

MASONRY ANCHORAGE SYSTEMS**SECTION 04900**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Division 04 for repointing and repair of existing masonry structures.

1.02 SUMMARY

- A. These specifications cover all plant, labor, materials, mobilization, surveying, directional boring, installation and injection of masonry anchorage enhancement, personnel qualifications, training, prior contractor qualifying experience, and nondestructive testing quality control requirements for the manufacture and injection of compatible injectable fill (CIF) including installation and injection of spiral wall ties and hollow injectable steel enhancement anchor rods.
- B. This Section includes the following injected fill work:
 - 1. The preparation of the existing wythe in the existing masonry walls between masonry back-up and exterior brick veneer.
 - 2. Drilling holes in the brick masonry exterior.
 - 3. Formulation and injection of cementitious fill into masonry wythes.
 - 4. Testing and cleanup.
 - 5. Providing equipment, scaffolding, power tools, etc., for preparation and installation of products.
 - 6. Refer to drawings for locations where injected fill work is identified.
 - 7. Providing General Contractor Bidders with allowance amount to be included in their proposal.
- C. The General Contractor shall provide, and is responsible for the following:
 - 1. Scaffolds and access to buildings.
 - 2. Electricity and water for mixers/ pumps (mixers/pumps furnished by this section 04901).
 - 3. Wiring and maintenance.
 - 4. Cleaning and storage, hoisting, debris removal, window-related work.

1.03 QUALITY ASSURANCE

- A. An experienced and approved Injection Contractor and Professional Engineer (CIF Engineer) shall be employed by the Contractor. The Injection Applicator and Professional Engineer shall be familiar with CIF restoration projects and have a thorough knowledge of non-destructive test methods.
- B. The Contractor's CIF/Injection Engineer shall design the CIF mix formulation(s) required for the building and provide other services as described herein. CIF component materials shall be

mixed according to the proportions and mix procedures determined by the Contractor's CIF/Injection Engineer and shall have the required properties, suitable for the masonry injection, listed herein.

- C. Preconstruction Meeting: A preconstruction meeting shall be held between the Architect, Contractor, Injection Contractor, and CIF Engineer for coordination between trades and work scheduling.

1.04 SUBMITTALS

- A. Masonry Personnel Qualifications: Documented qualifications for all personnel involved in performing the work including all personnel. The personnel qualifications must be complete and include reference project(s) Owner's name and current phone number along with any written statements of reference they are willing to provide. Experience must be specific to CIF injection, and installation of anchorage enhancement including specified equipment for historical brick masonry without changing the appearance, aesthetics of the masonry wall, and characteristics of the existing wall such as expansion, vapor transmission, and water diffusion. All referenced projects shall have been completed using CIF mix formulations that did not include additives or components that create moisture barrier problems or had plastic polymeric material characteristics unless they are compatible and can be shown to not create short and long term moisture barrier problems, contain no chloride or corrosive materials, and have the same thermal characteristics as the existing masonry.
- B. The Contractor shall employ a registered Professional Engineer with documented 10 years minimum experience specific to the CIF material required for this work, mix formulation, CIF injection, anchorage enhancement design, and testing, and determining the structural properties of brick and CMU masonry construction.
 - 1. Submitted documentation of experience must include; CIF injection and masonry enhancement engineering services and supervision provided for at least 5 brick masonry projects, on historic masonry buildings similar in age, size, and masonry composition, with 3 of the 5 having been successfully completed for a time period of seven (7) years.
- C. Injection and Boring Personnel Experience: Submit documentation of job experience and specifically related training over the past five (5) years for the tasks listed below;
 - 1. Injection Supervisor,
 - 2. Mixer-Supervisor,
 - 3. Injection Pump Operator.

Lead personnel must be competent in all skills of the CIF operation. They shall be capable of supervising wall preparations, equipment set up, injections, and cleaning operations. Work foreman shall be capable of submitting daily checklists. Submit documentation of training and current certifications in the preparation and installation of CIF and anchor rods (vertical and horizontal) including anchor socks for all injection personnel. Submit documentation of experience for personnel performing dry core air-cooled drilling work for anchor reinforcement for past project experience demonstrating the boring of at least 30 feet vertically and 50 feet horizontally.

- D. Work Plan: The Contractor shall submit a Work Plan which details the masonry injection and anchorage systems intended for use. The Work Plan shall include:
1. Schedule of all laboratory and field tests.
 2. Sequence of installation for CIF wall injection work and hollow stainless steel anchor rods.
 3. Description of coordination and sequencing with other subcontractor work which must be done in conjunction with the masonry anchorage and enhancement including sequence of work for temporary roof opening protection from weather and restoration/cleaning of existing masonry.
 4. Complete description of procedures and order of work for installation and injection of spiral wall ties, hollow stainless steel enhancement anchor rods, and retention fitting, including complete description of equipment and tools required for the work.
 5. Complete description of procedures for and order of work for injecting CIF, including complete description of equipment and tools required for the work.
- E. Shop Drawings: Shop drawings shall include plans, elevations, sections, and details showing:
1. Complete description of mounting and securing the drilling equipment to the existing wall including method/material for hole repair after equipment removal. Equipment shall be secured using socked CIF injected anchors. The anchor method shall be designed by the CIF/Injection Engineer. Equipment mounting shall not damage or permanently alter the visible appearance of the existing wall.
 2. Location, size, cross-sectional area, and total quantity of spiral wall ties (or equivalent), hollow injectable steel enhancement anchor rods (or equivalent), with retention fittings for each elevation. All anchor rod and spiral wall tie locations shall be numbered for reference. Placement dimensions and spacing including dimension(s) from nearest face of existing walls in plan, elevation or section. Anchor rod dimension from edge of masonry and embedment dimension into existing foundation or concrete supporting wall. All wall injection port locations shall be determined by the CIF/Injection Engineer including method of sealing all port openings.
 3. Method of finishing port openings for the masonry restoration sub-contractor under the supervision of the Injection Contractor.
- F. Component Materials and Mix Formulations: Submit certifications stating that all CIF mix formulations conform to the following requirements:
1. All formulations are non-shrink.
 2. All formulations have similar compatible properties as the masonry walls being repaired.
 3. All formulations are non-chloride and non-corrosive.
 4. Submit additional CIF mixes as required to properly fill the wall voids leaving no voids larger than a two (2) inch sphere within a cubic yard of wall volume and the overall voids within a cubic yard of wall volume will be less than 0.5%.
- G. Daily Field Reports: The Injection Contractor shall record the following in a daily field report for each building:
1. Date
 2. Weather conditions including temperature, humidity, cloud cover, and wind.
 3. Time of operations
 4. Personnel list

5. Description of work performed including installation locations, quantity (volume, cu. ft.) of injected CIF, identification of area injected, and CIF maximum injection pressure reading at the wall.
 6. Equipment performance
 7. Include results for all tests performed as well as flow test results of the flow cone calibration.
 8. Notes regarding any special or non-typical situations encountered during the day.
- H. As-Built Drawings:
1. As-built drawings showing the location and orientation of each masonry anchor, anchor lengths and injection records stating the mix batch number, quantity injected, and injection pressure recorded for each wall injection port and hollow steel anchor rod installation.
 2. All changes from the original shop drawings shall be shown, signed and dated, including a statement of the reason for the change, by the CIF/Injection Engineer.
- I. Installer Certificates: Signed by manufacturers certifying that installers complied with requirements.
- 1.05 TESTING AND INSPECTION
- A. Test reports from the Owner's approved masonry testing laboratory shall demonstrate that the CIF formulation meets the performance criteria and shall be submitted to the Architect.
- B. Prototype Test Wall: Under the supervision of the CIF/Injection Engineer, a four (4) foot high by six (6) foot wide prototype wall representative of the wall construction for the existing building will be erected in the laboratory with clear panels at each end where the CIF mix formulations will be tested for effectively filling the voids, shear bond strength, and flexural tensile strength. Photographs of the construction of the prototype wall shall be included showing the brickwork pattern, every three (3) courses. Each CIF mix formulation used for injection testing on the prototype wall shall contain a different color for visibly determining the extent of penetration. CIF consistency and viscosity characteristics shall be sufficient to flow from the drilled ports located within the mortar joints to sufficiently fill voids and fissures within the wall, bonding to the substrate without initial or long term shrinkage. Photographs and/or radio graphs of the injected CIF mix shall be included showing the CIF mix design penetration leaves voids no larger than a two (2) inch sphere within a cubic yard of wall volume and the overall voids within a cubic yard of wall volume will be less than 0.5%.
- C. The manufacturer's test result(s) for the capacity of the assembled hollow anchor rod components shall be submitted.
- D. Testing of Existing Masonry Structure: The following in-place tests shall be performed on each existing masonry structure.
1. Existing Masonry Compressive Strength: ASTM C 1197. For solid unreinforced masonry, the strength of the masonry will be estimated using a flatjack test in accordance with ASTM C 1196. The expected compressive strength shall be based on the net mortared area.

2. Existing Masonry Elastic Modulus in Compression: ASTM C 1197. For solid unreinforced masonry, the elastic modulus of the masonry will be estimated using a flatjack test in accordance with ASTM C 1197.
 3. Existing Masonry Flexural Tensile Strength: ASTM C 1072 or ASTM E 518.
 4. Minimum Number of Tests: At least one (1) test of each type shall be performed on each of the four (4) sides of the building with a minimum of six (6) tests of each type performed on the entire building.
- E. CIF Performance Tests on Prototype Wall:
1. Flow time: API RP 13B-1 or ASTM C 939, Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method). CIF material for the prototype wall and existing injected wall shall be required to flow without separation; flow time will be specified for the project by CIF/Injection Engineer. CIF material flow shall be calibrated twice daily by flow cone test.
 2. Bleeding: ASTM C 940, Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory; no greater than 0.5 percent.
 3. Mix stability: measured with the Gelman pressure cell; water loss under 10 psi pressure shall not be more than 5 ml per 350 ml sample.
 4. Plastic Expansion: ASTM C 940; shall be determined by the CIF/Injection Engineer based on the in-place material; typically not more than 1 to 4 percent by weight of cement.
 5. Shear bond strength: shall be 100 psi minimum, as tested on samples from the prototype wall constructed in the laboratory to be representative of in-place construction. Testing shall conform to California Test 644.
 6. Compression strength: ASTM C 1019, Standard Test Method for Sampling and Testing Grout. Strength testing for the prototype wall and existing injected wall shall be performed at 7, 14, and 28 days. All test results shall be certified by the Injection Contractor's CIF/Injection Engineer. Compression at 28 days shall not be less than 1,000 psi nor greater than 1,500 psi. Test on prototype wall shall be conducted for each batch of CIF material injected. Test on CIF material mixed on job site shall be conducted for every 3,000 lbs. of bagged CIF material used.
- F. Post Installation Testing:
1. The Injection Contractor shall conduct non-destructive verification of CIF penetration on the existing walls that received CIF injection using pulse-echo, infrared thermography, microwave radar, or through-wall pulse velocity measurements as determined by the CIF/Injection Engineer.
 2. Results of quality verification testing shall be kept in a Log Book showing areas inspected, approximate dimensions, how areas were chosen for inspection, test equipment used, results of nondestructive tests, and actions taken at locations found to be in non-compliance with these specifications. The Log book shall be keyed to a plan view of the floor level, room number, and elevation view of the walls with inspected areas drawn on the elevation view of each wall. The Log Book shall be submitted and approved by the CIF/Injection Engineer.
 3. The Injection Contractor shall determine the number and location of such tests by a random statistical process and shall submit the number and location of tests to the Architect for review and approval before beginning these tests. Approximately ten (10) percent of the injection area is to be tested to verify injection penetration.

- G. Post Installation Testing:
1. After all work is completed for each building, the Architect, Injection Contractor, and CIF/Injection Engineer shall inspect the masonry structures for any damages caused by the Contractor, any unpatched bolt holes, discolored brick due to injection spills, leakage, etc. The Injection Contractor shall make all required repairs. The Contractor shall submit a written report that the inspection was conducted, who was present for the inspection, obtain signatures from those present, and submit the inspection report for approval.

PART 2 - PRODUCTS

2.01 CIF COMPONENT MATERIALS

- A. CIF mix design shall be determined by testing performed on the prototype wall and existing masonry structure as described here-in.
1. All CIF mix formulations shall be non-shrink, non-chloride, non-corrosive, and have similar (compatible) properties as the masonry walls being repaired.
 2. CIF mix formulations that include additives or components that create moisture barrier problems or have plastic polymeric material characteristics will be rejected unless the Contractor can prove that the plastic polymeric material characteristics do not create short or long term moisture barrier problems, and have the same thermal characteristics as the existing masonry.
 3. Each CIF mix formulation used for injection testing on the prototype wall shall contain a different color for visibly determining the extent of penetration for each mix.
- B. Low-alkali Portland Cement, Type I/II or III conforming to ASTM C 150.
- C. Aggregate selection will be determined by the CIF/Injection Engineer.
1. Washed and graded sand aggregate must be free of organic materials and may contain no more than 1.0% (by weight) of deleterious substances as described in Section 5 and 6 of ASTM C 404 Standard Specification for Aggregates for Masonry Grout. Graded sand shall be in a damp and loose condition before use.
- D. Class F fly ash conforming to ASTM C 618.
- E. Type S lime conforming to ASTM C 5.
- F. Water: Clean, potable, free of deleterious amounts of acids, alkalis, or organic material conforming to ASTM C 94.

2.02 MATERIAL FLOW, MIXING, AND STORAGE OF CIF MATERIAL

- A. Material flow shall be calibrated daily by flow cone tests.
- B. No hand-mixing or small (200 pound or less packages) mixes will be allowed except for material within 20 inches of windows, doors or wall terminations, or secondary fine material injection, if additional mixes are required.

- C. Pre-blended CIF pre-packaged 1,000 lb. waterproof bags shall be stored in a covered location, off the ground, protected from environmental moisture. Access to the area shall be sufficient to off load pallets of material using a forklift. Materials and equipment shall be protected from freezing, as necessary.

2.03 EQUIPMENT

- A. CIF Injection Equipment: The equipment for injection of the CIF shall be clean, in good working order, and include all necessary components for the successful completion of the masonry injection. A positive displacement, non-piston pump, capable of maintaining a consistent regulated pressure shall be used for injection work. Equipment shall be pressure-limited, and verified by the CIF/Injection Engineer to be correctly calibrated to positively prevent a buildup of pressure within the building wall. Maximum pressure measured at the wall face shall be determined by the CIF/Injection Engineer. In order to prevent damage to the existing masonry, injection equipment shall not exceed an injection pressure beyond 29 psi (2 Bar) when measured at the wall. The injection pump shall be equipped with pressure gauges to accurately monitor CIF pressures, sized to enable continuous injection. Equipment for injection shall be low pressure range, self-dosing with automatic pressure shutoffs and pressure valves at the pump and the wall. Equipment shall include mixers, pumps, hoses, nozzles, pressure gauges, and be capable of continuously pumping and agitating the grout.
- B. Dry Core Boring Equipment: Equipment for drilling shall be wall mounted, non-percussive drills operating at 450 to 750(max.) RPM capable of long-bore drilling operation. Equipment used shall not cause damage to the existing walls. Any use of materials to enhance drilling shall not be detrimental to the existing wall construction or proposed injection materials. Vibrations shall be eliminated by all means necessary. Cutting crown segment used in coring for the hollow injectable steel anchor rods shall be custom-fitted cutting crowns capable of being re-tipped on site with segments positioned, as determined by the CIF/Injection Engineer according to wall conditions. In order to minimize vibration and dust, segments utilizing solely natural and/or synthetic diamonds will not be permitted.

2.04 STAINLESS STEEL SPIRAL WALL TIES AND ENHANCEMENT ANCHOR ROD ASSEMBLIES

- A. Injected Masonry Spiral Wall Ties: Shall be approximately 1mm gauge by 7.8 mm wide with a center stiffening helix formed from cold-twisted stainless steel, Type 304 or equivalent. The tube containment material shall be Nylon 319 psi (22 Bar), or suitable equivalent. The spiral wall tie injection tubes are to be factory-attached to the masonry anchorage and enhancement assembly. Tubes must be free and clear and be inspected for continuity.
- B. Fabric Containment Sock: The sock must be capable of 150% expansion. The sock to reinforcement member connection must be able to withstand an internal pressure of 58 psi (4 Bar). The containment "sock" for the hollow stainless steel enhancement anchor rods shall be sized by the CIF/Injection Engineer. Geotextile fabric will not be permitted.
- C. Injectable Stainless Steel Enhancement Anchor Rods with Hollow Center Stainless steel type 304 (minimum), conforming to ISO 10208, 1999(E), manufactured to the following standards:

maximum 0.07% Carbon, Silicon 1.0%, Sulphur 0.03%, Manganese 2.0%, Phosphorus 0.045%, with minimum 16.5% Chromium, or ASTM A 955, Grade 60, with irregular projecting (deformed) profile to increase outside surface area. The anchor rod shall be assembled on site from three (3) Meter lengths (or other approved length) and joined with couplers. Coupler shall be capable of developing the full cross sectional area of the anchor rod in tension. The anchor rod shall incorporate spacers to ensure that the anchor remains centered on the drilled hole. In-situ testing of grout outlet performance will be required before anchor installation commences. The bottom of the vertical anchors will incorporate a welded stainless steel threaded retention fitting capable of developing the full cross sectional area of the anchor rod and centering the rod on the cored hole bottom. The fitting diameter will be a minimum of 2mm less than the anchor rod cored hole diameter. The vertical anchor rod length shall not be less than the full-height of the wall and foundation plus the distance required for connecting to a structural steel element as detailed on the contract drawings, including the depth of the tapered connection formed by the Tapor-Loc drill assembly or other approved connection detail which produces similar strength properties which are compatible with the existing structure and CIF process. Horizontal injectable anchor rods shall be the length indicated on the contract drawings and approved shop drawings. Provide injectable stainless steel enhancement anchor rods with hollow center, including couplings and retention fittings.

PART 3 - EXECUTION

3.01 PRE-INJECTION EVALUATION

- A. An evaluation of the existing masonry material condition shall be conducted by the Injection Contractor and the CIF/Injection Engineer. The initial evaluation will utilize non-destructive methods using microwave radar, mapping the extent and size of any visible surface cracks, mortar joint delaminations, cracked or spalled units, or other visible surface damage which may have an effect on spiral wall tie performance, CIF containment or the spiral wall tie installation process. Include in the evaluation any situations requiring special treatment prior to spiral wall tie installation, such as interior voids or unstable zones.

3.02 WALL PREPARATION

- A. Surface Repairs Prior to Injection: Refer to Division 04 for historic masonry restoration. Prior to start of masonry anchorage work, restoration of masonry joints shall be evaluated by the Injection Contractor and CIF Engineer.

3.03 CIF MATERIAL MIXING

- A. Mix all CIF component materials according to the mix design(s) established by the CIF/Injection Engineer. Monitor flow of the CIF using appropriate quality control procedures to maintain mix stability. Flow properties must meet specification requirements for leaving voids no larger than a two (2) inch sphere. If the measured CIF flow rate varies by more than 10% from the rates established during injection testing on the prototype wall, discard the entire CIF batch. CIF shall not be used longer than one (1) hour after mixing and testing.

3.04 SPIRAL WALL TIE INJECTION

- A. **Spiral Wall Tie Location:** Provide spiral wall ties at a minimum spacing of one (1) for every 2.67 square feet. All locations of spiral wall ties shall be premarked with washable chalk. All locations shall be specified by the CIF/Injection Engineer, and shall occur only at the junction of an existing head and bed mortar joints. Holes drilled for the spiral wall ties shall be a maximum diameter of 12mm. The hole shall not drill into the stretcher unit side of the mortar joint junction. All holes shall be tangential to the stretcher without intruding on the whole brick and shall be centered on the head joint.
- B. **Spiral Wall Tie Flushing:** Flush the holes drilled to receive the spiral wall ties, and soak the injection tube assembly with potable water. During the flushing procedure, water must flow freely into each injection tube. If a hole is totally or partially blocked, remove and install a new injection tube. Do not allow water pressure to build in excess of fourteen (14) psi (0.965 bar) during flushing.
- C. **Injecting Spiral Wall Ties:** Immediately prior to CIF spiral wall tie injection (within ten (10) minutes) spray the exterior masonry surface lightly with water to prevent CIF adhesion. Keep a water hose and brush on hand during injection for cleaning any CIF spills from the masonry surface. Any CIF or "milk" on the wall must be washed off immediately. Surface cleaning shall be performed during spiral wall tie and CIF injection by immediately flushing any CIF from the masonry surface with water. Immediately following the injection of either the spiral wall ties or the wall with CIF, remove any remaining surface stains using water and a non-metallic bristle brush. Follow manufacturer's recommendations for CIF mixing and delivery. Injection pressure of CIF shall not exceed 29 psi (2 bar). Begin injection at lowest most location and proceed across the work area and up placing, flushing and injecting the spiral wall ties until all areas have been injected. CIF wall tie injection will typically begin at the lower-most location. Ports located above and to the side of the injection hole must be plugged only when CIF flows freely from that port. Proceed with injection of the next spiral wall tie as described above until all anchors in the designated repair area have either been injected or plugged.
- D. **Wall Injection with CIF:** The CIF/Injection Engineer will be responsible for establishing appropriate injection port location, size, depth and fill sequence in accordance with the requirements demonstrated by the prototype panel. When Injection port size in accordance with the Injection Engineer's protocol is in excess of 12 mm, face brick shall be removed so that the port may be hidden behind the removed brick unit. In these instances, the brick will be removed by the Injection Contractor to accommodate the injection port without damaging adjacent brick. The brick will be kept at a secure location and installed in accordance with Division 04 historic masonry restoration. Injection with CIF typically will begin with the lowest most injection port, with the exception of injection ports around windows, doors, corners, setbacks, alcoves and coves at which the Injection Contractor has been instructed by the CIF/Injection Engineer to inject in prior order. In the event that a second CIF mix is required using a finer aggregate, all course injection shall be completed in the work area before the second CIF mix is injected. In the course of injection, dam CIF at full ports by using wood damming dowels as instructed by the CIF/Injection Engineer's protocol. Each port shall be injected to refusal, as indicated by CIF flowing from an adjacent injection port or refusal of the present port to accept more CIF. Allow CIF to stiffen but not set before removing dowels from injection holes; time period shall be as specified by the CIF/Injection Engineer. All recessed (only) injection port holes in mortar joints shall be re-pointed. The injection hole shall be flushed with water and shall be damp, but not

saturated, prior to re-pointing. Point with a mortar similar in color and composition, after curing, to the original mortar firmly into injection holes and tool to match the surrounding mortar.

3.05 CORED HOLES AND CIF INJECTION INTO HOLLOW STAINLESS STEEL ENHANCEMENT ANCHOR ROD

- A. **Injectable Enhancement Anchor Rods:** The net cross section capacity of the hollow stainless steel enhancement anchor rods shall meet or exceed the cross section capacity of the deformed steel reinforcing shown on the contract drawings. The anchor rods shall be injected through the hollow center of the rod. The CIF will be introduced through the top of the anchor and exit at the base of the hollow stainless steel anchor rod. The CIF will inflate the factory installed fabric containment sock as it flows upward, expelling all air as it flows. The containment sock shall be filled with pressurized CIF where the pressure will be held for a time period as specified by the CIF/Injection Engineer, allowing the CIF "milk" to percolate into any micro pores of the masonry.
- B. **Coring Existing Masonry:** After the Contractor and the CIF/Injection Engineer's pre-injection examination of the existing conditions, installation of the stainless steel spiral wall ties and CIF wall injection remedial work shall be completed per the CIF/Injection Engineer's protocol. Minimum edge distance from edge of hole to face of brick shall not be less than two (2) inches. After completion and verification of the remedial work by the CIF/Injection Engineer, coring utilizing a non-irrigated, air-cooled, dry system may proceed. **ONLY A NON-IRRIGATED, AIR-COOLED, DRY SYSTEM WILL BE PERMITTED DUE TO THE POSSIBILITY OF EROSION AND UNDERMINING.** Percussive or vibratory methods will not be permitted. Cored material must be completely removed by method(s) that will insure no remnants of the core remain in the hole. When the vertical holes have been drilled to the correct depth, the base of the hole shall be reamed using equipment which will provide a positive, tapered core wall with a slope of at least five (5) degrees (wider at the bottom than the top) approximately twelve (12) inches in length providing a positive tension connection at the base of the anchor. The anchorage at the base of the anchor rod in the footing must provide for the full mobilization of the hollow stainless steel anchor rod. Tapering the slope of the cored hole wall shall be performed using a Tapor-Lok drill assembly as manufactured by Gruenstark International or approved equal.
- C. Only tapered wall holes will be used in the footings. No substitutions will be permitted.
- D. **Control of Dust Emissions:** Core drillers shall maintain negative pressure (vacuum) at holes undergoing the coring process. Dust emissions shall be evacuated to a container for legal disposal.
- E. **Containment "sock" for CIF:** The containment sock shall be checked by the CIF/Injection Engineer prior to placement to ensure that it is securely attached and undamaged.
- F. **Flushing Prior to Injection:** When operating outside in hot weather conditions, with temperatures greater than 90 F, additional water shall be sprayed inside of each cored hole to cool and partially saturate the masonry prior to injection.

- G. Injection of Hollow Stainless Steel Enhancement Anchor Rod Assemblies: The enhancement anchor rod installer is to maintain an injection pressure in order to completely fill the core hole and all anchor components. The maximum injection pressure shall be as specified by the CIF/Injection Engineer. Injection pressure shall not damage existing wall construction. Any damage resulting from CIF injection shall be repaired at the expense of the Injection Contractor. For the enhancement anchor rods, the CIF shall be injected from the top of the wall, through the hollow stainless steel enhancement anchor rod to the bottom of the cored hole and up the cored hole, around the rod within the containment sock. The CIF/Injection Engineer is responsible for determining the required protocol for the injection, including the order of work sequence for installing the anchor rods. Injected CIF will stiffen rapidly after placement: injection of each lift shall proceed in continuous fashion, with no time lapse of more than three (3) minutes during injection of any single lift.

3.06 TOP OF WALL CONDITIONS

- A. The hollow stainless steel enhancement anchor rods are shall provide for connections to steel framing as shown on the drawings. Anchor rods shall extend a minimum of four (4) inches above the top of wall anchor plate for attachment to the existing roof truss connection plate.

3.07 POST INSTALLATION TESTING AND INSPECTION

- A. Post Installation Testing: The Injection Contractor shall conduct non-destructive testing and inspection of CIF penetration on the existing walls that received CIF injection using pulse-echo, infrared thermography, microwave radar, or through-wall pulse velocity measurements as determined by the CIF/Injection Engineer and report the results according to requirements in paragraphs SUBMITTALS section and QUALITY CONTROL section. Non-destructive measurements and visual inspection by the Injection Contractor shall confirm the presence of CIF around the masonry anchoring and enhancement system and adhesion of CIF within the existing masonry. Where confirmation cannot be made or evidence of incomplete adhesion is found inspection holes shall be drilled to verify CIF by borescopic examination. Locations where CIF is not found to meet the specifications shall be re-injected and subsequently reinspected.
- B. Post Installation Testing: The Injection Contractor is responsible for cleaning and repairing any damages to the existing structures, including repairs/replacement of bricks removed, bolt holes repaired, and cleaning etc. in accordance with Division 04 for historic masonry restoration. After all work is completed, the Architect, Contractor, Injection Contractor, and CIF/Injection Engineer shall inspect the masonry structures for any damages caused by the Contractor, any unpatched bolt holes, discolored brick due to injection spills, leakage, etc. The Injection Contractor shall make all required repairs.
- C. Project Close-Out: The Injection Contractor and CIF/Injection Engineer shall coordinate project closeout thru review of the documentation of the masonry work with the Architect. The review will include a signed statement that the requirements of the design documents with regard to the work for masonry anchorage and enhancement have been met along with the quality verification, the Log Book, and sketches. At work completion the Contractor shall provide As-built Drawings. Refer to paragraph, "SUBMITTALS".

3.08 WALL CLEANING

- A. Surface cleaning shall be conducted during injection by immediately flushing any CIF from the masonry surface with water. Immediately following completion of the injection process, remove any remaining surface stains using water and a stiff, non-metallic bristle brush.
- B. Allow CIF to stiffen but not set before removing dowels from injection holes; an elapsed time of 30 minutes to 60 minutes is sufficient. All injection holes left in mortar joints must be repointed. The injection hole should be flushed with water and should be damp, but not saturated, prior to re-pointing. Point a mortar similar color and composition to the original mortar firmly into injection holes and too to match the surrounding mortar.

END OF SECTION

STRUCTURAL STEEL**SECTION 05120****PART 1 – GENERAL**

1.01 SUMMARY

- A. Scope: This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.
- B. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
- C. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

1.02 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
 - 1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
 - 2. High-strength bolts (each type), including nuts and washers.
 - 3. Structural steel primer paint.
 - 4. Shrinkage-resistant grout.
- C. Shop drawings prepared under supervision of a Louisiana licensed Structural Engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
 - 1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size, length, and type of each weld.
 - 2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.
 - 3. See Section Submittals for shop drawings requirements. Reproductions made from contract drawings will not be accepted. Submit three prints with each submittal. Two marked-up prints will be returned. Review of shop drawings by the Architect/Engineer will be for general compliance with contract documents. No responsibility will be assumed for correctness of dimensions, quantities or details.
 - 4. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.
 - 5. All shop drawings used in the field must bear the Architect/Engineer shop drawings review

stamp with "Approved" indicated.

- D. Mill Test Reports: Submit manufacturer's certified test reports to the testing laboratory and architect showing chemical analysis and results of tensile and bending tests. Tests shall meet the requirements of ASTM A6/A6M.
- E. Test reports conducted on shop- and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.

1.03 QUALITY ASSURANCE

- A. Standard Specifications: Except as modified or supplemented by these specifications, materials, design, fabrication, and erection of Structural Steel shall be in accordance with the American Institute of Steel Construction's "Specifications for Structural Steel for Buildings, Allowable Stress Design and Plastic Design", June 1, 1989, and the A.I.S.C. "Code of Standard Practice for Steel Buildings and Bridges", September 1, 1986. A.I.S.C. "Manual of Steel Construction, Allowable Stress Design", Ninth Edition.
- B. Codes and Standards: Comply with provisions of following, except as otherwise indicated:
 - 1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges."
 - a. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence:
"This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as a part of his preparation of these shop drawings."
 - 2. AISC "Specifications for Structural Steel Buildings," including "Commentary."
 - 3. "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Structural Connections.
 - 4. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."
 - 5. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."
- C. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.
 - 1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
 - 2. If re-certification of welders is required, retesting will be Contractor's responsibility.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.
- B. Structural Steel Shapes, Plates, and Bars: ASTM A 572 Grade 50.
- C. Cold-Formed Steel Tubing: ASTM A 500, Grade B, min. $f_y = 46$ ksi.
- D. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501, min. $f_y = 35$ ksi.
- E. Anchor Bolts: ASTM A 307, non-headed type unless otherwise indicated.
- F. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.
 - 1. Provide hexagonal heads and nuts for all connections.
- G. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows.
 - 1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A 325.
 - 2. Where indicated as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B 695, Class 50, or hot-dip galvanized complying with ASTM A 153.
- H. Electrodes for Welding: Comply with AWS Code.
 - 1. Welding electrodes for manual shielded metal-arc welding shall conform to AWS A5.1 or A5.5 E70XXX welding electrodes and flux used in submerged arc process shall conform to AWS A5.17 F7X-EXXX. Use low hydrogen electrodes for A572 steel.
- I. Structural Steel Primer Paint: Rust-inhibitive conforming to Fed. Spec. TT-P-664 and be compatible with finish paint systems.
- J. Cement Grout: Portland cement (ASTM C 150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 2.0 parts sand, by

volume, with minimum water required for placement and hydration.

- K. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, non-corrosive, non-staining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.

2.02 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
 - 1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
 - 2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.
- B. Connections: Weld or bolt shop connections, as indicated.
 - 1. Bolt field connections, except where welded connections or other connections are indicated.
- C. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.
- D. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.
 - 1. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.
 - 2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.03 SHOP PAINTING

- A. General: Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.
 - 1. Do not paint surfaces to be welded or high-strength bolted with friction-type connections.
 - 2. Do not paint surfaces scheduled to receive sprayed-on fireproofing.
 - 3. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- B. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils. Use

painting methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.04 GALVANIZING

- A. Items shown on the plans to be galvanized and bolts for same shall be hot dip zinc coated after fabrications. Galvanizing shall be done in accordance with A.S.T.M. Serial Designation A123 and A153. Any zinc coating that is damaged shall be touched up with Galvacon as manufactured by Southern Coatings in accordance with the manufacturer's recommendations.

2.05 SOURCE QUALITY CONTROL

- A. General: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 - 1. Promptly remove and replace materials or fabricated components that do not comply.
- B. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.
 - 1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

PART 3 - EXECUTION

3.01 ERECTION

- A. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary Members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.
- B. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.
- C. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.
 - 1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
 - 2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate

- prior to packing with grout.
3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
 4. For proprietary grout materials, comply with manufacturer's instructions.
- D. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure within specified AISC tolerances.
 2. Splice members only where indicated and accepted on shop drawings.
- E. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.
1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 2. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- F. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.
- G. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.
1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.02 QUALITY CONTROL

- A. The Owner will engage an independent testing and inspection agency to inspect high-strength bolted welded connections and to perform tests and prepare test reports.
1. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.
 2. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
 3. Testing agency may inspect structural steel at plant before shipment.
- B. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.
- C. Shop-Bolted Connections: Inspect or test in accordance with AISC specifications.

Verify that gaps of installed Direct Tension Indicators are less than gaps specified in ASTM F 959, Table 2.

D. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
2. Perform visual inspection of all welds.
3. Perform tests of welds as follows.

Ultrasonic Inspection: ASTM E 164.

E. Field-Bolted Connections: Inspect in accordance with AISC specifications.

F. Field Welding: Inspect and test during erection of structural steel as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
2. Perform visual inspection of all welds.
3. Perform tests of welds as follows:
Ultrasonic Inspection: ASTM E 164.

END OF SECTION

STEEL DECKING**SECTION 05300****PART 1 - GENERAL**

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

- A. All steel decking as shown on the drawings.
- B. Standing Seam Metal Roofing, if required by the drawings, is specified in Division 7.

1.03 QUALITY ASSURANCE

- A. Standard Specifications: Except as modified or supplemented herein, the decking shall be designed in accordance with the latest edition of AISI "Specifications for the Design of Cold-Formed Steel Structural Members and all applicable requirements contained in "Design Manual for Composite Decks, Form Decks and Roof Decks" of the Steel Deck Institute, Inc.
- B. Testing – Contractor's independent testing laboratory shall witness all welded connections.

1.04 SUBMITTALS

- A. Manufacturer's Data: For information only, submit 2 copies of manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certifications as may be required to show compliance with these specifications.
- B. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details, and conditions requiring closure panels, supplementary framing, cut openings, special jointing or other accessories. Submit three prints. Two marked-up prints will be returned. Refer to Division 1 requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Deck, Dimensions and Properties: Dimensions and properties of the various types of deck are shown on the drawings. Deck configurations shall be similar to that of the decks called for on the drawings. Allowable stresses shall be equal to that of the deck specified on the drawings.
- B. Deck Coating: Galvanized, ASTM A525, G90.
- C. Miscellaneous Steel Shapes: ASTM A36.

- D. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Deck sheets shall be erected and welded to supports in accordance with the manufacturer's specifications and erection layouts and as required to resist the uplift loads, if any, noted on the drawings.
- B. Side joints must be fastened together in accordance with manufacturer's specifications. Cutting openings through the deck less than 16 square feet in area, and all skew cutting shall be performed in the field. Deck shall be continuous over three (3) or more spans.
- C. Except where other permanent type edge closures are shown on the drawings, provide sheet metal edge closures around the perimeter of all steel deck areas, including openings, where concrete is to be applied to the deck. Deck closures shall be of proper gage and configuration to retain the wet concrete.

3.02 TOUCH-UP

- A. All damaged coating, including welds, shall be touched up with an approved coating before placing fill.

END OF SECTION

METAL FABRICATIONS**SECTION 05500****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Shop fabricated ferrous metal items, galvanized and prime painted with principal items listed below. Refer to Drawings for items not specifically listed.
 - 1. Rough hardware
 - 2. Ladders (including elevator pit ladders and exterior galvanized ladder).
 - 3. Loose steel lintels.
 - 4. Miscellaneous framing and supports.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

- A. Division 3 - Concrete: Work: Placement of metal fabrications in concrete.
- B. Section 04200 - Unit Masonry System: Placement of metal fabrications in masonry.

1.03 RELATED SECTIONS

- A. Section 05120 - Structural Steel: Structural steel column anchor bolts.
- B. Section 05510 - Prefabricated Metal Stairs: Prefabricated stairs and railings.
- C. Section 05522 - Handrails and railings systems.
- D. Section 09900 - Painting: Paint finish.

1.04 REFERENCES

- A. ASTM A36 - Structural Steel.
- B. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- C. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.
- D. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A283 - Carbon Steel Plates, Shapes, and Bars.
- F. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.
- G. ASTM A325 - High Strength Bolts for Structural Steel Joints.
- H. ASTM A386 - Zinc-Coating (Hot-Dip) on Assembled Steel Products.

- I. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- J. AWS A2.0 - Standard Welding Symbols.
- K. AWS D1.1 - Structural Welding Code.
- L. SSPC - Steel Structures Painting Council.
- M. Fed. Spec. FF-S-325 - Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry).
- N. Fed. Spec. FF-P-395 - Pin, Drive, Guided and Pin Drive, Power Actuated (Fasteners For Power Actuated And Hand Actuated Fastening Tools)
- O. Fed. Spec. FF-B-588 - Bolt, Toggle; and Expansion Sleeve, Screw.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.06 QUALIFICATIONS

- A. Fabricator Qualifications: Firm experienced in producing metal fabrications similar to those indicated for this project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the work.
- B. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the project is being constructed.
- A. Welders Certificates: Submit under provisions of Section 01300, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.07 FIELD MEASUREMENTS

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Steel Sections: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Plates: ASTM A283.
- D. Pipe: ASTM A53, Grade B, Schedule 40.
 - 1. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A53.
- E. Fasteners:
 - 1. Power Actuated Drive Pins: Fed. Spec. FF-P-395, style to suit material.
 - 2. Expansion Bolts (Shields): Fed. Spec. FF-S-325, except lead, fiber and plastic shields are not acceptable. Furnish bolts and screws required.
 - 3. Toggle Bolts: Fed. Spec. FF-B-588, except wire wings are not acceptable.
- F. Bolts, Nuts, and Washers: ASTM A325 or A307 as appropriate, galvanized to ASTM A153 for attachment to galvanized components.
- G. Gray-Iron Castings: ASTM A48, Class 30
- H. Malleable-Iron Castings: ASTM A47, Grade 32510 (ASTM A47M, Grade 22010).
- I. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E488, conducted by a qualified independent testing agency.
- J. Welding Materials: AWS D1.1; type required for materials being welded.
- K. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications equal to products as follows:
 - 1. B-6 Construction Grout; W. R. Bonsal Co.
 - 2. Euco N-S Grout; Euclid Chemical Co.
 - 3. Five Star Grout; Five Star Products
 - 4. Crystex; L & M Construction Chemicals, Inc.
 - 5. Masterflow 928 and 713; Master Builders Technologies, Inc.
 - 6. Sealtight 588 Grout; W. R. Meadows, Inc.
 - 7. SonogROUT 14; Sonneborn Building Products-ChemRex, Inc.

2.02 PAINT

- A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
 - 1. Provide organic zinc rich primer complying with FS SSPC 20, Type II, at exterior work and work built into exterior walls.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.03 FABRICATION - GENERAL

- A. Fit and shop assemble in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- G. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling

limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.04 FINISHES

- A. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Interiors (SSPC Zone 1A): SSPC-SP 3 "Power Tool Cleaning".
- B. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
- C. Galvanize in accordance with ASTM A123 or ASTM A386, as applicable. Provide minimum 1.25 oz/sq ft galvanized coating.
 - 1. Galvanize all items exposed to the exterior or built into exterior wall/roof construction.
 - 2. Do not apply passivating treatment for items which receive paint finish after erection.

2.05 ROUGH HARDWARE

- A. Furnish bent or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.06 STEEL LADDERS

- A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with requirements of ANSI A14.3 and OSHA.
- B. Siderails: Continuous steel flat bars, 3/8 inch x 3 inches, with eased edges, spaced 20-1/4 inch apart. At elevator pits, extend siderails 42 inches above floor/parpet level
- C. Bar Rounds: Round steel bars, 1 inch diameter, spaced 12 inches o.c.

- D. Crossover Platform: Steel supports indicated on the Drawings with non-slip raised pattern checker plate floor
- E. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
- F. Support each ladder at top and bottom and at intermediate points spaced not more than 4-0" o.c. by means of welded or bolted steel brackets.
 - 1. Size brackets to support design dead and live loads required and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches.

2.07 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.08 LOOSE STEEL LINTELS

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels for equal bearing of 1 inch per foot (85 mm per meter) of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.
- D. Provide lintels at all openings for mechanical and electrical penetrations of masonry partitions whether specifically indicated or not to provide support of the openings.

2.09 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - 2. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- C. Center nosings on tread widths with noses flush with riser faces and tread surfaces.
- D. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components indicated on Drawings or shop drawings as follows:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- D. Perform field welding in accordance with AWS D1.1.
- E. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- F. Cutting, Fitting, and Placement: Perform cutting, drilling and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and

elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- G. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- H. Obtain Architect approval prior to site cutting or making adjustments not scheduled.

3.04 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a 2.0 mil minimum dry film thickness.
 - 2. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Section 09900 - Painting.
 - 3. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A780.

3.05 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

METAL ALTERNATING TREAD STAIRS**SECTION 05515****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Pre-engineered steel alternating tread stair system complete with handrails, treads, railings and all supports independent of main building structural framing.

1.02 DESIGN REQUIREMENTS

- A. Fabricate stair assembly to comply with requirements of the 2000 edition of the International Building Code and City of New Orleans supplements and as follows, whichever is the most stringent: support live load of 100 lb/sq ft with deflection of stringer or landing framing not to exceed 1/180 of span and a concentrated load of 300 lbs. placed upon an area of 2-1/2 feet square or so located as to produce maximum stress condition.
- B. Size and Spacing of Handrails: The diameter or width of the gripping surfaces of a handrail shall be 1-1/4 inch to 1-1/2 inch or the shape shall provide an equivalent gripping surface. If handrails are mounted adjacent to a wall, the space between the wall and the grab bar shall be 1-1/2 inch.
- C. Railing assembly, wall rails, and attachments to resist a horizontal thrust of 50 lbs. per ft. at the top of the railing and as follows, without damage or permanent set. The following is a requirement of article 4.26 of Federal Register, Vol. 56 No. 144, July 26, 1991, Rules and Regulations.
 - 1. Bending stress in a handrail induced by the maximum bending moment from the application of 250 lbf shall be less than the allowable stress for the material of the handrail.
 - 2. Shear stress induced in a handrail by the application of 250 lbf shall be less than the allowable shear stress for the material of the handrail. If the connection between the handrail and its mounting bracket or other support is considered to be fully restrained, then direct and torsional shear stresses shall be totaled for the combined shear stress, which shall not exceed the allowable shear stress.
 - 3. Shear force induced in a fastener or mounting device from the application of 250 lbf shall be less than the allowable lateral load of either the fastener or mounting device or the supporting structure, whichever is the smaller allowable load.
 - 4. Tensile force induced in a fastener by a direct tension force of 250 lbf plus the maximum moment from the application of 250 lbf shall be less than the allowable withdrawal load between the fastener and the supporting structure.
 - 5. Handrails shall not rotate within their fittings.

1.03 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate profiles, sizes, supports, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
- C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.04 QUALIFICATIONS

- A. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana.
- B. Welders' Certificates: Submit under provisions of Section 01300 certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 FIELD MEASUREMENTS

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

PART 2 - PRODUCTS

2.01 STAIR SYSTEM

- A. The Lapeyre steel alternating tread stair. The treads shall welded to the central stringer and to the handrails, creating an all-in-one welded unit.
- B. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes
- C. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- D. Steel Tubing: ASTM A 513.
- E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D
- F. Finish: Factory painted.
- G. Angle: 68 degrees
- H. Handrails: Factory finished steel Schedule 40 pipe, Standard Handrail (42" above landing) .

2.02 FABRICATION - GENERAL

- A. Fit and shop assemble in largest practical sections, for delivery to site.

- B. Fabricate components with joints tightly fitted and secured.
- C. Continuously seal jointed pieces by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- G. Accurately form components required for anchorage of stairs, landings and railings to each other and to building structure.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

- A. Clean and strip primed/finished steel items to bare metal where site welding is required.
- B. Supply items required with setting templates, to appropriate sections.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide anchors, plates, angles, hangers and struts required for connecting stairs to structure.
- C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments..
- D. Field weld components indicated on Drawings and shop drawings. Perform field welding in accordance with AWS D1.1.
- E. Field bolt to match shop bolting.. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- F. Mechanically fasten joints butted tight, flush, and hairline..

3.04 ERECTION TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

ORNAMENTAL HANDRAILS AND RAILINGS**SECTION 05522****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Ornamental custom exterior fabricated galvanized steel handrails, balusters and fittings with components indicated on the drawings. Also, provide cast iron assemblies where indicated on drawings, factory primed

1.02 RELATED SECTIONS

- A. Section 05500-Miscellaneous Metal: For metal handrail anchorage other than specified in this Section.

1.03 REFERENCES

- A. ADA - American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).
- B. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- C. ASTM A283 - Carbon Steel Plates, Shapes and Bars.
- D. ASTM A386 - Zinc-Coating (Hot Dip) on Assembled Steel Products.
- E. ASTM 500 - Cold-Formed Welded and Seamless Carbon Steel Tubing and Shapes.
- F. AWS D1.1 - Structural Welding Code.

1.04 DESIGN REQUIREMENTS

- A. Comply with requirements of the American with Disabilities Act of 1990, Title III (Accessibility Regulations for Private Entities) and latest amendments (if any).
- B. Size and Spacing of Handrails: The diameter or width of the gripping surfaces of a handrail shall be 1-1/4 inch to 1-1/2 inch or the shape shall provide an equivalent gripping surface. If handrails or grab bars are mounted adjacent to a wall, the space between the wall and the grab bar shall be 2-1/4 inch. Handrails may be located in a recess if the recess is a maximum of 3 inches deep and extends to at least 18 inches above the top of the rail.
- C. Railing assembly, wall rails, and attachments shall resist a horizontal thrust of 50 lbs. per ft. applied to the top of the railing and as follows, without damage or permanent set.
 - 1. Bending stress in a handrail induced by the maximum bending moment from the application of 250 lbf shall be less than the allowable stress for the material of the handrail.

2. Shear stress induced in a grab bar by the application of 250 lbf shall be less than the allowable shear stress for the material of the handrail. If the connection between the handrail and its mounting bracket or other support is considered to be fully restrained, then direct and torsional shear stresses shall be totaled for the combined shear stress, which shall not exceed the allowable shear stress.
3. Shear force induced in a fastener or mounting device from the application of 250 lbf shall be less than the allowable lateral load of either the fastener or mounting device or the supporting structure, whichever is the smaller allowable load.
4. Tensile force induced in a fastener by a direct tension force of 250 lbf plus the maximum moment from the application of 250 lbf shall be less than the allowable withdrawal load between the fastener and the supporting structure.
5. Handrails shall not rotate within their fittings.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
- C. Samples: Submit two (2) samples of handrail finish.

1.06 FIELD MEASUREMENTS

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

PART 2 - PRODUCTS

2.01 STEEL RAILING SYSTEM

- A. Steel and Iron: Provide steel and iron in the form indicated complying with the following requirements:
 1. Tubing: Cold-formed, ASTM A500; or hot-rolled, ASTM A501.
 2. Steel Plate, Shapes and Bars: ASTM A 36/A 36M.
- A. Rails and Posts: Shapes indicated on Drawings, welded joints.
- B. Fittings: wall brackets, escutcheons; cast steel.
- C. Mounting: Brackets and flanges, with steel inserts for casting in concrete, with steel brackets for embedding in masonry. Prepare backing plate for mounting in drywall wall construction.

- D. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.
- E. Gray-Iron Castings: ASTM A48, Class 30
- F. Malleable-Iron Castings: ASTM A47, Grade 32510 (ASTM A47M, Grade 22010).
- G. Welding Materials: AWS D1.1; type required for materials being welded.

2.02 FABRICATION

- A. General: Fabricate handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of hollow members, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Fit and shop assemble components in largest practical sizes, for delivery to site.
- C. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- D. Fabricate components with joints tightly fitted and secured.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth.
- F. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- H. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- I. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.03 GROUT

- A. Nonshrink Nonmetallic Grout: Premixed, factory-pachaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section as follows:
 1. Euco N-S Grout; Euclid Chemical Co.
 2. Masterflow 713; Master Builders.
 3. SonogROUT; Sonneborn Building Products Div.

2.04 FINISHES

- A. Galvanize in accordance with ASTM A123 or ASTM A386, as applicable. Provide minimum 1.25 oz/sq ft galvanized coating.
 1. Galvanize all items exposed to the exterior or built into exterior wall/roof construction.
 2. Do not apply passivating treatment for items which receive paint finish after erection

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete and or embedded in masonry or placed in partitions with setting templates, to appropriate Sections.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions to comply with specified performance requirements.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Provide anchors, plates or angles required for connecting railings to structure. Anchor railing to structure.

- D. Field weld anchors as indicated on shop drawings. Grind welds smooth. Touch-up welds with specified galvanize primer.
- E. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- F. Adjust railings prior to securing in place to insure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
 - 1. Anchor post in concrete by means of pipe sleeves set and anchored into the concrete. Provide sleeves of galvanized, steel pipe, not less than 1/2" greater than the outside diameter of the inserted pipe post. Provide steel plate closure secured to the bottom of the sleeve, and of width and length not less than 1" greater than the outside diameter of the sleeve. After the posts have been inserted into the sleeves, fill the annular space between post and sleeve solid with non-shrink, non-ferrous grout. Cover anchorage joint with a round steel flange welded to the post.
- G. After erection, prime welds and abrasions of railings.

END OF SECTION

CARPENTRY**SECTION 06100****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Treated wood blocking in walls and roofs for miscellaneous nailers and supports, and framing lumber.
- B. Plywood sheathing where indicated on the drawings.
- C. Telephone and electrical panel backboards.
- D. Preservative and fire retardant treatment of wood.
- E. Hardware and attachment accessories.
- F. Factory finished wall and base cabinets for kitchens, reception area and vanities for bathrooms.

1.02 REFERENCES

- A. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.
- B. ANSI A208.1 - Mat Formed Wood Particleboard.
- C. APA: American Plywood Association.
- D. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- E. AWWA (American Wood Preservers Association) C1 - All Timber Products Preservative Treatment by Pressure Process.
- F. AWWA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.
- G. NHLA (National Hardwood Lumber Association).
- H. NWWDA (National Wood Window and Door Association) I.S.4 - Water Repellant Preservative Treatment for Millwork.
- I. NFPA: National Forest Products Association.
- J. PS 1 - Construction and Industrial Plywood.
- K. PS 20 - American Softwood Lumber Standard.
- L. SPIB: Southern Pine Inspection Bureau.

1.03 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories to a minimum scale of 1-1/2 inch to 1 ft
- C. Product Data: Provide technical data on wood preservative materials and application instructions.
- D. Certification of Treating Plant: Wood Preservatives: Submit certificate stating water-borne chemical and process used, net amount of preservative retained, and compliance with applicable standards. Include statement that moisture content of treated lumber was reduced to a maximum of 15% prior to shipment to site.

1.04 QUALITY ASSURANCE

- A. Rough Carpentry Lumber: Visible grade stamp, of agency certified by National Forest Products Association (NFPA).
- B. Lumber Standard: Comply with PS 20, except as otherwise indicated.
- C. Plywood Standard: Comply with PS 1, and APA grade trademarks.
- D. Factory mark each piece of lumber and plywood with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
- E. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.
- F. Pressure-treated lumber shall conform to AWWA requirements for preservative or fire-retardant treated materials. Treatment plant shall be licensed by manufacturer of treated material.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces.
- C. Stack lumber and plywood in a way to provide air circulation with stacks.

1.06 FIELD MEASUREMENTS

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

1.07 COORDINATION

- A. Coordinate the work with plumbing and electrical rough-in, installation of associated and adjacent components.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Lumber shall be sound, thoroughly seasoned and well manufactured in compliance with NFPA "National Design Specifications" for Stress Grade Lumber and its Fastenings.
 - 1. Each piece of lumber shall bear an identification stamp of the accredited test agency. Maximum moisture content: 19%.
- B. Softwood Plywood: Comply with PS1.
 - 1. Plywood Backing Panels (for mounting electrical or telephone equipment): Fire-retardant, C-D - plugged with exterior glue, Exposure 1, 3/4" thick, each piece bearing U.L. label.
 - 2. Plywood Sheathing APA - Rated Sheathing, Exposure 1 with exterior glue, thickness as indicated with span rating as required for spacing of framing members
- C. Miscellaneous Blocking: No. 2 Southern Yellow Pine, 15 percent maximum moisture content.

2.02 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fasteners: Hot-dipped galvanized steel for treated wood locations, unfinished steel elsewhere. Screw fasteners at the roof sheathing shall be long enough to penetrate the roof decking.
 - 2. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.

2.03 FACTORY WOOD TREATMENT

- A. Fire retardant: AWP Treatment C20, Interior Type, chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating of 25 /450.
 - 1. Provide at telephone and electrical backboards.
- B. Wood Preservative : AWP Treatment C2, ACQ (Alkaline Copper Quat) preservative, with a minimum of 0.40 lb/cu./ft. retainage. After treatment, kiln-dry lumber to a maximum moisture content of 19% .

1. To prevent deterioration of fasteners and anchors, all anchors and fasteners in contact with the treated wood and plywood shall be 300 series stainless steel, including fasteners for attachment of the treated wood and plywood, and also fasteners and anchors for securing building components (doors, windows, roofing, etc.) into and through the treated wood and plywood. Also, any treated wood in contact with aluminum and ferrous or galvanized steel products shall be isolated from the metal by installing a layer of self adhering modified bitumen sheet or equal (felt is not permitted) to the metal prior to installing the wood and plywood.
2. Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
3. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWWPA M4 to cut surfaces.

2.04 CABINETS

- A. Kitchen Cabinets, Reception Area: (full wood construction, no particle board)
Diamond Prelude Collection – “Lansing Maple”, Partial Overlay or Southeastern Architectural Woodworks - “Lagniappe cabinets”
Finish: Toffee Stain on Maple w/ Cocoa Glaze
Construction: ½” plywood sides, 3/8” plywood top, bottom, and solid back panel w/extra 3/8” plywood support rail, ¾” adjustable plywood shelving, fully concealed, six way adjustable hinge, ¾” wood dovetail drawer with undermount full access glides
Hardware: Belwith P2283-SN knobs at cabinets, Belwith P2281 – SN pulls at drawers
Warranty:
Kitchen Counter & Backsplash: Laminate plastic specified in Section 06410
- B. Bathroom Cabinet: (full wood construction, no particle board)
Diamond Prelude Collection – “Lansing Maple”, Partial Overlay or Southeastern Architectural Woodworks - “Lagniappe cabinets”
Finish: Toffee Stain on Maple
Construction: ½” plywood sides, 3/8” plywood top, bottom, and solid back panel w/extra 3/8” plywood support rail, ¾” adjustable plywood shelving, fully concealed, six way adjustable hinge, ¾” wood dovetail drawer with undermount full access glides
Hardware: Belwith P2281 – chrome pulls at drawers
Bathroom Counter: Cultured Marble, color as selected by designer

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Erect wood stripping and nailing members true to lines and levels with closure strips at all edges and openings. Do not deviate from true alignment more than 1/4 inch.

- B. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.
- C. Install cabinets and tops in strict accordance with manufacturers printed instructions attached to studs and blocking with screws. Erect plumb and levels coordinated with finish tops and appliances. Use fine finishing nails for exposed trim, countersunk and filled flush with woodwork, and matching final finish where transparent finish is required. Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Secure cabinet and counter bases to floor using appropriate angles and anchorages
- A. Install telephone and electrical panel boards with fire retardant treated plywood sheathing. Oversize the panels by 12 inches on all sides.
- B. Carefully scribe work abutting over components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- C. Construct members of continuous pieces of longest possible lengths.
- D. Place miscellaneous blocking true to lines and levels. Secure rigidly in place.
- E. Locations of Use for Decay and Insect Resistant Pressure Treated Lumber:
 - 1. Use pressure-treated decay and insect resistant lumber for blockings and nailing strips in contact with masonry, concrete, roofing, steel, framing setting on and in contact with concrete and blocking in contact with exterior wall openings.
 - 2. Apply two (2) drenching coats of preservative compatible with treatment to job cut edges of lumber.

3.02 INSTALLATION OF PLYWOOD

- A. Comply with recommendations of the American Plywood Association (APA), for the installation of plywood. Install sheathing as recommended by the APA's "Design/Construction Guide.

END OF SECTION

ENGINEERED LUMBER**SECTION 06140****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. This section includes all laminated veneer lumber as shown on the drawings.

1.03 QUALITY ASSURANCE

- A. Laminated veneer lumber shall be designed and manufactured to the standards set forth in the Council of American Building Officials (CABO) Report No. NER-126.

1.04 SUBMITTALS

- A. Shop drawings: Complete shop drawings showing the layout and details necessary for determining fit and placement in the structure shall be provided by the manufacturer. Reproductions made from contract drawings will not be allowed. Submit three prints to the Engineer. One will be kept as a record copy and two marked-up prints will be returned to the Architect. The Engineer will have up to ten (10) working days from the time of receipt of the submittal to complete his review and return the submittal to the Architect. Review of shop drawings by the Architect/Engineer will be for general compliance with contract documents. No responsibility will be assumed for correctness of dimensions, quantities or details.

PART 2 - PRODUCTS**2.01 MATERIAL**

- A. All materials used in the manufacture of laminated veneer lumber shall comply with CABO Report No. NER-126.
- B. Veneer species and thickness shall be those accepted by the above referenced standard. They shall be ultrasonically graded or graded by other advanced grading systems accepted by the standard.
- C. Adhesives shall be of the waterproof type conforming to the requirements of ASTM D- 2559.
- D. All hardware shall be as called for in the details and notes on the drawings.

2.02 DESIGN

- A. The laminated veneer lumber shall match the sizes and material properties indicated on the drawings.

- A. Refer to "QUALITY ASSURANCE".
- B. Laminated veneer lumber shall be manufactured by Trus Joist MacMillan or approved equal. It shall be manufactured in a continuous process with all grain parallel with the length of the member.

2.04 IDENTIFICATION

- A. The laminated veneer lumber shall be identified by a stamp indicating the product type, species and grade, CABO NER report number, manufacturer's name and plant number.

PART 3 - EXECUTION

3.01 ERECTION AND INSTALLATION

- A. Refer to "QUALITY ASSURANCE".
- B. Exercise care at all times to avoid damage to laminated veneer lumber due to careless handling during storage, delivery, unloading and installation. Protect from the weather, if stored.
- C. Members shall be installed plumb, adequately braced, in the proper orientation, and as specified in the design and erection drawings.
- D. Cutting of members or field alteration is not permitted.

END OF SECTION

ARCHITECTURAL WOODWORK**SECTION 06410****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Standing and running trim for paint finish
- B. Plastic laminate finished countertops; particleboard is not allowed
- C. Wood shelving, plywood shelving with paint finish ; see drawings for brackets
- D. Wood door frames and jambs for paint finish
- E. Interior and exterior custom panel wood doors for paint finish: Spanish cedar at exterior doors
- F. Kitchen cabinets and vanities are specified in Section 06100
- G. Provide all wood blocking required for attachment of architectural woodwork, complying with Section 06100

1.02 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Grounds and support framing.
- B. Division 15: Plumbing fixtures and trims.

1.03 REFERENCES

- A. ANSI/BHMA A1156.9 - Cabinet Hardware
- B. AWI - Quality Standards
- C. FS MM-L-736 - Lumber, Hardwood
- D. FS MMM-A-130 - Adhesive, Contact
- E. National Electrical Manufacturers Association (NEMA) LD3 - High Pressure Decorative Laminates
- F. PS-1 - Construction and Industrial Plywood
- G. PS-20 - American Softwood Lumber Standard

1.04 SUBMITTALS

- A. Submit under provision of Section 01300.

- B. Product data for each type of product and process specified and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- C. Shop Drawings: Include plans, indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location, schedule of finishes and as follows:
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking and hanging strips, including concealed blocking and reinforcing specified in other sections.
 - 3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
- D. Samples for initial selection of the following in the form of manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
 - 1. Plastic Laminates surface materials.

1.05 QUALITY ASSURANCE

- A. Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grades of interior architectural woodwork, construction, finishes, and other requirements.
- B. Prior to installation of custom casework, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.
- C. Provide custom casework and trim conforming to the following Architectural Woodwork Institute (AWI) Quality Standards as a minimum requirement:
 - 1. Standing and Running Trim:
 - a. Paint Finish: AWI Section 300 - Custom Grade
 - 2. Plastic Laminate Finished Countertops:
 - a. AWI Section 400C - Custom Grade
 - 3. Wood Shelving:
 - a. Finish: AWI Section 600 - Custom Grade
 - 4. Wood Door Frames:
 - a. Paint Finish: AWI Section 900B - Custom Grade

5. Wood Stile and Rail Panel Doors:
 - a. Paint Finish: AWI Section 1400 – Custom Grade

1.06 QUALIFICATIONS

- A. Fabricator: Company specializing in manufacturing the products specified in this section with minimum three (3) years documented experience.
- B. Installer Qualifications: Arrange for architectural woodwork installation by a firm that can demonstrate successful experience in installing architectural woodwork items similar in type and quality to those required for this Project.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle products to site under provisions of Section 01600.
- B. Protect units from moisture damage.

1.08 FIELD MEASUREMENTS

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

1.9 COORDINATION

- A. Coordinate the work with plumbing and electrical rough-in.

PART 2 - PRODUCTS

2.1 SOLID WOOD MATERIALS

- A. Softwood Lumber: PS 20; graded in accordance with AWI Custom grade average moisture content of 11 percent; species and grade as follows:
- B. Hardwood Lumber: FS MM-L-736; graded in accordance with AWI Premium; average moisture content of 11 percent; species and grade as follows:
 1. Paint Finish: Poplar.
 2. Exterior Paint Finish: Spanish Cedar

2.2 SHEET MATERIALS

- A. Plywood: PS 51; or graded in accordance with AWI, waterproof type glue recommended for application

2.3 LAMINATE MATERIALS

- A. Plastic Laminate: AWI 0.050 inch General Purpose quality, color, pattern, and surface texture as selected, high pressure application.
- B. Laminate Backing Sheet: 0.020 inch Backing Sheet grade, undecorated plastic laminate.

2.4 ACCESSORIES

- A. Adhesive: FS MMM-A-130 contact adhesive or type recommended by AWI or laminate manufacturer to suit application.
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.
- D. Concealed Joint Fasteners: Threaded steel.

2.5 FABRICATION

- A. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- C. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 1. Apply laminate cabinet linings to all interior surfaces.
- D. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- E. Mechanically fasten back splash to countertops with steel brackets at 16 inches on center.
- F. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

2.10 SHELVING HARDWARE

- A. Adjustable Shelf Standards and Related Supports: Provide standards and supports of type indicated which comply with ANSI/BHMA A156.9.

2.11 STILE AND RAIL DOORS

- A. Construction: AWI Sections 1400, Custom Grade for paint finish; finger joints are not permitted.
- B. Solid and Veneer Wood: Exterior doors, and frames shall be Spanish Cedar.
- C. Construction methods shall include panels tongue grooved into adjacent stiles and rails. Connecting joints between stiles, rails and mullions shall be doweled and glued under pressure using #1 PVA waterproof adhesive. Panels to be retained by solid sticking or an applied bead. Provide provisions for expansion and contraction of the door panels so not to be visible.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

- A. Set and secure casework in place; rigid, plumb, and level in accordance with AWI Section 1700.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose. Refinish cut surfaces or repair damaged finish at cuts.
- E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- G. Tops: Anchor securely to base units and other support systems as indicated. Calk space between backsplash and wall with specified sealant.
 - 1. Install countertops with no more than 1/8 inch in 96 inch sag, bow, or other variation from a straight line.
 - 2. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c.
- H. Install standing and running trim with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at inside returns, miter at outside corners to

produce tight fitting joints with full contact throughout length of joint, and comply with Quality Standards for joinery. Use scarf joints for end-to-end joints.

1. Install standing and running trim with no more than 1/8 inch in 96 inch variation from a straight line.
 - I. Anchor woodwork to anchors or blocking built-in or directly attached to substrate. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposed nailings, countersunk and filled flush with woodwork, and matching final finish where transparent finish is required.

3.03 ADJUSTING

- A. Adjust work under provisions of Section 01700.
- B. Adjust moving or operating parts to function smoothly and correctly.
- C. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.

3.04 CLEANING

- A. Clean work under provisions of Section 01700.
- B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION

CRYSTALLINE WATERPROOFING**SECTION 07145****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Apply crystalline waterproofing to elevator pits; all horizontal and vertical surfaces, and treatment of joints and penetrations. Provide slurry coat system. Permeable grout tubes injected with sealing material at all intersections of horizontal and vertical construction.
- B. Apply crystalline waterproofing to all existing plaster walls and concrete floors of the existing basement. Repair all plaster as required to provide a smooth surface and clean all surfaces as required and approved by the waterproofing manufacturer.

1.02 RELATED SECTIONS

- A. Division 3 - Concrete Work.
- B. Division 14 - Elevators.

1.03 REFERENCES

- A. Applicable standards; standards of the following as referenced herein:
 - 1. American Society for Testing and Materials (ASTM).
 - 2. Army Corps of Engineers (CRD).

1.04 SYSTEM DESCRIPTION

- A. Crystalline Waterproofing: Mix of Portland cement, fine treated silica sand and active proprietary chemicals which when mixed with water and applied as a cementitious coating, causes a catalytic reaction which generates a non-soluble crystalline formation of dendritic fibers within the pores and capillary tracts of concrete. This process shall cause concrete to become permanently sealed against the penetration of water or liquids from any direction.

1.05 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Product Data: Submit product data including installation methods for surface applications, treatment of penetrations and junctures, etc. for each type of product required, to demonstrate products comply with Contract Documents.
- C. Test Reports: Submit and obtain acceptance of independent laboratory test reports of tests specified herein, prior to application of cementitious crystalline waterproofing material.

- D. **Manufacturer's Certification:** Provide a copy of manufacturer's representative's report certifying that surfaces to which waterproofing is to be applied are in an acceptable condition to receive same, that materials to be installed comply with specified requirements, and that applicator has the experience to install the materials in accord with manufacturer's product data.

1.06 DELIVERY AND STORAGE

- A. Waterproofing materials shall be delivered to the project site in original sealed containers with manufacturer's name and brand clearly identified, shall be stored in dry locations with adequate ventilation, and shall be handled in a manner to prevent damage or contamination.

1.07 QUALITY ASSURANCE

- A. Provide products of a manufacturer with no less than 10 years experience in manufacturing the principal materials for the required work.
- B. **Applicator:** Waterproofing applicator shall be a firm experienced in the installation of cementitious crystalline waterproofing as demonstrated by previous successful installation. Waterproofing applicator shall be acceptable to the manufacturer and such acceptance shall be indicated in writing.
- C. **Pre-installation Conference:** Schedule a meeting, before start of construction of surfaces to receive waterproofing, with waterproofing applicator, applicators of work adjacent to or which penetrates waterproofing, waterproofing manufacturer's technical representative, Architect and Owner's representative to review procedures for substrate preparation and waterproofing application.
 - 1. Review Contract Document requirements for waterproofing and waterproofing manufacturer's product data including application instructions.
 - 2. Document discussion in writing, including issues requiring action, and distribute report to entities concerned with waterproofing work.

1.08 PROJECT CONDITIONS

- A. Comply with manufacturer's product data regarding condition of substrate to receive waterproofing, weather conditions before and during installation, and protection of the installed waterproofing system including work which will penetrate waterproofing.

1.09 WARRANTY

- A. Applicator, individually and separate from performance bonds, shall warrant his work from the Date of Substantial Completion, covering the surfaces treated, and binding him to repair, at his expense, any and all leaks through the surfaces treated which are not due to structural weaknesses or other causes beyond his control, such as fire, earthquake, tornado, and hurricanes, for a period of five (5) years after Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Acceptable products for slurry coat application: "Xypex Concrete Waterproofing by Crystallization" by Xypex Chemical Corporation and "Penetron" by Penetron Corporation or HEY'DI K-11.
- B. Provide products manufactured or approved by prime waterproofing manufacturer.
- C. Gout Tube Products: equal to "INJECTO" systems as available from De Neef Construction Chemicals, Inc. and distributed by TCS, Kenner, LA (504) 466-4564. To be considered equal, an alternative product shall:
 - 1. Be constructed to resist the pressures of freshly placed concrete.
 - 2. Have a filter layer to prevent the entry of cement particles into the tube, yet allow the easy passage of the sealing material during injection over the total length of the tube.
 - 3. Have protection for the filter layer to resist the abrasive effects of the concrete aggregates.
 - 4. Be less than 3/4 inch overall diameter.
- D. Tube Sealing Material: Hydrophobic polymer of the isocyanate type which is installed by injection. The uncured polyurethane grout shall have a viscosity of 600 - 1000 cps (at 70 F) and be 100% solids, Hydro Active Flex LV of De Neef Construction Chemicals, Inc.
 - 1. When the sealing material is mixed with approx. 10% water, the sealing material shall expand and cure to a closed cell foam with a tensile strength of 30 psi and 250% elongation (ASTM-3574).
 - 2. The sealing material shall have the ability to react in moving water and the viscosity shall remain the same until gelation occurs.
 - 3. The cured sealing material shall be resistant to most organic chemicals, mild acids, alkali, micro-organisms and be essentially non-toxic

2.02 PERFORMANCE CRITERIA

A. Slurry Coat System

- 1. Perform independent testing according to CRD C48-73 Permeability of Concrete under the following conditions:
 - a. Concrete samples shall be 6 inches (150 mm) in diameter and no thicker than 2 inches (50 mm).

- b. Coatings shall be a maximum thickness of 0.05 inches (1 mm) per coat with up to 2 coats permitted.
- c. Concrete samples shall have a design strength of 2000 psi or less. No admixtures will be permitted.
- d. A minimum of four samples shall be tested; 2 treated and 2 untreated. Untreated samples shall exhibit leakage at 10 psi or less.
- e. Test samples to a pressure of 175 psi (405 foot head of water). Treated samples, after crystalline growth has occurred, shall exhibit no measurable leakage whatsoever.

2.03 MIXES

A. General:

- 1. Mix waterproofing material by volume with clean water, which is free from salt and deleterious materials. Mix materials in quantities which can be applied within 20 to 30 minutes from the time of mixing. As mixture thickens, stir frequently, but do not add additional water.
- 2. Do not mix bonding agents or admixtures, with crystalline waterproofing materials.

B. Brush application mix:

- 1. Measure dry powder and place in mixing container. Measure water and mix into powder with a paddle on a slow speed electric drill (250 RPM) or other type mixer which will ensure mixing and is acceptable to manufacturer.
- 2. Mixing proportions shall be as follows:

<u>Coverage</u>	<u>Proportions (by Vol.)</u>
1.5 lbs. per sq. yd	5 powder to 2 water
2.0 lbs. per sq. yd.	3 powder to 1 water

C. Spray application mix:

- 1. Mixing shall be same as specified for brush application, except that mix shall be thinner. Use the following proportions only as a guide. Adjust proportions in order to match type of equipment and pressures used.
- 2. Mixing proportions shall be as follows:

<u>Coverage</u>	<u>Proportions (by Vol.)</u>
1.5 lbs. per sq. yd	5 powder to 3 water

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to start of waterproofing installation, arrange a visit to project site by waterproofing material manufacturer's representative. Representative shall inspect and certify that surfaces to which waterproofing is to be applied are in acceptable condition.
- B. Verify that surfaces are sound and clean.
- C. Verify that form release agents, methods, and materials used to cure concrete surfaces are compatible with waterproofing materials.

3.02 PREPARATION AND INSTALLATION

- A. General: Examine surfaces to be waterproofed for form tie holes and structural defects such as honeycombing, rock pockets, faulty construction joints, and cracks. Repair these defects in accordance with manufacturer's product data and as follows:
 - 1. Form tie holes, faulty construction joints and cracks: Chip defective areas in a "U" shaped slot 3/4 inch to 1 inch wide and a minimum of 1 inch deep. Clean slot of debris and dust. Soak with water and remove surface water then fill cavity with Dry-Pac. Compress into cavity using pneumatic packer or block and hammer.
 - 2. Rock pockets, honeycombing or other defective concrete: Rout out defective areas to sound concrete. Remove loose materials and saturate with water. After slurry has set, but while it is still "green", fill cavity to surface with non-shrink grout.
- B. Construction joints:
 - 1. Install injectable grout tube in accordance with manufacturer's instructions. See subsection 3.04.
- C. Concrete finish:
 - 1. Concrete surfaces shall have an open capillary system to provide tooth and suction and shall be clean; free from scale, excess form oil, laitance, curing compounds and foreign matter. Smooth surfaces caused by steel forms and surfaces covered with excess form oil or other contaminants shall be lightly sandblasted or waterblasted to provide a clean absorbent surface equivalent to ICRI CSP 3.
 - 2. Vertical surfaces may have a sacked finish.
 - 3. On horizontal surfaces which do not require a trowel finish, a broom finish shall be provided. Do not apply waterproofing material to this surface if concrete is less than 20 hours old.

4. Apply waterproofing material to "green" concrete as soon as possible after forms have been stripped, or to existing concrete which has been saturated with water. Moisten surfaces to be treated prior to application, as required to insure migration of crystalline chemicals into capillary voids in concrete. Remove free water prior to treatment with waterproofing material.
- D. Surface Application: After repair, patching and sealing strip placement has been completed in accord with manufacturer's product data and as specified herein, treat concrete surfaces with waterproofing material slurry applied at rates and locations indicated on Drawings and in accord with manufacturer's product data.
- E. Brushing: Use a semi-stiff bristle brush or broom to work slurry into concrete surface, filling hairline cracks and surface pores.
- F. Spraying: Hold spray nozzle close enough to ensure that slurry is forced into surface pores, and hairline cracks.
- G. First Coat: Apply at a rate of 1.5 lbs. per Sq. Yd
- H. Second Coat: Apply at a rate of 1.5 lbs. per Sq. Yd while first coat is still "green", but after it has reached an initial set. Lightly pre-water when rapid drying conditions occur.

3.03 INSTALLATION OF GROUT TUBES AND SEALING MATERIAL

- A. Grout tubes shall be fastened to clean concrete surface every 12 inches (see drawing for location in construction joint). The Plastic ends will be bent so that they will protrude through or under the forms. Install tube in strict accordance with tube manufacturer's printed instructions.
- B. Each end of the grout tube shall cross the next one so that there will be no default in the injected zone.
- C. After the concrete has cured the grout tubes shall be injected with the sealing material to fill the construction joint and any honeycombs with the sealing material.
- D. Prior to injection of the sealing material, water will be injected into one end in order to provide water for the reaction process and to verify continuity between ends.
- E. Water shall be injected into one end until it begins to flow from other end of grout tube. If an excessive amount of water needs to be injected or a blockage is encountered the location needs to be marked. This marking will influence the injection procedure
- F. Start the injection of the sealing material at one end of the grout tube (pressure of approx. 200 psi). As soon as sealing material appears at other end, close this other end and increase pump pressure (to approx. 250 psi). Stop injection when sealing material percolate out of joint or a substantial back-pressure is built.
- G. Patch injection ends with high strength cementitious mortar so not noticeable

3.05 CURING

A. Slurry Coat:

1. Begin curing as soon as waterproofing materials have set up sufficiently so as not to be damaged by a fine spray. Fog-spray treated surfaces three times a day for a two day period, or cover treated surfaces with damp burlap for the prescribed period.
 - a. In warm climates, more than 3 sprayings per day may be necessary to prevent excessive drying of coating.
 - b. Do not lay plastic sheeting directly on waterproofing coating as air contact is required for proper curing.
 - c. For structures holding hot or corrosive liquids, cure waterproofing for 3 days and allow to set for 18 days.
 - d. If there is poor air circulation in treated areas, provide fans or blown air to aid in curing of waterproofing.
2. Horizontal surfaces: Begin curing as soon as final set has occurred but before surface starts to dry. Conventional moist procedures such as water spray, and wet burlap may be used. Cure for a minimum of 48 hours.
3. In hot, dry, sunny conditions, consult manufacturer's product data.
4. If moist curing is not possible, a chemical curing agent manufactured for or compatible with each approved waterproofing material shall be available for the work. Chemical agent shall have at least 2 years of successful field use to be eligible for acceptance.
5. Protect cured surfaces from damage to wind, sun, rain and temperatures below 36 degrees F. for a period of not less than 48 hours after application. If plastic sheeting is used as protection, it shall be raised off waterproofing coating to allow air circulation.

3.06 PROTECTION AND CLEANING

- A. Protect completed coating from damage after application for balance of construction period.
- B. Do not permit traffic on unprotected coating.
- C. Clean spillage and soilage from adjacent surfaces, using cleaning agents and procedures recommended by manufacturer of surface.

END OF SECTION

BUILDING INSULATION**SECTION 07210****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Labor, materials, tools, and equipment, to perform all operations necessary for thermal insulation work indicated or specified.
- B. The applications of thermal insulation specified in this section include the following:
 - 1. Blown-in loose fill cellulose insulation at attics
 - 2. R-values are indicated on the Drawings.
- C. Insulation in conjunction with metal roofing is specified as part of Section 07610.

1.02 QUALITY ASSURANCE

- A. Thermal Resistance Values: Provide, if required, adjusted thicknesses of insulation (based on the insulation's thermal conductivity) to maintain the required thermal resistance. R- values are based on requirements of SPRR 257-55 of the U.S. Department of Commerce.
- B. Fire and Insurance Ratings: Comply with the fire resistance, flammability and insurance ratings indicated, and comply with code interpretations by governing authorities.
- C. Provide insulation with a flame spread rating of less than 25 and a smoke development rating of 450 or less.

1.03 SUBMITTALS

- A. Manufacturer's Data: Submit 2 copies of manufacturer's specifications and installation instructions for each type of insulation required. Include data substantiating that the materials comply with specified requirements.

1.04 PRODUCT HANDLING

- A. Protection From Deterioration: Do not allow insulation materials to become wet or soiled, or covered with ice. Comply with manufacturer's recommendations for handling, storage and protection during installation.

1.05 JOB CONDITIONS

- A. Examination of Substrate: The Installer must examine the substrate and the conditions under which the insulation work is to be performed, and notify the Contractor in writing of any unsatisfactory conditions. Do not proceed with the insulation work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cellulose Insulation: Loose fill insulation complying with ASTM C-739 (Standard Specification for CellulosicFiber [Wood-Base] Loose-Fill Thermal insulation)

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Comply with manufacturer's instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.
- B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation.
- C Even distribution of cellulose insulation with a pneumatic blowing machine.

3.02 PROTECTION

- A. General: Protect installed insulation from harmful weather exposures and from possible damage by completing the enclosing construction as soon as possible or by temporary enclosure.

END OF SECTION

SPRAY-ON THERMAL INSULATION**SECTION 07215****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. The applications of thermal insulation specified in this section include installation of sprayed-on closed cell polyurethane insulation to thickness indicated. The application shall be coverage of within the metal framing to encapsulate the framing. In addition to thermal resistance, the sprayed insulation shall provide a continuous, uninterrupted air/weather barrier at the exterior walls and overhead structure. Prime all existing plaster substrates.
- B. Where sprayed on insulation is exposed (not covered with drywall, etc) apply specified thermal barrier to achieve a 15 minute thermal barrier
- C. Mock-Up: A representative surface of not less than 100 square feet shall be sprayed, reviewed for adhesion and density, and approved by the Architect and Owner. This shall apply to each different substrate so substrates can be tested for adhesion

1.02 QUALITY ASSURANCE

- A. Thermal Resistance Values: Provide, if required, adjusted thicknesses of insulation (based on the insulation's thermal conductivity) to maintain the required thermal resistance. R- values are based on requirements of SPRR 257-55 of the U.S. Department of Commerce.
- B. Fire and Insurance Ratings: Comply with the fire resistance, flammability and insurance ratings indicated, and comply with code interpretations by governing authorities.
- C. Provide insulation with a flame spread rating of less than 25 and a smoke development rating of 450 or less.
- D. Contractor must use a total system, encompassing equipment, fiber and adhesive as supplied and tested by the manufacturer.
- E. Fibers supplied under this specification shall have each bag coded with the date and lot number of manufacture, and retained samples shall be kept by the manufacturer for not less than one year.
- F. Contractor must be licensed and trained by the manufacturer

1.03 SUBMITTALS

- A. Manufacturer's Data: Submit 2 copies of manufacturer's specifications and installation instructions for each type of insulation required. Include data substantiating that the materials comply with specified requirements.

- B. Submit under provisions of Section 01300. Submit data documenting LEED credits applicable to herein specified products that qualify for credit categories specified in Section 01352- LEED Requirements

1.04 PRODUCT HANDLING

- A. Protection From Deterioration: Do not allow insulation materials to become wet or soiled, or covered with ice. Comply with manufacturer's recommendations for handling, storage and protection during installation.

1.05 JOB CONDITIONS

- A. Examination of Substrate: The Installer must examine the substrate and the conditions under which the insulation work is to be performed, and notify the Contractor in writing of any unsatisfactory conditions. Do not proceed with the insulation work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Polyurethane Spray-On Insulation: Closed cell spray applied polyurethane foam equal to "Walltite" by BASF and "Earthseal Series" by Apex Foam industries, Metairie LA, 800-630-2338 and, complying with following:
 1. Density, in place: 1.8 minimum (ASTM D-1622).
 2. Compressive Strength: 30-35 psi (ASTM D-1621).
 3. Shear Strength: 90-95 psi (ASTM C-273).
 4. Closed Cell Content: greater than 90% (ASTM D-6226).
 5. R-Value, Initial: 6.2 per inch (ASTM C-518).
 6. Perm Rating: less than 1.0 perm at 2-3/4 inch thickness (ASTM E-96)
 7. Dimensional Stability (% volume change): 2.0-2.20 dry age 28 days (158 degree F (ASTM D-2126).
 8. Surface Burning Characteristics (4 inch thickness): Flame spread of max. 25 and smoke development of max. 450.
- B. Thermal Barrier: Minimum .5 lbs/cu.ft. density gypsum based spray applied coating over exposed polyurethane foam plastic to provide a well adhered, monolithic thermal barrier protecting the spray foam from the effects of heat and fire, equal to Monokote Z-3306-G by W.R. Grace.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. General: Comply with manufacturer's printed instructions for the particular conditions of installation in each case. If printed instructions are not available or do not apply to the project conditions, consult the manufacturer's technical representative for specific recommendations before proceeding with the work.
 - 1. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation.
- B. Apply a single layer of insulation of the required thickness, unless otherwise shown or required to make up the total thickness.
- C. Provide masking, drop cloths or other satisfactory coverings for all materials/surfaces which are not to receive insulation so as to prevent damage from over-spray.
- D. Surfaces to receive spray insulation shall be inspected prior to application to determine if priming/sealing is required to insure bonding and/or to prevent discoloration caused by migratory stains
- E. Thickness will be determined as the minimum thickness measured as per ASTM E-605 field test accordingly.
- F. Provide natural or mechanical ventilation continuously to properly cure the insulation
- G. Where foam is exposed, apply thermal barrier in thickness required in strict accordance with manufacturers printed instructions.
- H. Clean any overspray off adjacent surfaces

3.02 PROTECTION

- A. General: Protect installed insulation from harmful weather exposures and from possible damage by completing the enclosing construction as soon as possible or by temporary enclosure.

END OF SECTION

FIRESTOPPING**SECTION 07270****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Firestopping materials and accessories for all penetrations through existing and new fire or smoke rated construction with ratings indicated on the Drawings. Maintain fire ratings of construction being penetrated to include, but not limited to the following:
 - 1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - 2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
 - 3. Wall openings at heads of partitions between walls and overhead construction.
 - 4. Openings at each floor level in all vertical shafts.
 - 5. All penetrations for data/communication cabling shall be firestopped with "putty" type firestopping herein specified to accommodate future removal and reuse.

1.02 RELATED SECTIONS

- A. Section 09260: Gypsum board systems for fire rated construction.
- B. Division 15: Mechanical work requiring firestopping.
- C. Division 16: Electrical work requiring firestopping.

1.03 REFERENCES

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E814 - Standard Test Method of Fire Tests of Through-Penetration Firestops.
- C. UL 1479 Fire Test of Through - Penetration Firestops.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

- B. F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.
- C. T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings as determined per ASTM E 814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:
 - 1. Where firestop systems protect penetrations located outside of wall cavities.
 - 2. Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.
 - 3. Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
 - 4. Where firestop systems protect penetrating items larger than a 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E 119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.
- E. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal if insulation.
- F. For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke developed values of less than 250 as determined per ASTM E 84.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data on product characteristics, performance and limitation criteria for each product required.

- C. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.
- D. Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency, i.e. U.L. evidencing compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.
- E. Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.
- F. Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

1.06 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.
- B. Applicator: Company specializing in performing the work of this Section approved in writing by the manufacturer of the firestopping products. All firestop applications shall be performed by a one-specialty contractor that is trained and licensed specifically in this discipline. Said contractor's personnel shall have received specific training and certification or approval from the proposed respective firestop manufacturer and shall have a minimum of two years experience installing firestop systems of the type herein specified.
- C. Firestop System: Through Penetration Firestop Systems shall be designed to prevent the spread of fire, gases and smoke through openings in fire rated assemblies for a specified period of time. Incorporating the use of specific products installed in a specific manner, they shall only be installed in configurations for which they have been specifically tested and listed by Underwriters Laboratories (UL) per ASTM E 814 or UL 1479.
- D. Fire-Test-Response Characteristics: Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspection agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical of those tested per ASTM E 814 under conditions where positive furnace pressure differential of at least 0.01 inch of water is maintained at a distance of 0.78 inch below the fill materials surrounding

the penetrating items in the test assembly. Provide rated systems complying with the following requirements:

- a. Through-penetration firestop systems correspond to those indicated by reference through-penetration firestop system designations listed by UL in their "Fire Resistance Directory", by Warnock Hersey, or by another qualified testing and inspecting agency.
- E. Fire-resistive joint sealant systems are identical to those tested for fire-response characteristics per ASTM E 119 under conditions where the positive furnace pressure differential is at least 0.01 inch of water, as measured 0.78 inch from the face exposed to furnace fire. Provide systems complying with the following requirements:
1. Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another qualified testing and inspecting agency.
 2. Joint sealants, including backing materials, bear classification marking of qualified testing and inspection agency.
- F. Single-Source Responsibility: Obtain through-penetration firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.
- G. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section.

1.07 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire resistance ratings and surface burning characteristics.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when temperature of substrate material and ambient air is below 60 degrees F.
- B. Maintain this minimum temperature before, during, and for 3 days after installation of materials.
- C. Provide ventilation in areas to receive solvent cured materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. 3M Fire Protection Products

- B. Bio Fireshield, Inc.
- C. Dow Corning Corp.
- D. Hilti Construction Chemicals, Inc.
- E. International Protective Coatings Corp.
- F. General Electric Co.
- G. The RectorSeal Corp.
- H. Tremco, Inc.
- I. Substitutions: Under provisions of Section 01600.

2.02 MATERIALS - GENERAL

- A. Through-Penetration Firestopping System: Provide systems listed in the U.L. Fire Resistance Directory under categories XHCR and XHEZ, providing that it conforms to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems must be asbestos-free. Mortar systems must be Warnock Hersey approved.
 - 1. Additional requirements: Withstand the passage of cold smoke either as inherent property of the system, or by the use of a separate product included as a part of the U.L. system or device, and designed to perform this function.
 - 2. Acceptable Manufacturers and Products: Those listed in the U.L. Fire Resistance directory for the U.L. System involved or Mortar systems approved by Warnock Hersey.
 - 3. All firestopping products must be from a single manufacturer. All trades shall use products from the same manufacturer.
- B. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- C. Firestopping Material: Single component elastomeric foam compound, intumescent sealant, formulated compound mixed with incombustible non-asbestos fibers or mineral fiber stuffing insulation in combination with and encapsulated by the aforementioned products; passing ASTM E814 (UL 1479) Standard Method of Fire Tests for Through Penetration Fire Stops with basic rating criteria as follows:
 - 1. F Rating: No visible passage of flame or flaming on any element during rating period.

2. T Rating: Temperature rise of any thermocouple limited to 181°C (325°F) above ambient on non-fire side during rating period.
 3. Hose stream applied with no projection of water through fire stop.
- D. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces.
- E. Accessories: Provide components for each firestopping system that are needed to install fill materials and comply with "System Performance Requirements: article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:
1. Permanent forming/damming/backing materials including the following:
 - a. Semirefractory fiber (mineral wool) insulation
 - b. Ceramic fiber.
 - c. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
 - d. Fire-rated formboard.
 - e. Joint fillers for joint sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.03 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.
- B. Intumescent, Latex Sealant: Single-component, intumescent, latex formulation.
- C. Intumescent Putty/Compound: Nonhardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.
- D. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum foil on one side.
- E. Mortar: Prepackage dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogenous mortar.

- F. Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- G. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, nonshrinking foam.
- H. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping/gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
- I. Solvent-Release-Curing Intumescent Sealant: Solvent-release-curing, single-component, synthetic-polymer based sealant of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping/gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
- J. Products: Subject to compliance with requirements and actual job conditions, products and combination of products that may be incorporated in the work include, but are not limited to, the following:
 - 1. Endothermic, Latex Sealant: As follows:
 - a. Fyre-Shield, Tremco, Inc.
 - 2. Endothermic, Latex Compounds: As follows:
 - a. Flame-Safe FS500/600 Series, International Protective Coatings Corp.
 - b. Flame-Safe FS900/FST900 Series, International Protective Coatings Corp.
 - 3. Intumescent Latex Sealant: As follows:
 - a. Metacaulk 950, The RectorSeal Corporation.
 - b. Fire Barrier CP 25WB Caulk, 3M Fire Protection Products.
 - c. Firestop Sealant FS605 and FS611A, Hilti Construction Chemicals, Inc.
 - 4. Intumescent Putty/Compound: As follows:
 - a. Pensil 500 Intumescent Putty, General Electric Co.
 - b. Flame-Safe FSP1000 Putty, International Protective Coatings Corp.
 - c. Fire Barrier MPS-2 Moldable Putty, 3M Fire Protection Products.
 - d. Trowelable Firestop Compound FS635, Hilti Construction Chemicals, Inc.
 - e. Biostop Fire Rated Putty, The RectorSeal Corp.

- f. Biostop Fire Rated Putty Pods, The RectorSeal Corp.
5. Intumescent Wrap Strips: As follows:
 - a. Dow Corning Fire Stop Intumescent Wrap Strip 2002, Dow Corning Corp.
 - b. CS2420 Intumescent Wrap, Hilti Construction Chemicals, Inc.
 - c. Fire Barrier FS-195 Wrap/Strip, 3M Fire Protection Products.
 - d. Biostop Wrap Strip by The RectorSeal Corp.
6. Mortar: As follows:
 - a. Bio K-10, Bio K-2 Mortar by The RectorSeal Corp.
 - b. 3M Fire Barrier Mortar.
 - c. K-2 Firestop Mortar, Bio Fireshield, Inc.
 - d. Novaskit K-10 Firestop Mortar, Bio Fireshield, Inc.
 - e. KBS-Mortar Seal, International Protective Coatings Corp.
7. Pillows/Bags: As follows:
 - a. Firestop Pillows, Bio Fireshield, Inc.
 - b. KBS Sealbags, International Protective Coatings Corp.
8. Silicone Foams: As follows:
 - a. Dow Corning Fire Stop Foam 2001, Dow Corning Corp.
 - b. Pensil 200 Foam, General Electric Co.
9. Sealants: As follows:
 - a. Dow Corning firestop Sealant 200, Dow Corning Corp.
 - b. Dow Corning Firestop Sealant SL 2003, Dow Corning Corp.
 - c. Pensil 100 Firestop Sealant, Hilti Construction Chemicals, Inc.
 - d. Metacaulk 835, The RectorSeal Corporation.
 - e. Metacaulk 880, The RectorSeal Corporation
 - f. Fyre-Sil, Tremco Inc.
 - g. Fyre-Sil S/L, Tremco Inc.
 - h. Biostop 500+ by The RectorSeal Corp.
 - i. Biotherm 100, Biotherm 200 by The RectorSeal Corp.
 - j. Biostop 700 by The RectorSeal Corp.
 - k. CP 25WB+ Caulk by 3M.
10. Solvent-Release-Curing Intumescent Sealants: As follows:
 - a. Biostop 500 Intumescent Firestop Caulk, BioFireshield, Inc.
 - b. Fire Barrier CP 25N/S Caulk, 3M Fire Protection Products.
 - c. Fire Barrier CP 25S/L Caulk, 3M Fire Protection Products.

11. Firestop Mastic:

- a. Biostop 700 by The RectorSeal Corp.

2.04 GENERAL SYSTEMS

A. The following products and manufacturers are examples of acceptable products and combinations of products for the following general applications within the restrictions of the manufacturer's printed data:

1. Cable, metal pipe, insulated pipe, construction gaps, HVAC ductwork and certain plastic pipe applications under static conditions:
 - a. 3M Brand Barrier Moldable Putty MPS-2 STIX, CP 25WB/CP 25WB+ Caulk and Interam FireDam 150 Caulk.
 - b. Metacaulk 950 by Rectorseal Corp.
 - c. Hilti FS601 Elastomeric Firestop Sealant
2. Plastic pipe penetrations under static conditions:
 - a. 3M Brand Fire Barrier FS-195/FS-195+ Wrap or Strip used in conjunction with putty or RC-1 Collar.
 - b. Hilti FS 611A Intumescent Firestop Sealant
3. Multiple cables, large conduit and/or cable tray penetrations.
 - a. Hilti CP 657 Fire Blocks.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that openings are ready to receive the Work of this Section and all work penetrating the openings is completed.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which affect bond.
- C. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bone; do not allow spillage and migration onto exposed surfaces.

- D. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

3.03 APPLICATION

- A. Installing Through-Penetration Firestops: General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:
 - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- D. Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.
- E. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- F. Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

3.04 CLEANING

- A. Clean Work under provisions of Section 01700.
- B. Clean adjacent surfaces of firestopping materials.
- C. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- D. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce firestopping complying with specified requirements.

3.05 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01500.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SLATE ROOFING**SECTION 07311****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Remove existing shingle roofing, felts and sheetmetal where indicated on the drawings. Provide new natural slate roofing system to include one (1) layer of rubberized asphalt membrane underlayment sheets on sheathing for entire roof area, slate roofing, and new copper gutters and flashing and schedule 80 PVC downspouts to extent indicated on the Drawings on the following substrate:
 - 1. Sheathing substrate (Section 06100).

1.02 RELATED SECTIONS

- A. Section 06100 - Carpentry - Plywood substrate

1.03 QUALITY ASSURANCE

- A. UL Listing: Provide labeled materials which have been tested and listed by UL for Class "A" and Wind Resistant Label.
- B. Installer: Company experienced in installing natural slate roofing of the type and scope specified in this section and employing persons with not fewer than five years of documented experience. Company shall provide skilled workers, thoroughly trained and experienced in the necessary crafts of natural slate roof systems and who are familiar with this specification and methods required for a warrantable roof.
- C. Pre-Roofing Conference: Meet at the project well in advance of the time scheduled for roofing work, and review requirements for the work and conditions which could possible interfere with successful performance of the work. Require every party who is concerned with the work, or required to coordinate with it or to protect it thereafter, to attend the conference.
- D. Slate Standard: Comply with ASTM C 406 - Specification for Roofing Slate.

1.04 SUBMITTALS

- A. Product Data: Submit technical product data on all specified products, installation instructions and recommendations from slate manufacturer, including data that materials comply with requirements.
- B. Samples: Submit full range of samples for color and texture selection. After selection, submit two (2) full-size slates for verification of each color/style/texture selected.
- C. Maintenance Stock: 2% of each type/color/texture slate used in the work delivered in original unopened containers.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver shingles to project site in distributor's crates/pallets, labeled with data indicating source..
- B. Handle shingles to prevent chipping, breakage, soiling, or other damage. Protect edges with wood or other rigid material.
- C. Place and stack crates/pallets to distribute weight evenly and to prevent breakage or cracking.
- D. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double stack rolls.
- E. Protect unused underlayment from weather, sunlight and moisture when left overnight or when roofing work is not in progress.
- F. Stage roofing materials on the building in a manner to avoid significant or permanent damage to the roof deck or structural supporting members

1.06 JOB CONDITIONS

- A. Substrate: Proceed with work only after substrate construction and penetrating work have been completed.
- B. Weather Conditions: Proceed with work only when weather conditions are in compliance with manufacturer's recommendations and when substrate is completely dry.

1.07 WARRANTY

- A. Guarantee: Upon completion and acceptance of the work, furnish the attached two (2) year maintenance guarantee on the roofing Installer's letterhead stationery signed by the Installer and the Contractor. A copy of the guarantee follows this section.
 - 1. Slate shingle fabricators warranty, signed by the distributor and covering the slate shingles described in this section, in which the distributor agrees to replace slate shingles that fail in materials. The duration of this warranty shall be seventy five (75) years as established by ASTM C406.

1.08 EXTRA MATERIALS

- A. Provide an additional 3 percent of installed field slates for Owners use in roof maintenance

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Slate: Slate shall be hard, dense, sound rock, with chamfered edges, punched or drilled for two nails each, complying with ASTM C406, Grade S2: Expected service life 75 years. Slate shingles shall be punched or drilled back to front, and on the thinner end when there is variation in thickness along the length of the shingle. No broken corners on covered ends which sacrifice nailing strength or the laying of a watertight roof will be allowed. No broken or cracked slates shall be used. Slate shall be free of any visible inclusions of oxidizable iron pyrite.
1. Size: 20" ht x random size widths
 2. Thickness: Nominal 1/4 inch (7 mm).
 3. Exposure: 8-1/2" "
 4. Cut Butt Shape: Standard square cut
 5. Natural Cleft: Medium texture
 6. Starter Slate Size: Length of starter slates to be the exposure of the field slates plus the specified headlap and rounded up to the nearest full inch. Starter slates are to be front-side punched and installed chamfered edge down
 7. Color: 50% gren/50% grey to match existitng
 7. Approved: Vermont Slate, S1 Grade
- B. Curvature or twist in slate shingles shall not exceed 1/8 inch in 12 inches (3 mm in 100 mm). Curved slate shingles shall be trimmed and punched to permit them to be laid with convex side up. Knots, knurls and cramps are acceptable on the exposed slate shingle face. Knots, knurls and cramps on the back or covered portion of slate shingles, which prevent close contact of slate shingles or the laying of a watertight roof, will not be accepted
- C. Slate shingles shall be trimmed with 90-degree square corners. Face dimensions of slate shingles shall not differ from those specified by more than 1/8 inch (3 mm). Source: Obtain slate required for the project from a single quarry, with consistent color range, physical properties and texture throughout
- D. Elastic Cement: ANSI/ASTM D2822; asphalt type with mineral fiber components, free of toxic solvents, capable of setting within 24 hours at temperature of 75 degrees F and 50 percent RH; cement shall be colored to match the general color of the slate.
1. Above elastic cement must be specifically recommended in writing by slate roof applicator.
- E. Fasteners: Shall be a nail manufactured from structural copper with a minimum 7/16" head 0.120 inch (3 mm) or No. 11 gauge Stubs, not less than twice the nominal slate thickness plus 1 inch in length, with 3/8 inch (9 mm) head. and a needle point. Point should penetrate through underside of deck except where the underside of roof deck is exposed to view, where shorter nails are acceptable. Nails 1/2 inch (13 mm) or longer than field slate nails for hip and ridge installation..

- F. Rubberized Underlayment: ASTM D 1970, self-adhering polyethylene-sheet-back rubberized asphalt membrane, 40 mils thick. Provide primer when recommended by underlayment manufacturer. Approved products as follows:
 - 1. "Bituthene Ice & Water Shield", W.R. Grace & Co.
 - 2. "Polyken 640 Underlayment Membrane", Polyken Technologies.
 - 3. "Polyguard Deck Guard", Polyguard Products, Inc.
- G. Polymer Sealant: ASTM C 920 silicone sealant of type, grade, class, and use classification required to seal joints in slate-shingle roofing and remain watertight.
- H. Butyl Rubber Sealant: ASTM C 1311, single-component, solvent-release; polyisobutylene plasticized; heavy bodied.
- I. Plastic Cement: ASTM C 1085, one part non-sag polymerized butyl sealant.

2.02 SHEET METAL AND TRIM MATERIALS

- A. Copper: ASTM B 370; temper H00 (cold-rolled) except where temper 060 is required for forming; 16oz. (0.0216 inch thick) except as otherwise indicated
- B. Miscellaneous Materials and Accessories:
 - 1. Solder: For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.
 - 2. Fasteners: Same metal as flashing/sheet metal or, other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
 - 3. Bituminous Coating: SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
 - 4. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.
 - 5. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealers".
 - 6. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching material being installed, noncorrosive, size and gage required for performance but not less than item being anchored.
 - 7. Roofing Cement: ASTM D 2822, asphaltic
- C. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal

Manual" and other recognized industry practices. Fabricate for waterproof and weather resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

- D. Metal Drip Edge: Minimum 24 gauge prefinished sheet, brake-formed to provide 3 inch roof deck flange and 1½ inch fascia flange with 3/8 inch drip at lower edge. Furnish in lengths of 8 or 10 feet.
- E. Gutters: Form in sections not less than 8 ft. in length, complete with end pieces, outlet tubes, and any special pieces that may be required. Join sections with riveted and soldered or sealed joints. Unless otherwise indicated, provide expansion-type slip joint at the center of runs. Furnish gutter supports spaced at 36" o.c., constructed of same metal as gutters.
- F. Downspouts: Formed in sections of PVC pipe approximately 10 ft. long, complete with elbows and offsets. Join sections with waterproof adhesive. Provide fasteners for top, bottom, and 5' o.c. intermittently between, designed to securely hold downspouts not less than 1" away from walls.
 - 1. PVC shall have no writing or labels on the surfaces

PART 3 - EXECUTION

3.01 PREPARATION OF SUBSTRATE

- A. Clean substrate of any projections and substances detrimental to the work. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with roofing nails.
- B. Coordinate installation of roofing with flashing and other adjoining work to ensure proper sequencing. Do not install slate roofing until all vent stacks and other penetrations through roofing have been installed and are securely fastened against movement.

3.02 ROOFING INSTALLATION

- A. General: Comply with written instructions and recommendations of slate manufacturer and NRCA Steep Roofing Manual and slat manufacturers printed instructions, except to extent more stringent requirements are indicated.
 - 1. Double shingles at eaves and cornice line. Beginning at eaves, project shingle 2 inches (50 mm) beyond perimeter with no gutters or troughs, or 1 inch (25 mm) with gutters or troughs. Lay shingles in horizontal courses. Provide at least the specified head lap between succeeding courses of shingles and stagger joints between courses a minimum of 3 inches (75 mm). Provide 1 inch (25 mm) to 2 inches (50 mm) projection of shingles at gable and rake edges.
- B. Install one layer of self-adhering sheet underlayment wrinkle free. Apply from roof edge to a line that when projected to the horizontal is not less than 24 inches (610 mm) inside of interior wall line. Install lapped in direction to shed water. Lap sides not less than 3 1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm), staggered 24 inches (600 mm) between

courses. Roll laps with roller. Proceed with installation only within the range of ambient and substrate temperatures recommended by manufacturer. Stagger each layer by 1/3.

- C. The entire surface of all roofs, the roofs and sides of any appurtenances where indicated or required, and all other surfaces so indicated on the Drawings, shall be covered with slate in a proper and watertight manner. Blend slates from all crates/pallets together to achieve a uniform color and texture to the roof.
- D. The slate shall project 2" at the eaves and from 1/2" to 1" as directed at all gable ends, and shall be laid in horizontal courses with 3" headlap and each course shall break joints with the preceding one by at least 3". Slates at the eaves or cornice line shall be doubled using same thickness slate for under-eaves at first exposed course and canted 1/4" by a wood strip. Under-eave slate to be approximately 3" longer than exposure of first course.
- E. Slates overlapping sheet metal work shall have the nails so placed as to avoid puncturing the sheet metal. Exposed nails shall be permissible only in top courses where unavoidable.
- F. Neatly fit slate around any pipes, ventilators, etc.
- G. Nail slate shingles so nail heads touch shingle lightly. Nails shall not be driven in so far as to produce a strain on the slate.
- H. Cover all exposed nailheads with elastic cement. Hip slates and ridge slates shall be laid in plastic cement spread thickly over unexposed surface of undercourses of slate, nailed securely in place and pointed with elastic cement.
- I. Hips: Install slate shingles at hips. Lay hip shingles in plastic cement spread generously over unexposed portions of lower courses and nail in place. Only where heads of nails are exposed, cover with plastic cement.
 - 1. Install approved metal hip caps per manufacturers installation instructions.
- J. Ridges: Install slate shingles at ridges. Lay ridge slates in plastic cement spread generously over unexposed lower courses and nail in place. Only where nail heads are exposed, cover with plastic cement
- K. On completion all slate must be sound, whole and clean, and the roof shall be left in tight and neat in every respect. Remove and replace damaged or broken slates using slate repair hooks or nail and bib repair procedure where standard nailing is not possible.

3.03 SHEET METAL INSTALLATION

- A. Install sheet metal trim, flashing and counterflashing, and roof edges and penetrations in a manner indicated or implied by the Drawings and Specifications and as recommended by the manufacturer of SMACNA.
- B. Join sheet metal using a flat locked seam or lapped and securely soldered joints. Make allowance at all joints for expansion and contraction. At exposed edges, sheet metal shall be hemmed and returned upon itself 1/2" for strength. At lap joints, make hems together so that one slides into the other.

- C. Install gutters and downspouts in accordance with SMACNA with watertight joints; slope gutters for positive drainage.
- D. Downspouts shall be installed with a minimum of three (3) straps for every 10 ft. of run

3.04 PROTECTION

- A. Lay out progression of work to prevent other trades from working on or above completed roofing.
- B. Minimize traffic over finished roof surface. If necessary, wear soft-soled shoes and walk on the 'butt' of the shingles in order to avoid breakage

(Name of Building)

MAINTENANCE GUARANTEE

The General Contractor and roofing contractor jointly guarantee and warrant the roof of the above-named building against faulty material or workmanship, or both for a period of two (2) years from the date of the Owner's acceptance.

During this period, they agree to repair or replace all defects, and generally to maintain the roofing and associated sheet metal in its original weathertight and watertight condition - all without cost to the Owner.

EXCEPTIONS: Exceptions to this guarantee are failure of work installed by others, abuse, lightning, tornado, hail storm, or other unusual climatic phenomena.

During the maintenance period, the General Contractor and roofing contractor agree that, within 24 hours of receipt of notice from the Owner, they will inspect and make immediate repairs to defects and leaks threatening the interior of the building. They further agree to effect permanent repairs to these defects or leaks within 30 days of said notice. The above repairs shall be made without cost to the Owner.

Permanent restoration shall be made using materials and methods originally specified.

It is understood that the Owner reserves the right to make immediate emergency repairs, at their own expense, to conditions threatening the building contents, before the notice or expiration of the 24-hour period, without abrogating their rights under this guarantee.

It shall be understood and agreed that should temporary repairs not be made within 24 hours or permanent repairs within 30 days, then the Owner may employ others to make such corrections at the expense of either or both (jointly) of the signatories.

Date of Owner's Acceptance: _____

By: _____

By: _____

Title: _____

Title: _____

(Name of Roofing Contractor)

(Name of General Contractor)

END OF SECTION

ROOFING GUARANTEE

OWNER: ARCHDIOCESE OF NEW ORLEANS

ADDRESS: BUILDING OFFICE
7887 WALMSLEY AVE.
NEW ORLEANS, LA. 70125

WHEREAS _____

Address _____

Telephone () _____, herein called the "Roofing Contractor", has performed roofing and flashing in accordance with the Contract Documents (Hereinafter called the "Work") under a Contract with the Owner.

Name of Project: _____

Parish or Institution _____

Location/Address

Name and type of Building (s)

Type (s) of Roof Deck (s):

Total Roof Area _____ SF, Flashing, Edge: _____ LF
Base: _____ LF

Date of Acceptance: _____ Guarantee
Period: 2 Years

Date of Expiration: _____

AND WHEREAS the Roofing Contractor has contracted to guarantee said work against water entry from faulty or defective materials and workmanship for the designated Guarantee period:

NOW THEREFORE the Roofing Contractor guarantees, subject to the terms and conditions herein set forth, that during the Guarantee Period he will at his own cost and expense make or cause to be made with approval procedures and materials such repairs to or replacements of said work resulting from water entry or faults or defects of said Work as are necessary to correct faulty and defective work and as are necessary to maintain said Work in watertight conditions and further to respond

on or within two (2) working days upon written notification of leaks or defects by the Owner. Furthermore, he will at his own cost and expense maintain the roof for (2) years after acceptance, in accordance with the current edition of the Roof Maintenance Manual published by the Roofing Industry Educational Institute. The roof shall be inspected a minimum of twice each year, and a report prepared documenting the conditions observed at each inspection. These inspections shall be made once during the months of April or May and once during the months of September and October. Two copies of each report shall be forwarded to the Owner.

This guarantee is made subject to the following terms and conditions:

1. Specifically excluded from this guarantee are damages to the Work, other parts of the building and building contents caused by: A) lightning, windstorm (includes hurricanes and tornados), hailstorm, earthquakes and other unusual phenomena of the elements; B) fire; and C) structural failures causing excessive roof deck, edgings and related roof components movement. When the Work has been damaged by any of the foregoing causes, the Guarantee will be null and void until such damage has been repaired by the Roofing Contractor, and until the cost and expense thereof has been paid by the Owner or another responsible party so designated.
2. During the Guarantee Period, if the Owner allows alteration of the Work by anyone other than a Contractor approved in writing by the Roofing Contractor, prior to the work being performed, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations, the Guarantee shall not become null and void, unless the Roofing Contractor, prior to proceeding with said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the Work, thereby reasonably justifying a termination of this Guarantee.
3. During the Guarantee Period, if the original use of the roof is changed and it becomes used for, but for which it was not originally designed or specified, as a promenade, work deck, spray-cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
4. During the Guarantee Period, if any building or area of a building is changed to uses creating extremes of interior temperature and/or humidity, but for which it was not originally designed And specified, without provisions and alterations made to the building which effectively contain or control these conditions, this Guarantee shall become null and void upon the date of said change.
5. The Owner shall promptly notify the Roofing Contractor in writing of observed known or suspected leaks, defects or deterioration and shall afford reasonable opportunity for the Roofing Contractor to inspect the Work, and to examine the evidence of such leaks, defects or deterioration.
6. This Guarantee is recognized to be the only guarantee of the Roofing Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and recourses lawfully available to him in case of roofing failure. Specifically, this Guarantee shall not operate to relieve the Roofing Contractor of his responsibility for performance of the original work, regardless of whether the Contract was a Contract directly with the Owner or a Subcontract with the Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this day of _____, 201____.

General Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone No. _____

WITNESS: _____

Roofing Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone No. _____

WITNESS: _____

ROOF COATING**SECTION 07570****PART 1 - GENERAL****1.01 DESCRIPTION OF WORK**

- A. Urethane coating system to provide a seamless, fully adhered fluid applied waterproof roof coating system over existing galvalume metal roofing as indicated on the drawings..
- B. Note: Securing the existing roof is part of the work of this section.

1.02 MANUFACTURERS QUALIFICATIONS

- A. Manufacturer regularly and presently manufactures traffic coating as called for in this section as one of his principal products.
- B. Installer has technical qualifications, experience, trained personnel and facilities to install specified items and is an approved installer in writing by the manufacturer.
- C. Manufacturer's product submitted has been in satisfactory and efficient operation on three installations similar or equivalent to this project for three years. Submit list of installations. List shall include name and location of project and name of owner.
- D. UL Listed Products: Provide materials which have been tested and listed by UL for applications indicated, with following rating for deck and ramp slope shown:
 - 1. "Class A" rated materials/system.

1.03 SUBMITTALS

- A. In accordance with Section 1300.
- B. Manufacturer's Literature and Data: Printed installation instructions and Maintenance instructions.
- C. Samples: 12" square samples of fully cured exposed finish materials, in colors required for work including aggregate coating on samples.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's unopened, labeled containers, and comply with manufacturer's instructions for storage and handling.
 - 1. Provide UL labels on containers.

1.05 JOB CONDITIONS

- A. Proceed with traffic coating work only after substrate construction and penetrating work have been completed.

- B. Pre-Installation Conference: Meet at project site well in advance of time scheduled for work to proceed, and review requirements for work and conditions which could possibly interfere with successful performance. Require every party who is concerned with traffic coating work, or required to coordinate with it or to protect it thereafter, to attend conference.
 - 1. Require manufacturer's technical representative to participate in conference.

1.06 GUARANTEE

- A. Guarantee coating installation, including flashings against failures and water penetration with a guarantee period of ten (10) years.

PART 2 - PRODUCTS

2.01 ELASTOMERIC URETHANE ROOF COATING

- A. Liquid elastomeric urethane base coating, either one-component or 2-component mixture for application in one or more coats. Provide each coat complying with following requirements for cured membrane, as certified by independent laboratory tests:
 - 1. Tensile Strength (ASTM D412): 1500 psi.
 - 2. Elongation at Break (ASTM D412): 360%.
 - 3. Permanent Set (ASTM D412): <10%.
 - 4. Tear Resistance (ASTM D1004): 100 lb/in.
 - 5. Water Resistance (ASTM D471): <3% @ 7 days
 - 6. MVT @ 30 Mils (ASTM E96): 2.2 English
 - 7. Shore A (ASTM D2240): 70-75
 - 8. Adhesion (ASTM D903): 15 pli
 - 9. Weathering Resistance (ASTM D822): Slight chalk
 - 10. Minimum Dry Film Thickness: 15 mils average for total system.
 - 6. Approved: "Elasta-Gard M" by Neogard Division of Jones-Blair Company,

2.02 MISCELLANEOUS COVERING MATERIALS

- A. Flashing Sheets, Fillers, Cant Strips and Accessories: Types as recommended by deck coating manufacturer, supplied for locations recommended by manufacturer.
- B. Expansion Joint Sealant: Epoxy base elastic sealant as recommended by the coating manufacturer for compatibility with coating and size of joint indicated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Comply with manufacturer's printed instructions for preparation of substrates to receive traffic coating system.
- B. Cleaning: Surfaces contaminated with oil or grease shall be vigorously scrubbed with a power broom and a strong non-sudsing detergent. Thoroughly wash, clean and dry.
- C. Etching: Treat concrete surfaces with 10% to 15% solution of muriatic acid to remove laitance and impurities. After acid has stopped foaming or boiling, immediately rinse thoroughly with water. Re-rinse as required to remove muriatic acid solution. Note: If acid etching is not practical, shotblasting is an acceptable alternative.
- D. Cracks and Cold Joints: Visible hairline cracks (up to 1/16" in width) in concrete and cold joints shall be cleaned, primed and treated with polyurethane deck coating material a minimum distance of 2" on each side of crack to yield a total thickness of 30 dry mils. Large cracks (over 1/16" in width) in concrete shall be routed and sealed with coating manufacturer's traffic bearing sealant. Sealant shall be applied to inside area of crack only, not applied to deck surface. Detail sealed cracks with polyurethane deck coating material a distance of 2" on each side of crack to yield a total thickness of 30 dry mils.
- E. Install flashing sheets and accessory items as recommended by manufacturer.
- F. Fill voids, including non-moving joints and rough areas of substrate, with manufacturer recommended fillers or feathered-out coating of membrane material, in manner recommended by manufacturer. Form coves at corners and penetrations of substrate.
- G. Test substrate for excessive moisture content, in manner recommended by manufacturer.
- H. Prime and seal substrate as recommended by traffic coating manufacturer, applying thinned coating of membrane liquid if not otherwise recommended.
- I. Mask off adjoining surfaces not to receive traffic coating, to prevent spillage and migration of liquid materials outside membrane area.
 - 1. Protect all mechanical, electrical items, cables, conduit, etc., and do not allow contact with deck coating.

3.02 INSTALLATION

- A. General: Comply with manufacturer's instructions for installation of system, including surface preparation, priming, joint treatment, flashing, and surfacing. Apply membrane liquids by roller coating, or distributing with notched squeegee to provide uniform thickness. Trowel heavy-bodied mixtures in place uniformly as recommended by manufacturer.
 - 1. Start installation of deck covering only in presence of manufacturer's technical representative.
- B. Apply total thickness of traffic coating in number of coats recommended by manufacturer, using special top coating to achieve wear and chemical resistance required, and to provide color and texture required.
- C. System: Apply base membrane of urethane elastomer and aggregate-bearing top course in accordance with manufacturer's printed instructions.
 - 1. At urethane/epoxy system apply aggregate-bearing chemical resistant epoxy top coat to urethane base coating and slip resistant aggregate.
 - 2. Apply dry mil thickness indicated in product description herein.
- D. Terminate floor system at abutting walls with sealed joints and turn up a minimum of 4 inches at vertical arises.

3.03 PROTECTION

- A. Provide protection to ensure that work will be without damage or deterioration at time of final acceptance.

END OF SECTION

MODIFIED BITUMEN ROOFING**SECTION 07600****PART 1 - GENERAL**

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General and Supplementary Conditions, and other General Requirements apply to the work specified in this Section.

1.02 DESCRIPTION OF WORK

- A. Completely remove existing BUR. roofing systems, board insulation and base flashings to expose bare substrate of existing deck, i.e. concrete, plywood and wood.. After removal, no residual application materials shall remain that could cause failure of any kind of the new roofing systems

1. See the attached descriptions of existing **roof areas A-K** following this section.

Note: The information contained in above reports must be verified and does not relieve the Contractor of the responsibility to verify all existing conditions.

- B. **Asphalt modified bitumen roofing** shall include:

1. New roofing system configurations shall consist where applicable over existing deck; fiberglass base sheet loose laid, flat and tapered rigid insulation, crickets, cover panel, base ply of modified bitumen applied with torch application, cap sheet of modified bitumen layer with granular surfacing applied with torched application, and parapet treatment up wall and under the metal coping and flashing systems applied by torched application:

Concrete Deck: tapered polyisocyanurate board (minimum 1-1/2 inch thick) adhered in foam adhesive, gypsum cover panel adhered in foam adhesive, base ply of modified bitumen applied with torch application and top layer with granular surfacing applied with torched application, and parapet treatment up wall and under the metal coping and flashing systems applied by torched application

Wood/Plywood Decks: fiberglass base sheet loose laid over existing substrate, one layer of flat or tapered polyisocyanurate board (minimum 1-1/2 inch thick) mechanically attached simultaneously with gypsum cover board, base ply of modified bitumen applied with torch application and top layer with granular surfacing applied with torched application, and parapet treatment up wall and under the metal coping and flashing systems applied by torched application

2. Provide roofing system and application to meet the wind uplift requirements the perimeter and corners as required by FM LPDS 1-29: The net design wind pressures below represent the net pressures (sum of internal and external) to be applied normal to each building surface, as required by and calculated in accordance with the International Building Code 2009 and Supplements (Orleans Parish) and ASCE 7-05, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330, based on 130 mph wind speed, Exposure B and Importance Factor of 1.00, and perimeter and corners as required by Codes

figured without parapets.

3. Approved Roofing/Flashing Systems: Equal to the following system:

Siplast Inc.:

Fiberglass Base Sheet: (Wood/Plywood Decks Only): Parabase FS

Cap Sheet: Paradiene 30 FRTG.

Interply: Paradiene 20 TG.

Flashing: Paradiene 20 SA/Veral Alum; (Parapro 123 for flashing at all penetrations)

General notes:

- a. All foil faced flashing products shall be resistant to thermal shock.
 - b. Flashing systems are to be two ply systems (specify backer ply).
 - c. Note: If required, provide heavier base sheets or other components if required by the roofing manufacturer for the application being used.
 - d. Provide liquid flashing system (catalyzed acrylic resin and fleece inner layer), where indicated on the drawings and also at all pipe and other similar penetrations.
4. If application methods and materials are required to differ from those listed above due to new or existing slopes that are in excess of the slope limit of the specified systems, provide materials and application methods as recommended by the roofing manufacture for those conditions. It is the Contractor's responsibility to verify all slopes and coordinate with roofing manufacturer's requirements.

C. Sheet metal work shall include:

1. New stainless steel metal flashings, scuppers, downspouts, etc as indicated on the drawings associated with the modified bitumen roofing. Pre-engineered copings and gravel stops are specified in Section 07620-Flashing and Sheet metal

D. Rough Carpentry: Treated wood nailers.

1.03 QUALITY ASSURANCE

- A. Installer: Roofing and sheet metal work shall be by a single firm that has been in business at least five (5) years, called the Installer in this Section, specializing in the type(s) of roofing required, so that there will be undivided responsibility for the performance of the work.
- B. Installer shall be certified as an approved applicator in writing by the roofing materials manufacturer prior to award of contract for the installation of a fully guaranteed roof as required by this specification.
- C. UL Rating: Provide materials and roofing systems which have been tested, listed and labeled by UL for the following Class or Rating as roofing:
- D. Provide "Class A" rating, except as otherwise indicated.
- E. Manufacturer of Roofing Materials: Obtain primary and secondary materials from a single

manufacturer, who publishes complete information on the required system, and offers to guarantee or bond the completed roofing installation as required. Obtain accessory, i.e., non-combustible cant, roofing nails, etc materials from sources acceptable to the manufacturer of the primary materials.

- G. The roofing system product supplier shall furnish the Roofing Contractor with Material Safety data Sheet/Sheets (MSDS), incorporating OSHA approved form, current edition. Said sheets shall be available at the site at all times until project completion.
- H. On Site Inspector: The Owner may require that an inspector be in attendance continually from the beginning of roofing operations.
- I. Acceptable Products: Primary roofing products, including each type of sheet, all manufactured in the United States, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 10 years. The primary roofing products shall have maintained a consistent composition for a minimum of five years.
- J. Product Quality Assurance Program: Primary roofing materials shall be manufactured under a quality management system that is monitored regularly by a third party auditor under the ISO 9001 audit process. A certificate of analysis for reporting/confirming the tested values of the actual material being supplied for the project will be required prior to project close-out.
- K. Agency Approvals: The proposed roof system shall conform to the following requirements. No other testing agency approvals will be accepted.
 - 1. Underwriters Laboratories Class A acceptance of the proposed roofing system (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings.
- L. Acceptable Contractor: Contractor shall have a minimum of (5) years experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products. A complete list of projects, with the product to be used, shall be provided.
- M. Secondary Products: Products shall be supplied by the single roof system manufacturer for coverage under the terms of the guarantee. The primary membrane manufacture shall have private labeling agreements with secondary product suppliers for the listed products; thermal insulation, cover panel, insulation fasteners, fastener plates, base sheet fasteners, cements, primers, sealants, membrane and insulation adhesives, perimeter metal systems, etc. Manufacturer shall provide evidence that it complies with these requirements by providing
 - 1. Primary manufacturer's commercial product data sheets.
- N. Pre-Roofing Conference: Before the waterproofing work is scheduled to commence, after shop drawings have been reviewed by the Architect, and before any materials are ordered. A conference shall be called at the jobsite by the Contractor for the purpose of reviewing the drawings and specifications. The intent is to resolve questions before the work is started.

The conference shall be attended by the waterproofing contractor, and his foreman, General Contractor's Superintendent, roof manufacturer's representative as well as the Architect's and Owner's representative.

- O Pre-application Conference: Before the waterproofing work is scheduled and within one week of roofing application is to commence, after shop drawings have been reviewed by the Architects, a conference shall be held at the jobsite for the purpose of a final review of the drawings and specifications. The intent is to resolve questions before any work is started. (The manufacturer's representative shall be present).
- P. At start up, prior to completion and at completion, the waterproofing contractor must pay for an independent roofing inspector to inspect the roof and issue to the Architect a certificate stating that the material and workmanship on complying with a 20 year unlimited guarantee/warranty. At the completion visit, the independent auditor shall make a punch list of items to be completed with a dollar value, and shall revisit the project to confirm that all punch list items have been completed. (The Architect shall be sent a copy of the punch list). The name of the independent roofing auditor/inspector shall be submitted with shop drawings.
- Q. The representative of the Architect, Owner, the General Contractor, the Roofing Contractor, and Roofing Manufacturer's representative shall make inspections of the roofing system toward the end of the (1) year warranty period and toward the end of the Waterproofing Contractor's two (2) year guarantee period. The Roofing Contractor or Roofing System Manufacturer, as applicable, shall make approved repairs and/or replacements covered by the Guarantee. The project will not be accepted until the Roofing Contractor's Guarantee, executed in strict accordance with the Contract Documents, have been submitted and accepted by the Architect and Owner. (A sample of the total roof system guarantee shall be submitted in shop drawings.)
- R The roofing system supplier shall furnish the roofing Contractor with Material Safety Data Sheet/Sheets (MSDS), incorporating OSHA approved form, current edition. Said sheets shall be available at the site at all times until project completion.
- S The Roofing Contractor shall submit to the Architect, in a ring binder, two copies of all roofing data, including manufacturer's catalogs/manuals of material and accessories used in the Project for distribution to the Owner.
- T Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.
- U. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

- V. **Manufacturer Requirements:** The primary roofing materials manufacturer shall provide direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.

1.04 SUBSTITUTION SUBMITTALS

- A. **Submittal of Equals:** All submittals which do not conform to the following requirements will be rejected. A Contractor may submit a primary roof systems to be considered as equals to the specified roof system no less than 10 days prior to bid date. List the name of the substituted item, the manufacturer, model/number, etc., and any other deviations in performance or appearance from the "Standards" set forth in this Section. Contractor shall present to the Owner a written guarantee and certification that the substituted material/method meets the standards of the materials specified. The burden of proof of quality and equality rests on the Contractor. The Owner reserves the right to determine if the material is equal to the specified and is acceptable under this contract. Primary roof systems which have been reviewed and accepted as equals to the specified roof system will be listed in an addendum prior to bid date; only then will equals be accepted at bidding. Submittals shall include the following:
1. Two 3 inch x 5 inch samples of the primary roofing and flashing sheets.
 2. Latest edition of the roofing system manufacturer's specifications and installation instructions.
 3. Evidence that the manufacturer of the proposed roofing system utilizes a quality management system that is ISO 9001 certified. Documentation of ISO 9001 certification of foreign subsidiaries without domestic certification will not be accepted.
 4. Evidence and description of manufacturer's quality control/quality assurance program for the primary roofing products supplied. The quality assurance program description shall include all methods of testing for physical and mechanical property values. Provide confirmation of manufacturer's certificate of analysis for reporting the tested values of the actual material being supplied for the project prior to issuance of the specified guarantee.
 5. Descriptive list of the materials proposed for use.
 6. Evidence of Underwriters' Laboratories Class A acceptance of the proposed roofing system (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings. No other testing agency approvals will be accepted.
 7. Letter from the proposed primary roofing manufacturer confirming that a phased roof application, with only the modified bitumen base ply in place for a period of up to 10 weeks, is acceptable and approved for this project.
 8. List of 3 of the proposed primary roofing manufacturer's projects, located in the United States, of equal size and degree of difficulty which have been performing successfully for a period of at least 10 years.

9. Letter from the proposed primary roofing manufacturer confirming that the filler content in the elastomeric blend of the proposed roof membrane and flashing components does not exceed 35% in weight.
10. Complete list of material physical and mechanical properties for each sheet including: weights and thicknesses; low temperature flexibility; peak load; ultimate elongation; dimensional stability; compound stability; high temperature stability; granule embedment and resistance to thermal shock for foil faced products.
11. Request for substitution constitutes a representation that the Contractor:
 - a. Has personally investigated the proposed substitute product and determined that it is equal to or superior in all respect to that specified.
 - b. Will provide the same or better warranties, bonds and guarantees for the substitution as for the specified product.
 - c. Will coordinate the installation of an accepted substitution into the Work and making such changes as may be required to make the Work complete in all respects.
 - d. Waives all claims for additional costs, related to the substitution which may subsequently become apparent.
 - e. Certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesigns costs, and waives all claims for additional costs related to the substitution which subsequently become apparent.
12. Should the Contractor propose a substitute material or method assembly that is of questionable quality or suitability to the Architect, suitable tests may be required to establish a basis for acceptance or rejection. Such tests will be paid for by the Contractor and conducted in accordance with industry accepted standards and as accepted to the Architect.
13. Substitutions will not be considered when they are indicated or implied in shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
14. The Architect shall be the judge of the acceptability of proposed substitutions.
15. The Owner reserves the right to disapprove and reject any request for substitution.
16. Sample copy of the proposed guarantee.
17. Completed Product Substitution Request Form included with this specification section.
18. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.
19. Letter from the primary roofing manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

20. Certificate Of Analysis from the testing laboratory of the primary roofing materials manufacturer, confirming the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and ASTM D 7051 and indicate Quality Assurance/Quality Control data as required to meet the specified properties. A separate Certificate Of Analysis for each production run of material shall indicate the following information:
- a) Material type
 - b) Lot number
 - c) Production date
 - d) Dimensions and Mass (indicate the lowest values recorded during the production run);
 - Roll length
 - Roll width
 - Selvage width
 - Total thickness
 - Thickness at selvage (coating thickness)
 - Weight
 - e) Physical and Mechanical Properties;
 - Low temperature flexibility
 - Peak load
 - Ultimate Elongation
 - Dimensional stability
 - Compound Stability
 - Granule embedment
 - Resistance to thermal shock (foil faced products)
21. Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

1.05 MODIFIED BITUMEN CRITERIA

- A. General Requirements: All SBS membrane systems shall be a multi-layer, homogeneous roofing sheet assembly with a granular surfacing on the cap sheet layer. All roofing sheets shall be made with identical SBS blend formulations and manufactured using the same process for sheet construction.
- B. Performance Features: All SBS membrane systems shall have the following performance features as a minimum.
- 1. Phased Construction: Each SBS sheet shall be manufactured as an independent waterproofing layer. The independent waterproofing layer design shall allow for phased construction between layers.
 - 2. Granule Surfacing: The finished membrane system shall have a factory applied granule surfacing to allow for ease of inspection, maintenance and repair.

3. Detail Treatments: The SBS membrane terminations and associated roof penetrations shall be waterproofed using conservative detail configurations according to the following basic criteria.
 - a. Flanged metal flashings shall be set in mastic over the first SBS layer and waterproofed using a minimum of 2 additional layers of the SBS membrane.
 - b. Walls, curbed penetrations, etc. shall be waterproofed using a minimum total of 4 layers of the SBS membrane at junctures of the roof deck to the penetration. The 4 layered construction shall consist of: SBS base ply layer; SBS reinforcing ply layer; SBS cap sheet layer; SBS flashing sheet layer.
4. Underwriters Laboratories Rated: The SBS membrane system shall be UL rated Class A without the necessity for maintenance oriented coatings or surfacings.
5. Physical Properties: Each SBS sheet shall have the physical properties as a minimum specified under Part 2 herein.

1.06 PRE-INSTALLATION CONFERENCE

- A. Approximately two weeks prior to beginning of roofing operations, the roofing Contractor shall arrange to meet with the Architect, his inspector (if any), a representative of the material's manufacturer, and his project foreman which will be required to be on the roof at all times when any roofing is being done, for the purpose of reviewing specification requirements, construction procedures, and the prevalent job conditions under which the work is to be performed.
 1. Meet with Owner; Architect; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and attachment to structural members.
 4. Review loading limitations of deck during and after roofing.
 5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
 6. Review governing regulations and requirements for insurance, certifications, and inspection and testing, if applicable.
 7. Review temporary protection requirements for roofing system during and after installation.
 8. Review roof observation and repair procedures after roofing installation.
 9. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

1.07 ACCEPTANCE OF ROOF DECK

- A. Roofing Contractor shall inspect the roof deck and shall either accept the roof deck or shall indicate to the General Contractor where the deck is not acceptable for proper application of the roofing membrane.

1.08 NOTIFICATION OF START OF WORK

- A. The Contractor shall notify the Architect of his intention to begin work not less than 48 hours (2 working days) in advance so that arrangements may be made for an inspector to be present. No work is to be performed without the presence of the inspector.

1.09 SUBMITTALS

- A. **Manufacturer's Data:** Submit two copies of specifications, installation instructions and sample warranty from the manufacturer for each major roofing product, insulation and sheet metal required. Include data substantiating compliance with the requirements. Indicate by transmittal form that the Installer has received a copy of the manufacturer's instructions and recommendations.
- B. **Furnish approved application recommendations** which must include itemizing sequences of applications to provide for (1) inspection and approval by the Manufacturer's representative and the Owner's representative of the first ply or interply membrane complete with flashing installation prior to (2) application of the cap sheet and final finishing work on the flashings, both base and edge.
- C. **Contractor's Certification:** The Contractor shall certify in writing that the materials he will be using in the roofing system(s) shall be in accordance with the specifications.
- D. **Sheetmetal Shop Drawings** showing layout, profiles, methods of joining, and anchorages details, including counter-flashings, and expansion joint covers. Provide layouts 1/4 inch scale and details at 3 inch scale.
- E. **Submit, in a ring binder, three (3) copies of all roofing data, including manufacturer's catalogs/manuals of materials and accessories used in the Project, including manufacturer's Maintenance recommendations, for distribution to the User and Umbrella Agencies as directed by the Owner. See Section 01700 - Project Closeout.**

1.10 STORAGE AND HANDLING

- A. All materials shall be stored off the ground on pallets and protected from damage and moisture by tarpaulins. Do not store felts or roofing materials on the ground or over new concrete floors. Stack roofing felt or roofing materials on the ground or over new concrete floors. Stack roofing felt reels on end during storage. Avoid prolonged storage of felts at the site. All materials must be absolutely dry and in good condition when ready for use. All materials which in the opinion of the Architect, have become damaged or otherwise unfit for use during delivery or storage shall be replaced at the expense of the Contractor.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Precipitation; Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application.

1.12 PROTECTION REQUIREMENTS

- A. Torch Safety: Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas of the roof construction. Continue the fire watch after roofing material application has been suspended for the day.
- B. Debris Removal: Remove all debris daily from the project site and take to legal dumping area authorized to receive such materials.

1.13 WARRANTY

- A. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's watertight "No Dollar Limit" membrane guarantee. Coverage of this guarantee shall include roof membrane, base sheets, membrane flashing, roof insulation systems, insulation adhesives, insulation fasteners, new lightweight insulating concrete, asphalt cements, primers and base sheet fasteners specified. This guarantee shall not be prorated." Guarantee shall be signed by an authorized representative of the roofing manufacturer, on form which was published with product literature as of the date of Contract Documents, for the following period of time. The roofing guarantee shall not exclude random areas of ponding from the coverage defined as "no standing water after 48-hours from the last rain".
 - 1. Twenty (20) years from date of substantial completion.
- B. The Roofing Manufacturer's Warranty shall guarantee at the manufacturer's own cost and expense, to make or cause to be made such repairs to or replacement of, to correct any and all faulty installations or materials of the roofing system, to keep the roofing system in a watertight condition throughout the 20 year guarantee period. The guarantee shall not be prorated. The executed guarantee shall be delivered to the Architect in three original counterparts prior to acceptance of the Work. No signature by the Owner shall be required.
- C. The executed guarantee shall be delivered to the Architect in three original counterparts prior to acceptance of the work. Final payment shall not be given until the written guarantee is furnished.
- D. Any interior wall and ceiling finishes damaged by failure to correct any problem in a timely fashion shall be paid by the waterproofing contractor and/or manufacturer.
- E. Certificate of Analysis for all roll good products shall be submitted with waterproofing guarantee. A sample certificate of analysis shall be submitted with shop drawings
- F. Additionally, provide roofing contractors 2 year Roof Guarantee –see attached Guarantee following this section

PART 2 - PRODUCTS

2.01 MATERIALS GENERAL

- A. General: Furnish the specified materials for this roofing operation. Furnish all accessories necessary for a complete roofing and sheet metal job even if not specifically shown or specified. Substitution of any other materials or assemblies will not be permitted without prior approval before bid time. All SBS membrane sheets shall not contain any oxidized asphalt.
- B. Primer: Provide primer on all substrates to receive roofing components. Primer(s) shall be as recommended by roofing component manufacturers.

2.02 ASPHALT MODIFIED BITUMEN ROOFING

- A. Roofing Membrane Assembly: The roof membrane assembly shall consist of two (2) plies of a prefabricated, fiberglass reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane. The cap sheet shall have factory applied granular surfacing. The modified bitumen base ply shall be fully adhered to the prepared substrate as specified herein, and shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system. The modified bitumen cap sheet membrane shall be fully adhered to the modified bitumen base ply as specified herein.
- B. Flashing Membrane Assembly: The flashing membrane assembly shall consist of a prefabricated, fiberglass scrim-mat reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. A low softening point asphalt shall be incorporated into the membrane between the metal foil surfacing and the SBS modified bitumen asphalt membrane, at the channels, in order to preclude foil delamination during daily thermal cycling.
- C. Granule Surfaced Two-Ply SBS Roofing Membrane System: As follows:
 - 1. Modified Bitumen Base Ply in accordance with ASTM D5147 Test Method:
 - a. Compound Stability: Min. 121°C (250°F)
 - b. Low Temperature Flexibility: @-26°C (-15°F)
 - c. Elongation @23°C (73°F): 3% min. @ 5% max. load
 - d. Dimensional Stability: <0.1%
 - e. Elongation @-18°C (0°F): 4.5%
 - f. Ultimate Elongation **: 50%
 - g. Water Absorption (Maximum): 2%
 - h. Cyclic joint displacement fatigue passes ASTM D5849 both as manufactured and after heat conditions per ASTM D5147
 - 2. Modified Bitumen Cap Sheet in accordance with ASTM D5147 Test Method:
 - a. Compound Stability: Min. 121°C (250°F)
 - b. Low Temperature Flexibility: @-26°C (-15°F)
 - c. Elongation @23°C (73°F): 3% min. @ 5% max. load

- d. Dimensional Stability: <0.1%
- e. Granule Embedment*: <1.5 g. per sample*, max individual loss 2.0g per sample
- f. Breaking Load @-73°F (Ave): 30 lbf/inch
- g. Ultimate Elongation**: 55%
- h. Cyclic joint displacement fatigue passes ASTM D5849 both as manufactured and after heat conditions per ASTM D5147

* This test is based on #11 ceramic coated granules used as surfacing. Using this granule type, there are approximately 6 grams total in the abraded test area.

** Ultimate elongation is measured at the point on the stress-strain curve where the load is reduced to 5% of the reported tensile strength.

D. SBS Flashing Membrane Sheet

1. Modified Bitumen Flashing Sheet in accordance with ASTM D5147 Test Methods:

- a. High Temperature Compound Stability: Min. 107°C (225°F)
- b. Low Temperature Flexibility: -18°C (-5°F)
- c. Tensile Strength (lbs/in.): 120 lbs.
- d. Dimensional Stability: 2% max.
- e. Ultimate Elongation**: 45%

** Ultimate elongation is measured at the point on the stress-strain curve where the load is reduced to 5% of the reported tensile strength.

E. Primer: Primer(s) shall be as recommended by roofing component manufacturers.

- 1. At wood use asphalt primer complying with ASTM D-41.

F. Cant Strips: Fibrous adhered in system complying with uplift requirements.

G. Flashing Cement: ASTM D 2822 Bituminous plastic roofing cement, non-asbestos containing formulation or ASTM D4586, Type II.

H. Lead sheet: Fed. Spec. QQ-L-201, Grade D, hard lead, 4.0 lb.

G. Walkway Protection Board: As part of roofing system; equal to Paratred, as a part of the roofing system prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped ceramic coated granule and as follows:

- 1. Thickness: 0.217 in (5.5 mm)
- 2. Weight: 1.4 lb/ft² (6.8 kg/m²)
- 3. Width: 30 in (76.2 cm)

H. Mechanical Anchors: Type 304 stainless steel, type and size as specifically recommended by the insulation manufacturer for the type of deck used and complying with specified wind load rating requirements.

L. Catalyzed Acrylic Resin Liquid Flashing System: A specialty flashing system consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing

system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are pre-mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application Provide Parapro 123 Flashing System by Siplast or equal systems by specified manufacturers.

- M. Low Rise Foam Adhesive: Single component polyurethane adhesive dispensed from a portable pre-pressurized container requiring no external power source- range of working temperatures (33° F/0.5° C to 111° F/43° C.; equal to "ParaStik" by Siplast
- N. Insulation Fasteners for Wood/Plywood Decks: The fastener shall conform meet or exceed Factory Mutual Standard 4470 and when subject to 30 Kesternich cycles, show less than 15% red rust. A fluorocarbon coated screw type waterproofing fastener having a minimum 0.245 inch thread diameter. Plates used in conjunction with the fastener shall be a metal type having a minimum 3 inch diameter, equal to "Parafast HD Fastener" by Siplast.

2.03 SHEET METAL AND ACCESSORIES

- A. See Section 07620

2.04 ROOF INSULATION

- A. Base Layer (Straight and Tapered Wood/Plywood Decks): A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber facers. The polyisocyanurate panel shall be in full compliance with ASTM C1289, Type II, Class1, Grade 2. The panels shall have a minimum thickness of 1.5 inch, providing for a 1/4 inch per foot slope and a total nominal thickness indicated on the drawings. The insulation, for thermal performance , shall provide an R-value of 10 for each 1.5 thickness installed. Acceptable types are as follows:
 - 1. Equal to "Tapered Paratherm" by Siplast.
 - 2. Crickets shall have a minimum of 1/2" per foot slope.
- B. Base Layer (Tapered Concrete Decks): A closed cell, rigid polyisocyanurate foam core material, integrally laminated between coated facers. The polyisocyanurate panel shall be in full compliance with ASTM C1289, Type III, Class1, Grade 2. The panels shall have a minimum thickness of 1.5 inch, providing for a 1/4 inch per foot slope and total nominal thickness indicated on the drawings. The insulation, for thermal performance , shall provide an R-value of 10 for each 1.5 thickness installed. Acceptable types are as follows:
 - 1. Equal to "Tapered Paratherm" by Siplast.
 - 2. Crickets shall have a minimum of 1/2" per foot slope.
- C. Overlay Panels: Nonstructural, non-woven, non asphaltic glass mats embedded into both faces and 500 PSI moisture-resistant treated faced gypsum core, having a nominal thickness of 1/2 inch, Dens-Deck Primed" or "Securock" by USG, not requiring priming and compatible with specified roofing system-no substitutions.
 - 3. Insulation panels installed in Low Rise Foam Adhesive shall have a maximum panel size of four (4) feet x four (4) feet.

PART 3 - EXECUTION**3.01 GENERAL**

- A. All surfaces to be covered shall be smooth, dry and free from dirt, debris and foreign material which will affect the adherence and integrity of the specified materials. Installation of the roofing felts constitutes the acceptance of the roof deck by the Installer.
- B. Do not place any load on the roof that will exceed the safe design load.
- C. Provide barricades and, where necessary, signs to ensure the safety of the general public and other workmen on the job from fire and falling materials.
- D. The Roofing Contractor shall be responsible for the proper attachment of the specified work to any work embedded in, in contact with, or forming an integral part of the specified roofing system.
- E. All roof areas shall be accurately laid out for proper lap and sequence of plies, and all plies laid to chalked line. Each ply shall be broomed in place. Felts shall be free from fishmouths, buckles, blisters, or other faulty workmanship.
- F. Water Cut Offs: Provide water cut-offs at the end of each day's work or whenever operations cease due to weather conditions. Water cut-offs shall seal the exposed edges of roof insulation and shall consist of two plies of No. 15 tarred felt extending from a point 12" on the roof deck carrying up and over the roofing and extending 6". Hot mop both edges so that they are weathertight. Follow with a glaze coat. Remove the cut-off before commencing work at that point at a later date.
- G MAINTAIN A FIRE WATCH FOR TWO (2) HOURS AFTER TORCHING OPERATIONS AS WELL AS WALKING THE ENTIRE ROOF CHECKING FOR "HOT SPOTS" BY USING AN INFRARED HEAT-SENSING THERMOMETER

3.02 INSULATION

- A. Comply with the manufacturer's instructions for the particular condition of installation including treatment at edges of each insulated area. Extend insulation in thickness as shown over concrete deck. Cut and fit tightly around obstructions, and fill voids with insulation and mastic. Form crickets and tapered areas as shown and as required for proper drainage of the membrane.
- B. Apply with low rise foam adhesive in strict accordance with manufacturers printed instructions. Run long joints of insulation in continuous straight line, perpendicular to roof slope, with end joints staggered between rows. Stagger joints two ways in each course by not less than 1/3 of the narrow board dimension.
- C. Insulation – multiple layers: Mechanically attach the insulation layers simultaneously to the substrate, using the specified fasteners, at a rate of 1 fastener per 2 square feet of panel area (16 per 4' by 9' panel). Increase the fastening frequency at the roof perimeter by 50% and in the corners by 100%. Stagger the panel joints between insulation layers.

3.03 BASE SHEET SECUREMENT

- A. Wood Decks: Lay base sheet loose over the entire area to be roofed, lapping sides 3 inches and ends 6 inches.

3.04 ASPHALT MODIFIED BITUMEN ROOFING INSTALLATION

- A. Asphalt Modified Bitumen Roofing: Two (2) plies of modified bitumen asphalt membrane set in asphalt bitumen equal to systems specified installed in strict accordance with roof manufacturer's printed instructions.
- B. Priming: Prime metal flanges (all jacks, edge metal, lead drain flashings, etc.) and concrete and masonry surfaces with a uniform coating of asphalt primer ASTM D-41-73.
- C. Roofing Application: All layers of roofing shall be laid free of wrinkles, creases or fishmouths. Sufficient pressure shall be exerted on the roll during application to ensure prevention of air pockets. Lap seams of the cap sheet layer. The courses shall be staggered to ensure this.
 - 1. All layers of roofing shall be laid in relation to the slope of the deck as recommended by the manufacturer.
 - 2. The base ply shall be fully bonded to the prepared substrate and shall have a minimum of three (3) inch side and end laps. Each sheet shall be applied directly behind the asphalt applicator.
 - 3. The cap sheet shall be bonded to the base ply and have a minimum of three (3) inch side and end laps.
 - 4. Sufficient pressure shall be exerted on the metal clad modified bitumen sheet to ensure the prevention of air pockets.
 - 5. All end laps of the metal-clad modified bitumen flashing sheet shall be primed with a uniform coating of the specified asphalt primer and allowed to thoroughly dry prior to overlapping of adjoining sheets.
 - 6. All side laps of the metal-clad modified bitumen flashing sheet shall be heat fused to ensure a complete seal.
 - 7. Maximum sheet lengths and special fastening of the specified roof membrane system may be required at various slope increments where the roof deck slope exceeds one-half (1/2) inch per foot. The manufacturer shall provide acceptable sheet lengths and the required for all roofing sheet applications to applicable roof slopes.
- D. Granule Embedment: Mineral granules shall be broadcast over all bitumen overruns on the cap sheet surface, while the bitumen is still hot, to ensure a monolithic surface color.
- E. Flashing Application at Vertical Walls: Flashing shall be accomplished using the reinforcing sheet and metal foil flashing membrane. The flashing shall be applied in three foot lengths

(cut from the end of roll) using the factory selvage edge for laps. The reinforcing sheet shall be lapped a minimum of three (3) inches to itself and shall extend a minimum of three (3) inches onto the base surface and three (3) inches up the parapet wall above the cant. Lap seams in the reinforcing layer shall never coincide with the laps of the metal foil flashing layer. The reinforcing sheet shall be adhered by a mopping of asphalt both wall and sheet. After the cap sheet has been applied to the top of the cant, the surface area that is to receive flashing coverage shall be prepared by torch heating granular surfaces or application of asphalt primer to foil surfaces allowing primer to dry thoroughly. The metal foil flashing sheet shall be torched in place. Pressure shall be exerted on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. All loose laps and edges shall be checked and sealed. The top edge of the flashing shall be nailed on nine (9) inch centers.

- F. Use Of Metallic Powder: Metallic powder shall be broadcast over all bitumen overruns on the metal foil membrane surface color.
- G. Lead Pipe Flashings: The lead flanges shall be flashed with Catalyzed Acrylic Resin Liquid Flashing System
- H. Sheet Metal Components: In all cases, unless otherwise approved by the roofing manufacturer, flanged components shall be incorporated into the system between the application of the base ply and the cap sheet. The flange must be primed with a uniform coating of approved ASTM D41-73 asphalt primer and allowed to dry thoroughly; all flanges must be set in approved mastic.
- I. Catalyzed Acrylic Resin Liquid Flashing System: Install the liquid-applied primer and flashing system in accordance with the membrane system manufacturer's printed installer's guidelines and other applicable written recommendations as provided by the manufacturer.

3.04 ROOF DRAINS

- A. Lead Drain Flashings: The lead drain flashing shall be completely primed and allowed to dry prior to installation. After the base ply has been applied, the lead flashing sheet shall be set in mastic and formed to turn down inside of the drain bowl. The perimeter of the lead flashing shall be plied-in using an additional layer of the base ply material, overlapping the perimeter of the lead a minimum of three (3) inches. The cap sheet shall then be applied, extending beyond the clamping ring seal. The clamping ring shall then be installed with all clamps, bolts, etc., in place.

3.05 EXPANSION JOINTS

- A. A. Install all components of the system in accordance with the manufacturer's instructions. The system is to be wholly encapsulated between the plies of the modified bitumen membrane in a roofing/waterproofing by torching.
- B. Slit the modified bitumen base ply with a knife along the joint gap. Refer to the manufacturer's instructions for the preparations and torching of the expansion joint material. Torch the prepared expansion joint material to the substrate, making sure that the expansion joint material is firmly and uniformly set, without voids, into the liquefied asphalt. Torching is carried out by the liquefaction of the modified bitumen base sheet and the expansion joint material rolled into it. Flame can be directed at the expansion joint material. At all times observe the modified bitumen manufacturer's

recommendations and safety instructions. The expansion joint material must be completely encapsulated in the hot asphalt/bitumen and a bitumen bead visible along expansion joint material selvage edge.

- C. Torch the modified bitumen stripping plies smooth, free from air pockets, wrinkles, fish mouths, or tears. When torching, direct the flame away from the expansion joint material gland material, use the torch and flop technique. Install each stripping ply; shingle lap fashion, onto the expansion joint material firmly and uniformly, without voids. At all times observe the modified bitumen manufacturer's recommendations. The expansion joint material must be completely encapsulated in the melted bitumen and a bitumen bead visible along the expansion joint material selvage edge
- D. Attach a modified bitumen sheet to one side of the expansion joint. This is achieved by torching the modified bitumen sheet to the already installed modified bitumen cap ply.

3.06 ROOF ACCESSORIES

- A. Install roof accessories in accordance with manufacturer's recommendations. All roof accessories shall be left in a clean and first class condition.

END OF SECTION

ROOFING GUARANTEE

OWNER: ARCHDIOCESE OF NEW ORLEANS

ADDRESS: BUILDING OFFICE
7887 WALMSLEY AVE.
NEW ORLEANS, LA. 70125

WHEREAS _____

Address _____

Telephone () _____, herein called the "Roofing Contractor", has performed roofing and flashing in accordance with the Contract Documents (Hereinafter called the "Work") under a Contract with the Owner.

Name of Project: _____

Parish or Institution _____

Location/Address

Name and type of Building (s)

Type (s) of Roof Deck (s):

Total Roof Area _____ SF, Flashing, Edge: _____ LF
Base: _____ LF

Date of Acceptance: _____ Guarantee
Period: 2 Years

Date of Expiration: _____

AND WHEREAS the Roofing Contractor has contracted to guarantee said work against water entry from faulty or defective materials and workmanship for the designated Guarantee period:

NOW THEREFORE the Roofing Contractor guarantees, subject to the terms and conditions herein set forth, that during the Guarantee Period he will at his own cost and expense make or cause to be made with approval procedures and materials such repairs to or replacements of said work resulting from water entry or faults or defects of said Work as are necessary to correct faulty and defective work and as are necessary to maintain said Work in watertight conditions and further to respond

on or within two (2) working days upon written notification of leaks or defects by the Owner. Furthermore, he will at his own cost and expense maintain the roof for (2) years after acceptance, in accordance with the current edition of the Roof Maintenance Manual published by the Roofing Industry Educational Institute. The roof shall be inspected a minimum of twice each year, and a report prepared documenting the conditions observed at each inspection. These inspections shall be made once during the months of April or May and once during the months of September and October. Two copies of each report shall be forwarded to the Owner.

This guarantee is made subject to the following terms and conditions:

1. Specifically excluded from this guarantee are damages to the Work, other parts of the building and building contents caused by: A) lightning, windstorm (includes hurricanes and tornados), hailstorm, earthquakes and other unusual phenomena of the elements; B) fire; and C) structural failures causing excessive roof deck, edgings and related roof components movement. When the Work has been damaged by any of the foregoing causes, the Guarantee will be null and void until such damage has been repaired by the Roofing Contractor, and until the cost and expense thereof has been paid by the Owner or another responsible party so designated.
2. During the Guarantee Period, if the Owner allows alteration of the Work by anyone other than a Contractor approved in writing by the Roofing Contractor, prior to the work being performed, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations, the Guarantee shall not become null and void, unless the Roofing Contractor, prior to proceeding with said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the Work, thereby reasonably justifying a termination of this Guarantee.
3. During the Guarantee Period, if the original use of the roof is changed and it becomes used for, but for which it was not originally designed or specified, as a promenade, work deck, spray-cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
4. During the Guarantee Period, if any building or area of a building is changed to uses creating extremes of interior temperature and/or humidity, but for which it was not originally designed And specified, without provisions and alterations made to the building which effectively contain or control these conditions, this Guarantee shall become null and void upon the date of said change.
5. The Owner shall promptly notify the Roofing Contractor in writing of observed known or suspected leaks, defects or deterioration and shall afford reasonable opportunity for the Roofing Contractor to inspect the Work, and to examine the evidence of such leaks, defects or deterioration.
6. This Guarantee is recognized to be the only guarantee of the Roofing Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and recourses lawfully available to him in case of roofing failure. Specifically, this Guarantee shall not operate to relieve the Roofing Contractor of his responsibility for performance of the original work, regardless of whether the Contract was a Contract directly with the Owner or a Subcontract with the Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this
day of _____, 201____.

General Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone No. _____

WITNESS: _____

Roofing Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone No. _____

WITNESS: _____

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area A
Inspection Date:	August 25, 2011
Square Footage:	423
# Stories:	1 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Ladder
Leakage Reported:	No
Previous work done:	No
Work done by:	

Membrane / Flashing Deficiencies: Perimeter edge blocking is rotted. Roof deck is exposed on corner of the roof area. Area of the roof has thick vegetation growing on system. Wall flashing is brittle and aged.

Composition: 3 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Structural concrete
 Insulation Single Layer: Three layers of 3/4 –inch fiberglass insulation.
 Membrane System: 3 ply built-up-roof with gravel surfacing
 Flashing System: Asphalt based granular surfaced.

Drainage: Gutter downspout.
Flashing Details: 2 piece copper wall counter flashing, waste stack, gravel stop edge,

Inspected by: Sean Tufts
 Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area B
Inspection Date:	August 25, 2011
Square Footage:	976
# Stories:	1 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Ladder
Leakage Reported:	No
Previous work done:	No
Work done by:	

Membrane / Flashing Deficiencies: Inter-ply blistering. Alligating of asphalt flood coat surfacing is thru out the roof area and is brittle. I observed a large split in BUR felts at perimeter edge.

Composition: 3 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Wood Deck
Insulation Single Layer: Perlite crickets.
Membrane System: 3 ply built-up-roof with asphalt flood coat surfacing.
Flashing System: Asphalt based granular surfaced.

Drainage: Gutter downspout.

Flashing Details: 2 piece copper wall counter flashing, waste stack, gravel stop edge,

Inspected by: Sean Tufts
Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area C
Inspection Date:	August 25, 2011
Square Footage:	38
# Stories:	1 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Ladder
Leakage Reported:	No
Previous work done:	No
Work done by:	

Membrane / Flashing Deficiencies: Exposed deck evident. Roof and flashing system is well beyond service life.

Composition: 3 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Plywood Deck
Base Sheet: asphalt fiberglass felt.
Membrane System: 3 ply built-up-roof with asphalt flood coat surfacing.
Flashing System: Asphalt based granular surfaced.

Drainage: Gutter downspout.
Flashing Details: 2 piece copper wall counter flashing, waste stack, gravel stop edge,

Inspected by: Sean Tufts
Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area D
Inspection Date:	August 25, 2011
Square Footage:	90
# Stories:	2 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Ladder
Leakage Reported:	No
Previous work done:	No
Work done by:	

Membrane / Flashing Deficiencies: Typical deficiencies in BUR system were not evident. Wall flashing system has been repaired. The repair of membrane and fabric is aged with cracks and exposed felts.

Composition: 3 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Plywood Deck, slope in structure.
 Base Sheet: asphalt fiberglass felt.
 Membrane System: 3 ply built-up-roof with asphalt flood coat surfacing.
 Flashing System: Composition flashing.

Drainage: Conductor head to downspout.

Flashing Details: 1 piece galvanized step wall counter flashing, thru-wall scupper, parapet wall.

Inspected by: Sean Tufts

Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area E
Inspection Date:	August 25, 2011
Square Footage:	60
# Stories:	2 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Ladder
Leakage Reported:	No
Previous work done:	No
Work done by:	

Membrane / Flashing Deficiencies: Typical deficiencies in BUR system were not evident. Wall flashing system has been repaired. The repair of membrane and fabric is aged with cracks and exposed felts.

Composition: 3 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Plywood Deck, slope in structure.
 Base Sheet: asphalt fiberglass felt.
 Membrane System: 3 ply built-up-roof with asphalt flood coat surfacing.
 Flashing System: Composition flashing.

Drainage: Conductor head to downspout.

Flashing Details: 1 piece galvanized wall counter flashing (low height), thru-wall scupper, parapet wall.

Inspected by: Sean Tufts

Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area F
Inspection Date:	August 25, 2011
Square Footage:	38
# Stories:	1 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Ladder
Leakage Reported:	No
Previous work done:	No
Work done by:	

Membrane / Flashing Deficiencies: Exposed deck evident. Roof and flashing system is well beyond service life.

Composition: 3 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Plywood Deck
Base Sheet: Red Rosin.
Membrane System: 3 ply built-up-roof with asphalt flood coat surfacing.
Flashing System: Asphalt based granular surfaced.

Drainage: Gutter downspout.
Flashing Details: 2 piece copper wall counter flashing

Inspected by: Sean Tufts
Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area G
Inspection Date:	August 25, 2011
Square Footage:	773
# Stories:	1 Story
Approx. year Installed:	Unknown
Type of building:	Canopy
Space sensitivity:	Yes
Roof access:	Ladder
Leakage Reported:	No
Previous work done:	No
Work done by:	

Membrane / Flashing Deficiencies BUR system showing signs of age and service life is limited.

Composition: 4 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Plywood Deck, slope in structure
 Base Sheet: Red Rosin.
 Membrane System: 4 ply built-up-roof with asphalt with gravel surfacing.
 Flashing System: Composition flashing.

Drainage: Gutter downspout.

Flashing Details: 1 piece galvanized wall counter flashing, gravel stop, Two A/C duct curb (raise height), Two A/C unit on wood sleepers, two electrical supply penetrations, gas line on wood sleepers,

Inspected by: Sean Tufts

Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area H
Inspection Date:	August 25, 2011
Square Footage:	536
# Stories:	3 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Roof Hatch
Leakage Reported:	No
Previous work done:	No
Work done by:	Unknown

Membrane / Flashing Deficiencies: Observed collapsed chimney lying on roof area.
Possible punctures but this could not be determined.

Composition: 4 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Wood Deck
Base Sheet: Asphalt fiberglass base sheet.
Membrane System: 4 ply built-up-roof with asphalt with gravel surfacing.
Flashing System: Composition flashing.

Drainage: Gutter downspout.
Flashing Details: Gravel stop

Inspected by: Sean Tufts
Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area I
Inspection Date:	August 25, 2011
Square Footage:	298
# Stories:	4 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Roof Hatch
Leakage Reported:	No
Previous work done:	No
Work done by:	Unknown

Membrane / Flashing Deficiencies: Organic felts are deteriorated in system. Coal Tar still shows signs of being active. Wall flashing system is aged with exposed felts, crack and splits.

Composition: 4 ply organic rag felt coal tar pitch applied.

Core Data: Deck: Wood Deck
 Base Sheet: Fiberglass base sheet.
 Membrane System: 4 ply built-up-roof with gravel surfacing.
 Flashing System: Composition flashing.

Drainage: Thru-wall scupper.
 Flashing Details: Parapet wall with terra cotta coping (coping is waterproofed with composition flashing., flanged gravity vent, wall flashing with not termination

Inspected by: Sean Tufts
 Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area J
Inspection Date:	August 25, 2011
Square Footage:	64
# Stories:	4 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Roof Hatch
Leakage Reported:	No
Previous work done:	No
Work done by:	Unknown

Membrane / Flashing Deficiencies: Organic felts are deteriorated in system. Coal Tar still shows signs of being active. Wall flashing system is aged with exposed felts, crack and splits.

Composition: 4 ply organic rag felt coal tar pitch applied.

Core Data: Deck: Wood Deck
 Base Sheet: Fiberglass base sheet.
 Membrane System: 4 ply built-up-roof with gravel surfacing.
 Flashing System: Composition flashing.

Drainage: Thru-wall scupper.
 Flashing Details: Parapet wall with terra cotta coping (coping is waterproofed with composition flashing., flanged gravity vent, wall flashing with not termination

Inspected by: Sean Tufts
 Date: August 25, 2011

EXISTING ROOF DESCRIPTION

General Information:	Martin Manor 1501 N. Johnson New Orleans, LA 70116
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Roof Area:	Roof Area K
Inspection Date:	August 25, 2011
Square Footage:	279
# Stories:	3 Story
Approx. year Installed:	Unknown
Type of building:	Brick
Space sensitivity:	Yes
Roof access:	Ladder
Leakage Reported:	No
Previous work done:	No
Work done by:	

Membrane / Flashing Deficiencies: Roof deck is exposed on corner of the roof area.
Wall flashing is brittle, aging and is not properly terminated.

Composition: 4 ply fiberglass felts hot asphalt applied.

Core Data: Deck: Wood Deck, slope in structure.
Base Sheet: Asphalt fiberglass felt.
Membrane System: 4 ply built-up-roof with asphalt flood coat surfacing.
Flashing System: Composition flashing.

Drainage: Gutter to downspout.

Flashing Details: Wall flashing missing sheet metal counter flashing, gravel stop.

Inspected by: Sean Tufts

Date: August 25, 2011

SHEET METAL ROOFING**SECTION 07610****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Factory formed curved copper sheetmetal standing seam roof system, field assembled, concealed fastener system with 1 inch high seams with snap-on seam, fastened with stainless steel fasteners, and related gutters, downspouts, flashings and accessory components. See drawings for radius.
- B. Rubberized underlayment over existing wood deck for entire roof area.

1.02 RELATED SECTIONS

- A. Section 06100 - Carpentry: Wood blocking

1.03 REFERENCES

- A. ANSI/ASTM A167 - Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet, and Strip.
- B. ANSI/ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
- C. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- D. ANSI/ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- E. American Iron & Steel Institute (AISI) Specification for the Design of Coldformed Steel Structural Members.
- F. SMACNA - Architectural Sheet Metal Manual.
- G. Building Materials Directory - Underwriter's Laboratories, Test Procedure 580.

1.04 SYSTEM DESCRIPTION

- A. Roofing System: Preformed custom fabricated copper metal 1 inch high standing seam concealed fastener .
 - 1. Basis fo Design: "Curved Tee-Panel" by Berridge Manufacturing Company or equal by Peterson aluminum and Architctural Metal Systems.

1.05 DESIGN REQUIREMENTS

- A. **Structural:** Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the International Building Code 2009 and Supplements (Jefferson Parish) and ASCE 7-05, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330 as follows based on 130 mph wind speed; Importance Factor: 1.00, and Exposure B, and corners as defined in Code, and also 125 PSF uplift resistance with no permanent deformation.
1. Limit deflection to $L/240$.
- B. Provide roofing system complying with requirements of Underwriters Laboratory Label U.L. Standard 580 class 90 and FM Fire/Windstorm Classification: Class 1-90.
- C. **Air Infiltration:** Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ANSI/ASTM E283.
- D. **Water Infiltration:** No uncontrolled leakage when measured in accordance with ASTM E331, with a test pressure difference of 20% of design loads, but not less than 10.00 lbf/sq. ft. with water rate of 5 gallons per hr. per sq. ft., nor any water leakage at a static pressure at an air stream equivalent to the static pressure specified, tested for dynamic water penetration (similar test to AAMA 501.1 with water rate of 5 gallons per hr. per sq. ft., at a pressure at an air stream equivalent of 85 miles per hour wind speed.
- E. System shall accommodate, without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads and deflection of structural support framing.
- F. **Thermal Movements:** Provide metal roof panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. **Temperature Change (Range):** 120 deg. F, ambient; 180 deg. F, material surfaces

1.06 SUBMITTALS

- A. **Product Data:** Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal roof panel and accessory Submit under provisions of Section 01300.
- B. **Shop Drawings:** Show fabrication and installation layouts of metal roof panels; details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.
- C. **Samples:** Submit two samples of prefinished roofing panel, 12 x 17 inch in size illustrating finish color, sheen and texture.

- D. Submit results indicating compliance with minimum requirements of the following performance tests:
 - 1. Air Infiltration ASTM E 283-84
 - 2. Water Infiltration ASTM E 331-86 and AAMA 501.1
 - 3. Wind Uplift - U.L. Standard 580 class 90, FM 1-90
- E. Submit calculations with Louisiana registered engineer seal, verifying roof panel and attachment method resists wind pressures imposed on it pursuant to applicable building codes.
- F. Coordination Drawings: Roof plans drawn to scale and coordinating penetrations and roof-mounted items. Show the following: Roof panels and attachments, purlins and rafters, and Roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs

1.07 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
- B. Installer: Company specializing in performing the Work of this section with minimum ten years documented experience and approved in writing by roofing manufacturer.
- C. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain each type of metal roof panels through one source from a single manufacturer.
- E. Product Options: Drawings indicate size, profiles, and dimensional requirements of metal roof panels and are based on the specific system indicated. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- F. Surface-Burning Characteristics: Provide insulation material with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Flame-Spread Index: 25 or less
 - 2. Smoke-Developed Index: 450 or less

1.08 PRE-INSTALLATION CONFERENCE

- A. Convene one week prior to commencing Work of this section. Before starting roof deck construction, conduct conference at Project site. Comply with requirements for pre-installation conferences in Section 01200. Review methods and procedures related to roof deck construction and metal roof panels including, but not limited to, the following;

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal roof panel Installer, metal roof panel manufacturer's representative, deck Installer, and installers whose work interfaces with or affects metal roof panels including installers of roof accessories and roof-mounted equipment.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal roof panel installation, including manufacturer's written instructions.
4. Examine deck substrate conditions for compliance with requirements, including flatness and attachment to structural members.
5. Review structural loading limitations of deck during and after roofing.
6. Review flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
7. Review governing regulations and requirements for insurance, certificates, and testing and inspecting if applicable

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600. Deliver components, sheets, metal roof panels, and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling. Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage
- B. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- C. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage
- D. Prevent contact with materials which may cause discoloration or staining including exposure to sunlight.
- E. Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to extent necessary for period of metal roof panel installation

1.10 PROJECT CONDITIONS

- A. Verify that field measurements are as indicated on shop drawings.
- B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal roof panels to be performed according to manufacturers' written instructions and warranty requirements

1.11 WARRANTY

- A. Provide under provisions of Section 01700.
- B. Applicator shall furnish guarantee covering watertightness of the roofing system for the period of two (2) years from the date of substantial completion. See Maintenance Guarantee form following this Section.
- C. Manufacturer, along with the applicator, agree to repair or replace metal roof panel assemblies that fail to remain weathertight, including leaks for the period of ten (10) years from the date of Substantial Completion or longer period as allowed by law.

PART 2 - PRODUCTS

2.01 EXTERIOR SHEET METAL

- A. Copper: ASTM B 370; temper H00 (cold-rolled) except where temper 060 is required for forming; 16oz. (0.0216 inch thick) except as otherwise indicated.

2.02 ACCESSORIES

- A. Sealants: Manufacturer's standard type suitable for use with installation of system; non-staining, skinning, non-shrinking and non-sagging; ultra-violet and ozone resistant; color as selected as follows:
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311
- B. Fasteners: Manufacturer's standard type to suit application (fully concealed); self-drilling or self-tapping 410 stainless steel.
- C. Field Touch-up Paint: As recommended by panel manufacturer.
- D. Bituminous Paint: Asphalt base.
- E. Rubberized Underlayment: Polyethylene-sheet-back rubberized asphalt membrane, 40 mils thick. Provide primer when recommended by underlayment manufacturer. Approved products as follows:
 - 1. "Bituthene Ice & Water Shield", W.R. Grace & Co.
 - 2. "Polyken 640 Underlayment Membrane", Polyken Technologies.
 - 3. "Polyguard Deck Guard", Polyguard Products, Inc.

2.03 COMPONENTS

- A. Panels shall have 12 3/4" on-center seam spacing with a seam height of 1".
- B. Panels shall be site-formed in continuous lengths with a 4' min. radius to conform to solid-sheathed curved substrate.
- C. Snap-on seams shall be 1" in height and shall contain factory-applied Extruded Vinyl Weather Seal Insert to prevent siphoning of moisture through the standing seam.
- D. Concealed anchor clips shall be spaced as required to meet uplift loads (maximum of 24" on center).
- E. Expansion Joints: Same material, thickness and finish as exterior sheets; of profile to suit system.
- F. Trim, Closure Pieces, Gutters, Caps and Flashings: Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Same material, thickness and finish as exterior sheets; brake formed to required profiles.
 - 1. Comply with SMACNA requirements.
 - 2. Hem all exposed edges of flashing on underside, 1/2 inch.
- G. Anchors: Stainless steel.
- E. Gutters: Form in sections not less than 8 ft. in length, complete with end pieces, outlet tubes, and any special pieces that may be required. Join sections with riveted and soldered or sealed joints. Unless otherwise indicated, provide expansion-type slip joint at the center of runs. Furnish gutter supports spaced at 48" o.c., constructed of same metal as gutters. Fabricate in minimum 96-inch- long sections, sized according to SMACNA's "Architectural Sheet Metal Manual." Material and finish to match roof panels.
- H. Downspouts: Formed in sections approximately 10 ft. long, complete with elbows and offsets. Join sections with minimum 1-1/2" telescoping joints. Provide fasteners for top, bottom, and 5' o.c. intermittently between, designed to securely hold downspouts not less than 1" away from walls. Material and finish to match roof panels.
- I. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge
 - 1. Clips: Panel clips designed to withstand negative-load requirements.
 - 2. Cleats: Mechanically seamed cleats formed from copper.
 - 3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer

2.04 FABRICATION

- A. General: Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill

indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements. Form sections true to shape, accurate in size, square, and free from distortion or defects.

- B. Panels shall be roll-formed in continuous lengths from eave to ridge.
- C. Concealed 2 inch wide anchor clips shall be spaced a maximum of 12" on center, in consideration for the strength of copper or closer if required for specified wind loads and 1-90 uplift requirements.
 - 1. Clips shall allow roof panels to move as required to accommodate expansion and contraction of panels without contract with factory installed seam sealants.
 - 2. Any transverse seams shall be installed per SMACNA with full closure and have continuous cleating from standing seam to standing seam. Install sealant at the corners of the fold for a watertight condition.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
- E. Where indicated or required, fabricate metal roof panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will minimize noise from movements within panel assembly

PART 3 - EXECUTION

3.01 GENERAL

- A. Verify substrate framing.
- B. Verify that roof deck is ready to received sheet metal roofing system.

3.02 INSTALLATION - SUBSTRATE

- A. Install rubberized underlayment, weather lapped sealed joints applied in strict accordance with manufactureres printed instructions. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof sheathing under metal roof panels. Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over entire roof, in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.

3.03 INSTALLATION - SHEET METAL ROOFING

- A. General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations. Anchor metal roof panels and other components of the Work securely in place, with provisions for thermal and structural movement. Comply with manufacturers printed instructions and/or conform to standards set forth in the Architectural Sheet Metal Manual published by SMACNA, in order to achieve a watertight installation.

1. Field cutting of metal roof panels by torch is not permitted
- B. Install panels in such a manner that horizontal lines are true and level and vertical lines are plumb.
- C. Install starter and edge trim before installing roof panels.
- D. Remove protective strippable film immediately prior to installation of roof panels.
- E. Fasten metal roof panels to supports with concealed clips at each standing-seam joint location, double fastening cleats, and with self-tapping fasteners recommended by manufacturer, spaced as specified and in accordance with approved shop drawings and required by loading.
- F. Crimp standing seams with manufacturer-approved motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged. Install sealants and/or butyl tape for preformed roofing panels as required for weathertightness.
- G. Do not allow panels or trim to come into contact with dissimilar materials.
- H. Do not allow traffic on completed roof. If required, provide cushioned walk boards.
- I. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
- J. Remove and replace any panels or components which are damaged beyond successful repair.
- K. Install gutters and downspouts in accordance with SMACNA; slope gutters for positive darinage.
- L. Flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of all openings.
- M. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- N. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to

eave with gutter hangers spaced not more than 4 feet o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

- O. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 48 inches o.c. in between.
 - 1. Provide elbows at base of downspouts to direct water away from building.
 - 2. Tie downspouts to underground drainage system indicated

3.04 TOLERANCES

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch in 20 feet.

3.05 CLEANING

- A. Clean work under provisions of 01700.
- B. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction. Remove site cuttings from finish surfaces.
- C. Clean and wash pre-finished surfaces with mild soap and water, rinse with clean water.
- D. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

ROOFING GUARANTEE

OWNER: ARCHDIOCESE OF NEW ORLEANS

ADDRESS: BUILDING OFFICE
7887 WALMSLEY AVE.
NEW ORLEANS, LA. 70125

WHEREAS _____

Address _____

Telephone () _____, herein called the "Roofing Contractor", has performed roofing and flashing in accordance with the Contract Documents (Hereinafter called the "Work") under a Contract with the Owner.

Name of Project: _____

Parish or Institution _____

Location/Address

Name and type of Building (s)

Type (s) of Roof Deck (s):

Total Roof Area _____ SF, Flashing, Edge: _____ LF
Base: _____ LF

Date of Acceptance: _____ Guarantee
Period: 2 Years

Date of Expiration: _____

AND WHEREAS the Roofing Contractor has contracted to guarantee said work against water entry from faulty or defective materials and workmanship for the designated Guarantee period:

NOW THEREFORE the Roofing Contractor guarantees, subject to the terms and conditions herein set forth, that during the Guarantee Period he will at his own cost and expense make or cause to be made with approval procedures and materials such repairs to or replacements of said work resulting from water entry or faults or defects of said Work as are necessary to correct faulty and defective work and as are necessary to maintain said Work in watertight conditions and further to respond

on or within two (2) working days upon written notification of leaks or defects by the Owner. Furthermore, he will at his own cost and expense maintain the roof for (2) years after acceptance, in accordance with the current edition of the Roof Maintenance Manual published by the Roofing Industry Educational Institute. The roof shall be inspected a minimum of twice each year, and a report prepared documenting the conditions observed at each inspection. These inspections shall be made once during the months of April or May and once during the months of September and October. Two copies of each report shall be forwarded to the Owner.

This guarantee is made subject to the following terms and conditions:

1. Specifically excluded from this guarantee are damages to the Work, other parts of the building and building contents caused by: A) lightning, windstorm (includes hurricanes and tornados), hailstorm, earthquakes and other unusual phenomena of the elements; B) fire; and C) structural failures causing excessive roof deck, edgings and related roof components movement. When the Work has been damaged by any of the foregoing causes, the Guarantee will be null and void until such damage has been repaired by the Roofing Contractor, and until the cost and expense thereof has been paid by the Owner or another responsible party so designated.
2. During the Guarantee Period, if the Owner allows alteration of the Work by anyone other than a Contractor approved in writing by the Roofing Contractor, prior to the work being performed, including cutting, patching and maintenance in connection with penetrations, attachment of other work, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations, the Guarantee shall not become null and void, unless the Roofing Contractor, prior to proceeding with said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the Work, thereby reasonably justifying a termination of this Guarantee.
3. During the Guarantee Period, if the original use of the roof is changed and it becomes used for, but for which it was not originally designed or specified, as a promenade, work deck, spray-cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
4. During the Guarantee Period, if any building or area of a building is changed to uses creating extremes of interior temperature and/or humidity, but for which it was not originally designed And specified, without provisions and alterations made to the building which effectively contain or control these conditions, this Guarantee shall become null and void upon the date of said change.
5. The Owner shall promptly notify the Roofing Contractor in writing of observed known or suspected leaks, defects or deterioration and shall afford reasonable opportunity for the Roofing Contractor to inspect the Work, and to examine the evidence of such leaks, defects or deterioration.
6. This Guarantee is recognized to be the only guarantee of the Roofing Contractor on said work, and shall not operate to restrict or cut off the Owner from other remedies and recourses lawfully available to him in case of roofing failure. Specifically, this Guarantee shall not operate to relieve the Roofing Contractor of his responsibility for performance of the original work, regardless of whether the Contract was a Contract directly with the Owner or a Subcontract with the Owner's General Contractor.

IN WITNESS THEREOF, this instrument has been duly executed this day of _____, 201_____.

General Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone No. _____

WITNESS: _____

Roofing Contractor's Signature: _____

Typed Name: _____

Representing: _____

Telephone No. _____

WITNESS: _____

FLASHING AND SHEET METAL**SECTION 07620****PART 1 - GENERAL**

1.01 SECTION INCLUDES:

- A. Copper gravel stops
- B. Copper copings
- C. Copper gutters and heavy gauge PVC downspouts of Brown color. PVC downspouts shall not have writing or graphic visible.
- D. Miscellaneous copper sheet metal flashings and accessories.
- D. Miscellaneous flexible sheet membrane flashings at exterior openings, etc.

1.02 RELATED SECTIONS

- A. Section 04200 - Unit Masonry which includes membrane type thru-wall flashing.
- B. Section 07310 - Shingle Roofing
- C. Section 07600 - Built-up roofing.
- D. Section 07610 - Sheetmetal Roofing
- D. Section 08520 - Aluminum Windows, which includes the metal sill flashings.

1.03 SUBMITTALS

- A. Manufacturer's Data: Submit two copies of specifications, installation instructions and sample warranty from the manufacturer for flashing and sheetmetal required. Include data substantiating compliance with the requirements.
- B. Sheetmetal Shop Drawings: Showing layout, profiles, methods of joining, and anchorages details. Provide layouts 1/4 inch scale and details at 3 inch scale.
- C. Samples of the following sheet metal and accessory items:
 - 1. 8 inch square samples of specified sheet materials to be exposed as finished surfaces.
 - 2. 12 inch long samples of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.

1.04 QUALITY ASSURANCE

- A. Insurance Requirements: Provide fascia systems complying with Factory Mutual Loss Prevention Data Sheets 1-49 "Perimeter Flashing" requirements in either of the following categories and wind zones.
 - 1. Approval by Factory Mutual Research Corporation for use indicated.
- B. Industry Standards: Provide products which comply with applicable requirements of SMACNA "Architectural Sheet Metal Manual" except as otherwise indicated.

PART 2 - PRODUCTS

2.01 SHEET METAL MATERIALS AND ACCESSORIES

- A. Copper: ASTM B 370; temper H00 (cold-rolled) except where temper O60 is required for forming; weight as recommended in SMACNA "Formed Metal Copings - Design Data", Plate 76, Chart 12 but not less than 16 oz.
- B. Miscellaneous Materials and Accessories:
 - 1. Solder: For use with copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.
 - 2. Fasteners: Same metal as flashing/sheet metal or, other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
 - 3. Bituminous Coating: SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
 - 4. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching material being installed, noncorrosive, size and gage required for performance but not less than item being anchored.
 - 5. Roofing Cement: ASTM D 2822, asphaltic.

2.02 SHEETMETAL FABRICATION

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated.

1. Exposed edges folded back to form hems.
 2. Exposed edges shall be neat and true with the line of the masonry face.
- B. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- C. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
- D. Gutters: Form in sections not less than 8 ft. in length, complete with end pieces, outlet tubes, and any special pieces that may be required. Join sections with riveted and soldered or sealed joints. Unless otherwise indicated, provide expansion-type slip joint at the center of runs. Furnish gutter strap supports spaced at 36" o.c., constructed of same metal as gutters. Material and finish to match roof panels.
- F. Downspouts: Formed in sections approximately 10 ft. long, complete with elbows and offsets. Join sections with minimum 1-1/2" telescoping joints. Provide fasteners for top, bottom, and 5' o.c. intermittently between, designed to securely hold downspouts not less than 1" away from walls. Material and finish to match roof panels

2.03 MEMBRANE SHEET FLASHINGS

- A. Rubberized Asphalt Sheet Flashing: Manufacturer's standard composite flashing product consisting of a pliable and highly adhesive rubberized asphalt compound 32 mils thick, bonded completely and integrally to a high-density, cross-laminated polyethylene film, 8 mils (0.2 mm thick, to produce an overall thickness of 40 mils (1.0 mm), Perm-A Barrier by W.R. Grace and equal product by Sandal.
1. Primer: Flashing manufacturer's standard product or product recommended by flashing manufacturer for bonding flashing sheets to masonry and concrete

PART 3 - EXECUTION

3.01 SHEET METAL

- A. Furnish and install sheet metal roof edges, copings, flashing and counterflashing and protrusions in a manner indicated or implied by the Plans and Specifications and as recommended by the manufacturer and SMACNA. Metal edge securement shall be designed and installed in strict accordance with ANSI/SPRI ES-1, except basic wind speed shall be determined from Figure 1609 of the 2006 edition of the International Building Code. Nailer securement shall resist a vertical load of 200lb/Ft or the design load, whichever is greater. Bolts shall be staggered to avoid splitting the wood. Fasteners shall be located approximately 4 inches but not less than 3 inches from each end of the wood blocking Fasteners shall be staggered, spaced at a maximum 12 inches on center and penetrate the wood sufficiently to achieve the design pullout resistance. Spacing of fasteners shall be on maximum 6 inch centers in corner regions of the building

- B. Join sheet metal using a flat locked seam or lapped and securely soldered joints. For gravel guards butt ends together and furnish a joint cover 4" wide, fully bedded in flashing cement, and securely locked to the gravel guard. Make allowance at all joints for expansion and contraction. At exposed edges, sheet metal shall be hemmed and returned upon itself 1/2" for strength. At lap joints, make hems together so that one slides into the other. Nail down all metal flanges 3" on center.
- C. All corners shall be factory fabricated.
- D. All items passing through the roof whether shown or not shall be provided with collar and umbrella flashing or pipe penetration seals.
- E. Metal Pipe Flashings: Consist of a two (2) component assembly as follows:
 - 1. The first component shall be a galvanized metal roof jack having a minimum four (4) inch perimeter flange, and a sleeve opening to fit closely around the penetration without forcing, with a minimum eight (8) inch height. All metal laps shall be fastened and soldered.
 - 2. The second component shall be a galvanized metal, watertight umbrella, fabricated to be mechanically secured tightly by stainless steel drawband around the roof penetration and extended beyond the roof jack opening by a minimum radius of three (3) inches. The top edge of the watertight umbrella shall be caulked using an approved sealant.
- F. Set coping in a full bed of mastic using four (4) inch cover plates at joints, tightly fitted. Space joints equally and equal at ends. No section shall be smaller than 4'-0" in length.
 - 1. Where blocking is shown, provide treated wood continuous under the sheetmetal or fibrous tapered edge strip set in mastic and one layer of felt.
- G. Cleaning: Upon completion, all exposed sheet metal work shall be cleaned of all grease spots, oil, dirt, solder spatter, and the work shall be left in a clean and first class condition.
- H. Underlayment: Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.
- I. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
- J. Install counterflashing in reglets, either by snap-in seal arrangement or by welding in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.
- K. Nail flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches o.c. Fabricate seams at joints between units with minimum 3 inch overlap, to form a continuous, waterproof system.

- L. Install continuous gutter guards on gutters, arranged as hinged units to swing open for cleaning gutters. Install "beehive"-type strainer-guard at conductor heads, removable for cleaning downspouts.
- M. Downspouts shall be installed with a minimum of three (3) straps for every 10 ft. of run.

3.02 RUBBERIZED SHEET MEMBRANE FLASHINGS

- A. Prepare substrate surfaces so that they are smooth and free from projections that could puncture flashing. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer. Prime if recommended by the manufacturer
- B. Install membrane and seal penetrations in strict accordance with the membrane manufacturers printed instructions. Turn up ends not less than 4" to form a continuous pan where installed horizontally. Roll edges and joints to eliminate "fishmouths"

END OF SECTION

ROOF ACCESSORIES**SECTION 07800****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Roof hatches.

1.02 RELATED SECTIONS

- A. Section 07600 - Roofing and Sheetmetal

1.03 SUBMITTALS

- A. Submit under provision of Section 01300.
- B. Product Data: Provide product data on system including flashing materials, and insulation.
- C. Shop Drawings: Submit shop drawings of units where Product Data does not adequately depict the units. Include roof plan indicating model numbers at required roof accessory locations.

1.04 PRE-INSTALLATION CONFERENCE

- A. Review procedures and coordination required with related Work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, sealed and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.

1.06 COORDINATION

- A. Coordinate the work with the installation of roofing and associated metal flashings, as the work of this section proceeds.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Zinc-Coated Steel: Commercial quality with 0.20% copper, ASTM A 525, G90 hot-dip galvanized, mill phosphatized.

- B. Insulation: Manufacturer's standard rigid or semi-rigid board of glass fiber of thickness indicated.
- C. Wood Nailers: Softwood lumber, pressure treated with water-borne preservatives for above-ground use, complying with AWPB LP-2; not less than 1-1/2" thick.
- D. Fasteners: Same metal as metals being fastened, or non-magnetic stainless steel or other non-corrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 - 1. Where removal of exterior exposed fasteners affords access to building, provide non-removable fastener heads.

2.02 PRODUCTS AND FABRICATION, GENERAL

- A. Provide manufacturer's standard products except as otherwise indicated and comply with applicable recommendations and details of the "Architectural Sheet Metal Manual" by SMACNA for custom fabricated work.
- B. Fabricate units to withstand 40-lb. live loading, except for other superimposed loading as shown.

2.03 ROOF HATCHES

- A. Fabricate units of sizes shown, single-leaf type unless otherwise indicated, for 40 lbs. per sq. ft. external loading and 20 lbs. per sq. ft. internal loading pressure. Frame with integral-curb double-wall construction with 1-1/2" insulation and cap flashing (roofing counterflashing), with welded corner joints. Provide double-wall cover (lid) construction with 1" insulation core. Equip units with complete hardware set including hold-open devices, interior padlock hasps, and both interior and exterior latch handles. Provide gasketing for a watertight installation. Fabricate units of following materials:
 - 1. Metal: 14 gauge galvanized curb and hatch door, prime painted.
- B. Well Liner: Manufacturer's standard sheet metal well liner, primed for paint finish.

2.04 EXPOSED METAL FINISHES

- A. Shop Primed Metal: Except as otherwise indicated, prime metal surfaces of roof accessories by pretreatment (phosphate for zinc-coated steel and acid-chromate-phosphate for aluminum) followed by metal primer paint, 2 mil dry film thickness.
 - 1. Finish painting of primed metal surfaces is specified in Section 09900.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck surfaces are dry.

3.02 INSTALLATION

- A. General: Comply with manufacturer's printed instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
 - 1. Except as otherwise indicated, install roof accessory items in accordance with construction details of "NRCA Roofing and Waterproofing Manual".
- B. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- C. Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of roofing cement, to form a seal.
- D. Cap Flashing: Where cap, flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.
- E. Operational Units: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.03 MISCELLANEOUS FLASHINGS AND ACCESSORIES

- A. Comply with manufacturer's printed instructions and recommendations. Coordinate with installation of substrates to receive accessory units, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
 - 1. Except as otherwise indicated, install roof accessory items in accordance with construction details of "NRCA Roofing and Waterproofing Manual."

3.04 CLEANING

- A. In areas where finished surfaces are soiled by Work of this section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.

3.05 PROTECTION

- A. Protect building surfaces against damage from roofing work.

END OF SECTION

JOINT SEALERS**SECTION 07900****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Preparing substrate surfaces; removal of existing sealant in preparation for new sealants
- B. Sealant and joint backing for new walls, joints, openings, wall penetration, etc. Also, preformed compressible joint sealers at penetrations where indicated on the drawings.
- C. Recaulk all existing wall joints, openings, and miscellaneous penetrations, etc

1.02 RELATED SECTIONS

- A. Section 07270 - Firestopping: Sealants required in conjunction with firestopping.
- B. Section 07600 - Roofing and Sheet Metal: Sealants required in conjunction with roofing and flashing.
- C. Section 08800 - Glazing: Sealants required in conjunction with glazing methods.

1.03 REFERENCES

- A. ASTM C790 - Use of Latex Sealing Compounds.
- B. ASTM C804 - Use of Solvent-Release Type Sealants.
- C. ASTM C834 - Latex Sealing Compounds.
- D. ASTM C920 - Elastomeric Joint Sealants.
- E. ASTM C962 - Use of Elastomeric Joint Sealers.
- F. ASTM C1193 - Guide for Use of Joint Sealants.
- G. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations and color availability.
- C. Samples: Submit two samples, 1/2" x 3" inch in size illustrating sealant colors for selection.

- D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.
- E. Test Reports: Submit the following test reports by the sealant manufacturer:
 - 1. Compatibility and adhesion test reports indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.
 - 2. Preconstruction joint sealer-substrate test results including recommendations of joint sealer manufacturer for joint preparation and application of joint sealers applicable to project conditions.
 - 3. Certified test reports for elastomeric sealants evidencing compliance with requirements specified based on comprehensive testing of current product formulations within a 24-month period of preceding date of submission of test reports to Architect. Include test results for aged performances including hardness, stain resistance, adhesion and cohesion under cyclic movement (ASTM C719), low-temperature flexibility, modulus of elasticity at 100% strain, effects of heat aging, and effects of accelerated weathering.
 - 4. Preconstruction field test results reported by Installer indicating which products and joint preparation methods demonstrated acceptable adhesion to joint substrates.
- F. Certificates: Submit certificates from manufacturers of joint sealers attesting that their products comply with specification requirements, are compatible with all materials in contact with joint backers and sealants, and will not bleed into adjacent surfaces, and are suitable for the use indicated.

1.05 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants for exterior applications that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates and adjacent surfaces.
- B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain air tight continuous seals that are water resistant and cause no staining or deterioration of joint substrates and adjacent surfaces.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Maintain copies of each document on site.

- C. **Single Source Responsibility:** Obtain joint sealer materials from a single manufacturer for each different product required.
- D. **Testing Laboratory Qualifications:** To qualify for acceptance, an independent testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying progress of the work.
 - 1. All cost of testing laboratory services shall be borne by the Contractor.
- E. **Preconstruction Compatibility and Adhesion Tests:** Submit substrate materials representative of actual joint surfaces to be sealed to manufacturer of joint sealer products for laboratory testing of sealants for adhesion to primed and unprimed substrates and for compatibility with secondary seals, if required, as indicated below:
 - 1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealers to joint substrates under environmental conditions that will exist during actual installation.
 - 2. Submit not less than 9 pieces of each type of material, including joint substrates, shims, joint sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analysis of results to prevent delay in the progress of the work.
 - 4. Investigate materials failing compatibility or adhesion tests and obtain joint sealant manufacturer's written recommendations for corrective measures, including use of specially formulated primers.
- F. **Preconstruction Field Tests:** Prior to installation of joint sealants, field-test adhesion to joint substrates as follows:
 - 1. Install joint sealants in 5-foot joint lengths using same materials and methods required for completed work. Allow sealants to cure before testing. Test adhesion to joint substrates by manually trying to pull joint sealant out of joint.
 - a. Make knife cuts horizontally from one side of joint to the other followed by 2 vertical cuts approximately 2 inches long at side of joint and meeting horizontal cut at top of 3 inch cuts. Place a mark 1 inch from top of 2 inch piece.
 - b. Use fingers to grasp 2 inch piece of sealant just above 1 inch mark; pull firmly down at a 90 degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.
 - 2. Locate test joints where indicated or, if not indicated, as directed by Architect.

3. Perform field tests for each application as follows:
 - a. Each type of elastomeric sealant and joint substrate application indicated.
 - b. Perform tests in Architect's presence.
 4. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
 5. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.
- G. Field-Constructed Mock-Ups: Prior to installation of joint sealers, apply elastomeric sealants to the following selected building joint as indicated below for further verification of colors selected from sample submittals and to represent completed work for qualities of appearance, materials and applications.
1. Joints in field-constructed mock-ups of assemblies specified in other sections which are indicated to receive elastomeric joint sealants as work of this section.
 2. Retain mock-up during construction as standard for judging completed work.

1.07 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing the work of this section with minimum 5 years documented experience and approved by manufacturer.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.09 COORDINATION

- A. Coordinate work.
- B. Coordinate the work with all sections referencing this section.

1.10 WARRANTY

- A. Provide three year warranty under provisions of Section 01700.

- B. **Warranty:** Include coverage for installed sealants and accessories which fail to achieve water tight seal or exhibit loss of adhesion or cohesion, or do not cure.

PART 2 – PRODUCTS

2.01 MATERIALS, GENERAL

- A. **Colors:** For exposed materials, provide color as selected by Architect from manufacturer's standard colors. For concealed materials, provide the natural color which has the best overall performance characteristics.
- B. **Compatibility:** Before purchase of each required material, confirm its compatibility with each other material it will be exposed to and be in contact with in the joint system.
- C. **Size and Shape of Joint:** As shown, or if not shown, as recommended by the manufacturer for the type and condition of joint, and for the indicated joint performance or movement.

2.02 SEALANTS

- A. **Exterior Silicone Elastomeric Sealant (Type A):** One-Part Neutral-Curing, ASTM C 920, Type S; Grade NS, Class 25; Uses NT, G, A, and O as applicable to uses indicated, \pm 50% movement capability after 5 years, and complying with requirements for medium modulus as required for indicated application and recommended by the manufacturer.

- 1. 790; Dow Corning
- 2. Silpruf; G.E.

NOTE: Sealant must be tested and certified in writing not to stain or discolor adjacent surfaces.

- B. **Polyurethane Sealant (Type B):** ASTM C920, Type S, Grade NS, Class 25, Use NT, M, A and O, single component, chemical curing, non-staining, non-bleeding, non-sagging:

- 1. Sikaflex-1a; Sika Chemical Corp.
- 2. Sonolastic, NPI; Sonneborn/Contech, Inc.
- 3. Dymonic; Tremco
- 4. Vulken 921; Mameco International, Inc.

- C. **Polyurethane Sealant (Type C):** ASTM C920, Grade P/NS, Class 25, Type M/S; multi-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, self-leveling type:

- 1. TCH-900/901; Tremco
- 2. Chem-Calk 550; Woodmont Products, Inc.
- 3. Sonolastic Pavement Joint Sealer; Sonneborn/Contech, Inc.
- 4. NR-200 Urexpan; Pecora Chemical Co.
- 5. Vulken 245; Mameco International, Inc.

- D. Butyl Sealant (**Type D**): ASTM C920, Grade single component, solvent release, non-skinning, non-sagging:
1. Elongation Capability 7 to 10 percent
 2. Service Temperature Range -13 to 180 degrees F.
 3. Shore A Hardness Range 10 to 30
- E. Acrylic Emulsion Latex (**Type E**): ASTM C834, single component:
1. AC20 Acrylic Latex Caulk; Pecora Chemical Co.
 2. Latex Caulk; DAP
 3. Chem-Calk 600; Woodmont Products, Inc.
 4. Acrylic Latex Caulk; Tremco
- F. Silicone Sanitary Sealant (**Type F**): ASTM C920, Grade P/NS, Class 25, single component, solvent curing, non-sagging, non-staining, fungus/mildew resistant, non bleeding.
1. Sanitary 1700; G.E.
 2. 786; Dow Corning

2.03 ACCESSORIES

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: ASTM C962; round, closed cell, non absorbent to liquid water and gas, non-outgassing polyethylene foam rod; acceptable to the manufacturer, oversized 30 to 50 percent larger than joint width equal to:
1. Ethofoam by Dow Chemical Co.
 2. Minicel by Haveq Industries
- D. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.
- E. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.

- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Perform preparation in accordance with manufacturer's instructions.
- B. Immediately before installing sealants remove loose materials and foreign matter which might impair adhesion of sealant.
- C. Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- D. Protect elements surrounding the work of this section from damage or disfiguration.
 - 1. Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- E. Prepare existing joints for sealants and caulking by removing existing sealant and backing material, foreign matter, such as dust, oil, grease, water, surface dirt or residue of previous caulking whether missing or removed as part of the preparation of the surfaces for new caulking. Porous surface shall be cleaned by grinding, abrading by hand or mechanical grinder or acid wash. Non-porous surfaces such as metal shall be cleaned mechanically or chemically, and all protective coats removed by solvent, leaving no residue. Do not allow to air dry without wiping.
 - 1. In addition to the joint depth, the midpoint depth of the sealant shall be one-half the width of the joint, with a maximum depth of 1/2" and a minimum of 1/4" except as maybe otherwise recommended by the sealant manufacturer

3.03 INSTALLATION

- A. Install sealant in accordance with manufacturer's printed instructions and ASTM C 1193.
- B. Measure joint dimensions and size materials to achieve width/depth ratios recommended by the manufacturer.
- C. Install backer rods of type indicated to provide support of sealants during application and at a position required to product uniform cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability. All joints shall be used 25 - 30% under compression.
 - 1. Do not leave gaps between ends of joint fillers.

2. Do not stretch, twist, puncture, or tear joint fillers.
 3. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.
- D. Install bond breaker tape wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly and when backer rod cannot be implemented.
 - E. Install sealants to depths as shown or, if not shown, as recommended by the sealant manufacturer.
 - F. Apply sealant with sufficient pressure to completely fill the void space and to assure complete wetting of contact area to obtain uniform adhesion. During the application, keep the tip of nozzle at the bottom of joint, forcing sealant to fill from bottom to top. Move tip along joint at a rate as to completely fill the joint.
 - G. Install sealant free of air pockets, foreign embedded matter, ridges and sags.
 - H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
 - I. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.
 1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.04 CLEANING

- A. Clean work under provisions of 01700.
- B. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

- A. Protect finished installation under provisions of Section 01500.
- B. Protect sealants until cured.

3.06 SCHEDULE

A. **Sealant Type A:** as follows:

1. Exterior Openings: Caulk perimeter joints of exterior openings, such as doors, louvers, windows, wall joints, penetrations, etc. and all penetrations to exclude water, i.e. handrail brackets, outlet boxes, fixture attachments, etc
2. Expansion and control Joints: Caulk all expansion and control joints in exterior wall construction.

B. **Sealant Type B:** As follows:

1. Interior Joints: Caulk all interior joints 3/8" wide or more.
2. Flashing at Roof: See section 07600, caulk all joints.

C. **Sealant Type C:** As follows:

1. Expansion Joints: Caulk all expansion joints of traffic-bearing decorative paving including exterior decorative paving where indicated "sealant" on the Drawings.

D. **Sealant Type D:** As follows:

1. Thresholds: Set thresholds in bed of sealant; where thresholds have weep holes, keep the weep clear and remove excess sealant.

E. **Interior Caulking Type E:** As follows:

1. Door Frames: Caulk perimeter joints of metal frames.
2. Casework: Caulk at contact with wall construction where gaps occur.
3. Joints: Caulk all joints 1/4" wide or less, except use Type B sealant at joints 3/8" wide or more.

F. **Interior Sealant Type F:** As follows:

1. Plumbing Fixtures: Caulk at contact with wall construction.
2. Expansion joints in tile finish.
3. Tops and fixtures in bathrooms and kitchens

END OF SECTION

STEEL DOORS AND FRAMES**SECTION 08112****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Standard steel doors and frames; interior and exterior.

1.02 RELATED SECTIONS

- A. Section 08300 – Acoustical Doors
- B. Section 08710 - Door Hardware
- C. Section 09900 - Painting: Field painting of doors

1.03 REFERENCES

- A. ANSI A117.1 - Specifications for Making Building and Facilities Accessible to an Usable by Physically Handicapped People
- B. ANSI/SDI-100 - Standard Steel Doors and Frames
- C. ASTM A224.1 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces.
- D. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
- E. DHI - Door Hardware Institute: The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware
- F. ASTM E152 - Methods of Fire Tests of Door Assemblies
- G. NFPA 80 - Fire Doors and Windows
- H. NFPA 252 - Fire Tests for Door Assemblies
- I. UL 10B - Fire Tests of Door Assemblies

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300
- B. Product Data: Indicate frame configuration, anchor types and spacings, location of cut-outs for hardware, reinforcement.
- C. Manufacturer's Installation Instructions: Indicate special installation instructions.
- D. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-

outs for glazing, louvers, and finish.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of ANSI/SDI-100 by the Steel Door Institute and ANSI A117.1.
- B. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.

1.07 REGULATORY REQUIREMENTS

- A. Fire Rated Construction: Conform to ASTM E152, NFPA 252 or UL 10B.
- B. Fire Rated Construction: Rate of rise of 450° F across door thickness at stairwells.
- C. Installed Assembly: Conform to NFPA 80 for fire rated class as scheduled.
- D. Exterior doors and frames shall comply with IBC code requirement for wind loads indicated on the drawings, and have labels affixed showing testing and compliance. Also, doors and frames shall comply with the large missile impact criteria per requirements of SBCCI SSTD-12, and ASTM E1886 and E1996

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products to site under provisions of Section 01600.
- B. Accept doors and frames on site in manufacturer's packaging. Inspect for damage.

1.09 COORDINATION

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

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Steelcraft Manufacturing Company
- B. Republic Steel Corporation
- C. Amweld Building Products Division
- D. Ceco Industries, Medallion Design
- E. Curries

- F. Amertex
- G. Pioneer Industries, Inc
- H. Metal Products Inc

2.02 MATERIALS

- A. Hot-Rolled Steel Sheets: Commercial quality carbon steel, pickled and oiled, complying with ASTM A1011 and ASTM A568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A1008 and ASTM A568.
- C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A924 and ASTM A653, with ASTM A525 G90 zinc coating, mill phosphatized for preparation of paint coating..
- D. Supports and Anchors: Fabricate of not less than 18 gage galvanized sheet steel.
- E. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanized items to be built into exterior walls, complying with ASTM A153, Class C or D as applicable.
- F. Shop Applied Paint: Rust-inhibitive primer, either air-drying or baking, suitable as a base for specified finish paints.

2.03 FRAMES

- A. Exterior Frames: 14 gauge thick galvanized steel material, base metal thickness.
- B. Interior Frames: 16 gauge thick cold-rolled or hot-rolled steel material, base metal thickness.

2.04 DOORS

- A. Exterior Doors: SDI-100 Level 3, (Extra Heavy Duty) Model 2 (Seamless Design) of 16 gauge galvanized steel.
- B. Interior Doors (Non-rated): SDI-100 Level 3, (Extra Heavy Duty) Model 2 (Seamless Design) of 16 gauge cold-rolled steel.
- C. Interior Doors (Fire Rated): SDI-100 Level 3, (Extra Heavy Duty) Model 2 (Seamless Design) of 16 gauge cold-rolled steel.
- D. Face: Steel sheet in accordance with ANSI/SDI 100 but not less than 16 gauge.
- E. Core: Manufacturers standard noncombustible hoeycomb core on interior doors, and solid insulation non-combustible core per ANSI A250.8, Section 2.3.2 at exterior doors.

2.05 ACCESSORIES

- A. Silencers: Resilient rubber fitted into drilled hole.
- B. Louvers:
 - 1. Material and Finish: Roll formed steel; 24 gauge; wipe coat of zinc.
 - 2. Louver Blade: Inverted V blade.
 - 3. Louver Free Area: 55 percent.
 - 4. Frame: 20 gauge steel frame

2.06 FABRICATION

- A. Fabricate frames as a single welded unit.
 - 1. Knock down frames are not acceptable.
- B. Fabricate frames with hardware reinforcement plates welded in place.
- C. Fabricate doors with hardware reinforcement welded in place.
- D. Reinforce frames wider than 48 with roll formed steel channels fitted tightly into frame head, flush with top.
- E. Prepare frame for silencers. Provide three single silencers for single doors on strike side. Provide two single silencers on frame head at double doors without mullions.
- F. Door shall be 1-3/4" thick unless otherwise indicated.
- G. Astragals for double doors: Steel, T-shaped, specifically for double doors.
- H. Close top edge of exterior doors with flush end closure. Seal joints watertight.

2.07 HARDWARE PREPARATION

- A. Mortise Hardware Preparation: Reinforce, drill and tap doors and frames to receive mortised hinges, locks, latches, flush bolts and concealed door closers as required. Preparation shall be in accordance with applicable requirements of ANSI A115.
- B. Surface Applied Hardware: Field drilling and/or tapping for surface applied hardware by others is standard.
- C. Reinforcings: Provide minimum hardware reinforcing gages as noted in SDI-107.
- D. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware", published by Door and Hardware Institute.

2.08 NOMINAL DESIGN CLEARANCES

- A. The nominal clearance between the door and frame head and jamb s shall be 1/8" in the case of both single swing and pairs of doors.
- B. The nominal clearance between the meeting edges of pairs of doors can range from 1/8" to 1/4" (1/8" for fire rated doors).
- C. The nominal clearance at the bottom shall be 3/4".
- D. The nominal clearance between the face of the door and door stop shall be 1/16".
- E. All clearances are subject to a tolerance of + or - 1/32".

2.09 STEEL SHEET FINISH

- A. Doors and frames leading to the exterior shall be galvanized in accordance with ASTM A525 G60.
- B. Primer: Air dried or baked complying with requirements for acceptance stated in ANSI A224.1 with minimum 1.2 dry mil thickness. Doors and frames shall be thoroughly cleaned, and chemically treated to insure maximum paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer, either air-dried or baked-on. The finish shall meet the requirements for acceptance stated in ANSI/SDI A250.10 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

- A. Install doors and frames in accordance with ANSI/SDI-100 and DHI.
- B. Place frames in accordance with SDI-105 "Recommended Erection Instructions for Steel Frames", with a minimum of three (3) wall anchors per at hinge and strike levels and four (4) anchors for frames over 7'-6" in height.
- C. Doors shall be installed and fastened to maintain alignment with frames to achieve maximum operational effectiveness and appearance. Doors shall be adjusted to maintain perimeter clearances specified. Shimming shall be performed by the installer as needed to assure the proper clearances are achieved
- D. Coordinate installation of doors and frames with installation of hardware specified in Section 08710.
- E. Coordinate with glass and glazing.
- F. Install fire rated assemblies in accordance with NFPA 80.

3.03 ERECTION TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust door for smooth and balanced door movement.

END OF SECTION

ACCESS DOORS**SECTION 08305****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Standard size steel access doors.
- B. Oversized Fire Rated Access Panels for ceiling access.
- C. Provide fire rated doors when penetrating fire rated construction.

1.02 RELATED WORK

- A. Painting of Access Doors: Section 09900, Painting

1.03 FIRE RATING CLASSIFICATION

- A. Fire rated access doors shall bear the Underwriters Laboratories, Inc., 1-1/2 hour "B" Label (250 degrees rating).

1.04 SUBMITTALS

- A. In accordance with Section 01300.
- B. Shop Drawings: Access doors, each type, showing construction, location and installation details.
- C. Manufacturer's Literature and Data: Access doors, each type.

1.05 APPLICABLE PUBLICATIONS

- A. The National Association of Architectural Metal Manufacturers (NAAMM): Metal Finishes Manual (August, 1969)

1.06 MANUFACTURERS

- A. Approved Manufacturers: Babcock-Davis, The Bilco Co. and J.L. Industries

PART 2 - PRODUCTS

2.01 FABRICATION, GENERAL

- A. Fabricate components so as to be straight, square, flat and in same plane where required. Slightly round exposed edges and provide access without burrs, snags and sharp edges. Welds where exposed shall be continuous and ground smooth.
- B. Number of locks and non-continuous hinges shall be as required to maintain alignment of panel with frame, except for fire rated doors, the number shall be the same as required by the fire test.

- C. Provide anchors or make provisions in frame for anchoring to adjacent construction. Provide size, number and location of anchors as required to secure access door in opening and as required by fire test.

2.02 STANDARD SIZE ACCESS DOORS, FIRE RATED

- A. Door Panel: Form of 0.0359 inch thick galvanized steel sheet, insulated sandwich type construction.
- B. Frame: Form of 0.0598 inch thick galvanized steel sheet of depth and configuration to suit material and type of construction where installed. Provide frame flange at perimeter where installed in concrete and masonry openings. Weld exposed joints in flange and grind smooth.
- C. Automatic Closing Device: Provide automatic closing device for each door.
- D. Hinge: Continuous steel hinge with stainless steel pin.
- E. Lock: Self-latching, with provision for fitting flush a standard screw-in type lock cylinder. Lock cylinder is specified in Section 08710- Hardware. Provide latch release device operable from inside of door. Mortise lock case in door.

2.03 STANDARD SIZE ACCESS DOORS, FLUSH PANEL

- A. Door Panel: Form of 0.0747 inch thick galvanized steel sheet. Reinforce as required to maintain flat surface.
- B. Frame: Form of 0.0598 inch thick galvanized steel sheet of depth and configuration to suit material and type of construction where installed and to align flush with surrounding construction. Provide surface mounted units having frame flange at perimeter where installed in concrete or masonry construction. Weld exposed joints in flange and grind smooth.
 - 1. At drywall construction provide perforated portion of frame with bead for joint treatment flush with face of gypsum board; overlapping flange is not permitted.
- C. Hinge: Concealed spring hinge to allow panel to open 175 degrees. Provide removable hinge pin to allow removal of panel from frame.
- D. Lock: Flush, screwdriver operated cam lock.

2.04 FINISH

- A. Steel Surfaces: Baked-on prime coat over a protective phosphate coating.

2.05 SIZE

- A. Access doors shall be minimum 12 inches, unless otherwise shown.

2.06 OVERSIZED FIRE RATED ACCESS PANELS

- A. Oversized Fire Rated Access Panels for horizontal applications, equal to Nystrom FRD Series .Provide 2 hour Warnock Hersey label at horizontal applications
 - 1. Sizes: 48 inch x 60 inch for horizontal applications.
 - 2. Door: Fabricate from 18-gauge galvanized steel, insulated sandwich type construction. 22 gauge liner.
 - 3. Frame: Fabricate from 16-gauge galvanized steel.
 - a. .875 flange at perimeter.
 - 4. Hinge: Concealed continuous rod opening to 100 degrees.
 - 5. Latching/Locking Mechanism: Factory installed flush ¼ inch allen key, self latching.
 - 6. Finish: White electrostatically applied rust inhibitive prime coat.
 - 7. Insulation: 1 ½ inches thick high temperature.
 - 8. Automatic Closure Device: Integral automatic spring closure device for each door, will close and latch all doors from an open position of approximately 90 degrees.
 - 9. Interior Latch Release: Mechanism to allow for panel to open from interior side-standard on all panels

PART 3 - EXECUTION

3.01 LOCATION

- A. Provide access panels or doors wherever any valves, traps, air splitter dampers, cleanouts and other control items of mechanical, and electrical work are concealed in wall, partition or ceiling construction.

3.02 INSTALLATION, GENERAL

- A. Install access doors in openings to have sides vertical in wall installations, and parallel to ceiling grid or side walls when installed in ceiling. Set frames so that edge of frames without flanges will finish flush with surrounding finish surfaces.

3.03 ANCHORAGE

- A. Secure frames to adjacent construction using anchors attached to the frames or by use of bolts or screws through the frame members. Type, size and number of anchoring device shall be suitable for the material surrounding the opening, and as required to maintain alignment and resist displacement during normal use of the access door and the building.
 - 1. Anchors for fire rated access doors shall be as required by the fire test.

3.04 ADJUSTMENT

- A. Adjust hardware so that the door panel will open freely, and when closed the door panel will be centered within the frame.

END OF SECTION

OVERHEAD COILING DOORS**SECTION 08331****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Exterior overhead coiling insulated doors, factory finished, operating hardware, for manual operation.

1.02 RELATED SECTIONS

- A. Section 09900 - Painting: Field paint finish of guides.

1.03 REFERENCES

- A. ANSI/ASTM A526 - Steel Sheet, Zinc-coated (Galvanized) by the Hot-dip Process, Commercial Quality.
- B. ANSI/UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.
- C. ASTM A525 - General Requirements for Steel Sheet, Zinc-coated (Galvanized) by the Hot-dip Process.
- D. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- C. Product Data: Provide general construction, component connections, details, and finishes.
 - 1. Provide operating instructions and maintenance information.
 - 2. Provide information describing fire-release system including electrical rough-in instructions.
- D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
- E. Samples: Submit two (2) samples of finish on steel.

1.05 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Furnish each overhead coiling door as a complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.

1. Furnish overhead coiling door units by one manufacturer for entire project.
- B. Insert and Anchorages: Furnish inserts and anchoring devices that must be set in concrete or built into masonry to install units. Provide setting drawings, templates, instructions, and directions to install anchorage devices. Coordinate delivery with other work to avoid delay.
 1. See concrete and masonry sections of these specifications regarding installation of inserts and anchorage devices.

1.06 MAINTENANCE DATA

- A. Submit under provisions of Section 01700.
- B. Maintenance Data: Indicate lubrication requirements and frequency, periodic adjustments required.

1.07 QUALITY ASSURANCE

- A. Furnish each overhead service door as a complete unit produced by one manufacturer, including hardware, accessories, mounting, and installation components.
- B. Wind Loading: Design and reinforce rolling doors to withstand a wind loading pressure with a maximum deflection of 1/120 of opening width, as follows:
 1. Wind Pressure: 130 mph base wind load per IBC 2009 and ASCE-7-05.
Door unit shall meet missile impact criteria per requirements of SBCCI SSTD-12, and ASTM E1886 and E1996, meeting requirements of the Large Missile Test of ASTM E 1996

1.08 FIELD MEASUREMENTS

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

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Stormtite 625 Series by Overhead Door Corp. or equal ds-357 by Wayne Dalton Corp., or J.G. Wilson.

2.02 MATERIALS

- A. Door Curtain: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand required wind loading, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of material gage recommended by door manufacturer for size and type of door required, and as follows:

1. Slats: Flat face, interlocking, 22 gauge of ANSI/ASTM A526 steel, single thickness slat; G90 galvanized per ASTM A525 as follows:
 2. Nominal Slat Size: 2 inches wide x required length.
 3. Slat Ends: Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 4. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact with floor in closed position.
 5. Fully insulated slats with manufacturer's standard CFC-free, foamed-in-place polyurethane insulation., full thickness of slats
- B. Guides: Galvanized structural steel angles (min. 3/16" thick), continuous, vertical mounted bolted to opening frame.
1. Guides shall be weatherstripped with vinyl at each jamb at exterior units.
 2. Secure continuous wall angle to wall framing with a minimum of 3/8 inch bolts at not more than 30 inches o.c., unless closer spacing recommended by door manufacturer. Extend wall angles above door opening head to support coil brackets, unless otherwise indicated. Place anchor bolts on exterior wall guides so they are concealed when door is in closed position. Provide removable stops on guides to prevent over-travel of curtain and a continuous bar for holding windlocks.
- C. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to assure smooth operation of curtain from any position; with adjustable spring tension, deflection shall be limited .03" maximum per foot of door width.
1. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast steel barrel plugs to secure ends of springs to barrel and shaft.
 2. Fabricate torsion rod for counterbalance shaft of cold-rolled steel in size required to hold fixed spring ends and carry torsional load.
 3. Brackets: Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate with bell mouth guide groove for curtain.
- D. Hood Enclosure and Fascia: Form to entirely enclose coiled curtain and operating mechanism at opening head and act as weather seal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.
1. Fabricate steel hoods for doors of not less than 20 gauge hot-dip galvanized steel sheet with G 90 zinc coating, complying with ASTM A 525.

- E. Endlocks: Malleable iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets. Provide locks on alternate curtain slats for curtain alignment and resistance against lateral movement.
- F. Windlocks: Malleable iron castings secured to curtain slats with rivets.
- G. Bottom Bar: Consisting of two angles, each not less than 1½ by 1½ by 1/8 inch thick, either galvanized or stainless steel or aluminum extrusions to suit type of curtain slats.
- H. Weatherstripping: Vinyl weatherstripping on the bottom bar, exterior curtainside guide and hood baffle.

2.03 FINISHES

- A. Curtain Slats and Hood Enclosure: Precoated baked-on primer/paint finish rated for exterior exposure, color as selected by Architect, primer of epoxy polyester and finish powder coat electrostatically applied.

- 1. Color: Custom as selected by the Architect

2.04 OPERATION

- A. Manual Operation: Design counterbalance mechanism so that required lift or pull for shutter operation does not exceed 25 lbs. Adjust operating mechanism so that the curtain can be easily stopped at any point in its travel and to remain in position until movement is reactivated.
 - 1. Provide two (2) lift handles on inside bottom bar, of same material and finish as curtain.
 - 2. Provide two (2) slide bolt locks on inside bottom bar, of same material and finish as curtain

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify openings.
- B. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's printed instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely brace components suspended from structure.

- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.
- F. After completing installation, including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist, or distortion.

3.03 ERECTION TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch
- C. Maximum Variation From Level: 1/16 inch
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

3.04 ADJUSTING AND TESTING

- A. Upon completion of installation, including work by other trades, lubricate, test and adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for the entire perimeter.
- B. Train Owner's maintenance personnel on procedures and schedules related to door operation, servicing, preventive maintenance, and procedures for resetting closing devices after activation.

3.05 CLEANING

- A. Clean door and components.
- B. Remove labels and visible markings.

END OF SECTION

FIRE RATED SINGLE HUNG STEEL WINDOWS**SECTION 08513****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes: 3/4 Hour fire rated, operable, self closing, vertically hung, steel windows.
- B. Related sections:
 - 1. Section 07900 - Joint Sealers: Sealants and backing material for perimeter window joints.
 - 2. Section 08800 - Glazing: Glass for steel windows.

1.2 REFERENCES

- A. American National Standards Institute (ANSI): ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
 - 2. ASTM C864 - Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
 - 3. ASTM C1281 - Preformed Tape Sealants for Glazing Applications.
 - 4. ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Difference Across Specimen.
 - 5. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - 6. ASTM E331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- C. Consumer Product Safety Commission (CPSC): CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- D. Flat Glass Marketing Association (FGMA): FGMA - Glazing Manual.
- E. ICBO UBC - Uniform Building Code (UBC) published by International Conference of Building Officials (ICBO).
- F. National Fire Protection Association (NFPA)
 - 1. NFPA 80 - Fire Doors and Windows.

2. NFPA 257 - Fire Test for Window and Glass Block Assemblies.

G. SWI: The Steel Window Institute.

1.3 PERFORMANCE REQUIREMENTS

A. Fire rating: 3/4 hour tested in accordance with NFPA 80 and NFPA 257.

B. Testing: Test each type and size of required window through a recognized testing laboratory or agency, in accordance with ASTM E 330 for structural performance, with ASTM E 283 for air infiltration and with both ASTM E 331 for water penetration. Provide certified test results. Installed windows must meet the following performance:

3. Structural Performance: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the International Building Code 2009 and Supplements (City of New Orleans Building Code) and ASCE 7-05, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330, based on 130 mph wind speed, Exposure B and Importance Factor of 1.00, and corners as required by Codes.

- a. With window sash and ventilators closed and locked, test unit in accordance with ASTM E 330 at a static air pressure equal to structural test pressure with high pressure applied first on one side of the unit and then on the other side with no glass breakage or damage to make window inoperable.
- b. No member shall deflect more than $L/175$ of its span or permanent deflection exceeding .4% of its span at structural test pressure load, with full recovery of glazing materials.
- c. Test pressures required to measure deflection parallel to the plane of the wall shall be equal to 1.5 times the wind pressures specified above. Deflection of any member carrying its full dead load shall not exceed an amount that will reduce glass bite below 75 percent of the design dimension and shall not reduce the edge clearance between the member and the fixed panel, glass or other fixed member above to less than 1/8 inch. The clearance between the member and an operable door or window shall be at least 1/16 inch
- d. Glass and framing meeting missile impact criteria per requirements of SBCCI SSTD-12, and ASTM E1886 and E1996, meeting requirements of the Large Missile Test of ASTM E 1996 up to 30 foot of building height and meeting requirements of the Small Missile Test of ASTM E 1996 above 30 ft.

D. Maximum air infiltration rate tested @ 1.57 PSF (25 mph) static air pressure in accordance with ASTM E283:

3. Operable windows: 0.30 cfm/ft of air per minute per linear foot of vent perimeter.

E. Water leakage: None when tested in accordance with ASTM E331 at 6.0 PSF pressure difference.

1.4 SUBMITTALS

A. Submit in accordance with Section 01300 - Submittals:

1. Product data.
2. Shop drawings showing layout, configurations, profiles, dimensions, wall opening tolerances, hardware, self closing device, fasteners, and adjacent related work. Provide large scale details showing method of anchoring and sealing window units in rough openings.
3. Certificates that windows have been successfully tested in accordance with Paragraph 1.3.
4. Sample of finish.
5. Manufacturer's recommended installation and maintenance instructions.

1.1 QUALITY ASSURANCE

- A. Conform to ICBO applicable codes and regulations of authority having jurisdiction] for design and installation fire rated windows.
- B. Comply with Consumer Product Safety Commission 16 CFR 1201 and other applicable safety requirements. Each piece of safety glazing shall be permanently labeled with appropriate marking.

1.2 WARRANTY

A. Provide in accordance with Section 01700 - Closeout:

1. 3 years warranty for factory finish against cracking, peeling, and blistering under normal use.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Equal to Optimum Window Manufacturing Corporation, 28 Canal Street, Ellenville, New York 12428; 845-647-1900; www.optimumwindow.com.
- B. Basis of Design: Series 7650TSH (TSH=True Single Hung

2.2 MATERIALS

A. Framing sections:

1. Formed from cold rolled ASTM A653 low carbon steel with 20 gage minimum thickness.
2. Depth:

- a. Exterior frame: 3-5/8 inches [92 mm].
 - b. Sash frame: 1-5/8 inches [41 mm].
- B. Glass: As specified in Section 08800 - Glazing.
1. Type: Fire rated insulated units with inner lite of laminated glass with intumescent interlayer and listed by Underwriters Laboratories (UL) for 3/4 hour fire rated assembly.
 - a. In locations indicated on Drawings or where required by applicable regulations, glass shall comply with CPSC 16 CFR and ANSI Z97.1 to qualify as safety glass.
 2. Color: match exterior lites specified in Section 08800].
- C. Gaskets: Molded or extruded elastomeric type of profile and hardness required to maintain weathertight seal and complying with ASTM C864.
- D. Setting blocks: Neoprene or EPDM complying with ASTM C864.
- E. Glazing tape: Preformed, non-staining, coiled on release paper, and complying with ASTM C1281.
- F. Glazing sealants: As recommended by window manufacturer and compatible with materials and conditions.
- G. Anchorage devices: Manufacturer's recommended clips, anchors, fasteners, and shims required for secure installation of window units.
- H. Joint materials: As specified in Section 07900 - Joint Sealers.
1. Backing: Round polyethylene foam rod oversized 30 percent larger than joint width.
 2. Sealants: Silicone] type suitable for perimeter window joint size and Project conditions.

2.3 WINDOW UNITS

- A. Type: Fire rated, operable, self closing, [single] hung, steel framed window unit; Series 7650TSH as manufactured by Optimum Window Manufacturing Corporation.
- B. Grade: Heavy Monumental in accordance with SWI.
- C. Size, shape, and configuration: As indicated on Drawings.
- D. Frame corners: Coped, mechanically fastened, and sealed to prevent water leakage.
- E. Muntins: T sections mechanically fastened to perimeter frame with cross notched intersections.
- F. Glazing beads: Formed cold rolled steel bead with 3/4 inch edge bite, applied from interior, and designed for snap-in installation and securing with mechanical fasteners.

G. Hardware:

1. Support operating sashes on pair of heavy duty balances and equip with sweep locks.
2. Locking device: Cam type lock and strike. Provide two locks for sash greater than [36 inches] [914 mm] high.
3. Self closing hardware: Equip fire rated window windows with [gravity] operated, self closing device activated by fusible link during a fire.
4. Lift handles. Provide two handles for sash greater than [36 inches] [914 mm] high.

H. Weatherstripping: Factory apply EPDM and silicoated pile gaskets around entire perimeter.

I. Insect screens: Provide screens for all operable windows.

1. Frame: Aluminum with rigid corners to lie flat against window frame without bow or screen sag. Finish to match window color.
2. Screen: 18 by 16 aluminum mesh.

J. Trim: Provide mullion covers, attachment clips, and other trim required for complete, finished installation as detailed on Drawings and approved shop drawings.

K. Factory glaze windows in accordance product manufacturer's standard procedures.

2.4 FACTORY FINISH

A. Steel sections shall be hot-dip galvanized in accordance with ASTM A653 followed by skin pass smoothing procedure to eliminate roughness.

B. Primer: Thermoset epoxy-ureic paint with 3 mills minimum thickness.

C. Finish coat:

1. Electrostatically applied, colored, polyester powder coating heat cured at 325 to 385 degrees F for 15 minutes minimum to chemically bond finish to metal substrate.
2. Minimum average thickness: 3 - 6 mills thick.
3. Overall finish thickness (primer & final coat) 6-9 mills.

D. Color: Match windows specified in Section 08520

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that wall openings are ready to receive windows.

B. Insulate dissimilar metals to prevent electrolysis and other forms of corrosion with bituminous paint or non-absorptive gasket to prevent contact.

3.2 INSTALLATION

- A. Install fire rated windows in accordance with NFPA 80, approved shop drawings, and manufacturer's instructions.
- B. Use anchorage devices to securely attach window frame in rough openings. Align window units plumb, level, and free of warp or twist.
- C. Apply backing material and sealant in perimeter joints to ensure weathertight installation.
- D. Securely attach insect screens with clips and screws.
- E. Adjust operating hardware to provide smooth operation, tight fit, and weathertight closure.

3.3 CLEANING

- A. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
- B. Exercise care in removing mortar, cementitious materials, and sand from glass and frames. Do not wipe surfaces in order to avoid scratching.
- C. Touch up damaged or abraded factory finish with enamel to match type and color of original finish.
- D. Wash exposed surfaces with solution of mild detergent applied with soft cloth. Take care to remove dirt from corners. Wipe surfaces clean.

END OF SECTION

ALUMINUM WINDOWS**SECTION 08520****PART 1 - GENERAL****1.01 WORK INCLUDED**

- A. Furnish all necessary material, labor and equipment for the complete installation of aluminum windows as shown on the Drawings and specified herein, complete with glass and glazing and sills for the following operation:
 - 1. Single hung and awning operable sash units and fixed sections, factory finished, complete with all operating hardware, aluminum insect screens in frames at each operable window and aluminum panning system, silicone adhered aluminum muntins as indicated on the drawings, glazed with insulated hurricane/impact resistant glass assembly rated for large missile specified in Section 08800

1.02 REFERENCE STANDARDS

- A. AAMA 101 - Specifications for Aluminum Prime Windows and Sliding Glass Doors.
- B. AAMA 606.1 - Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
- C. AAMA 607.1 - Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
- D. AAMA 608.1 - Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
- E. ASTM A386 - Zinc Coating (Hot Dip) on Assembled Steel Products.
- F. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- G. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.
- H. ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
- I. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- J. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1.03 DEFINITIONS

- A. Performance class number included as a part of the window designation system is the actual design pressure in pounds per sq. ft. used to determine the structural test pressure and water test pressure.

- B. Structural test pressure, windload test, is equivalent to 150 percent of the design pressure.

1.04 SYSTEM DESCRIPTION

- A. Design requirements: Comply with air infiltration, water penetration and structural performance requirements indicated in AAMA 101-93 for the type, grade and performance class of window units required.
- B. Windows: Tubular aluminum sections, shop fabricated, factory pre-finished, vision glass, sills, related flashings, anchorage and attachment devices.
- C. Configuration: Fixed non-operable and operable bottom sash as indicated on the drawings.

1.05 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall specified below:
- B. Testing: Test each type and size of required window through a recognized testing laboratory or agency, in accordance with ASTM E 330 for structural performance, with ASTM E 283 for air infiltration and with both ASTM E 331 for water penetration. Provide certified test results. Installed windows must meet the following performance:
 - 1. Structural Performance: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as required by and calculated in accordance with the International Building Code 2009 and Supplements (City of New Orleans Building Code) and ASCE 7-05, measured in accordance with ANSI/ASTM E330 and when tested in accordance with ANSI/ASTM E330, based on 130 mph wind speed, Exposure B and Importance Factor of 1.00, and corners as required by Codes.
 - a. With window sash and ventilators closed and locked, test unit in accordance with ASTM E 330 at a static air pressure equal to structural test pressure with high pressure applied first on one side of the unit and then on the other side with no glass breakage or damage to make window inoperable.
 - b. No member shall deflect more than $L/175$ of its span or permanent deflection exceeding .4% of its span at structural test pressure load, with full recovery of glazing materials.
 - c. Test pressures required to measure deflection parallel to the plane of the wall shall be equal to 1.5 times the wind pressures specified above. Deflection of any member carrying its full dead load shall not exceed an amount that will reduce glass bite below 75 percent of the design dimension and shall not reduce the edge clearance between the member and the fixed panel, glass or other fixed member above to less than 1/8 inch. The clearance between the member and an operable door or window shall be at least 1/16 inch
 - d. Glass and framing meeting missile impact criteria per requirements of SBCCI SSTD-12, and ASTM E1886 and E1996, meeting requirements of the Large

Missile Test of ASTM E 1996 up to 30 foot of building height and meeting requirements of the Small Missile Test of ASTM E 1996 above 30 ft.

2. Air Infiltration: Provide units with an air infiltration rate of not more than 0.20 cfm/sq.ft. of operable sash joint for a static air pressure tested at 6.24 lbs./sq. ft.
 3. Water Penetration: Provide units with no water penetration as defined in the test method at a static air pressure difference of 12.00 lbs./sq. ft. and also in addition to the aforementioned performance, unit no water penetration when equivalent static pressure is stabilized.
- C. Operating Force: Each sash shall be adjusted before any tests are performed so that they shall operate in either direction with a force not to exceed 45 lbs. after the sash is in motion.
1. This operating test must be completed with the specified glazing materials for this project unless the unit was tested with a glazing material of a heavier type of glazing.
- D. System to accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.
- E. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

1.06 SUBMITTALS

- A. Submit shop drawings and product data in accordance with Section 01300.
- B. Shop Drawings: Submit shop drawings for each type of window including information not fully detailed in the manufacturer's standard product data and the following:
1. Elevations of continuous work at 1/4" scale.
 2. Typical unit elevations at 3/4" scale.
 3. Full size section details of every typical composite member.
 4. Anchors.
 5. Hardware and Operators.
 7. Indicate pertinent dimensioning, general construction, component connections and locations, anchorage methods and locations, hardware locations, finishes and installation details.
- C. Product Data: Submit manufacturer's product specifications, technical product data, recommendations and standard details for each type of aluminum window unit required. Include the following information:
1. Fabrication methods.
 2. Finishing.
 3. Hardware.
 4. Accessories.
- D. Samples: Submit samples of the specified finish on 12" lengths of window members.
- E. Certification: Provide certification by the manufacturer showing that each type, grade and size of window unit complies with requirements where the manufacturer's standard window

units have been tested in accordance with specified tests and meet performance requirements specified. Where such testing has not been accomplished, perform required tests through a recognized testing laboratory or agency and provide certified test results.

1.07 WARRANTY

- A. Aluminum Commercial Window Warranty: Submit a written warranty, executed by the window manufacturer, agreeing to repair or replace window units that fail in materials or workmanship within the specified warranty period. Failures include but are not necessarily limited to:
 - 1. Structural failures including excessive deflection, excessive leakage, or air infiltration.
 - 2. Faulty operation of sash and hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- B. Warranty period: 3 years after date of Substantial Completion and ten (10) years for finish.
- C. The warranty shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the law, and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents. Owner's signature shall not be required.

1.08 QUALITY ASSURANCE

- A. Standards: Requirements for aluminum windows, terminology and standards of performance, and fabrication workmanship are those specified and recommended in AAMA 101-85 and applicable general recommendation published by AAMA and AA.
 - 1. AAMA Designation: AW-65 (operable) and AW-100 (fixed)
- B. Single Source Responsibility: Provide aluminum windows produced by a single manufacturer capable of showing prior production of units similar to those required.
- C. Design Criteria: The drawings are based on a specific type and model of aluminum window by a single manufacturer. An equivalent type of window by another listed manufacturer may be accepted provided that deviations in dimensions and profiles are minor and do not materially detract from the design concept or intended performances as judged solely by the Architect.
 - 1. Quality Standard: Equal to "YOW-225TUH" by YKK AP America.

1.09 PROJECT CONDITIONS

- A. Field Measurements: Where possible, check actual window openings in construction work by accurate field measurement before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress as directed by the Contractor to avoid delay of work. Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit of window units.

PART 2 - PRODUCTS**2.010 MATERIALS**

- A. Aluminum shall be of commercial quality and for window construction free from defects impairing strength and durability. All extruded sections shall be of 6063-T5 alloy temper complying with ASTM B221 and shall have a minimum ultimate tensile strength of 22,000 psi and a yield of 16,000 psi.
- B. Frame and Sash Members: Minimum .090" wall thickness.
- C. Subframes and Panning System: Same as main frame. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners.
- D. Fasteners: Provide aluminum, non-magnetic stainless steel, or other materials warranted by the manufacturer to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors and other components of window units.
 - 1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125" thick, reinforce the interior with aluminum or non-magnetic stainless steel to receive screw threads, or provide standard non-corrosive pressed-in splined grommet nuts.
 - 2. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For application of hardware, use fasteners that match the finish of the member or hardware being fastened, as appropriate.
- E. Anchors, Clips and Window Accessories: Fabricate anchors, clips and window accessories of aluminum or non-magnetic stainless steel, Anchors, clips and window accessories fabricated of zinc-coated steel or iron complying with ASTM B 663 may be used for concealed work; provide sufficient strength to withstand design pressure indicated.
- F. Weatherstripping: Provide double compression-type weatherstripping of neoprene or EPDM.
- G. Sealant: For sealants required within fabricated window units, provide type recommended by the manufacturer for joint size and movement. Sealant shall remain permanently elastic, non-shrinking and non-migrating and comply with AAMA 803.3.
- H. Sills: Extruded aluminum sized and profiled to suit application; longest practical lengths.
- I. Glass: Manufacturers standard 1-1/16" insulated assembly meeting the specified wind load and rated for large missile impact with published test data, with Low-E coated performance characteristics specified in Section 08800.
- J. Glazing Materials: Manufacturer's standard dry glazed elastomer gaskets in accordance with ASTM C509, to suit locations and applications. Fixed and operable sash shall be glazed using aluminum glazing beads, finished to match frame.
- K. Bituminous paint: Acid and alkali resistant type, black.

2.02 HARDWARE

- A. General: Except to the extent that more specific or stringent requirements are indicated, provide the manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum and of sufficient strength to perform the function for which it is intended.
- B. Hardware having component parts which are exposed shall be of aluminum, stainless steel, or other corrosion-resistant material(s) compatible with aluminum and of sufficient strength to perform the functions for which they are used. Cadmium or zinc-plated steel, where used, shall be in accordance with ASTM A 165 or A 164.
- C. Awning Hardware: Provide the following equipment and operating hardware
 - 1. Locking: Key operated security lock and keeper.
 - 2. Hinges: Manufacture's standard heavy duty 4-bar hinges
- C. Awning Hardware: Provide the following equipment and operating hardware:
 - 1. Hinges: Manufacture's standard heavy duty concealed 4-bar hinges (2 per ventilator).
 - 2. Lock: Lift type cam action lock.
 - 3. Operating Device: Gear-type rotary operator located on the jamb at the sill.
- D. Single Hung Hardware: Provide the following equipment and operating hardware:
 - 1. Sash Balances: Equal to Ultra Lift® Balances by Caldwell.
 - 2. Lock: cam lock engaging into recessed receiver in the bottom rail of upper fixed sash.
 - 3. Lift Handle: Continuous integral sash lift bar on bottom rail of lower sash.
 - 4. Tilt Latches: surface mounted reinforced nylon

2.03 CONSTRUCTION

- A. General: Except to the extent that more specific or stringent requirements are indicated, provide manufacturer's standard fabrication that complies with indicated standards and that produces units that are reglazable without dismantling sash framing. Include a complete system for assembly of components and anchorage of window units, and prepare sash for glazing except where preglazing at the factory is indicated.
- B. Sizes and Profiles: Required sizes for window units and profile requirements are indicated on the Drawings. Variable dimensions are indicated along with maximum and minimum dimensions as required to achieve design requirements and coordination with other work.

1. Details shown are based upon standard details by one or more manufacturers. Similar details by other manufacturers will be acceptable, provided they comply with size requirements, minimum/maximum profile requirements, and performance standards as indicated or specified.
- C. Provide panning system if indicated on the Drawings.
- D. Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, in the manner indicated.
- E. Glazing: Factory glaze all units. Glass units shall be set in channel-type elastomer gaskets. ; materials compatible with aluminum which will not promote corrosion and shall be resistant to deterioration by all forms of weathering and shall be suitably retained to maintain a watertight seal between the glass and its surrounding frame. .Insulated units complying with section 08800.
- F. Weepholes: Provide weepholes and internal passage to conduct infiltrating water to the exterior.
- G. The windows shall be assembled in a secure and workmanlike manner to perform as herein specified and to assure neat and weathertight construction.
- H. Fabricate window units in conformance with ANSI A134.1.
- I. Fabricate aluminum windows to allow for adequate clearances and shim spacing around perimeter of assemblies to enable proper installation. Allow for thermal movement within window construction.
- J. Provide sufficient corrosion resistant anchorage devices to securely and rigidly fit windows in place.
- K. Frames, corners, and horizontal muntins are to be joined at corners and frames section by interlocking mechanical joints (tabbed) and sealed with joint sealant per AAMA 803.3-92.
- L. Accurately and rigidly fit together joints and corners. Match components carefully ensuring continuity of line and design. Ensure joints and connections are flush, hair line and weatherproof.
- M. Weatherstripping: Provide double-type weatherstripping at locations where sash rails meet the unit frame. Unless otherwise indicated, provide double compression-type weatherstripping at the non sliding ends.
- N. Provide internal reinforcing, with galvanized steel members; where required to maintain rigidity.
- O. Provide for moisture entering joints, and condensation occurring within frame construction to drain to exterior.

- P. Weepholes: Provide weepholes and internal water passages to conduct infiltrating water to the exterior
- Q. Sash shall be non-tilt type, but can be removed for service from the interior of the building.
- R. Apply coat of bituminous paint on concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.04 FINISHES

- A. Fluoropolymer Coating: High performance fluoropolymer coloring coating meeting AAMA 605.2 and containing thermocuring polyvinylidene fluoride (70% solids by weight) supplied under license by manufacturers listed below with minimum rated service life of 20 years as published by the manufacturer. Pre-treatment, epoxy primer, and finish coat(s) shall be factory baked-on of 1.0 - 1.25 dry mil thickness (minimum 0.2 - 0.3 dry mil primer and minimum 0.8 dry mil finish).
 - 1. Color: As selected by the Architect.
- B. Polyvinylidene Fluoride (PVDF) Resin Manufacturers:
 - 1. Hylar 5000™, Ausiomont USA, Inc.
 - 2. Kynar 500®, Elf Atochem North America, Inc.
- C. Coating Manufacturers: One of the following:
 - 1. Akzo Chemical, Trinar
 - 2. Lilly Co.; Nubelar
 - 3. Morton International; Fluoroceram
 - 4. PPG Industries, Inc.; Duranar
 - 5. Valspar Corp.; Fluorpon
- D. Performance Requirements: Provide applied coatings of color selected by the Architect that meet or exceed the criteria for the following tests using the test procedures specified in AAMA 605.2:
 - 1. Color Uniformity and Retention.
 - 2. Specular Gloss.
 - 3. Dry Film Hardness.
 - 4. Film Adhesion.
 - 5. Impact Resistance.
 - 6. Abrasion Resistance.
 - 7. Chemical Resistance.
 - 8. Corrosion Resistance.
 - 9. Weathering.
 - 10. Acid Resistance.
 - 11. Chalking
- E. Qualifications of Applicator: Licensed by the coating manufacturer. Use one applicator for all fluoropolymer coatings in the Project.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect openings before beginning installation. Verify that rough or masonry opening is correct and the sill plate is level.

3.02 INSTALLATION

- A. Comply with manufacturer's written specifications and recommendations for installation of window units, panning system, hardware, operators, and other components of the work.
- B. The windows shall be installed square, plumb, and level in a secure and professional manner to assure neat and weathertight construction in accordance with ANSI/ASTM Specification F-737 latest edition. A permanent weathertight joint shall be made at the junction of the sill and side frame members of the master frame with a good grade of sealant that shall meet AAMA Specification 803. Windows shall be properly caulked with a compound meeting AAMA 808, "Specifications for Exterior Perimeter Sealing Compounds", to accomplish a thoroughly weathertight installation around the perimeter of the window master frame.
- C. Set units plumb, level and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.
 - 1. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with the requirements specified under paragraph "Dissimilar Materials" in the Appendix to AAMA 101-85.
- D. Install sill flashings at abutting construction; turn up flashing a minimum of 1/2" to form a concealed continuous pan with soldered/sealed watertight joints including rear and end dams.
- E. Install sufficient corrosion resistant anchorage devices to securely and rigidly fasten windows to building, without causing detrimental effects to shape or performance.
- F. Set window sills level and uniform. Accurately and rigidly fit together joints. Ensure joints are flush, hairline and weatherproof.
- G. Install sealants and related backing materials around perimeter of windows in accordance with workmanship and installation requirements indicated in Section 07900.
- H. Protection and Cleaning: After installation, all metal surfaces shall be cleaned to remove any mortar, plaster, paint or other contaminants in accordance with AAMA 609-93. After cleaning, all work shall be protected against damage until it is accepted by the Contractor. Thereafter, it shall be the responsibility of the Contractor to maintain protection and provide final cleaning.

3.03 ADJUSTING

- A. Adjust operating sash and hardware to provide a tight fit at contact points and at weatherstripping, for smooth operation and a weathertight closure for an operating force of 25 lbs. in motion.

3.04 FIELD TESTS

- A. Build a mock-up replicating the wall construction with a window (fixed and operable assembly), metal stud, sheathing membrane barrier, flashings and sealant, etc. Field water tests the mock-up by static test method at design pressures per standard for 15 minutes in accordance with AAMA 502-08 with latest updates shall be performed on completed mock-up including window and surrounding wall by an approved independent testing laboratory Contractor shall include in his bid a \$8000 allowance for the cost of the testing. This allowance shall cover the direct cost of the testing agency. Remedial measures must maintain standards of quality and durability and are subject to review by the Architect. Provide powered scaffold, hose, and sufficient personnel to operate scaffold and hose

END OF SECTION

DOOR HARDWARE**SECTION 08710****PART 1 – GENERAL**

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following:
 - 1. Hinges
 - 2. Key control system
 - 3. Lock cylinders and keys
 - 4. Lock and latch sets
 - 5. Bolts
 - 6. Exit devices
 - 7. Push/Pull units
 - 8. Closers
 - 9. Overhead holders
 - 10. Miscellaneous door control devices
 - 11. Door trim units
 - 12. Protection plates
 - 13. Weatherstripping for exterior doors
 - 14. Astragals or meeting seals on pairs of doors
 - 15. Thresholds
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 08110: Steel Doors and Frames
 - 2. Section 08113: Steel Frames
 - 3. Section 08210: Wood Doors
 - 4. Division 16: Electrical
- D. Products furnished but not installed under this Section to include:
 - 1. Final replacement cores and keys to be installed by Owner.

1.3 REFERENCES

- A. Standards of the following as referenced:
 - 1. American National Standards Institute (ANSI)
 - 2. Door and Hardware Institute (DHI)
 - 3. Factory Mutual (FM)
 - 4. National Fire Protection Association (NFPA)

5. Underwriters' Laboratories, Inc. (UL)
 - a. UL 10C - Fire Tests Door Assemblies
 6. Warnock Hersey
- B. Regulatory standards of the following as referenced:
1. Department of Justice, Office of the Attorney General, *Americans with Disabilities Act*, Public Law 101-336 (ADA).
 2. CABO/ANSI A117.1: *Providing Accessibility and Usability for Physically Handicap People*, 1992 edition.

1.4 SYSTEM DESCRIPTION

- A. Refer to applicable "Headings" for system description for electric and electro-pneumatic hardware products.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements. For items other than those scheduled in the "Headings" of Section 3, provide catalog information for the specified items and for those submitted.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:
 - a. Type, style, function, size, and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 - h. Keying information.
 - i. Cross-reference numbers used within schedule deviating from those specified.
 - 1) Column 1: State specified item and manufacturer.
 - 2) Column 2: State prior approved substituted item and its manufacturer.
 2. Submittal Sequence: Submit final schedule at earliest possible date particularly

- where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- D. Samples, if requested, of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.
1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.
- E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- F. Contract closeout submittals:
1. Operation and maintenance data: Complete information for installed door hardware.
 2. Warranty: Completed and executed warranty forms.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
 2. Required supplier to meet with installer prior to beginning of installation of door hardware. (Pre-installation conference)
- C. The hardware manufacturer's representative(s) shall conduct a pre-installation conference with the Contractor's installer, a representative of the county planning and/or maintenance department, and a representative of the hardware supplier, to demonstrate product installation and adjustment in accordance with manufacturer's recommendations and Owner's requirements.
- D. Hardware manufacturers' representative shall inspect hardware installation to confirm that all products are installed and adjusted according to manufacturers recommendations. A certificate of compliance shall be submitted with the project closeout documents.

- E. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware shall comply with standards UBC 702 (1997) and UL 10C.
 - 1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

1.7 PRODUCT HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.8 WARRANTY

- A. Special warranties:
 - 1. Door Closers: Ten year period
 - 2. Exit Devices: Three year period
 - 3. Automatic Door Operators: Two year period
 - 4. Locks and Cylinders: Three year period

1.9 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

(*Denotes manufacturer referenced in the Hardware Headings)

A. Hinges:

1. Acceptable manufacturers:
 - a. Hager Hinge Company
 - b. Stanley Works
 - c. Ives
 - d. Bommer*
2. Characteristics:
 - a. Templates: Provide only template-produced units.
 - b. Screws: Provide Phillips flat-head screws complying with the following requirements:
 - 1) For metal doors and frames install machine screws into drilled and tapped holes.
 - 2) For wood doors and frames install threaded-to-the-head wood screws.
 - 3) For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.
 - 4) Finish screw heads to match surface of hinges or pivots.
 - c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1) Out-Swing Exterior Doors: Non-removable pins.
 - 2) Out-Swing Corridor Doors with Locks: Non-removable pins.
 - 3) Interior Doors: Non-rising pins.
 - 4) Tips: Flat button and matching plug. Finished to match leafs.
 - d. Size: Size hinges in accordance with specified manufacturer's published recommendations.
 - e. Quantity: Furnish one pair of hinges for all doors up to 5'0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof.

B. Cylinders:

1. Acceptable manufacturers:
 - a. Best
 - b. Sargent
 - c. Schlage*
2. Characteristics:
 - a. Standard System: Except as otherwise indicated, provide new master key system for Project.
 - b. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster), either new or integrated with Owner's existing system.
 - c. Equip locksets with interchangeable core cylinders with auxiliary locking pin.
 - d. Furnish final cores and keys for installation by Owner.
 - e. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
 - f. Comply with Owner's instructions for master keying and, except as

otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.

- 1) Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
 - g. Key Material: Provide keys of nickel silver only.
 - h. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, 5 grandmaster keys for each grandmaster system, and 5 control keys for interchangeable core series, 10 Constructions Master keys and 2 Construction Control Keys.
 - 1) Furnish one extra blank for each lock.
 - 2) Deliver keys to Owner.
- C. Locksets, Latchsets, Deadbolts:
1. Acceptable manufacturers:
 - a. Best - 16H Design, 16D Design,
 - b. Sargent - LNB Design, LLB Design,
 - c. Schlage* - 07A Design, ATH Design, Jazz Design
 2. Mortise Locksets and Latchsets: as scheduled.
 - a. Chassis: cold-rolled steel, handing field-changeable without disassembly.
 - b. Latchbolts: 3/4-inch throw stainless steel anti-friction type.
 - c. Lever Trim: through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: independent break-away.
 - d. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
 - e. Deadbolts: stainless steel 1-inch throw.
 - f. Electric operation: Manufacturer-installed continuous duty solenoid.
 - g. Strikes: 16 gage curved stainless steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
 - h. Scheduled Lock Series and Design: Schlage L series, 07A design.
 - i. Certifications:
 - 1) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
 - 2) ANSI/ASTM F476-84 Grade 30 UL Listed.
 3. Extra Heavy Duty Cylindrical Locks and Latches: as scheduled, fastened with through-bolts.
 - a. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel.
 - b. Locking Spindle: stainless steel, interlocking design.
 - c. Latch Retractors: forged steel. Balance of inner parts: corrosion-resistant plated steel, or stainless steel.
 - d. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
 - e. All lock functions: 7 year warranty, Vandalguard function outside lever is disengaged when in the locked mode.
 - f. Rosettes: minimum 3-7/16" diameter for coverage of ANSI/DHI A115.18, 1994 door preparation, through-bolt lugs on both spring cages to fully engage this pattern.
 - g. Springs: full compression type.

- h. Electric operation: Manufacturer-installed continuous duty solenoid.
 - i. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
 - j. Lock Series and Design: Schlage ND series, Athens design.
 - k. Certifications:
 - 1) ANSI A156.2, Series 4000, Grade 1. Tested to exceed 3,000,000 cycles.
 - 2) UL listed for A label single doors up to 4 ft x 8 ft.
 - 4. Standard Duty Cylindrical Locks and Latches: as scheduled,
 - a. Chassis: cylindrical design - Tubular.
 - b. Latchbolt – Universal Backset (2-3/8 or 2-3/4).
 - c. Lever Trim: accessible design
 - d. Strikes: curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
 - e. Lock Series and Design: Schlage F series, JAZZ design.
 - f. Certifications:
 - 1) ANSI A156.2, Series 4000, Grade 2
 - 5. Offline Electronic Locks
 - a. Locks to be Battery Operated Cylindrical Design
 - b. Locks to a computer programmable offline lock that stores user rights on the magnetic stripe credential and captures an audit trail in lock
 - c. Locks to have a key override.
 - d. Furnish locks as listed in hardware sets.
 - e. Acceptable Manufacturers
 - 1) Schlage CO250 Series
- D. Exit Devices:
- 1. Acceptable manufacturers:
 - a. Von Duprin
 - b. Falcon*
 - c. Precision
 - d. Sargent
 - 2. Characteristics:
 - a. Exit devices shall be "UL" listed for life safety. All exit devices for fire rated openings shall have "UL" labels for "Fire Exit Hardware."
 - b. All exit devices mounted on labeled wood doors shall be mounted on the door per the door manufacturer's requirements.
 - c. All trim shall be thru-bolted to the lock stile case. Lever design to match locksets.
 - d. All exit devices shall be made of brass, bronze, stainless steel, or aluminum material, powder coated, anodized, or plated to the standard architectural finishes to match the balance of the door hardware.
 - e. Provide glass bead conversion kits to shim exit devices on doors with raised glass heads.
 - f. All exit devices shall be one manufacturer. No deviation will be considered.
 - g. All exit devices shall be non-handed. Plastic touchpads are not acceptable. All latchbolts to be the deadlocking type.

- h. Lever trim shall be solid case material with a break-away feature to limit damage to the unit from vandalism.
 - i. Surface vertical rod devices shall be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices shall be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.
- E. Closers and Door Control Devices:
- 1. Acceptable manufacturers:
 - a. Falcon Dor-o-matic* SC70 Series, Sc80 Series
 - b. Sargent - 350 Series, 1430 Series
 - 2. Characteristics:
 - a. Door closers shall have fully hydraulic, full rack and pinion action.
 - b. All closers shall utilize a stable fluid withstanding temperature range of 120°F to -30°F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
 - c. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.
 - d. All closers shall have solid forged steel main arms (and forearms for parallel arm closers) and where specified shall have a cast-in solid stop on the closer shoe. Where door travel on out-swing doors must be limited, use "CNS" or "S-CNS" type closers. Auxiliary stops are not required when cushion type closers are used.
 - e. All surface closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).
 - f. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
 - g. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
 - h. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
 - i. Magnetic Door Holders to be heavy duty wall or floor mounted with metal housing and complete mounting hardware. Provide 24V holding coils unless otherwise scheduled.
- F. Power Operators:

1. Acceptable manufacturers:
 - a. LCN*
 2. Where low kinetic energy, as defined by ANSI Standard A1 56.19, power operators are indicated for doors required to be accessible to the disabled, provide electrically powered 4640 Series. operators complying with the 1990 ADA for opening force and time to close standards.
 3. All electrically powered operators shall include the following features or functions:
 - a. When an obstruction or resistance to the opening swing is encountered, the operator will pause at that point, then attempt to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.
 - b. Easily accessible main power and maintain hold open switches will be provided on the operator.
 - c. An electronically controlled clutch to provide adjustable opening force.
 - d. A microprocessor to control all motor and clutch functions.
 - e. An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.
 - f. All input and output power wiring shall be protected by slow blow fuses. These fuses shall be easily replaceable without special tools or component replacement.
 4. Actuators shall have a stainless steel touch plate that measures 4-1/2" in diameter and features a blue filled handicap symbol. The actuator shall be weather resistant and provide normally open momentary contacts. The actuator is designed to mount in a standard single gang box (2" wide, 4" high, and 2" deep).
 5. With reference to door closers, refer to "additional security" in Article E-20 of the General Conditions and extend the guarantee period to ten (10) years from the date of the Final Certificate of the Architect. Power door operators will provide a two (2) year warranty.
 6. The contractor shall furnish a certificate executed by a representative of the manufacturer of the door closers that all closers have been inspected and adjusted, are operating as designed and have been installed in accordance with the manufacturer's instructions.
 7. All low voltage switch hookups are the responsibility of the operator installer, as well as temporary wiring hookup to plug into wall outlet for test of system. Final hookup of 115VAC power will be handled by and coordinated with the general contractor's electrical contractor.
- G. Overhead Door Holders:
1. Acceptable manufacturers:
 - a. Glynn Johnson*
 - b. Rixson Firemark
 2. Characteristics:
 - a. Provide medium duty door holders, surface mounted of stainless steel.
 - b. Surface holders to be installed with the jamb bracket mounted on the stop.
- H. Floor Stops and Wall Bumpers:
1. Acceptable manufacturers:

- a. Trimco*
 - b. Ives*
 - c. Rockwood Manufacturing
 2. Characteristics: Refer to Hardware Headings.
- I. Door Bolts/Coordinators:
1. Acceptable manufacturers:
 - a. Trimco
 - b. Ives*
 - c. Rockwood Manufacturing
 2. Characteristics:
 - a. Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side that fits into a matching guide.
 - b. Automatic flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
 - c. Self-latching flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
 - d. Automatic flush bolts and self-latching flush bolts shall be UL listed for fire door application without bottom bolts (LBB).
 - e. Coordinator to be soffit mounted non-handed fully automatic UL listed coordinating device for sequential closing of paired doors with or without astragals.
 - f. Provide filler pieced to close the header. Provide brackets as required for mounting of soffit applied hardware.
- J. Door Pulls::
1. Acceptable manufacturers:
 - a. Trimco
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Characteristics:
 - a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for single units.
 - b. Material to be stainless steel.
 - c. Provide units sized as shown in Hardware Headings.
- K. Protective Plates:
1. Acceptable manufacturers:
 - a. Trimco
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Characteristics:
 - a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
 - b. Materials:

- 1) Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
 - c. Fabricate protection plates not more than 2 inches less than door width on hinge side and not more than 1 inch less than door width on pull side.
 - d. Heights:
 - 1) Kick plates to be 8" inches in height.
 - 2) Kick Plates to be 6" inches in height. At Apartment entry
- L. Thresholds:
 1. Acceptable manufacturers:
 - a. National Guard Products, Inc.*
 - b. Reese Industries
 - c. Zero Weatherstripping Co., Inc.
 2. Types: Indicated in Hardware Headings.
- M. Door Seals/Gasketing:
 1. Acceptable manufacturers:
 - a. National Guard Products, Inc.*
 - b. Reese Industries
 - c. Zero Weatherstripping Co., Inc.
 2. Types: Indicated in Hardware Headings.
- N. Silencers:
 1. Acceptable manufacturers:
 - a. Hager
 - b. Ives*
 - c. Rockwood Manufacturing
 2. Three for each single doors; four for pairs of doors.
- O. Key Cabinet and System:
 1. Acceptable manufacturers:
 - a. Telkee, Inc.
 - b. Lund
 - c. MMF
 2. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150 percent of the number of locks required for the Project.
 - a. Provide complete cross index system set up by key control distributor, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
 - b. Provide hinged-panel type cabinet for wall mounting.

2.2 MATERIALS AND FABRICATION

- A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise

acceptable to Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
 2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
 3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
 4. Do not use thru-bolts or sex bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware, or otherwise found in Headings. Coordinate with wood doors and metal doors and frames where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.3 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).
- B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."
- E. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S.

finishes shown by certain manufacturers for their products.

1. Hinges (Exterior): 630 (US32D) Satin Stainless Steel
2. Hinges (Interior): 652 (US26D) Satin Chrome Plated Steel
3. Continuous Hinges: 628 (US28) Clear Anodized Aluminum
4. Flush Bolts: 626 (US26D) Satin Chrome Plated Brass/Bronze
5. Locks: 626 (US26D) Satin Chrome
6. Exit Devices: 630 (US32D) Satin Stainless Steel
7. Door Closers: 689 Powder Coat Aluminum
8. Pulls: 630 (US32D) Satin Stainless Steel
9. Protective Plates: 630 (US32D) Satin Stainless Steel
10. Door Stops: 626 (US26D) Satin Chrome Plated Brass/Bronze
11. Overhead Holders: 630 Satin Stainless Steel
12. Thresholds/Weatherstripping: 627/628 (US27/US28) Aluminum

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
 2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.
 3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers".
- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper

operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Door Hardware Supplier's Field Service
1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
 2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
 3. File written report of this inspection to Architect.
- D. Prior to project completion, representatives of the lock, exit device and overhead closer manufacturers shall inspect and adjust all units and certify that all units are installed in accordance with the manufacturer's instructions, and are regulated properly and functioning correctly. A written report shall be provided to the Architect as to the inspection and shall include appropriate certificates.

3.3 HARDWARE SCHEDULE

HW 01

DOOR NUMBERS:

APARTMENT ENTRY DOORS – EXTERIOR

EACH TO HAVE:

3	EA	HINGES	BB5000 OR BB5004 AS REQ	652
1	EA	ENTRY LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
2	EA	HINGE PIN DOOR STOP	73	619E
1	EA	KICK PLATE	K1050 6" X 2" LDW	630
1	EA	DOOR VIEWER	U698	626
1	EA	THRESHOLD	424	628
1	SET	GASKETING	2525B	BRN
1	EA	DOOR SWEEP	C627A	628

HW 02

DOOR NUMBERS:

APARTMENT ENTRY DOORS – INTERIOR

EACH TO HAVE:

3	EA	HINGES	BB5000 OR BB5004 AS REQ	652
1	EA	ENTRY LOCK	CO-250-CY-50-MS-ATH-JD	626

1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	CORE	23-030	626
1	EA	DOOR CLOSER	SC81	689
2	EA	HINGE PIN DOOR STOP	73	619E
1	EA	KICK PLATE	K1050 6" X 2" LDW	630
1	EA	DOOR VIEWER	U698	626
1	SET	GASKETING	2525B	BRN

HW 03

DOOR NUMBERS:
BEDROOMS AND BATHS (IN SWING)

EACH TO HAVE:

3	EA	HINGES	5000	652
1	EA	PRIVACY	F40 JAZZ	626
1	EA	DOOR STOP	519	626
3	EA	DOOR SILENCERS	SR66	GRY

HW 04

DOOR NUMBERS:
BEDROOMS AND BATHS (OUT SWING)

EACH TO HAVE:

3	EA	HINGES	5000	652
1	EA	PRIVACY	F40 JAZZ	626
2	EA	HINGE PIN STOP	73	619E
3	EA	DOOR SILENCERS	SR66	GRY

HW 05

DOOR NUMBERS:
CLOSETS – PAIRS

EACH TO HAVE:

6	EA	HINGES	5000	652
2	EA	ROLLER LATCHES	336B	626
2	EA	DUMMY LEVERS	F170 JAZZ	626
4	EA	HINGE PIN STOPS	73	619E
2	EA	DOOR SILENCERS	SR66	GRY

HW 06

DOOR NUMBERS:
CLOSETS – SINGLE

EACH TO HAVE:

3	EA	HINGES	5000	652
1	EA	PASSAGE	F10 JAZZ	626

1	EA	DOOR STOP	519	626
3	EA	DOOR SILENCERS	SR66	GRY

HW 07

DOOR NUMBERS:

D117, D145, D176, D177, D239, D245, D346

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	STORE ROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81DS	689
1	EA	KICK PLATE	K1050 8" X 2" LDW	630
3	EA	DOOR SILENCERS	SR66	
1	EA	DOOR SWEEP	600A (DOOR D132-2)	628
1	SET	GASKETING	2525B (DOOR D132-2)	

HW 08

DOOR NUMBERS:

D121-1, D139-1, D150-1, D150-2, D151-1, D154-2

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	OFFICE LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	OVERHEAD STOP	450S	630
3	EA	DOOR SILENCERS	SR66	GRY

HW 09

DOOR NUMBERS:

D132-2

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	CLASSROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81 DS	689
1	EA	KICK PLATE	K1050 8" X 2" LDW	630
3	EA	DOOR SILENCERS	SR66	GRY

HW 10

DOOR NUMBERS:

D118, D127-1, D233, D242-1, D333, D342-1,

EACH TO HAVE:

3	EA	HINGES	BB5002 NRP	630
1	EA	POWER TRANSFER	EPT-2	628
1	EA	EXIT DEVICE	EL-25-R-EO	630
1	EA	EXIT TRIM	CO-250-993R-MS ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	AUTO OPERATOR	4640	689
1	EA	THRESHOLD	896 V	626
1	SET	GASKETING	2525B	BRN
1	EA	POWER SUPPLY	PS914 X 900-2RS	
2	EA	ACTUATORS	856	630

ELECTRICAL CONNECTION REQUIRED

HW 11

DOOR NUMBERS:

D140-1, D140-2, D143-2, D158-1, D158-3, D149, D161, D179, D232, D238, D239, D247, D330-3, D332, D338, D345, D374-4, D375-4

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	STOREROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	KICK PLATE	K1050 8" X 2" LDW	630
1	EA	FLOOR STOP	1211	626
3	EA	DOOR SILENCERS	S464	GRY

HW 12

DOOR NUMBERS:

D163, D164, D168, D178, D180, D234-1, D241, D246, D334-1, D339

EACH TO HAVE:

6	EA	HINGES	BB5000	652
2	EA	FLUSH BOLTS	FB458	626
1	EA	DUST PROOF STRIKE	DP2	626
1	EA	STOREROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81 DS (ACT LEAF)	689
1	EA	OVERHEAD STOP	450S (INACT LEAF)	630
1	SET	ASTRAGAL	600A	628
4	EA	DOOR SILENCERS	SR64	GRY

HW 13

DOOR NUMBERS:

D125, D126, D151-2

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	PASSAGE SET	AL10S JUP	626
1	EA	DOOR CLOSER	SC81 REG/PA	689
1	EA	KICK PLATE	K1050 6" X 2" LDW	630
1	EA	FLOOR STOP	1211	626
1	EA	OVERHEAD STOP	450S (DR D151-2)	630
3	EA	DOOR SILENCERS	SR64	GRY

HW 14

DOOR NUMBERS:

D144, D153

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	PRIVACY	AL40S JUP	626
1	EA	DOOR CLOSER	SC81DS	689
3	EA	DOOR SILENCERS	SR66	GRY

HW 15

DOOR NUMBERS:

D147-1, D154-1, D155

EACH TO HAVE:

3	EA	HINGES	BB5002 N	630
1	EA	CLASSROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81 DS	689
1	EA	THRESHOLD	896V	689
1	SET	GASKETING	2525B	BRN

HW 15A

DOOR NUMBERS:

D143-1

EACH TO HAVE:

3	EA	HINGES	BB5002 N	630
1	EA	CLASSROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81 DS	689
1	EA	THRESHOLD	425	628
1	EA	DOOR SWEEP	C627A	628
1	SET	GASKETING	2525B	BRN

HW 16

DOOR NUMBERS:

D135, D141

EACH TO HAVE:

3	EA	HINGES	BB5002 N	630
1	EA	EXIT DEVICE	25-R-EO	630
1	EA	EXIT TRIM	C0-250-993R-MS- ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81 DS	689
1	EA	THRESHOLD	896V	628
1	SET	GASKETING	2525B	BRN

HW 17

DOOR NUMBERS:

D134, D165-1, D165-2, D274-2, D274-3, D275-2, D275-3, D374-2, D374-3, D375-2, D375-3

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	EXIT DEVICE (PASSAGE)	F25-R-L-BE AVLON	630
1	EA	DOOR CLOSER	SC81DS	689
3	EA	DOOR SILENCERS	SR66	GRY
1	SET	GASKETING	2525B	BRN

HW 18

DOOR NUMBERS:

D158-2, D162

EACH TO HAVE:

6	EA	HINGES	BB5002 N	630
2	EA	FLUSH BOLTS	FB458	626
1	EA	STOREROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORES	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81DS	689
1	EA	THRESHOLD	896V	628
1	SET	GASKETING	2525B	BRN
1	SET	ASTRAGAL	600A	628

HW 19

DOOR NUMBERS:

D122-1, D122-2, D142, D157-1, D244, D344

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	CLASSROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	KICK PLATE	K1050 8" X 2" LDW	630
1	EA	FLOOR STOPS	1211	626
3	EA	DOOR SILENCERS	SC66	GRY

HW 20

DOOR NUMBERS:

D119-1

EACH TO HAVE:

3	EA	HINGES	BB5002N	630
1	EA	EXIT DEVICE	25-R-EO	630
1	EA	EXIT TRIM	C0-250-993R-MS- ATH-JD	626
1	EA	CORES	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81 DS	689
1	EA	THRESHOLD	896V	628
1	SET	GASKETING	2525B	BRN

HW 21

DOOR NUMBERS:

D128

EACH TO HAVE:

6	EA	HINGES	BB5000	652
2	EA	EXIT DEVICES	F25-V-EO- LBR	630
2	EA	EXIT DEVICE TRIM	C0-250-993S-MS- ATH-JD	626
2	EA	CORES	23-030	626
2	EA	CONSTRUCTION CORE	23-030 ICX	
2	EA	DOOR CLOSER	SC81 PA	689
2	EA	STOP/HOLDERS	491	626
4	EA	DOOR SILENCERS	SR66	GRY

HW 22

DOOR NUMBERS:

D130-1

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	OFFICE LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81DS	689
1	EA	KICKDOWN DOOR STOP	461	626
3	EA	DOOR SILENCERS	SR66	GRY

HW 23

DOOR NUMBERS:

D214-5, D314-5, D222-2

EACH TO HAVE:

3	EA	HINGES	BB5002 NRP	630
1	EA	ENTRY LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	OVERHEAD STOP	450S	630
1	EA	THRESHOLD	896S	628
1	SET	GASKETING	2525B	BRN

HW 24

DOOR NUMBERS:

D230-2, D330-2

EACH TO HAVE:

3	EA	HINGES	BB5002 NRP	630
1	EA	ENTRY LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81DS	689
1	EA	THRESHOLD	896S	628
1	SET	GASKETING	2525B	BRN

HW 25

DOOR NUMBERS:

D275-1, D274-1, D375-1, D374-1

EACH TO HAVE:

3	EA	HINGES	BB5002N	630
1	EA	ENTRY LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	THRESHOLD	425	628
1	EA	DOOR SWEEP	C627A	628
1	SET	GASKETING	2525B	BRN

HW 26

DOOR NUMBERS:

G190-1, G191-1, G191-2, G193-1, C196-2, C197-1

EACH TO HAVE:

3	EA	HINGES	BB5002N	630
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1	EA	OFFICE LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	FLOOR STOP	1211	626
1	EA	THRESHOLD	425	628
1	EA	DOOR SWEEP	C627A	628
1	SET	GASKETING	2525B	BRN

HW 27

DOOR NUMBERS:

G190-2

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	OFFICE LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR STOP	1211	626
3	EA	DOOR SILENCERS	SR66	GRY

HW 28

DOOR NUMBERS:

G193-2, G195-1

EACH TO HAVE:

3	EA	HINGES	BB5002N	630
1	EA	STOREROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	FLOOR STOP	1211	626
1	EA	THRESHOLD	425	628
1	EA	DOOR SWEEP	C627A	628
1	SET	GASKETING	2525B	BRN

HW 29

DOOR NUMBERS:

G193-3

EACH TO HAVE:

6	EA	HINGES	BB5002N	630
2	EA	FLUSH BOLTS	FB458	626
1	EA	STOREROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689

2	EA	FLOOR STOP	1211	626
1	EA	THRESHOLD	425	628
1	EA	DOOR SWEEP	C627A	628
1	SET	GASKETING	2525B	BRN

HW 30

DOOR NUMBERS:

G194-1

EACH TO HAVE:

3	EA	HINGES	BB5002N	630
1	EA	STOREROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	THRESHOLD	425	628
1	SET	GASKETING	2525B	BRN
1	EA	DOOR SWEEP	C627A	628

HW 31

DOOR NUMBERS:

C198-1, C198-2

EACH TO HAVE:

4	EA	ACORN STRAP HINGES	IHLBP	BLK
2	EA	ACORN CANE BOLTS	RLCBP	BLK
1	EA	HASP	ALCBP	
1	EA	PADLOCK	KEYED TO SYSTEM	

HW 32

DOOR NUMBERS:

D124-1, D124-2, D127-2, D127-3, D157-2

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	CLASSROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81 REG/PA	689
1	EA	KICKDOWN DOOR STOP	461	626
3	EA	DOOR SILENCERS	SR66	GRY

HW 33

DOOR NUMBERS:

D129-2

EACH TO HAVE:

3	EA	HINGES	BB5000	652
1	EA	EXIT DEVICE	F25-R-EO	630
1	EA	EXIT DEVICE TRIM	C0-250-993S-MS- ATH-JD	626
1	EA	CORE	23-030	
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81DS	689
3	EA	DOOR SILENCERS	SR66	GRY
1	SET	GASKETING	2525B	BRN

HW 34

DOOR NUMBERS:

D237-1, D337-1

3	EA	HINGES	BB5000	626
1	EA	CLASSROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	ELECTRIC STRIKE	6210 X FSE	630
1	EA	CORE	23-030	626
1	EA	AUTO OPERATOR	4630	689
1	EA	THRESHOLD	425	628
1	SET	GASKETING	2525B	BRN
1	EA	KEY SWITCH	653-04	
2	EA	ACTUATORS	856	630

ELECTRICAL CONNECTION REQUIRED

OPERATION: WHEN EITHER ACTUATORS IS PRESSED THE ELECTRIC STRIKE RELEASES AND DOOR WILL OPEN. WHEN DOOR IS LOCKED ON EXTERIOR SIDE, THE OUTSIDE ACTUATOR IS TURNED OFF BY KEYSWITCH. ENTRY TO ELEVATOR LOBBY IS BY KEY ONLY. EGRESS FROM ELEVATOR LOBBY AT ALL TIME. PRESSING ACTUATOR IN ELEVATOR LOBBY, THE ELECTRIC STRIKE RELEASES AND DOOR WILL OPEN.

HW 34A

DOOR NUMBERS:

D337-2

EACH TO HAVE:

3	EA	HINGES	BB5000	626
1	EA	CLASSROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	FLOOR STOP	1211	626
1	EA	THRESHOLD	425	628
1	SET	GASKETING	2525B	BRN

HW 35

DOOR NUMBERS:

D115, D230-1, D330-1

EACH TO HAVE:

3	EA	HINGES	BB5002 NRP	630
1	EA	EXIT DEVICE	F25-R-EO	630
1	EA	DOOR CLOSER	SC81DS	689
1	EA	THRESHOLD	425	628
1	SET	GASKETING	2525B	BRN

HW 36

DOOR NUMBERS:

D159, D160

EACH TO HAVE:

3	EA	HINGES	BB5002 NRP	630
1	EA	EXIT DEVICE	25-R-EO	630
1	EA	EXIT DEVICE TRIM	C0-250-993R-MS- ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81DS	689
1	EA	THRESHOLD	896V	628
1	SET	GASKETING	2525B	BRN

HW 37

DOOR NUMBERS:

D116-1

EACH TO HAVE:

3	EA	HINGES	BB5002 NRP	630
1	EA	EXIT DEVICE	25-R-EO	630
1	EA	EXIT TRIM	C0-250-993R ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81 DS	689
1	EA	THRESHOLD	896V	628
1	SET	GASKETING	2525B	BRN

HW 38

DOOR NUMBERS:

D173

EACH TO HAVE:

6	EA	HINGES	BB5002 NRP	630
2	EA	POWER TRANSFER	EPT-2	628
2	EA	EXIT DEVICES	EL-25-V-EO	630
1	EA	EXIT TRIM	CO-250-993S-MS- ATH-JD	626
1	EA	CORE	23-030	626

1	EA	CONSTRUCTION CORE	23-030 ICX	
2	EA	AUTO OPERATORS	4640	689
1	EA	THRESHOLD	896V	628
2	EA	ACTUATORS	856	630
1	EA	POWER SUPPLY	PS914 X 900-2PS	

ELECTRICAL CONNECTION REQUIRED

HW 39

DOOR NUMBERS:

D123, D129-1, D174, D175

EACH TO HAVE:

3	EA	HINGES	BB5002 NRP	630
1	EA	EXIT DEVICE	F25-R-EO	630
1	EA	EXIT TRIM	CO-250-993R-MS- ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81DS	689
1	EA	THRESHOLD	896V	628
1	SET	GASKETING	2525B	BRN

HW 40

DOOR NUMBERS:

D132-1

EACH TO HAVE:

6	EA	HINGES	BB5006 NRP	630
1	SET	FLUSH BOLTS	FB61P	630
1	EA	ENTRY LOCK	CO-250-CY-50-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
2	EA	DOOR CLOSERS	SC81 PA	689
2	EA	STOP/HOLDERS	490	626
1	EA	THRESHOLD	424	628
1	SET	GASKETING	2525B	BRN
1	SET	ASTRAGAL	600A	628

HW 41

DOOR NUMBERS:

D121-2

EACH TO HAVE:

DOORS TO BE IN FIXED POSITION

HW 42

DOOR NUMBERS:

M100

EACH TO HAVE:

3	EA	HINGES	BB5002	630
1	EA	STOREROOM LOCK	CO-250-CY-70-MS-ATH-JD	626
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	DOOR CLOSER	SC81	689
1	EA	FLOOR STOP	1211	626
1	EA	THRESHOLD	425	628
1	EA	DOOR SWEEP	C627A	628
1	SET	GASKETING	2525B	BRN

HW 43

DOOR NUMBERS:

Z1-16

EACH TO HAVE:

3	EA	HINGES	BB5002 NRP	630
1	EA	PADLOCK	KS43D3200	606
1	EA	CORE	23-030	626
1	EA	CONSTRUCTION CORE	23-030 ICX	
1	EA	HASP	994848	
1	EA	PUSH PLATE	70C	630
1	EA	PULL PLATE	110 X 70C	630
1	EA	THRESHOLD	896V	628
1	SET	GASKETING	2525B	BRN

HW 44

1	EA	SOFTWARE	SMS SELECT
1	EA	HAND HELD READER	HHD KIT
1	EA	ENCODER	CL-ENCODER-2
500	EA	MAGNETIC STRIPE CARD	MAG1

END OF SECTION

GLAZING**SECTION 08800****PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. The required applications of glass and glazing include but are not necessarily limited to the following:
1. Glazing window units (Section 08520).
 2. Glazing wood and metal doors.
 3. Glazing interior partitions and miscellaneous interior glazing.
 4. Mirror glazing, excluding packaged mirror units in Section 10800.
- B. Generally glass types required are as follows unless otherwise indicated on the Drawings:
1. Exterior Vision Lites: Insulated units, Low-E coating on no.2 surface of 1/4" exterior HS clear lite, 1/2" air space and interior lite of 9/16" thick laminated unit of 1/4" clear HS glass, .09" PVB interlayer and 1/4" clear HS glass.
 - a. For the exterior transom windows, provide 5/16" clear laminated glass, outboard lite of 1/8" heat strengthened, inner layer .090 PVB, and inboard lite of 1/8" heat strengthened. Replace any existing putty glazing with new bentwood stops. For the door sidelites, provide above 9/16" laminated glass, outboard lite of 1/4" heat strengthened, inner layer .090 PVB, and inboard lite of 1/4" heat strengthened
 2. Glass and framing meeting missile impact criteria per requirements of SBCCI SST-12, and ASTM E1886 and E1996, meeting requirements of the Large Missile Test of ASTM E 1996 up to 30 foot of building height and meeting requirements of the Small Missile Test of ASTM E 1996 above 30 ft
 3. Interior: 1/4" monolithic units or thicker where indicated on the drawings, clear; tempered where safety glazing is required.

1.02 RELATED SECTIONS

- A. Section 07900 - Joint Sealers: Sealant and back-up material.
- B. Section 08112 - Steel Doors.
- C. Section 08211 - Wood Doors.
- D. Section 08500 - Exterior Windows

1.03 REFERENCES

- A. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- B. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
- C. ASTM C1036 - Flat Glass.
- D. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
- E. ASTM E546 - Test Method For Frost Point of Sealed Insulating Glass Units.
- F. ASTM E576 - Test Method For Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
- G. ASTM E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.
- H. ASTM E774 - Sealed Insulating Glass Units.
- I. FGMA - Glazing Manual.
- J. FGMA - Sealant Manual.
- K. FS DD-G-45ID - Glass, Plate, Sheet, Figure (Flat, for Glazing, Mirrors and other Uses).
- L. FS TT-C-00598 - Caulking Compound, Oil and Resin Base Type.
- M. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.
- N. FS TT-S-00227 - Sealing Compound, Rubber Base, Two Component.
- O. FS TT-S-00230 - Sealing Compounds, Synthetic-Rubber Base, Single Component, Chemically Curing.
- P. FS TT-S-01543 - Sealing Compound, Silicone Rubber Base.
- Q. FS TT-G-410 - Glazing Compound, Sash (Metal) for Back Bedding and Face Glazing (Not for Channel or Stop Glazing).
- R. Laminators Safety Glass Association - Standards Manual.
- S. SIGMA - Sealed Insulated Glass Manufacturers Association.

1.04 PERFORMANCE REQUIREMENTS

- A. Provide glass and glazing that has been produced, fabricated and installed to withstand normal thermal movement, wind loading and impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and

airtight, deterioration of glass and glazing materials and other defects in the work.

- B. Glass and glazing materials of this Section shall provide continuity of building enclosure.
 - 1. To utilize the inner pane of multiple pane sealed units for the continuity of the air and vapor seal.
 - 2. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.
- C. Provide thickness and/or heat treatment of glass as required to meet the wind loads (pounds/square foot) and large missile criteria specified in section 08520, required in sections specifying the systems in which glass is included, but not less than 1/4" thick; based on wind loading duration of 60 seconds, maximum allowable breakage probability at initial occurrence of design load of 8 lites/1000 (design safety factor of 2.5), and 1 lite/thousand and at overhead glazing.
- D. Limit glass deflection to 1/200 or flexure limit of glass, with full recovery of glazing materials, whichever is less.

1.05 SUBMITTALS

- A. Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- B. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- C. Product Data for Credit 5.C4(EQ 4.1): For sealants, including printed statement of VOC content and chemical components
- D. Samples: Submit two (2) samples, 12 x 12 inch in size, illustrating glass units; also glass units incorporated in curtainwall sample.
- E. Samples: Submit 12 inch long bead of glazing gaskets, color as selected.
- F. Manufacturer's Installation Instructions: Indicate special precautions required.
- G. Manufacturer's Certificate: Certify that sealed insulated glass, meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with FGMA Glazing Manual, FGMA Sealant Manual, SIGMA and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
 - 1. Maintain one copy of each document on site.
- B. Safety Glazing Standards: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials, dated January 6, 1977 (The Consumer Product Safety Commission), i.e. doors, sidelights, etc.

- C Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certification label or inspecting and testing organization indicated below:
 - 1. Insulating Glass Certification Council (IGCC).
- D. Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type an class required.

1.07 PRE-INSTALLATION CONFERENCE

- A. Convene one week prior to commencing work of this Section; see Section 01200.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop Drawings and as instructed by the manufacturer.

1.10 COORDINATION

- A. Coordinate the work with glazing frames.

1.11 WARRANTY

- A. Manufacturer's Warranty on Insulating Glass Products: Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacturer, freight allowed to project site, within specified warranty period indicated below, replacements for those insulating glass units which develop manufacturing defects. Manufacturing defects are defined as failure of hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging at temperature above 20°F (-29°C), and other visual indications of seal failure or performance.
 - 1. Warranty Period: Manufacturer's standard but not less than 10 years after date of substantial completion. Owner's signature shall not be required
- B. Manufacturer's Warranty on Laminated Glass: Provide written warranty signed by manufacturer of laminated glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, laminated glass units which develop manufacturing defects. Manufacturing defects are defined as edge separation or delamination which materially obstructs vision through glass.

1. Warranty Period: Manufacturer's standard but not less than 5 years after date of substantial completion. Owner's signature shall not be required

PART 2 - PRODUCTS

2.01 GLASS PRODUCTS, GENERAL:

- A. Primary Glass Standard: Provide primary glass which complies with ASTM C 1036 requirements, including those indicated by reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.
- B. Heat-Treated Glass Standard: Provide heat-treated glass which complies with ASTM C 1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.
- C. Sizes: Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application and performance indicated.

2.03 PRIMARY GLASS PRODUCTS

- A. Clear Float Glass: Type I, Class 1 (transparent), quality q3 (glazing select).
- B. Mirror Glass: Clear float type with copper and silver coating, organic overcoating, square and lapped edges, 1/4 inch thick minimum.

2.04 HEAT-TREATED PRODUCTS

- A. Manufacturing Process: Manufacture heat-treated glass as follows:
 1. Horizontal (roller hearth) process with minimal roll wave distortion parallel with bottom edge of glass as installed to eliminate tong marks.
 2. Tempered glass shall be strengthened in bending to not less than 4.5 times annealed glass strength.
 3. Heat-strengthened glass shall be strengthened in bending to not less than 2.0 times annealed glass strength.
- B. Tolerances: Heat strengthened and tempered glass shall be examined by the glass manufacturer to detect and discard any lights which exceed the following tolerances: 1/16" bow in 2 feet; 1/8" bow in 5 feet; 1/4" bow in 10 feet; 3/8" bow in 15 feet. Where the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed .005 inch, and the difference between adjacent peaks shall not exceed .003 inch. Where bow tolerance and wave tolerance differ, the stricter requirement shall govern.
- C. Clear Tempered Float Glass: Grade B (fully tempered), style I (uncoated surfaces), type 1 (float), quality q3 (glazing quality), class 1 (transparent).

- D. Clear Heat-Strengthened Float Glass: Grade A (heat strengthened), style I (uncoated surfaces), type 1 (float), quality q3 (glazing select), class 1 (transparent).

2.05 COATED GLASS PRODUCTS

- A. General: Performance characteristics designated for coated glass products below are based on manufacturer's published test data for 1/4" thick glass products, unless otherwise indicated. Refer to primary and heat-treated glass requirements relating to properties of glass products to which coatings are applied.
1. Provide heat-strengthened coated float glass except provide tempered units where coated safety glass is indicated or required for performance and loads.
- B. Coating shall be subject to the following criteria:
1. Pinholes with diameter greater than 1/16 inch are not permitted.
 2. Individual pinholes with diameter 1/16 inch or less are permitted only within three (3) inches of an edge.
 3. Cluster of pinholes (regardless of diameter or location) visible at 6 feet are not permitted.
 4. Scratches, rub marks or other gaps in the coating are not permitted where any portion thereof could include a circle of diameter exceeding 1/16 inch. Where the included circle is 1/16 inch or less, scratches, rub marks or other gaps visible at 10 feet are permitted only within three (3) inches of an edge.
 5. Streaks or splotches resulting from nonuniformity of the coating which are visible from the building interior or exterior are not permitted.
 6. Color range must fall within the limits established by approved samples.

2.06 LAMINATED GLASS

- A. Plastic Interlayer: Provide glass fabricator's standard clear polyvinyl butyral interlayer for laminating sheet of glass, with a proven record of showing no tendency to bubble, discolor or lose physical or mechanical properties after laminating and installation, in colors and of thickness indicated.
1. Product: Subject to compliance with requirements, provide "Saflex" by Monsanto Co. or equal.
- B. Laminating Process: Fabricate laminated glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substance and air/glass pockets.
- C. Laminated Safety Glass: Two sheets of glass laminated together with a 0.090" thick plastic interlayer, heat treated if required for specified loads and large missile requirements, and complying with requirements indicated below:

1. Exterior Sheet: 1/4" coated glass.
 2. Interior Sheet: 1/4" clear glass.
 3. Overall Thickness: 9/16".
- D. 9/16" thick clear laminated glass, with glass and framing meeting large missile impact criteria per requirements of SSTD-12, hurricane/impact resistance complying with 2006 IBC Code. Two sheets of glass laminated together with a minimum 0.090" thick plastic interlayer or thicker if required to meet SSTD-12 and ASTM E1886 and E1996.

2.07 SEALED INSULATING GLASS UNITS

- A. Insulating Glass: Provide two (2) sheets of heat strengthened glass complying with ASTM E 774 as follows, and 1/2" dry air or gas-filled space with -20°F dew point, with Class A sealant-type edge construction to maintain a hermetic seal as certified by the Insulating Glass Certification Council (I.G.C.C.) with silicone secondary seal at structural silicone joints; fabricated to provide the following overall performance characteristics:
1. Exterior Sheet: Low -E (Sputtered) Coated glass 1/4" thick clear glass, with coating placed on No. 2 surface.
 2. Interior Sheet: 9/16" thick clear laminated clear glass with .09" interlayer.
 3. **Note: Heat strengthen each lite as required to meet wind loads and missile requirements**
 4. Performance: As follows:
 - a. Visible Light Transmittance: 68 percent.
 - b. Visible Light Reflectance Outdoors: 11 percent.
 - c. U-Value: 0.29.
 - d. Shading Coefficient: 0.43
 - e. Solar Heat Gain Coefficient: .38.
 - i. Light to Solar Gain: 1.80
 - j. Approved: Equal to "SunGuard SN 68 on clear" by Guardian
 5. Edge Construction: Twin primary seals of polyisobutylene; tubular aluminum or galvanized steel spacer-bar frame with welded or soldered sealed corners, and filled with dessicant; and secondary seal outside of bar, bonded to both sheets of glass and bar, of polysulfide, silicone or hot-melt butyl elastomeric sealant (fabricator's option).

2.08 GLAZING ACCESSORIES

- A. General: All glazing accessories shall be compatible with all sealants within the system and with sealant at edge of insulated glass units.
- B. Setting Blocks: Neoprene, EPDM or Silicone as recommended by the glazing manufacturer, 80 - 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Spacers: Neoprene, EPDM or Silicone 50 - 60 Shore A durometer hardness, minimum 3 inch long x one-half the height of the glazing stop x thickness to suit application.

- D. Edge Blocks: Neoprene, EPDM or Silicone extruded shape of size and hardness required to limit lateral movement (side-walking) of glass.
- E. Butyl Rubber Glazing Tape: Partly-vulcanized, self-adhesive, non-staining, elastomeric butyl rubber tape, 98% solids, intended for 35% compression, no appreciable deterioration for 3000 hour test in Atlas Weathermeter.
- F. Mirror Attachment Accessories: Stainless steel clips for the bottom edge and mirror adhesive, chemically compatible with mirror coating and wall substrate equal to products by Palmer Products Corporation.

2.09 GLAZING GASKETS

- A. See Sections 08900 for requirements for gaskets.
- B. Dense Elastomeric Compression Seal Gaskets: Molded or extruded neoprene or EPDM gaskets of profile and hardness required to maintain watertight seal; complying with ASTM C 864, Option 1.
- C. Cellular Elastomeric Preformed Gaskets: Extruded or molded closed cell, integral-skinned neoprene of profile and hardness required to maintain watertight seal; complying with ASTM C 509, Type II; black.

2.10 GLAZING SEALANT/COMPOUNDS

- A. Provide exposed glazing materials of color selected by the Architect from manufacturer's standard colors. Provide hardness of materials as recommended by the manufacturer for the required application and condition of installation in each case. Provide only compounds which are proved to be fully compatible with surfaces contacted.
- B. Silicone Rubber Glazing Sealant: Silicone rubber, one-part elastomeric sealant, complying with FS TT-S-001543, Class A, high modulus silicone glazing compound, acid curing. One of the following:
 - 1. Dow Corning 999; Dow Corning Corp.
 - 2. SCS 1200; General Electric Co.
 - 3. Proglaze; Tremco

2.11 STRUCTURAL SILICONE SEALANT

- A. Structural Silicone Sealant: Type recommended by sealant and system manufacturers that complies with ASTM C 1184 requirements, is compatible with system components with which it comes in contact, and is specifically formulated and tested for use as a structural and weatherseal sealant as follows:
 - 1. "Ultraglaze SSG 4000" by G.E.
 - 2. "983 SSG" by Dow.
- B. Color: As selected by Architect from manufacturer's full range of colors.

- C. Tensile Strength: 100 psi (689.5 kPa) minimum.
- D. Provide sealant with high modulus of elasticity that will not allow movement of more than 25 percent of joint width, unless less movement is required by structural-sealant-glazed systems' design.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.02 PREPARATION

- A. Pre-Installation Meeting: At Contractor's direction, Glazier, sealant and gasket manufacturers' technical representatives, glass framing erector and other trades whose work affects glass and glazing shall meet at project site to review procedures and time schedule proposed for glazing and coordination with other work.
- B. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.03 GLAZING

- A. Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.
- B. Comply with "Glazing Manual" by Flat Glass Marketing Association except as shown and specified otherwise, and except as specifically recommend otherwise by the manufacturers of the glass and glazing materials.
 - 1. Provide a minimum nominal glass bite as required by ASTM F 2248.
- C. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.
- D. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- E. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with

a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

- F. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- G. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from each corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.
- H. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except sealant tape use thickness slightly less than final compressed thickness of tape.
- I. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- J. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- K. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- L. Where wedge-shaped gaskets are driven into one side of the channel to pressurize the gasket on the opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when subjected to dynamic movement. Anchor gasket to stop with matching ribs, or by proven adhesives, including embedment of gasket tail in cured heel bead.
 - 1. Miter cut and permanently bond gasket ends together by vulcanized process or silicone adhesive at corners so that gaskets will not pull away from the corners and result in voids or leaks in the glazing system.

3.04 MISCELLANEOUS INTERIOR GLAZING

- A. Install glazing tape in accordance with manufacturer's instructions.
- B. Cut glazing tape to length; install on glazing pane. Seal corners by butting spline and sealing junctions with manufacturer's recommended sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing tape. Exert pressure for full continuous

contact.

3.05 INSTALLATION - MIRRORS

- A. Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions except lower edge of mirror shall be set with clips. Anchor rigidly to wall construction.
 - 1. Unless otherwise recommended by mirror manufacturer, limit mastic coverage to 25% of mirror back where mirror is permanently supported on bottom edge, otherwise limit coverage to 60 - 80%. Press mirror into positions, checking for plumb and true position.

3.06 MANUFACTURER'S FIELD SERVICES

- A. Glass product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures, and unacceptable conditions.

3.07 CLEANING

- A. Clean work under provisions of 01700.
- B. Remove glazing materials from finish surfaces.
- C. Remove labels after work is complete.
- D. Clean glass and mirrors.

3.08 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01500.
- B. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

