Removing and disposing of all temporary protections,
 - 15. Repair, patch and touch-up marred surfaces to match adjacent surfaces,

- 16. Prior to Final Completion, inspect exposed interior and exterior surfaces and work areas to verify that entire work is clean.
- C. Clean finishes free of dust, stains, films, and other foreign substances.
- D. Clean transparent and glossy materials to a polished condition; remove foreign substances. Polish reflective surfaces to a clear shine.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Instruction of using personnel.
- B. Submittals.

1.02 RELATED SECTIONS:

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 32 00 - Construction Progress Documentation.
- C. Section 01 33 00 - Submittal Procedures.
- D. Section 01 50 00 - Temporary Facilities and Controls.
- E. Section 01 74 00 - Cleaning.
- F. Section 01 78 00 - Closeout Submittals

1.03 INSTRUCTION OF USING PERSONNEL:

- A. The Contractor will provide demonstrations; conduct training and familiarization sessions for physical plant/User personnel on the mechanical and electrical systems in the facility prior to Substantial Completion inspection. Arrangements for these instruction periods shall be made by the ODR. Operation and maintenance manuals must be available and used during this training period. Refer to Section 01 78 00 for requirements of operating and maintenance manuals.

1.04 SUBMITTALS:

- A. Refer to Section 01 29 00 - Payment Procedures for required administrative action and submittals that must precede or coincide with Contractor's final payment application. Contractor shall deliver these submittals to A/E for transmittal to Owner, properly executed, in one package, prior to the request for final payment.
- B. Final Completion: Submit written request for Final Completion inspection and the following:
 - 1. Certification that Work is complete and Owner has full access and use of completed work, Contract Documents have been reviewed, and systems and equipment have been tested, are operational and User personnel have received proper instruction and training on equipment and systems.
 - 2. Copy of list of items to be completed or corrected from Substantial

- Completion Inspection, with each item initialed and showing date completed.
3. Evidence of compliance with requirements of governing authorities:
 - a. Certificates of occupancy.
 - b. Certificates of final inspection for elevator, plumbing, mechanical, fire protection, electrical, and other systems required by governing authorities.
 4. List of all Subcontractors and material suppliers and product description. Provide name, address, and complete phone number:
 - a. Product manufacturer.
 - b. Installer (Subcontractor).
 - c. Local representative.
 - d. Local source of supply for parts and replacement.
 5. Submit test/adjust/balance records; start-up performance reports, and other information relevant to Owner's occupancy.
 6. Clean-up: Refer to Section 01 74 00 for requirements.
 7. Deliver all special tools and keys in relation to project equipment and devices to ODR.
 8. Instruction Logs for Instruction of Owner's Operating Personnel: Refer to Section 01 78 00 for requirements.
 9. Warranties: Refer to Section 01 78 00 for requirements.
 10. Keys, Keying Schedule, and Changeover of Locks: Refer to appropriate section in Division 8 of these Specifications for requirements.
 11. Spare Parts and Maintenance Material: Refer to appropriate Sections in this Specification for requirements.
 12. List of Contractor's incomplete work, recognized as exceptions to Owner's Certificate of Final Acceptance.
 13. Certificate of Insurance for Products and Completed Operations.
 14. Final Application for Payment.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Operating and maintenance manuals
- B. Maintenance instruction.
- C. Maintenance materials.
- D. Warranties.
- E. Project record documents.

1.02 RELATED SECTIONS:

- A. Uniform General Conditions, Article 13 - Warranty & Guarantee.
- B. Section 01 33 00 - Submittal Procedures.
- C. Section 01 77 00 - Closeout Procedures.
- D. Individual Specification Sections: Special Project Warranties

1.03 GENERAL

A. FORMAT:

1. The final version of all closeout documents shall be uploaded to the appropriate e-Builder folder in searchable PDF form prior to Final Completion.
2. Organize the closeout documents into the folders listed below with PDF content. The folders along with PDF content shall be uploaded to the 12 Contractor Closeout folder. Only upload the folders one time. If additional PDF content needs to be uploaded, navigate to the individual folders and upload the files.

3. For Operating and Maintenance Manuals and Warranties organize the PDF files into the following folders

Division 2

Division 3

Division 4

Division 5

Division 6

Etc. through Division 32

Folders not containing any files can be deleted. Name each file with specification section number (no spaces)-product name-subcontractor name.

Example: 093013-Ceramic Tile-Acme Flooring.pdf

1.04 OPERATING AND MAINTENANCE (O&M) MANUALS (UGSC 12.3.2):

Payment will be withheld unless O&M Manuals submitted are in accordance with this specification.

A. CONTENTS:

1. A list of each product required to be included with name, address and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Local source of supply for parts and replacement.
2. Product Data:
 - a. Include only those sheets that are pertinent to specific product with product clearly identified.
 - b. Delete references to inapplicable information.
3. Provide instructions for care and maintenance including:
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods that are detrimental to product.
 - c. Recommended schedule for cleaning and maintenance.
4. Drawings:
 - a. Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and systems and control and flow diagrams.
 - b. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
5. Written Text: As required to supplement product data for particular installation to provide logical sequence of instructions for each procedure.
6. Miscellaneous Data:
 - a. Furnish copy of each warranty, bond and service contract issued.
 - b. Furnish proper procedures in event of failure and instances that might affect validity of warranties or bonds.
7. Additional Requirements: Refer to respective Specification Sections.

B. MATERIALS AND FINISHES:

1. Provide a summary listing of all exterior and interior colors.
2. Upload the list of all finished to the e-Builder folder 12.4 Finishes prior to final payment.

C. MANUAL FOR EQUIPMENT AND SYSTEMS:

1. Each Type of Equipment and System:
 - a. Provide description of unit and component parts including:
 - (1). Function, normal operating characteristics and limiting

- conditions.
 - (2). Performance curves, engineering data and tests.
 - (3). Complete nomenclature and catalog number of replaceable parts.
 - (4). Dimensional drawing.
 - b. Operating Procedures: Include the following.
 - (1). Start-up, break-in, routine and normal operating instructions.
 - (2). Regulation, control, stopping, shut-down and emergency instructions.
 - (3). Summer and winter operating instructions.
 - (4). Special operating instructions.
 - c. Maintenance Procedures: Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing and checking instructions.
 - d. Provide servicing and lubrication schedule including list of lubricants required.
 - e. Include manufacturer's printed operating and maintenance instructions.
 - f. Describe sequence of operation by control manufacturer.
 - g. Include original manufacturer's parts list, price lists, illustrations, assembly drawings and diagrams required for maintenance, predicted life of parts subject to wear and items recommended to be stocked as spare parts.
 - h. Include control diagrams by controls manufacturer.
 - i. Coordinate drawings and color coded piping diagrams.
 - j. Schedule valve tag numbers with location and function of each valve.
 - k. Include water treatment procedures and tests.
 - l. Include final balancing reports for mechanical systems.
(Only if included in Contractors WORK.)
- 2. Each Electric and Electronic System:
 - a. Provide description of system and component parts including:
 - (1). Function, normal operating characteristics and limiting conditions.
 - (2). Performance curves, engineering data and tests.
 - (3). Complete nomenclature and catalog number of replaceable parts.
 - b. Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications.
 - c. Include color coded wiring diagrams.
 - d. Operating Procedures: Include start-up, break-in, and routine and normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
 - e. Maintenance Procedures: Include routine procedures and guide for

trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

f. Include manufacturer's printed operating and maintenance instructions.

g. Provide list of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.

h. Electrical coordination study.

i. Special systems wiring diagrams.

3. Include warning of detrimental maintenance practices.

4. Prepare and include additional data when need for such data becomes apparent during instruction of Owner's personnel or as required under pertinent Specification Sections.

D. SUBMITTALS:

1. Submit completed manuals to A/E for review and transmittal to ODR thirty plus (30+) days prior to Substantial Completion Inspection.

2. Submittal of operating and maintenance manuals shall be prior to instruction of Owner's operating and maintenance personnel.

1.05 MAINTENANCE INSTRUCTION (OWNER TRAINING):

A. SUBMITTALS:

1. Submit preliminary copy of "Instruction of Owner's Operating and Maintenance Personnel" report for each system or item requiring instruction, on photocopy of form provided herein, at least 60 days prior to instruction date.

2. Submit fully completed forms upon completion of all instruction.

B. QUALITY ASSURANCE:

1. Instruction shall be done by personnel trained and experienced in maintenance of described products and operation of described equipment and systems, and familiar with requirements of this Section.

C. SCHEDULING:

1. Do not perform instruction until systems and equipment have been inspected and approved.

2. Complete all instruction prior to Substantial Completion.

D. INSTRUCTION OF OWNER'S PERSONNEL:

1. Instruct Owner's designated personnel in operation and maintenance of systems and equipment. Use Operating and Maintenance Data specified in this section as basis for instruction.

2. Furnish specialized tools required to operate and maintain systems and equipment for Owner's use.
3. Provide level of instruction commensurate with system or item requiring instruction. Some items may require multiple training sessions at different times due to Owner's 24 hours per day operation.
4. Explain contents and use of Operation and Maintenance Data.
5. Explain operating sequences as follows:
 - a. Show location and operation of switches, valves and other such devices used to start, stop and adjust systems.
 - b. Explain use of flow diagrams, operating sequence diagrams and other such devices.
 - c. Demonstrate operation through complete cycles and full range of operation through all modes, including testing and adjusting relevant to operation.
6. Explain use of control equipment, including temperature settings, switch modes, available adjustments, reading of gauges, and functions that must be serviced by factory-authorized representatives.
7. Explain trouble-shooting procedures; demonstrate problems which commonly occur, and their resolution, and note procedures which must be performed by factory authorized personnel.
8. Explain maintenance procedures and requirements, including items requiring periodic maintenance. Demonstrate preventive maintenance procedures and recommended maintenance intervals. Demonstrate other maintenance procedures not part of periodic maintenance program. Identify maintenance materials to be used.
9. Provide a recording of Owner training in MP4 format.
10. Upload all training videos to the e-Builder 12.5 Training folder prior to final payment.

1.06 MAINTENANCE MATERIALS

A. GENERAL:

1. Assemble spare parts and maintenance materials as required in individual Specification Sections. Deliver in clean packaging identified with manufacturer's name, trade name, stock number, size, color, and other similar information identifying products. Identify building and location in building where item is used or with what it is used. Include name, address and telephone number of local supplier.
2. Deliver to ODR, prior to Final Inspection, at a location within three (3) miles of Project Site as directed by ODR. Include a letter of transmittal with delivery with a copy to A/E listing materials provided.

1.07 WARRANTIES

A. WARRANTY SUBMITTAL (UGSC 13.1 & 13.5):

1. Warranty Format: Assemble warranties executed by respective manufacturers, suppliers, subcontractors and Contractor as follows:
 - a. Cover: Identify each packet with type or printed title "WARRANTIES". List title of Project and name of Contractor.
 - b. Procedures to be followed in case of failure.
2. Warranty Forms: Except as otherwise specified, Contractor shall execute on Contractor's letterhead, the Project Warranty for General Construction and special Warranties required by various Specification Sections.
3. Warranty Effective Date:
 - a. For portions of Work accepted by Owner prior to Final Completion: Date of Substantial Completion and Early Occupancy.
 - b. For portions of Work accepted by Owner at Final Completion: Date of Substantial Completion or Final Completion whichever occurs sooner.

B. PREPARATION:

1. Obtain warranties and guarantees, by responsible subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item or work. Except for items put into service with Owner's permission, warranty begins with date of Substantial Completion in accordance with Uniform General Conditions, Article 13.
2. Verify that documents comply with requirements of Contract Documents, are in form approved by Owner, contain full information. As a minimum, each warranty shall contain:
 - a. Name and location of Project.
 - b. Name and address of Contractor.
 - c. Product or work item.
 - d. Scope of warranty.
 - e. Date of beginning and duration of correction period for warranty.
3. Retain warranties until time specified for submittal.

C. TIME OF SUBMITTALS:

1. For equipment or component parts of equipment put into service with Owner's permission, submit documents within ten (10) days after acceptance.
2. Make other submittals within ten (10) days after Date of Substantial Completion, prior to Final Application for Payment.

D. SCHEDULE OF SUBMITTALS:

1. Refer to Sections 01 33 00 and 01 34 00 for Schedule of Submittals.

E. WARRANTY ADMINISTRATION

1. A representative of the User will be the Owner's point of contact for all warranty work. When disagreements develop between the Warranty

Administrator and the Warrantor, the Chief Facilities Officer or designee, Office of Facilities Planning and Construction will act for the User.

1.08 PROJECT RECORD DOCUMENTS (UGSC 6.2)

A. GENERAL:

1. Maintain in Owner's project management information system Autodesk Build:
 - a. Drawings,
 - b. Specifications,
 - c. Addenda,
 - d. Change Orders and other modifications to the Contract,
 - e. A/E's field orders and other written instruction,
 - f. Approved shop drawings, product data, and samples,
 - g. Field test records,
 - h. Other records required throughout construction by ODR.
2. Maintenance of Record Documents and Samples:
 - a. Maintain documents in a clean, legible manner.
 - b. Make samples available at all times for inspection by A/E and ODR.
 - c. Record Documents will be reviewed monthly by the ODR and A/E. This will be a requirement for approval of monthly payment application.

B. RECORDING:

1. Record information concurrently with construction progress. Make entries within 24 hours after receipt of information. Do not cover-up items required to be shown on Project Record Documents until recorded.
2. Record actual construction as follows:
 - a. Location of underground utilities and appurtenances covered by construction, referenced by an elevation and dimension to visible and accessible features of structure.
 - b. Location of internal utilities and appurtenances covered by construction, referenced by elevation and dimension to visible and accessible features of structure.
 - c. Indicate field changes of dimension and detail, changes made by field order or Change Order, and details not on Contract Drawings.
 - d. Record actual CFM rating in each space on Mechanical Drawings.
 - e. In Specifications and Addenda, record manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed, changes made by Change Order, approved substitution, or other modification, and other matters not originally specified.
3. Entries: Clearly describe change by note and by graphic line, as required. Date all entries. Call attention to entry by "cloud" around area or areas affected. In event of overlapping changes, use different color for each change.

C. SUBMITTAL:

1. Prior to Final inspection and as a prerequisite to Final Payment, Record Documents shall be reviewed by A/E and ODR.

1.09 NON-ASBESTOS CERTIFICATIONS

Obtain from each subcontractor a notarized certification that no materials containing asbestos were included in the project and upload the certifications and a copy of all SDS to the e-Builder folder 12.3 Non Asbestos.

1.10 RELEASE OF LIEN

Obtain from each subcontractor a release of lien and upload to the e-Builder folder 12.6 Release of Lien no later than 60 days after final payment.

1.11 FACILITIES MAINTANENCE DATA

Upload all data required by specification section 01 78 20 Facilities Maintenance Data to the e-Builder folder 12.7 prior to final payment.

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

INSTRUCTION OF OWNER'S OPERATING PERSONNEL

PROJECT: _____

Project No. _____

Contract No. _____

SYSTEM OR EQUIPMENT: _____

PRELIMINARY INFORMATION:

A. To be completed by Contractor:

1. Proposed dates of instruction: _____ to _____

2. Representative performing instruction: _____

3. Number of hours required: _____

B. To be completed by Owner:

1. Owner's personnel to be instructed:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

INSTRUCTION LOG:

Date	No. of Hours	Materials Covered	Instructor's Initials	Owner's Rep. Initials	Comments
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Total Hours: _____ Date Instruction Completed: _____

Owner's Representative: _____

Instructor: _____

PROJECT WARRANTY FOR GENERAL CONSTRUCTION

WHEREAS, _____(Contractor),

Address _____

Telephone () _____ has performed general construction work on the following project:

Contract No. _____ Project No. _____

For _____(Owner),

Address _____, and,

WHEREAS, Contractor has agreed to warrant said Work to be new, unless otherwise specified in the Contract Documents, and that all Work is of good quality, free from faults and defects, and in accordance with the Contract Documents.

NOW THEREFORE, Contractor hereby warrants said Work in accordance with terms hereof, complying with terms of Contract with Owner dated _____, 20_____, that:

Contractor agrees to repair or replace to the satisfaction of the Owner all Work that may prove defective in workmanship or materials together with all other Work which may be damaged or displaced in so doing, except for abuse, modifications not executed by Contractor, insufficient maintenance, improper operation, or normal wear and tear under normal usage.

All repairs or replacements shall have a correction period for such Work equal to the original correction period as herein stated, dated from the final acceptance of repairs or replacement.

CORRECTION PERIOD FOR THE WORK: STARTING _____, TERMINATING _____.

In the event of our failure to comply with the above mentioned conditions within a reasonable time after being notified in writing, we hereby authorize the Owner to proceed to have defects repaired and made good at our expense, and we will pay the costs and charges therefore immediately upon demand.

IN WITNESS THEREOF, this instrument has been duly executed this ____ day of _____, 20_____, for Contractor by _____
(Signature)

_____ as its _____.
(Typed Name) (Title)

SPECIAL WARRANTY FOR _____
WHEREAS, _____(Contractor),

Address _____

Telephone () _____ has performed _____

work on the following project: _____

Contract No. _____ Project No. _____

For _____(Owner),

Address _____, and,

WHEREAS, Contractor has agreed to warrant said Work to be new, unless otherwise specified in the Contract Documents, and that all Work is of good quality, free from faults and defects, and in accordance with the Contract Documents.

NOW THEREFORE, Contractor hereby warrants said Work in accordance with terms hereof, complying with terms of Contract with Owner dated _____, 20____, that:

Contractor agrees to repair or replace to the satisfaction of the Owner all Work that may prove defective in workmanship or materials together with all other Work which may be damaged or displaced in so doing, except for abuse, modifications not executed by Contractor, insufficient maintenance, improper operation, or normal wear and tear under normal usage.

All repairs or replacements shall have a correction period for such Work equal to the original correction period as herein stated, dated from the final acceptance of repairs or replacement.

CORRECTION PERIOD FOR THE WORK: STARTING _____, TERMINATING _____.

In the event of our failure to comply with the above mentioned conditions within a reasonable time after being notified in writing, we agree to hereby authorize the Owner to proceed to have defects repaired and made good at our expense, and we will pay costs and charges therefore immediately upon demand.

IN WITNESS THEREOF, this instrument has been duly executed this ____ day of _____, 20____

for Contractor by _____
(Signature)

_____ as its _____
_____.
(Typed Name) (Title)

And has been countersigned in accordance with terms and conditions, for

Installer by: _____
(Signature) (Typed Name)

as its _____.
(Title)

Name of Firm _____

Address _____

SECTION 01 78 20
FACILITIES MANAGEMENT DATA

PART 1 - GENERAL

1.01 SUMMARY

A. Description:

1. This section specifies the standards that the Contractor shall follow for their scope of work related to Facilities Management Data (FM Data) Requirements.
2. This section does not negate any other section that requires Commissioning or Operations and Maintenance Data.

1.02 RELATED SECTIONS:

- A. Section 01 78 00 - Closeout Submittals
- B. Section 01 91 00 - General Commissioning Requirements

1.03 FACILITY EQUIPMENT DATA

A. Facility Equipment Information Required

1. The Contractor shall provide facilities information in a digital format acceptable to the Owner for all assets identified in Table 01 Asset Groups that are included in the project. The minimum required information per asset are Floor, Location Asset Group, Description, Manufacturer, Model Number, Serial Number and Tag. Contractor shall also provide Owner a photo of the SSC asset sticker, photo of the asset's name plate data, and a photo of each asset in its final location in digital JPEG format and at least 8 megapixels. (See photo examples)
2. Floor shall designate the level (Basement, 01, 02, 03, ..., Roof) or the exterior by Outside.
3. Location shall be the final room numbers assigned to each space or by use of roof or outside.
4. Asset Group shall be one of the asset groups as identified in Table 01.
5. Description shall be a simple description of the asset. (Ex. Air Handler Unit)
6. Manufacturer shall be the actual manufacturer's name of the asset from the approved submittal and as installed.
7. Model Number shall be the complete model number of the asset from the approved submittal and as installed

8. Serial Number shall be the serial number for the asset as installed.
9. Tag shall be the tag designation for the asset as installed. (Ex. AHU-1)
10. See Table 02 for acceptable format (.xlsx) of data collection.
11. All photographs shall be named in the following format xxxx-yyyyy-zz.jpg where “xxxx” represents the building number, “yyyyy” represents SSC barcode number and “zz” represents the picture number sequence. (Ex. 1416-28044-01)

B. Barcodes

1. Barcodes shall be provided by the Owner for Contractor to place on equipment in field. The Contractor shall request these barcodes from the Owner, providing the total number of equipment assets to the Owner.

C. Final Deliverables

1. The Contractor shall provide, on a USB drive, the asset information to the owner within two (2) weeks of the substantial completion date.
2. The Contractor shall upload the asset information to e-Builder within two (2) weeks of the substantial completion date.

1.04 MEETING

A. Contractor shall set up a meeting with the ODR and SSC to review asset groups on the project, quantity of assets on the projects, floor and location nomenclature for the project, placement of barcodes on assets and any other information necessary to complete the task prior to collecting the required information.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

Table 01 Asset Groups

ACID NEUTRALIZING SYS
AHU
AIR BLOWER
AIR COMPRESSOR
AIR DEHUMIDIFIER
AIR DRYER
AIR HUMIDIFIER
AMMONIA REFRIG SYS
AUTOCLAVE
AUTODOOR
BACKFLOW PREVENTER
BOILER
BUILDING FIRE SYSTEM
CENTRAL VACUUM EQUIPMENT
CHAIR LIFT
CHILLER
CLOTHES DRYER
COLD STORAGE ROOM
COMMERCIAL DISHWASHER
COMMERCIAL DISPOSAL
COMPACTOR-TRASH
CONDENSING UNIT
CONVEYING SYSTEM
COOKER/OVEN/STOVE
DEHUMIDIFIER
DESCALER
DOCK LIFT
DOOR-OVERHEAD
DRINKING FOUNTAIN
DUST COLLECTOR
ELECTRIC GATE
ELECTRICAL DISTRIBUTION
ELEVATOR
ENTHALPY WHEELS
ENVIRONMENTAL CHAMBER
ENVIRONMENTAL MONITORING
ESCALATOR
EXHAUST FAN
FAN COIL UNIT
FAN-RETURN
FAN-STAIR
FIRE BACKFLOW PREVENTER

07/22

FIRE PANEL
FIRE PUMP
FOUNTAIN - OUTDOOR
GAS STORAGE TANK
GAS SYSTEM
GLYCOL FEED SYSTEM
HAND/HAIR DRYER
HEAT EXCHANGER
HOOD-VENT
ICE MACHINE
INCINERATOR
KITCHEN EQUIPMENT
LAB EQUIP WASHING SYSTEM
LAB FUME HOOD
LAB VACUUM/LAB AIR
LIFT-CRANE_HOIST
LIGHTNING PREDICTION
LOUVER
MEDICAL GAS SUPPLY SYS
MIXING VALVE
NAT-GAS-SYSTEM
NITROGEN GENERATOR
OVERHEAD DOOR
PACKAGED AIR CONDITIONER
PANELBOARDS
PLAYGROUND STRUCTURES
PUMP
PUMP-CIRC
PUMP-SUMP
RADIATOR
RESIDENTIAL DISHWASHER
RO WATER SYSTEM
ROOF SYSTEM
SOLAR PANEL
STOVE
STRAINER
SUPPLY AIR FAN
SURGEON SCRUB SINK
TANKLESS WATER HEATER
TNK-ACID
TNK-FUEL
TNK-GREASE
TRAP-PRIMER
UNIT HEATER

07/22

UPS
 VACUUM EQUIPMENT
 VAV-FP
 VAV-NP
 VFD
 WALL SYSTEM
 WASHING MACHINE
 WATER FILTRATION SYSTEM
 WATER HEATER
 WATER TREATMENT
 WATER-DI
 WATER-RO
 WATER-SPECIAL
 WINDOW A/C UNIT

Table 02 Data Collection

Asset #	Floor	Location	Asset Group	Description	Manufacturer	Model	Serial #	Tag
175166	01	158	PANELBOARDS	MSA1 - Main Distribution Panel	SQUARE D	HCP	443 810 194 303 1000	MSA1 Main SB
175167	01	119 A	FIRE PANEL	Fire Alarm Main Panel	Siemens	XLS		NA
175171	01	137	VAV-FP	137, 138 Music Rooms	Price	SDV5-001	1318991-030-001	VAV 3-3
175172	01	141	VAV-FP	141 Game Room NNW	Price	SDV5-003	1318991-029-001	VAV 3-1
175173	01	141	VAV-FP	141 Game Room NNE	Price	SDV5-003	1318991-050-001	VAV 3-31
175174	01	141	VAV-FP	141 Game Room NE	Price	SDV5-004	1318991-049-001	VAV 3-32
175175	01	134	VAV-FP	134, 135, 136 Gaming Rooms	Price	SDV5-001	1318991-031-001	VAV 3-4
175176	01	132	VAV-FP	132, 133 Office Key storage	Price	SDV5-001	1318991-039-001	VAV 3-15
175177	01	151	VAV-FP	151 Gallery NW	Price	SDV5-005	1318991-040-001	VAV 3-16
175178	01	C130	VAV-FP	C130 Corridor	Price	SDV5-001	1318991-033-001	VAV 3-6
175179	01	130	VAV-FP	130, 131 Res Storage Copy	Price	SDV5-001	1318991-036-001	VAV 3-9
175180	01	129	VAV-FP	129 Conference	Price	SDV5-001	1318991-035-001	VAV 3-8
175181	01	128	VAV-FP	128 Breakroom	Price	SDV5-001	1318991-034-001	VAV 3-7
175182	01	141	VAV-FP	141 Game room NW	Price	SDV5-004	1318991-048-001	VAV 3-30
175183	01	124	VAV-FP	124, 125 Staff Offices	Price	SDV5-002	1318991-032-001	VAV 3-5
175184	01	122	VAV-FP	122, 123 Staff Offices	Price	SDV5-002	1318991-037-001	VAV 3-10
175185	01	C115	VAV-FP	C115 121 Corridor, Storage	Price	SDV5-003	1318991-041-001	VAV 3-17
175186	01	120	VAV-FP	120 Catering	Price	SDV5-004	1318991-038-001	VAV 3-12
175187	01	119	VAV-FP	119 Electrical	Price	SDV5-004	1341602-004-001	VAV 3-13
175188	01	118	VAV-FP	118 MDF	Price	SDV5-003	1341602-003-001	VAV 3-11
175189	01	151	VAV-FP	151 Gallery SW	Price	SDV5-005	1318991-044-001	VAV 3-24

Sample Photos



1416-28044-01



1416-28044-02



1416-28044-03

SECTION 01 80 00

DOCUMENTING AND EXCAVATING NEAR EXISTING UTILITIES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Information requirements.
- B. Excavation requirements

1.02 RELATED SECTIONS:

- A. Uniform General Conditions and Special Conditions
- B. Section 01 11 00 - Summary of Work.

PART 2 – PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 INFORMATION REQUIREMENTS:

- A. All contractors who will be excavating at any depth must create an account at Texas 811 and receive a ticket before digging. Online registration is required. Tickets shall be updated every 12 days maximum for the duration of the excavation.
 - 1. The general contractor must identify private utility owners on site and contact them directly for any utilities that are not covered by Texas 811.
- B. Before excavation proceeds, the contractor must upload the 811 ticket, as well as notifications from all utility owners listed on the 811 ticket that the ticket has been closed to e-Builder in the 811 Utility Locate Process as described in e-Builder training (schedule e-Builder training through ODR if a new employee will be in charge of this process.). If a utility owner does not respond, the contractor must contact Texas 811 again with a “No Response” ticket to get a response before proceeding with excavation. Note that per Texas Law, any utility that does not respond within the initial 48 hours must respond with 4 hours after receiving a no response notification.
 - 1. Note: the e-Builder process is controlled by the Contractor and is for data tracking purposes. The Contractor is responsible for receiving the tickets as well as ticket-closed notifications from the subcontractors who are performing the excavation and uploading them to e-Builder.

- C. All contractors and their employees who will be operating excavation equipment must attend a General Contractor sponsored utility locate training. Operators will be issued a card or hardhat sticker that they must have on them while operating the equipment.
- D. The Contractor superintendent shall attend the initial site utility locate. The Contractor shall have previously prepared the TAMUS Utility Locate form and shall acquire all signatures required during this meeting. The form shall be turned in to the ODR before excavation can proceed.
 - 1. Photo documentation clearly showing all utility locates with easily identifiable location should be uploaded to the e-Builder 811 Utility Locate process.
 - 2. Located utilities shall be drawn on the civil utility plan confirming the location of the utilities and uploaded to the e-Builder 811 Utility Locate process.
- E. Please be advised that water, slurry, sewage, service lines and privately owned facilities in the area of the proposed excavation may not be located even after contacting the 811 Center. If your facility is not listed or marked by the utility company you will need to contact the company directly or get private locates by an authorized party.

3.02 EXCAVATION REQUIREMENTS:

- A. Due to locating equipment accuracy, marked locations are subject to a horizontal variance. The contractor shall pot hole all marked utilities by means of compressed air or hydro-excavation with equipment and personnel certified to do such work without damaging underground utilities. After locating the utility, all excavation within 2' of either side of the utility shall be hydro excavated with the exception of utilities within 10' of a roadway, which shall be excavated with compressed air.
- B. If a marked utility is not located within the hydro excavation zone, the contractor shall call the utility locate again to return to site and locate the utility.
- C. During and after excavation, utilities must be adequately supported throughout the trench to prevent any deflection of the pipe, duct bank, direct bury cable, or any other type of utility.
- D. If the marks of the utility are disturbed or otherwise erased, the contractor shall create a new request for a utility locate. The excavator is responsible for reasonably protecting and preserving the facility location markings.
- E. Failure to follow these procedures will result in any or all of the following

consequences depending on the severity of the incident as judged by the utility owner (note: no additional days will be added to the schedule as a result of any of the following consequences.):

1. Stop work order until training can be schedule at the contractor's cost,
2. Permanent removal of the operator from the job,
3. Permanent removal of the subcontractor from the job site,
4. Full cost of the repair and all downtime will be incurred or reimbursed by the contractor.

END OF SECTION



SECTION 09 91 00

COMMERCIAL PAINTING

(United States)

Display hidden notes to specifier. (Don't know how? [Click Here](#))
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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial painting, including surface preparation, for projects in the United States.
 - 1. Interior commercial painting.
 - 2. Interior high-performance commercial painting.
 - 3. Exterior commercial painting.

1.2 RELATED SECTIONS - EXTERIOR

- A. Division 3 - Concrete - Cementitious Siding, Flexboard, Transite Board, Shingles (Non-Roof), Common Brick, Stucco, Tilt-up, Precast, and Poured-in-place Cement.
- B. Division 4 - Concrete Block, Floors (Non-Vehicular).
- C. Division 5 - Metal - Galvanized, Miscellaneous Iron, Ornamental Iron, Structural Iron and Steel, Ferrous Metal.
- D. Division 6 - Wood - Decks, Exterior including pressure treated lumber, Floors (non-Vehicular).
- E. Division 7 - Wood - Siding, Trim, Shutters, Sashes, Hardboard-Bare/Primed, Architectural PVC, Plastic, Fiberglass, Azek, Vinyl Siding, EIFS, Synthetic Stucco.

1.3 REFERENCES

- A. Green Seal Standard GS-11; May 20, 1993.
- B. US Green Building Council, (USGBC) - Green Seal standards for LEED paint credits.
- C. Occupational Safety and Health Act (OSHA) - Safety Standards.
- D. American National Standards Institute (ANSI) - Performance Standards.

- E. Paint Decorating Contractors of America (PDCA) - Application Standard.
- F. National Paint and Coatings Association (NPCA) - Gloss Standard.
- G. American Society for Testing Materials (ASTM) - Testing Methods.
- H. Master Paint Institute (MPI #) - Established paint categories and standards.
- I. Ozone Transmission Commission (OTC) - Established levels of Volatile Organic Compounds.
- J. SCAQMD 1168 - South Coast Air Quality Management District Rule #1168; October 3, 2003.
- K. SSPC (PM1) - Steel Structures Painting Manual, Vol. 1, Good Painting Practice; Society for Protective Coatings; 1993, Third Edition.
- L. SSPC (PM2) - Steel Structures Painting Manual, Vol. 2, Systems and Specifications; Society for Protective Coatings; 1995, Seventh Edition.
- M. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

1.4 DEFINITIONS

- A. Commercial as used in this Section refers to a product well suited for a commercial application.
- B. DFT as used in this Section refers to the Dry Film Thickness of the coating.
- C. Enamel refers to any acrylic or alkyd (oil) base paint which dries leaving an eggshell, pearl, satin, semi-gloss or high gloss enamel finish.
- D. DTM as used in this Section refers to paint that is applied Direct To Metal.
- E. LEED as used in this Section refers to Leadership in Energy and Environmental Design. Products listed meet LEED criteria for environmentally safe interior primers, paints and coatings.
- F. OTC as used in this Section refers to the Ozone Transmission Commission. OTC has established the following VOC levels for the Northeastern United States. Products shall meet the following OTC limits for VOC's.
 - 1. Interior flat paints: 100 grams per liter or less, per gallon.
 - 2. Interior enamels: 150 grams per liter or less, per gallon.
 - 3. Interior stains: 250 grams per liter or less, per gallon.
 - 4. Interior primers: 200 grams per liter or less, per gallon.
 - 5. Rust preventive coatings: 400 grams per liter or less, per gallon.
 - 6. Dry fog coatings: 400 grams per liter or less, per gallon.
 - 7. Floor coatings: 250 grams per liter or less, per gallon.
- G. Premium as used in this Section refers to the best quality product "top of the line".
- H. VOC as used in this Section refers to Volatile Organic Compounds found in primers, paints, sealers and stains. The level of VOCs appears after each product listed in the Schedule in grams per liter (g/L).
- I. Paints are available in a wide range of sheens or glosses, as measured by a gloss meter from a 60 and/or 85 degree angle from vertical, as a percentage of the

amount of light that is reflected. The following terms are used to describe the gloss of our products. The list below is provided for general guidance; refer to the technical data sheet for the actual gloss/sheen level for each product.

1. Flat - Less than 5 Percent.
2. Eggshell - 5 - 20 Percent.
3. Satin - 20 - 35 Percent.
4. Semi-Gloss - 30 - 65 Percent.
5. Gloss - Over 65 Percent.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. LEED Certification Product Data:
 1. See Section 01 00 00 - General Requirements.
 2. Submittals Required:
 - a. MRc3 Resource Reuse (LEED Form).
 - b. MRc4 Recycled Content (LEED Form).
 - c. MRc5 Local and Regional Materials (LEED Form).
 - d. EQc4.2 Low Emitting Materials - Paint (VOC Certification Letter).
- C. Product Data: Provide a complete list of all products to be used, with the following information for each:
 1. Manufacturer's name, product name and/or catalog number, and general product category.
 2. Cross-reference to specified paint system(s) that the product is to be used in; include description of each system.
- D. Samples: Submit three paper samples, 5 inches by 7 inches (127mm x 178mm) in size, illustrating selected colors for each color and system selected with specified coats cascaded.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
- B. Installer Qualifications: All products listed in this section are to be applied by a Painting Contractor with a minimum of five years demonstrated experience in surface preparation and field application of the same type and scope as specified.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 1. Mock-up areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 3. Approved mock-up areas will serve as the standard for remaining Work.
 4. Refinish mock-up area as required to produce acceptable Work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Disposal:
 - 1. Never pour leftover coating down any sink or drain. Use up material on the job or seal can and store safely for future use.
 - 2. Do not incinerate closed containers.
 - 3. For specific disposal or recycle guidelines, contact the local waste management agency or district. Recycle whenever possible.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

- A. Inspection of all surfaces to be coated must be done by the manufacturer's representative to insure proper preparation prior to application. All thinners, fillers, primers and finish coatings shall be from the same manufacturer to support a product warranty. Products other than those submitted shall be accompanied by a letter stating its fitness for use and compatibility.
- B. At project closeout, provide to the Owner or owner's representative an executed copy of the Manufacturer's standard form outlining the terms and conditions of and any exclusions to their Limited Warranty against Manufacturing Defect.

1.10 EXTRA MATERIALS

- A. At project closeout, supply the Owner or owner's representative one gallon of each product for touch-up purposes. Cans shall be clearly marked with color name, number and type of paint.
- B. At project closeout, provide the color mixture name and code to the Owner or owner's representative for accurate future color matching.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Benjamin Moore & Co. (United States), which is located at: 101 Paragon Dr; Montvale, NJ 07645; Toll Free Tel: 866-708-9181; Email: [request info \(info@benjaminmoore.com\)](mailto:info@benjaminmoore.com); Web: <https://www.benjaminmoore.com> | <https://www.benjaminmoore.com/en-ca>
- B. Substitutions: Coronado Paint Company.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 LEED CRITERIA

- A. LEED Version 3 - 2009: EQ CR4.2 Low Emitting Materials: 1 Credit - Paint.
 - 1. All architectural paints and coatings used must meet the VOC limits of Green Seal Standard GS-11, 1993.
 - 2. Interior: 50 g/l VOC or less for Flats, 150 g/l VOC for Non Flats, and 200 g/l or

- less for primer sealers/
- 3. Anti-Corrosive Coatings GC-03, 1997: Interior 250 g/l VOC or less any sheen.
- 4. Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements: District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.
- 5. Clear wood finishes: varnish 350 g/L; lacquer 550 g/L; Floor coatings; 100 g/L, waterproofing sealers 250 g/L; sanding sealers 275 g/L; Shellacs: Clear 730 g/L; pigmented 550 g/L; Stains: 250 g/L.

B. LEED Version 4

- 1. All interior paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011 (50g/l or less for interior flats, 100 g/l or less for non-flats, 150 g/l or less for non-flats high gloss).
- 2. Ninety percent of all interior paints and coatings must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1-2010.

2.3 MATERIALS - GENERAL

A. Volatile Organic Compound (VOC) Content:

- 1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D-National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

- B. Compatibility: Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.4 MIXING AND TINTING

- A. Except where specifically noted in this section, all paint shall be ready-mixed and pre-tinted. Agitate all paint prior to and during application to ensure uniform color, gloss, and consistency.
- B. Thinner addition shall not exceed manufacturer's printed recommendations. Do not use kerosene or other organic solvents to thin water-based paints.
- C. CONCRETE - (Walls and Ceilings, Poured Concrete, Precast Concrete, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place) including PLASTER - (Walls, Ceilings).
 - 1. Latex Systems:
 - a. Gloss Finish High Performance:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.

- b. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Latex Gloss N540 (0 g/L), MPI # 54, X-Green 54, 147, X-Green 147, 141, X-Green 141, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Latex Gloss N540 (0 g/L), MPI # 54, X-Green 54, 147, X-Green 147, 141, X-Green 141, LEED 2009, LEED V4.
 - c. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Latex Gloss N540 (0 g/L), MPI # 54, X-Green 54, 147, 147 X-Green, 141, X-Green 141, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Latex Gloss N540 (0 g/L), MPI # 54, X-Green 54, 147, X-Green 147, 141, X-Green 141, LEED 2009, LEED V4, CHPS Certified.
 - d. Semi-Gloss Finish High Performance
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Latex Gloss N540 (0 g/L), MPI # 54, X-Green 54, 147, X-Green 147, 141, X-Green 141, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Latex Gloss N540 (0 g/L), MPI # 54, X-Green 54, 147, X-Green 147, 141, X-Green 141, LEED 2009, LEED V4, CHPS Certified.
 - e. Eggshell/ Satin Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell N538 (0 g/L), MPI # 52, X-Green 52, 145, X-Green 145, 139, X-Green 139, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell N538 (0 g/L), MPI # 52, X-Green 52, 145, X-Green 145, 139, X-Green 139, LEED 2009, LEED V4, CHPS Certified.
 - f. Low Sheen Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Low Sheen N537 (0 g/L), MPI # 44, X-Green 44, 144, X-Green 144, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Low Sheen N537 (0 g/L), MPI # 44, X-Green 44, 144, X-Green 144, LEED 2009, LEED V4, CHPS Certified.
 - g. Flat Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53, X-Green 53, 143, X-Green 143, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53, X-Green 53, 143, X-Green 143, LEED 2009, LEED V4, CHPS Certified.
2. Alkyd System:
 - a. Gloss Finish (Water Base)

- 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
- 2) Second Coat: Benjamin Moore Advance Waterborne Interior Alkyd High Gloss N794 (48 g/L), MPI # 157, X-Green 157, LEED 2009, LEED V4.
- 3) Third Coat: Benjamin Moore Advance Waterborne Interior Alkyd High Gloss N794 (48 g/L), MPI # 157, X-Green 157, LEED 2009, LEED V4.
- b. Semi-Gloss Finish (Water Base):
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Advance Waterborne Interior Alkyd Semi-Gloss 793 (48 g/L), LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Advance Waterborne Interior Alkyd Semi-Gloss 793 (48 g/L), LEED 2009, LEED V4, CHPS Certified.
- c. Eggshell Finish (Water Base):
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Advance Waterborne Interior Alkyd Satin 792 (48 g/L), LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Advance Waterborne Interior Alkyd Satin 792 (48 g/L), LEED 2009, LEED V4, CHPS Certified.
3. Epoxy Systems (Water Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech 100% Solid Epoxy Pre-Primer V155 (6 g/L), LEED 2009.
 - 2) Second Coat: Corotech Waterborne Amine Epoxy V440 (206 g/L).
 - 3) Third Coat: Corotech Waterborne Amine Epoxy V440 (206 g/L).
 - b. Gloss Finish
 - 1) First Coat: Corotech 100% Solid Epoxy Pre-Primer V155 (6 g/L), LEED 2009.
 - 2) Second Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - 3) Third Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - c. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - d. Eggshell Finish
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.

D. CONCRETE: Ceilings.

1. Dryfall Waterborne Systems:
 - a. Semi-Gloss Finish:
 - 1) First Coat: Coronado Super Kote 5000 Dry Fall Latex Semi-Gloss 112 (67 g/L), MPI # 226.
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Latex

- Semi-Gloss 112 (67 g/L), MPI # 226.
- b. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Dry Fall Latex Semi-Gloss 397 (43 g/L), MPI # 226.
 - 2) Second Coat: Benjamin Moore Dry Fall Latex Semi-Gloss 397 (43 g/L), MPI # 226.
 - c. Flat Finish:
 - 1) First Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
 - d. Flat Finish:
 - 1) First Coat: Benjamin Moore Dryfall Latex Flat 395 (46 g/L), MPI # 118.
 - 2) Second Coat: Benjamin Moore Dryfall Latex Flat 395 (46 g/L), MPI # 118.
- E. MASONRY: CMU - Concrete, Split Face, Scored, Smooth, High Density, Low Density, Fluted.
- 1. Latex Systems:
 - a. Gloss Finish High Performance:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L) MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - b. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Latex Semi-Gloss N539 (0 g/L), MPI # 43, X-Green 43, 146, X-Green 146, 140, X-Green 140, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Latex Semi-Gloss N539 (0 g/L), MPI # 43, X-Green 43, 146, X-Green 146, 140, X-Green 140, LEED 2009, LEED V4, CHPS Certified.
 - c. Semi-Gloss Finish High Performance:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - d. Eggshell / Satin Finish:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell N538 (0 g/L), MPI # 52, X-Green 52, 145, X-Green 145, 139,

- X-Green 139, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Latex Eggshell N538 (0 g/L), MPI # 52, X-Green 52, 145, X-Green 145, 139, X-Green 139, LEED 2009, LEED V4, CHPS Certified.
 - e. Low Sheen Finish:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Low Sheen N537 (0 g/L), MPI # 44, X-Green 44, 144, X-Green 144, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Low Sheen N537 (0 g/L), MPI # 44, X-Green 44, 144, X-Green 144, LEED 2009, LEED V4, CHPS Certified.
 - f. Flat Finish:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53, X-Green 53, 143, X-Green 143, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53, X-Green 53, 143, X-Green 143, LEED 2009, LEED V4, CHPS Certified.
- 2. Alkyd System:
 - a. Gloss Finish High Performance:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - b. Semi-Gloss Finish (Water Base):
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Advance Waterborne Interior Alkyd Semi-Gloss 793 (48 g/L), LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Advance Waterborne Interior Alkyd Semi-Gloss 793 (48 g/L), LEED 2009, LEED V4, CHPS Certified.
 - c. Eggshell/Satin Finish (Water Base):
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Advance Waterborne Interior Alkyd Satin 792 (48 g/L), LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Advance Waterborne Interior Alkyd Satin 792 (48 g/L), LEED 2009, LEED V4, CHPS Certified.
- 3. Epoxy System (Water Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Acrylic Block Filler V114 (43 g/L), LEED 2009.
 - 2) Second Coat: Corotech Waterborne Amine Epoxy V440 (206

- g/L).
 - 3) Third Coat: Corotech Waterborne Amine Epoxy V440 (206 g/L).
 - b. Gloss Finish:
 - 1) First Coat: Corotech Acrylic Block Filler V114 (43 g/L), LEED 2009.
 - 2) Second Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - 3) Third Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - c. Semi-Gloss Finish:
 - 1) First Coat: Corotech Acrylic Block Filler V114 (43 g/L), LEED 2009.
 - 2) Second Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - 3) Third Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - d. Semi-Gloss Finish:
 - 1) First Coat: Corotech Acrylic Block Filler V114 (43 g/L), LEED 2009.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - e. Eggshell/Low Luster Finish:
 - 1) First Coat: Corotech Acrylic Block Filler V114 (43 g/L), LEED 2009.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
 - 4. Multi-Surface Acrylic Coating System:
 - a. Gloss Finish High Performance:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic DTM Enamel Gloss V330 (199 g/L), MPI # 154, 164, LEED 2009, LEED V4.
 - 5. Dryfall Waterborne Topcoats:
 - a. Semi-Gloss Finish:
 - 1) First Coat: Coronado Super Kote 5000 Dry Fall Latex Semi-Gloss 112 (67 g/L), MPI # 226.
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Latex Semi-Gloss 112 (67 g/L), MPI # 226.
 - b. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Dry Fall Latex Semi-Gloss 397 (43 g/L), MPI # 226.
 - 2) Second Coat: Benjamin Moore Dry Fall Latex Semi-Gloss 397 (43 g/L), MPI # 226.
 - c. Flat Finish:
 - 1) First Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
- F. METAL - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous and Ornamental Iron, Structural Iron, Ferrous Metal)
- 1. Latex Systems:
 - a. Gloss Finish High Performance:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic DTM Enamel Gloss V330 (199

- g/L), MPI # 154, 164, LEED 2009, LEED V4.
- 3) Third Coat: Corotech Acrylic DTM Enamel Gloss V330 (199 g/L), MPI # 154, 164, LEED 2009, LEED V4.
- b. Semi-Gloss Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic DTM Enamel Semi-Gloss V331 (204 g/L), MPI # 153.
 - 3) Third Coat: Corotech Acrylic DTM Enamel Semi-Gloss V331 (204 g/L), MPI # 153.
- c. Semi-Gloss Finish High Performance:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
- d. Eggshell Finish High Performance:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
- e. Low Sheen Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Low Sheen N537 (0g/L), MPI # 44, X-Green 44, 144, X-Green 144, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Low Sheen N537 (0g/L), MPI # 44, X-Green 44, 144, X-Green 144, LEED 2009, LEED V4, CHPS Certified.
- f. Flat Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53, X-Green 53, 143, X-Green 143, LEED 2009, LEED V4, CHPS Certified.
 - 3) Third Coat: Benjamin Moore Ultra Spec 500 Interior Latex Flat N536 (0 g/L), MPI # 53, X-Green 53, 143, X-Green 143, LEED 2009, LEED V4, CHPS Certified.
- 2. Alkyd System:
 - a. Gloss Finish Waterborne Alkyd:
 - 1) First Coat: Benjamin Moore Super Spec HP Alkyd Metal Primer P06 (323 g/L), MPI # 79.
 - 2) Second Coat: Benjamin Moore Advance Waterborne Interior Alkyd High Gloss N794 (48 g/L), MPI # 157, X-Green 157, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Advance Waterborne Interior Alkyd High Gloss N794 (48 g/L), MPI # 157, X-Green 157, LEED 2009, LEED V4.
 - b. Semi-Gloss Finish Waterborne Alkyd:
 - 1) First Coat: Benjamin Moore Super Spec HP Alkyd Metal Primer

- 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - b. Semi-Gloss Finish High Performance:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - c. Eggshell/Low Sheen:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97 g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
2. Alkyd System (Water Base):
- a. Gloss Finish (Water base):
 - 1) First Coat: Benjamin Moore Fresh Start Multi-Purpose Primer N023 (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Advance Waterborne Interior Alkyd High Gloss N794 (48 g/L), MPI # 157, X-Green 157, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Advance Waterborne Interior Alkyd High Gloss N794 (48 g/L), MPI # 157, X-Green 157, LEED 2009, LEED V4.
3. Alkyd System (Solvent Base Finish):
- a. Gloss Finish Urethane Modified:
 - 1) First Coat: Benjamin Moore Fresh Start Multi-Purpose Primer N023 (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
 - 2) Second Coat: Corotech Alkyd Urethane Gloss V200 (336 g/L), MPI # 9, 27, 48.
 - 3) Third Coat: Corotech Alkyd Urethane Gloss V200 (336 g/L), MPI # 9, 27, 48.
4. Epoxy Systems (Water Base):
- a. Gloss Finish:
 - 1) First Coat: Benjamin Moore Fresh Start Multi-Purpose Primer N023 (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
 - 2) Second Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - 3) Third Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - b. Semi-Gloss/High Luster Finish:
 - 1) First Coat: Benjamin Moore Fresh Start Multi-Purpose Primer N023 (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
 - 2) Second Coat: Corotech Acrylic Epoxy V450 (168 g/L).

- 3) Third Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - c. Eggshell/Low Luster Finish:
 - 1) First Coat: Benjamin Moore Fresh Start Multi-Purpose Primer N023 (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
 - 5. Epoxy Systems (Solvent Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Waterborne Bonding Primer V175, LEED Credit.
 - 2) Second Coat: Corotech Polyamide Epoxy V400 (341 g/L), MPI # 82, 98, 108, 177.
 - 3) Third Coat: Corotech Polyamide Epoxy V400 (341 g/L), MPI # 82, 98, 108, 177.
 - 6. Urethane System (Water Base):
 - a. Gloss Finish Single Component:
 - 1) First Coat: Corotech Waterborne Bonding Primer V175, LEED Credit.
 - 2) Second Coat: Corotech Waterborne Urethane Gloss V540 (10 g/L), LEED Credit.
 - 3) Third Coat: Corotech Waterborne Urethane Gloss V540 (10 g/L), LEED Credit.
- B. Non-Ferrous- (Galvanized and Aluminum):
- 1. Latex Systems:
 - a. Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - b. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - 2) Second Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - c. Semi-Gloss Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic DTM Enamel Semi-Gloss V331 (204 g/L), MPI # 153.
 - 3) Third Coat: Corotech Acrylic DTM Enamel Semi-Gloss V331 (204 g/L), MPI # 153.
 - d. Low Sheen:

- 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
- 2) Second Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Low Lustre Enamel HP25 (145 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009.
- 3) Third Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Low Lustre Enamel HP25 (145 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009.
- e. Flat Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
2. Alkyd System (Water Base):
 - a. Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 3) Third Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
3. Alkyd System (Solvent Base Finish):
 - a. Gloss Finish Urethane Modified:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Super Spec HP Urethane Alkyd Gloss Enamel P22 (394 g/L), MPI # 9, 48.
 - 3) Third Coat: Benjamin Moore Super Spec HP Urethane Alkyd Gloss Enamel P22 (394 g/L), MPI # 9, 48.
4. Epoxy Systems (Water Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Waterborne Amine Epoxy V440 (206 g/L).
 - 2) Second Coat: Corotech Waterborne Amine Epoxy V440 (206 g/L).
 - b. Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - 3) Third Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - c. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - d. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Corotech Acrylic Epoxy V450 (168 g/L).

- 3) Third Coat: Corotech Acrylic Epoxy V450 (168 g/L).
- e. Eggshell Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009.
5. Epoxy Systems (Solvent Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Polyamide Epoxy V400 (341 g/L), MPI # 82, 98, 108, 177.
 - 2) Second Coat: Corotech Polyamide Epoxy V400 (341 g/L), MPI # 82, 98, 108, 177.
 - b. Semi-Gloss Finish:
 - 1) First Coat: Corotech Polyamide Epoxy V400 (341 g/L), MPI # 82, 98, 108, 177.
 - 2) Second Coat: Corotech Polyamide Epoxy V400 (341 g/L), MPI # 82, 98, 108, 177.
6. Urethane Systems (Water Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Waterborne Bonding Primer V175, LEED Credit.
 - 2) Second Coat: Corotech Waterborne Urethane Gloss V540 (10 g/L), LEED Credit.
 - 3) Third Coat: Corotech Waterborne Urethane Gloss V540 (10 g/L), LEED Credit.
7. Urethane Systems (Solvent Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Waterborne Bonding Primer V175, LEED Credit.
 - 2) Second Coat: Corotech Aliphatic Acrylic Urethane Gloss V500 (229 g/L), MPI # 72, 78, 83, 105.
 - 3) Third Coat: Corotech Aliphatic Acrylic Urethane Gloss V500 (229 g/L), MPI # 72, 78, 83, 105.
 - b. Semi-Gloss Finish:
 - 1) First Coat: Corotech Waterborne Bonding Primer V175, LEED Credit.
 - 2) Second Coat: Corotech Aliphatic Acrylic Urethane Semi-Gloss V510 (305 g/L), MPI # 83, 174.
 - 3) Third Coat: Corotech Aliphatic Acrylic Urethane Semi-Gloss V510 (305 g/L) MPI # 83, 174.
8. Multi-Surface Acrylic Coating:
 - a. Gloss Finish:
 - 1) First Coat: Corotech Quick Dry Acrylic Spray DTM Gloss V300 (87 g/L), MPI # 114, LEED Credit, SSPC Paint Spec. 24.
 - 2) Second Coat: Corotech Quick Dry Acrylic Spray DTM Gloss V300 (87 g/L), MPI # 114, LEED Credit, SSPC Paint Spec. 24.
9. Dryfall Waterborne Systems:
 - a. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Dry Fall Latex Semi-Gloss 397 (43 g/L), MPI # 226.
 - 2) Second Coat: Benjamin Moore Dry Fall Latex Semi-Gloss 397 (43 g/L), MPI # 226.
 - b. Flat Finish:

- 1) First Coat: Benjamin Moore Dryfall Latex Flat 395 (46 g/L), MPI # 118.
 - 2) Second Coat: Benjamin Moore Dryfall Latex Flat 395 (46 g/L), MPI # 118.
10. Dryfall Alkyd Topcoats:
- a. Flat Finish:
 - 1) First Coat: Corotech Waterborne Bonding Primer V175, LEED Credit.
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Alkyd Flat 105 (346 g/L), MPI # 55.
- C. METAL - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous and Ornamental Iron, Structural Iron, Ferrous Metal).
1. Latex Systems:
 - a. Gloss Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic DTM Enamel Gloss V330 (199 g/L), MPI # 154, 164, LEED 2009, LEED V4.
 - 3) Third Coat: Corotech Acrylic DTM Enamel Gloss V330 (199 g/L), MPI # 154, 164, LEED 2009, LEED V4.
 - b. Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - c. Semi-Gloss Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic DTM Enamel Semi-Gloss V331 (204 g/L), MPI # 153.
 - 3) Third Coat: Corotech Acrylic DTM Enamel Semi-Gloss V331 (204 g/L), MPI # 153.
 - d. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - e. Low Sheen:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Low Lustre Enamel HP25 (145 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009.
 - 3) Third Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Low

Lustre Enamel HP25 (145 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009.

- f. Flat Finish
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
- 2. Alkyd System (Water Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Water Reducible Alkyd Enamel V210 (331 g/L), MPI # 157.
 - 3) Third Coat: Corotech Water Reducible Alkyd Enamel V210 (331 g/L), MPI # 157.
- 3. Alkyd System (Solvent Base Finish):
 - a. Gloss Finish Urethane Modified:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Alkyd Urethane Gloss V200 (336 g/L), MPI # 9, 27, 48.
 - 3) Third Coat: Corotech Alkyd Urethane Gloss V200 (336 g/L), MPI # 9, 27, 48.
 - b. Gloss Finish Urethane Modified:
 - 1) First Coat: Benjamin Moore Super Spec HP Acrylic Metal Primer P04 (47 g/L), MPI # 107, X-Green 107, 134, LEED 2009, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Super Spec HP Urethane Alkyd Gloss Enamel P22 (394 g/L), MPI # 9, 48.
 - 3) Third Coat: Benjamin Moore Super Spec HP Urethane Alkyd Gloss Enamel P22 (394 g/L), MPI # 9, 48.
- 4. Epoxy Systems (Water Base):
 - a. Gloss Finish
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - 3) Third Coat: Corotech Acrylic Epoxy V450 (168 g/L).
 - b. Gloss Finish
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Waterborne Amine Epoxy V440 (206 g/L).
 - 3) Third Coat: Corotech Waterborne Amine Epoxy V440 (206 g/L).
 - c. Semi-Gloss Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit..
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V341 (71 g/L), LEED 2009.
 - d. Eggshell Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342 (73 g/L), MPI # 151, LEED 2009
 - 3) Third Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell

V342 (73 g/L), MPI # 151, LEED 2009

5. Epoxy System (Solvent Base):
 - a. Semi-Gloss Finish:
 - 1) First Coat: Corotech Polyamide Epoxy Primer V150 (330 g/L).
 - 2) Second Coat Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 6. Urethane System (Water Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Corotech Waterborne Urethane Gloss V540 (10 g/L), LEED Credit.
 - 3) Third Coat: Corotech Waterborne Urethane Gloss V540 (10 g/L), LEED Credit.
 7. Urethane System (Solvent Base):
 - a. Gloss Finish:
 - 1) First Coat: Corotech Polyamide Epoxy Primer V150 (330 g/L).
 - 2) Second Coat: Corotech Aliphatic Acrylic Urethane Gloss V500 (229 g/L), MPI # 72, 78, 83, 105.
 - 3) Third Coat: Corotech Aliphatic Acrylic Urethane Gloss V500 (229 g/L), MPI # 72, 78, 83, 105.
 - b. Semi-Gloss Finish:
 - 1) First Coat: Corotech Polyamide Epoxy Primer V150 (330 g/L).
 - 2) Second Coat: Corotech Aliphatic Acrylic Urethane Semi-Gloss V510 (305 g/L), MPI # 83, 174.
 - 3) Third Coat: Corotech Aliphatic Acrylic Urethane Semi-Gloss V510 (305 g/L), MPI # 83, 174.
- D. METAL - (Ceilings - Structural Steel, Joists, Trusses, Beams).
1. MultiSurface Acrylic Coating:
 - a. Gloss Finish:
 - 1) First Coat: Coronado Rust Scat Waterborne Acrylic Gloss 80 (224 g/L), MPI # 114, 154, LEED Credit.
 - 2) Second Coat: Coronado Rust Scat Waterborne Acrylic 80 Line (224 g/L), MPI # 114, 154, LEED Credit.
 - b. Semi-Gloss Finish:
 - 1) First Coat: Corotech Prep All Universal Metal Primer V132 (394 g/L).
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Latex Semi-Gloss 112 (67g/L), MPI # 226.
 - 3) Third Coat: Coronado Super Kote 5000 Dry Fall Latex Semi-Gloss 112 (67g/L), MPI # 226.
 - c. Eggshell Finish:
 - 1) First Coat: Corotech Prep All Universal Metal Primer V132 (394 g/L).
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
 - 3) Third Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
 - d. Flat Finish:
 - 1) First Coat: Corotech Prep All Universal Metal Primer V132 (394 g/L).
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.
 - 3) Third Coat: Coronado Super Kote 5000 Dry Fall Latex Flat N110 (46 g/L), MPI # 118.

2. Dryfall Alkyd Topcoats:
 - a. Flat Finish:
 - 1) First Coat: Corotech Prep All Universal Metal Primer V132 (394 g/L).
 - 2) Second Coat: Coronado Super Kote 5000 Dry Fall Alkyd Flat 105 (346 g/L), MPI # 55.

2.6 COMMERCIAL EXTERIOR PAINT SYSTEMS - UNITED STATES

- A. CONCRETE (Cementitious Siding, Flexboard, Transite Board, Shingles (Non-Roof), Common Brick, Stucco, Tilt-up, Precast, and Poured-in-place Cement).
 1. Latex Systems:
 - a. Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ben Waterborne Exterior Soft-Gloss 543 (45 g/L), MPI # 11.
 - 3) Third Coat: Benjamin Moore Ben Waterborne Exterior Soft-Gloss 543 (45 g/L), MPI # 11.
 - b. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Regal Select Exterior High-Build Soft-Gloss N403 (43 g/L), MPI # 11, 311.
 - 3) Third Coat: Benjamin Moore Regal Select Exterior High-Build Soft-Gloss N403 (43 g/L), MPI # 11, 311.
 - c. Satin Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Satin N448 (46 g/L), MPI # 15.
 - 3) Third Coat: Benjamin Moore Ultra Spec EXT Satin N448 (46 g/L), MPI # 15.
 - d. Satin Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Regal Select Exterior High-Build Low Lustre N401 (40 g/L), MPI # 15, 315.
 - 3) Third Coat: Benjamin Moore Regal Select Exterior High-Build Low Lustre N401 (40 g/L), MPI # 15, 315.
 - e. Flat Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore ben Waterborne Exterior Flat 541 (44 g/L), MPI # 10.
 - 3) Third Coat: Benjamin Moore ben Waterborne Exterior Flat 541 (44 g/L), MPI # 10.
 - f. Flat Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Regal Select Exterior High-Build Flat Finish N400 (42 g/L) MPI # 10.
 - 3) Third Coat: Benjamin Moore Regal Select Exterior High-Build Flat Finish N400 (42 g/L) MPI # 10.
 - g. High Build Coating:
 - 1) First Coat: Coronado Texcrete WB Acrylic Masonry Waterproofer

- Smooth Finish 3194 (90 g/L), LEED Credit.
2. Elastomeric System: Not including cementitious siding, Flexboard, Transite board or shingles (non-roof).
 - a. Flat Finish:
 - 1) First Coat: Benjamin Moore Super Spec Interior/Exterior Acrylic High Build Masonry Primer N068 (97g/L), MPI # 3, LEED 2009.
 - 2) Second Coat: Benjamin Moore Super Spec Masonry 100% Acrylic Elastomeric Coating Flat 056 (99 g/L).
 - 3) Third Coat: Benjamin Moore Super Spec Masonry 100% Acrylic Elastomeric Coating Flat 056 (99 g/L).
 3. Textured and Smooth Systems:
 - a. Textured (Water Based Finish):
 - 1) First Coat: Coronado Texcrete WB Acrylic Masonry Waterproofer Smooth 3194 (90 g/L), LEED Credit.
 - 2) Second Coat:
 - a) Finish Texture- Fine: Coronado Texcrete WB Acrylic Masonry Waterproofer Sand Finish 3192 (78 g/L), LEED Credit.
 - b) Finish Texture- Smooth: Coronado Texcrete WB Acrylic Masonry Waterproofer Smooth Finish 3194 Line (90 g/L), LEED Credit.
 - c) Finish Texture- Medium: Coronado Texcrete WB Acrylic Masonry Waterproofer Medium Finish 3196 Line (20 g/L), MPI # 42, LEED Credit.
 - b. Smooth (Water Based Finish):
 - 1) First Coat: Coronado Texcrete WB Acrylic Masonry Waterproofer Smooth Finish 3194 (90 g/L), LEED Credit.
 - 2) Second Coat: Coronado Texcrete WB Acrylic Masonry Waterproofer Smooth Finish 3194 (90 g/L), LEED Credit.
 4. Stain System:
 - a. Solid Color Waterborne Finish:
 - 1) First Coat: Coronado TuffCrete Waterborne Acrylic Concrete Stain CST-2000 (153 g/L), MPI # 58.
 - 2) Second Coat: Coronado TuffCrete Waterborne Acrylic Concrete Stain CST-2000 (153 g/L), MPI # 58.
- B. MASONRY: Concrete Masonry Units (CMU) - Cinder or Concrete Block.
1. Latex Systems:
 - a. Gloss Finish:
 - 1) First Coat: Coronado Super Kote 5000 Production Block Filler 958-11 (35 g/L), MPI # 4, X-Green 4, LEED V4, CHPS Certified.
 - 2) Second Coat: Coronado Cryli Cote 100% Acrylic Gloss House & Trim Paint 2 (94 g/L).
 - 3) Third Coat: Coronado Cryli Cote 100% Acrylic Gloss House & Trim Paint 2 (94 g/L).
 - b. Gloss Finish - Early Moisture Resistant Finish:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Regal Select Exterior High-Build Soft-Gloss N403 (43 g/L), MPI # 11, 311.
 - 3) Third Coat: Benjamin Moore Regal Select Exterior High-Build Soft-Gloss N403 (43 g/L), MPI # 11, 311.
 - c. Semi-Gloss Finish:
 - 1) First Coat: Coronado Super Kote 5000 Production Block Filler 958-11 (35 g/L), MPI # 4, X-Green 4, LEED V4, CHPS Certified.

- 2) Second Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
- 3) Third Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
- d. Satin Finish:
 - 1) First Coat: Coronado Super Kote 5000 Production Block Filler 958-11 (35 g/L), MPI # 4, X-Green 4, LEED V4, CHPS Certified.
 - 2) Second Coat: Coronado Cryli Cote 100% Acrylic Satin House & Trim Paint 410 (83 g/L).
 - 3) Third Coat: Coronado Cryli Cote 100% Acrylic Satin House & Trim Paint 410 (83 g/L).
- e. Satin Finish - Early Moisture Resistant Finish:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Regal Select Exterior High-Build Low Lustre N401 (40 g/L), MPI # 15, 315.
 - 3) Third Coat: Benjamin Moore Regal Select Exterior High-Build Low Lustre N401 (40 g/L), MPI # 15, 315.
- f. Flat Finish:
 - 1) First Coat: Coronado Super Kote 5000 Production Block Filler 958-11 (35 g/L), MPI # 4, X-Green 4, LEED V4, CHPS Certified.
 - 2) Second Coat: Coronado Cryli Cote 100% Acrylic Flat House & Trim Paint 10 (44 g/L), MPI # 10.
 - 3) Third Coat: Coronado Cryli Cote 100% Acrylic Flat House & Trim Paint 10 (44 g/L), MPI # 10.
- g. Flat-Early Moisture Resistant Finish:
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Regal Select Exterior High-Build Flat Finish N400 (42 g/L) MPI # 10.
 - 3) Third Coat: Benjamin Moore Regal Select Exterior High-Build Flat Finish N400 (42 g/L) MPI # 10.
- h. High Build Coating
 - 1) First Coat: Coronado Texcrete WB Acrylic Masonry Waterproofer Smooth Finish 3194 (90 g/L), LEED Credit.
2. Elastomeric System:
 - a. Flat Finish
 - 1) First Coat: Benjamin Moore Super Spec Masonry Interior/Exterior Hi-Build Block Filler 206 (45 g/L), MPI # 4, X-Green 4, LEED 2009, LEED V4, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Super Spec Masonry 100% Acrylic Elastomeric Coating Flat 056 (99 g/L).
 - 3) Third Coat: Benjamin Moore Super Spec Masonry 100% Acrylic Elastomeric Coating Flat 056 (99 g/L).
3. Textured Masonry System:
 - a. Textured (Water Based Finish)
 - 1) First Coat: Coronado Texcrete WB Acrylic Masonry Waterproofer Smooth Finish 3194 (90 g/L), LEED Credit.
 - 2) Second Coat: Coronado Texcrete WB Textured Waterproofer
 - a) Finish Texture Sand: 3192 (78 g/L), LEED Credit.
 - b) Finish Texture Medium: 3196 (20 g/L) MPI # 42, LEED Credit.

- b. Smooth (Water Based)
 - 1) First Coat: Coronado Texcrete WB Acrylic Masonry Waterproofer Smooth Finish 3194 (90 g/L), LEED Credit.
 - 2) Second Coat: Coronado Texcrete WB Acrylic Masonry Waterproofer Smooth Finish 3194 (90 g/L), LEED Credit.
 - 4. Stain System:
 - a. Solid Color Waterborne Stain Finish:
 - 1) First Coat: Insl-X TuffCrete Solvent Acrylic Concrete Stain & Waterproofing Sealer CST-5100 (651 g/L), MPI # 58, 104.
 - 2) Second Coat: Insl-X TuffCrete Solvent Acrylic Concrete Stain & Waterproofing Sealer CST-5100 (651 g/L), MPI # 58, 104.
 - 5. Clear Water Repellant:
 - a. Clear Finish
 - 1) First Coat: Coronado Texcrete Silicone Water Repellant 194 (21 g/L), MPI # 117, LEED Credit.
 - 2) Second Coat: Coronado Texcrete Silicone Water Repellant 194 (21 g/L), MPI # 117, LEED Credit.
- C. CONCRETE: Concrete Floors (non-vehicular), Patios, Porches, Steps and Platforms.
 - 1. Acrylic System Water-Based:
 - a. Floor Finish:
 - 1) First Coat: Benjamin Moore Floor & Patio Latex Enamel Low Sheen N122 (45 g/L), LEED 2009.
 - 2) Second Coat: Benjamin Moore Floor & Patio Latex Enamel Low Sheen N122 (45 g/L), LEED 2009.
- D. METAL: Aluminum, Galvanized.
 - 1. Latex Systems:
 - a. Gloss Finish:
 - 1) First Coat: Benjamin Moore Ultra Spec EXT Gloss Finish N449 (46 g/L) MPI # 11.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Gloss Finish N449 (46 g/L) MPI # 11.
 - b. Gloss Finish- Early Moisture Resistant Finish
 - 1) First Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - 2) Second Coat: Benjamin Moore Ultra Spec D.T.M. Acrylic Gloss Enamel HP28 (142 g/L), MPI # 114, X-Green 114, 154, X-Green 154, 164, LEED 2009, LEED V4.
 - c. Semi-Gloss Finish:
 - 1) First Coat: Benjamin Moore Ultra Spec HP Acrylic DTM Semi-Gloss Enamel HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009.
 - 2) Second Coat: Benjamin Moore Ultra Spec HP Acrylic DTM Semi-Gloss Enamel HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009.
 - d. Satin Finish:
 - 1) First Coat: Benjamin Moore Ultra Spec EXT Satin N448 (46 g/L), MPI # 15.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Satin N448 (46 g/L), MPI # 15.
 - e. Satin Finish- Early Moisture Resistant Finish:
 - 1) First Coat: Benjamin Moore Regal Select Exterior High-Build Low Lustre N401 (40 g/L), MPI # 15, 315.

- 2) Second Coat: Benjamin Moore Regal Select Exterior High-Build Low Lustre N401 (40 g/L), MPI # 15, 315.
 - f. Flat Finish:
 - 1) First Coat: Benjamin Moore Ultra Spec Exterior Flat Finish N447 (45 g/L), MPI # 10.
 - 2) Second Coat: Benjamin Moore Ultra Spec Exterior Flat Finish N447 (45 g/L), MPI # 10.
 - g. Flat Finish- Early Moisture Resistant Finish:
 - 1) First Coat: Benjamin Moore Regal Select Exterior High-Build Flat Finish N400 (42 g/L) MPI # 10.
 - 2) Second Coat: Benjamin Moore Regal Select Exterior High-Build Flat Finish N400 (42 g/L) MPI # 10.
- E. METAL: Misc. Iron, Ornamental Iron, Structural Iron and Steel, Ferrous Metal.
- 1. Latex Systems:
 - a. Gloss Finish
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Benjamin Moore Ultra Spec EXT Gloss Finish N449 (46 g/L) MPI # 11.
 - 3) Third Coat: Benjamin Moore Ultra Spec EXT Gloss Finish N449 (46 g/L) MPI # 11.
 - b. Semi-Gloss Finish
 - 1) First Coat: Corotech Acrylic Metal Primer V110 (199 g/L), LEED Credit.
 - 2) Second Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
 - 3) Third Coat: Benjamin Moore Ultra Spec HP D.T.M. Acrylic Semi-Gloss Enamel, HP29 (147 g/L), MPI # 141, X-Green 141, 153, X-Green 153, LEED 2009, LEED V4.
- F. WOOD: Decks, Exterior including pressure treated lumber, Floors (non-Vehicular), Platforms.
- 1. Acrylic Water-Based Floor System:
 - a. Floor Finish:
 - 1) First Coat: Benjamin Moore Fresh Start Multi-Purpose Primer N023 (44 g/L), MPI # 6, 17, X-Green 17, 39, 137, X-Green 137, LEED Credit, CHPS Certified.
 - 2) Second Coat: Benjamin Moore Floor & Patio Latex Enamel Low Sheen N122 (45 g/L), LEED 2009.
 - 2. Stain Systems:
 - a. Solid Color Acrylic Latex:
 - 1) First Coat: Benjamin Moore Arborcoat Solid Deck & Siding Stain 640 (93 g/L), MPI # 16.
 - 2) Second Coat: Benjamin Moore Arborcoat Solid Deck & Siding Stain 640 (93 g/L), MPI # 16.
 - b. Semi-Transparent Stain:
 - 1) First Coat: Benjamin Moore Arborcoat Semi-Transparent Deck & Siding Stain N638 (92 g/L), MPI # 156.
 - 2) Second Coat: Benjamin Moore Arborcoat Semi-Transparent Deck & Siding Stain N638 (92 g/L), MPI # 156.
 - c. Clear Stain:
 - 1) First Coat: Benjamin Moore Arborcoat Waterproofer 320 (34 g/L).

PART 3 EXECUTION

3.1 EXAMINATION

- A. The Contractor shall review the product manufacturer's special instructions for surface preparation, application, temperature, re-coat times, and product limitations.
- B. The Contractor shall review product health and safety precautions listed by the manufacturer.
- C. The Contractor shall be responsible for enforcing on site health and safety requirements associated with the Work.
- D. Do not begin installation until substrates have been properly prepared.
- E. Ensure that surfaces to receive paint are dry immediately prior to application.
- F. Ensure that moisture-retaining substrates to receive paint have moisture content within tolerances allowed by coating manufacturer. Where exceeding the following values, promptly notify Architect and obtain direction before beginning work.
 - 1. Concrete and Masonry: 3-5 percent. Allow new concrete to cure a minimum of 28 days.
 - 2. Exterior Wood: 17 percent.
 - 3. Interior Wood: 15 percent.
 - 4. Interior Finish Detail Woodwork, Including Trim, and Casework: 10 percent.
 - 5. Plaster and Gypsum: 15 percent.
 - 6. Concrete Slab-On-Grade: Perform calcium chloride test over 24 hour period or other acceptable test to manufacturer. Verify acceptable moisture transmission and pH levels.
- G. Examine surfaces to receive coatings for surface imperfections and contaminants that could impair performance or appearance of coatings, including but not limited to, loose primer, rust, scale, oil, grease, mildew, algae, or fungus, stains or marks, cracks, indentations, or abrasions.
- H. Correct conditions that could impair performance or appearance of coatings in accordance with specified surface preparation procedures before proceeding with coating application.

3.2 PREPARATION - GENERAL

- A. Clean surfaces thoroughly prior to coating application.
- B. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform, satisfactory appearance.
- C. Stains and Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely removed with isolating primer or sealer recommended by coating manufacturer to prevent bleed-through.
- D. Remove Mildew, Algae, and Fungus using materials and methods recommended by coating manufacturer.
- E. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.
- F. Remove or protect adjacent hardware, electrical equipment plates, mechanical

grilles and louvers, lighting fixture trim, and other items not indicated to receive coatings.

- G. Move or protect equipment and fixtures adjacent to surfaces indicated to receive coatings to allow application of coatings.
- H. Protect adjacent surfaces not indicated to receive coatings.
- I. Prepare surfaces in accordance with manufacturer's instructions for specified coatings and indicated materials, using only methods and materials recommended by coating manufacturer.

3.3 SURFACE PREPARATION

- A. Concrete and Concrete Masonry: Clean surfaces free of loose particles, sand, efflorescence, laitance, form oil, curing compounds, and other substances which could impair coating performance or appearance.
- B. Concrete Floors: Remove contaminants which could impair coating performance or appearance. Verify moisture transmission and alkaline-acid balance recommended by coating manufacturer; mechanically abrade surface to achieve 80-100 grit medium-sandpaper texture.
- C. Existing Coatings:
 - 1. Remove surface irregularities by scraping or sanding to produce uniform substrate for coating application; apply one coat primer of type recommended by coating manufacturer for maximum coating adhesion.
 - 2. If presence of lead in existing coatings is suspected, cease surface preparation and notify Architect immediately.
- D. Gypsum Board: Repair cracks, holes and other surface defects with joint compound to produce surface flush with adjacent surfaces.
- E. Masonry Surfaces - Restored: Remove loose particles, sand, efflorescence, laitance, cleaning compounds and other substances that could impair coating performance or appearance.
- F. Metals - Aluminum, Mill-Finish: Clean and etch surfaces with a phosphoric acid-water solution or water based industrial cleaner. Flush with clean water and allow to dry, before applying primer coat.
- G. Metals - Copper: Clean surfaces with pressurized steam, pressurized water, or solvent washing.
- H. Metals - Ferrous, Unprimed: Remove rust or scale, if present, by wire brush cleaning, power tool cleaning, or sandblast cleaning; remove grease, oil, and other contaminants which could impair coating performance or appearance by solvent cleaning, with phosphoric-acid solution cleaning of welds, bolts and nuts; spot-prime repaired welds with specified primer.
- I. Metals - Ferrous, Shop-Primed: Remove loose primer and rust, if present, by scraping and sanding, feathering edges of cleaned areas to produce uniform flat surface; solvent-clean surfaces and spot-prime bare metal with specified primer, feathering edges to produce uniform flat surface.
- J. Metals - Galvanized Steel (not passivated): Clean with a water-based industrial strength cleaner, apply an adhesion promoter followed by a clean water rinse. Alternately, wipe down surfaces using clean, lint-free cloths saturated with xylene or

lacquer thinner; followed by wiping the surface dry using clean, lint-free cloths.

- K. Metals - Galvanized Steel, Passivated: Clean with water-based industrial strength cleaner. After the surface has been prepared, apply recommended primer to a small area. Allow primer to cure for 7 days, and test adhesion using the "cross-hatch adhesion tape test" method in accordance with ASTM D 3359. If the adhesion of the primer is positive, proceed with a recommended coating system for galvanized metal.
- L. Metals - Stainless Steel: Clean surfaces with pressurized steam, pressurized water, or water-based industrial cleaner.
- M. Plaster: Repair cracks, holes and other surface defects as required to maintain proper surface adhesion. Apply patching plaster or Joint compound and sand to produce surface flush with adjacent undamaged surface. Allow a full cure prior to coating application as recommended by the patching compound manufacturer's recommendations.
- N. Polyvinyl Chloride (PVC) Pipe: remove contaminants and markings with denatured alcohol scuff sand and wipe with solvent for maximum adhesion. Test adhesion before starting the job.
- O. Fiberglass Doors - remove contaminants with cleaning solvent (alcohol) scuff sand and wipe. Test adhesion of primer before starting job.
- P. Textiles - Insulated Coverings, Canvas or Cotton: Clean using high-pressure air and solvent of type recommended for material.
- Q. Wood:
 - 1. Seal knots, pitch streaks, and sap areas with sealer recommended by coating manufacturer; fill nail recesses and cracks with filler recommended by coating manufacturer; sand surfaces smooth.
 - 2. Remove mill marks and ink stamped grade marks.
 - 3. Apply primer coat to back of wood trim and paneling.
- R. Wood Doors: Seal door tops and bottoms prior to finishing.
- S. Wood Doors - Field-Glazed Frames and Sash: Prime or seal glazing channels prior to glazing.

3.4 APPLICATION - GENERAL

- A. Application of primers, paints, stains or coatings, by the Contractor, will serve as acceptance that surfaces were properly prepared in accordance with the manufacturer's recommendation.
- B. Apply each coat to uniform coating thickness in accordance with manufacturer's instructions, not exceeding manufacturer's specified maximum spread rate for indicated surface; thins, brush marks, roller marks, orange-peel, or other application imperfections are not permitted.
- C. Allow manufacturer's specified drying time, and ensure correct coating adhesion, for each coat before applying next coat.
- D. Inspect each coat before applying next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet (1.5 m).

- E. Remove dust and other foreign materials from substrate immediately prior to applying each coat.
- F. Where paint application abuts other materials or other coating color, terminate coating with a clean sharp termination line without coating overlap.
- G. Where color changes occur between adjoining spaces, through framed openings that are of same color as adjoining surfaces, change color at outside stop corner nearest to face of closed door.
- H. Re-prepare and re-coat unsatisfactory finishes; refinish entire area to corners or other natural terminations.

3.5 CLEANING

- A. Clean excess coating materials, and coating materials deposited on surfaces not indicated to receive coatings, as construction activities of this section progress; do not allow to dry.
- B. Re-install hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items that have been removed to protect from contact with coatings.
- C. Reconnect equipment adjacent to surfaces indicated to receive coatings.
- D. Relocate to original position equipment and fixtures that have been moved to allow application of coatings.
- E. Remove protective materials.

3.6 PROTECTION AND REPAIR

- A. Protect completed coating applications from damage by subsequent construction activities until completion of painting project.
- B. Touch-up coatings damaged by subsequent construction activities.
- C. All references to (0 g/L) are Zero VOCs according to EPA Method 24.
- D. The CERTIFIED ASTHMA & ALLERGY FRIENDLY Mark is a Registered Certification Mark of the ASTHMA AND ALLERGY FOUNDATION OF AMERICA and ALLERGY STANDARDS, LTD. Cradle to Cradle Certified is a certification mark licensed by the Cradle to Cradle Products Innovation Institute. These products are not endorsed by or a division of CHPS. These products are provided by Benjamin Moore and Co., not CHPS.

END OF SECTION



SUPERIOR[™]
PLASTIC PRODUCTS



KEY-LINK[™]
FENCING & RAILING

SECTION 32 31 00

ALUMINUM FENCING AND GATES

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Residential Fencing
- B. Commercial Fencing
- C. Post Caps
- D. Gates.
- E. Gate Hardware.
- F. Postcap LED Lighting.
- G. Accessories.

1.2 RELATED SECTIONS

- A. Section 02 20 00 - Assessment.
- B. Section 32 31 23 - Plastic Fences and Gates.
- C. Section 03 30 00 - Cast-in-Place Concrete.

- D. Section 05 50 00 - Metal Fabrications.
- E. Section 05 73 16 - Wire Rope Decorative Metal Railings Aluminum Railings and Balustrades.
- F. Section 06 10 00 - Rough Carpentry.
- G. Section 06 63 00 - Plastic Railings.

1.3 REFERENCES

- A. AAMA 2604 - Performance Requirements and Test Procedures for High-Performance Organic Coatings on Aluminum Extrusions and Panels
- B. AAMA 609 and AAMA 610.02 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum
- C. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- D. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
- E. ASTM B 247 - Standard Specification for Aluminum and Aluminum Die Forgings, Hand Forgings and rolled Ring Forgings.
- F. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
- G. NAHB ICC 700-2011 - Practice #601.7 No Site-Applied Finishing Materials
- H. NAHB ICC 700-2011 - Practice #604.1 Recycled Content.
- I. U. S. Green Building Council, LEED Building Design & Construction (BD+C) 2009 (Version 3.0) (LEED v2009).

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Details of material and construction.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods and requirements.
- C. Shop Drawings: Submit shop drawings for fabrication and installation of ornamental metalwork. Include plans, elevations and detail sections. Indicate materials, methods, finishes and types of joinery, fasteners, anchorages and accessory items.
- D. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
 - 1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
 - 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.

- E. NAHB ICC 700-2011:
 - 1. Practice #601.7 No Site-Applied Finishing Materials.
 - 2. Practice #604.1 Recycled Content.
- F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm), representing actual product, color, and patterns.
- H. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- I. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of all components.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 10 years documented experience manufacturing products specified in this section.
- B. Installers Qualifications: Minimum 3 years documented experience installing systems specified in this section.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.
 - 4. Accepted mock-ups shall be comparison standard for remaining Work
- D. Pre-Installation Meeting: Convene a meeting at the project site prior to scheduled commencement of the Work of this Section. Attendees to include the Architect the Manufacturer's representative, the Contractor, the Installer, and related trades. Review the following.
 - 1. Project conditions.
 - 2. Status of other trades.
 - 3. Project duration.
 - 4. Field-constructed mock-ups.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store materials in accordance with manufacturers instructions and to prevent damage.
- B. Store products in manufacturer's unopened, properly labeled, original packaging until ready for installation.
- C. Store components to avoid damage from moisture, abrasion, and other construction activities.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Provide with manufacturer's limited lifetime warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Key-Link Fencing & Railing and Superior Plastic Products, which is located at: 260 Jalyn Dr.; New Holland, PA 17557; Toll Free Tel: 800-633-7093; Fax: 717-355-7129; Email: [request info \(aalvarez@superiorplastic.net\)](mailto:aalvarez@superiorplastic.net); Web: <https://superiorplasticproducts.com> | <http://KeyLinkOnline.com>
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 RESIDENTIAL FENCING

- A. Model: 202003
 1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 48 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: No.
- B. Model: 211011/Model 211014
 1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 62.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- C. Model: 211051/ Model: 211054
 1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.

4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: Spear Short Pickets/ Quad Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 62.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- D. Model: 211111/ Model: 211114
1. Width Options: 6 foot
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 67.5 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- E. Model: 211151/ Model: 211154
1. Width Options: 6 foot
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 67.5 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- F. Model: 211211/ Model: 211414
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: Spears/ Quad.
 7. Ring Option: No Rings.
 8. Short Picket Option: Spear Short Pickets/ Quad Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 75.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.

12. Convex or Concave Gate: Yes
- G. Model: 211251/ Model: 211454
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: Spear Short Pickets/ Quad Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 75.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- H. Model: 212011/ Model: 212014
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 58.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- I. Model: 212051/ Model: 212054
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 58.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- J. Model: 212111/ Model: 212114
1. Width Options: 6 foot
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.

4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 63.5 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- K. Model: 212151/ Model: 212154
1. Width Options: 6 foot
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 63.5 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- L. Model: 212211/Model: 212414
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: No Rings.
 8. Short Picket Option: Spear Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 75.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: Yes
- M. Model: 212251/ Model: 212454
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: Spear Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 75.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.

12. Convex or Concave Gate: Yes
- N. Model: 221022/ Model: 221032/ Model: 221042
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 52 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: No.
- O. Model: 221122/ Model: 221132/ Model: 221142
1. Width Options: 6 foot
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 56.75 inches or larger
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: No.
- P. Model: 221322/ Model: 221332/ Model: 221342
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: Flush Top Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 65 inches or larger
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: No.
- Q. Model: 222022/ Model: 222032/ Model: 222042
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.

4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 48 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: No.
- R. Model: 222122/ Model: 222132/ Model: 222142
1. Width Options: 6 foot
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 52.75 inches or larger.
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: No.
- S. Model: 222322/ Model: 222332/ Model: 222342
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: Flush Top Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 65 inches or larger
 11. Racking: 23 inches over 6 foot section.
 12. Convex or Concave Gate: No.
- T. Model: 231013
1. Width Options: 6 foot
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
 4. Vertical Pickets: 5/8 inch by 5/8 inch.
 5. Picket Spacing: 3.79 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 56.75 inches or larger
 11. Racking: 23 inches over 6 foot section.

12. Convex or Concave Gate: No.

U. Model: 231053

1. Width Options: 6 foot
2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 56.75 inches or larger
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

V. Model: 231113

1. Width Options: 6 foot
2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3.79 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 61.5 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

W. Model: 231153

1. Width Options: 6 foot
2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 61.5 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

X. Model: 231313

1. Width Options: 6 foot
2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.

4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3.79 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: Flush Top Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 65.75 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

Y. Model: 231353

1. Width Options: 6 foot
2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: Flush Top Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 65.75 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

Z. Model: 232013

1. Width Options: 6 foot
2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3.79 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 52.75 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

AA. Model: 232053

1. Width Options: 6 foot
2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 52.75 inches or larger.
11. Racking: 23 inches over 6 foot section.

12. Convex or Concave Gate: No.

BB. Model: 232113

1. Width Options: 6 foot
2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3.79 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 57.5 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

CC. Model: 232153

1. Width Options: 6 foot
2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 57.5 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

DD. Model: 232313

1. Width Options: 6 foot
2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.
4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3.79 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: Flush Top Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 65.75 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

EE. Model: 232353

1. Width Options: 6 foot
2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2 inches by 2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1-1/8 inch by 1 inch.

4. Vertical Pickets: 5/8 inch by 5/8 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: Flush Top Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 65.75 inches or larger.
11. Racking: 23 inches over 6 foot section.
12. Convex or Concave Gate: No.

FF. Accessories: Provide the following accessories as required for the installation.

1. Concrete Bracket: 2 inch stainless steel post brackets.
2. Swivel Wall Mount: Color
 - a. Black
 - b. Bronze
 - c. White
3. Post Stiffener: 2 inch square post
4. Wall Mount
 - a. Black
 - b. Bronze
 - c. White

GG. Optional Features:

1. Caps:
 - a. 2 inch Caps: Square Flat Cap
 - b. 2 inch Caps: Square Raised Cap
 - c. 2 inch Square Indented Recess Cap
 - d. 2 inch Ball Cap
2. Finials:
 - a. Quad
 - b. Spear
3. Ring Option
4. Pickets
 - a. Short Picket
 - b. Convex Picket
 - c. Concave Picket

2.3 COMMERCIAL FENCING

A. Model: 402003

1. Width Options: 8 foot.
2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3.56 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 48 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

B. Model: 411011/ Model: 411014

1. Width Options: 8 foot.

2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 62.75 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: Yes
- C. Model: 411051/ Model: 411054
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 62.75 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: Yes
- D. Model: 411111/ Model: 411114
1. Width Options: 8 foot.
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 67.5 inches or larger.
 11. 12. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: Yes
- E. Model: 411151/ Model: 411154
1. Width Options: 8 foot.
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings

8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 67.5 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: Yes

F. Model: 411211/ Model: 411414

1. Width Options: 8 foot.
2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3.56 inches.
6. Quad or Spear Finial Options: Spears/Quads.
7. Ring Option: No Rings.
8. Short Picket Option: Spear Short Pickets/ Quad Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 75.75 inches or larger.
11. 12. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: Yes

G. Model: 411251/ Model: 411454

1. Width Options: 8 foot.
2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: Spears/Quads.
7. Ring Option: Rings
8. Short Picket Option: Spear Short Pickets/ Quad Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 75.75 inches or larger.
11. 12. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: Yes

H. Model: 412011/ Model: 412014

1. Width Options: 8 foot.
2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3.56 inches.
6. Quad or Spear Finial Options: Spears/Quads.
7. Ring Option: No Rings.
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 58.75 inches or larger.
11. 12. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: Yes

I. Model: 412051/ Model: 412054

1. Width Options: 8 foot.

2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 58.75 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: Yes
- J. Model: 412111/ Model: 412114
1. Width Options: 8 foot.
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: Spears
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 63.5 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: Yes
- K. Model: 412151/ Model: 412154
1. Width Options: 8 foot.
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 63.5 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: Yes
- L. Model: 412211/ Model: 412414
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: No Rings.

8. Short Picket Option: Spear Short Pickets/ Quad Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 75.75 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: Yes
- M. Model: 412251/ Model: 412454
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: Spears/Quads.
 7. Ring Option: Rings
 8. Short Picket Option: Spear Short Pickets/ Quad Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 75.75 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: Yes
- N. Model: 421022/ Model: 421032/ Model: 421042
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 52 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: No.
- O. Model: 421122/ Model: 421132/ Model: 421142
1. Width Options: 8 foot.
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 56.75 inches or larger
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: No.
- P. Model: 421322/ Model: 421332/ Model: 421342
1. Width Options: 8 foot.

2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: Flush Top Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 65 inches or larger
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: No.
- Q. Model: 422022/ Model: 422032/ Model: 422042
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 48 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: No.
- R. Model: 422122/ Model: 422132/ Model: 422142
1. Width Options: 8 foot.
 2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 52.75 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: No.
- S. Model: 422322/ Model: 422332/ Model: 422342
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 72 inches.
 3. Post Size: 2-1/2 inches by 2-1/2 inches square.
 4. Post Height: Fence Height 30 inches plus.
 5. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 6. Vertical Pickets: 3/4 inch by 3/4 inch.
 7. Picket Spacing: 3.56 inches.
 8. Quad or Spear Finial Options: None
 9. Ring Option: No Rings.

10. Short Picket Option: Flush Top Short Pickets.
11. Arched Top Gate: Yes.
12. Pool Friendly: 65 inches or larger
13. Racking: 38 inches over 8 foot section.
14. Convex or Concave Gate: No.

T. Model: 431013

1. Width Options: 8 foot.
2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3.56 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 56.75 inches or larger
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

U. Model: 431053

1. Width Options: 8 foot.
2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 56.75 inches or larger
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

V. Model: 431113

1. Width Options: 8 foot.
2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3.56 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 61.5 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

W. Model: 431153

1. Width Options: 8 foot.

2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: Rings
 8. Short Picket Option: No Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 61.5 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: No.
- X. Model: 431313
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.
 8. Short Picket Option: Flush Top Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 65.75 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: No.
- Y. Model: 431353
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3-5/8 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: Rings
 8. Short Picket Option: Flush Top Short Pickets.
 9. Arched Top Gate: Yes.
 10. Pool Friendly: 65.75 inches or larger.
 11. Racking: 38 inches over 8 foot section.
 12. Convex or Concave Gate: No.
- Z. Model: 432013
1. Width Options: 8 foot.
 2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
 3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
 4. Vertical Pickets: 3/4 inch by 3/4 inch.
 5. Picket Spacing: 3.56 inches.
 6. Quad or Spear Finial Options: None
 7. Ring Option: No Rings.

8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 52.75 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

AA. Model: 432053

1. Width Options: 8 foot.
2. Fence Height: Varies between 36 inches to 66 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 52.75 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

BB. Model: 432113

1. Width Options: 8 foot.
2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3.56 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 57.5 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

CC. Model: 432153

1. Width Options: 8 foot.
2. Fence Height: Varies between 64 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: No Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 57.5 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

DD. Model: 432313

1. Width Options: 8 foot.

2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3.56 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: No Rings.
8. Short Picket Option: Flush Top Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 65.75 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

EE. Model: 432353

1. Width Options: 8 foot.
2. Fence Height: Varies between 36 inches to 72 inches.
 - a. Post Size: 2-1/2 inches by 2-1/2 inches square.
 - b. Post Height: Fence Height 30 inches plus.
3. Horizontal Fence Rails: 1.25 inches by 1.5 inches.
4. Vertical Pickets: 3/4 inch by 3/4 inch.
5. Picket Spacing: 3-5/8 inches.
6. Quad or Spear Finial Options: None
7. Ring Option: Rings
8. Short Picket Option: Flush Top Short Pickets.
9. Arched Top Gate: Yes.
10. Pool Friendly: 65.75 inches or larger.
11. Racking: 38 inches over 8 foot section.
12. Convex or Concave Gate: No.

FF. Accessories: Provide the following accessories as required for the installation.

1. Concrete Bracket: 2-1/2 inch stainless steel post brackets.
2. Swivel Wall Mount: Color
 - a. Black
 - b. Bronze
 - c. White
3. Post Stiffener: 2-1/2 inch square post
4. Wall Mount
 - a. Black
 - b. Bronze
 - c. White

GG. Optional Features:

1. Caps:
 - a. 2-1/2 inch Square Flat Cap
 - b. 2-1/2 inch Square Raised Cap
 - c. 2-1/2 inch Square Indented Recess Cap
 - d. 2-1/2 inch Ball Cap
2. Finials:
 - a. Quad
 - b. Spear
3. Ring Option
4. Pickets
 - a. Short Picket
 - b. Convex Picket
 - c. Concave Picket

5.radiation with colors as selected by the Architect.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until conditions have been properly prepared.
- B. Verification of Conditions: Examine locations where fencing is to be installed for any conditions detrimental to the proper and timely completion of the work.
- C. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare the grade and remove surface irregularities, if any, which may cause interference with the installation of the fence.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Set posts and gate posts for gate openings as indicated on the Drawings.
- C. Center and align posts, place concrete around posts and vibrate or tamp for consolidation. Recheck vertical and top alignment of posts, and make necessary corrections.
- D. Install gates plumb, level, and secure for full opening without interference. For double gates, install drop rod. Adjust hardware for smooth operation.

3.4 CLEANING

- A. Touch-up, repair, or replace damaged products before Substantial Completion.
- B. Clean the work according to manufacturer's written instructions. Post hole excavations shall be scattered uniformly away from the posts. Clean fence with mild household detergent and rinse well with clean water. Remove mortar from exposed posts using a 10 percent solution of muriatic acid followed immediately by several rinses with clean water.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

Structural Steel (https://www.steelsupplylp.com/structural-steel)	Pipe Fittings (https://www.steelsupplylp.com/pipe-fittings)	Value Added Services (https://www.steelsupplylp.com/fabrication-services)	Welding Supplies (https://www.steelsupplylp.com/welding-supplies)
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CONCRETE STEP 02

TES) ▲

CONCRETE STEP-11 INCH X 36 INC

PPLES-STORE) ▲



(<https://www.steelsupplylp.com/uploads/product/concrete-stair-step-11-inch-x-36-inch.jpg>)

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Handrail & Stairway Components » Floorplate & Concrete Steps

Product Name: CONCRETE STEP-11 INCH X 36 INC Weight: 75.00
SKU: 101794 (<https://www.steelsupplylp.com/sku/101794>)

Description:
STAIR STEPS W/BOLTS #1136TB

Price by Quantity:

1 - 25 = \$52.36
26 - 50 = \$50.23
51 - 75 = \$48.09
76 + = \$45.96
We show 315 in stock

Questions? Chat with us.

To estimate shipping please add to cart, click checkout and enter your zipcode on the left.
All items ship from Houston, TX.

Note: This item is shipped via freight.

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INTERNATIONAL BUILDING CODE

ALL USE GROUP COMPLIANT IBC PREFAB STEEL STAIRWAYS

***NOW! 5 COLOR CHOICES!
SAME PRICE!***



Two Level IBC Stair Tower

- Quality engineered to your specific height requirements.
- Designed for safety and convenience
- Heavy duty diamond plate stair treads won't sag or dish (supplied as standard).
- Factory welded offset handrails of 1 1/2" x 11 Ga. square tubing.
- Standard 12" handrail extensions at top and bottom of stairs.
- 42" high guards welded to stair stringers with 1/2" square rod vertical pickets on 4" centers.

- 10" structural channel stringers.
- Fire proof construction.
- Meets IBC requirements.
- Standard finish gray polyester powder coated, others available upon request.
- Standard 44" wide closed riser treads, 48" overall stair width. Other widths available upon request.
- Tread depths are 12" deep diamond plate.
- Shipped as 2 side frames and 1 bundle of treads for bolted assembly.

NEW! Optional Finishes!

Our standard finish is a quick dry polyester powder coat Gray (RAL 7005). Also available in Black (RAL 9005), Blue (RAL 5010), White (RAL 9016) and Safety Yellow. In addition we are pleased to offer our products with a [hot-dipped galvanized finish](#) or in a Two Part System which is our powder coat over a hot-dipped galvanized undercoat.

RAL 7005

RAL 9005

RAL 5010

RAL 9016

PS211Y66

Color Disclaimer: Please note that the appearance of the color blocks shown above may vary depending on the device used to view this web page.



Galvanized IBC Stair & Landing



Galvanized IBC Stair & Landing



IBC Stair with Offset Handrail and Guards

***Important Note when ordering:** Specify actual floor to floor height when ordering, stairways are custom designed to meet your height requirements.

IBC Stair with Closed Riser Diamond Plate Treads

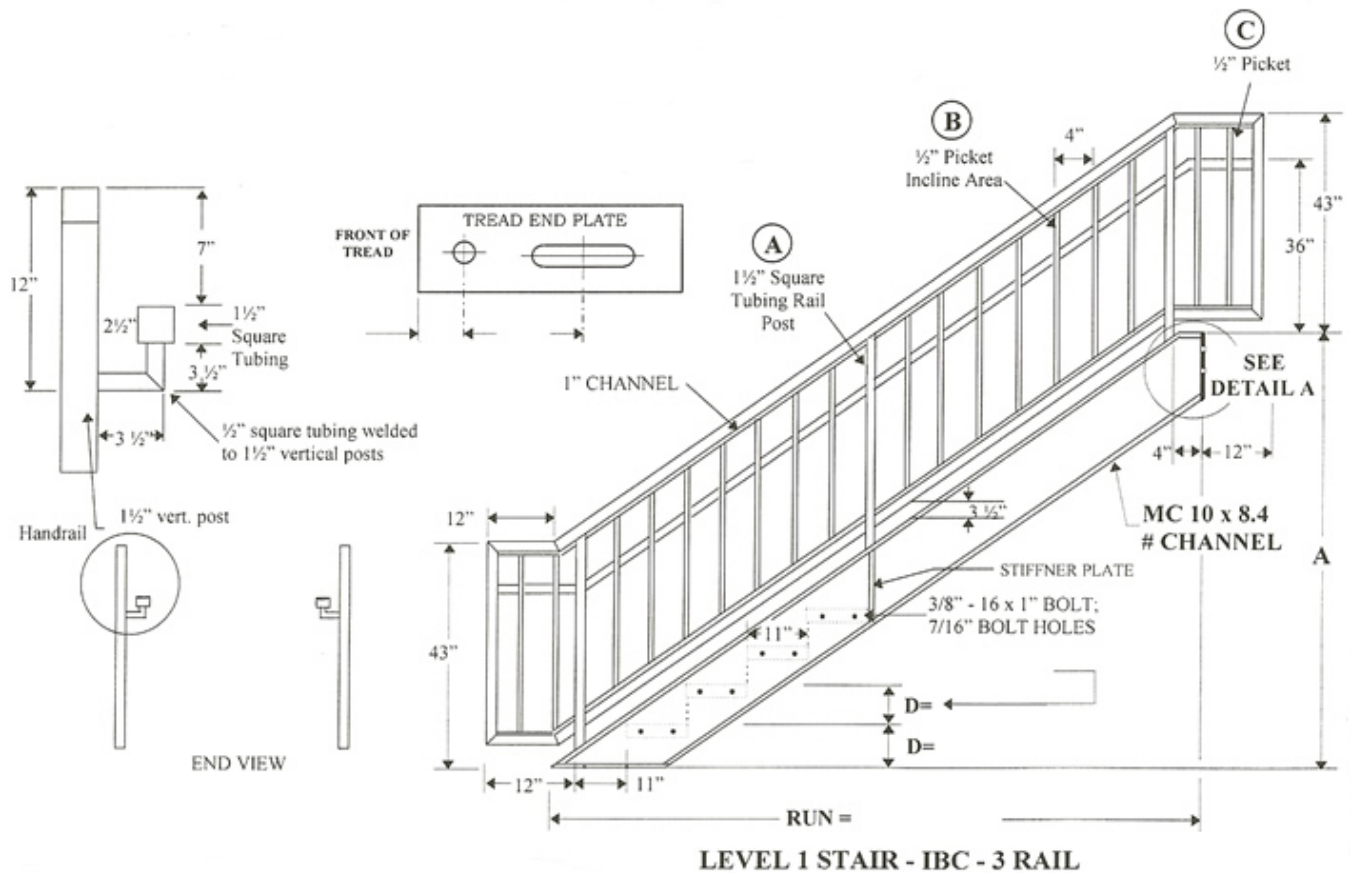
STANDARD DIAMOND PLATE TREAD



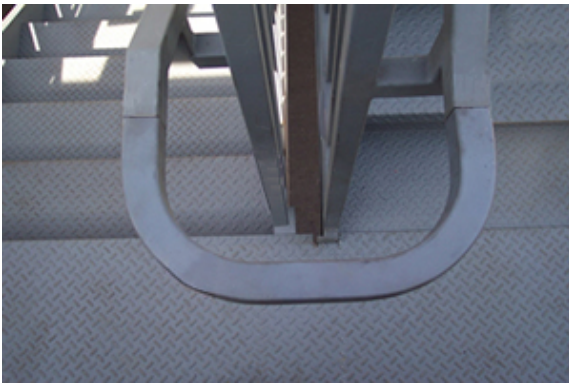
Intermediate Tread
12" Deep x 2", 11 Gauge
Powder Coated to match frame color selection



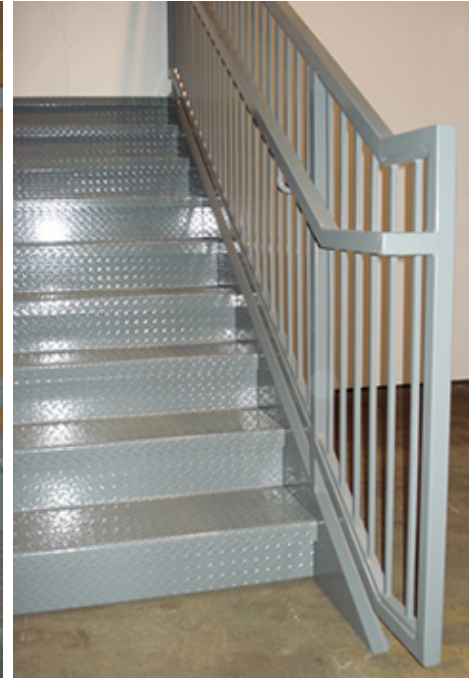
Standard Top Tread Shown with Special Color



[Click Here to View the
Stair Assembly Instructions](#)



**Round contour handrail provided
on multi level units**



Bottom Handrail Extension

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Click a Price of the item you wish to purchase.

PRICES

IBC Type Model No.	Pricing Height Range	Horizontal Run	Tread Width	Nominal Overall Width	Powder Coated Finish Prices	Galvanized Finish Prices
I4436	3'-0" - 3'-5"	5'-10" - 6'-0"	44	48	\$4,551	\$5,474
I4836			48	52	\$4,687	\$5,649
I4441	3'-6" - 3'-11"	5'-10" - 6'-10"	44	48	\$4,869	\$5,901
I4841			48	52	\$5,021	\$6,096
I4448	4'-0" - 4'-5"	6'-10" - 7'-9"	44	48	\$5,188	\$6,329
I4848			48	52	\$5,355	\$6,544
I4454	4'-6" - 4'-11"	7'-9" - 8'-8"	44	48	\$5,506	\$6,756
I4854			48	52	\$5,690	\$6,992
I4460	5'-0" - 5'-5"	8'-8" - 9'-8"	44	48	\$5,886	\$7,245
I4860			48	52	\$6,085	\$7,500
I4466	5'-6" - 5'-11"	9'-7" - 10'-6"	44	48	\$6,210	\$7,678
I4866			48	52	\$6,425	\$7,953
I4472	6'-0" - 6'-5"	10'-6" - 10'-6"	44	48	\$6,533	\$8,111
I4872			48	52	\$6,764	\$8,407
I4478	6'-6" - 6'-11"	11'-5" - 11'-5"	44	48	\$6,857	\$8,543
I4878			48	52	\$7,104	\$8,860

I4484	7'-0" - 7'-5"	11'-5" - 12'-4"	44	48	<u>\$7,181</u>	<u>\$8,976</u>
I4884			48	52	<u>\$7,444</u>	<u>\$9,313</u>
I4490	7'-6" - 7'-11"	12'-4" - 13'-3"	44	48	<u>\$7,505</u>	<u>\$9,409</u>
I4890			48	52	<u>\$7,783</u>	<u>\$9,766</u>
I4496	8'-0" - 8'-5"	13'-3" - 14'-2"	44	48	<u>\$7,829</u>	<u>\$9,842</u>
I4896			48	52	<u>\$8,123</u>	<u>\$10,219</u>
I44102	8'-6" - 8'-11"	14'-2" - 15'-1"	44	48	<u>\$8,153</u>	<u>\$10,275</u>
I48102			48	52	<u>\$8,462</u>	<u>\$10,672</u>
I44108	9'-0" - 9'-5"	15'-1" - 16'-0"	44	48	<u>\$8,549</u>	<u>\$10,834</u>
I48108			48	52	<u>\$8,878</u>	<u>\$11,260</u>
I44114	9'-6" - 9'-11"	15'-11" - 16'-0"	44	48	<u>\$8,873</u>	<u>\$11,267</u>
I48114			48	52	<u>\$9,218</u>	<u>\$11,713</u>
I44120	10'-0" - 10'-5"	16'-10" - 16'-11"	44	48	<u>\$9,196</u>	<u>\$11,699</u>
I48120			48	52	<u>\$9,558</u>	<u>\$12,166</u>
I44126	10'-6" - 10'-11"	16'-10" - 17'-10"	44	48	<u>\$9,520</u>	<u>\$12,132</u>
I48126			48	52	<u>\$9,897</u>	<u>\$12,619</u>
I44132	11'-0" - 11'-5"	17'-10" - 18'-9"	44	48	<u>\$9,844</u>	<u>\$12,565</u>
I48132			48	52	<u>\$10,237</u>	<u>\$13,072</u>
I44138	11'-6" - 12'-0"	18'-9" - 19'-8"	44	48	<u>\$10,168</u>	<u>\$12,998</u>
I48138			48	52	<u>\$10,577</u>	<u>\$13,525</u>



IBC stair with vertical balusters provides complete code compliance.



IBC stair used for general access to in plant mezzanine.

CLASSIFICATION

SECTION 302 CLASSIFICATION

302.1 General. Structures or portions of structures shall be classified with respect to occupancy in one or more

IBC DESIGN SPECIFICATIONS

SECTION 1011 STAIRWAYS

1011.1 General. *Stairways* serving occupied portions of a building shall comply with the requirements of

of the groups listed below. Structure with multiple uses shall be classified according to Section 302.3. Where a structure is proposed for a purpose which is not specifically provided for in this code, such structure shall be classified in the group which the occupancy most nearly resembles, according to the fire safety and relative hazard involved.

1. Assembly (see section 303): Group A-1, A-2, A-3, A-4 and A-5.
2. Business (see Section 304): Group B.
3. Educational (see Section 305): Group E.
4. Factory and Industrial (see Section 306): Groups F-1 and F-2.
5. High Hazard (see Section 307): Group H-1, H-2, H-3, H-4 and H-5.
6. Institutional (see Section 308): Groups I-1, I-2, I-3 and I-4.
7. Mercantile (see Section 309): Group M.
8. Residential (see Section 310): Groups R-1, R-2, R-3 as applicable in Section 101.2, and R-4.
9. Storage (see Section 311): Groups S-1 and S-2.
10. Utility and Miscellaneous (see Section 312): Group U.

SECTION 306 FACTORY GROUP F

306.1 Factory Industrial Group F. Factory Industrial Group F occupancy includes, among other, the use of a building or structure, or a position thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous or Group S storage occupancy.

306.2 Factory Industrial F-1 Moderate-Hazard Occupancy. Factory industrial uses which are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

Aircraft - Appliances - Athletic equipment - Automobiles and other motor vehicles - Bakeries -
Beverages; over 16-percent alcohol content - Bicycles -
Boats - Brooms or brushes - Business machines
Cameras and photo equipment - Canvas or similar

fabric - Carpets and rugs (includes cleaning) -
Clothing - Construction and agricultural machinery
Disinfectants - Dry cleaning and dyeing - Electric
generation plants - Electronics - Engines (including
rebuilding) - Food processing Furniture - Hemp
products - Jute products - Laundries - Leather
products - Machinery - Metals - Millwork (sash &
door) - Motion pictures and television filming (without
spectators) - Musical instruments - Optical goods -
Paper mills or products - Photographic film

Sections 1011.2 through 1011.13. *Alternating tread devices* shall comply with Section 1011.14. Ships ladders shall comply with Section 1011.15. Ladders shall comply with Section 1011.16.

Exception: Within rooms or spaces used for assembly purposes, stepped aisles shall comply with Section 1029.

1011.2 Width and capacity. The required capacity of *stairways* shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44". See section 1009.3 for accessible means of egress stairways.

Exceptions:

1. *Stairways* serving an *occupant load* of less than 50 shall have a width of not less than 36".
2. *Spiral stairways* as provided for in Section 1011.10.
3. Where an incline platform lift or stairway chair-lift is installed on *stairways* serving occupancies in Group R-3, or within *dwelling units* in occupancies in Group R-2, a clear passage width not less than 20" shall be provided. Where the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

1011.3 Headroom. *Stairways* shall have a headroom clearance of not less than 80" measured vertically from a line connecting the edge of the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* and landing.

Exceptions:

1. *Spiral stairways* complying with Section 1011.10 are permitted a 78" headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings of treads at the side of a flight extend under the*

edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom not more than 4 3/4".

1011.4 Walkline. The walkline across *winder* treads shall be concentric to the direction of travel through the turn and located 12" from the side where the *winders* are narrower. The 12" dimension shall be measured from the widest point of the clear *stair* width at the

Plastic products - Printing or publishing} Recreational vehicles - Refuse incineration - Shoes - Soaps and detergents - Textiles - Tobacco - Trailers - Upholstering - Wood: distillation - Woodworking (cabinet)

306.3 Low-hazard factory industrial, Group F-2.

Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials which during finishing, packing or processing do not involve a significant fire hazard shall be classified as F-2 occupancies and shall include, but not be limited to, the following:

Beverages; up to and including 16-percent alcohol content - Brick and masonry - Ceramic products - Foundries - Glass products - Gypsum - Ice Metal products (fabrication and assembly)

SECTION 307 HIGH-HAZARD GROUP H

[F] 307.1 High-Hazard Group H. High-Hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess.

[F] 307.4 High-Hazard Group H-2. Buildings and structures which contain materials that present a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or combustible liquids which are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 psi gage (103.4 kPa) .

Combustible dusts - Cryogenic fluids, flammable - Flammable gases - Organic peroxides, Class I - Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 psi (103.3 kPa) gage Pyrophoric liquids, solids and gases, nondetonable Unstable (reactive) materials, Class 3, nondetonable - Water-reactive materials, Class 3

[F] 307.5 High-Hazard Group H-3. Buildings and structures that contain materials that readily support combustion or present a physical hazard shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or combustible liquids which are used or stored in normally closed containers or systems pressurized at less than 15 psi (103 kPa) gage.

walking surface of the *winder*. Where *winders* are adjacent within the *flight*, the point of the widest clear *stair* width of the adjacent *winders* shall be used.

1011.5 Stair treads and risers. *Stair* treads and risers shall comply with Sections 10.5.1 through 1011.5.5.3.

1011.5.1 Dimension reference surfaces. For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

1011.5.2 Riser height and tread depth. *Stair* riser heights shall be 7" maximum and 4" minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads. Rectangular tread depths shall be 11" minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11" between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10" within the clear width of the *stair*.

Exceptions:

1. *Spiral stairways* in accordance with Section 1011.10.
2. Stairways connecting stepped aisles to cross *aisles* or concourses shall be permitted to use the riser/tread dimension in Section 1029.13.2.
3. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; the maximum riser height shall be 7 3/4"; the minimum tread depth shall be 10"; the minimum *winder* tread depth at the walkline shall be 10"; and the minimum *winder* tread depth shall be 6". A *nosing* projection not less than 3/4" but not more than 1 1/4" shall be provided on *stairways* with solid risers where the tread depth is less than 11".
4. See Section 403.1 of the *International Existing Building Code* for the replacement of existing *stairways*.
5. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 sq. ft. in area, shall be permitted to have a maximum riser height of 8" and a minimum tread depth of 9".

1011.5.3 Winder treads. *Winder* treads are not permitted in *means of egress stairways* except within a *dwelling unit*.

Exceptions:

1. Curved *stairways* in accordance with Section 1011.9.

Combustible Fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3.

Consumer fireworks, 1.4G (Class C Common)
Cryogenic fluids, oxidizing
Flammable solids
Organic peroxides, Classes II and III
Oxidizers, Class 2
Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 psi gauge (103 kPa) or less
Oxidizing gases
Unstable (reactive) materials, Class 2
Water-reactive materials, Class 2

[F] 307.6 High-Hazard Group H-4. Buildings and structures which contain materials that are health hazards shall be classified as group H-4. Such materials shall include, but not be limited to, the following:

Corrosives - Highly toxic materials - Toxic materials

[F] 307.7 Group H-5 Structures. Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials is in excess of those listed in Tables 307.1(1) and 307.1(2) should be classified as Group H-5.

SECTION 308 INSTITUTIONAL GROUP I

308.1 Institutional Group I. Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are not capable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-1, I-2, I-3 or I-4.

308.2 Definitions. The following terms are defined in Chapter 2:

**24-HOUR BASIS, CUSTODIAL CARE,
DETOXIFICATION FACILITIES,
HOSPITALS AND PSYCHIATRIC
HOSPITALS, INCAPABLE OF SELF-
PRESERVATION, MEDICAL CARE,
NURSING HOMES.**

308.3 Institutional Group I-1. Institutional Group I-1 occupancy shall include buildings, structures or portions thereof for more than 16 persons, excluding staff, who reside on a 24-hour basis in a supervised environment and receive custodial care. Buildings of Group I-1 shall

2. Spiral *stairways* in accordance with Section 1011.10.

1011.5.4 Dimensional uniformity. *Stair* treads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser height or between the largest and smallest tread depth shall not exceed 3/8" in any *flight of stairs*. The greatest winder tread depth at the walkline within any *flight of stairs* shall not exceed the smallest by more than 3/8".

Exceptions:

1. *Stairways* connecting stepped *aisles* to cross *aisles* or concourses shall be permitted to comply with the dimensional nonuniformity in Section 1029.13.2.
2. Consistently shaped *winders*, complying with Section 101.5, differing from rectangular treads in the same *flight of stairs*.
3. Nonuniform riser dimension complying with Section 1011.5.4.1.

1011.5.4.1 Nonuniform height risers. Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4" in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of *stair* width. The *nosings* or leading edges of treads at such nonuniform height risers shall have a distinctive marking stripe, different from any other nosing marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair* and shall have a slip-resistant surface. Marking stripes shall have a width of not less than 1" but not more than 2".

1011.5.5 Nosing and riser profile. *Nosings* shall have a curvature or bevel of not less than 1/16" but not more than 9/16" from the foremost projection of the tread. Risers shall be solid and vertical or sloped under the tread above from the underside of the *nosing* above at an angle not more than 30 degrees (0.52 rad) from the vertical.

1011.5.1 Nosing projection size. The leading edge (*nosings*) of treads shall project not more than 1 1/4" beyond the tread below.

1011.5.5.2 Nosing projection uniformity. *Nosing* projections of the leading edges shall be of uniform size, including the projections of the *nosing's* leading edge of the floor at the top of a *flight*.

1011.5.5.3 Solid risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for *stairways* that are not required to comply with Section 1009.3, provided that the opening between treads does

be classified as one of the occupancy conditions specified in Section 308.3.1 or 308.3.2. This group shall include, but not be limited to, the following:

Alcohol and drug centers, Assisted living facilities, Congregate care facilities, *Group homes*, Halfway houses, Residential board and care facilities, Social rehabilitation facilities

308.3.1 Condition 1. This occupancy condition shall include buildings in which all person receiving custodial care who, without any assistance, are capable of responding to an emergency situation to complete building evacuation.

308.3.2 Condition 2. This occupancy condition shall include buildings in which there are any persons receiving custodial care who require limited verbal or physical assistance while responding to an emergency situation to complete building evacuation.

308.4 Institutional Group I-2. Institutional Group I-2 occupancy shall include buildings and structures used for *medical care* on a 24-hour basis for more than five person who are *incapable of self-preservation*. This group shall include, but not be limited to, the following:

Foster care facilities, detoxification facilities, hospitals, nursing homes, psychiatric hospitals

308.4.1 Occupancy conditions. Buildings of Group I-2 shall be classified as one of the occupancy conditions specified in Section 308.4.1.1 or 308.4.1.2.

308.4.1.1 Condition 1. This occupancy condition shall include facilities that provide nursing and medical care but do not provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to nursing homes and foster care facilities.

308.4.1.2 Condition 2. This occupancy condition shall include facilities that provide nursing and medical care and could provide emergency care, surgery, obstetrics or in-patient stabilization units for psychiatric or detoxification, including but not limited to hospitals.

308.4.2 Five or fewer persons receiving medical care. A facility with five or fewer persons receiving medical care shall be classified as Group R-3 or shall comply with the *International Residential Code* provided an *automatic sprinkler system* is installed in accordance with Section 903.3.1.3 or Section P2904 of the *International Residential Code*.

308.5 Institutional Group I-3. Institutional Group I-3 occupancy shall include buildings and structures that are inhabited by more than five persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants'

not permit the passage of a sphere with a diameter of 4".

2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.

3. Solid risers are not required for *spiral stairways* constructed in accordance with Sections 1011.10.

1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each *stairway*. The width of landings shall be not less than the width of *stairways* served. Every landing shall have a minimum width measured perpendicular to the direction of travel equal to the width of the *stairway*. Where the *stairway* has a straight run the depth need not exceed 48". Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7" into a landing. Where *wheelchair spaces* are required on the stairway landing in accordance with Section 1009.6.3, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exception: Where *stairways* connect stepped *aisles* to cross *aisles* or concourses, *stairway* landings are not required at the transition between *stairways* and stepped *aisles* constructed in accordance with Section 1029.

1011.7 Stairway construction. *Stairways* shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood *handrails* shall be permitted for all types of construction.

1011.7.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in stair walking surfaces shall be a size that does not permit the passage of 1/2" diameter sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided a sphere with a diameter of 1 1/8" cannot pass through the opening.

1011.7.2 Outdoor conditions. Outdoor *stairways* and outdoor approaches to *stairways* shall be de-

control. This group shall include, but not be limited to, the following:

Correctional centers, Detention centers, Jails,
Prerelease centers, Prisons, Reformatories

Buildings of Group I-3 shall be classified as one of the occupancy conditions specified in Sections 308.5.1 through 308.5.5 (see Section 408.1).

308.5.1 Condition 1. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas, and other spaces where access or occupancy is permitted, to the exterior via *means of egress* without restraint. A condition 1 facility is permitted to be constructed as Group R.

308.5.2 Condition 2. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied *smoke compartment* to one or more other *smoke compartments*. Egress to the exterior is impeded by locked exits.

308.5.3 Condition 3. This occupancy condition shall include buildings in which free movement is allowed within individual *smoke compartments*, such as within a residential unit comprised of individual *sleeping units* and group activity spaces, where egress is impeded by remote-controlled release of *means of egress* from such a *smoke compartment* to another *smoke compartment*.

308.5.4 Condition 4. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from *sleeping units*, activity spaces and other occupied areas within the *smoke compartment* to other *smoke compartments*.

308.5.5 Condition 5. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled release is provided to permit movement from *sleeping units*, activity spaces and other occupied areas within the *smoke compartment* to other *smoke compartments*.

SECTION 311 STORAGE GROUP S

311.1 Storage Group S. Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

311.1.1 Accessory storage spaces. A room or space used for storage purposes that is less than 100 square feet (9.3 m²) in area and accessory to another occupancy shall be classified as part of that occupancy. The aggregate area of such rooms or spaces shall not exceed the allowable area limits of Section 508.2.

signed so that water will not accumulate on walking surfaces.

1011.7.3 Enclosures under interior stairways.

The walls and soffits within enclosed usable spaces under enclosed and unenclosed stairways shall be protected by 1-hour fire-resistance-rated construction or the fire-resistance-rated construction or the fire-resistance rating of the stairway enclosure, whichever is greater. Access to the enclosed space shall not be directly from within the stairway enclosure.

Exception: Spaces under stairways serving and contained within a single residential dwelling unit in Group R-2 or R-3 shall be permitted to be pro-

ected on the enclosed side with 1/2" gypsum board.

1011.7.4 Enclosures under exterior stairways.

There shall not be enclosed usable space under *exterior exit stairways* unless the space is completely enclosed in 1-hour fire-resistance-rated construction. The open space under *exterior stairways* shall not be used for any purpose.

1011.8 Vertical rise. A flight of stairs shall not have a vertical rise greater than 12' between floor levels or landings.

Exception: Spiral stairways used as a means of egress from technical production areas.

1011.9 Curved stairways. Curved stairways with winder treads shall have treads and risers in accordance with Section 1011.5 and the smallest radius shall be not less than twice the minimum width or required capacity of the stairway.

Exception: The radius restriction shall not apply to curved stairways in Group R-3 and within individual dwelling units in Group R-2

1011.10 Spiral stairways. *Spiral stairways* are permitted to be used as a component in the *means of egress* only within dwelling units or from a space not more than 250 sq. feet in area and serving not more than five occupants, or from *technical production areas* in accordance with Section 410.6.

A *spiral stairway* shall have a 7 1/2" minimum clear tread depth at a point 12" from the narrow edge. The risers shall be sufficient to provide a headroom of 78" minimum, but riser height shall not be more than 9 1/2". The minimum *stairway* clear width at and below the *handrail* shall be 26".

1011.11 Handrails. *Stairways* shall have *handrails* on each side and shall comply with Section 1014. Where glass is used to provide the handrail, the *handrail* shall comply with Section 2407.

Exceptions:

311.2 Moderate-hazard storage, Group S-1. Buildings occupied for storage uses which are not classified as Group S-2 including, but not limited to, storage of the following:

Aerosols, Levels 2 and 3 - Aircraft repair hangar -
 Bags; cloth, burlap and paper - Bamboo's and rattan -
 Baskets - Belting; canvas and leather -
 Books and paper in rolls or packs - Boots and shoes -
 Buttons, including cloth covered, pearl or bone -
 Cardboard and cardboard boxes -
 Clothing, woolen wearing apparel - Cordage -
 Furniture - Furs - Glues, mucilage, pastes and size -
 Grains - Horns and combs, other than celluloid -
 Leather - Linoleum - Lumber -
 Motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials. -
 Photo engravings - Resilient flooring - Silks - Soaps -
 Sugar - Tires, bulk storage of Tabasco, cigars, cigarettes and stuff - Upholstery and mattresses -
 Wax candles

311.3 Low-hazard storage, Group S-2. Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials such as products on wood pallets or in paper cartons with or without single thickness divisions; or in paper wrappings. Such products are permitted to have a negligible amount of plastic trim, such as knobs, handles or film wrapping. Group S-2 storage uses shall include, but not be limited to, storage of the following:

Asbestos - Beverages up to and including 12-percent alcohol in metal, glass or ceramic containers - Cement in bags - Chalk and crayons - Dairy products in nonwaxed coated paper containers - Dry cell batteries - Electrical coils - Electrical motors - Empty cans - Food products - Foods in noncombustible containers - Fresh fruits and vegetables in nonplastic trays or containers - Frozen foods - Glass - Glass bottles, empty or filled with noncombustible liquids - Gypsum board - Inert pigments - Ivory - Meats - Metal cabinets - Metal desks with plastic tops and trim - Metal parts - Metals - Mirrors - Oil-filled and other types of distribution transformers - Parking garages, open or enclosed - Porcelain and pottery - Stoves - Talc and soapstones - Washers and dryers

SECTION 1015 GUARDS

1015.1 General. Guards shall comply with the provisions of Sections 1015.2 through 1015.6. Operable windows with sills located more than 72" above finished grade or other surface below shall comply with Section 1015.7.

1. *Stairways* within dwelling units and *spiral stairways* are permitted to have a *handrail* on one side only.
2. Decks, patios and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a landing do not require *handrails*.
3. In Group R-3 occupancies, a change in elevation consisting of a single riser at an entrance or egress door does not require *handrails*.
4. Changes in room elevations of three or fewer risers within dwelling units and sleeping units in Group R-2 and R-3 do not require *handrails*.

1011.12 Stairway to roof. In buildings four or more stories above *grade plane*, one *stairway* shall extend to the roof surface unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope).

Exception: Other than where required by Section 1011.12.1, in buildings without an occupied roof access to the roof from the top story shall be permitted to be by an alternating tread device, a ships ladder or a permanent ladder.

1011.12.1 Stairway to elevator equipment. Roofs and penthouses containing elevator equipment that must be accessed for maintenance are required to be accessed by a stairway.

1011.12.2 Roof access. Where a stairway is provided to a roof, access to the roof shall be provided through a penthouse complying with Section 1510.2.

Exception: In buildings without an occupied roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 sq. ft. in area and having a minimum dimension of 2'.

1011.13 Guards. Guards shall be provided along stairways and landings where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10' of the roof edge, such roof access or roof edge shall be protected by guards installed in accordance with Section 1015.

1011.14 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in buildings of Groups F, H and S from a mezzanine not more than 250 sq. ft. in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 sq. ft. in area and for access to unoccupied roofs. *Alternating tread devices* used as a means of egress shall not have a rise greater than 20' between floor levels or landings.

1015.2 Where Required. Guards shall be located along open-sided walking surfaces, including mezzanines, equipment platforms, aisles, stairs, ramps and landings than are located more than 30" measured vertically to the floor or grade below at any point within 36" horizontally to the edge of the open side. Guards shall be adequate in strength and attachment in accordance with Section 1607.8.

Exception: Guards are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including steps leading up to the stage and raised platforms
3. On raised stage and platform floor areas such as runways, ramps and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating areas at cross aisles in accordance with Section 1029.16.2.

1015.2.1 Glazing. Where glass is used to provide a guard or as a portion of the guard system, the guard shall comply with Section 2407. Where the glazing provided does not meet the strength and attachment requirements of Section 1607.8, complying guards shall be located along glazed sides of open-sided walking surfaces.

1015.3 Height. Required guards shall be not less than 42" high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On stairways and stepped aisles, from the line connecting the leading edges of the tread nosings.
3. On ramps and ramped aisles, from the ramp surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual dwelling units in occupancies in Group R-2 not more than three stories above grade in height with separate means of egress, required guards shall be not less than 26" in height measured vertically above the adjacent walking surfaces or adjacent fixed seating.
2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, guards on the open sides of stairs shall have a height not less than 34" measured vertically from a line connecting the leading edges of the treads.

1011.14.1 Handrails of alternating tread devices.

Handrails shall be provided on both sides of alternating tread devices and shall comply with Section 1021.

1011.14.2 Treads of alternating tread devices. *Alternating tread*

devices shall have a minimum tread depth of 5", a minimum projected tread depth of 8 1/2", a minimum tread width of 7" and a maximum riser height of 9 1/2". The tread depth shall be measured horizontally between treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees. The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.

Exception: *Alternating tread devices* used as an element of a *means of egress* in buildings from a mezzanine area not more than 250 sq. ft. in area that serves not more than five occupants shall have a minimum tread depth of 3" with a minimum projected tread depth of 10 1/2".

1011.15 Ships ladders. Ships ladders are permitted to be used in Group I-3 as a component of a means of egress to and from control rooms or elevated facility observation stations not more than 250 sq. ft. with not more than three occupants and for access to unoccupied roofs. The minimum clear width at and below the handrails shall be 20".

1011.15.1 Handrails of ships ladders. *Handrails* shall be provided on both sides of ships ladders.

1011.15.2 Treads of ships ladders. Ships ladders shall have a minimum tread depth of 5". The tread shall be projected such that the total of the tread depth plus the *nosings* projection is not less than 8 1/2". The maximum riser height shall be 9 1/2".

1011.16 Ladders. Permanent ladders shall not serve as a part of the *means of egress* from occupied spaces within a building. Permanent ladders shall be permitted to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.
3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupied roofs that are not required to have stairway access in accordance with Section 1011.12.1.

3. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall be not less than 34" and not more than 38" measured vertically from a line connecting the leading edges of the treads.
4. The guard height in assembly seating areas shall comply with Section 1029.16 as applicable.
5. Along alternating tread devices and ships ladders, guards where the top rail also serves as a handrail shall have height not less than 30" and not more than 34", measured vertically from the leading edge of the device tread nosing.

1015.4 Opening Limitations. Required guards shall not have openings that allow passage of a sphere 4" in dia. from the walking surface to the required guard height.

Exceptions:

1. From a height of 36" to 42", guards shall not have openings that allow passage of a sphere 4 3/8" in dia.
2. The triangular openings at the open side of a stair, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6" in dia.
3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, guards shall not have openings that allow passage of a sphere 21" in dia.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for alternating tread devices and ships ladders, guards shall not have openings that allow passage of a sphere 21" in dia.
5. In assembly seating areas, guards required at the end of aisles in accordance with Section 1029.16.4 shall not have openings that allow passage of a sphere 4" in dia. up to a height of 26". From a height of 26" to 42" above the adjacent walking surfaces, guards shall not have openings that allow passage of a sphere 8" in dia.
6. Within individual dwelling units and sleeping units in Group R-2 and R-3 occupancies, guards on the open sides of stairs shall not have openings that allow passage of a sphere 4 3/8" in dia.

1015.5 Screen Porches. Porches and decks which are enclosed with insect screening shall be provided with guards where the walking surface is located more than 30" above the floor or grade below.

1015.6 Mechanical equipment, systems and devices. Guards shall be provided where various

components that require service are located within 10' of a roof edge or open side of a walking surface and such edge or open side is located more than 30" above the floor, roof or grade below. The guard shall extend not less than 30" beyond each end of such components.

6. Ladders shall be constructed in accordance with Section 306.5 of the *International Mechanical Code*.

SECTION 1014 HANDRAILS

1014.1 Where required. Handrails serving stairways, ramps, stepped aisles and ramped aisles shall be adequate in strength and attachment in accordance with Section 1607.8. Handrails required for stairways by Section 1011.11 shall comply with Sections 1014.2 through 1014.9.

1014.2 Height. *Handrail* height, measured above *stair* tread *nosings*, or finish surface of *ramp* slope, shall be uniform, not less than 34" and not more than 38". *Handrail* height of alternating tread devices and ships ladders, measured above tread *nosings*, shall be uniform, not less than 30" and not more than 34".

Exceptions:

1. Where handrail fittings or bendings are used to provide continuous transition between flights, the fittings or endings shall be permitted to exceed the maximum height.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual *dwelling units* in Group R-2 occupancies; where handrail fittings or bendings are used to provide continuous transition between *flights*, transition at *winder* treads, transition from *handrail* to *guard*, or where used at the start of a *flight*, the *handrail* height at the fittings or bendings shall be permitted to exceed the maximum height.
3. Handrails on top of a guard where permitted along stepped aisles and ramped aisles in accordance with Section 1029.15.

1014.3 Handrail graspability. Required handrails shall comply with Section 1014.3.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; *handrails* shall be Type I in accordance with Section 1014.3.1, Type II in accordance with Section 1014.3.2 or shall provide

equivalent graspability.

1014.3.1 Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than 1 1/4" and not greater than 2". Where the handrail is not circular, it shall have a perimeter dimension of not less

The guard shall be constructed so as to prevent the passage of a sphere 21" in dia.

Exception: Guards are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are affixed for use during the entire roof covering lifetime. The devices shall be reevaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10' on center along hip and ridge lines and placed not less than 10' from the roof edge or open side of the walking surface.

1015.7 Roof access. Guards shall be provided where the roof hatch opening is located within 10' of a roof edge or open side of a walking surface and such edge or open side is located more than 30" above the floor, roof or grade below. The guard shall be constructed so as to prevent the passage of a sphere 21" in dia.

Exceptions: Guards are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are affixed for use during the entire roof covering lifetime. The devices shall be reevaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10' on center along hip and ridge lines and placed not less than 10' from the roof edge or open side of the walking surface.

1015.8 Window openings. Windows in Group R-2 and R-3 buildings including dwelling units, where the top of the sill of an operable window opening is located less than 36" above the finished floor and more than 72" above the finished grade or other surface below on the exterior of the building, shall comply with one of the following:

1. Operable windows where the top of the sill of the opening is located more than 75' above the finished grade or other surface below and that are provided with window fall prevention devices that comply with ASTM F 2006.
2. Operable windows where the openings will not allow a 4-inch diameter sphere to pass through the opening when the window is in its largest opened position.
3. Operable windows where the openings are provided with window fall prevention devices that comply with ASTM F 2090
4. Operable windows that are provided with window opening control devices that comply with Section 1015.8.1.

1015.8.1 Window opening control devices. Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net

than 4" and not greater than 6 1/4" with a maximum cross-sectional dimensions of 2 1/4" and minimum cross-sectional dimensions of 1". Edges shall have a minimum radius of 0.01".

1014.3.2 Type II. Handrails with a perimeter greater than 6 1/4" shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 3/4" measured vertically from the tallest portion of the profile and achieve a depth of not less than 5/16" within 7/8" below the widest portion of the profile. This required depth shall continue for not less than 3/8" to a level that is not less than 1 2/4" below the tallest portion of the profile. The width of the hand-rail above the recess shall be not less than 1 1/4" to not greater than 2 3/4". Edges shall have a minimum radius of 0.01".

1014.4 Continuity. Handrail-gripping surfaces shall be continuous, without interruption by newel posts or other obstruction.

Exceptions:

1. Handrails within dwelling unit are permitted to be interrupted by a newel post at a stair landing.
2. Within a dwelling unit, the use of a volute, turnout or starting easing is allowed on the lowest tread.
3. Handrail brackets or balusters attached to the bottom surface of the handrail that do not project horizontally beyond the sides of the handrail within 1 1/2" of the bottom of the handrail shall not be considered to be obstructions and provided further that for each 1/2" of additional handrail perimeter dimension above 4", the vertical clearance dimension of 1 1/2" shall be permitted to be reduced by 1/8".
4. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.
5. Handrails serving stepped aisles or ramped aisles are permitted to be discontinuous in accordance with Section 1029.15.1.

1014.5 Fittings. Handrails shall not rotate within their fittings.

1014.6 Handrail Extensions. Handrails shall return to a wall, guard or the walking surface or shall be continuous to the handrail of an adjacent stair flight. Where handrails are not continuous between flights, the handrails shall extend horizontally at least 12" beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At ramps where handrails are not continuous between runs, the handrails shall extend horizontally above the landing 12" minimum beyond the top and bottom of ramp runs. The extensions

clear opening are of the window unit to less than the area required by Section 1030.2.

of handrails shall be in the same direction of the flights of stairs at stairways and the ramp runs at ramps.

Exceptions:

1. Handrails within a dwelling unit that is not required to be accessible need extend only from the top riser to the bottom riser.
2. Handrails serving aisles in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1029.15.
3. Handrails for alternating tread devices and ships ladders are permitted to terminate at a location vertically above the top and bottom risers. Handrails for alternating tread devices are not required to be continuous between flights or to extend beyond the top or bottom risers.

1014.7 Clearance. Clear space between a handrail and a wall or other surface shall be not less than 1 1/2". A handrail and a wall or other surface adjacent to the handrail shall be free of any sharp or abrasive elements.

1014.8 Projections. On ramps and on ramped aisles that are part of an accessible route, the clear width between handrails shall be 36" minimum. Projections into the required width of aisles, stairways and ramps at each side shall not exceed 4 1/2" at or below the handrail height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1011.3. Projections due to intermediate handrails shall not constitute a reduction in the egress width. Where a pair of intermediate handrails are provided within the stairway width without a walking surface between the pair of intermediate handrails and the distance between the pair of intermediate handrails is greater than 6", the available egress width shall be reduced by the distance between the closest edges of each such intermediate pair of handrails that is greater than 6".

1014.9 Intermediate handrails. Stairways shall have intermediate handrails located in such a manner that all portions of the stairway minimum width or required capacity are within 30" of a handrail. On monumental stairs, handrails shall be located along the most direct path of egress travel.

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