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SECTION 07190

ANTI-GRAFFITI WATER REPELLENTS PROTECTION

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 SECTION INCLUDES

A. Application of water repellents to protect horizontal masonry & concrete garden wall surfaces.

1.03 REFERENCES

A. ASTM D 2369-92 - Test Methods for Volatile Content of Coatings.

B. ASTM D 3960-93 - Practice for Volatile Organic Compound (VOC) Content of Paints and Related Coatings.

C. Federal Specification SS-W-110C - Water Repellent, Colorless Silicon, Resin Base.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Product Data: Submit manufacturer's product data sheets on all products to be used for the work. Submit description for protection of surrounding areas and nonmasonry surfaces, surface preparation, application, and final cleaning.

C. Applicator Qualifications: Submit qualifications of applicator.

1. Certification stating applicator is experienced in the application of the specified products.

2. List of recently completed water repellent projects, including project name and location, names of owner and architect, and description of products used, substrates, applicable local environmental regulations, and application procedures.

D. Environmental Regulations: Submit applicable local environmental regulations.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications:

1. Experienced in the application of the specified products.

2. Employs persons trained for the application of the specified products.

B. Pre-Application Meeting: Convene a pre-application meeting two weeks before the start of application of water repellents. Require attendance of parties directly affecting work of this section, including the Contractor, Architect, applicator, and a PROSOCO representative. Review environmental regulations, test panel procedures, protection of surrounding areas and nonmasonry surfaces, surface preparation, application, field quality control, final cleaning, and coordination with other work.

1.07 ENVIRONMENTAL REGULATIONS

Comply with applicable federal, state, and local environmental regulations.

1.08 TEST PANELS

A. Before full scale application, review manufacturer's product data sheets to determine the suitability of each product for the specific surfaces. Apply each water repellent to test panels to determine number of applications, coverage rates, compatibility, effectiveness, surface preparation, application procedures, and desired results.

B. Apply water repellents to test panels in accordance with manufacturer's written instructions. Allow 48 hours or until test panels are thoroughly dry before evaluating final appearance and results. Do not begin full scale application until test panels are inspected and approved by the Architect.

C. Test Panel Requirements:

1. Size: Minimum 4 feet by 4 feet each.

2. Locations: As determined by the Architect.

3. Number: As required to completely test each water repellent with each type of substrate to be protected.

D. Retain and protect test panels approved by the Architect in undisturbed condition during the work of this section, to be used as a standard for judging the water repellent work.

1.09 DELIVERY, STORAGE, AND HANDLING

Delivery: Deliver materials to site in manufacturer's original, unopened container and packaging, with labels clearly identifying product name and manufacturer.

Storage and Handling: Store containers upright in a cool, dry, well ventilated place, out of the sun. Store away from all other chemicals and potential sources of contamination. Keep lights, fire, sparks, and heat away from containers. Do not drop containers or slide across sharp objects. Keep containers tightly closed when not in use. Store and handle materials in accordance with manufacturer's written instructions.

1.010 PROJECT CONDITIONS

A. Temperature Limitations:

1. Do not apply at surface and air temperatures below 40°F or above 95°F, unless otherwise indicated by manufacturer's written instructions.

2. Do not apply when surface and air temperatures are not expected to remain above 40°F for a minimum of 8 hours after application, unless otherwise indicated by manufacturer's written instructions.

B. Do not apply under windy conditions such that water repellent may be blown to surfaces not intended.

C. Do not apply to frozen substrate. Allow adequate time for substrate to thaw, if freezing conditions exist before application.

D. Do not apply earlier than 24 hours after rain or if rain is predicted for a period of 8 hours after application, unless otherwise indicated by manufacturer's written instructions.

PART 2 -- PRODUCTS

2.01 MANUFACTURER

ProSoCo, Inc., PO Box 171677, Kansas City, Kansas 66117, (800) 255-4255

2.02 WATER REPELLENTS / NON-SACRAFICIAL GRAFFITI PROTECTION

A. "Weather Seal Blok-Guard & Graffiti Control II" is a clear-drying , water-based silicone emulsion formulated to weatherproof masonry and concrete and protect from repeated graffiti attacks without altering natural appearance.

B. Active Solids: 6%

Form: Milky liquid

Specific Gravity: 1.0

Flash Point: >212 degrees F

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

E. Verify by examination that brick masonry and concrete surfaces are acceptable to receive the specified water repellents. Notify the Architect if surfaces are not acceptable to receive the specified products.

3.02 PROTECTION

A. Protect surrounding areas, landscaping, building occupants, pedestrians, vehicles, and nonmasonry surfaces during the work from contact with water repellents, masonry or concrete cleaners if used, residues, rinse water, fumes, wastes, and effluents in accordance with manufacturer's written instructions.

B. Apply water repellents after protection of windows.

C. Divert and protect pedestrian and auto traffic.

3.03 SURFACE PREPARATION

A. Clean all dirt, dust, oil, grease, and other contaminants from surfaces that interfere with penetration or performance of water repellents. Use appropriate masonry or concrete cleaners approved by the water repellent manufacturer where necessary. Rinse thoroughly using pressure water spray to remove cleaner residues. Allow surfaces to dry completely before application of water repellents.

B. Repair, patch, and fill all cracks, voids, defects, and damaged areas in surface as approved by the Architect. Allow repair materials to cure completely before application of water repellents.

C. Apply specified sealants and caulking and allow to cure completely before application of water repellents.

D. Seal all open joints.

E. Allow new brick masonry and concrete construction and repointed surfaces to cure for minimum of 28 days before application of water repellents.

3.04 APPLICATION

A. Apply water repellents to substrates in accordance with manufacturer's written

instructions, environmental regulations, and application procedures determined from test panel results approved by the Architect.

B. Apply to clean, dry, cured, and properly prepared surfaces approved by the Architect.

C. Consult manufacturer's written instructions for information on application equipment to be used and precautions to be taken with the specified products.

D. Do not dilute or alter water repellents. Apply as packaged.

E. Do not apply to below-grade surfaces.

F. Do not apply to asphalt or other non-masonry materials.

G. Do not apply to painted surfaces.

H. Do not apply to compensate for structural or material defects in substrates.

I. Avoid overspray, wind drift, and splash of water repellents.

3.05 FIELD QUALITY CONTROL

A. Inspection: Inspect the water repellent work with the Contractor, Architect, applicator, and ProSoCo representative, and compare with test panel results approved by the Architect. Determine if the substrates are suitably protected by the water repellents.

B. Manufacturer's Field Services: Provide the services of a manufacturer's authorized field representative to verify specified products are used, and protection, surface preparation, and application of water repellents are in accordance with the manufacturer's written instructions and the test panel results approved by the Architect.

3.06 FINAL CLEANING

A. Clean site of all unused water repellents, residues, rinse water, wastes, and effluents in accordance with environmental regulations.

B. Remove and dispose of all materials used to protect surrounding areas and non-masonry surfaces, following completion of the work of this section.

C. Repair, restore, or replace to the satisfaction of the Architect, all materials, landscaping, and non-masonry surfaces damaged by exposure to water repellents.

*****END OF SECTION*****

SECTION 07210

THERMAL INSULATION

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract requirements and Division 1, General Conditions apply to this section.

1.02 SCOPE OF WORK

A. Furnish and install Thermal Insulation indicated on the Drawings and as specified herein.

B. The principal items of work include:

1. Thermal Insulation within roof.
2. Thermal Insulation within exterior walls.
3. Thermal Insulation within interior walls.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Upon completion of this portion of the Work, complete and post a certificate of insulation compliance in accordance with pertinent requirements of governmental agencies having jurisdiction.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

1.06 GUARANTEE

Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than two (2) years from the date the Owner records Notice of Completion.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Provide thermal insulation as indicated on Drawings. All insulation shall be inorganic glass fiber insulation. Insulation shall comply with ASTM Testing Standards. Fire Hazard

Classification, Flame Spread Index, Smoke Developed Index, Combustibility, and Fire Endurance Ratings as required by Code.

B. Insulation shall be as manufactured by Certain-Teed, Johns-Manville, Owens-Corning, or Architect approved equal.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Verify adjacent materials are dry and ready to receive installation.

B. Verify mechanical and electrical services within walls have been installed and tested.

3.03 INSPECTION

A. Before any installation is started, determine that the other work is suitable to receive insulation.

B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

C. Remove or protect against projections in construction framing that may damage or prevent proper insulation.

3.04 INSTALLATION

A. All work shall be performed by licensed applicators, shall comply with the recommendations of the manufacturer and the National Association of Insulation Manufacturers.

B. Install insulation with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane over and between framing numbers. Secure in place. Tape seal butt ends and lapped side flanges. Tape seal tears or cuts in membrane.

C. Trim insulation neatly to fit spaces. Use batts free of damage. Install batt insulation, in wall spaces without gaps or voids.

D. Install Insulation in all indicated walls from floor to underside of roof. Secure insulation with 19-gage wire or 1" wide, 20 gage steel strips. Architect shall approve all insulation details, including methods of fastening, before commencement of the work.

3.05 CLEAN UP AND DISPOSAL

At frequent intervals during and again upon completion of work, remove from building and working premises tools and equipment, surplus materials, all rubbish and debris of whatever nature not caused by other trades, and leave the work in a clean, orderly and acceptable condition approved by the Architect.

***** END OF SECTION *****

SECTION 07500

ADHERED FELTBACK PVC THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope

To install an adhered Single Ply Thermoplastic (PVC) Roofing Membrane with flashings and other components to comprise a roofing system for the County of Riverside.

C. Upon successful completion of work the following warranties may be obtained:

1. Manufacturer Warranty
2. Roofing Contractor Warranty

1.02 QUALITY ASSURANCE

A. This roofing system shall be applied only by a Roofing Contractor authorized by the Manufacturer prior to bid ("Applicator"). The Roofing Contractor shall have at least five (5) years of experience as an applicator with the submitted manufacturer as certified by the manufacturer.

B. Upon completion of the installation and the delivery to the Manufacturer by the Applicator of a certification that all work has been done in strict accordance with the contract specifications and the Manufacturer's requirements, an inspection shall be made by a Technical Representative of the Manufacturer to review the installed roof system.

C. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written approval by the Owner, the Owner's Representative and the Manufacturer.

D. All work pertaining to the installation of the membrane and flashings shall only be completed by Applicator personnel trained and authorized by the Manufacturer in those procedures.

E. Membrane to have no formulation changes in the last fifteen (15) years as certified by the manufacturer

1.03 SUBMITTALS

All submittals which do not conform to the following requirements will be rejected.

A. SUBMITTALS WITH BID

1. A list of each primary component to be used in the roof system and the Manufacturer's current literature for each component.
2. Sample copy of Roofing Manufacturer's warranty.
3. Sample copy of Contractor's warranty.
4. Letter from Roofing Manufacturer confirming that the Contractor is an authorized applicator of the specified roof system.

B. SUBMITTALS OF EQUALS

Submit proposed equals to be considered for use on this project no less than ten (10) days prior to bid date. Proposed roof systems which have been reviewed and accepted will be listed in an addendum prior to bid date; only then will roof systems be accepted at bidding. Submittals shall include the following:

1. Copies of Specification including physical properties.
2. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.
3. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.
4. Sample copy of Manufacturer's warranty including no exclusion for ponding water and no time limit shall be assigned to any such ponding water.
5. Sample copy of Applicator's warranty.
6. Dimensioned shop drawings which shall include:
    a. Outline of roof with roof size and elevations shown.
    b. Profile details of flashing methods for penetrations.
    c. Technical acceptance from Manufacturer.
7. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and industry standards or practices and requirements of this specification as stated in Section 2.01, C & D and Quality Assurance.
8. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by the Specification.
9. Letter from the proposed manufacturer confirming the number of years it has DIRECTLY manufactured the proposed roof system under the trade names and/or trademarks as proposed.
10. Material Safety Data Sheets (MSDS)

1.04 CODE REQUIREMENTS

The applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.

A. Factory Mutual Research Corporation (FM) - Norwood, MA
    1. Class 1-75

B. Underwriters Laboratories, Inc. - Northbrook, IL
    1. Class A assembly

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.

B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.

C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

D. All adhesives shall be stored at temperatures between 40° F (5° C) and 80° F (27° C).

E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.

F. All materials which are determined to be damaged by the Owner's Representative or the manufacturer are to be removed from the job site and replaced at no cost to the Owner.

1.06 JOB CONDITIONS

A. Membrane materials may be installed under certain adverse weather conditions but only after consultation with the Manufacturer, as installation time and system integrity may be affected.

B. Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned and heat welded before leaving the job site that day.

C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.

D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.

G. The Applicator is cautioned that certain membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with the membranes. The Applicator shall consult the manufacturer regarding compatibility, precautions and recommendations.

H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over Felt or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air and/or similar methods.

J. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.

K. All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.

L. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.

M. The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.

N. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.

O. All rooftop contamination that is anticipated or that is occurring shall be reported to the manufacturer to determine the corrective steps to be taken.

P. The Applicator shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages in writing (letter copy to the manufacturer) to the Owner's Representative for corrective action prior to installation of the roof system.

Q. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner of such condition in writing for correction at the Owner's expense (letter copy to the manufacturer).

R. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction.

S. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.

T. The Applicator shall conduct fastener pullout tests in accordance with the latest revision of the SPRI/ANSI Fastener Pullout Standard to help verify condition of deck/substrate and to confirm expected pullout values.

U. The adhered membrane shall not be installed under the following conditions without consulting the manufacturer's technical department for precautionary steps:

1. The roof assembly permits interior air to pressurize the membrane underside.
2. Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.
3. The wall/deck intersection permits air entry into the wall flashing area.

V. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.

W. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

1.07 BIDDING REQUIREMENTS

A. Pre-Bid Meeting: A pre-bid meeting shall be held with the Owner's Representative and involved trades to discuss all aspects of the project. The Applicator's field representative or roofing foreman for the work shall be in attendance. Procedures to avoid rooftop damage by other trades shall be determined.

B. Site Visit: Bidders shall visit the site and carefully examine the areas in question as to conditions that may affect proper execution of the work. All dimensions and quantities shall be determined or verified by the contractor. No claims for extra costs will be allowed because

of lack of full knowledge of the existing conditions unless agreed to in advance with the Owner or Owner's Representative.

1.08 WARRANTIES

A. Manufacturer's System Warranty (only products purchased from the membrane manufacturer are covered under System Warranty): Upon successful completion of the work to the Roofing Manufacturer's and Owner's satisfaction, and receipt of final payment, the twenty (20) Year System Warranty shall be issued. The System Warranty shall provide for the roof membrane, all accessories that comprise a roof system, and contractor labor. The Warranty shall be **Non-Prorated** provide for No Dollar Limit (NDL), and **shall not exclude ponding water and no time limited shall be assigned for any such ponding water during the warranty period**.

B. Applicator/Roofing Contractor Warranty: The Applicator shall supply the Owner with a separate five-year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the Applicator warranty term, defective or otherwise not in accordance with the Contract Documents, the Applicator shall repair that defect at no cost to the Owner. The Applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.

C. Owner Responsibility: Owner shall notify both the manufacturer and the Applicator of any leaks as they occur during the time period when both warranties are in effect.

PART 2 --PRODUCTS

2.01 GENERAL

A. The components of the Adhered roof system are to be products of the membrane manufacturer as indicated on the Detail Drawings and specified in the Contract Documents.

B. Components to be used that are other than those supplied or manufactured by the membrane manufacturer may be submitted for review and acceptance by the manufacturer. The manufacturer's acceptance of any other product is only for a determination of compatibility with membrane products and not for inclusion in the manufacturer's warranty. The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the Owner's Representative for acceptability for the intended use with the manufacturer's products.

C. Membrane shall be certified by the manufacturer to be within two (2) mils of the specified membrane thickness as stated in this section.

D. Membrane shall have a minimum of twenty-two (22) mils of waterproofing polymers above the reinforcements as documented by a third party source.

2.02 MEMBRANE

A. Sarnafil® G410 Feltback fiberglass reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity. Contact Keith Steiger, (760) 617-4404.

B. Membrane shall conform to ASTM D4434-96 (or latest revision), "Standard for Polyvinyl Chloride Sheet Roofing". Classification: Type II, Grade I.

1. Sarnafil G410-18 feltback, 72 mil (1.8 mm), thermoplastic membrane with fiberglass reinforcement and a factory applied 9 oz. geotextile felt backing.
2. Or Pre-Approved Equal subject to compliance with all specification requirements herein so stated.

C. Color of Membrane

1. EnergySmart feltback (white), initial reflectivity of 0.83, initial emissivity 0.92, solar reflective index (SRI) of >104.

D. Typical Physical Properties

Parameters	ASTM Test Method	Minimum ASTM Requirement
Reinforcing Material	-	Fiberglass
Overall Thickness, min., inches (mm)	D638	[0.072 inches)]
Tensile Strength, min., psi (MPa)	D638	1600 (11.1)
Elongation at Break, min. (machine x tranverse)	D638	270% / 250%
Seam strength*, min. (% of tensile strength)	D638	80
Retention of Properties After Heat Aging	D3045	-
Tensile Strength, min., (% of original)	D638	95
Elongation, min., (% of original)	D638	90
Tearing Resistance, min., lbf (N)	D1004	14 (63.0)
Low Temperature Bend, -40° F (-40° C)	D2136	Pass
Accelerated Weathering Test (Xenon Arc)	D2565	10,000 Hours
Cracking (7x magnification)	-	None
Discoloration (by observation)	-	Negligible
Crazing (7 x magnification)	-	None
Linear Dimensional Change	D1204	0.02%
Weight Change After Immersion in Water	D570	2.5%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf (10 J)	D5635	Pass

*Failure occurs through membrane rupture not seam failure.

2.03 FLASHING MATERIALS

A. Wall/Curb Flashing

1. Flashing Membrane: A fiberglass reinforced membrane adhered to approved substrate using adhesive.
2. Clad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side.

B. Perimeter Edge Flashing

1. Clad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side.
2. Non-Typical Edge: Project-specific perimeter edge detail reviewed and accepted for one-time use by the manufacturer's Technical Department. Consult Regional Technical Manager prior to job start for review and consideration for acceptance.

C. Miscellaneous Flashing

1. Flash: A prefabricated expansion joint cover made from membrane. Flash is designed for securement to wall or horizontal surfaces to span and accommodate the movement of new and existing expansion gaps from 1 inch to 4½ inches (25 mm to 114 mm) across.
2. Reglet: A heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs. Reglet is produced from 6063-T5, 0.10 inch - 0.12 inch (2.5 mm - 3.0 mm) thick extruded aluminum. Reglet has a 2¼ inch (57 mm) deep profile, and is

provided in 10 foot (3 m) lengths. Use prefabricated Reglet mitered inside and outside corners where walls intersect.

3. Stack: A prefabricated vent pipe flashing made from 0.048 inch (48 mil/1.2 mm) thick G410 membrane.
4. Circle-"G": Circular 0.048 inch (48 mil/1.2 mm) thick G410 membrane patch welded over T-joints formed by overlapping thick membranes.
5. Corner: Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or Clad base flashings. Corner is available in 2 outside sizes (5 inch and 8½ inch diameter/127 mm and 215 mm) and 1 inside size.
6. Multi-Purpose Sealant: A sealant used at flashing terminations.
7. StaBond Adhesive: A solvent-based reactivating-type adhesive used to attach membrane to flashing substrate.
8. Felt: A non-woven polyester or polypropylene mat cushion layer that is necessary behind G410 or G459 Flashing Membrane when the flashing substrates are rough-surfaced or incompatible with the flashing membrane.

2.04 SEPARATION BOARD

A. Dens-Deck®: A siliconized gypsum, fire-tested hardboard with glass-mat facers. Dens-Deck is provided in a 4 ft x 8 ft (1.2 m x 2.4 m) board size and in thickness of 1/2".

2.05 ATTACHMENT COMPONENTS

A. Membrane adhesive: 2121 Adhesive: A water-based adhesive used to attach the membrane to horizontal or near-horizontal substrates. Application rates are as follows:

APPLICATION RATES FOR FELTBACK MEMBRANE						
	Adhesive Rates - Gallons/100 Ft² *(Liters/Meter²)*					**Approximate Sq. Ft./Pail** *(meter²)*
	Substrate		**Membrane**		**Total**	
GP Dens-Deck®	1.75 *(0.71)*	+	0	=	1.75 *(0.71)*	285 *(26.48)*

Notes:

a) There is a significant increase in drying time due to an increase in humidity and/or a decrease in temperature. Do not install when outdoor or substrate temperatures during drying period are expected to fall below 40° F (5° C).

b) Do not allow 2121 adhesive to skin-over or surface-dry prior to installation of membrane.

c) Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

B. Plate: Used with various Fasteners to attach insulation boards to roof deck. Plate is a 3 inch (75 mm) square or round, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.

C. Fastener No. 12: Number 12 corrosion-resistant fastener used with Plates to attach insulation boards to steel or wood roof decks. Fastener No. 12 has a modified buttress thread, a shank diameter of approximately 0.168 inch (4 mm) and a thread diameter of approximately 0.214 inch (5 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.

D. Fastener-XP: A #15, heavy-duty, corrosion-resistant fastener used with Plate to attach insulation or Stop and Bar to attach G410 roof membrane to steel or wood roof decks. Fastener-XP has a shank diameter of approximately 0.21 inch (5.3 mm) and the thread

diameter is approximately 0.26 inch (6.6 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.

E. Fastener-XPS: A specially designed, heavy-duty, corrosion-resistant fastener used with Stop or Bar to attach G410 roof membrane to steel roof decks. Fastener-XPS has a shank diameter of approximately 0.21 inch (5.3mm) and a thread diameter of approximately 0.26 inch (6.6). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement and simplicity of application.

F. Fastener-King Con: A nail-in, corrosion-resistant fastener used with Plate to attach insulation or with Bar to attach membrane to poured structural concrete roof decks.

G. Stop: An extruded aluminum, low profile bar used with certain Fasteners to attach to the roof deck or to walls/curbs at terminations, penetrations and at incline changes of the substrate. Stop is a 1 inch (25 mm) wide, flat aluminum bar 1/8 inch (3 mm) thick that has predrilled holes every 6 inches (152 mm) on center.

H. Bar: An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach membrane to roof decks. The formed steel is pre-punched with holes every 1 inch (25 mm) on center to allow various Fastener spacing options.

I. Cord: A 5/32 inch (4 mm) diameter, red-colored, flexible thermoplastic extrusion that is welded to the top surface of the membrane and against the side of the Bar, used to hold the membrane in position.

2.06 WALKWAY PROTECTION

A. Tread: A polyester reinforced, 0.096 inch (96 mil/2.4 mm), weldable membrane with surface embossment. Used as a protection layer from rooftop traffic. Tread is supplied in rolls of 39.3 inches (1.0 m) wide and 32.8 feet (10 m) long.

2.07 MISCELLANEOUS ACCESSORIES

A. Aluminum Tape: a 2-inch (50 mm) wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at Clad joints.

B. Sealing Tape Strip: Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and wind blown moisture entry.

C. Multi-Purpose Tape: A high performance sealant tape with used with metal flashings as a preventive measure against air and wind blown moisture entry.

D. Seam Welder 641mc: 220 volt, self-propelled, hot-air welding machine used to seal long lengths of membrane seams.

E. Perimat Welder: 120 volt, self-propelled, hot-air welding machine used to seal long-lengths of membrane seams along perimeter details.

F. Solvent: A high quality solvent cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. Solvent is also used daily to clean seam areas prior to hot-air welding in tear off or dirty conditions or if the membrane is not welded the same day it is unrolled. Consult Product Data Sheet for additional information.

2.08 MISCELLANEOUS FASTENERS AND ANCHORS

A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

2.09 RELATED MATERIALS

A. Wood Nailer: Treated wood nailers shall be installed at the perimeter of the entire roof and around such other roof projections and penetrations as specified on Project Drawings. Thickness of nailers must match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #2 quality or better lumber. Creosote or asphalt-treated wood is not acceptable. Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.

B. Plywood: When bonding directly to plywood, a minimum ½ inch (12 mm) CDX (C side out), smooth-surfaced exterior grade plywood with exterior grade glue shall be used. Rough-surfaced plywood or high fastener heads will require the use of Felt behind the flashing membrane. Plywood shall have a maximum moisture content of 19% by weight on a dry weight basis.

PART 3 --EXECUTION

3.01 PRE-CONSTRUCTION CONFERENCE

A. The Applicator, Owner's Representative/Designer and Manufacturer(s) shall attend a pre-construction conference.

B. The meeting shall discuss all aspects of the project including but not limited to:

1. Safety
2. Set up
3. Construction schedule
4. Contract conditions
5. Coordination of the work

3.02 SUBSTRATE CONDITION

A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.
B. Applicator shall verify that the work done under related sections meets the following conditions:

1. Roof drains and/or scuppers have been reconditioned and/or replaced and installed properly.
2. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
3. All surfaces are smooth and free of dirt, debris and incompatible materials.
4. All roof surfaces shall be free of water, ice and snow.

3.03 SUBSTRATE PREPARATION

The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Applicator shall load materials on the rooftop in such a manner to eliminate risk of deck overload due to concentrated weight. The Owner's Representative shall ensure that the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.

A. New Construction

1. Steel Deck:

a) FM approved steel deck - The roof deck shall be 22 gauge (minimum) grade E and shall conform and be installed to meet the latest revision of FM's Loss Prevention Data Sheet 1-28 and the local code's current requirements.

b) Non-FM approved steel deck - The roof deck shall be 24 gauge (minimum) grade D and shall conform and be installed to the local code's current requirements.

3.04 SUBSTRATE INSPECTION

A. A dry, clean and smooth substrate shall be prepared to receive the Adhered roof system.

B. The Applicator shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.

C. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.

D. All roof surfaces shall be free of water, ice and snow.

E. The membrane shall be applied over compatible and accepted substrates only.

3.05 WOOD NAILER INSTALLATION

A. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations as shown on the Detail Drawings.

B. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall meet this requirement and that of the current Factory Mutual Loss Prevention Data Sheet 1-49.

C. Thickness shall be as required to match substrate or insulation height to allow a smooth transition.

D. Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction and shall be free of rot, excess moisture or deterioration. Only woodwork shown to be reused in Detail Drawings shall be left in place. All other nailer woodwork shall be removed.

3.06 SEPARATION BOARD INSTALLATION

A. Separation board shall be installed according to insulation manufacturer's instructions.

B. Separation board shall be neatly cut to fit around penetrations and projections.

C. Install tapered insulation in accordance with insulation manufacturer's shop drawings.

D. Install tapered insulation around drains creating a drain sump.

E. Do not install more insulation board than can be covered with the membrane by the end of the day or the onset of inclement weather.

F. Use at least 2 layers of insulation when the total insulation thickness exceeds 2½ inches (64 mm). Stagger joints at least 12 inches (0.3 m) between layers.

G. Mechanical Attachment

1. Insulation shall be mechanically fastened to the deck with approved fasteners and plates at a rate according to the insulation manufacturer's, FM's and the manufacturer's recommendations for fastening rates and patterns. The quantity and locations of the fasteners and plates shall also cause the insulation boards to rest evenly on the roof deck/substrate so that there are no significant and avoidable air spaces between the boards and the substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides.
2. Fasteners are to be installed consistently in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by the fastener manufacturer and the membrane manufacturer.
3. Use fastener tools with a depth locator and torque-limiting attachment as recommended or supplied by fastener manufacturer to ensure proper installation.

3.07 INSTALLATION OF ROOF MEMBRANE

The surface of the insulation or substrate shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.

A. 2121 Adhesive:

1. Over the properly installed and prepared substrate, 2121 adhesive shall be poured out of the pail and spread using notched ¼ inch x ¼ inch x ¼ inch (6 mm x 6 mm x 6 mm) rubber squeegees. The 2121 adhesive shall be applied at a rate according to the manufacturer's requirements. No adhesive is applied to the back of the G410 feltback membrane. **Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.**
2. The G410 feltback roof membrane is unrolled immediately into the wet 2121 adhesive. Adjacent rolls overlap previous rolls by 3 inches (75 mm). This process is repeated throughout the roof area. Immediately after application into adhesive, each roll shall be pressed firmly into place with a water-filled, foam-covered lawn roller by frequent rolling in two directions. **Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.**
3. Weld G410 coverstrips at all G410 feltback seams that do not have a factory selvage edge. Notes:

    a. 2121 adhesive shall not be used if temperatures below 40° F (5° C) are expected during application or subsequent drying time.
    b. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.

3.08 HOT-AIR WELDING OF SEAM OVERLAPS

A. General

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
2. Welding equipment shall be provided by or approved by the manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Technical Representative prior to welding.
3. All membrane to be welded shall be clean and dry.

B. Hand-Welding

1. Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
2. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
3. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1½ inch (40 mm) wide nozzle is recommended for use. For corners and compound connections, the ¾ inch (20 mm) wide nozzle shall be used.

C. Machine Welding

1. Machine welded seams are achieved by the use of automatic welding equipment. When using this equipment, the manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.
2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.

D. Quality Control of Welded Seams

1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Owner's Representative or a manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

3.09 MEMBRANE FLASHINGS

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

A. Adhesive for Membrane Flashings

1. Over the properly installed and prepared flashing substrate, adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
2. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.

B. Install Stop/Bar/Cord according to the Detail Drawings with approved fasteners into the structural deck at the base of parapets, walls and curbs. Stop is required by the manufacturer at the base of all tapered edge strips and at transitions, peaks, and valleys according to the manufacturer's details.

C. The manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by the manufacturer prior to installation.

D. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the Owner's Representative and the Technical Department.

E. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the membrane.

F. All flashing membranes shall be mechanically fastened along the counter-flashed top edge with Stop at 6-8 inches (0.15-0.20 m) on center.

G. Flashings shall be terminated according to the manufacturer's recommended details.

H. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement. Consult Technical Department for securement methods.

3.10 METAL FLASHINGS

A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:

1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.

B. Metal, other than that provided by the manufacturer, is not covered under the warranty.

C. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.

D. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.

E. Metal joints shall be watertight.

F. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).

G. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.

H. Counter flashings shall overlap base flashings at least 4 inches (100 mm).

I. Hook strips shall extend past wood nailers over wall surfaces by 1½ inch (38 mm) minimum and shall be securely sealed from air entry.

3.11 CLAD METAL BASE FLASHINGS / EDGE METAL

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.

A. Clad metal flashings shall be formed and installed per the Detail Drawings.

1. All metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch (25 mm).
2. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.

B. Adjacent sheets of Clad shall be spaced ¼ inch (6 mm) apart. The joint shall be covered with 2 inch (50 mm) wide aluminum tape. A 4 inch minimum (100 mm) wide strip of flashing membrane shall be hot-air welded over the joint.

3.12 WALKWAY INSTALLATION

A. Tread Walkway

Roofing membrane to receive the Tread Walkway shall be clean and dry. Place chalk lines on deck sheet to indicate location of Walkway. Apply a continuous coat of 2170 adhesive to the deck sheet and the back of Walkway in accordance with manufacturer's technical requirements and press Walkway into place with a water-filled, foam-covered lawn roller. Clean the deck membrane in areas to be welded. Hot-air weld the entire perimeter of the Walkway to the membrane deck sheet. Check all welds with a rounded screwdriver. Re-weld any inconsistencies. **Important:** Check all existing deck membrane seams that are to be covered by Walkway with rounded screwdriver and reweld any inconsistencies before Walkway installation. Do not run Walkway over Bars.

3.13 TEMPORARY CUT-OFF

A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2.10. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.

B. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.

C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Applicator's expense.

3.14 COMPLETION

A. Prior to demobilization from the site, the work shall be reviewed by the Owner's Representative and the Applicator. All defects noted and non-compliances with the Specifications or the recommendations of the manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the Owner's Representative and the manufacturer prior to demobilization.

B. All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract award.

*****END OF SECTION*****

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SECTION 07530

MECHANICALLY ATTACHED KEE ROOFING SYSTEM

PART 1 -- GENERAL

1.1 REQUIREMENTS

A. Furnish and install a new weather and watertight --- High Performance KEE Thermoplastic Roofing System on the following:

Jurupa Evidence Warehouse

B. This roofing project consists of roofing approximately 15000 sq. ft. using a Mechanically Attached FiberTite-SM FTR 8540 45mil membrane.

C. This specification is constructed around FiberTite Roofing Systems and Seaman Corporation's General Guide Specification as the standard of performance and quality and shall be considered part of these specifications.

1.2 PROJECT SCOPE

A. Roofing Contractor shall furnish all labor, materials, tools, equipment and supervision necessary to complete the installation of a new High Performance Mechanically Attached FiberTite-SM FTR 8540 45mil including roof related insulation and/or cover-boards, flashings, accessories and related metalwork in strict accordance with the contract, drawings and High Performance Membrane Roof System Manufacturer's most current specifications and details.

B. The roofing contractor shall be an "Authorized Roofing Contractor" of the MRSM in good standing and be fully knowledgeable of all the requirements within the contract documents as well as all job site conditions that could affect their work.

C. The roofing contractor shall confirm all given information and notify the building owner / owner's representative, prior to bid, of any conflicts that will affect the quality or cost of the proposal.

D. Any contractor wishing to submit a proposal using an alternative "High Performance" roofing system other than the approved manufacturer(s) must submit a pre-qualification request in writing at least fourteen (14) days prior to the bid date justifying in writing that the alternate is of equal quality and performance in ALL RESPECTS to the high performance selected foundation of this specification.

E. Failure to submit a timely pre-qualification proposal will be grounds for total rejection of the contractor's proposal.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: The High Performance Membrane Manufacturer shall be an American owned company with no less than 25 years experience as a commercial roofing manufacturer.

B. Installer Qualifications: A licensed roofing contractor, authorized by the MRSM with a minimum of five (5) years experience installing the type of roof system specified for this project.

C. Source Limitations: Obtain all components including roof insulation and/or cover-board, fasteners adhesives and other accessories as required, from the approved MRSM.

D. The specified membrane roofing system must consist of the materials required and be installed under the following criteria.

1. UL Listing; provide materials bearing Underwriters Laboratories (UL) marking / label on the packaging or containers indicating materials have been produced under UL

classification and follow-up services.

2. FM Listing; provide membrane roofing system and materials that have been evaluated by FM Global (FM) for spread of flame, seam leakage, hail resistance and wind uplift. Identify materials with FM Approved marking / label.
    i Fire/Windstorm Classification: 00
    ii Hail Resistance: SH

E. Project requiring or subject to FMG Approval shall be defined by a specific RoofNav Assembly Number.

F. The roofing contractor shall maintain an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods necessary for the proper performance of the work. No allowance will be made for lack of skill on the part of the workers.

G. Any deviations from contract, drawings and/or specifications must be submitted in writing for approval prior to implementation to the design professional representing the owner and the MRSM for acceptance / approval by both parties.

H. Upon completion of the roof installation the roofing contractor shall arrange for a quality assurance / warranty inspection by the Technical Service Department of the approved MRSM. Notice of the inspection date and time will be given to the owner / owner's representative at least 72 hours prior to the inspection taking place.

1.4 REFERENCES

A. ASTM D6754 Standard Specification for Ketone Ethylene Ester Based Sheet Roofing

B. ASTM D 751 Test Methods for Coated Fabrics

C. Seaman Corporation / FiberTite General Guide Specification FTR GS04/08

D. UL 790 Underwriters Laboratories (UL) - Fire Hazard Classifications

E. FM 4470 GM Global (FM) - Roof Assembly Classifications

F. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: completed high performance membrane roof system and base flashing shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation or other defects in construction.

B. Material Compatibility: provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by the MRSM based upon insitu field evidence of the roofing membrane/systems service life cycle greater than 20-years.

C. Roofing System Design: provide high performance membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated according to ASCE-7.

D. Energy Performance: provide high performance membrane roofing system that is listed on the EPA website as ENERGY STAR qualified and has an initial Solar Reflective Index equal to or greater than 78.

1.6 SUBMITTAL REQUIREMENTS

A. Prior to mobilization and commencement of work, the roofing contractor shall submit the following:

B. Shop drawings showing roof layout, construction details to be implemented and identifying

materials to be used

C. Sample of MRSM Commercial Roofing Warranty

D. Submit a letter from MRSM attesting that the roofing contractor is an authorized roofing contractor of the prescribed roofing material in good standing.

E. If pre-finished metal is called for, submit a color chart for the pre-finished metal in order for a color selection to be made.

F. Submit an assembly letter and/or an approved Pre-Installation Notice / Request for Warranty from the high performance membrane roof system manufacturer certifying compliance with the system requirements described in the Quality Assurance section of this specification.

1.7 PRODUCTS AND/OR WORK NOT INCLUDED IN THIS SPECIFICATION

A. Rough Carpentry; wood nailers and wood blocking

B. Masonry; waterproofing, through wall flashing, scupper openings

C. Plumbing; installation of any roof drains

D. Electrical; rooftop electrical penetrations

E. Mechanical; rooftop HVAC equipment installation

1.8 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver all materials to the job site in manufacturer's original, unopened containers, with legible labels and in sufficient quantity to allow for continuity of work.

B. Select and operate material handling equipment in a safe manner, guarding against damage to existing construction or newly applied roofing and conforming to manufacturer's recommendations of handling and storage.

C. All rolls of membrane shall be stored, lying down, elevated above the roof deck and completely protected from moisture with tarpaulins. (Manufacturer's packaging is not considered adequate for outdoor storage.)

D. Insulation and cover board materials shall be elevated on pallets and fully protected from moisture with tarpaulins. (Manufacturer's packaging is not considered adequate protection from moisture.)

E. Adhesives and sealants shall be safely stored between 50° F and 80°F prior to use.

F. Flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow all precautions as outlined in manufacturer's Material Safety Data Sheets.

G. Materials, having been determined by the owner/owner's representative to be damaged, shall be immediately removed from the construction site and replaced at no cost to the owner.

1.9 COORDINATION

A. Prior to installation of materials, a pre-roofing conference shall be held with the roofing contractor, general contractor, owner/owner's representative(s) and representatives of all trades that may be working on the roof / completed membrane to discuss the specified roofing system, coordinate its proper application and the expectations of all parties involved. The authorized roofing contractor and the owner/owner's representative shall notify all parties a minimum of fourteen days prior to the meeting.

B. Plan and coordinate the installation of the roofing system with other trades in such a manner to avoid membrane damage, keeping the complete installation weather tight and in accordance with all approved details and warranty requirements.

C. A Technical Representative of the MRSM shall be available to make recommendations necessary to ensure compliance with project specifications and specification alternatives due to unforeseen job conditions.

D. Topics of discussion at the pre-construction meeting may include the following:

1. Utility Usage
2. Sanitary Facilities
3. Material Storage Areas
4. Roof loading areas
5. Site Access
6. Roof Access
7. Project security
8. Rooftop Penetrations
9. Completed Roof Protection
10. Employee parking

1.10 JOB CONDITIONS

A. Safety

1. Take all necessary precautions regarding worker health and safety when using solvents, adhesives and hot asphalt.
2. Store flammable liquid and materials away from open sparks, flames and extreme heat.
3. Take necessary precautions when using solvents and adhesives near fresh air intakes.
4. Comply with all OSHA requirements for construction. It is the roofing contractor's responsibility to comply with all state, federal and local codes, guidelines and safety requirements.
5. Daily site cleanup shall be performed to minimize debris and hazardous congestion.
6. Roof work involves handling combustible and heavy materials at height, on some occasions directly over other trades working below the roof deck or in cases of occupied buildings, over building occupants. Extreme caution will be utilized when installing the roof to prevent injury to roofing personnel, other trades, building occupants and to property. Listed below is a partial list of safety requirements, additional requirements exist in order to comply with OSHA and jobsite regulations.
7. Material Safety Data Sheets (MSDS) shall be maintained on the jobsite for any and all roofing materials being stored or installed on the project.
8. Fire suppression equipment will be readily available on the roof top whenever combustible roofing material is being handled. Protect against fire and flame spread at all times.
9. Roofing contractor will establish a safety plan and rooftop evacuation procedures and brief his personnel on appropriate emergency actions.

B. Protection

1. Schedule installation sequence to limit access and utilization of the newly installed membrane for material storage, construction staging, mechanical and/or excessive foot traffic.
2. Provide proper protection on all newly completed roofing to avoid damage to the new roofing system.
3. Traffic should be minimized on a freshly laid roof.
4. Protect building walls, rooftop units, windows and other components during installation.

C. Additional Precautions

1. Adverse weather conditions e.g. extreme temperature, high winds, high humidity and moisture, could have a detrimental effect on adhesives, general production efforts and/or the quality of the finished installation. Contact FTCS for recommendations and acceptable tolerances.
2. Daily production schedules of new roofing shall be limited to only that which can be made 100% watertight at the end of the day, including all flashing and night seals.
3. All surfaces to receive new roof system, including insulation and flashing, shall be free from all dirt, debris and be thoroughly dry.
4. Comply with local EPA requirements as published by Local, State and Federal authorities.
5. All construction debris shall be removed from the construction site and legally dispose of off site.
6. If a condition is discovered that is not covered by the project drawings and specifications notify the general contractor and owner's representative immediately and resolve the conflict. Take appropriate steps to prevent water intrusion into the roof system until such conflict is resolved and roofing operations are continued.

1.11 WARRANTY

A. Provide manufacturer's 20 Year System NDL. Installed to FM 1-90, NRCA and manufactures guide lines.

B. Provide contractor's warranty covering leaks caused by material defects and or installation workmanship for a period of two years.

2.0 PRODUCTS

2.1 GENERAL

A. All roofing system components shall be manufactured or supplied by approved MRSM.

B. Unless approved otherwise prior to project bid, all roofing components are to be manufactured or supplied through approved MRSM and be included in the warranty coverage.

C. For purposes of designating type and quality, drawings and specifications are based upon FiberTite Roofing Systems as manufactured and supplied by Seaman Corporation of Wooster, Ohio. For additional information, the roofing contractor shall refer to FiberTite General Guide Specifications.

2.2 FIBERTITE-SM 8540 MEMBRANE

A. FiberTite-SM 8540 - nominal 45-mil ketone ethylene ester (KEE) membrane, reinforced with a 5-oz yd² knitted polyester fabric as manufactured by Seaman Corporation, under the trade name FiberTite-SM 8540, conforming to the typical physical properties as outlined below. FiberTite-SM 8540 exceeds the physical property requirements and the surface compound meets polymer content definitions as outlined in ASTM D 6754 - 02 Standard Specification for Ketone Ethylene Ester (KEE) Sheet Roofing. Membrane color shall be: DC196 White (Title 24/CRRC)

PHYSICAL PROPERTIES

ASTM D 6754-02Test Method(s)	ASTM D6754 Min. Req.	FiberTite-SM 8540 Typ. Values

Thickness, mm (in.) *ASTM D 751*	0.79 (0.031)	1.14 (0.045) nom.
Thickness over Fiber mm (in) *Optical method (inches)*	0.15 (0.006)	0.37 (0.0145)
Breaking Strength N (lbf) *ASTM D 751 proc. B – strip*	1175 (265)	1557 (350)
Elongation at Break % *ASTM D 751 - strip*	15	18
Tear Strength N (lbf) *ASTM D 751 proc. B. tongue tear*	335 (75)	445 (100)
Linear Dimensional Change % *ASTM D 1204 max %*	1.3	0.63
Fabric Adhesion N/m (lbf/in) *ASTM D 751*	225 (13)	No Peel
Low Temperature Bend *ASTM D 2136 (°F)*	-30	-40
Retention of Properties after Heat Aging *ASTM D 3045 – 176°F/156 days*		
Breaking Strength Strip % Original:	90	90
Elongation at Break Strip % Original:	90	90
Low Temperature Bend after Heat Aging	-30	-40
Change in Weight after Exposure in Water *ASTM D 471 158°F, 166h, one side only, max %*	0.0 +6.0	0.0, +3.7
Factory Seam Strength N (lbf) *ASTM D 751 Grab Method*	1780 (400)	> Fabric Strength
Hydrostatic Resistance Mpa (psi) *ASTM D 751*	3.5 (500)	5.2 (750)
Static Puncture Resistance *ASTM D 5602 (99lbf)*	Pass	Pass
Dynamic Puncture Resistance (J) *ASTM D 5635*	10	25
Accelerated Weathering *Practice G 155 / xenon*	5,000 hr.	10,000 hr.
Cracking or Crazing at 7x magnification	None	None
Accelerated Weathering *Practice G 154 / UVA*	5,000 hr.	10,000 hr.
Cracking or Crazing at 7x magnification	None	None
Fungi Resistance: *Practice G 21, 28 days*		
Sustained Growth	None	None
Fungi Resistance: Discoloration	None	None
Abrasion Test Cycles *ASTM D 3389 H-18 wheel / 1,000 g load*	1,500	> 2,000
Solar Reflective Index (SRI)	n/a	98.54

Color: DC 196 off white

2.3 FLASHING MEMBRANE

A. DC196 White Nominal 45-mil FiberTite-SM membrane shall be used for all flashing requirements to match the field membrane and warranty expectations selected for the roofing system.

2.4 INSULATION (BATTEN INSULTAION)

A. Roof insulation shall be installed, where specified and/or required to provide a suitable surface for the membrane roofing system and/or meet desired thermal values.

B. Whenever insulation thickness exceeds 2-inches install insulation in multi-layer assembly with all joints staggered the maximum amount possible to increase thermal efficiency.

C. Minimum acceptable characteristics for batten insulation:

1. FM approved rigid insulation
2. UL Classification: Class A
3. Density: 2.0 pcf. Minimum
4. Meet requirements of ASTM C1289

2.5 APPROVED INSULATION

A. Not Applicable.

2.6 COVER BOARD

A. Cover-board (deck overlayment) shall be a water resistant gypsum core substrate conforming to the following:

1. FM approved meeting Class A 1-90, for fire and wind.
2. UL Classification: Class A Assembly.
3. Meet requirements of ASTM C 473

B. Approved Cover Board

1. 1/2 in. DensDeck

2.7 VAPOR RETARDER

A. The decision regarding the inclusion of a vapor retarder within the roof system shall fall within the responsibility of the design professional and is outside the scope of this specification. Consult N.R.C.A. or other technical resource for appropriate guidelines.

B. Vapor retarder for use in a roof system shall comply with identifiable code and/or insurance requirements.

C. The vapor retarder manufacturer shall certify, in writing, that the specified vapor retarder meets identifiable code requirements and is approved for its intended use.

2.8 ROOF ACCESSORIES

A. Furnish accessories manufactured, marketed or approved by MRSM required to complete the

roof installation to manufacturer's specification including (as applicable) but not limited to the items listed below.

1. ADHESIVES; application technique and coverage rates will vary according to substrate and environmental conditions.
    i FTR-190e Bonding Adhesive - A VOC compliant solvent borne, contact (two sided) bonding adhesive, designed for bonding non-fleece back FiberTite membranes to properly prepared and pre-authorized horizontal and vertical substrates.
2. FTR-101 Sealant; a one-component gun-grade polyurethane sealant to seal flashing termination.
3. FTR-SL1 Sealant; a one-component *pourable*, self leveling, polyurethane sealant to fill "pitch pans".
4. Fiber Clad Metal; to fabricate metal flashing, 4' x 10' sheets of 24 gauge hot dipped G-90 steel, or 0.040 thick 3003H14 aluminum, laminated with a 0.020 mil polymeric coating.
5. FTR-Pre-Molded Flashing(s); injection molded vent stack and inside/outside corner flashing using FiberTite KEE compound.
6. FTR Non-Reinforced Membrane; field fabrication membrane, 0.060 mil non-reinforced KEE membrane.
7. FTR-Tuff Track Walk Way & Protection Pads; high grade walk way/protection material with "slip resistant" design.
8. FTR-Fasteners
    i FiberTite MAGNUM Series; to secure FiberTite to steel, wood and structural concrete decks. A #15-13, buttress threaded, #3 Phillips head fastener constructed of case hardened carbon steel with a reduced diameter drill point and corrosion resistant coating.
    ii FiberTite HD; to secure insulation to steel, wood and structural concrete decks. A #14-13, heavy duty threaded steel #3 Phillips truss, self tapping corrosion resistant fastener.
9. FTR-MAGNUM Barbed Stress Plates; used to anchor membrane,2.5 inch x 1.5 inch rectangular in dimension with 0.75 inch radial corners, manufactured from 18 gauge AZ-50 galvalume steel with a 0.250 inch diameter hole in its center. The plate has a raised reinforcement area and eight "barbs".
10. FTR-Sand Dollar Insulation Stress Plates; used to secure insulation and/or cover-board to steel, wood and structural concrete decking. Manufactured from high density polyethylene, 3 inch in diameter, designed with a self locking mechanism to secure the head of the FTR fasteners into the plate.
11. FTR-Termination Bar; membrane flashing(s) restraint/termination seals, nominal 1/8 inch x 1 inch x 10' 6060-T5 extruded aluminum bar with pre-punched slots, 8 inch on center.
12. FiberTite Metal Fascia System; two piece "snap-on" pre-formed, architectural metal edge system.

2.9 WOOD NAILERS

A. Not Applicable.

3.0 EXECUTION

3.1 GENERAL

A. The latest manufacturer specifications and installation techniques are to be followed along with the following additional requirements. These specific minimum requirements must be accounted for in the contractors bid / proposal and shall not be altered.

B. The roofing contractor is responsible for providing a suitable substrate surface for the proper installation of the Membrane Roofing System, roof insulation and specified components.

C. The roofing contractor shall examine all areas and conditions where by work in this section is to be installed.

D. Notify the Building Owner / Owner Representative of any and all conditions detrimental to the proper and timely execution of the work. Do not proceed until such conditions have been corrected to the satisfaction of the owner / owner's representative.

E. Commencement of roofing operations indicates the roofing contractor's acceptance of the roofing substrate for roof application.

3.2 SUBSTRATE PREPARATION

A. Surfaces scheduled to receive new membrane roofing shall be free of any standing water, dew, ice, loose debris or any other contaminate that could impair the quality of the installation.

B. Substrate shall be smooth, clean and free of sharp edges and or projections and obvious depressions that would interfere with the installation of a high quality high performance

C. Examine all the areas and conditions where by work in this section is to be installed. Correct any and all conditions detrimental to the proper and timely execution of the work. Do not proceed until such conditions have been corrected to the satisfaction of the owner / owner's representative.

D. Steel Deck

1. Steel decking should conform to Factory Mutual (FM) guidelines for Class-1 insulated steel deck construction.
2. Steel decking should be constructed of a minimum 22 gauge cold rolled steel sheets with factory G-90 galvanized coating.
3. Panel profiles, (ribs) shall be formed to minimize deflection and provide suitable strength and integrity to support anticipated structural live and dead loads.
4. Steel decking shall be installed in compliance with specified design criteria and local building code requirements.
5. Steel decking that is less than 22 gauge will be considered for application by Seaman Corporation. Fastener withdrawal tests shall be performed on all "Non-FM Approved" steel decking, (decking less than 22 gauge) to determine suitability and appropriate fastener patterns and densities for mechanical attachment of the new components of the FiberTite Roofing System.

3.3 INSTALLATION - GENERAL

A. Perform all related work specified in other sections of the contract documents necessary for the proper installation of the high performance high performance.

B. Ensure mechanical fasteners do not penetrate items located within or secured to the bottom of the deck: i.e. electrical conduit, post tension cables or other miscellaneous items.

C. Outside ambient air temperatures must be 40°F and rising during the use of any and all adhesives.

3.4 INSTALLATION OF WOOD NAILERS

A. Not Applicable.

3.5 INSTALLATION OF INSULATION AND/OR COVERBOARD

A. Roof insulation and/or coverboard shall be installed where by the long dimension of the board(s) run in parallel alignment and the short dimensions are staggered.

B. Insulation and/or coverboard shall be installed with minimum joint dimensions and shall be tightly butted where possible. Maximum joint widths shall be 3/8 inch. Damaged corners shall be cut out and replaced with an insulation piece a minimum of 12 inch x 12 inch pieces which are cut from larger panels and are smaller than one square foot are not acceptable.

C. Install no more than can be covered during the same working day.

D. When a cover board and/or multiple layers of installation are installed each layer shall be offset from the previous layer a minimum of 12 inch on center.

E. At the end of each working day, provide a watertight cover on all unused insulation as to avoid moisture penetration

3.6 INSULATION SECUREMENT

A. Not Applicable.

3.7 COVER BOARD SECUREMENT

A. Coverboard shall be applied to and installed over properly prepared and pre-approved substrates, free of any debris, dirt, grease, oil or moisture.

B. All fasteners and stress plates for the mechanical attachment of coverboard materials shall be as provided by MRSM.

C. All fasteners and stress plates shall be FM approved for mechanical attachment of coverboard and comply with FM Standard 4470 for corrosion resistance.

D. Follow MRSM guidelines for mechanical attachment of coverboard in order to comply with design requirement specified in Section 1.3 A. 2. i.

E. Perimeter areas require a 50% increase in the fastener density.

F. Corner areas require a 100% increase in the fastener density.

G. Coverboard shall be fastened in accordance with the MRSM recommendations.

H. Adhered roof systems incorporating mechanically attached coverboards may also require mechanically fastened perimeter and corner membranes systems to comply with guidelines set forth articulated in FM LPD 1-29.

I. Fasteners shall be installed in accordance with manufacturer's recommendations, complying with minimum penetration requirements for specific deck types.

J. Fasteners shall be installed using depth sensing tool attachments to ensure proper installation.

3.8 MEMBRANE INSTALLATION

A. Quality Control

1. It will be the responsibility of the roofing contractor to initiate and maintain a QC program to govern all aspects of the installation of the Membrane Roofing System.

2. The project foreman and or supervisor will be responsible for the daily execution of the QC program which will include but is not limited to the supervision, inspection and probing of all heat welding incorporated within the Membrane Roofing System.

3. If inconsistencies in the quality of the application of the composite, membrane and/or welds are found, all work shall cease until corrective actions are taken to ensure the continuity the installation.

B. General

1. Work shall be coordinated to ensure that sequencing of the installation promotes a 100% watertight installation at the end of each day.
2. Restrictions regarding outside ambient air temperature are relative only to the exposure limits of the workers and/or adhesives.
3. When using adhesives outside ambient air temperature shall be above 40°. Curing or drying time of the adhesive will be affected by ambient temperatures and must be taken into consideration when determining flashing lengths.
4. Humidity can effect the drying time of solvent borne adhesives and/or cause condensation to form on the newly applied adhesive.
5. Moisture may not be present on the adhesive prior to mating or application of Membrane Roofing System.
6. New Membrane Roofing Systems shall only be installed over properly prepared and sound substrates, free from excessive surface roughness, dirt, debris and moisture.

3.9 MEMBRANE SECUREMENT

A. The properly positioned membrane shall be attached using FTR Magnum Fasteners and Magnum Stress Plates installed through the membrane and insulation assembly and engage the structural decking.

B. The Magnum stress plates shall be installed straight and parallel to existing structural purlin members. All stress plates must set completely on the membrane allowing a minimum of 1/2 inch from the edge and allow sufficient room to facilitate welding.

C. Fastener row spacing and intervals shall be established to resist design pressures, determined in compliance with procedures outlined within the current publication of ASCE Standard 7. Alternative designs may be determined using the criteria within Factory Mutual Research Loss Prevention Data.

D. Perimeter zone and corner zone enhancement is required on all mechanically fastened roofing systems. Perimeters and corners are defined as follows:

E. Perimeter: 10% of the width of the roof areas or 40% of the height of the roof area, which ever is less to a minimum of 4-ft. Perimeter zones run parallel to all external roof edges including those with parapet walls.

F. Corner zones are the square intersection of perimeters.

G. Projects having variable roof levels shall treat the outer boundary of each level as a perimeter. Internal expansion joints, firewalls or adjoining building walls greater than 3 feet are not considered perimeter areas.

H. Perimeters and corners may be enhanced by:

I. Installing "half" rolls of membrane fastened as prescribed by project requirements

J. Adding additional rows of fasteners through the top of the membrane system within the perimeter at prescribed intervals area and sealing with a 6 inch strip

K. Individual project, insurance and building code requirements can vary substantially.

3.10 HOT AIR WELDING

A. General

1. All field seams exceeding 10 feet in length shall be welded with an approved automatic welder.
2. All field seams must be clean and dry prior to initiating any field welding.
3. All welding shall be performed only by qualified personnel to ensure the quality and continuity of the weld.

B. Hand Welding

1. The lap or seam area of the membrane should be intermittently tack welded to hold the membrane in place.
2. Properly hand welded seams shall utilize a 1-1/2 inch wide nozzle, to create a homogeneous weld, a nominal 1-1/2 inches in width.

C. Automatic Machine Welding

1. Follow all manufacturers' instructions for the safe operation of the automatic welder.
2. Follow local code requirements for electric supply, grounding and surge protection.
3. Properly Automatic Machine welded seams shall utilize a 1-1/2 inch wide nozzle, to create a homogeneous weld, a nominal 1-1/2 inches in width.

3.11 INSPECTION

A. The job foreman and/or supervisor shall initiate daily inspections of all completed work which shall include, but is not limited to the probing of all field welding with a dull pointed instrument to assure the quality of the application and ensure that any equipment or operator deficiencies are immediately resolved.

B. Ensure that all aspects of the installation (sheet layout, attachment, welding, flashing details, etc.) are in strict accordance with the most current MRSM Specifications and Details.

C. Excessive patching of field seams because of inexperienced or poor workmanship will not be accepted at time of FINAL INSPECTION FOR WARRANTY ACCEPTANCE.

3.12 FLASHING

A. Clean all vents, pipes, conduits, tubes, walls, and stacks to bare metal. All protrusions must be properly secured to the roof deck with approved fasteners.

B. Flash all curbs, parapets and interior walls in strict accordance with approved MRSM details.

C. The base flange of all membrane flashing shall extend out on to the plane of the deck, beyond the wood nailers to a maximum width of 8 inches.

D. Vertical flashing shall be terminated no less than 8 inch above the plane of the deck with approved termination bar and counter-flashing or metal cap flashing.

E. Complete all inside and outside corner flashing details with MRSM pre-formed corners or an approved field fabrication detail.

F. Probe all seams with a dull, pointed probe to ensure the weld has created a homogeneous bond.

3.13 METAL FLASHING

A. All perimeter edge details are to be fabricated from Polymeric-Clad Metal or utilize a prefabricated Fascia System.

B. Fasten all metal flashing to wood nailers or approved substrate with approved fasteners 8 inches on center.

C. Install metal flashing in accordance with MRSM Published Specifications and Construction Details.

3.14 ROOF DRAINS

A. Flash all roof drains in accordance with MRSM roof drain details.

B. Minimum 60-mil non-reinforced membrane shall be used for flashing the drain assembly.

C. The drain target sheet should be sized and installed to provide for a minimum of 12 inch of exposed 60-mil on all sides of the drain

3.15 PITCH PANS

A. EVERY REASONABLE effort shall be made to eliminate the need for pitch pans including the removal of all existing pans.

B. In the event of no alternative, fabricate pitch pans from Polymeric-Clad metal, installed in accordance with MRSM details.

C. Pitch Pans and the sealant will require periodic maintenance by the building owner's maintenance personnel.

3.16 EXPANSION JOINTS

A. Flash all expansion joints in accordance with authorized/approved details. Fasten all expansion joint material according to MRSM specifications. Ensure the expansion material has sufficient material to expand to the widest point in expansion without causing undue stress on the expansion joint material.

B. If the expansion joint is a "pre-formed" system, the manufacturer, description and a drawing illustrating the method of installation must be included in the contractor's submittals.

3.17 SEALANTS

A. Apply authorized sealant(s) to all surface mounted reglets and per project requirements. Sealant(s) are to shed water. Follow all manufacturer's instructions and installation guides.

B. Use primer when recommended by the manufacturer.

C. Sealants will require periodic maintenance by the building owner's maintenance personnel.

3.18 TEMPORARY SEALS

A. At the end of each working day or at the sign of rain, install temporary, 100% watertight seal(s) where the completed new roofing adjoins the uncovered deck.

B. If water is allowed to enter beneath the newly completed roofing, the affected area(s) shall be removed and replaced at no additional expense to the building owner.

C. Prior to the commencement of work, cut out and remove all contaminated membrane, insulation, roof cement or sealant and properly dispose off site.

3.19 WALKWAYS

A. Walkways and protection pads shall be installed at staging areas for roof top equipment maintenance or areas subject to regular foot traffic as designated by contract and/or drawings.

3.20 LIGHTNING PROTECTION

A. The installation of lightning protection must be coordinated with the authorized roofing contractor, certified lightning contractor and the building owner.

B. The lightning protection must be installed in such a manner that base plates, air terminals and cables do not penetrate the roofing membrane without the use of pre-approved flashing details.

3.21 COMPLETION

A. Remove any and all debris, excess materials and scrap of any kind from the roof and surrounding premises prior to demobilization.

B. Inspect all field welds, detailing and terminations to ensure a 100% the watertight installation.

3.22 WARRANTY INSPECTION

A. Upon completion of the project, the authorized roofing contractor shall complete and submit the MRSM Project Completion Notice.

B. Upon receipt of the notice of completion, a Technical Representative of the MRSM shall schedule an inspection with a representative of the authorized roofing contractor to thoroughly review the installation and verify compliance with MRSM specifications.

C. Any corrections or modifications necessary for compliance with the specifications and acceptance for warranty (punch list) will be noted on the Final Inspection for Warranty Form.

D. Upon completion of all punch list items and final acceptance of the installation, a warranty as authorized by the MRSM will be issued.

*****END OF SECTION*****

SECTION 07600

FLASHING & SHEET METAL

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to, these major items:

1. All metal wall flashings, related flashing, coping and caps.
2. Flashing at curbed openings, and other miscellaneous areas where indicated on the drawings.
3. Flashing flanges for roof drains and overflows.
4. Flashing at parapet walls that receive roofing membrane.
5. Flashing and metal covers at mechanical equipment platforms.
6. Gutters and downspouts.
7. Shop and field priming, shop painting, galvanizing, screening, caulking, anchors and anchor straps, clips, etc.
8. Shop drawings of all sheet metal work including expansion joints.

1.03 QUALITY ASSURANCE

A. Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces.

B. Report to the Architect all conditions that prevent proper execution of this work.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Shop Drawings: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit: all information required for fabrication, finishing and installation of this work in complete details.

1.06 GUARANTEE

Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than two (2) years from the date the Owner records Notice of Completion.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Galvanized Sheet Metal: Conform to ASTM A525, thickness indicated or specified, but not less than 24-gauge. Zinc coating shall weigh not less than 1-1/2 ounces, or more than 1-1/2 ounces per square foot of surface covered.

B. Solder: Standard Grade-A brand of 50:50 Alloy Lead-Tin, complying with ASTM B32. Name of manufacturer and grade designation shall be cast or die-marked on each bar.

C. Solder Flux: Raw muratic acid for galvanized metal and zinc; resin for tin, lead, and tinned copper; and non-corrosive soldering salts for uncoated copper.

D. Sheet Metal Fasteners: Rivets, nails, sheet metal screws, self-tapping screws, and stove bolts, of the type and size best adapted to the condition of use. Provide fasteners of the type specified or indicated.

1. Use: galvanized steel, cadmium-plated steel or 300 Series alloy stainless steel.

2. Pop rivets may be used for metal-to-metal connections when future disassembly is not required. Open-end type may be used for all applications except where watertight connections are required, in which case, use closed end type.

E. Caulking Compound: Provide as specified under Section 07900. Apply as recommended by the manufacturer; caulking compound of proper consistencies for gun and knife application as necessary.

F. Shop Prime Coat: Rust-Oleum Corporation. Apply #3202 to 1/2 mil wet coating thickness, #3268 to 1-mil dry coating thickness or provide primer as specified under Section 09900.

G. Shop Color Coat: Pre-coat in shop with coating of color to match adjoining surfaces.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 FABRICATION AND ASSEMBLY

A. Workmanship: Fabricate and finish metal work in a first class manner in accordance with best trade practices with all joints and corners accurately machined, filed and fitted, and rigidly framed together and connected. Carefully match components to produce perfect continuity of line and design. Make joints and connections in exterior face metal watertight, using approved scaling materials and methods of assembly. Fit faces of metal in contact with hairline joints, except as otherwise indicated or required for expansion or fitting. Conceal fastenings, unless otherwise indicated. Conceal required reinforcements within the finished assembly.

B. Expansion and Contraction: Form and fabricate work to adequately provide for thermal expansion and contraction and building movement in the completed work, without over-stressing the materials, breaking connections, or producing wrinkles and distortion in finished surfaces. Finish sheet metal work water and weathertight throughout.

C. Attachment Clips: Where subject to thermal expansion and contraction, attach members with clips to permit movement without damage to the installation, or provide slotted or over-size holes with washers where appearance is not critical, as approved by the Architect.

D. Lock Seams: Make lock seam work flat and true to line; sweat full of solder except where installed to permit expansion and contraction. Lap flat lock seams, and lap seams where soldered, according to pitch but in no case less than 4". Make seams in direction of flow. Fill expansion joints with sealant. Plane surfaces shall be free of buckles. Provide reinforcement as necessary. Cleat and fasten substantially on approximately eight-inch centers. All cap flashing and gutter seams to be flat lock seams.

E. Soldering: Thoroughly clean and tin material prior to soldering. Solder with heavy coppers of blunt design, properly tinned before use. For flat seam work they shall not weight less than ten pounds per pair, and for other work not less than size pounds per pair. Solder slowly with well-heated coppers, heating the seams thoroughly and completely filling them with solder. Finish surfaces neatly, full flowing and smooth. Wash acid flux thoroughly with a soda solution after soldering and completely remove soldering flux on exposed surfaces.

F. Welding: Conform to the requirements of AWS "Standard Code for Arc and Gas Welding". Perform welding in a manner resulting in strong, durable, tight, flush, smooth, and clean joints. Weld sheet steel to produce full and complete fusion welds without inducing locked-in stresses in the metal or surface distortions. Welding on exposed surfaces shall be ground smooth and flush and finished to match adjacent surfaces.

G. Caulking: Where indicated, caulk joints in sheet metal work and between sheet metal work and adjacent construction with polysulfide sealing compound. Apply in accordance with Caulking and Sealants Section.

H. Coping: Shall be attached to top of parapets in strict conformance with the latest written specifications of the Sheet Metal Industry Fund of Los Angeles, and as indicated on the drawings.

I. All sheet metal work shall be examined carefully the Contractor, Owner and Architect and if necessary, tested. The Contractor shall make all repairs to damaged items as a result of this testing, leaving them in a condition satisfactory to the Architect.

***** END OF SECTION *****

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SECTION 07720

ROOF HATCHES AND SAFETY RAILING

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 DESCRIPTION

A. Work included: Provide roof hatch system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Section includes:

1. Roof hatches
2. Automatic smoke vents
3. Hatch railing safety system

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Provide units listed by Underwriters Laboratories, Inc. and/or Factory Mutual Research Corporation (FMRC).

C. OSHA compliant roof hatch safety railing system as required by OSHA Standard 1910.23 and 1910.27.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Product Data: Manufacturer's specifications and technical data including the following.

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures.

D. Quality Control Submittals:

1. Statement of qualifications.

E. Contract Closeout Submittals

1. Operating and maintenance manuals.

1.06 PRODUCT HANDLING

A. Package and ship in accordance to manufacturer's recommendations.

B. Store in compliance to manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Verify drawing dimensions with actual field conditions.

B. Inspect related work and adjacent surfaces.

C. Determine specific locations for personnel access to roof for location of roof hatches.

C. Determine type of stair or ladder needed for roof access - needed to determine size of hatch.

D. For location of automatic smoke vents, refer to building codes for venting requirements.

PART 2 -- PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Nystrom Building Products: (800) 547-2635. Internet: www.nystrom.com

B. Roof Hatch Safety-Railing System: David/Randall (877) 723-3766

2.02 ALUMINUM ROOF HATCHES

A. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Size: As indicated on the drawings.

2. Model: Nystrom Model RHA

B. Description:

1. Cover and liner: 11-gauge (.090-inch) aluminum cover with 1-inch insulation and 18-gauge (.040-inch) aluminum cover liner.

2. Curb: 11 gauge (.090-inch) aluminum curb with 1-inch rigid fiberboard insulation. Curb to be configured to match roof pitch.

3. Hinges: Tamperproof hinge contained within hatch as part of spring assembly.

4. Latch: Zinc plated steel slam latch with turn handle and inside/outside padlock hasps.

5. Finish: Mill finish

6. Springs: Greased heavy-duty compression springs in telescoping tubes.

7. Hardware: Zinc plated steel hold open arm(s) with rubber handle that automatically locks the door when opened. Furnish hatches with interior padlock hasp and neoprene draft seal.

8. Mounting flange: 3-1/2 inch.

2.03 GALVANIZED STEEL ROOF HATCHES

A. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Size: As indicated on the drawings.

2. Model: Nystrom Model RHG

B. Description

1. Cover and liner: 14-gauge (.075-inch) galvanized steel cover with 1-inch insulation and 22-gauge (.0299-inch) galvanized steel cover liner.

2. Curb: 14-gauge galvanized steel with 1-inch rigid fiberboard insulation at curb perimeter. Curb to be configured to match pitch of roof.

3. Hinges: Tamperproof hinge contained within hatch as part of spring assembly.

4. Latch: Zinc coated steel slam latch.

5. Finish: Factory applied powder coat.

6. Springs: Greased heavy-duty compression springs in telescoping tubes.

7. Hardware: Zinc plated steel hold open arm(s) with rubber handle that automatically locks the door when opened. Furnish hatches with interior padlock hasp and neoprene draft seal.

8. Mounting flange: 3½".

2.04 ALUMINUM AUTOMATIC SMOKE VENTS

A. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Size: As indicated on the drawings.

2. Nystrom Model SVA

B. Description:

1. Cover and liner: 11-gauge (.090-inch) aluminum cover with 1-inch insulation and 18-gauge (.040-inch) aluminum cover liner. Curb to be configured to match roof pitch.

2. Curb: 11 gauge (.090-inch) aluminum with 1-inch rigid insulation at curb perimeter.

3. Hinge: Tamperproof hinge contained within vent as part of spring assembly.

4. Latch: Positive hold/release mechanism designed to hold the covers closed against 20-lbs./sq. ft. uplift force. Released either manually or by either fusible melt out link or electric/thermal resettable link.

5. Finish: Mill finish.

6. Springs: Greased heavy-duty compression springs enclosed in telescopic tubes, designed to open vent covers automatically against 10-lbs./sq. ft. wind or snow load when released.

7. Hardware: Heavy-duty shock absorbers, neoprene draft seal, inside and outside manual release cables.

8. Mounting flange: 3½".

9. U.L/F.M. Listing: The pyrolatch with fusible melt-out link is UL listed. Only eight sizes of double and quad-leaf models are UL and FM approved, excluding size 48 x 60."

2.05 GALVANIZED STEEL AUTOMATIC SMOKE VENTS

A. Acceptable Manufacturers: Subject to compliance with requirements of the Contract Documents, acceptable manufacturers are as follows or approved equal:

1. Size: As indicated on the drawings.

2. Nystrom Model SVG

B. Description:

1. Cover and liner: 14-gauge (.075-inch) galvanized steel cover with 1-inch insulation and 22-gauge (.0299-inch) galvanized steel cover.

2. Curb: 14-gauge (.075-inch) galvanized steel with 1.0-inch rigid fiberboard insulation at curb perimeter. Curb to be configured to match pitch roof.

3. Hinge: Tamperproof hinge contained within vent as part of the spring assembly.

4. Latch: Positive hold/release mechanism designed to hold the covers closed against 20-lbs./sq. ft. uplift force. Released either manually or by either fusible melt-out link or electric/thermal resettable link.

5. Finish: Factory applied powder coat.

6. Springs: Greased heavy-duty compression springs enclosed in telescoping tubes, designed to open vent covers automatically against 10 lbs./sq. ft. wind or snow load when released.

7. Hardware: Heavy-duty shock absorbers, neoprene draft seal, inside and outside manual release cables.

8. Mounting flange: 3 ½"

9. U.L/F.M. Listing: The pyrolatch with fusible melt-out link is UL listed. Only eight sizes of double and quad-leaf models are UL and FM approved, excluding size 48 x 60."

2.06 SAFETY RAILING SYSTEM

A. Nystrom Safety Railing System: Model: Select railing model to match specified hatch types from selection chart attached to this guide specification. For multiple hatch types indicate hatch designation and railing model.

B. Description: Top rail, mid rail, and chain or swinging gate, with the hatch curb acting as the toe plate.

1. Test load: 200-pounds.

2. Height: Minimum 42 inches above finished roof deck.

3. Pipe: Galvanized, 1-1/4 inch ID, A53 Grade B seamed pipe or galvanized, 1-5/8 inch OD A500 seamed tube.

4. Flat bar: 2 x 3/8 inch thickness A36 mild steel.

5. Chain system: 3/16-inch proof coil ASTM specification, zinc plated with quick link on fixed end.

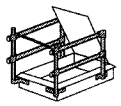
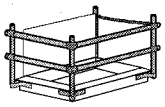
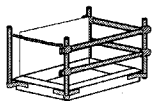
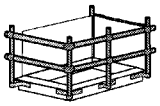
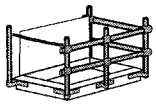
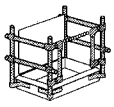
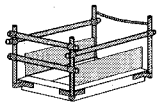
6. Pipe ends and tops: Covered or plugged with weather and light resistant material.

7. Bolts and washers: 3/8 x 2-1/2 inch grade Z, zinc plated.

8. Sealant: As recommended by manufacturer.

9. Factory finish: Hot dipped galvanized.

C. Nystrom Safety Railing System selection Chart:

MODEL:	DESCRIPTION:	PICTURE:
RHSR-SS (size)	Nystrom Safety Railing System for standard 2'-6" x 3' roof hatches and with hatchway ladder mounted on 2'-6" side of hatch opposite of hinge lid.	
RHSR-FB-EL (size)	Nystrom Safety Railing System with forward barrier exit left for a hatch up to 2'-6" x 4'-6" where a left exit is desired, or where hatchway exit is close to the roof edge or opens up to an obstruction.	
RHSR-FB-ER (size)	Nystrom Safety Railing System with forward barrier exit right for a hatch up to 2'-6" x 4'-6" where a right exit is desired, or where hatchway exit is close to the roof edge or opens up to an obstruction.	
RHSR-FB-EEL (size)	Nystrom Safety Railing System with forward barrier end exit left (exit left with back to hinge) for roof hatches up to 4' x 8' with a ladder or stairway.	
RHSR-FB-EER (size)	Nystrom Safety Railing System with forward barrier end exit right (exit right with back to hinge) for roof hatches up to 4' x 8' with a ladder or stairway.	
RHSR-O (size)	Nystrom Safety Railing System with offset handles for where hatchway ladder or stairway is mounted opposite of hatch lid hinge and where hatch dimension on mounting side exceeds 30".	
RHSR-DL (size)	Nystrom Safety Railing System for double-leaf roof hatches.	

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Check openings for correct size and irregularities.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Do not proceed until unsatisfactory conditions are corrected.

E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Comply with manufacturer's recommendations.

C. Securely anchor roof accessories in compliance with manufacturer's instructions.

D. Set units plumb, level, and true to line without warp or rack.

E. Apply bituminous paint on metal surfaces of units in contact with cementitious materials and

dissimilar metals on roof units.

F. Set railing brackets in sealant.

G. Put operating components through at least five complete operating cycles, adjusting as required, and achieving optimum ease of operation.

3.03 FIELD QUALITY CONTROL

A. Smoke Hatch Testing: Test for proper operation after installation by fusing the links and also test fusible link release system.

B. Adjust and retest as required until units operate satisfactorily.

C. Close hatches, replace links, and leave units in an operable condition.

D. Touch up coatings as required.

***** END OF SECTION *****

SECTION 07840

FIRE STOPPING

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 DESCRIPTION

A. Work included: Provide firestopping where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. It is the intent of this section of the specifications to establish a single, competent source to be responsible for providing all labor, materials, products, equipment and services, to supply and install the firestopping and smoke seal work for the entire project, at the following locations, as indicated on the drawings:

1. Openings in fire rated walls, floors and roofs both empty and those containing penetrations such as cables, conduits, cable trays, pipes, ducts and similar penetrating items.
2. Gaps between fire-rated floor slabs and exterior curtain walls.
3. Gaps between fire-rated walls and exterior curtain walls.
4. Gaps located within expansion joints.
5. Gaps between the tops of fire rated walls and underside of fire rated floor or roof assemblies.
6. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
7. Openings at each floor level in fire rated shafts or stairwells.

1.03 RELATED WORK

A. Openings through Floors and Walls:

1. Fire Rated: Metal sleeves for fire rated openings through floors and walls shall be provided under applicable mechanical and electrical specification sections.
2. Non-Rated: Non-rated openings through floors and walls shall be sealed under applicable mechanical and electrical specification sections.

B. Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies shall be sealed under applicable mechanical and electrical specifications sections and only in accordance with the equipment or device manufacturers' installation instructions. Firestopping and smoke seals around outside of such mechanical and electrical assemblies, where they penetrate fire rated separations, are the responsibility of this section.

1.04 REFERENCE STANDARDS/DOCUMENTS

A. ASTM E814 - Test Method of Fire tests of Through Penetration Firestops.

B. ANSI/UL 1479 - Fire Tests Of Through-Penetration Firestops

C. ANSI/UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems

D. UL: Fire Resistance Directory, Volume 2.

E. ITS: Directory of Listed Products.

F. Factory Mutual, Approvals Guide

1.05 SYSTEM DESCRIPTION

A. Firestopping Materials: Provide firestopping system(s) of sufficient thickness, width and density to provide and maintain a fire resistance rating, as indicated on drawings and in accordance with [UL], [WH], or [FM] design numbers.

B. Provide a seal completely filling all annular spaces to prevent the passage of flame, smoke and gases through the opening in the fire separation in which it is installed.

C. Material Compatibility: Provide materials which are compatible with all materials used in the system including materials used in or on penetrating items as well as all construction materials used in conjunction or contiguous with the system.

D. Accessories: Provide components for each firestopping system that are needed to install fill materials. 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
2. Temporary forming materials
3. Substrate primers
4. Collars
5. Steel sleeves

1.06 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.07 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Manufacturer's Data: Submit manufacturer's specifications, installation instructions and product data for each material required. Include [UL], [WH], or [FM] tested systems or designs to show compliance with the Contract Documents.

C. Shop Drawings: Submit shop drawings showing typical installation details including reinforcement, anchorage, fastenings and method of installation for each type of firestopping condition.

D. Samples: If requested, submit samples of each type of firestopping systems, smoke seals and accessories. Indicate location where material/system shall be utilized.

1.08 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing products of this Section with minimum ten (10) years documented experience, and having a quality management system that is registered as conforming to the requirements of ISO9001.

B. Applicator: Company having a minimum of three (3) years experience in the installation of materials specified herein on projects comparable to this project. The firm shall have the written authorization of the firestopping material manufacturer (s).

1.09 REGULATORY REQUIREMENTS

A. Conform to applicable local Building Codes for fire resistance ratings.

B. Provide materials, accessories and application procedures which have been listed by [UL], [WH], [FM] or [tested by a nationally recognized independent testing agency] in accordance with [ASTM E814], [ANSI/UL 1479], or [ANSI/UL 2079] to achieve the required fire protection rating(s).

1.010 ENVIRONMENTAL REQUIREMENTS

A. Do not proceed with the installation of firestopping materials when temperatures or weather conditions exceed the manufacturer's recommended limitations for installation.

B. Ventilate solvent based and moisture-cure firestopping per firestopping manufacturer's instructions by natural means or, where this is inadequate, by forced air circulation.

1.011 DELIVERY, STORAGE AND HANDLING

Deliver materials to Site in manufacturer's sealed and labelled containers intact. Handle and store materials in accordance with manufacturer's instructions.

1.012 PROJECT/SITE CONDITIONS

Comply with manufacturer's recommended requirements for temperature, relative humidity and substrate moisture content during application and curing of materials.

1.013 SEQUENCING AND SCHEDULING

Do not install firestopping system(s) until Work within opening has been completed. Coordinate with other applicable Sections. Schedule work of other trades so that firestopping applications can be inspected prior to being covered by subsequent construction.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Provide firestopping silicone sealants, water-based sealants, intumescent sealant, mortars, or firestop devices from the following manufacturer:

A/D Fire Protection Systems Inc. or Architect approved equal.

2.02 MATERIALS

A. Provide a complete system of asbestos-free firestop systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of [ASTM E814], [ANSI/UL 1479], or [ANSI/UL 2079] and listed by [UL], [WH], or [FM] and in addition are approved by jurisdictional authorities and the Consultant.

B. A/D FIRE BARRIER Silicone Sealants: For use in: openings with penetrating items subject to high movement; multiple penetration systems; for combustible pipes up to 2-in. diameter; in control joints; in curtain wall joints; expansion joints; floor/wall joints; wall/wall joints; head of wall joints; and as a sealant for smoke barrier construction.

C. A/D FIRE BARRIER Intumescent Caulk: For general use as a firestop sealant with: insulated pipes; pipes; electrical cables and conduit; ducts.

D. A/D FIRE BARRIER Seal and Seal NS: Water based firestop sealants for use with: control joints; head of wall joints; floor/wall joints; wall/wall joints; multiple penetration systems; plumbing; mechanical; electrical; and where sprayed sealant application is required or desired.

E. A/D FIRE BARRIER Mortar: For use in: large openings; static non-moving penetrations such as cable trays; for multiple penetration systems; electrical and communication bundles; conduits; non-combustible sleeves; and insulated pipes.

F. A/D FIRE BARRIER Collars: For use in openings with single combustible pipe penetrations greater than 2-in. diameter.

G. A/D FIRE BARRIER Pillows: For use in openings with: cable tray; multiple cable penetrations; where retrofitting of penetrating items is anticipated, and as a temporary fire stop system.

H. Fire stop system ratings: Comply with applicable Building Code requirements for locations and ratings.

2.03 ACCESSORIES

A. Damming and backup materials, supports and anchoring devices: Non-combustible, to manufacturer's recommendations and in accordance with the tested system being installed as acceptable to jurisdictional authorities.

B. Primers: As required by firestopping manufacturer and compatible with selected system and contiguous materials.

C. Water: Potable.

D. Firestopping for vertical (wall) applications: Non-sag caulk or spray grade sealants, Mortar, Collars or Pillows.

E. Firestopping for horizontal (floor) applications: Non-sag caulk or self-levelling or spray grade sealants, Mortar, Collars or Pillows.

F. Firestopping for overhead applications: Non-sag caulk or spray grade sealants or Mortar.

G. Tape: Pressure sensitive masking tape as recommended by the firestopping manufacturer.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Examine substrates, openings, voids, adjoining construction and conditions under which the Work is to be installed. Confirm compatibility of surfaces scheduled to receive firestopping.

C. Correct conditions detrimental to timely and proper completion of the Work.

D. Verify that penetrating elements are securely fixed and properly located with the proper space allowance between penetrations and surfaces of openings.

E. Do not proceed with Work until unsatisfactory conditions are corrected.

F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Surfaces to receive firestopping shall be free of dirt, dust, grease, oil, rust, loose materials, form release agents, frost, moisture or any other matter which would impair the bond of firestopping material to the substrate of penetrating item(s).

B. Prime substrates in accordance with manufacturer's written instructions or recommendations. Confine primers to areas of bond; do not allow spillage or migration onto exposed surfaces.

C. Do not apply firestopping and smoke seals to surfaces previously painted or treated with sealers, curing compounds, water repellent or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

D. Ensure that anchoring devices, back-up materials, clips, sleeves, supports and other related materials used in the actual fire tests are provided.

E. Mask where necessary to prevent firestopping materials from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing firestopping seal with substrates.

F. Installation is not to proceed until submittals have been completed.

3.03 INSTALLATION

A. Manufacturer's Instructions: Comply with [UL], [WH] or [FM] Listings and manufacturer's instructions for the type of material and condition of opening in each case. Consult with the manufacturer's technical representative to determine proper procedure for conditions not fully covered by printed instructions. Record in writing any oral instructions received, with copy to manufacturer.

B. Install firestopping with sufficient pressure to properly fill and seal openings to ensure an effective smoke seal. Tool or trowel exposed surfaces. Remove excess firestopping material promptly as the Work progresses and upon completion.

C. Damming: Provide leak-proof dams as required to seal openings and contain liquid sealants, putty or mortar until cured. Install damming in accordance with manufacturer's instructions.

D. Damming Boards: Install forming/damming materials and other accessories of type required to support fill materials during their application and in the position needed to produce the shapes and depths required to achieve fire ratings of through-penetration fire stop systems.

1. Combustible Type: For temporary dams only. Remove after firestopping material has cured.

2. Non-Combustible Type: For temporary or permanent dams. Provide non-combustible type wherever damming material cannot be removed after applying firestopping materials.

E. Void Filler: Use materials recommended by the firestopping manufacturer to seal gaps created by non-combustible type damming boards and to seal around cables, conduits, pipes and where void filler material becomes part of the fire rated assembly.

F. Sealant: Install damming material or mineral wool as required. Apply sealant so air voids are not present and sealant is in full contact with penetrating items. Tool sealant to ensure substrate contact. Remove excess sealant in accordance with manufacturer's recommendations.

G. Mortar: Install damming material as required. Mix mortar in strict accordance with manufacturers instructions. Pump, trowel or hand pack mortar through openings to minimum thickness as recommended by manufacturer and as listed by [UL], [WH] or [FM], to achieve required fire rating.

H. Firestopping Mineral Wool: Install firestopping by compressing material to the minimum required by [UL], [WH] or [FM] listing. Apply firestopping in sufficient thickness, depth and density so as to achieve the required fire resistance rating. Use impaling clips to support and secure firestopping where required by tested system.

3.04 FIELD QUALITY CONTROL

A. Notify Consultant when completed installations are ready for inspection prior to concealing or enclosing an area containing firestopping materials.

B. Arrange for inspections by the Owners independent inspection and testing company, appointed and paid for by Owner.

C. Following field inspections, provide all repair as required to ensure compliance with the Contract Documents.

3.05 CLEANING AND PROTECTION

A. Upon completion of this work, remove all materials, equipment and debris from the site.

B. Leave work area and adjacent surfaces in a condition acceptable to the Consultant.

C. Leave installed work with sufficient protection to enable it to remain untouched until project turnover.

*****END OF SECTION*****

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SECTION 07900

CAULKING AND SEALANTS

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 DESCRIPTION

Work included: Throughout the work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture and passage of air.

1.03 QUALITY ASSURANCE

A. Conform to Sealant and Waterproofers Institute requirements for materials and installation.

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

C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

D. Warranty: Provide written warranty for all caulking and sealants against all defects of material or application for a period of five (5) years after date of acceptance. All failures that may occur within this period due to defective application or materials shall, upon written notification of such failures, be repaired or replaced with proper materials and labor as accepted by the Architect, at no additional cost to the Owner.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. List of items that will be provided under this Section.

2. Manufacturer's Data: catalog cuts, dimensioned drawings, and other data needed to prove compliance with the specified requirements.

3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.06 WARRANTY

A. The guarantee specified herein shall include warranties against leakage, hardening, cracking, crumbling, melting, running, shrinking or staining adjacent surfaces.

B. Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than five (5) years from the date of Substantial Completion.

PART 2 -- PRODUCTS

2.01 SEALANTS

A. Except as specifically otherwise accepted by the Architect, use only the types of sealants described as follows:

1. One component polyurethane sealant, moisture curing, low modulus, FS TT-S-0023OC, Type II, Class A, ASTM-C-920, Class 25, for vertical and horizontal joints in connection with all building materials. Do not use in traffic areas. Minimum ¼" joint; maximum 1-1/4" x 3/8"d.

   a. Dymonic by Tremco

   b. Sonolastic NP1 by Sonneborn

2. One-part silicone sealant, moisture curing, low modulus, FS TT-S-0023OC, Type II, Class A, FS TT-S-001543A, Class A, for vertical and horizontal joints in connection with aluminum, glass and concrete materials which require greater movement capabilities. Do not use in traffic areas. Minimum joint ¼" x 3/16"d; maximum1" x ½"d.

   a. Spectrum 1 by Tremco

   b. Omniseal by Sonneborn

   c. Dow Corning 790

3. One-part silicone sealant, medium modulus, neutral cure, FS S-0023OC, Type II, Class A, FS TT-S-001543A, Type II, Class A, ASTM C920, Class 25, for vertical and horizontal joints in connection with non-porous surfaces such as aluminum, glass, tile, laminated plastic and concrete. Do not use in traffic areas.

   a. Spectrum 2 by Tremco

   b. Omni Plus by Sonneborn

   c. Dow Corning 795

   d. Construction 1200 by GE

4. Multi-Component polyurethane sealant, FS TT-S-00227E, Type I, Class A, ASTM C920 for horizontal joints in traffic areas. Minimum 3/8" wide, depth to be 3/8" to ½" - use primer.

   a. THC-900/901 by Tremco

   b. Chem. Caulk 950 by Bostick

5. One-part translucent silicone sealant, low modulus, moisture curing, FS TT-S-0023OC, Type II, Class A, FS TT-S-001543A, Type II, Class A, for vertical joints in connection with butt glazing.

   a. 895 Silicone by Pecora

   b. Silglaze N by GE

6. One-part mildew resistant silicone sealant meeting requirements of FDA Regulation 21 CFR 177.2600, for vertical and horizontal joints in connection with non-porous applications as sealing around bathroom fixtures, shower-tub enclosures, sinks and urinals.

   a. Dow Corning 786

   b. Sanitary 1700 by GE

7. One-part siliconized acrylic latex polymer caulk, ASTM C834-76, for interior horizontal and vertical joints in connection with window and door buck perimeters, interior wall surfaces, etc.

   a. AC-20 by Pecora

   b. Acrylic Latex by Tremco

8. Roof Penetrations: Use asphalt mastic conforming to ASTM D491.

9. For other services, provide products especially formulated for the proposed use and accepted in advance by the Architect.

B. Colors:

1. The Architect will select Colors for each sealant installation to match adjacent finishes from a standard color list normally available from the specified manufacturers.

2. Should a matching standard color not be available from the accepted manufacturer except at additional charge, the Contractor shall provide such colors at no additional cost to the Owner.

3. In concealed installations, and in partially or fully exposed installations where so accepted by the Architect, use standard gray or black sealant.

2.02 PRIMERS

Use only those primers that are: non-staining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

A. Use only those backup materials that are specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and which are non-staining.

B. Acceptable types include:

1. Closed-cell resilient urethane or polyvinyl chloride foam;

2. Closed-cell polyethylene foam;

3. Closed-cell sponge of vinyl or rubber;

4. Polychloroprene tubes or beads;

5. Polyisobutylene extrusions;

6. Oil-less dry jute.

C. Preformed support strips for ceramic tile control joint and expansion joint work: Use polyisobutylene or polychloroprene rubber.

2.04 BOND-PREVENTATIVE MATERIALS

Use only one of the following as best suited for the application, and as recommended by the manufacturer of the sealant used:

1. Polyethylene tape, pressure-sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated;

2. Aluminum foil complying with MIL-A-148E;

3. Wax paper complying with Fed. Spec. UU-P-270.

2.05 JOINT PACKING

Shall be installed in all joints to receive sealant. Material shall be a resilient type such as closed cell PVC foam or as recommended by the manufacturer. Oakum or other types of absorptive materials shall not be used as packing material.

2.06 OTHER MATERIALS

A. For masking around joints, provide masking tape complying with Fed. Spec. UU-T-106c.

B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Concrete and ceramic tile surfaces:

1. Install only on surfaces that are dry, sound, and well brushed, wiping free from dust.

2. At open joints, remove dust by mechanically blown compressed air if so required.

3. Use solvent to remove oil and grease, wiping the surfaces with clean rags.

4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.

5. Remove laitance and mortar from joint cavities.

6. Where backstop is required, insert the approved backup material into the joint cavity to the depth needed.

B. Steel surfaces:

1. Steel surfaces in contact with sealant:

a. Sandblast as required to achieve acceptable surface for bonding.

b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.

c. Use solvent to remove oil and grease, wiping the surfaces with clean rags.

2. Remove protective coatings on steel by sandblasting or by using a solvent that leaves no residue.

C. Aluminum surfaces:

1. Remove temporary protective coatings, dirt, oil, and grease.

2. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.

3. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.03 INSTALLATION OF BACKUP MATERIAL

A. Use only the backup material recommended by the manufacturer of the sealant used, and accepted by the Architect for the particular installation, compressing the backup material 25% to 50% to achieve a positive and secure fit.

B. When using backup of tub or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

C. Interior and exterior joints where no backing has been provided or which is in excess of 3/4" deep shall be packed by this subcontractor with fiberglass or a suitable joint filler to reduce the depth to 1/2" maximum. Maximum movement: the width of the joint shall be at least four times its maximum movement.

3.04 PRIMING

A. Use only the primer recommended by the manufacturer of the sealant, and accepted by the Architect for the particular installation, applying in strict accordance with the manufacturer's recommendations as accepted by the Architect.

B. The priming of joints shall be by brush to reach all surfaces to which compound will be applied. Primer shall be provided on masonry, concrete and wood surfaces as recommended by sealant manufacturer. Primer shall not be applied to surfaces that will be exposed after caulking is completed.

3.05 BOND-BREAKER INSTALLATION

Provide an approved bond-breaker where recommended by the manufacturer of the sealant, and where directed by the Architect, adhering strictly to the installation recommendations as accepted by the Architect.

3.06 INSTALLATION OF SEALANTS

A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.

B. Equipment:

1. Apply sealant under pressure with power-actuated or hand gun, or by other appropriate means.

2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.

C. Thoroughly and complete mask joints where the appearance of sealant on adjacent surfaces would be objectionable.

D. Install the sealant in strict accordance with the manufacturer's recommendations as accepted by the Architect, thoroughly filling joints to the recommended depth.

E. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.

F. Cleaning up:

1. Remove masking tape immediately after joints have been tooled.

2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.

3. The excess material shall be cleaned from the surfaces adjacent to the joint, following the caulking operation and the top of the compound deposit shall be left with a smooth even finish. No material is permitted on the exposed face of aluminum sections.

***** END OF SECTION *****

SECTION 08100

METAL DOORS AND FRAMES

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 DESCRIPTION

Work included: Provide metal doors and metal door frames which are not specifically described in other Sections of these Specifications, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. All the requirements of the Contract Documents apply to this Section.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Unless specifically otherwise accepted by the Architect, provide all products of this Section from a single manufacturer.

C. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with:

1. SDI Grade II for Heavy Duty metal doors (Steel Door Institute).

2. HMMA Standard CHM-1-74 (Hollow Metal Manufacturers Association).

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. List of items that will be provided under this Section.

2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

3. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation, and anchorage.

4. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

PART 2 -- PRODUCTS

2.01 MATERIALS

Doors and Frames shall be made of commercial quality, level cold rolled steel conforming to ASTM A-366, Latest Edition, and free of scale, pitting, or other surface defects. Face sheets and frames of exterior doors shall be zinc coated.

2.02 METAL DOORS

A. Type and design: Provide full-flush polystyrene insulated design, in dimensions and types shown on the Drawings, labeled or non-labeled as indicated on the Door Schedule in the Drawings, in 16 gage for interior doors and 16 gage for exterior doors, properly reinforced. SDI-111A shall be used as the standard for all frame details.

B. Finish: Pre-clean and shop prime each door with rust inhibitive primer for finish painting which will be performed at the job site under Section 09900 of these Specifications. Cleaning shall include a phosphate treatment for paint adhesion and all exposed surfaces shall have a rust inhibiting primer.

C. Acceptable products:

1. Steel Craft Type L Series typically. Type B where security door called out on Drawings, gage of door to be increased to 14.

2. Republic, DB Series typically. Security doors called out on plans to be increased to 14-gauge.

3. Equal products of other manufacturers when accepted in advance by the Architect.

D. Clearances: Provide single swing doors with not more than 1/8" clearance at jambs and heads, not more than ¼" clearance at meeting edges of pairs of doors (1/8" on fire doors) and not more than ¾" clearance at the bottom. Provide door bottom per hardware specifications. All clearance dimensions are nominal and subject to a tolerance of + 1/32". Lock edges of the door shall be designed to provide proper operating clearance conforming to dimensions noted above.

2.03 METAL FRAMES

A. Type and design: Provide frames of the types and dimensions shown on the Drawings, labeled or non-labeled as indicated on the Schedule and Types in the Drawings, in 16 gage for interior and exterior frames, properly reinforced. SDI-111A shall be used as the standard for all frame details.

B. Finish: Pre-clean and shop prime each door with rust inhibitive primer for finish painting which will be performed at the job site under Section 09900 of these Specifications. Cleaning shall include a phosphate treatment for paint adhesion and all exposed surfaces shall have a rust inhibiting primer.

C. Acceptable manufacturers: See Paragraph 2.02-C above.

D. Welded Frames. Secure headers and jambs at the corners either by internal welding of faces or by welded splice plates. Also secure joints at jambs and headers at the rabbet either by tack welding on the inside of the profile or by mechanical interlock. Form neat line joints at faces of frames at junction of head and jamb.

E. Frame Anchors:

1. Wall Conditions. Provide frames with a minimum of three anchors per jamb as required for the adjoining wall construction. Provide anchors of not less than 18 gage steel or 3/16" diameter wire adjustable.

2. Floor Anchors. Provide all frames with minimum 18 gage anchors for attachment to the floor.

2.04 DOOR LOUVERS

A. Fire-Rated Louver: Each fire-rated louver shall have the listing mark of Underwriter's Laboratories Inc. affixed to louver assembly.

All louvers in fire-rated doors shall be Model FLDL-UL, 16 gage cold rolled steel with stainless steel operating springs, as manufactured by Anemostat Products, Carson,

California, or equal products of other manufacturers when accepted in advance by the Architect. Louvers shall be sight-proof per SDI-111C.

B. Fixed-Blade Louver

1. All fixed blade louvers shall be Model FDLS, 18 gage cold rolled steel with mitered and welded frames and countersunk mounting holes, as manufactured by Anemostat Products, or equal products of other manufacturers when accepted in advance by the Architect. Louvers shall be sight-proof per SDI-111C.

2. Provide insect screen where louver occurs in exterior door.

C. Finish

Finish shall be factory painted in color selected by the Architect.

2.05 FINISH HARDWARE

Secure templates from the finish hardware supplier, and accurately install, or make provision for, all finish hardware at the factory.

2.06 INSULATION

Provide polystyrene foam insulation core typically and at all 12" high horizontal mullions and sills. Insulation shall have a minimum R factor of 7.7.

2.07 GLAZING

Non-removable glazing stops shall occur on the outside of exterior doors and the secure side of interior doors. Glazing beads on the inside of glass and louver panels shall be removable. Miter of butt join beads at corners. Glazing beads may be either screw-on or snap-on type. Glazing systems shall be a minimum of 20-gage steel or .040" aluminum.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 FABRICATION

A. Doors:

1. All doors shall be of types and sizes on the drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Doors shall be strong, rigid and neat in appearance, free from warpage or buckle. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.

2. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

3. Top and bottom edges shall be closed with a continuous recessed 16 gauge steel channel extending the full width and spot welded to both faces. Exterior doors shall have an additional flush closing channel at the top edge. Opening shall be provided in the bottom closer for escape of entrapped moisture.

4. Vertical edges of single acting swing doors shall be beveled 1/8" in 2".

5. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully template hardware only. Where surface mounted hardware is to be applied, doors shall have reinforcing plates only, with drilling and tapping to be done in the field. Minimum gauge of hardware reinforcing shall be as follows:

   a. Hinge: 7-gauge

   b. Lock, flush bolts, concealed holders, and for all surface-mounted hardware: 12-gauge.

6. Allow 1/8" clearance between doors and frame at top rail and at lock and hinge stiles. At floors allow 1/2" clearance. At thresholds and curbs allow 1/4" clearance unless otherwise detailed.

7. The Face sheets of Exterior and Security doors shall be stiffened by continuous vertical formed steel sections occupying the full thickness of the interior space between door faces. These stiffeners shall be not less than 20 gauge, spaced not more than 6" apart and securely attached to both face sheets by spot welds not more than 4" o.c. Spaces between stiffeners shall be sound deadened and insulated the full height of the door with an inorganic non-combustible batt-type material.

B. Frames:

1. All door and louver frames shall be strong and rigid, neat in appearance, square, true and free of defects, warp and buckle. Molded members shall be clean cut, straight and of uniform profile and back-bends shall be as detailed.

2. Corner joints shall have all contact edges closed tight, with trim faces and stops mitered and continuously welded. All welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

3. Hardware reinforcement shall be same as specified for door, with hinge and pivot reinforcement 1-1/2" x 10" minimum size.

4. Unit frames for installation in stud partitions shall be provided with steel anchors of suitable design for welding to steel studs. Anchors shall be not less than 16-gauge and shall be securely welded inside each jamb. Anchors are to be spaced at 24" on center.

5. Provide floor anchor of 14-gauge steel securely welded inside each jamb with two holes provided for floor anchorage.

6. Dust cover boxes of not less than 26-gauge shall be provided at all hardware mortises on frames to be set in masonry or drywall partitions. All frames shall be provided with a steel spreader attached to the feet of both jambs to serve as a brace during shipping and handling.

C. Finish: Finish shall consist of the following items:

1. Thoroughly clean all metal of rust, oil, and grease after fabrication.

2. Bonderize all metal with bonderite solution.

3. Baked-on coat of primer after bonderizing.

4. Additional coat of primer prior to shipping.

D. Labeled Doors and Frames: Labeled doors and frames shall be provided for those openings requiring fire protection ratings, as scheduled on the drawings. Such doors and frames shall be constructed as tested by the Underwriter's Laboratories, Inc., and shall bear their label for the required rating. Provide additional frame accessories as required to maintain the fire protection ratings once the frames are installed in the openings.

3.03 FIELD MEASUREMENTS

Verify all opening dimensions in the field prior to fabrication and assembly of frames.

3.04 INSTALLATION

Placing frames:

1. Where practicable, place frames prior to construction of enclosing walls and ceilings.
2. Set frames accurately into position, plumbed, aligned and braced securely until permanent anchors are set.
3. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
4. At in-place wood stud construction, set frames and secure to adjacent construction with #12 self-tapping flathead wood screws and zee clips.
5. At in-place metal stud construction, set frames and weld anchorage devices to adjacent construction.
6. When installed in prepared openings in concrete construction, provide sealant between frame and concrete in accordance with provisions of Section 07900 of these Specifications.

3.05 ADJUST AND CLEAN

A. Final adjustments:

1. Check and readjust operating finish hardware items in hollow metal work just prior to final inspection.
2. Leave work in complete and proper operating condition.
3. Remove defective work and replace with work complying with the specified requirements.

B. Immediately after erection, sand smooth all rusted and damaged areas of prime coat, and apply touch-up of compatible air-drying primer.

***** END OF SECTION *****

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SECTION 08360

INSULATED ROLLING SERVICE DOORS

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

Insulated rolling service doors.

1.03 RELATED WORK

Related Work: Documents affecting work of this Section include, but are not necessarily limited to, Special Conditions, and Sections in Division 1 of these Specifications.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. List of items that will be provided.

2. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation, and anchorage.

3. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

4. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.06 PRODUCT HANDLING

A. Comply with pertinent provisions of General Conditions.

B. Lift doors and carry them into position. Do not drag doors across one another.

1.07 Warranty

All Cookson Rolling Insulated Service Doors shall be warranted for a period of 2 years from the time of shipment against defects in workmanship and materials.

PART 2 -- PRODUCTS

2.01 CHAIN OPERATED INSULATED ROLLING SERVICE DOOR

All Rolling Insulated Service Doors shall be as manufactured by The Cookson Company, Phoenix, Arizona. Furnished materials shall include all curtains, bottom bars, guides, brackets, hoods, operating mechanisms and any special features.

2.02 QUALITY ASSURANCE

A. Exterior rolling insulated service doors shall be designed to withstand at least a twenty

(20) pounds per square foot wind load. Wind locks shall be installed on doors over 14'1" wide.

B. All rolling insulated service doors shall be designed to a standard maximum use of 25 cycles per day and an overall maximum of 50,000 operating cycles for the life of the door.

2.03 MATERIALS

A. The door curtain shall be constructed of interconnected strip steel slats conforming to ASTM A-653. The slats shall be designated by The Cookson Company as Number 45 (measuring 3" high by 7/8" deep) consisting of a 22 gauge, exterior slat and a 22 gauge, interior slat separated by 13/16" of rigid insulation.

B. The finish on the door curtain shall be Cookson Color Cote consisting of the following:

1. Hot dipped galvanized G-90 coating consistent with ASTM A-653
2. Bonderized coating for prime coat adhesion
3. Factory applied Thermosetting Powder Coating applied with a minimum thickness of 2 mils. The color shall be selected by the architect and shall be chosen from custom color selection.

C. The bottom bar shall consist of two 1/8" angles mechanically joined together with a 1" diameter vinyl covered foam edge astragal continuous along the bottom. The finish on the bottom bar shall be the Cookson Color Cote finish as indicated in the curtain section.

D. The guides shall consist of 3 steel angles bolted together with 3/8" fasteners to form a channel for the curtain to travel. Extruded vinyl snap-on weather-stripping shall be furnished continuously along the exterior leg of each guide. The wall angle portion shall be continuous and fastened to the surrounding structure with either minimum 1/2" fasteners or welds, both on 36" centers. The finish on the guide angles shall be the Cookson Color Cote finish as indicated in the curtain section.

E. The brackets shall be constructed of steel not less than 1/4" thick and shall be bolted to the wall angle with minimum 1/2" fasteners. The finish on the brackets shall be the Cookson Color Cote finish as indicated in the curtain section.

F. All gears shall be cast iron with teeth cast from machine cut patterns. The pinion gear shall not be less than a 3" pitch diameter. The gear ratio shall be designed for a maximum effort of not more than 30 pounds.

G. The barrel shall be steel tubing of not less than 6" in diameter. Oil tempered torsion springs shall be capable of correctly counter balancing the width of the curtain. The barrel shall be designed to limit the maximum deflection to .03" per foot of opening width. The springs shall be adjusted by means of an exterior wheel. The finish on the barrel shall be one (1) coat of bronze rust-inhibiting prime paint.

H. The hood shall be fabricated from 24 gauge, galvanized steel and shall be formed to fit the curvature of the brackets. The hood shall contain a waterproof baffle to control air infiltration. The finish on the hood shall be the Cookson Color Cote finish as indicated in the curtain section.

2.04 OPERATION

Chain operated doors shall open and close with a maximum of 30 pounds of effort utilizing an endless chain and cast iron reduction gears.

2.05 LOCKING MECHANISMS

The chain door shall be secured by means of a chain lock.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

An authorized Cookson distributor shall install all Cookson Rolling Insulated Service doors.

3.03 ADJUSTING AND CLEANING

A. Test rolling doors for proper operation and adjust as necessary to provide proper operation without binding or distortion.

B. Touch-up damaged coatings and finishes and repair any damage. Clean all exposed surfaces as recommended by manufacturer.

***** END OF SECTION *****

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SECTION 08625
TUBULAR DAYLIGHTING DEVICE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings.

B. Accessories.

1.2 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008a.

B. ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process; 2006.

C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process; 2007.

D. ASTM E 283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.

E. ASTM E 308 - Standard Practice for Computing the Colors of Objects by Using the CIE System; 2006.

F. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors; 2002.

G. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference; 2000.

H. ASTM D 635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position; 2006.

I. ASTM D-1929 - Test Method for Ignition Properties of Plastics; 1996 (2001).

J. UL 181 - Factory Made Air Ducts and Air Connectors

K. UL 790 - Standard for Tests for Fire Resistance of Roof Covering Materials; 2004.

L. ICBO/ICC AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

1.3 PERFORMANCE REQUIREMENTS

A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
   1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
   2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with

ASTM E 547.

3. Uniform Load Test:
   a. No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).
   b. All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
4. Fire Testing:
   a. When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.
   b. Self-Ignition Temperature - Greater than 650 degrees F Per: U.B.C. Standard 26-6. See ASTM D-1929.
   c. Smoke Density - Rating no greater than 450 Per U.B.C. 8-1 (See ASTM Standard E 84) in way intended for use. Classification C.
   d. Rate of Burn and/or Extent - Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2: U.B.C. Standard 26-7. See ASTM D 635.
   e. Rate of Burn and/or Extent - Maximum Burn Extent: 1 inch (25 mm) Classification CC-1: U.B.C. Standard 26-7. See ASTM D 635.

1.4 SUBMITTALS

A. Per Article 5 of the General Conditions.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.

D. Verification Samples: As requested by Architect.

E. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

F. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
   1. List of Daylight Credits available for the products specified.
   2. Data on Energy Optimization Performance Credits for the products specified.
   3. Data on Regional Credits which may me available for the project location. (LEED 2.1)
   4. Data on Perimeter and Non-Perimeter Controllability of Systems for use of Daylight Dimmer option with the products specified.
   5. Data on potential Innovation in Design Credits which may be available for the innovative use of the products specified.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 15 years.

1.6 DELIVERY, STORAGE, AND HANDLING

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

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

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

1.8 WARRANTY

A. Daylighting Device: Manufacturer's standard warranty for 10 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Solatube International, Inc., which is located at: 2210 Oak Ridge Way ; Vista, CA 92081; Toll Free Tel: 888-765-2882; www.solatube.com Contact Sun West Distributors; 760-432-0729; www.sunwestdistributors.com

B. Substitutions: Not permitted.

2.2 TUBULAR DAYLIGHTING DEVICES

A. Tubular Daylighting Devices General : Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICBO/ICC AC-16.

B. SolaMaster Series: Solatube Model 330 DS-O Open Ceiling, 21 inch (530 mm) Daylighting System:
   1. Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
      a. Glazing: Type DA, 0.143 inch (3.7 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibiting, impact modified acrylic blend.
   2. LightTracker Reflector, made of aluminum sheet, thickness 0.015 inch (0.4 mm) with Spectralight Infinity. Positioned in the dome to capture low angle sunlight.
   3. Roof Flashing Base: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube.
      a. Base Material: Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M, 0.028 inch (0.7 mm) thick.
      b. Base Style: Type FCM, Curb cap, with inside dimensions of 27 inches by 27 inches (685 mm x 685 mm) to cover curb as specified in Section 07600.
   4. Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
   5. Tube Ring Seal: Attached to the base of the dome ring; butyl glazing rope, 0.24 inch (6 mm) diameter; to minimize air infiltration.
   6. Dome Seal: Adhesive backed weatherstrip, 0.63 inch (16 mm) tall by 0.28 inch (7 mm).

7. Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm).
   a. General:
      1) Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 93 percent.
      2) Color: a* and b* (defined by CIE L*a*b* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
   b. Top Tube Angle Adapter, Type TA:
      1) Reflective 30 degree adjustable Top Tube Angle Adapter, 16 inches (406 mm) long.
   c. Extension Tube:
      1) Reflective extension tube, Type EXX, Notched for Open Ceiling diffuser attachment, 24 inches (610 mm) long
8. Diffuser Assemblies for Tubes Not Penetrating Ceilings (Open Ceiling): Solatube Model 330 DS-O. 21 inch (530 mm) diameter diffuser attached directly to bottom of tube.
   a. Lens: Type L2, Prismatic lens designed to maximize light output and diffusion. Visible Light Transmission shall be greater than 90 percent at 0.100 inch (2.5 mm) thick. Classified as CC2.
   b. Diffuser Seal: Open cell foam, acrylic adhesive backed, 0.75 inch (19 mm) wide by 0.125 inch (3.2 mm) thick.
   c. Diffuser Trim Ring: Injection molded acrylic. Nominal wall thickness 0.172 inches (4.4 mm)
9. Accessories:
   a. Security Bar: Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening.
   b. Open ceiling trim ring: Type R, Aluminum. Nominal thickness of 0.018 inches (0.5 mm).

2.3 ACCESSORIES

A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

B. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's printed instructions.

B. Installer shall be factory trained and certified by the manufacturer prior to commencement of installation.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

*****END OF SECTION*****

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SECTION 08710

FINISH HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Door Hardware, including electric hardware..

B. Specific Omissions: Hardware for the following is specified or indicated elsewhere.

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Conduit, junction boxes & wiring.
8. Sliding aluminum doors, except cylinders where detailed.
9. Access doors and panels, except cylinders where detailed.

1.2 REFERENCES:

Use date of standard in effect as of Bid date.

A. American National Standards Institute – ANSI 156.18 – Materials and Finishes.

B. ICC/ANSI A117.1 - 1998 – Specifications for making buildings and facilities usable by physically handicapped people.

C. ADA – Americans with Disabilities Act of 1990

D. BHMA – Builders Hardware Manufacturers Association

E. DHI – Door and Hardware Institute

F. NFPA – National Fire Protection Association

1. NFPA 80 – Fire Doors and Windows
2. NFPA 105 – Smoke and Draft Control Door Assemblies
3. NFPA 252 – Fire Tests of Door Assemblies

G. UL – Underwriters Laboratories

1. UL10C – Positive Pressure Fire Tests of Door Assemblies.
2. UL 305 – Panic Hardware

H. WHI – Warnock Hersey Incorporated State of California Building Code

I. Local applicable codes

J. SDI – Steel Door Institute

K. WI – Woodwork Institute

L. AWI – Architectural Woodwork Institute

M. NAAMM – National Association of Architectural Metal Manufacturers

1.3 SUBMITTALS & SUBSTITUTIONS

A. SUBMITTALS: Submit six copies of schedule. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:

1. Type, style, function, size, quantity and finish of hardware items.
2. Use BHMA Finish codes per ANSI A156.18.
3. Name, part number and manufacturer of each item.
4. Fastenings and other pertinent information.
5. Location of hardware set coordinated with floor plans and door schedule.
6. Explanation of abbreviations, symbols, and codes contained in schedule.
7. Mounting locations for hardware.
8. Door and frame sizes, materials and degrees of swing.
9. List of manufacturers used and their nearest representative with address and phone number.
10. Catalog cuts.
11. Wiring Diagrams.
12. Manufacturer's technical data and installation instructions for electronic hardware.

B. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.

C. Deviations: Highlight, encircle or otherwise identify deviations from "Schedule of Finish Hardware" on submittal with notations clearly designating those portions as deviating from this section.

D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, not the discrepancy in the submittal and request direction from Architect for resolution.

E. Substitutions per Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.

F. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.

G. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

1.4 QUALITY ASSURANCE:

A. Qualifications:

1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.

   a) Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.

B. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.

C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

D. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C / UBC Standard 7-2 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.

E. Note: scheduled resilient seals may exceed selected door manufacturer's requirements.

F. See 2.6.E for added information regarding resilient and intumescent seals.

G. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Delivery: coordinate delivery to appropriate locations (shop or field).

1. Permanent keys and cores: secured delivery direct to Owner's representative.

B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.

C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.6 PROJECT CONDITIONS AND COORDINATION:

A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.

B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:

1. Location of embedded and attached items to concrete.

2. Location of wall-mounted hardware, including wall stops.

3. Location of finish floor materials and floor-mounted hardware.

4. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.

5. Manufacturer templates to door and frame fabricators.

C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.

1.7 WARRANTY:

A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties:

1.	Locksets:	Three years
2.	Extra Heavy Duty Cylindrical Lock:	Seven Years
3.	Closers:	Ten years mechanical
4.	Hinges:	One year
5.	Other Hardware	Two years

1.8 COMMISSIONING:

A. Conduct these tests prior to request for certificate of substantial completion:

1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.

2. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.

3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

1.9 REGULATORY REQUIREMENTS:

A. Locate latching hardware between 30" to 44" above the finished floor, per California Building Code, Section 1133B.2.5.1.

B. Adjust doors to open with not more than 5.0 lbs pressure to open at exterior doors and 5.0 lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15 lbs.

C. Adjust door closer sweep periods so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door, per California Building Code Section 1133B.2.5.1

D. All hardware to meet California Building Code Sections 1133B.2.1, 1133B.2.5.1 and 1003.3.1.8l.

E. Thresholds: Comply with California Building Code Section 1133B.2.4.1.

F. Floor stops: Do not locate in path of travel. Locate no more than 4" from walls

PART 2PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers and their abbreviations used in this schedule:

IVE	H. B. Ives
GLY	Glynn-Johnson Hardware
LCN	LCN Closers
NGP	National Guard Products
SCH	Schlage Lock Company

2.2 HINGING METHODS:

A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

C. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.

1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.

2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

D. Continuous Hinges:

1. Geared-type aluminum.

a) Use wide-throw units where needed for maximum degree of swing, advise architect if commonly available hinges are insufficient.

2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

A. Mortise Locksets and Latchsets: as scheduled.

1. Chassis: cold-rolled steel, handing field-changeable without disassembly.

2. Latchbolts: 3/4 inch throw stainless steel anti-friction type.

3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.

a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.

4. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.

5. Thumbturns: accessible design not requiring pinching or twisting motions to operate.

6. Deadbolts: stainless steel 1-inch throw.

7. Electric operation: Manufacturer-installed continuous duty solenoid.

8. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.

9. Scheduled Lock Series and Design: Schlage L series, 06A design.

10. Certifications:

    a) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.

    b) ANSI/ASTM F476-84 Grade 31 UL Listed.

A. Surface Closers:

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.

2. ISO 2000 certified. Units stamped with date-of-manufacture code.

3. Independent lab-tested 10,000,000 cycles.

4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.

5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.

6. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.

7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.

8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.

9. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.

10. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.

11. Non-flaming fluid, will not fuel door or floor covering fires.

12. Pressure Relief Valves (PRV) not permitted.

2.6 OTHER HARDWARE

A. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.

B. Door Stops: Provide stops to protect walls, casework or other hardware.

1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.

2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.

C. Seals: Finished to match adjacent frame color. Resilient seal material: polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Do not furnish vinyl seal material. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability.

1. Proposed substitutions: submit for approval.

2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.

3. Non-corroding fasteners at in-swinging exterior doors.

4. Sound control openings: Use components tested as a system using nationally accepted standards by independent laboratories. Ensure that the door leafs have the necessary sealed-in-place STC ratings. Fasten applied seals over bead of sealant.

5. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.

6. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / UBC Standard 7-2. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required

D. Automatic door bottoms: low operating force units. Doors with automatic door bottoms plus head and jamb seals cannot require more than two pounds operating force to open when closer is disconnected.

E. Thresholds: As scheduled and per details. Comply with CBC Section 1133B.2.4.1. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.

1. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).

2. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.

3. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.

4. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.

F. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

2.7 FINISH:

A. Generally BHMA 626 Satin Chromium

1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.

B. Door closers: factory powder coated to match other hardware, unless otherwise noted.

C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

2.8 KEYING REQUIREMENTS:

A. Key System: Schlage Everest Primus high-security utility-patented keyway, interchangeable core throughout. Utility patent protection to extend at least until 2014. Key blanks available only from factory-direct sources, not available from after-market keyblank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner and I-R Security & Safety Consultants representatives to determine system keyway(s), keybow styles, structure, degree of physical security and degree of geographic exclusivity. Furnish Owner's written approval of the system. Owner will authorize order permanent cores. Contractor will install permanent cores.

1. Existing factory-registered master key system.

2. Primus Level 9

3. Construction keying: furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.

4. Temporary cylinders/cores remain supplier's property.

5. Furnish 10 construction keys.

6. Furnish 2 construction control keys.

7. Key Cylinders: furnish 6-pin solid brass construction.

B. Cylinders/cores: keyed at factory of lock manufacturer where permanent records are maintained. Locksets and cylinders same manufacturer.

C. Permanent keys: use secured shipment direct from point of origination to Owner.

1. For estimate: 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.

D. Bitting List: use secured shipment direct from point of origination to Owner at completion.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS:

A. Can read and understand manufacturers' templates, suppliers hardware schedule and printed installation instructions. Can readily distinguish drywall screws from manufacturers furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.2 PREPARATION:

A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation.

B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.

1. Notify Architect of code conflicts before ordering material.

2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 30 inches to 44 inches above the finished floor, per CBC Section 1133B.2.5.1.

3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.

C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.

1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.

2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.

3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.

4. Replace fasteners damaged by power-driven tools.

B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.

C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.

D. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.

E. Drill pilot holes for fasteners in wood doors and/or frames.

F. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

3.4. ADJUSTING

A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.

1. Hardware damaged by improper installation or adjustment methods: repair or replace to Owner's satisfaction.

2. Adjust doors to fully latch with no more than 1 pound of pressure.

3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.

4. Adjust door closers per 1.9 this section.

B. Inspection: Use hardware supplier's consultant or consultant's agent. Include supplier's report with closeout documents.

C. Final inspection: Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following:

1. Re-adjust hardware.

2. Evaluate maintenance procedures and recommend changes or additions, and instruct Owner's personnel.

3. Identify items that have deteriorated or failed.

4. Submit written report identifying problems

3.5 DEMONSTRATION:

A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING:

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.

B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

A. See door schedule in drawings for hardware set assignments.

B. Miscellaneous Material:

SPECWORKS # 107328

HW SET: 01

2	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	ELECTRIC HINGE	3CB1 4.5 X 4 TW4	652	IVE
1	EA	EU STOREROOM LOCK	L9080REU RX 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH

1	EA	SURFACE CLOSER	4041-SCNS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	4440SA	CL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP
1	EA	POWER SUPPLY	PS873	GRY	VON

CARD READER AND WIRING BY OTHERS

HW SET: 02

2	EA	HINGE	3CB1 4.5 X 4.5	630	IVE
1	EA	ELECTRIC HINGE	3CB1 4.5 X 4 TW4	652	IVE
1	EA	EU STOREROOM LOCK	L9080REU RX 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	4440SA	CL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP
1	EA	POWER SUPPLY	PS873	GRY	VON

CARD READER AND WIRING BY OTHERS

HW SET: 03

1	EA	CONTINUOUS HINGE	112HD EPT	628	IVE
1	EA	EU STOREROOM LOCK	L9080REU RX 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	CLOSER	4041-EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP & HOLDER	FS41/FS42 AS REQUIRED	626	IVE
1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	4440SA	CL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP
1	EA	POWER SUPPLY	PS873	GRY	VON

CARD READER AND WIRING BY OTHERS

HW SET: 04

1	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	PRIVACY	L9040 06A L583-363	626	SCH
1	EA	CLOSER	4041-EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP & HOLDER	FS41/FS42 AS REQUIRED	626	IVE

1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	4440SA	CL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP

HW SET: 05

3	EA	HINGE	3CB1 4.5 X 4.5 NRP SEC STUD	630	IVE
1	EA	STOREROOM LOCK	L9080R 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	CLOSER	4041-EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP & HOLDER	FS41/FS42 AS REQUIRED	626	IVE
1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	4440SA	CL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP

HW SET: 06

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080R 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP
1	EA	DOOR BOTTOM	4440SA	CL	NGP
1	EA	THRESHOLD	AS DETAILED	AL	NGP

SEAL DOOR 4 SIDES FOR NOISE

HW SET: 07

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	L9050R 06A L583-363	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP

HW SET: 08

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080R 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 09

2	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	3CB1 4.5 X 4 TW4	652	IVE
1	EA	EU STOREROOM LOCK	L9080REU RX 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS873	GRY	VON

CARD READER AND WIRING BY OTHERS

HW SET: 10

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080R 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041-SCNS	689	LCN
1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP

HW SET: 11

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY LOCK	L9496R 06A L583-363	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041-SCNS	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	SET	PERIMETER SEALS	155S HEAD AND JAMBS	AL	NGP

HW SET: 12

3	EA	HINGE	3CB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	3CB1 4.5 X 4 TW4	652	IVE
1	EA	SURFACE BOLTS	SB0454-8-TB	626	IVE
1	EA	EU STOREROOM LOCK	L9080REU RX 06A	626	SCH
1	EA	CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4041-H	689	LCN
1	EA	DOME STOP	FS436/438 AS REQ'D	626	IVE
1	EA	WALL STOP	WS401CCV	626	IVE
4	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS873	GRY	VON

CARD READER AND WIRING BY OTHERS

HW SET: 13

1	EA	CORE ONLY	20-740	626 SCH
1	EA	PADLOCK	KS43D3200	452 SCH

DOOR SCHEDULE:

Qty	Mark	Arch Door No	HwSet	Mode	Width	Height	Thick	Door	Frame	Rating	Outside Location	Inside Location
1	100	100	12	DD	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	INTAKE	OFFICE
1	101	101	07	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	OFFICE	WAREHOUSE
1	102	102	06	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	OFFICE	ELECTRIC
1	103	103	10	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	60MIN	WAREHOUSE	JANITOR
1	104	104	11	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	60MIN	WAREHOUSE	TOILET
1	105	105	08	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	WAREHOUSE	DRY ROOM
1	109	109	09	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	WAREHOUSE	SECURE STORAGE
1	110	110	13	RU								
1	110A	110A	13	RU								
1	E100	E100	01	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	EXTERIOR	INTAKE
1	E105	E105	03	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	EXTERIOR	DRY ROOM
1	E107	E107	04	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	EXTERIOR	TOILET
1	E110	E110	02	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	EXTERIOR	STAGING
1	E110A	E110A	13	RU								
1	E111	E111	05	SGL	3'0"	7'0"	1-3/4"	HMD	HMF	NON-RTD	EXTERIOR	FSR

SECTION 08800

GLAZING

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

All of the requirements of the Contract Documents apply to this Section.

1.03 REFERENCES

A. SIGMA No. 64-7-2 -- Specification for Sealed Insulating Glass Units.

B. FGMA -- Glazing Manual, Glazing Sealing Systems Manual.

1.04 QUALITY ASSURANCE

Conform to Flat Glass Marketing Association (FGMA) for glazing installation methods.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.06 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements.

C. Provide data on glazing sealant. Identify colors available.

D. Submit two samples, illustrating glass unit and coloration.

1.07 GUARANTEE

A. Contractor shall guarantee the work covered by this specification against all defects in material and workmanship for a period of not less than two (2) years.

B. Include coverage of sealed glass units from seal failure, interpane dusting or misting, and replacement.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE GLASS MANUFACTURERS

A. Insulated, Laminated, and Spandrel Glass: PPG Industries, Inc.

B. Security Glazing: Nippon Electric Glass Company (800) 426-0279.

C. Clear Fire-Rated Window Glazing: Pyrobel by Interedge (877) 376-3343.

D. Clear Fire-Rated Door/Sidelight Glazing: PyroEdge or Pyrobel by Interedge (877) 376-3343.

2.02 GLASS MATERIALS (As indicated on the Window Schedule):

A. General: Exposed "tong" marks are not acceptable.

B. Interior Tempered Glass: Clear, Tempered ¼" thick. Grade B (tempered), Style I (uncoated), Type I (float or plate).

C. Insulated Glass Units: Double pane ¼" units with edge seal; interpane ½" space purged with dry hermetic air; total unit thickness of 1 inch. Tempered as required by Code and indicated on drawings. Tinting as indicated on Window Schedule - tinted on inside of outer layer only. PPG Solarban 60 (2) or (3) or equal low e coating. Performance values based on tinted product selected.

D. Interior Wired Glass: 1/4" clear wire glass.

E. Interior laminated glazing - one way: Two pieces of 1/8" clear float glass, tempered as required by code, laminated with .030 in. polyvinyl butyl plastic interlayer conforming to 16CFR 1201 Category II for one-way glazing.

F. Security Glazing: 11/16" thick, glazing assembly consisting of two outer lights of 1/8" clear chemically strengthened glass with a core of two 1/8" polycarbonate sheets laminated with four inter-layers of .50 inch thick urethane.

G. Ballistic Glazing:

15/16" thick glazing assembly certified for level-A ballistics consisting of two outer lights of 1/8" clear chemically strengthened glass with a core of two 1/8" and 1/4" polycarbonate sheets laminated with four inter-layers of .50-inch thick urethane.

H. Clear Fire Glazing: Model as required for required Fire-Rated Assembly.

2.03 GLAZING COMPOUNDS

A. Glazing Compound: Modified oil type, non-hardening, knife grade consistency.

B. Butyl Sealant: Single component; Shore-A hardness of 10-20; black color; non-skinning.

C. Acrylic Sealant: Single component, solvent curing, cured Shore hardness, non-bleeding.

D. Silicone Sealant: Single component, non-bleeding, non-staining; Capable of water immersion without loss of properties.

2.04 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene; 80-90 Shore A durometer hardness; 4 inch minimum long x 1/4 inch thick.

B. Spacer Shims: Neoprene; 40-50 Shore A durometer hardness; 4 inch long on 18 inch centers for wet-glazed systems.

C. Glazing Clips: Manufacturer's standard type.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the area and conditions under which work of this Section will be performed.

B. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.

C. Verify surfaces of glazing channels or recesses are clean, square in plane, free of obstructions, and ready for work of this Section.

D. Verify weep holes in exterior frame are provided.

E. Correct conditions detrimental to timely and proper completion of the Work.

F. Do not proceed until unsatisfactory conditions are corrected.

G. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses.

3.03 EXTERIOR WET METHOD (SEALANT AND SEALANT)

A. Place setting blocks at 1/4 points and install glass pane.

B. Install removable stops with pane centered in space by inserting spacer shims both sides at 18-inch intervals, 1/4 inch below sightline.

C. Fill gap between pane and stops with sealant to depth equal to bite of frame on pane, but not more than 3/8 inch below sightline.

D. Apply sealant to uniform line, flush with sightline. Tool or wipe sealant surface with solvent for smooth appearance. Security Glazing to be sealed with security sealant as recommended by manufacturer.

E. Drain or weep the sill of each opening to the outdoors at three points using 3/8-inch diameter weep holes or the equivalent.

3.04 INTERIOR COMBINATION METHOD (TAPE AND SEALANT)

A. Cut glazing tape to length and install against permanent stops, project 1/16 inch above sightline.

B. Place setting blocks at 1/4 points.

C. Rest glass on setting blocks and push against tape to ensure full contact at perimeter of pane.

D. Install: removable stops, spacer shims between glass, and applied stops at 18-inch intervals 1/4 inch below sightline.

E. Fill gap between pane and applied stop with sealant to depth equal to bite of frame on pane to uniform and level line.

F. Trim protruding tape edge.

3.05 INTERIOR WET METHOD (COMPOUND AND COMPOUND)

A. Install glass resting on setting blocks. Install applied stop and center pane by use of spacer shims at 18-inch centers, kept 1/4 inch below sightline.

B. Locate and secure glass pane using glaziers' clips.

C. Fill gaps between pane and stops with glazing compound until flush with sightline.

3.06 CLEANING

A. After installation, mark pane with an "X" by using plastic tape or removable paste.

B. Remove glazing materials from finish surfaces.

C. Remove labels after work is completed.

D. Clean glass with solvent and normal wash. Final cleaning and polishing shall be done prior to final inspection.

E. Remove and replace broken, scratched, chipped or otherwise defective glass with new materials and leave the entire installation in a neat, clean, and acceptable condition.

***** END OF SECTION *****

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SECTION 09250

GYPSUM BOARD SYSTEMS

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

All of the requirements of the Contract Documents apply to this Section.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.04 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. List of items to be provided under this Section.

2. Manufacturer's Specifications and other data needed to prove compliance with the specified requirements.

3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

C. Mock-ups:

1. At an area on the site where accepted by the Architect, provide mock-up panels as follows:

a. Make each mock-up panel approximately 4'-0" high and 4'-0" long.

b. Provide one mock-up panel for each variation of panels.

c. The mock-up panels may be part of the Work, and may be incorporated into the finished Work, when so accepted in advance by the Architect.

2. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the other work of this Section.

1.05 DELIVERY AND STORAGE

Deliver all manufactured materials in original packages bearing manufacturer's name and brand. Use only one brand of each material throughout job. Store materials off ground and cover against weather. Remove any damaged materials from the site.

1.06 QUALITY ASSURANCE

A. Comply with all applicable requirements of "American Standard Specifications for the Application and Finishing of Gypsum Wallboard", by the America Standards Association, except where more stringent requirements are called for herein, in local Codes or by manufacturer of wallboard. Do all cutting and patching required to accommodate work of other trades.

B. Maintain temperature of drywalled spaces in range of 55 to 90 degrees F until building is entirely closed and ventilated to eliminate excessive moisture.

C. All work herein requires coordination with trades who's Work connects with, is affected or concealed by drywall. Before proceeding with drywall Work, make certain all required inspections have been made.

D. Inspect surfaces to receive drywall before starting Work and do not start until surfaces are acceptable. Starting Work under this Section implies acceptance of surfaces.

PART 2 -- PRODUCTS

2.01 WALLBOARD MATERIALS

A. Gypsum Board: Conforming to ASTM C-36: 5/8" thick, maximum permissible length, ends square cut, tapered and beveled edges.

B. Fire resistive gypsum board: Type X at all interior conditions: 5/8 inch thick x 4 feet wide. Use moisture resistant type X where used in interior wet conditions (ASTM C79).

C. Moisture-resistant Gypsum Board, conform to ASTM C630, 5/8" thick, maximum permissible length.

D. Exterior Cement Board: Concrete glass-fiber reinforced, ½" thick prefabricated panel, consisting of aggregate and Portland cement reinforced with vinyl coated woven glass fiber mesh embedded in both surfaces. Durock Tile Backer Board by USG or approved equal.

2.02 WALLBOARD ACCESSORIES

A. Trim and Edging: 26 gauge, electro-galvanized steel, with knurled surfaces for bedding cement. Provide angle corner pieces with 1-1/4 inch legs at all external corners and channel type metal trim pieces as detailed at all gypsum board edges meeting dissimilar materials. 136#/1000 l.f.

B. Screws: KW self-tapping sheet metal screws, blued steel, counter sunk Phillips heads, of lengths as required to accommodate thickness of drywall construction, for metal framing attachments.

C. Expansion joints: Conspec Systems, Inc. model FWF and FWFC as applicable in field locations. Extruded clear aluminum with continuous gasket.

D. Adhesive: Manufacturer's recommended adhesive for drywall/masonry condition.

2.03 FINISHES

A. Typical walls and/or ceilings to be painted are to receive a medium stipple (orange peel) textured finish as approved by the Architect. Texture to be applied mechanically by this subcontractor.

B. Sand textured walls shall have white play or plaster sand added into the mud prior to application. The application shall be troweled to simulate a smooth plaster finish.

C. A sample of 4' x 4' is to be prepared of each texture for the Architect's approval prior to application.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. If framing members are out to alignment, bowed or warped, correct to make true surfaces before application of gypsum board. Make finish walls or ceilings plumb and level without ridges, bows or warps.

B. Apply boards with long dimension perpendicular to framing members with all abutting ends and edges over supports. Neatly fit and stagger all end joints. Make joints occur on different studs at opposite sides of partition. Cut and fit neatly around all outlets and switches. Space fasteners 8 inches o.c. along vertical edges, and 12 inches o.c. of midpoints, 3/8 inch from edge of board. Fasten boards to backings specified (unless noted as shear walls).

C. Erection technique shall result in plumb and straight surfaces with no waves or buckles, free of unevenness at joints.

D. Joints wider than 1/8 inch will be cause for rejection of board surface by Architect.

E. Provide all backing, furring, stripping, or blocking indicated or required for installation and attachment of Work of all other trades. Cut and frame all openings required by other trades. Structural members shall not be cut, notched or drilled except as shown or noted on Drawings.

3.03 TAPING AND FINISHING

A. Mix joint and finishing compounds per manufacturer's directions.

B. Center tape over joint and embed in uniform layer of joint compound of sufficient width and depth to provide firm and complete bond. Apply skim coat while embedding tape.

C. Treat angles with reinforcing tape folded to conform to adjacent surfaces and straight true angles.

D. Allow compound to thoroughly dry for at least 24 hours.

E. Over joint compound and tape, apply coat of finishing compound. Spread evenly and feather out beyond edge of board. After first finishing coat is thoroughly dry (at least 24 hours), cover with second coat with edges feathered out slightly beyond preceding coat.

F. Give all dimples at fastener heads and all marred spots on surface of board one coat joint compound and two coats finishing compound, applied as each coat is applied to joints.

G. Install metal corner reinforcement at all external corners. Conceal flanges of metal reinforcement with at least two coats compound. When completed, compound shall extend approximately 8 inches to 10 inches on each side of metal nosing.

H. After each application of joint or finishing compound has dried, lightly sand all joints. Leave all board and treated areas uniformly smooth and ready for texturing and painting.

3.04 SCHEDULE

A. Provide fire-rated gypsum board at all firewalls and shafts as indicated on Drawings and required by code.

B. Provide water resistant gypsum board at all bermed walls, plumbing walls - full height, and walls to receive tile finish.

3.05 CLEAN UP

A. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust and to prevent tracking gypsum and joint finishing compound onto floor surfaces.

B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris and surplus material of the Section.

***** END OF SECTION *****

SECTION 09510

ACOUSTICAL CEILING SYSTEMS

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

Supply and install all Acoustical Ceiling Work as shown on Drawings and as specified herein. All the requirements of the Contract Documents apply to this Section.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article of the General Conditions.

1.04 SUBMITTALS

A. In accordance with Article 5 of the General Conditions.

B. Submit complete layout of all systems including attachments, intersections of members and edge conditions.

C. Samples: submit 2 samples of each type of unit specified herein.

1.05 QUALITY ASSURANCE

A. Have applicators approved by manufacturer of material or system being installed.

B. Work hereunder requires coordination with trades who's Work connects with, is affected, or concealed by acoustical units. Before proceeding with Work, make certain all required inspections have been made.

C. Examine sub-surfaces to receive Work. Commencement of Work will be construed as acceptance of all sub-surfaces.

D. Comply with all applicable requirements of Acoustical Materials Association, Bulletin "Architectural Acoustical Materials".

1.06 DELIVERY AND STORAGE

Deliver all manufactured materials in original containers bearing manufacturer's name and brand. Use only one brand for each type of unit throughout job. Store materials within building in locations directed.

PART 2 -- PRODUCTS

2.01 GRID

A. Ceiling Suspension Materials: Comply with ASTM C635, as applicable to the type of suspension system required for the type of ceiling units indicated. Coordinate with other work supported by or penetrating through the ceilings.

B. Manufacturer, Type, Location, and Pattern: as indicated on the drawings.

C. Edge Mouldings: Manufacturer's standard channel moulding for edges and penetrations of ceiling, with a single flange of moulding exposed, white baked enamel finish, unless otherwise indicated.

2.02 ACOUSTICAL TILE

Manufacturer, Type, Location, and Pattern: as indicated on the drawings.

2.03 EXTRA STOCK

Order additional 3% of each type of acoustical unit specified, for maintenance use, at no additional cost to Owner. (One box minimum.)

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

A. Provide all materials and accessories for complete installation per Drawings and manufacturer's printed instructions and recommendations.

B. Install units to sub-surfaces from setout points and to pattern shown on Drawings. Verify location of Work of other trades so their items occur within a whole unit or at joints as shown.

C. Install units in place fitting snugly. Provide spacers or hold-down clips where shown or required.

D. After installation, clean any soiled surfaces. Replace any damaged units at no additional cost to the Owner.

E. Arrange acoustical units in the manner shown by reflected ceiling plans. Consult with Architect pertaining to any adjustments.

3.03 SUPPORT SYSTEMS FOR SUSPENDED CEILING

A. General: Ceilings shall not support material or building components other than grills, insulation batts or light fixtures. Duct work, plumbing and like work shall have its own support system and shall not use the ceiling system or suspension wires.

B. Vertical Support System: Suspension wires shall be a minimum of 12-gauge galvanized wire attached to the main runner at 4 ft. maximum spacing in both directions. Each wire shall be anchored to the structure above with a device capable of supporting a minimum of 75 pounds. Wires supporting fixtures shall be capable of supporting four times the fixture weight. Suspension wires shall not hang more than 1 in 6 out of plumb unless counter sloping wires are provided. Wires shall not attach to or bond around interfering material such as ductwork. Trapeze or equivalent devices shall be used where obstructions interfere with direct suspension.

C. Horizontal Support System: The lateral support system for ceilings shall be shown in detail shop Drawings. Provisions shall be made for possible deferential movement between ceilings and sidewalls. Terminal ends of each main and each cross runner shall be wire supported; wall trim angles shall not provide primary support for runners. Lateral support of ceilings shall not be provided by the angle trim and runner shall not be riveted to wall trim.

D. Light Fixture Support: All recessed or drop-in light fixtures shall be supported directly from the fixture housing to the structure above with a minimum of two 12 gauge wires; leveling

and positioning of fixture may be provided by the ceiling grid. Fixture support wires may be slightly loose to allow fixture to seat in heavy-duty grid system only.

E. Secure wire hangers by looping and wire tying either directly to structures or to inserts, eye-screws or other devices which are secure and appropriate for the substrate, and which will not deteriorate or fail with age or elevated temperatures.

3.04 CLEANING AND PROTECTION

A. Clean exposed surfaces of acoustical ceilings, including trim, edge mouldings and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

B. The installer shall advise the Contractor of required protection for the acoustical ceilings, including temperature and humidity limitations and dust control, so that the Work will be without damage and deterioration at the time of acceptance by the Owner.

***** END OF SECTION *****

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SECTION 09650

RESILIENT FLOORING

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 SCOPE OF WORK

Furnish all materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to these major items:

1. Resilient tile flooring.
2. Floor substrate surface.
3. Rubber base.

1.03 REGULATORY REQUIREMENTS

Conform to applicable code for flame rating requirements of 75 or less in accordance with ASTM E84.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

A. Provide product data on specified products, describing physical and performance characteristics.

B. Submit two samples, illustrating color and pattern for each floor material or base, substituted for those indicated in the Drawings.

C. Submit manufacturer's installation instructions. When approved by the Architect, will become the basis for accepting or rejecting actual installation procedure used on the Work.

1.06 OPERATION AND MAINTENANCE DATA

Submit cleaning and maintenance data maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.08 EXTRA MATERIALS

Provide 5% of each pattern and color of flooring and of base specified.

PART 2 -- PRODUCTS

2.01 VINYL COMPOSITION TILE

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.02 SHEET VINYL

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.03 BASE MATERIALS

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.04 ACCESSORIES

A. Subfloor Filler: Latex cement underlayment as recommended by flooring material manufacturer.

B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.

C. Sealer and Wax: Types recommended by flooring manufacturer.

D. Welding rod: Use same manufacturer as flooring manufacturer and install per manufacturer's instructions. Colors to be selected from standard colors. All flooring in medical procedure rooms and in restrooms shall be heat welded.

E. Provide other materials, not specifically described but required for a complete and proper installation as selected by the Contractor subject to the approval of the Architect.

2.05 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Finishes(s), as indicated on drawings.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work.

E. Verify concrete floors are dry to the maximum moisture content of 2.5% (two and one half percent); and exhibit negative alkalinity, carbonization, or dusting. Provide test results to indicate that the substrate meets moisture requirements prior to starting work. Higher moisture content will be as accepted by manufacturer in their written warranty.

F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Apply, trowel, and float filler to leave smooth, flat, hard surface.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Maintain the temperature of the space to receive the flooring and the materials to be installed at a minimum of 65 degrees F and maximum of 100 degrees F for at least 48 hours prior to, during, and 48 hours after installation. Maintain a minimum temperature of 55 degrees F thereafter.

F. Install flooring after all other trades, including painting, have been completed.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, conventional full-spread system.

B. Spread only enough adhesive to permit installation of materials before initial set.

C. Set flooring in place; press with heavy roller to attain full adhesion.

D. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

E. Install edge strips at unprotected or exposed edges, and where flooring terminates.

F. Scribe flooring to walls, columns, permanent cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION -- BASE MATERIAL

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. At external corners, "V" cut back of base strip to 2/3 of thickness and fold.

C. Install base on solid backing. Bond tight to wall and floor surfaces.

D. Scribe and fit to doorframes and other interruptions.

3.05 PROTECTION

Prohibit traffic on floor finish for 48 hours after installation.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

***** END OF SECTION *****

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SECTION 09660

FLUID-APPLIED FLOORING

PART 1 -- GENERAL

1.01 SUMMARY

Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

1.02 WORK INCLUDED

A. Trowel-applied, direct bonded, elastomeric resin with graded aggregates for floor and base. System shall incorporate an elastomeric fiberglass reinforced waterproof membrane.

B. Perimeter edging for edge of deck and joint between plaster walls and decking cove base. Coordinate with other trades for correct installation.

1.03 QUALIFICATIONS

A. Applicator: Company specializing in resinous matrix flooring applications.

B. Supervisor; Trained by product manufacturer.

1.04 REGULATORY REQUIREMENTS

Conform to applicable code for flooring flame/fuel/smoke ratings in accordance with UL listings.

Substitutions will be considered per Article of the General Conditions.

1.05 SUBMITTALS

A. Submit product data and samples under pertinent provisions of Article of the General Conditions.

B. Submit product data for divider strips and perimeter edging.

C. Submit two samples illustrating color and variation.

D. Submit manufacturer's installation instructions. When approved by the Architect, these will become the basis for accepting or rejecting actual installation procedures.

1.06 OPERATION AND MAINTENANCE DATA

Submit cleaning and maintenance data under provisions of Section 01730. Include procedures for stain removal, repairing surface, and cleaning.

1.07 DELIVERY, STORAGE, AND HANDLING

A. All materials must be shipped to the job in unopened bags and containers.

B. Store materials in a dry, secure area. Maintain minimum temperature of 50 deg. F.

C. Keep products away from open flame.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not install flooring when temperature is below 50 degrees F except with written acceptance from manufacturer.

B. Maintain this temperature, 24 hours before, during and 72 hours after installation of flooring.

C. Ventilate area where flooring is being installed. Post and enforce NO SMOKING or OPEN FLAME signs until flooring has cured.

D. Provide uniform lighting of 25 fc measured at area of installation.

E. Restrict traffic from area where flooring is being installed or is curing.

1.09 WARRANTY

A. Provide one-year warranty

B. Warrant: Include coverage against flooring delamination from substrate and degradation of surface finish. All products found not to conform to specifications within one year of completion of project shall be replaced at no extra cost to the Owner.

1.10 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

Selby: Promdek Exterior deck system with Selby waterproof elastomeric membrane. Distributed by Harris Specialty Chemicals, Inc. (904) 996-6228.

2.02 MATERIALS

A. Waterproof membrane: modified neoprene, elastomeric resin system reinforced with fiberglass.

1. Weight: 0.25 lbs. per square foot – 3/32" thick.
2. Tensile strength: ASTM D0751 – 43 psi.
3. Water Absorption: ASTM D-570 – nil.
4. Electrical resistivity: NFPA Bulletin 99 – nonconductive.
5. Elongation: ASTM D-751 – 535%.
6. Moisture Vapor Permeability: ASTM-1653 – nil.

B. Top Coat: elastomeric resin with graded aggregates - colored, skid-resistant.

1. Weight: 2.5 lbs/square foot – ¼" thick.
2. Compressive strength: ASTM C-579 – 1,550 psi.
3. Tensile strength: ASTM D-638.
4. Indentation: MIL-D-3134 – Initial 2.7%; After 24 hr. residual – 1.2%.
5. Impact resistance: MIL-D-3134 – 0.03" – no chipping, cracking or detachment.
6. Fire resistance: MIL-D- 3134 – U.L. – Class-A fireproof decking fire retardant.
7. Adhesive strength: MIL-D-3134 – 165 psi.
8. Water absorption: MIL-D-3134 – Nil.
9. Moisture Vapor Permeability: ASTM D-1653 – Nil.
10. Electrical resistivity: NFPA Bulletin #56A – non-conductive.
11. Abrasion resistance – 110 wear index.
12. Non-slip properties:
    a. Static Friction: dry- 1.03; water – 1.07; oily – 0.84.
    b. Sliding Friction: dry – 1.05; water – 1.07; oily – 0.84.
13. Color as selected from standard manufacturer colors.

2.03 ACCESSORIES

A. Divider Strips, end caps: With anchoring features as shown on drawings and required where adjacent to non-compatible surfaces.

B. Finish: divider strips and end caps to be aluminum with bronze anodized finish or equal as accepted by coating manufacturer.

C. Strip Height: To match flooring thickness.

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Verify that surfaces are ready to receive work, that subfloor surface is clean, dry, and free of substances which could affect bond.

E. Do not begin work until concrete substrate, where occurs, has cured 28 days, minimum, and measured moisture content is not greater than 16 percent.

F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

A. Clean substrate surface free of foreign matter.

B. Do not install products over wet substrate or in rainy weather.

C. Apply primer coat per manufacturer's recommendations.

3.03 INSTALLATION – ACCESSORIES

A. Install strips straight and level as required.

B. Install base divider strips and seismic expansion joints as shown on the plans and required to allow for movement of substrate.

3.04 INSTALLATION – FLOORING

A. Install the waterproof elastomeric membrane reinforced with woven fiberglass in a direct bonded method approved by manufacturer. The cove base membrane should be brought over the top of the deck membrane where applicable.

B. Install exterior deck type grit coat and when dry sand lightly to remove trowel marks. Trowel apply one grout coat. Sand and vacuum to produce smooth surface.

C. Apply topcoat to ¼" minimum thickness in color and finish as selected through submittals.

3.05 MAINTENANCE

A. At the completion of installation, the applicator shall furnish three sets of the manufacturer's maintenance instructions.

B. Deck should be cleaned with a free rinsing detergent as often as necessary following recommended practices of the maintenance industry.

C. Protect the finish surface during construction to prevent damage from other trades until completion of project.

END OF SECTION

SECTION 09670

EPOXY RESINOUS FLOORING

PART 1 -- GENERAL

1.01 RELATED DOCUMENTS

Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Section in Division 1 of these Specifications.

1.02 DESCRIPTION/SUMMARY

A. Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.

B. Work Included the work includes, but is not limited to, providing all materials, labor, equipment and transportation to provide an epoxy resinous flooring system complete as indicated and as specified herein.

Surface preparation

Primer, base coat and cove base

1.03 REFERENCES

References made herein to published specifications; standards, methods of testing and recommended methods of trade, industry and governmental organizations shall apply to the year of original adoption or the year of the latest revision or approvals.

Refer to Division 1, Section: REFERENCE STANDARDS.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5 of the General Conditions.

1.05 SUBMITTALS

Submit samples, manufacturers literature and installation instructions per Division

1. Comply with pertinent provisions of Article 5 of the General Conditions.

1.06 QUALITY ASSURANCE

A. Applicator shall have minimum of five years experience in application of the specified type of flooring.

B. Provide certification from the manufacturer that the applicator is approved for installation of the flooring.

1.07 WARRANTY

Provide one (1) year guarantee for material and installation.

1.08 PRODUCT HANDLING AND DELIVERY

Deliver all material in manufacturers sealed containers and store under cover in a well-ventilated area.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Manufacturer: **Sunbelt Flooring, Inc.,**

Phone: (909) 628-1090 Fax: (909) 628-1280

Website: www.sunbeltflooirng.com

B. System: **The Sunbelt Flooring System** as installed **by Sunbelt Flooring, Inc.,** including: Preparation and installation on the **"Heavy-Duty Sunbelt Flooring No. 1100 Chemical Resistant Industrial Floor"** The General Contractor shall coordinate scheduling with adequate advance notice prior to floor installation as agreed upon with **Sunbelt Flooring, Inc**.

C. Products: Primer as recommended for conditions. Chemical Resistant Industrial Flooring No. 1100 (Color to be selected by Architect from the **Sunbelt Flooring, Inc.**, sample boards as submitted) and installed only by **Sunbelt Flooring, Inc.** System shall be solids, translucent quartz grains, coated, pigmented, inorganic ceramic film, grade #28.

D. Sunbelt 1100 Flooring System Physical Properties

TEST	PHYSICAL PROPERTIES	
Compressive Strength (Kpsi) **ASTM C579**	18.5	
Tensile Strength (psi) **ASTM C-307**	2000	
Flexural Strength (Kpsi) **ASTM C-580**	6.15	
Flexural Modulus of Elasticity (psi) **ASTM D-790**	2.2×10^5	
Hardness (Shore D) **ASTM D-2240**	86	
Bond Strength (psi) **ASTM D-454**	600	
Indentation (mil/Kpsi) **Mil D-3124F**	11	(No visible indentation)
Abrasion Resistance (mg/Kcyc) **ASTM C-501**	597.4	
Coefficient of Friction **ASTM D-2047**	>0.9	
Flammability **ASTM D-635**		
Burning time (sec)	104	(Self extinguishing)
Extent of burning (mm)	6.5	
Thermal Coefficient of Linear Expansion (in/in °C) **ASTM E-831**		
25° to 65°C	2.6×10^5	
65°C to 135°C	5.7×10^5	

135°C to 220°C	2.3×10^5

TEST	PHYSICAL PROPERTIES
Water Absorption (%) **ASTM C-413**	.01%
Heat Resistance limit (°F) **ASTM N/A**	**DRY** - 250° Continuous / 275° Intermittent **WET** - 140° Continuous / 200° Intermittent
Impact Resistance / Indention **Mil D-3124**	5x10-4 in. (No visible indentation)
Weather Resistance Weather-O-Meter 200 Hr Exposure	No visible cracking or deterioration

Resistance to Elevated Temperatures
A sample of the flooring was warmed to 158 degrees. There was no discernable softening. After cooling sample showed no measurable slip or flow.

U.S.D.A	Approved

Fungus/Bacteria Resistance
Will not support growth of fungus or bacterial when subject to mildew and bacteria test specified in TT-P-34

Electrical Conductivity	Electrically non-conductive

PART 3 -- EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed.

B. Correct conditions detrimental to timely and proper completion of the Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION OF EXISTING CONCRETE

Cleaning of interior concrete slabs: Vacuum shot blast ("Blastrac") all designated existing interior concrete floor slabs that are to receive new flooring materials or leveling underlayment coating. Vacuum shot blasting shall be with steel pellets 330-5 to 390-5 for optimum surface profile in order for all sealers or adhesives to penetrate and bond. Coordinate all vacuum shotblasting with respective floor covering contractor. Dustless diamond cup grinding may be used in some instances in lieu of shot blasting.

3.03 PREPARATION AND INSPECTION

A. Insure structural substrate to receive flooring is designed to prevent random cracking and/or deflection. Provide adequate control and expansion joints. Finish shall be "light steel trowel finish."

B. Concrete to receive flooring shall be wet cured for a minimum of 28 days. Do not permit use of chemical surface curing agents that may interfere with adhesion.

C. Ensure substrate is sound, dry, and free of dust, dirt, paint, grease, oil or other foreign substances.

D. Substrates in contact with ground must have an effective vapor barrier to prevent potential problems resulting from hydrostatic or capillary moisture pressure.

E. Variations in substrate level should not exceed 1/8" in ten feet. Ensure deviations or deteriorated concrete is corrected prior to start of this work.

F. Advise other trades of finished, fixtures and fittings not to be installed until decking is cured, such as: Painting, floor supported equipment, caulking, plumbing fixtures, etc.

G. Dirt, dust, plaster, oil, grease, tar, paint or any substrate that might impair adhesion must be thoroughly removed with suitable cleaners.

H. All cracks, holes broken and crumbling areas must first be cut out, cleaned and repaired with sand filled Sunbelt 1100.

I. Moving of settling cracks shall be cut or routed out and filled with flexi-caulk or resilient caulk and reinforced with 20 by 20 fiberglass tape.

J. Building shall be encased with roof, walls, windows and doors prior to floor installation. Exceptions shall be agreed upon, in writing, by flooring installer and architect.

3.04 INSTALLATION

A. Comply with manufacturer's instructions and recommendations. Mix Sunbelt Flooring No. 1100 industrial flooring liquids with manufacturers approved equipment.

B. Troweled apply Sunbelt 1100 self-priming epoxy for the first build coat.

C. Add clean, dry aggregates as recommended by manufacturer. Allow to dry.

D. Sand if needed to remove all laitance and vacuum clean.

E. Apply finish coat with trowels to a tight flat surface.

F. If a skid resistant surface is required by Architect or indicated on drawings, non-skid aggregates shall be broadcast onto surface of finish coat, then back rolled for sealing.

G. Allow to cure thoroughly before opening floor to normal use. Use of heating equipment or infrared lamps is suggested if the seal coat cannot be given more than twelve hours of curing time before normal use.

H. Protection: Supply barricades and precautions to allow traffic after and during start of installation, and for the cure period of the final coat.

Sunbelt Flooring 1100
Chemical Resistance Table
ASTM D – 1308-57

Test involved completely submerged a cured disk of Sunbelt 1100 in each of the following solutions. Maximum submersion time was 30 days. Most actual commercial applications are far less demanding, particularly where solvents and other evaporating materials are concerned.

Chemical	**Results**
Acetic Acid 5%	No Effect
Acetic Acid 10%	Ok 3 days then very slow
Acetone	Ok 3 days then slight deterioration
Ammonium Hydroxide 10%	No Effect
Blood	No Effect
Boric Acid	No Effect
Brake Fluid	Very minor swelling over 30 days

Calcium Chloride	No Effect
Carbolic Acid	Ok 2 days then slow dissolve
Acid 5%	No Effect
Detergent Solution	No Effect
Gasoline	No Effect
Hydrochloric Acid 10%	No Effect
Jet Fuel	No Effect
Lactic Acid 5%	No Effect
Methanol	Ok 3 days then Minor surface attack
Mineral Spirits	No Effect
Nitric Acid 5%	No Effect
Phenol	Ok 2 days then slow dissolve
Seawater	No Effect
Skydrol	Very minor swelling over 30 days
Sodium Hydroxide 50%	No Effect
Sodium Hypo chlorite	No Effect
Sugar Solution	No Effect
Sulfuric Acid 25%	No Effect
Toluene	Ok 3 days then very minor effect
Vegetable Oil	No Effect
Urine	No Effect
Vinegar	No Effect
Xylene	Ok 3 days then very minor effect

*****END OF SECTION*****