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Revision date: May 2025

SPEC NOTE: This master specification is written to include SPEC NOTES to assist designers in their decision-making process. SPEC NOTES precede the text to which they apply. This section should serve as a guideline only and should be edited by a knowledgeable person to meet the requirements of each specific Project.

Text indicated in bold and by square brackets is optional. Make appropriate decisions and delete the optional text as well as the brackets in the final copy of the specification. Delete or hide the SPEC NOTES in the final version of the document.

This section is produced jointly by Etex SA/NV Group dba EQUITONE, Dörken Systems Inc., ROCKWOOL, and SFS GROUP CANADA INC. to specify a high-performance rainscreen cementitious panel assembly consisting of through-color cementitious panels, stone wool insulation, a vapor-permeable water-resistive barrier or air barrier membrane and a thermally broken rainscreen support system. The following specifies a non-proprietary system where each manufacturer is responsible for their own scope within the rainscreen assembly.

It is important to note that manufacturers specified in this Section do not practice architecture or engineering. Therefore, the design responsibility remains with the Consultant, engineer, or Consultant. We hope the information given here will be of assistance. It is based upon data considered to be true and accurate and is offered solely for the user's consideration, investigation, and verification. Nothing contained herein is representative of a warranty or guarantee for which Etex SA/NV Group dba EQUITONE, Dörken Systems Inc., ROCKWOOL, or SFS GROUP CANADA INC. can be held legally responsible. Etex SA/NV Group dba EQUITONE, Dörken Systems Inc., ROCKWOOL, and SFS GROUP CANADA INC. do not assume any responsibility for any misinterpretation or assumptions the reader may formulate.

This specification was developed with the assumption that it will be used with a CCDC standard Contract, as amended by any supplementary instructions. As a result, some words have been capitalized in keeping with CCDC standard definitions. Please change the defined terms and capitalization if this Specification will be used with another type of Contract.

PART 1 GENERAL

1.1 SECTION INCLUDES

1.1.1 Labour, materials, Products, equipment and services to complete a single-source, high-performance cementitious panel assembly specified herein. This includes, but is not necessarily limited, to:

1.1.1.1 High-density, through-color cementitious panels.

1.1.1.2 Stone wool insulation.

1.1.1.3 Vapour-permeable **[air barriers] [and] [water-resistive barriers]**.

1.1.1.4 Thermally broken rainscreen cladding support system.

1.1.1.5 Auxiliary materials required for a complete installation.

SPEC NOTE: Edit the list below to reflect the items affected by this Project. Only include in this Paragraph those sections and documents that directly affect the work of this section. If a reader could reasonably expect to find a product or component specified in this section, but it is specified elsewhere, then list the related section number(s) in the Paragraph below. Do not include Division 00 Documents or Division 01 Sections since it is assumed that technical sections are all related to Division 00 Documents and Division 01 Sections to some degree.

1.1.2 Related Requirements: Specifications throughout all Divisions of the Project shall be read as a whole and may be directly applicable to this Section.

1.1.2.1 Related requirements provided below are for convenience purposes only.

1.1.2.2 Section 04 20 00, Unit Masonry: for masonry support for cementitious wall panel assemblies.

1.1.2.3 Section 05 41 00, Structural Metal Stud Framing: for steel stud support framing for cementitious wall panel assemblies.

1.1.2.4 Section 07 62 00, Sheet Metal Flashing and Trim: for miscellaneous copings, flashings and other sheet metal work not part of work of this Section.

1.1.2.5 Section 07 65 00, Flexible Flashing: for miscellaneous flashing membranes and other through wall flashing work not part of work of this Section.

1.1.2.6 Section 07 92 00, Joint Sealants: for field-applied sealants not otherwise specified in this Section.

1.2 REFERENCES

1.2.1 Reference Standards: Unless otherwise indicated in this Section or the Building Code, the latest published editions of reference standards as of the Project's Bid Closing deadline apply.

SPEC NOTE: Pare down the paragraphs below to only include references which appear in the final version of the Specification.

1.2.1.1 Fenestration and Glazing Industry Alliance (FGIA), previously AAMA:

.1 AAMA 501.2: Quality Assurance and Water Field Check of Installed Storefronts, Curtain Walls and Sloped Glazing Systems

.2 AAMA 711: Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products

1.2.1.2 American Association of Textile Chemists and Colorists (AATC)

.1 AATCC 42: Test Method for Water Resistance: Impact Penetration

.2 AATCC 127: Test Method for Water Resistance: Hydrostatic Pressure

1.2.1.3 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

.1 ANSI/ASHRAE 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings

1.2.1.4 ASTM International

.1 ASTM C165: Standard Test Method for Measuring Compressive Properties of Thermal Insulations

.2 ASTM C167: Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations

.3 ASTM C177: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

.4 ASTM C303: Standard Test Method for Dimensions and Density of Preformed Block and Board--Type Thermal Insulation

.5 ASTM C356: Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat

.6 ASTM C423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

.7 ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Metre Apparatus

.8 ASTM C612: Standard Specification for Mineral Fibre Block and Board Thermal Insulation

.9 ASTM C665: Standard Specification for Mineral-Fibre Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

.10 ASTM C795: Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel

.11 ASTM C1104: Standard Test Method for Determining the Water Vapour Sorption of Unfaced Mineral Fibre Insulation

.12 ASTM C1185: Standard Test Methods for Sampling and Testing Non-Asbestos Fibre-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards

.13 ASTM C1186: Standard Specification for Flat Fibre-Cement Sheets

.14 ASTM C1338: Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings

.15 ASTM C1363: Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus

.16 ASTM D882: Standard Test Method for Tensile Properties of Thin Plastic Sheeting

.17 ASTM D1204: Standard Test Method for Bulk Specific Gravity and Density of Compacted Asphalt Mixtures Using Coated Samples

.18 ASTM D 2244: Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

.19 ASTM D3330: Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape

.20 ASTM D4541: Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

.21 ASTM D5034: Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)

.22 ASTM E84: Standard Test Method For Surface Burning Characteristics Of Building Materials

.23 ASTM E96: Standard Test Methods for Gravimetric Determination of Water Vapour Transmission Rate of Materials

.24 ASTM E186: Standard Reference Radiographs for Heavy-Walled (2 to 412 in. (50.8 to 114 mm)) Steel Castings

.25 ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

.26 ASTM E783: Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors

.27 ASTM E2178: Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials

.28 ASTM E2357: Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies

.29 ASTM G 115: Standard Practice for operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

1.2.1.5 Cradle to Cradle Product Innovation Institute (C2CPII)

.1 Certificate Program Version 3.1

1.2.1.6 CSA Group

.1 CSA Z5010: Thermal Bridging Calculation Methodology

1.2.1.7 International Organization for Standardization (ISO)

.1 ISO 9001: Quality Management Systems – Requirements

.2 ISO 10211: Thermal Bridges in Building Construction Heat Flows and Surface Temperatures Detailed Calculations

.3 ISO 14025: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

1.2.1.8 National Fire Protection Association

.1 NFPA 285: Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components

1.2.1.9 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC S102: Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

.2 CAN/ULC S114: Standard Method of test for determination of Non-Combustibility in Building Materials

.3 CAN/ULC-S702.1: Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification

.4 CAN/ULC S741: Standard for Air Barrier Materials - Specification

.5 CAN/ULC S742: Standard for Air Barrier Assemblies - Specification

1.3 DEFINITIONS

1.3.1 Drained / back-ventilated rainscreen cladding (D/BV): Rainscreen system that deflects and drains off the majority of rain water using the outermost surface of the wall. Joints are intended to withstand the kinetic action of wind-driven rain wind. However, no attempt is made to minimize leakage using pressure equalization or other methods.

1.3.2 Rainscreen: a rainscreen is defined as an assembly applied to an exterior wall which consists of, at minimum, an outer layer, an inner layer, and a cavity between them sufficient for the passive removal of liquid water and water vapour.

1.4 PREINSTALLATION MEETINGS

1.4.1 General Requirements and Procedures for Project Meetings: in accordance with **[Section 01 31 19, Project Meetings]**.

1.4.2 Pre-installation Meetings: Schedule and hold a pre-installation meeting at the Project site at least one week before beginning work on this Section to coordinate activities with related Subcontractors.

1.4.2.1 Ensure attendance of Subcontractor performing work of this Section, as well as representatives from manufacturers and fabricators involved in or affected by installation. Notify Consultant and Owner of scheduled meeting dates in advance.

1.4.2.2 Agenda:

.1 Review progress of related construction activities and preparations for particular activity under consideration.

.2 Make note of required sequencing and coordination with materials and activities that have preceded or will follow.

.3 Review procedures necessary for high performance cementitious panel installation, including manufacturer's written instructions.

.4 Verify condition of sub-framing and supports, including alignment and connection to structural elements, and confirm that such framing meets manufacturer's acceptance criteria.

.5 Conduct a review of flashing, penetrations, openings and other special details that may impact high performance cementitious panel installation.

.6 Review regulations and requirements pertaining to insurance, certificates, as well as requirements for testing and inspections.

.7 Confirm requirements for temporary protection of high performance cementitious panel assemblies during and after installation.

.8 Review and establish procedures for repairing panels that have been damaged during or after installation.

.9 Maintain records of proceedings, including remedial measures and action items. Provide copies of meeting records to each participant.

1.4.2.3 Record significant discussions, agreements, and disagreements, including required corrective measures and actions.

1.4.2.4 Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information not more than 72 hours after meeting.

1.5 COORDINATION

1.5.1 Coordinate high-performance cementitious panel assemblies' installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, weather-tight, secure, and noncorrosive installation.

1.5.2 Material Compatibility: Before installation, review and confirm compatibility of material types, including insulation, adhesives, and substrates.

1.5.3 Scheduling:

1.5.3.1 Include provisions for preinstallation meetings, mock-ups, reviews, testing, and inspections in construction schedule.

1.5.3.2 Ensure activities are properly timed and coordinated with related sections.

1.5.3.3 Schedule all reviews and inspections to align with relevant milestones to avoid delays.

1.5.3.4 Allow sufficient time for mock-ups to be reviewed and accepted before proceeding with related work.

1.5.3.5 Ensure that testing activities do not interrupt critical path and are planned in conjunction with material delivery or installation phases.

1.6 SUBMITTALS

1.6.1 General Requirements and Procedures for Submittals: in accordance with Section **[01 33 00, Submittal Procedures]**.

1.6.2 Product Data: Submit manufacturer's product characteristics, catalogue cuts, installation instructions and other relevant information for each material and product used for high-performance cementitious panel assemblies work specified in this Section.

1.6.3 Embodied Carbon / Environmental Product Declarations (EPDs):

1.6.3.1 For stone wool and cementitious panels, submit Type III EPDs conforming to ISO 14025 or other recognized environmental Product declaration framework meeting following criteria:

.1 EPD Scope: must cover Cradle-to-Gate (A1 to A3) as a minimum.

.2 EPD Impact Categories: must report Global Warming Potential (GWP) in form of unit of $kgCO_2e$/declared unit as a minimum.

.3 Product Options: Give preference to Products with compliant documentation when choice is at Contractor's option.

1.6.3.2 Submit EPDs for the following items:

.1 **[High-density, through-color cementitious panels].**

.2 **[Stone wool insulation].**

1.6.4 Material Ingredient Disclosure:

1.6.4.1 For principal items specified in this Section, submit documentation disclosing chemical inventory of materials to at least 0.01% (100ppm) meeting following criteria:

.1 Standard: Health Product Declaration (HPD) Open Standard, Cradle to Cradle v3 (Bronze level), International Living Future Institute (ILFI) Declare, or other approved material ingredient declaration framework.

.2 Product Options: Give preference to Products with compliant documentation when choice is at Contractor's option.

1.6.4.2 Submit material ingredient disclosure documentation disclosing chemical inventory of materials to at least 0.01% (100ppm) for the following items:

.1 High-density, through-color cementitious panels.

.2 Stone wool insulation.

1.6.5 Shop Drawings: Submit Shop Drawings indicating material layouts, details of construction, connections, and relationship with adjacent construction. As a minimum indicate following:

1.6.5.1 Include plans, elevations, sections and details as applicable.

1.6.5.2 Include installation details, including edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trims, flashings, closures, and accessories.

1.6.5.3 For water-resistive barrier assembly, include details showing penetrations, terminations, flashings, and transitions to adjoining construction.

1.6.5.4 Indicate field-measured dimensions on Shop Drawings.

1.6.6 Delegated Design Submittals:

1.6.6.1 Engineering design completion of high-performance cementitious panel assemblies work is delegated to Contractor based on structural design criteria indicated in Contract Documents.

SPEC NOTE: Modify the following paragraph below if stamped drawings sets are required for the projects delegated design.

1.6.6.1 Submit Shop Drawings for work of this Section [that bear the stamp of a Professional Engineer registered in the Province of **[Ontario] [Insert Province]**.

1.6.6.2 Submit copy of structural calculations that bear the stamp of a Professional Engineer registered in the Province of **[Ontario] [Insert Province]**.

1.6.7 Test and Evaluation Reports: Submit copies of fire testing (NFPA 285 and CAN/ULC S102) and engineering judgment or evaluation reports prepared by independent testing agencies acceptable to authorities having jurisdiction attesting to the conformity of high performance cementitious panels with fire performance requirements stipulated in this Section.

1.6.8 Contractor's Quality Control Plan: submit quality control plan describing approach to maintaining material and installation quality including the following:

1.6.8.1 Lists of third-party standards, guidelines or reference documents forming part of proposed construction best-practices used to achieve specified performance requirements;

1.6.8.2 Substrate preparation and installation instructions of each material specified in this Section;

1.6.8.3 Treatment of transitions between building enclosure components and their penetrations (including doors, frames, glazing, flashings, louvers and other penetrations);

1.6.8.4 Confirmation of compatibility between building enclosure components;

1.6.8.5 Proposed list of observations and tests forming a part of Contractor's quality assurance and quality control activities;

1.6.8.6 Methods for addressing corrective action plans and addressing deficient or incompatible installation procedures;

1.6.8.7 Format and frequency of reports, records of pre-construction meetings and site modifications; and

1.6.8.8 Proposed construction schedule indicating stages of building enclosure construction and potential dates for Consultant's, and third-party inspection and testing company's review activities.

1.6.9 Samples:

1.6.9.1 Initial Selection Samples: Submit initial selection samples for Products requiring color, texture, or design selection. Submit manufacturer’s list of finishes or color swatches for Consultant's selection.

1.6.9.2 Verification Samples: Submit verification samples confirming color and finish selections for each exposed element in minimum **[A4 11 11/16” x 8 17/64” (297 mm x 210 mm)]** size. As a minimum submit the following:

.1 **[High-density, through-color cementitious panels].**

.2 **[Stone wool insulation].**

.3 **[Vapour-permeable [air barriers] [and] [water-resistive barriers]**, including flashing and transition membranes.

.4 **[Thermally-broken rainscreen cladding support system].**

1.6.10 Thermal Bridging and Condensation Risk Analysis Report.: Submit analysis report produced by third-party engineering firm demonstrating that enclosure assemblies, including framing components, as proposed, meet thermal performance requirements established by **[[Ontario Building Code] [National Building Code of Canada] [Specify Building Code] [Supplementary Standard SB10] [Model National Energy Code of Canada] [ASHRAE 90.1]** and validated through computer modeling and thermal bridging analysis performed in accordance with in accordance with industry-accepted methods. .

1.6.10.1 As a minimum, report must include the following:

.1 Each wall’s nominal R-value, clear wall U-value and effective R-value.

.2 Rainscreen cladding support spacing (vertical and horizontal).

.3 Maximum allowable wind loads.

.4 Cladding dead loads.

.5 Fastener type.

1.6.10.2 Simulations must be carried out by a qualified simulator, and summary reports must bear the seal of a Professional Engineer licensed to practice in the jurisdiction of the project.

1.7 CLOSEOUT SUBMITTALS

1.7.1 General Requirements and Procedures for Closeout Submittals: in accordance with Section **[01 78 00, Closeout Submittals]**.

1.7.2 Warranty Documentation: Submit copy of extended warranties specified in this Section.

1.8 QUALITY ASSURANCE

1.8.1 Manufacturer Qualifications:

1.8.1.1 Provide Products for work of this Section by manufacturers having minimum experience in manufacturing such materials as follows:

.1 Cementitious panel manufacturer: minimum 20 years.

.2 Stone wool insulation manufacturer: minimum 20 years.

.3 Vapour-permeable **[air barriers] [and] [water-resistive barriers]** manufacturer: minimum 10 years.

.4 Thermally-broken rainscreen support system manufacturer: minimum 10 years.

1.8.1.2 Certifications: Following manufacturers must be ISO 9001 certified:

.1 Cementitious panel manufacturer.

.2 Vapour-permeable **[air barriers] [and] [water-resistive barriers]** manufacturer.

.3 Thermally-broken rainscreen support system

.4 Submit proof of certification upon request by Consultant.

1.8.2 Installer Qualifications: Engage an entity with at least five years' experience installing, erecting, or assembling work similar in material, design, and extent to that shown on Drawings and Schedules, and whose work has resulted in construction with a track record of successful in-service performance.

SPEC NOTE: Include the requirement below on projects where a higher level of workmanship is desired.

1.8.2.1 **[Certification: Installer must be trained by manufacturer(s) or authorized partner/distributer]**

1.8.3 Professional Engineer’s Qualifications: Employ Professional Engineer licensed to practice in Province of **[Ontario] [Insert Province]** who carries professional liability insurance and has sufficient experience providing engineering services of similar kind, scope, and complexity.

1.8.3.1 Professional Engineer’s Responsibility:

.1 production and review of Shop Drawings,

.2 structural and hygrothermal design and certification of high-performance cementitious panel assemblies, including attachments for building construction, in accordance with applicable codes and regulations.

SPEC NOTE: Some jurisdictions require shop drawings to also be submitted with a professional stamp. In cases where this is not a requirement delete the following option.

.3 stamping and signing of each **[Shop Drawing]** and associated calculations.

SPEC NOTE: Retain paragraph below if overall U-value is being specified in this section.

1.8.4 **[Thermal Design Engineer Qualifications: Qualified engineer, design professional, or individual with sufficient experience providing engineering services of similar kind, scope, and complexity].**

SPEC NOTE: Whenever project-specific wall assemblies do not exactly match an assembly tested per NFPA 285, a third-party engineering judgement may be required. Annex B of NFPA 285 provided guidance for qualified engineers, design professionals, and individuals performing engineering evaluations but does not specifically indicate credentials to do so. Final determination on the acceptance of an engineering judgement is to be made by the authority having jurisdiction.

1.8.5 **[Fire Judgement Engineer Qualifications: Qualified engineer, design professional, or individual with experience in preparing engineering judgements] [who is acceptable to the authorities having jurisdiction].**

SPEC NOTE: Specify the following when the primary requirement of the mock-up is to establish a benchmark for the aesthetics of the project. Use VMUs when the intent is to demonstrate the visual aspects of the assembly, such as materials, finishes, and colors. VMUs are usually not subjected to performance tests but may demonstrate installation techniques. Keep the paragraph below when appearance is the primary focus of the mock-up and performance testing is not required. These mockups are generally less costly due to the lack of testing requirements. They are used for architectural review and remain in place to guide construction

1.8.6 Visual Mock-Ups (VMU): Construct mock-ups to verify selections made under submittals, demonstrate aesthetic effects of high-performance cementitious panel assemblies, and to set quality standards for fabrication and installation.

1.8.6.1 Location: In-situ (i.e. first installation), as directed on site by Consultant.

1.8.6.2 Extent: Build mockup of typical high-performance cementitious panel assemblies including sheathing, insulation, vapour-permeable **[air barriers] [water-resistive barriers,]** at penetrations, flashings, and transitions; flashings, thermally-broken supports, attachments, high-performance cementitious panels, and accessories.

1.8.6.3 Stage each component within the mock-up so that each construction layer can be reviewed and tested before applying succeeding layers.

1.8.6.4 Include junctures, transitions and interfaces to establish baseline quality for installation and workmanship and to evaluate enclosure-related constructability and performance, with a specific emphasis on required coordination of Subcontractors and sequencing necessary to ensure that performance of high-performance cementitious panel assemblies including materials, components, systems, and interfaces meet or exceed requirements of Contract Documents.

1.8.6.5 Demonstrate typical wall conditions, transitions, and interfaces with adjacent systems such as windows, doors, and penetrations.

1.8.6.6 Incorporation of Feedback: Integrate lessons learned from observations and testing into the Contractor's quality control plan.

1.8.6.7 Modifications to Mock-Up: Adjust the mock-up as necessary to account for site conditions and compatibility between adjacent materials and

assemblies. Provide corrective actions as required to obtain acceptance.

1.8.6.8 Size: Mock-ups must be minimum of **[10 sq. m (100 sq. ft.)]** and extend one full structural bay wide by one full story high plus additional height as required to connect to assemblies below and above.

1.8.6.9 Purpose: To set benchmarks for installation and to judge subsequent work. Maintain mock-ups during construction in undisturbed condition.

1.8.6.10 Reviewed mock-ups: may become part of the completed work if undisturbed at the time of **[Substantial Performance of the Work] [Ready-for-Takeover]**. Repair mock-ups that will remain part of the final construction if they have been damaged or failed testing.

SPEC NOTE: Specify performance mockups (PMUs) when the project requires validation of system performance under environmental conditions. PMUs are important for evaluating the system's air-tightness, water resistance, and other in-service elements. Keep the following when the project's building enclosure performance requires real-world confirmation. PMUs can be significantly more expensive than VMUs as they often involve large-scale laboratory testing or on-site testing under controlled conditions. This cost includes not only construction but also testing, monitoring, and potential rebuilding if failures occur.

1.8.7 Performance Mock-Ups (PMU):

1.8.7.1 Construct mock-ups of high performance cementitious panel assembly **[in-situ] [in laboratory]** including junctures, transitions, and interfaces for the purposes of performing in-situ testing.

1.8.7.2 Include full assembly, including **[air barriers,] [water-resistive barriers]**, insulation, and support materials.

1.8.7.3 Minimum Mockup Testing Requirements:

1.8.7.4 Air Leakage Testing:

.1 Test **[air barriers] [and] [water-resistive barriers]**

.2 Test Method: Pressurized chamber testing in accordance with ASTM E783.

.3 Acceptance Criteria: Air leakage not to exceed **[0.2 L/s·m²]** at 75 Pa.

1.8.7.5 Water Penetration Testing:

.1 Test high-performance cementitious panel wall assemblies at transitions with openings and similar components such as louvres.

.2 Test Method: Water-spray test in accordance with AAMA 501.2 at locations determined by the Consultant.

.3 Acceptance Criteria: No leakage observed.

1.8.7.6 **[Air Barriers] [and] [Water-Resistive Barriers]** Adhesion Testing:

.1 Perform pull-off testing on self-adhesive water-resistive barrier in accordance with ASTM D4541.

.2 Acceptance Criteria: Pull-off strength must meet or exceed the manufacturer's published data.

1.8.7.7 Incorporation of Feedback: Integrate lessons learned from observations and testing into the Contractor's quality control plan.

1.8.7.8 Modifications to Mock-Up: Adjust the mock-up as necessary to account for site conditions and compatibility between adjacent materials and assemblies. Provide corrective actions as required to obtain acceptance.

1.8.7.9 Purpose: To set benchmarks for performance and to judge subsequent work. Maintain mock-ups during construction in undisturbed condition.

1.8.7.10 Tested mock-ups: may become part of the completed work if undisturbed at the time of **[Substantial Performance of the Work] [Ready-for-Takeover]**. Repair mock-ups that will remain part of the final construction if they have been damaged or failed testing.

1.9 DELIVERY, STORAGE AND HANDLING

1.9.1 Delivery and Acceptance Requirements

1.9.1.1 General Product Requirements: In accordance with Section **[01 61 00, Common Product Requirements]**.

1.9.1.2 Delivery: Deliver panels on stable, flat pallets, with packaging that protects surfaces and edges. Ensure panels arrive separated by protective covers and are covered with waterproof material during transport.

1.9.1.3 Packaging: Deliver materials to site in original factory packaging, labelled with the manufacturer’s name and address.

1.9.1.4 Damage Prevention: Prevent contact with other materials to avoid staining, denting, or other damage to cementitious panels.

1.9.1.5 Replace defective or damaged materials with new panels.

1.9.2 Storage and Handling Requirements

1.9.2.1 Transportation: Use forklifts or cranes for moving stacked panels; provide secure transport under a waterproof cover.

1.9.2.2 On-Site Storage: Store panels flat on pallets, stacked no more than five panels high. Protect panels from weather, direct sunlight, and moisture. Use breathable waterproof tarps with cross-ventilation when storing panels outdoors; remove plastic wrappings that may cause condensation on panels.

1.9.2.3 Handling During Installation: Lift panels to avoid scratching. Carry panels upright; protect decorative face at all times.

1.9.2.4 Staging: Panels removed from pallets must be stored flat or upright for short periods (maximum 1 hour). Protect edges and surfaces with spacers when stacking.

1.9.2.5 Protection: Store materials in a dry location, protecting them from damage and deterioration.

1.10 FIELD CONDITIONS

1.10.1 Weather Conditions: Begin installation only when current and anticipated weather conditions allow for proper assembly of high-performance cementitious panels in accordance with manufacturers' written instructions and warranty requirements.

1.10.2 Field Measurements: Verify actual dimensions of construction contiguous with high-performance cementitious panel assemblies by field measurements before fabrication. Verified measurements must be documented on Shop Drawings. Coordinate timing of field measurements and fabrication with the construction schedule to prevent delays.

1.11 WARRANTY

SPEC NOTE: Each manufacturer is responsible for issuance and fulfillment of their individual product warranties per the manufacturer's limits of liability. EQUITONE is willing to extend a 20-year warranty on the cementitious rainscreen panels for projects where the originally specified EQUITONE, SFS, ROCKWOOL, and Dörken, systems are carried through to project completion.

1.11.1 Submit for Owner's review and acceptance, manufacturers' standard limited warranties as follows:

1.11.1.1 High-density, through-color cementitious panels: 10 years in accordance with manufacturer's standard terms and conditions.

1.11.1.2 Stone wool: Limited Warranty, refer to the ROCKWOOL Terms and Conditions regarding Limited Warranty for more information.

1.11.1.3 Vapour-permeable **[air barriers] [and] [water-resistive barriers].**: 10 years in accordance with manufacturer's standard terms and conditions.

1.11.1.4 Thermally broken cladding support system: 20 years in accordance with manufacturer's standard terms and conditions

PART 2 PRODUCTS

2.1 MANUFACTURERS

2.1.1 Basis-of-Design: Materials specified in this Section are based on following manufacturers to form a complete high-performance building enclosure system:

2.1.1.1 Cladding: EQUITONE; 1731 Fred Lawson Drive, Maryville, TN 37801; Tel: +1 865-268-2705; URL: http://www.equitone.com

2.1.1.2 Vapour-Permeable **[Air Barrier] [and] [Water-Resistive Barrier]** Membranes: Dörken Systems Inc., 4655 Delta Way, Beamsville, Ontario, L3J 0T6, Canada, Phone: 1-905-563-3255, Toll Free: 1-888-4DELTA4 (1-888-433-5824), URL: http://www.dorken.com.

2.1.1.3 Insulation: ROCKWOOL; 8024 Esquesing Line, Milton, Ontario, Canada, L9T 6W3; Phone: 1-800-265-6878
URL: http://www.rockwool.com

2.1.1.4 Thermally-broken cladding support system: SFS Group Canada Inc. (Nvelope); 40 Innovation Drive, Dundas, ON L9H 7P3 Direct: +1 289 925 3552 Office: +1 866 847 5400; URL: http://ca.sfs.com

2.1.2 Substitution Limitations: No substitutions are permitted.

2.2 SYSTEM DESCRIPTION

2.2.1 Exterior enclosure assembly specified in this Section includes a complete system comprising the following elements:

2.2.1.1 High-density, through-color cementitious panels.

2.2.1.2 Stone wool insulation.

2.2.1.3 Vapour-permeable **[air barriers] [and] [water-resistive barriers].**

2.2.1.4 Thermally-broken rainscreen cladding system.

2.3 PERFORMANCE / DESIGN CRITERIA

SPEC NOTE: Update the text in square brackets below to reflect the appropriate thermal performance criteria for the project. Refer to manufacturer's thermal analysis reports to establish assemblies' R-values and U-values.

2.3.1 Thermal Performance: System must provide minimum thermal performance for opaque exterior wall assemblies demonstrated by three-dimensional thermal analysis or guarded hot-box test as follows:

2.3.1.1 Wall Type **[#]**:

.1 Assembly Type: **[Exterior insulated steel stud wall assembly] [Split insulated steel stud wall assembly] [Exterior insulated concrete block wall assembly] [As indicated on Drawings]**

.2 Effective R-value: **[R-?? ft^2-hr-deg F/Btu] [As indicated on Drawings]**

.3 Nominal R-value: **[R-?? ft^2-hr-deg F/Btu] [As indicated on Drawings]**

.4 Clear-Wall U-value: **[0.?? W/m^{2}K] [As indicated on Drawings]**

2.3.2 Engineering Design: Employ a qualified professional engineer, as specified in this Section, to design and certify high-performance cementitious panel assemblies, including attachment to building construction.

2.3.3 Wall System Design: High-performance cementitious panel assemblies must be designed to withstand project-specific design loads and their effects within constraints specified in this Section and **[[Ontario Building Code] [National Building Code of Canada] [Specify Building Code]**] without defects, damage, or failure, including but not limited to the following:

2.3.3.1 Dead Loads: Including those transferred from structural elements.

2.3.3.2 Environmental Loads: Such as wind, snow, rain, hydrostatic, seismic and earth pressures as applicable.

2.3.3.3 Live Loads: Including those arising from use and occupancy.

2.3.3.4 Loads from Temperature and Moisture Loads: Including expansion, contraction, deflection, deformation, creep, shrinkage, settlement, and differential movement.

2.3.3.5 Fire Loads: as determined by fire performance testing specified.

2.3.4 Moisture Control and Weathertightness:

2.3.4.1 Building Enclosure Design Principle: Exterior enclosure construction for this Project is based on in. Rainscreen in. design principle, as recommended by National Research Council of Canada. Face sealed assemblies are not permitted.

2.3.4.2 Continuity: Maintain integrity and continuity of building enclosure's thermal, air, and vapour control layers at all times by using appropriate insulation, **[air barriers] [water-resistive barriers]** to tie work of this Section with adjacent construction.

2.3.4.3 System must be a drained, back ventilated system. Incorporate means of draining moisture to exterior. Drainage system must provide clear, paths of drainage of trapped moisture within cementitious panel assemblies to exterior of wall assemblies.

SPEC NOTE: Cementitious panel ventilation requirements vary significantly based on façade height and panel joint treatment. Specifying a minimum air outlet size alone does not guarantee adequate system ventilation due to potential installation tolerances.

2.3.4.4 Air Space Inlets and Outlets: Provide Install air inlets and outlets at both the top and bottom of the building or at wall terminations. Size the openings based on the vertical distance between the inlets and outlets. Ensure air outlets do not exceed the size of the inlets, allowing for a reduction of up to 3 mm (1/8 in). Maintain unobstructed vertical airflow near windows, doors, eaves, and building bases.

SPEC NOTE: Edit the following to reflect the continuous height of your facade and whether the panel joints are designed as open or closed. Contact your local EQUITONE representative for additional guidance, especially regarding specifications for closed-joint systems.

.1 Minimum sizes for air inlets and outlets (based on building height):
- .1 0 to 16 ft (0 to 5 m): Minimum air inlets and outlets 3/8 inch (10 mm).
- .2 >16 ft to 33 ft (5 to 10 m): Minimum air inlets and outlets 1/2 inch (13 mm).
- .3 >33 ft to 66 ft (10 to 20 m): Minimum air inlets 3/4 inch (19 mm).
- .4 >66 ft to 99 ft (20 to 30 m): Minimum air inlets 1 inch (25 mm).
- .5 >99 ft to 134 ft (30 to 41m): Minimum air inlets 1 1/4 inches (32 mm).
- .6 >134 to 165 ft (41 to 50m): Minimum air inlets 1 1/2 inches (38 mm).

2.3.4.5 Minimum Air Space: Maintain vertical continuity of airflow behind the fiber cement panels from the air inlets to the outlets. Provide a

minimum vertical air gap based on the building height to ensure the performance of the rainscreen system.

SPEC NOTE: Edit the following to reflect the continuous height of your facade and whether the panel joints are designed as open or closed. Contact your local EQUITONE representative for additional guidance, especially regarding specifications for closed-joint systems.

.1 Minimum size for air space (based on building height):
- .1 0 to 44 ft (0 to 13m): Minimum 3/4 inch (19 mm) vertical air space.
- .2 >44 ft to 99 ft (13 to 30m): Minimum 1 inch (25 mm) vertical air space.
- .3 >99 ft to 134 ft (30 to 41m): Minimum 1 1/4 inches (32 mm) vertical air space.
- .4 >134 to 165 ft (41 to 50m): Minimum 1 1/2 inches (38 mm) vertical air space.

2.3.5 Structural Performance: Design high-performance cementitious panel assemblies in accordance with the requirements of **[Ontario Building Code] [National Building Code of Canada] [Specify Building Code]** and ASTM E330:

2.3.5.1 Wind Loads: As indicated on Drawings, determined in accordance with Building Code requirements for geographical location of the project (1 in 50-year return probability).

2.3.5.2 Cladding Deflection Limits: maximum **[L/300 of span under wind loads].**

2.3.6 Thermal Movements: fabricate and install high-performance cementitious panel assemblies to prevent buckling, opening up of joints and overstressing of fasteners under the following temperature conditions:

2.3.6.1 Temperature Change: ambient temperature cycling of - 20 deg C (-4 deg F) to 80 deg C (176 deg F) .

2.3.6.2 Account for thermal stresses, drilling impacts, or other causes before or during cementitious panel installation. Implement handling and storage methods for high-performance cementitious panel assemblies to reduce such stresses.

2.3.7 System Fire Propagation Characteristics: Wall assemblies containing high-performance cementitious panel assemblies must meet requirements of NFPA 285 and other requirements specified by **[Ontario Building Code] [National Building Code of Canada] [Specify Building Code]**.

SPEC NOTE: All EQUITONE air-cured panels are suitable for use on interior and exterior walls, soffits, angled or pitched facades, curved facades, open or closed joint systems (with necessary adjustments for ventilation).

Air-cured panels are naturally cured over approximately 28 days in a controlled environment. This curing process allows for a gradual chemical bonding, reducing internal stress in the panels and resulting in a stable material. Air-cured panels perform especially well in specialized conditions, such as “sky-facing” roof applications and designs incorporating perforations, such as screen walls. In addition, they can provide good resistance to graffiti and impacts.

Edit the text below to reflect the types used on your project. Delete if they are not used on your project.

2.4 AIR-CURED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV), GENERALLY

SPEC NOTE: The following characteristics are common to EQUITONE [natura], [natura] PRO, and [pictura] panels

2.4.1 Panel Physical Characteristics (EN 12467 & ASTM C518):

2.4.1.1 Strength Classification: Class IV.

2.4.1.2 Mean Density (dry): ≥1700 kg/m³ (106 lb/ft³).

2.4.1.3 Mean Bending Strength (dry): ≥16 MPa (2320 psi).

2.4.1.4 Mean Bending Strength (wet): ≥18 MPa (2610 psi).

2.4.1.5 Moisture Content: ≤ 6%.

2.4.1.6 Moisture Movement: ≤ 0.1%.

2.4.1.7 Water Tightness: Pass.

2.4.1.8 Freeze-Thaw Resistance: Pass.

2.4.1.9 Warm Water Resistance: Pass.

2.4.1.10 Thermal Conductivity: ≤ 0.43 W/m·K (0.25 BTU/h·ft·°F).

2.4.2 Panel Fire Performance

2.4.2.1 Flame Spread Index: 0 to CAN/ULC S102.

2.4.2.2 Smoke Development Index: 0 to CAN/ULC S102.

2.4.2.3 Material Combustibility: Non-combustible to CAN/ULC S114.

2.4.2.4 Fire Classification: A2,s1-d0 to EN 13501

SPEC NOTE: The following characteristics are common to EQUITONE [inspires] panels

2.4.3 Panel Physical Characteristics (EN 12467 & ASTM C518):

2.4.3.1 Strength Classification: Class IV.

2.4.3.2 Mean Density (dry): ≥1700 kg/m³ (106 lb/ft³).

2.4.3.3 Mean Bending Strength (dry): ≥16 MPa (2320 psi).

2.4.3.4 Mean Bending Strength (wet): ≥18 MPa (2610 psi).

2.4.3.5 Moisture Content: ≤ 10%.

2.4.3.6 Moisture Movement: ≤ 0.1%.

2.4.3.7 Water Tightness: Pass.

2.4.3.8 Freeze-Thaw Resistance: Pass.

2.4.3.9 Warm Water Resistance: Pass.

2.4.3.10 Thermal Conductivity: ≤ 0.43 W/m·K (0.25 BTU/h·ft·°F).

2.4.4 Panel Fire Performance

2.4.4.1 Flame Spread Index: 0 to CAN/ULC S102.

2.4.4.2 Smoke Development Index: 0 to CAN/ULC S102.

2.4.4.3 Fire Classification: A2,s1-d0 to EN 13501.

SPEC NOTE: The following specifies EQUITONE **[natura]**.

EQUITONE **[natura]** is a high-quality, through-colored fiber cement cladding panel designed for modern building facades. This innovative material offers a unique combination of esthetics and performance, making it a popular choice among architects and designers.

The **[natura]** panels feature a smooth, tactile surface with a semi-transparent double-layer acrylic coating that allows the natural texture of the fiber cement to be visible.

The finish results in a hard, dirt-resistant surface. The panel fibers do not remain visible. Some shade differences and manufacturing traces are inherent to the material.

Delete the following paragraph if you're not using this product on the project.

2.5 AIR-CURED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV) – SEMI-TRANSPARENT FINISH

2.5.1 **[Material Tag: This item is noted as "CEM-#" on Drawings and Schedules].**

2.5.1.1 Basis-of-Design Product: **[natura]** by EQUITONE

2.5.1.2 Nominal Thickness: **[8 mm (5/16 in)] [12 mm (1/2 in)]**.

2.5.1.3 Panel Sizes: **[2500 mm x 1250 mm (98-7/16 in. x 49-1/4 in.[3100 mm x 1250 mm (122-1/16 in. x 49-1/4 in.)] [As noted on Drawings]**

SPEC NOTE: For exposed fastening onto metal framing specify either the UNI-Rivet or UNI-Metal Screw. For exposed fastening onto wood framing specify UNI-Wood Screw. For concealed fastening specify either UNI-Anchor, TUF-S, or Tergo+.

2.5.1.4 Panel Fastening Method: **[exposed] [concealed]** using **[UNI-Metal Screw] [UNI-Wood Screw] [UNI-Anchor] [SFS TUF-S] [Fischer Tergo+] [fasteners indicated per drawings and schedules]** or approved alternatives per manufacturer.

2.5.1.5 Exposed Finish: Manufacturer's standard semi-transparent, double-layer acrylic finish that allows for panel fibers to remain visible.

2.5.1.6 Panel Color : **[N073 – Charcoal] [N074 – Obsidian] [N154 – Cream White] [N161 – Pale Mist] [N162 – Chalk Grey] [N163 – Soft Grey] [N164 – White] [N211 – Classic Grey] [N250 – Natural Grey] [N251 – Anthracite] [N252 – Ash Grey] [N281 – Nimbus] [N294 – Portland] [N331 – Agate Red] [N359 – Ruby] [N411 – Sea Mist] [N412 – Blue Grey] [N593 – Green Mist] [N594 – Jadeite Green] [N661 – Muted Yellow] [N662 – Summer Haze] [N861 – Tawny Hue] [N891 – Beach Stone] [N891 – Fossil Grey] [N961 – Ecru] [N972 – Sepia] [N991 – Autumn Dusk] [To be selected at a later date from manufacturer standard offering]**

2.5.1.7 Concealed Finish: back side to be sealed with transparent coating.

SPEC NOTE: The following specifies EQUITONE **[natura] PRO**.

EQUITONE **[natura] PRO** is an enhanced version of the standard EQUITONE **[natura]** fiber cement cladding panel. EQUITONE **[natura] PRO** features a UV-hardened PU topcoat that provides extra protection against staining and environmental factors. This coating also offers graffiti -resistant properties and will have a more matte finish when compared to **[natura]**.

The finish results in a hard, dirt-resistant surface with high abrasion resistance and durable graffiti protection. The panel fibers remain visible, and the finish allows for irregularities, shade differences, and natural characteristics of the material to be visible. Natural variations, shade differences, and manufacturing traces are inherent to the material.

Delete the following paragraph if you're not using this product on the project.

2.6 AIR-CURED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV) – PREMIUM SEMI-TRANSPARENT / GRAFITTI RESISTANT FINISH

2.6.1 **[Material Tag: This item is noted as "CEM-#" on Drawings and Schedules].**

2.6.1.1 Basis-of-Design Product: **[natura] PRO** by EQUITONE

2.6.1.2 Nominal Thickness: **[8 mm (5/16 in)] [12 mm (1/2 in)]**.

2.6.1.3 Panel Sizes: **[2500 mm x 1250 mm (98-7/16 in. x 49-1/4 in.[3100 mm x 1250 mm (122-1/16 in. x 49-1/4 in.)] [As noted on Drawings]**

SPEC NOTE: For exposed fastening onto metal framing specify either the UNI-Rivet or UNI-Metal Screw. For exposed fastening onto wood framing specify UNI-Wood Screw. For concealed fastening specify either UNI-Anchor, TUF-S, or Tergo+.

2.6.1.4 Panel Fastening Method: **[exposed] [concealed]** using **[UNI-Metal Screw] [UNI-Wood Screw] [UNI-Anchor] [SFS TUF-S] [Fischer Tergo+] [fasteners indicated per drawings and schedules]** or approved alternatives per manufacturer.

2.6.1.5 Exposed Finish: Manufacturer's standard semi-transparent, double-layer acrylic finish with a matte UV-hardened polyurethane (PU) topcoat that allows for panel fibers to remain visible.

2.6.1.6 Panel Color : **[NU073 – Charcoal] [NU074 – Obsidian] [NU154 – Cream White] [NU161 – Pale Mist] [NU162 – Chalk Grey] [NU163 – Soft Grey] [NU164 – White] [NU211 – Classic Grey] [NU250 – Natural Grey] [NU251 – Anthracite] [NU252 – Ash Grey] [NU281 – Nimbus] [NU294 – Portland] [NU331 – Agate Red] [NU359 – Ruby] [NU411 – Sea Mist] [NU412 – Blue Grey] [NU593 – Green Mist] [NU594 – Jadeite Green] [NU661 – Muted Yellow] [NU662 – Summer Haze] [NU861 – Tawny Hue] [NU891 – Beach Stone] [NU892 – Fossil Grey] [NU961 – Ecru] [NU972 – Sepia] [NU991 – Autumn Dusk] [To be selected at a later date from manufacturer's standard offering].**

2.6.1.7 Concealed Finish: back side to be sealed with transparent coating.

SPEC NOTE: The following specifies EQUITONE **[pictura]**.

EQUITONE **[pictura]** is a high-performance through-colored fiber cement board with a double-layer acrylic coating and UV-hardened PU topcoat. The panel's finish is smooth, matte, scratch-resistant and provides graffiti-resistance.

The finish results in a hard, dirt-resistant surface with high abrasion resistance and durable graffiti protection. The panel fibers do not remain visible; Some shade differences and manufacturing traces are inherent to the material.

Delete the following paragraph if you're not using this product on the project.

2.7 AIR-CURED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV) – OPAQUE / GRAFITTI RESISTANT FINISH

2.7.1 **[Material Tag: This item is noted as "CEM-#" on Drawings and Schedules].**

2.7.1.1 Basis-of-Design Product: **[pictura]** by EQUITONE

2.7.1.2 Nominal Thickness: **[8 mm (5/16 in)] [12 mm (1/2 in)]**.

2.7.1.3 Panel Sizes: **[2500 mm x 1250 mm (98-7/16 in. x 49-1/4 in.[3100 mm x 1250 mm (122-1/16 in. x 49-1/4 in.)] [As noted on Drawings]**

SPEC NOTE: For exposed fastening onto metal framing specify either the UNI-Rivet or UNI-Metal Screw. For exposed fastening onto wood framing specify UNI-Wood Screw. For concealed fastening specify either UNI-Anchor, TUF-S, or Tergo+.

2.7.1.4 Panel Fastening Method: **[exposed] [concealed]** using **[UNI-Metal Screw] [UNI-Wood Screw] [UNI-Anchor] [SFS TUF-S] [Fischer Tergo+] [fasteners indicated per drawings and schedules]** or approved alternatives per manufacturer.

2.7.1.5 Exposed Finish: Manufacturer's standard semi-transparent, double-layer acrylic finish, with a matte UV-hardened polyurethane (PU) topcoat that allows for panel fibers to remain visible.

2.7.1.6 Panel Color: **[PA041 – Matte Black] [PA944 – Espresso] [PG241 – Gunmetal Grey] [PG243 – Moonstone] [PG341 – Volcanic Red] [PG342 – Deep Purple] [PG442 – Sky Blue] [PG443 – Regency Blue] [PG444 – Navy Blue] [PG542 – Olive] [PG544 – Bright Green] [PG545 – Autumn Green] [PG546 – Teal] [PG641 – Powder Yellow] [PG642 – Antique Yellow] [PG742 – Pale Orange] [PG843 – Fawn Grey] [PG844 – Mocha] [PW141 – Porcelain] [PW841 – Parchment] [To be selected at a later date from manufacturer standard offering].**

2.7.1.7 Concealed Finish: Back side to be sealed with a transparent coating.

SPEC NOTE: The following specifies EQUITONE **[pictura]**.

EQUITONE **[pictura]** is a high-performance through-colored fiber cement board with a double-layer acrylic coating and UV-hardened PU topcoat. The panel's finish is smooth, matte, scratch-resistant and provides graffiti-resistance.

The finish results in a hard, dirt-resistant surface with high abrasion resistance and durable graffiti protection. The panel fibers do not remain visible; Some shade differences and manufacturing traces are inherent to the material.

Delete the following paragraph if you're not using this product on the project.

2.8 AIR-CURED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV) – OPAQUE / PRINT / GRAFITTI RESISTANT FINISH

2.8.1 **[Material Tag: This item is noted as "CEM-#" on Drawings and Schedules].**

2.8.1.1 Basis-of-Design Product: **[inspires]** by EQUITONE

2.8.1.2 Nominal Thickness: **[8 mm (5/16 in)]**

2.8.1.3 Panel Sizes: **[2500 mm x 1250 mm (98-7/16 in. x 49-1/4 in.[3100 mm x 1250 mm (122-1/16 in. x 49-1/4 in.)] [As noted on Drawings]**

SPEC NOTE: For exposed fastening onto metal framing specify either the UNI-Rivet or UNI-Metal Screw. For exposed fastening onto wood framing specify UNI-Wood Screw. For concealed fastening specify either UNI-Anchor, TUF-S, or Tergo+.

2.8.1.4 Panel Fastening Method: **[exposed] [concealed]** using **[UNI-Metal Screw] [UNI-Wood Screw] [UNI-Anchor] [SFS TUF-S] [Fischer Tergo+] [fasteners indicated per drawings and schedules]** or approved alternatives per manufacturer.

2.8.1.5 Exposed Finish: Manufacturer's standard opaque, digitally printed, finish with a double layer, matte, UV-hardened topcoat.

2.8.1.6 Panel Color: **[PA041 – Matte Black] [PA944 – Espresso] [PG241 – Gunmetal Grey] [PG243 – Moonstone] [PG341 – Volcanic Red] [PG342 – Deep Purple] [PG442 – Sky Blue] [PG443 – Regency Blue] [PG444 – Navy Blue] [PG542 – Olive] [PG544 – Bright Green] [PG545 – Autumn Green] [PG546 – Teal] [PG641 – Powder Yellow] [PG642 – Antique Yellow] [PG742 – Pale Orange] [PG843 – Fawn Grey] [PG844 – Mocha] [PW141 – Porcelain] [PW841 – Parchment] [To be selected at a later date from manufacturer standard offering].**

2.8.1.7 Concealed Finish: Back side to be sealed with a transparent coating.

SPEC NOTE: Autoclaved panels are cured in an industrial autoclave under high temperatures and pressure for less than 24 hours. Both air-cured and autoclaved panels are suitable for ventilated facade applications. Autoclaved panels are particularly well suited for engraving due to the absorption of the water-repellent throughout the material's thickness. These panels provide the most natural textures and colors. Moreover, as they do not rely on an exterior coating, scratches are a lot less noticeable.

2.9 AUTOCLAVED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV), GENERALLY

SPEC NOTE: The following characteristics are common to all EQUITONE autoclaved high-density panels.

2.9.1 Panel Physical Characteristics (EN 12467 & ASTM C518):

2.9.1.1 Strength Classification: Class IV.

2.9.1.2 Mean Density (dry): ≥1600 kg/m³ (100 lb/ft³)

2.9.1.3 Mean Bending Strength (dry): ≥16 MPa (2320 psi).

2.9.1.4 Mean Bending Strength (wet): ≥18 MPa (2610 psi).

2.9.1.5 Moisture Content: ≤ 6%.

2.9.1.6 Moisture Movement: ≤ 0.08%.

2.9.1.7 Water Tightness: Pass.

2.9.1.8 Freeze-Thaw Resistance: Pass.

2.9.1.9 Warm Water Resistance: Pass.

2.9.1.10 Thermal Conductivity: ≤ 0.43 W/m·K (0.25 BTU/h·ft·°F).

2.9.2 Panel Fire Performance

2.9.2.1 Flame Spread Index: 0 to ASTM E84 and CAN/ULC S102.

2.9.2.2 Smoke Development Index: 5 to ASTM E84 and CAN/ULC S102.

2.9.2.3 Material Combustibility: Non-combustible to CAN/ULC S114.

2.10 AUTOCLAVED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV) – NATURAL FINISH

SPEC NOTE: The following specifies EQUITONE **[tectiva]**.

EQUITONE **[tectiva]** is a premium fiber cement facade panel with a distinct texture and appearance. It is a through-colored panel that does not require any additional surface coating. The material has a raw, honest look, characterized by its fine sanding lines and occasional white spots. The result is a facade that appears dry, lively, and dynamic, offering architects and designers a versatile and durable solution.

Natural color variations, shade differences, and manufacturing inclusions are inherent to the material. Panels are considered to be non-directional and are typically fabricated and installed in any orientation, enhancing the façade's natural look. If alignment of the sanding lines is a requirement of the project, please indicate the direction of the grains in the drawings and modify the below exposed finish text. Furthermore, please reach out to an EQUITONE representative to determine if the projects design is capable of such constraint.

Each panel is distinctive due to its production process, and no two panels are identical. Panels are water-repellent due to hydrophobation treatment.

Delete the following paragraph if you're not using this product on the project.

2.10.1 **[Material Tag: This item is noted as "CEM-#" on Drawings and Schedules].**

2.10.1.1 Basis-of-Design Product: **[tectiva]** by EQUITONE

2.10.1.2 Nominal Thickness: **[8 mm (5/16 in)] [10 mm (3/8 in)]**.

2.10.1.3 Panel Sizes: **[2500 mm x 1220 mm (98-7/16 in. x 48 in.)] [3050 mm x 1220 mm (120 in. x 48 in.)] [As noted on Drawings]**.

SPEC NOTE: For exposed fastening onto metal framing specify either the UNI-Rivet or UNI-Metal Screw. For exposed fastening onto wood framing specify UNI-Wood Screw. For concealed fastening specify either UNI-Anchor, TUF-S, or Tergo+.

2.10.1.4 Panel Fastening Method: **[exposed] [concealed]** using **[UNI-Metal Screw] [UNI-Wood Screw] [UNI-Anchor] [SFS TUF-S] [Fischer Tergo+] [fasteners indicated per drawings and schedules]** or approved alternatives per manufacturer.

2.10.1.5 Exposed Finish: through-colored core with no additional surface coating; final panel appearance to be natural with visible fine sanding lines in longitudinal direction. Panel to be naturally water-repellent due to hydrophobation treatment.

2.10.1.6 Panel Color: **[TE00 – Calico] [TE10 – Linen] [TE15 – Argent Grey] [TE20 – Pebble] [TE30 – Sandstorm] [TE40 – Sahara] [TE60 –**

Hessian] [TE85 – Graphite] [TE90 – Chalk] [To be selected at a later date from manufacturer's standard offering].

SPEC NOTE: The following specifies EQUITONE **[linea]**. EQUITONE **[linea]** is a 3D-shaped fiber cement facade panel, made from through-colored material. It features a linear surface texture composed of ribs and grooves, which produce varying light and shadow effects depending on the angle of light.

Natural color variations, shade differences, and manufacturing inclusions are inherent to the material. Panels are considered non-directional and may be installed in any orientation to enhance the façade's natural look. If a particular alignment of the ribs is a requirement of the project, please indicate the direction of the ribs in the drawings and modify the below exposed finish text. Please contact an EQUITONE representative to determine if the project's design is in alignment with allowable panel sizes.

Each panel is distinctive due to its production process, and no two panels are identical. Panels are water-repellent due to hydrophobation treatment.

Delete if you're not using this product on the project.

2.11 AUTOCLAVED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV) – 3D GROOVED FINISH

2.11.1 **[Material Tag: This item is noted as "CEM-#" on Drawings and Schedules].**

2.11.1.1 Basis-of-Design Product: **[linea]** by EQUITONE

2.11.1.2 Nominal Thickness: 10 mm (3/8 in)

2.11.1.3 Panel Sizes: **[2500 mm x 1220 mm (98-7/16 in. x 48 in.)] [3050 mm x 1220 mm (120 in. x 48 in.)] [As noted on Drawings]**

SPEC NOTE: For exposed fastening onto metal framing specify either the UNI-Rivet or UNI-Metal Screw. For exposed fastening onto wood framing specify UNI-Wood Screw. For concealed fastening specify either UNI-Anchor, TUF-S, or Tergo+.

2.11.1.4 Panel Fastening Method: **[exposed] [concealed] using [UNI-Metal Screw] [UNI-Wood Screw] [UNI-Anchor] [SFS TUF-S] [Fischer Tergo+] [fasteners indicated per drawings and schedules]** or approved alternatives per manufacturer.

2.11.1.5 Exposed Finish: Through-colored core with no additional surface coating; the panel to have 12mm wide and 2mm deep grooves and 8,4mm wide ridges on the front face to produce a 3D effect. Coated or painted finishes are not acceptable. Grooves of adjacent panels should be fabricated to align. Panel to be naturally water-repellent due to hydrophobation treatment.

2.11.1.6 Panel Color: **[LT00 – Calico] [LT10 – Linen] [LT15 – Argent Grey] [LT20 – Pebble] [LT30 – Sandstorm] [LT40 – Sahara] [LT60 – Hessian] [LT85 – Graphite] [LT90 – Chalk] [To be selected at a later date from manufacturer's standard offering].**

SPEC NOTE: The following specifies EQUITONE **[lunara]**. EQUITONE **[lunara]** is a fiber cement facade panel designed with a surface that mimics the irregular elevations and depressions reminiscent of the Moon's landscape. The panel is through-colored, with no surface

coating, allowing the natural fiber cement material to remain visible. It's rough, unpolished surface has a subtle linen-like texture. The structure of the panel is visually distinctive, creating a natural and expressive look. Each panel varies slightly in color, texture, and surface due to its unique production process, ensuring that no two panels are identical.

Natural color variations, shade differences, and manufacturing inclusions are inherent to the material. Panels are considered non-directional and are typically fabricated and installed in any orientation enhancing the façade's natural look.

Each panel is distinctive due to its production process, and no two panels are identical. Panels are water-repellent due to hydrophobation treatment.

Delete if you're not using this product on the project.

2.12 AUTOCLAVED HIGH-DENSITY CEMENTITIOUS PANELS (CLASS IV) – RANDOM TEXTURE FINISH

2.12.1 **[Material Tag: This item is noted as "CEM-#" on Drawings and Schedules].**

2.12.1.1 Basis-of-Design Product: **[Iunara]** by EQUITONE

2.12.1.2 Nominal Thickness: 10 mm (3/8 in)

2.12.1.3 Panel Sizes: **[2500 mm x 1220 mm (98-7/16 in. x 48 in.)] [3050 mm x 1220 mm (120 in. x 48 in.)] [As noted on Drawings]**

SPEC NOTE: For exposed fastening onto metal framing specify either the UNI-Rivet or UNI-Metal Screw. For exposed fastening onto wood framing specify UNI-Wood Screw. For concealed fastening specify either UNI-Anchor, TUF-S, or Tergo+.

2.12.1.4 Panel Fastening Method: **[exposed] [concealed]** using **[UNI-Metal Screw] [UNI-Wood Screw] [UNI-Anchor] [SFS TUF-S] [Fischer Tergo+] [fasteners indicated per drawings and schedules]** or approved alternatives per manufacturer.

2.12.1.5 Exposed Finish: Through-colored core with no additional surface coating; the panel surface texture to be random and non-repeating, with irregular elevations and depressions, to provide each panel with a unique appearance. Panel to be naturally water-repellent due to hydrophobation treatment.

2.12.1.6 Panel Color: **[LA20 – Pebble] [LA60 – Hessian]**
[To be selected at a later date from manufacturer's standard offering].

SPEC NOTE Use the article below if using semi-rigid board insulation (Cavityrock by ROCKWOOL) in the assembly. Delete paragraph below if no semi-rigid insulation is required on the project. ROCKWOOL Cavityrock® is a semi-rigid stone wool insulation board designed for exterior cavity wall and rainscreen applications.

2.13 SEMI-RIGID BOARD, STONE WOOL INSULATION

2.13.1 **[Material Tag: This item is noted as "INS-#" on Drawings and Schedules].**

2.13.2 Thickness: As indicated on Drawings.

2.13.3 Facing: **[Unfaced] [Black mineral fiber facing]**.

2.13.4 Compliance: to CAN/ULC-S702.1 Type 1 and ASTM C612, Type IVB, semi-rigid board, dual density with following characteristics:

SPEC NOTE: Retain either monolithic or dual density below.

2.13.4.1 **[Monolithic Density (ASTM C303): > 69 kg/m^3 (4.3 lbs./ft^3)]. [Dual Density (ASTM C303): 100 kg/m^3 (6.2 lbs./ft^3) for outer layer; 61 kg/m^3 (3.8 lbs./ft^3) inner layer].**

2.13.4.2 Linear Shrinkage (ASTM C356): < 1.0% at maximum use temperature of 649 deg C (1200 deg F).

2.13.4.3 Stress Corrosion Performance for Use on Austenitic Stainless Steel (ASTM C795): Pass.

2.13.4.4 Corrosiveness to Steel (ASTM C665): Pass.

2.13.4.5 Water Vapour Sorption (ASTM C1104): < 5% by weight.

SPEC NOTE: Retain first option below for unfaced; retain second option for black mineral fiber facing.

2.13.4.6 Water Vapour Transmission (ASTM E96): Minimum **[27] [43]** perm.

2.13.4.7 Fungi Resistance (ASTM C1338): No mould growth.

2.13.4.8 Thermal Resistance (ASTM C518 and ASTM C177): R-value per inch of 4.2 deg. F x hr. x ft^2/Btu.

2.13.5 Fire Performance:

2.13.5.1 Surface Burning Characteristics – Unfaced (CAN/ULC-S102): Flame Spread = 0; Smoke Developed = 0.

SPEC NOTE: Black mineral fiber facing is available for ROCKWOOL Cavityrock®. Delete below if not used.

2.13.5.2 Surface Burning Characteristics – With Black Facer (CAN/ULC-S102): Flame Spread = 10; Smoke Developed = 10.

2.13.5.3 Combustibility - Unfaced (CAN/ULC-S114): Non-combustible

2.13.6 Basis-of-Design Product: Cavityrock® manufactured by ROCKWOOL.

SPEC NOTE Use the article below if using rigid stone wool insulation (Comfortboard® 110 by ROCKWOOL) in the assembly. Delete paragraph below if no rigid insulation is required on the project. ROCKWOOL Comfortboard® 110 is a noncombustible, rigid, high-density stone wool insulation board designed for use as an exterior continuous insulation in commercial applications.

2.14 RIGID BOARD, STONE WOOL INSULATION

2.14.1 **[Material Tag: This item is noted as "INS-#" on Drawings and Schedules].**

2.14.2 Thickness: As indicated on Drawings.

2.14.3 Compliance: to CAN/ULC-S702.1 Type 1 and ASTM C612, Type IVA, rigid board, with following characteristics:

2.14.3.1 Density (ASTM C303): 176 kg/m^3 (11.0 lbs./ft^3).

2.14.3.2 Stress Corrosion Performance for Use on Austenitic Stainless Steel (ASTM C795): Pass.

2.14.3.3 Corrosiveness to Steel and Aluminum (ASTM C665): Pass.

2.14.3.4 Thermal Resistance (ASTM C518 and ASTM C177): R-value per inch of 4 deg. F x hr. x ft^2/Btu.

2.14.3.5 Water Vapour Sorption (ASTM C1104): < 5% by weight.

2.14.3.6 Water Vapour Transmission (ASTM E96): Minimum 30 perm.

2.14.3.7 Fungi Resistance (ASTM C1338): No mould growth.

2.14.3.8 Compressive Resistance (ASTM C165): Minimum 28 kPa (584 psf) at 10% compression.

2.14.3.9 Fire Performance:

.1 Surface Burning Characteristics (CAN/ULC-S102): Flame Spread = 0; Smoke Developed = 0.

.2 Combustibility (CAN/ULC S114): Non-combustible

2.14.3.10 Basis-of-Design Product: Comfortboard® 110 manufactured by ROCKWOOL.

SPEC NOTE Use the article below if using batt insulation (Comfortbatt® by ROCKWOOL) in the assembly. Delete paragraph below if no batt insulation is required on the project. ROCKWOOL Comfortbatt® is a stone wool insulation product for use in wood and steel framing in both new residential and commercial builds and renovations. This semi-rigid batt has a unique flexible edge designed to compress as the batt is inserted into walls, attics, ceilings, and floor frames. Product link below accesses Technical Data Sheet.

2.15 BATT OR BLANKET, STONE WOOL INSULATION

2.15.1 **[Material Tag: This item is noted as "INS-#" on Drawings and Schedules].**

2.15.2 Thickness: As indicated on Drawings.

2.15.3 Compliance: to CAN/ULC-S702.1 Type 1 and ASTM C665, Type I, semi-rigid batt with following characteristics:

2.15.3.1 Density (ASTM C303): Minimum 32 kg/m^3 (2.0 lbs./ft^3).

2.15.4 Thermal Performance (ASTM C518):

2.15.4.1 Wood Stud Wall Batt: Minimum [RSI 2.46 (R-14) for 89 mm (3.5-inch)] [RSI 3.87 (R-22) for 140mm (3.5-inch)] [RSI 4.23 (R-24) for 140mm (5.5-inch)] [RSI 4.93 (R-28) for 184mm (7.25-inch)] [RSI 5.64 (R-32) for 203mm (8.0-inch)] thickness.

2.15.4.2 Steel Stud Wall Batt: Minimum [RSI 2.47 (R-14) for 89mm (3.5-inch)] [RSI 3.96 (R22.5) for 152mm (6-inch)] [RSI 4.23 (R24.0) for 152mm (6.0-inch)] [RSI 5.37 (R32) for 203mm (8-inch)] thickness.

2.15.5 Fire Performance:

2.15.5.1 Surface Burning Characteristics (CAN/ULC-S102): Flame Spread = 0; Smoke Developed = 0.

2.15.5.2 Combustibility (CAN/ULC S114): Non-combustible

2.15.6 Basis-of-Design Product: Comfortbatt® manufactured by ROCKWOOL.

2.16 WATER-RESISTIVE BARRIER

2.16.1 **[Material Tag: This item is noted as "WRB-#" on Drawings and Schedules].**

2.16.2 Description: Vapour permeable, tear-resistant, waterproof, UV-resistant acrylic coated, thermo-bonded non-woven polyester water-resistive barrier.

2.16.3 Physical Properties:

2.16.3.1 Water Vapour Permeance (ASTM E96, Procedure A): minimum 204 perms.

2.16.3.2 Water Impact Penetration Resistance (AATCC 42): no water passage.

2.16.3.3 Air Permeance (ASTM E2178): 0.9 L/(s x m²) @ 75 Pa.

2.16.3.4 Tear Resistance (ASTM D1922): minimum. **[MD-1916 g] [CD-2564 g]**.

2.16.3.5 Dry Tensile Strength (ASTM D882): MD 47.4 lb/in², CD 28.7 lb/in² minimum.

2.16.3.6 Elongation at Break (ASTM D882): MD 40%, CD 45% minimum.

2.16.3.7 Fire Performance: to ASTM E84; NFPA Class A, IBC Class A minimum.

.1 Flame Spread: 10 maximum.

.2 Smoke Developed: 145 maximum.

2.16.3.8 Service Life Expectancy: > 25 years.

2.16.3.9 Allowable Exposure at Open Joints: Maximum 5 cm (2 in) comprising maximum of 50% of overall façade.

2.16.3.10 Weight: 5.5 lb/100 ft², 270 g/m², 44 lb/roll nominal.

2.16.3.11 Dimensions: Roll size 1.5 m x 50 m (4 ft – 11 in x 164 ft).

2.16.3.12 Color: Black.

2.16.4 Accessories:

2.16.4.1 Seam tape: In accordance with water-resistive barrier manufacturer's written recommendations.

.1 Basis-of-Design Product: DELTA®-FASSADE TAPE (60 mm (2-1/2 in.) x 20 m (65' 7 in.)) manufactured by Dörken Systems Inc.

2.16.4.2 Flashings: Self-adhering, water-resistive flashing membrane **[in accordance with water-resistive barrier manufacturer's written recommendations] [and] [in accordance with Section 07 65 00 – Flexible Flashing]**.

.1 Basis-of-Design Product: DELTA®-FASSADE FLASHING **[([100 mm (4 in.)]) x 20 m (65' 7 in.)] [[230 mm (9 in.)]) x 20 m (65' 7 in.)]** manufactured by Dörken Systems Inc.

2.16.4.3 Flashings: Fluid-applied, water-resistive flashing membrane **[in accordance with water-resistive barrier manufacturer's written recommendations]**

.1 Basis-of-Design Product: DELTA®-LFS fluid-applied flashing and sealant manufactured by Dörken Systems Inc.

2.16.4.4 Fasteners: Corrosion-resistant fasteners in accordance with water-resistive barrier manufacturer's written recommendations.

SPEC NOTE: For steel frame construction, use the following paragraph. Check with manufacturer before using 1-1/4 inch fasteners with 2 inch metal gasketed washer and edit paragraph to suit project.

.1 **[1-5/8 in.) corrosion-resistant screw with 2 in.) minimum diameter plastic caps] [1-1/4 in.) fasteners with 2 in.) metal gasketed washers]**.

SPEC NOTE: For wood frame construction, use the following paragraph.

.2 #4 nails with 1 in. minimum diameter plastic caps.

SPEC NOTE: For masonry construction, use the following paragraph.

.3 Masonry **[tap-con fasteners]** with 2 in. minimum diameter plastic caps

2.16.4.5 Sealants and Adhesives: Elastomeric sealant and adhesive in accordance with **[water-resistive barrier manufacturer's written recommendations] [Section 07 92 00 – Joint Sealants]**.

.1 Ensure sealants are UV resistant and compatible with adjacent materials.

.2 Basis-of-Design Product: **[DELTA®-LFS, DELTA®-TILAXX]** manufactured by Dörken Systems Inc.

2.16.4.6 Primers: In accordance with flashing manufacturer's written recommendations.

2.16.4.7 Flexible Membrane Through-wall Flashing: Self-adhering, butyl-rubber based flashing membrane.

.1 Basis-of-Design Product: DELTA®-TW FLASHING (18 in. x 75 ft) manufactured by Dörken Systems Inc.

SPEC NOTE: Specify DELTA®-FASSADE S if you are going to include tape to seal the joints. Specify DELTA®-FASSADE S PLUS if you want to use a water-resistive barrier membrane with factory-applied adhesive strips applied to the long edges of the membrane for sealing overlapping joints.

2.16.5 Basis-of-Design Product: **[DELTA®-FASSADE S] [DELTA®-FASSADE S PLUS]**.

2.17 SELF-ADHERING AIR AND WATER-RESISTIVE BARRIER

2.17.1 **[Material Tag: This item is noted as "AWRB-#" on Drawings and Schedules].**

2.17.2 Description: AAMA 711-compliant, vapour permeable, tear-resistant, self-adhesive, 3-layer membrane consisting of two outer layers of spun-bonded polypropylene fabric, a water-tight thermal polyurethane middle layer, and an aggressive adhesive coating on back side.

2.17.3 Physical Properties:

2.17.3.1 Water Vapour Permeance (ASTM E96):

.1 Procedure A: 34.9 perms.

.2 Procedure B: 50 perms.

2.17.3.2 Water Vapour Transmission (ASTM E96)

.1 Procedure A: 241 g/m²/24 hr.,

.2 Procedure B: 343 g/m²/24 hr.

2.17.3.3 Water Penetration: AATCC 127, Pass.

2.17.3.4 Air Permeance – Material (ASTM E2178) : < 0.02 l/(s x m²) @ 75 Pa (0.0034 cfm/sq ft @ 0.3 inches wg).

2.17.3.5 Air Permeance – Material (CAN/ULC S741): < 0.02 l/(s x m²) @ 75 Pa (0.0034 cfm/sq ft @ 0.3 inches wg).

2.17.3.6 Air Permeance – Assembly (CAN/ULC S742): Class A1.

2.17.3.7 Breaking Strength (ASTM D5034): MD 548 N (123.1 lb), CD 487 N (109 lb) minimum.

2.17.3.8 Elongation at Break (ASTM D5034): MD 77.5%, CD 95.1% minimum.

2.17.3.9 Peel Adhesion (ASTM D3330): Pass at room and elevated temperatures 80 deg C (176 deg F).

2.17.3.10 Maximum Exposure to UV Light: 1 year (Climate Zones 3 and above)

2.17.3.11 Fire Performance: to ASTM E84; NFPA Class A, IBC Class A minimum.

.1 Flame Spread: 0 maximum.

.2 Smoke Developed: 25 maximum.

2.17.3.12 Weight: 40 lb/roll nominal.

2.17.3.13 Color: Dark Grey

2.17.4 Accessories:

2.17.4.1 Seam tape: Acrylic-based adhesive tape in accordance with **[air] [and] [water-resistive]** barrier manufacturer's written recommendations.

.1 Basis-of-Design Product: DELTA®-MULTIBAND (60 mm (2-1/2 in.) x 25 m (82 ft)) by Dörken Systems Inc.,

SPEC NOTE: Specify DELTA®-FLASHING or DELTA®-LFS for flashing around windows, doors and general flashing areas.

2.17.4.2 Flashings: Self-adhering, butyl-rubber based **[air] [and] [water-resistive]** flashing membrane **[in accordance with [air] [and] [water-resistive]** barrier manufacturer's written recommendations] **[and] [in accordance with Section 07 65 00 – Flexible Flashing]**

.1 Basis-of-Design Product: DELTA®-FLASHING **[(140 mm (6 in.) x 22.86 m (75 in.)] [230 mm (9 in.) x 20.83 m (75 in.)]** by Dörken Systems Inc.

2.17.4.3 Flashings: Fluid-applied, water-resistive flashing membrane **[in accordance with water-resistive barrier manufacturer's written recommendations]**

.1 Basis-of-Design Products: DELTA®-LFS fluid-applied flashing and sealant by Dörken Systems Inc.

2.17.4.4 Flashings: Stretchable butyl-rubber based adhesive on **[non-woven fabric] [fluid-applied 100% silicone]** flashing membrane **[in accordance with [air] [and] [water-resistive]** barrier manufacturer's written recommendations.

DÖRKEN SYSTEMS INC. GUIDE NOTE: Specify DELTA®-FLEXX BAND or DELTA®-LFS for flashing around penetrations and protrusions.

.1 Basis-of-Design Product: DELTA®-FLEXX BAND 100 mm (4 in. x 10 m (33ft) by Dörken Systems Inc.

.2 OR

.3 Basis-of-Design Product: DELTA®-LFS fluid-applied flashing and sealant by Dörken Systems Inc.

2.17.4.5 Sealants and Adhesives: Elastomeric sealant and adhesive in accordance with **[air] [and] [water-resistive]** barrier manufacturer's written recommendations] **[Section 07 92 00 – Joint Sealants]**.

.1 Ensure sealants are compatible with adjacent materials.

.2 Basis-of-Design Product: **[DELTA®-LFS] [DELTA®-TILAXX]** by Dörken Systems Inc.

2.17.4.6 Window Corner: Prefabricated rubber-compound window corner.

.1 Basis-of-Design Products: DELTA®-FAS CORNER by Dörken Systems Inc.

2.17.4.7 Primers: In accordance with **[air] [and] [water-resistive]** barrier manufacturer's written recommendations.

.1 Basis-of-Design Products: DELTA®-HF PRIMER or DELTA®-ADHESIVE LVC or DELTA®-ADHESIVE (cold weather application) Dörken Systems Inc.

2.17.4.8 Flexible Membrane Through-wall Flashing: Self-adhering, butyl-rubber based flashing membrane.

.1 Basis-of-Design Products: DELTA®-TW FLASHING 460 mm (18 in.) x 22.86 m (75 ft)) by Dörken Systems Inc.

2.17.5 Basis-of-Design Product: DELTA®-VENT SA by Dörken Systems Inc.

2.18 THERMALLY-BROKEN RAINSCREEN CLADDING SUPPORT SYSTEM

2.18.1 Manufacturer's standard thermally-broken support system for rainscreen cladding consisting of horizontal and vertical framing elements, designed to minimize thermal bridging and securely support cladding assembly. The use of exclusively horizontal framing elements is not permitted.

2.18.2 Components: proprietary profiles and brackets suitable for exterior cladding applications. Components must allow for thermal isolation between cladding and building structure.

2.18.3 Thermal Isolation: Incorporate thermal break elements into system to reduce heat transfer. Thermal isolators must be compatible with structural components and sized appropriately to meet system performance requirements.

2.18.4 Adjustability: Ensure system allows for adjustable cavity depth to accommodate insulation and align cladding .

2.18.5 Fasteners: Provide mechanical fasteners suitable for substrate encountered. Ensure fasteners are corrosion-resistant and capable of long-term performance in exterior conditions.

2.18.6 Bracing and Reinforcement: Include necessary bracing, furring, and support elements to ensure system stability and accommodate special conditions, such as complex geometries or variations in cladding plane.

SPEC NOTE: Below is guidance on when to select the NV1 or NH3 with or without hat channels to support the cementitious cladding.

NV1 (Pure Vertical Framing System): These systems are suitable for installations on concrete, CMU, structural plywood, or strapping when used between stud frames. substrates where the placement of vertical members is not constrained by the building structure. These systems are useful when the placement of vertical members is not constrained by the building structure. They also generally used for horizontally oriented panel layouts, except running bonds, as well as larger format panels sizes. If a single vertical rail framing system is being used delete secondary rail system section below.

NH3 with additional hats/z channels (Horizontal Framing with Vertical Panel Rail System): These systems should be specified when installing over typical steel stud or wood stud construction. These systems can take the form of a vertical rail over horizontal framing members or vice versa. Specifying the vertical rail directly behind the fiber cement is the best way to ensure the proper flow of air, however there are limitations in design as identified in the above paragraph.

EQUITONE does not recommend the use of purely horizontal framing systems due to the significant reduction in airflow, which included concealed systems like the NV3. Lack of adequate ventilation can cause elevated cavity temperatures, leading to increased expansion and contraction of the panel material, ultimately raising the risk of material failure. Additionally, moisture trapping which can result in efflorescence is another potential issue.

NV1 with additional hats/z channels or NV3 concealed rail (Vertical Framing with Horizontal Panel Rail System): When a horizontal rail is directly behind EQUITONE, extra care must be taken into the design of the system to ensure a continuous vertical air cavity exists. Contact an EQUITONE representative for additional guidance. These systems make most sense for horizontal running bond, thin vertically oriented panels, large formats and concealing the fasteners from view.

2.18.7 Basis-of-Design: **[NV1] [NV1 complete with additional hat/z channels] [NV1 and NV3] [NH3 complete with additional hat/z channels]** by Nvelope/SFS Group USA, Inc.

2.18.7.1 Rail Finish**: [anodized] [powder coated] [Per manufacturer's standard]**.

2.18.7.2 Rail Color: **[Black] [Per manufacturer's standard]**.

2.18.7.3 Rail Material: Minimum 2.2mm and maximum 3.125mm thick, 6005A-T6 aluminum

2.19 AUXILIARY MATERIALS

SPEC NOTE: The following text is optional. EQUITONE recommends using perforated insect/vermin screens at inlet and outlet openings that are 19 mm (¾") or larger. Modify or remove this section as needed.

2.19.1 Perforated Insect/Vermin Screen: Provide perforated screen with perforation pattern that permits airflow equivalent to the continuous inlet/outlet gap as specified in this Section.

2.19.1.1 Minimum open area: minimum 1025 mm² open area per linear metre (4.75 in² / ft) of open area.

2.19.1.2 Screen thickness: not to exceed 0.79 mm (1/32 in. / 21ga) when installed between the cementitious panel and sub-framing elements.

SPEC NOTE: Remove the paragraph below if designing an open joint rainscreen system and do not wish to use decorative corner profiles.

2.19.2 **[Aluminum Joint Closures] [Decorative Corner Profiles]**: Provide products as detailed on Drawings. Maximum thickness of nonstructural finishing profile to be 0.79 mm (1/32 in. / 21ga) gauge between cementitious panel and sub-framing elements.

2.19.3 Galvanic Protection: Provide tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Verify actual site conditions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.1.2 Construction tolerances: Prior to installation, verify acceptable construction tolerances for applicable materials, including back-up structure and high-performance cementitious panel assembly. Confirm compatibility of tolerances between material types to ensure proper alignment and fit during assembly.

3.2 PREPARATION

3.2.1 Install sub framing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and cementitious panel manufacturer's written recommendations.

3.2.2 Ensure step flashings and kick-out flashings are installed before beginning installation of **[air] [and] [water-resistive]** membrane.

3.2.3 Ensure protrusions that may penetrate **[air] [and] [water-resistive]** barrier membrane are removed before beginning installation.

3.3 INSTALLATION, GENERALLY

3.3.1 Install work of this Section in strict accordance with manufacturer's written installation instructions and reviewed Shop Drawings. Supplement manufacturer's installation instructions with additional installation requirements specified in this Section to produce specified work results.

3.3.2 Install components in plumb, level and square. Maintain dimensional tolerances and alignment with surrounding construction.

3.4 WATER-RESISTIVE BARRIER

SPEC NOTE: Refer to the water-resistive barrier manufacturer's current installation guide for detailed information regarding specific details and integration of auxiliary materials.

3.4.1 Install water-resistive barrier before installation of windows and doors in accordance with manufacturer's written recommendations.

SPEC NOTE: When this section was developed, ABAA had not yet published their installation procedures. Check with ABAA for actual installation guideline publication before including the following paragraph in the project specification.

3.4.2 Perform installation in accordance with ABAA written recommendations for installation of water-resistive barriers.

3.4.3 Unroll water-resistive barrier with printed side out, wrapping entire building, including rough openings for windows, doors and other protrusions or penetrations.

3.4.3.1 Install water-resistive barrier plumb and level to exterior face of structural **[sheathing board] [insulation board] [exterior gypsum board]** or directly to framing members in accordance with manufacturer written recommendations.

3.4.3.2 Ensure water-resistive barrier is installed with textured side facing substrate.

3.4.4 Start installation of water-resistive barrier at building corner, leaving 150 mm (6 in.) to 300 mm (12 in.) of membrane extended beyond corner.

3.4.5 Install horizontally starting at bottom of wall.

3.4.6 Overlap water-resistive barrier membrane as follows:

3.4.6.1 Exterior Corners: **[300 mm (12 in.)]** minimum.

3.4.6.2 Vertical and horizontal seems: **150 mm (6 in.)** minimum.

3.4.6.3 Other seams, joints or at protrusions and penetrations:**150 mm (6 in.)** minimum.

3.4.7 Sill Plate Interface: Extend lower edge of water-resistive barrier over sill plate interface 75 mm (3 in.)– 150 mm (6 in.).

3.4.8 Secure to substrate with elastomeric sealant in accordance with water-resistive barrier manufacturer's written recommendation.

3.4.9 Attachment of Water-resistive Barrier Membrane to Substrate:

SPEC NOTE: For steel frame construction, use the following paragraph. Check with manufacturer before using 1-1/4 inch with 2 inch metal gasketed washer and edit paragraph to suit project.

3.4.9.1 Attach water-resistive barrier to steel studs through exterior sheathing with **[mechanical fasteners] [and] [elastomeric adhesive in accordance with manufacturer's written recommendations]**.

SPEC NOTE: Retain the following four paragraphs if mechanical fasteners are to be used.

3.4.9.2 Secure using fasteners and **[custom caps] [metal gasketed washers]** spaced **[450 mm (18 in.)]** maximum vertically on centre along stud line and 24 inches maximum on centre, horizontally.

3.4.9.3 Ensure fasteners penetrate securely through metal studs **[19 mm (¾ in.)]** minimum.

3.4.9.4 Install fasteners **[150 mm (6 in.)]** from sill and frame of window and door openings.

3.4.9.5 Ensure fasteners are installed **[230 mm (9 in.)]** minimum from window or door head.

SPEC NOTE: For wood frame construction, use the following paragraph.

3.4.10 Attach water-resistive barrier to wood stud framing through exterior sheathing with **[mechanical fasteners] [and] [elastomeric adhesive in accordance with manufacturer's written recommendations]**.

SPEC NOTE: Retain the following four paragraphs if mechanical fasteners are to be used.

3.4.10.1 Secure using fasteners and custom caps spaced **[450 mm (18 in)]** maximum vertically on centre along stud line and **[600 mm (24 in.)]** maximum on centre, horizontally.

3.4.10.2 Ensure fasteners penetrate wood studs **[19]** mm **[¾]** in. minimum.

3.4.10.3 Install fasteners **150 mm (6 in.)** from sill and frame of window and door openings.

3.4.10.4 Ensure fasteners are installed **230 mm (9 in.)** minimum from window or door head.

SPEC NOTE: For masonry construction, use the following paragraph.

3.4.11 Attach water-resistive barrier to masonry or concrete substrate with **[mechanical fasteners] [and] [elastomeric adhesive in accordance with manufacturer's written recommendations]**.

SPEC NOTE: Retain the following four paragraphs if mechanical fasteners are to be used.

3.4.11.1 Attach membrane to masonry or concrete substrate using tap-con fasteners and custom caps spaced **450 mm (18 in.)** maximum vertically on centre and **[600 mm (24 in.)]** maximum on centre, horizontally.

3.4.11.2 Attach membrane to masonry or concrete substrate using adhesive in accordance with water-resistive barrier manufacturer's written recommendations.

3.4.11.3 Install fasteners **[150 mm (6 in.)]** from sill and frame of window and door openings.

3.4.11.4 Ensure fasteners are installed **[230 mm (9 in.)]** minimum from window or door head.

SPEC NOTE: Keep the paragraphs below if specifying self-adhering air and water-resistive barriers.

3.5 SELF-ADHERING AIR AND WATER-RESISTIVE BARRIER

SPEC NOTE: Refer to the air or water-resistive barrier manufacturer's current installation guide for detailed information regarding specific details and integration of auxiliary materials.

3.5.1.1 Install **[air] [and] [water-resistive]** barrier before installation of windows and doors in accordance with manufacturer's written recommendations.

SPEC NOTE: When this section was developed, ABAA had not yet published their installation procedures. Check with ABAA for actual installation guideline publication before including the following paragraph in the project specification.

3.5.1.2 Do installation in accordance with ABAA written recommendations for installation of **[air] [and] [water-resistive]** barriers.

3.5.1.3 Unroll **[air] [and] [water-resistive]** barrier with printed side out, wrapping entire building, including rough openings for windows, doors and other protrusions or penetrations.

3.5.1.4 Where required, prime substrate before applying **[air] [and] [water-resistive]** barrier in accordance with manufacturer's written recommendations.

3.5.1.5 Allow primer to dry 120 minutes or until tacky (depending on weather conditions) before applying **[air] [and] [water-resistive]** barrier.

3.5.1.6 Install **[air] [and] [water-resistive]** barrier plumb and level to exterior face of structural **[sheathing board] [insulation board] [exterior gypsum board]** members in accordance with manufacturer written recommendations.

3.5.1.7 Ensure **[air] [and] [water-resistive]** barrier is installed with printed side facing installer.

3.5.1.8 Remove release liner from back of membrane and press firmly onto substrate.

3.5.1.9 Roll firmly in place with hand roller.

3.5.1.10 Start installation of **[air] [and] [water-resistive]** barrier at building corner, leaving 150 mm (6 in.)-300 mm (12 in.) of membrane extended beyond corner.

3.5.1.11 Install horizontally starting at bottom of wall.

.1 Overlap **[air] [and] [water-resistive]** barrier membrane as follows:

.2 Exterior Corners: **[300 mm (12 in.)]** minimum.

.3 Vertical seams: **[150 mm (6 in.)]** minimum.

.4 Horizontal seams: **[100 mm (4 in.)]** minimum. Remove release liner and press firmly together

.5 Other seams, joints or at protrusions and penetrations: **[150 mm (6 in.)]** minimum.

3.5.1.12 Sill Plate Interface: Extend lower edge of **[air] [and] [water-resistive]** barrier over sill plate interface 75 mm (3 in.) 150 mm (6 in.).

3.5.1.13 Adhere to substrate by removing release liner in accordance with **[air] [and] [water-resistive]** barrier manufacturer's written recommendation.

3.5.1.14 Ensure installed **[air] [and] [water-resistive]** barrier is not exposed to UV for longer than [1 year (Climate Zones 3 and above)] [240 days Climate Zone 2] [180 days Climate Zone 1]

3.6 THERMALLY-BROKEN RAINSCREEN CLADDING SUPPORT SYSTEM

SPEC NOTE: Refer to the thermally-broken rainscreen support manufacturer's current installation guide for detailed information regarding specific details and integration of auxiliary materials.

3.6.1 Install cladding support system according to manufacturer's written instructions approved Shop Drawings. Anchor brackets, rails, and other components of the Work securely in place, with provisions for thermal and structural movement.

3.6.2 Set components plumb, square, and true to line, and with connections securely fastened.

3.6.3 Locate mechanical fasteners in compliance with requirements for spacing, edge distances, and screw penetration.

3.6.4 Touch-up shop-applied protective coatings damaged during handling and installation.

3.7 STONE WOOL INSULATION

SPEC NOTE: Refer to the stone wool insulation manufacturer's current installation guide for detailed information regarding specific details and integration of auxiliary materials.

3.7.1 Install stone wool batt and board insulation in accordance with insulation manufacturer's written instructions and as shown on Drawings.

3.7.2 Install insulation securely, completely filling space between framing members in single layer using friction fit in locations indicated.

3.7.3 Cut with serrated knife around electrical boxes, pipes, wiring, ductwork, obstructions, and between studs and joists that are less than a standard width.

3.7.4 Install board insulation to tightly fit between wall brackets to make continuous, unbroken insulated face of wall.

3.8 HIGH-DENSITY, THROUGH-COLOR CEMENTITIOUS PANELS

SPEC NOTE: Refer to the cementitious cladding manufacturer's current installation guide for detailed information regarding specific details and integration of auxiliary materials.

3.8.1 Install high-density, through-color cementitious panels in accordance with manufacturer's written instructions, in orientations, sizes, and locations indicated on reviewed Shop Drawings.

3.8.2 Use manufacturer-specified tools and accessories where applicable.

3.8.3 Sequence: As far as practical, begin panel installation at top of building and proceed downward, and start installations at inside corners or centre of elevations, and proceed outward.

3.8.4 Securely fasten high-density, through-color cementitious panels and other components to structure, while allowing for thermal and structural movements. Comply with manufacturer's requirements on placement of fixed and sliding connections.

3.8.5 Install accessories with positive attachment to building, and with weathertight mounting. Coordinate installation with flashings and other components.

3.8.6 Do not obstruct vents, screens, trims, and similar elements where such are required behind panels.

3.8.7 Control Joints: Provide control joints in sub-framing system as required by manufacturer's instruction. Do not fasten panels across sub-framing joints or building control joints.

3.9 FIELD QUALITY CONTROL

3.9.1 Manufacturer's Services:

SPEC NOTE: Use the following Paragraphs only when manufacture's field services are provided and are required to verify the quality of the installed components. Establish the number and duration of periodic site visits required by manufacturer and specify below. Consult manufacturer for services required. Delete if field services are not required.

3.9.1.1 Coordinate manufacturer's services with Section **[01 45 00 - Quality Control]**.

3.9.1.2 Have manufacturer review work involved in handling, installation, protection, and cleaning of high-performance cementitious panel assemblies and components, and submit written reports in acceptable format to verify compliance of Work with Contract conditions.

3.9.1.3 Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation review in accordance with manufacturer's instructions.

.1 Report any inconsistencies from manufacturer's recommendations immediately to Consultant.

.2 Schedule site visits to review work at stages listed:

.1 As required by Consultant.

3.10 PROTECTION

3.10.1 Protect high-performance cementitious panel assemblies from damage, soiling and contaminating substances resulting from construction activities or caused by work of other trades. Protect panels from damage during the removal of spacers and shims. Do not apply adhesives or tapes to finished surfaces of panels.

3.10.2 Where soiling or spills have occurred, remove spills and soiling from adjacent surfaces using cleaning procedures recommended in writing by affected

material's manufacturer. Do not use materials or process that can damage finishes, surfaces, or construction.

3.10.3 Promptly replace high-performance cementitious panel assemblies work damaged during construction that cannot be satisfactorily repaired.

3.10.4 Protect installed stone wool insulation from damage.

3.10.5 Stone wool insulation that cannot be repaired to Architect's satisfaction shall be removed and replaced.

3.11 CLEANING AND WASTE MANAGEMENT

3.11.1 Cleaning: Maintain clean construction area at the end of each day. When activities of this Section are complete, remove materials, tools, equipment and rubbish.

3.11.2 Waste Management and Disposal: sort waste for reuse, recycling, or disposal, as specified. Remove recycling bins and containers from site and dispose of contents at the appropriate waste disposal facilities.

END OF SECTION