

DOCUMENT 00010

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**SOUTHWEST AREA HIGH SCHOOL
CHICAGO, ILLINOIS**

FOR

**CHICAGO PUBLIC SCHOOLS
CAPITAL PROGRAM NEW CONSTRUCTION**

The complete Project Manual for this Project consists of Book 1, Book 2, Book 2A, and Book 3, which must not be separated for any reason. The Architect and Owner will not be responsible for any assumptions made by a Contractor or Subcontractor who does not receive a complete bound Project Manual including all Books and all documents and sections listed in the Table of Contents.

The following listed documents comprise the Technical Specifications for the Southwest Area High School. Where numerical sequence of Divisions or Sections is interrupted, such interruptions are intentional.

Additions within previously issued sections have been bolded and italicized. Deletions have been struck out.

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SECTION 07142

HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Waterproofing system indicated and as specified.
 - 1. Horizontal application beneath green roof systems.
 - 2. Horizontal application beneath entry plaza deck systems.
 - 3. Molded-sheet drainage panels.
 - 4. Insulation.

- B. Related Sections:
 - 1. Section 02515, Architectural Precast Concrete Pavers.
 - 2. Section 07900, Joint Sealants.

1.2 SUBMITTALS

- A. Product Data: Submit complete printed data of each product to be provided. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

- B. Shop Drawings: Submit shop drawings. Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that is approved or licensed by manufacturer for installation of waterproofing required for this Project.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer.

- C. Remove and replace liquid materials that cannot be applied within their stated shelf life.

- D. Protect stored materials from direct sunlight.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate, or when temperature is below 0 degrees F.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace waterproofing and sheet flashings that do not comply with requirements or that fail to remain watertight within specified warranty period.
 - 1. Warranty pavers will not dish or warp and will not crack, split, or disintegrate in freeze-thaw conditions.
 - 2. Duration of Insulation: 20 year 80% of original thermal value; remain on the deck withstanding wind speeds not to exceed 70 mph)
 - 3. Warranty includes removing and reinstalling protection board, drainage panels, insulation, paver pads, and pavers on plaza decks.
 - 4. Warranty Period: 20 years, no dollar limit, from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WATERPROOFING MEMBRANE

- A. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Monolithic Membrane 6125; American Hydrotech, Inc.
 - b. Ram-Tough 250; Barrett Company.
 - c. CCW-500R; Carlisle Coatings & Waterproofing Inc.
 - d. 790-11; Henry Company.
 - e. TW-Hot Melt; Tamko Waterproofing.
 - f. Tremproof 150; Tremco Incorporated.

2.2 FLASHING SHEET MATERIALS

- A. Elastomeric Flashing Sheet: 50 mil minimum, uncured sheet neoprene as follows:

1. Tensile Strength: 1400 psi minimum; ASTM D 412, Die C.
2. Elongation: 300 percent minimum; ASTM D 412.
3. Tear Resistance: 125 psi minimum; ASTM D 624, Die C.
4. Brittleness: Does not break at minus 30 degrees F; ASTM D 2137.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Miscellaneous Materials:
1. Subject to compliance with requirements, furnish the following products for use with the modified bituminous sheet waterproofing:
 - a. Primer: Liquid primer recommended for substrate by manufacturer of sheet waterproofing material.
 - b. Elastomeric Sheet: 50 mil minimum, uncured sheet neoprene as follows:
 - 1) Tensile Strength: 1400 psi minimum; ASTM D 412, Die C.
 - 2) Elongation: 300 percent minimum; ASTM D 412.
 - 3) Tear Resistance: 125 psi minimum; ASTM D 624, Die C.
 - 4) Brittleness: Does not break at minus 30 degrees F; ASTM D 2137.
 - c. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum termination bars; approximately 1 inch by 1/8 inch thick; with anchors.
 - d. Sealants and Accessories: Manufacturer's recommended sealants and accessories.

2.4 MOLDED-SHEET DRAINAGE PANELS

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side with a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core, with a flow rate of 15 gpm per ft. (188 L/min. per m).

2.5 INSULATION

- A. Board Insulation: Extruded-polystyrene board insulation complying with ASTM C 578.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.
 - b. DiversiFoam Products.
 - c. Dow Chemical Company.
 - d. Owens Corning.

2. On Roof Areas A2, A7, C1, C2 & C3:
 - a. Type IV, 25 psi (173-kPa) minimum compressive strength.
 - b. Five (5) inch total thickness in two layers.
3. On Roof Area A6 (base course):
 - a. Type IV, 25 psi (173-kPa) minimum compressive strength.
 - b. Tapered system, rate of taper as required to match sloped concrete topping (approximately 1/8 inch per foot).
 - c. Two (2) inch starting thickness.
 - d. Install in "reverse" fashion (counteracting slope of substrate) to create substantially level surface.
4. On Roof Area A6 (overlay course):
 - a. Type VII, 60 psi (420-kPa) minimum compressive strength.
 - b. Two (2) inch thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
 2. Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- D. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

3.3 JOINTS, CRACKS, AND TERMINATIONS

- A. Prepare and treat substrates to receive waterproofing membrane, including joints and cracks, deck drains, corners, and penetrations according to manufacturer's written instructions.
 - 1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.
 - 2. Adhere strip of elastomeric sheet to substrate in a layer of hot rubberized asphalt. Extend elastomeric sheet a minimum of 6 inches on each side of moving joints and cracks or joints and cracks exceeding 1/8 inch thick, and beyond deck drains and penetrations. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.
- B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric sheet extended a minimum of 6 inches on each side of joints and adhere to substrates in a layer of hot rubberized asphalt. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3.4 FLASHING INSTALLATION

- A. Install elastomeric flashing sheets at terminations of waterproofing membrane according to manufacturer's written instructions.
- B. Prime substrate with asphalt primer.
- C. Install elastomeric flashing sheet and adhere to deck and wall substrates in a layer of hot rubberized asphalt.
- D. Extend elastomeric flashing sheet onto deck to be waterproofed a minimum of 6 inches.
- E. Install termination bars and mechanically fasten to top of elastomeric flashing sheet at terminations and perimeter of roofing according to manufacturer's written instructions.

3.5 MEMBRANE APPLICATION

- A. Apply primer, at manufacturer's recommended rate, over prepared substrate and allow to dry.
- B. Heat and apply rubberized asphalt according to manufacturer's written instructions.
 - 1. Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized asphalt.
- C. Start application with manufacturer's authorized representative present.
- D. Unreinforced Membrane: Apply hot rubberized asphalt to substrates and adjoining surfaces indicated. Spread to form a uniform, unreinforced, seamless membrane, 180-mil (4.5-mm) minimum thickness.
- E. Apply waterproofing over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.

3.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. Place molded-sheet drainage panels, with geotextile facing away from deck substrate, according to manufacturer's written instructions. Do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.7 INSULATION INSTALLATION

- A. Install one or more layers of board insulation to achieve required thickness over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.
- B. Loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units. Provide sufficient temporary ballast to hold in place until permanent overburden can be installed.

3.8 FIELD QUALITY CONTROL

- A. Engage a full-time site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions; surface preparation; and application of the membrane, flashings, protection, and drainage components; furnish daily reports to Architect.
- B. Provide Electric Field Vector Mapping (EFVM) – low voltage electronic leak detection. All electronic leak detection shall be completed by trained and authorized personnel accepted by the manufacturer.
 - 1. Components and equipment provided for the initial EFVM leak detection shall be installed as, and shall become, a permanent system for future use by the Owner.
- C. Provide EFVM leak detection on roof membrane for testing of capillary defects and breaches in the membrane. Testing is to be administered by a testing agency approved by the manufacturer.
- D. Test the entire membrane on an area-by-area basis.
- E. Wet the entire membrane test area with water prior to the start of each test and maintain wet for the duration of testing. Verify integrity of the membrane at drains and penetrations by localized testing.
- F. If a breach is detected, make repairs according to the following guidelines:
 - 1. Open wet area and allow deck to dry.
 - 2. Dry out or replace wet layer.
 - 3. Seal membrane, thoroughly probe membrane welds, and conduct new test.

3.9 CLEANING AND PROTECTION

- A. Protect waterproofing from damage and wear during remainder of construction period.

- B. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07195

AIR BARRIER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fluid-applied vapor retarding membrane air barrier applied to masonry.
2. Fluid-applied vapor permeable membrane air barrier applied to sheathing.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions demonstrating compliance with specification requirements for each product.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.2: For air-barrier products, documentation including printed statement of VOC content.

C. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
2. Include details of interfaces with other materials that form part of air barrier.

D. Qualification Data: For Installer. Include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.

E. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.

F. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** An entity that employs installers and supervisors who are trained and approved by manufacturer.
1. ***Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.***
- B. **Mockups:** *Build mockups to set quality standards for materials and execution and for preconstruction testing.*
1. ***Build integrated mockups of exterior wall assembly , 150 sq. ft., incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.***
 - a. ***Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.***
 - b. ***Include junction with roofing membrane, building corner condition, and foundation wall intersection.***
 - c. ***If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.***
 2. ***Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.***
 3. ***Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.***

1.5 PRECONSTRUCTION TESTING

- A. **Preconstruction Testing Service:** *Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.*
- B. **Mockup Testing:** *Air-barrier assemblies shall comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.*
1. ***Qualitative Air-Leakage Testing: Mockups will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers or ASTM E 1186, chamber depressurization with detection liquids, as directed by Architect.***
 2. ***Quantitative Air-Leakage Testing: Mockups will be tested for air leakage according to ASTM E 783.***
 3. ***Adhesion Testing: Mockups will be tested for minimum air-barrier adhesion of 30 lbf/sq. in. according to ASTM D 4541.***
 4. ***Notify Architect seven days in advance of the dates and times when mockups will be tested.***

1.6 PRODUCT HANDLING

- A. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces.
- B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- C. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Inspection: Inspect the framing system and sheathing and report conditions detrimental to a successful installation to the Contractor. Start of work will evidence acceptance.
- B. Environmental Conditions: Conduct work only under environmental conditions acceptable to the manufacturers of the products to be installed.
 - 1. Do not allow exposure for periods of time in excess of that recommended by product manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
- B. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

2.2 FLUID-APPLIED MEMBRANE AIR BARRIER

- A. Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings & Waterproofing; Barriseal.
 - b. Meadows, W. R., Inc.; Air-Shield LM.
 - c. Grace, W. R. & Co.; Perm-A-Barrier Liquid.
 - d. Henry Company; Air-Bloc 32.
 - 2. ***Physical and Performance Properties:***
 - a. ***Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.***
 - b. ***Vapor Permeance: Maximum 0.1 perm; ASTM E 96/E 96M.***
 - c. ***Ultimate Elongation: Minimum 500 percent; ASTM D 412, Die C.***

2.3 VAPOR-PERMEABLE MEMBRANE AIR-BARRIER

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Elastomeric, Modified Bituminous Membrane:
 - 1) Meadows, W. R., Inc.; Air-Shield LMP.
 - b. Synthetic Polymer Membrane:
 - 1) Carlisle Coatings & Waterproofing Inc.; Barritech VP.
 - 2) Grace, W. R., & Co. - Conn.; Perm-A-Barrier VP.
 - 3) Henry Company; Air-Bloc 31.
 - 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
 - b. Vapor Permeance: Minimum 10 perms; ASTM E 96/E 96M.
 - c. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.

2.4 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid waterborne primer recommended for substrate by manufacturer of air barrier material.
- C. Counterflashing Strip: Modified bituminous 40-mil- thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil- thick, cross laminated polyethylene film with release liner backing.
- D. Termination Mastic: Cold fluid-applied elastomeric liquid; trowel grade.
- E. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- F. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- G. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.
- H. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft. density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

- I. Modified Bituminous Transition Strip: Vapor-retarding, 40-mil- thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
- J. Elastomeric Flashing Sheet: ASTM D 2000, 2BC415 to 3BC620, minimum 50- to 65-mil- thick, cured sheet neoprene with manufacturer's recommended contact adhesives and lap sealant with aluminum termination bars and stainless-steel fasteners.
- K. Joint Sealant: Sealant as recommended by the manufacturer of the air barrier system. Comply with Division 7 Section "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that concrete has cured and aged for minimum time period recommended by air barrier manufacturer.
 - 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
 - 5. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
 - 1. Install modified bituminous strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.

- G. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping modified bituminous strips.
- H. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- I. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 JOINT TREATMENT FOR FLUID APPLIED AIR BARRIERS

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
- B. Prime substrate and apply a single thickness of preparation coat strip extending a minimum of 3 inches along each side of joints and cracks. Apply a double thickness of air barrier membrane and embed a joint reinforcing strip in preparation coat.

3.4 TRANSITION STRIP INSTALLATION

- A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install modified bituminous strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over both substrates.
- B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
 - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials as indicated.
- D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- E. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply modified bituminous transition strip or elastomeric flashing sheet so that a minimum of 3 inches of coverage is achieved over both substrates. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact.
1. Modified Bituminous Transition Strip: Roll firmly to enhance adhesion.
 2. Elastomeric Flashing Sheet: Apply adhesive to wall, frame, and flashing sheet. Install flashing sheet and termination bars, fastened at 6 inches o.c. Apply lap sealant over exposed edges and on cavity side of flashing sheet.
- G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- I. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, modified bituminous or counterflashing strip.
- J. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- K. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.5 FLUID-APPLIED MEMBRANE AIR BARRIER INSTALLATION

- A. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
- C. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
- D. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
- E. Vapor-Retarding Membrane Air Barrier: 40-mil dry film thickness.
- F. Vapor-Permeable Membrane Air Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, but not less than 40-mil dry film thickness, applied in one or more equal coats.

- G. Apply strip and transition strip a minimum of 1 inch onto cured air membrane or strip and transition strip over cured air membrane overlapping 3 inches onto each surface according to air barrier manufacturer's written instructions.
- H. Do not cover air barrier until it has been inspected by Owner's testing agency.
- I. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.6 FIELD QUALITY CONTROL

- A. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Continuous structural support of air barrier system has been provided.
 - 3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings.
 - 4. Site conditions for application temperature and dryness of substrates have been maintained.
 - 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 6. Surfaces have been primed.
 - 7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
 - 8. Termination mastic has been applied on cut edges.
 - 9. Air barrier has been firmly adhered to substrate.
 - 10. Compatible materials have been used.
 - 11. Transitions at changes in direction and structural support at gaps have been provided.
 - 12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
 - 13. All penetrations have been sealed.
- B. Field Testing: The Owner will engage an independent testing and inspection agency to perform field water penetration testing on the air barrier system in accordance with AAMA 501.2. A minimum of three locations for testing shall be selected by the Architect.
- C. Remove and replace deficient air barrier components and retest as specified above at no cost to the Owner

3.7 CLEANING AND PROTECTION

- A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed to these conditions for more than 30 days.

2. Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.
- B. Clean spills, stains, and soiling from adjacent construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07415

COMPOSITE METAL PANEL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Engineering, fabrication and installation of metal panel system as indicated and as specified.

1.2 SUBMITTALS

- A. Product Data: Submit complete printed data on panel system indicating features and products to be provided demonstrating specification compliance.
 - 1. Submit full line color charts for selections by Architect.
- B. Shop Drawings: Submit complete layout and installation drawings indicating method of attachment signed and sealed by a State of Illinois Licensed Structural Engineer.
- C. Samples: Submit mock-up at least 10" square consisting of two panel sections having corner bends and attachment devices.
- D. ***Delegated-Design Submittal: For metal-faced composite wall panel assembly indicated to comply with performance requirements and design criteria, including analysis data and calculations signed and sealed by a State of Illinois Licensed Structural Engineer responsible for their preparation.***

1.3 QUALITY ASSURANCE

- A. Fabricator: Experienced in the engineering of the panel system and attachment system.
- B. Installer: Experienced in the installation of the panel system and acceptance to the manufacturer.
- C. Regulatory Requirements: Verify and conform to requirements of authorities having jurisdiction.
 - 1. Flame spread rating of maximum 15 and smokes developed maximum 105 when tested in accordance with ASTM E 84.
- D. Preinstallation Conference: Conduct preconstruction conference at the project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review methods and procedures related to metal wall panel installation, including manufacturer's written instructions.
 - 3. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 4. Review flashings, special details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.

5. Review temporary protection requirements for metal wall panel assembly during and after installation.
6. Review wall panel observation and repair procedures after metal wall panel installation.

1.4 PERFORMANCE REQUIREMENTS

- A. ***Delegated Design: Design metal-faced composite wall panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.***
- B. Deflection and Thermal Movement: Provide systems that conform to the following criteria under wind loading of 30 psf inward and 30 psf outward except 40 psf at corners:
 1. Normal Deflection: Deflection of perimeter framing member not to exceed $L/175$ normal to plane of the wall; deflection of individual panels not to exceed ~~$L/60$~~ $L/180$.
 2. Anchor Deflection: At connection points of framing members to anchors, anchor deflection in any direction not to exceed 1/16 inch.
 3. Thermal Movements: Allow for free horizontal and vertical thermal movement, due to expansion and contraction of components over a temperature range from 1°F to 180°F.
 - a. Buckling, opening of joints, undue stress on fasteners, failure of sealants, or any other detrimental effects of thermal movement will not be permitted.
 - b. Fabrication, assembly, and erection procedures shall take into account the ambient temperature range at the time of the respective operation.
- C. Water and Air Leakage: Provide systems that have been tested and certified to conform to the following criteria:
 1. Air Leakage: Not more than 0.06 cfm per square foot of wall area, when tested at 1.57 psf in accordance with ASTM E 283.
 2. Water Penetration: No water infiltration under static pressure when tested in accordance with ASTM E331 at a differential of 10% of inward acting design load, 6.24 psf minimum, after 15 minutes.
 - a. Water penetration is defined as the appearance of uncontrolled water in the wall.
 - b. Wall design shall feature provisions to drain to the exterior face of the wall a leakage of water at joints and any condensation that may occur within the construction.
- D. Structural: Provide systems that have been tested in accordance with ASTM E 330 at a design pressure of 40 psf and have been certified to be without permanent deformation or failures of structural members.

1.5 DELIVERY, STORAGE, HANDLING

- A. Deliver in manufacturer's original unopened, undamaged containers or wrapping.
- B. Handle and install in exact accordance with manufacturer's recommendations.
- C. Remove and replace damaged panels.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design: Composite metal panel system is based on Alucobond panels by Alcan Composites. Subject to compliance with drawing and specification requirements and availability, provide product and system of one of the following:
 - 1. Mitsubishi
 - 2. Reynolds Metals
 - 3. Citadel

2.2 MATERIALS/FABRICATION

- A. Panels: Minimum 4 MM (0.157 inch) thick composed of a structural core of fire retardant thermoset polymer composite having an exterior skin of minimum 0.020" aluminum and an interior skin minimum of .010 aluminum.
- B. Accessories: Fabricated of non-corrosive metal to provide secure attachment to supporting construction as shown and as required to resist design loads.
- C. Sealant: One component polyurethane sealant as recommended by panel system manufacturer.

2.3 FABRICATION

- A. Fabricate panels to exact profiles and dimensions with sharp breaks and angles, which surfaces free of warp and buckle.
- B. Provide fully concealed attachment system without exposed trim.

2.4 FINISH

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. High Performance Organic Coating: Polyvinylidene fluoride, 70% strength, thermocured system, composed of specially formulated primer and topcoats, complying with AAMA 2605.
 - 1. Color: Provide 2-coat mica color to match Architect sample.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Erect panel system plumb, level and true to profile and location with uniform joints square and true to at corners.
- B. Provide fully concealed attachment system to meet performance requirements.

- C. Install attachment system required to support wall panels and to provide a complete weather tight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
 - 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals
- D. Rainscreen-Principle Installation: Provide manufacturer's standard pressure-equalized, rainscreen-principle system with vertical channel that provides support and complete secondary drainage system, draining at base of wall. Notch vertical channel to receive support pints. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by manufacturer. Attach wall panels by engaging horizontal support pins into notches in vertical channels and into flanges of wall panels. Leave horizontal and vertical joints with open reveal.
 - 1. Install wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
 - 2. Do not apply sealants to joints, unless otherwise indicated on Drawings.

3.2 CLEANING

- A. Clean installed system to provide uniform appearance.

END OF SECTION

SECTION 11489

TRACK AND FIELD EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Track and field equipment and accessories as shown on the Drawings and specified, including the following:
 - 1. Long jump/triple jump pit.
 - 2. Vault box form.

1.2 SUBMITTALS

- A. Product Data: Submit complete printed data for each type of product indicating features proposed to be provided demonstrating compliance with specification. Include construction details, material descriptions, dimensions of individual components and profiles, features, and finishes. Include details of anchors, hardware, and fastenings. If applicable, include assembly, disassembly, and storage instructions.
- B. Shop Drawings: Submit complete layout drawings. Show location and extent of fully assembled equipment. Show location and extent of disassembled equipment and components and transport and storage accessories. Include elevations, sections, and details not shown in Product Data. Show method of field assembly, connections, installation details, mountings, attachments to other Work, operational clearances and relationship to adjoining work.
 - 1. Blocking and Reinforcement: Show locations of blocking and reinforcement required for installation.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer employing workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of equipment through one source from a single manufacturer.
- C. Track and field equipment to meet all National Federation of State High School Associations (NFSHSA) rules.
- D. Preinstallation Conference: Conduct conference at Project site.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Verify position and elevation of field inserts, if required. Verify dimensions by field measurements.

1.5 COORDINATION

- A. Coordinate installation of field inserts, if required, with site grading, synthetic running track surfacing, and synthetic grass system installation and with adjacent court layout and game lines and markers.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - 1. Extruded Bars, Profiles, and Tubes: ASTM B 221.
 - 2. Cast Aluminum: ASTM B 179.
 - 3. Flat Sheet: ASTM B 209.
- B. Steel: Comply with the following:
 - 1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M, hot-dip galvanized.
 - 2. Steel Sheet: ASTM A 1011/A 1011M, hot-dip galvanized not less than G60 coating designation.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666; Type 304; finished on exposed faces with No. 2B finish.
- D. Anchors, Fasteners, Fittings and Hardware: Manufacturer's standard corrosion-resistant or non-corrodible units, concealed tamperproof, vandal and theft resistant. Provide as required for assembly, mounting and secure attachment.

2.2 LONG JUMP/TRIPLE JUMP PIT

- A. Long Jump/Triple Jump Pit: Provide manufacturer's standard long jump/triple jump pit form with sand catchers and cover to comply with the following:
 - 1. Form: Provide pour-in-place aluminum form for concrete with cover ledge.
 - 2. Pit Size: As indicated on Drawings, or if not indicated, as directed by Architect.
 - 3. Grating: Steel grating with spacing every 1". Include UV-resistant rubber safety mats.
 - 4. Cover: Mill-finished extruded aluminum tongue-and groove interlocking connector with a double-let supported aluminum framed and reinforced with aluminum angles.
 - 5. Hardware: Stainless steel hardware as required for a complete installation.

2.3 VAULT BOX FORM

- A. Vault Box Form: Provide manufacturer's standard vault box form to comply with the following:
 - 1. Form: Provide aluminum c-channel form with powder-coated finish.
 - 2. Vault Box: Constructed of stainless steel with powder-coated finish with winged support for concrete setting.
 - 3. Hardware: Zinc plated hardware as required for a complete installation.

2.4 FINISHES

- A. Metal Finishes, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Powder-Coated Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply thermosetting TGIC polyester, polyester urethane, or acrylic urethane powder-coating with cured film thickness not less than 0.5 mils complying with powder-coating manufacturer's written instructions for cleaning, conversion coating and powder coating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions with Installer present, for compliance with requirements for installation tolerances, operational clearances and other conditions affecting performance.
 - 1. Verify track and field equipment locations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written installation instructions and competition rules indicated for track and field equipment. Complete equipment assembly in field, where required.

3.3 CLEANING AND PROTECTION

- A. After completing installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions acceptable to manufacturer and Installer that ensure track and field equipment is without damage or deterioration at time of Substantial Completion.
- C. Replace track and field equipment, and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION