SECTION 07 24 00

EXTERIOR WALL INSULATION SYSTEM (EWIS)
05/11, CHG 4: 08/18

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

GERMAN INSTITUTE FOR STANDARDIZATION (DIN)

DIN 4108-11	(2018) Thermal Insulation and Energy Economy in Buildings
DIN EN 13501-1	(2019) Fire Classification of Construction and Building Elements
DIN EN 13162	(2013) Thermal Insulation Products for Buildings - Factory Made Mineral Wood (MW) Products - Specification
DIN EN 13164	(2015) Thermal Insulation Products for Buildings - Factory Made Extruded Polystyrene Foam (XPS) Products - Specification

EUROPEAN STANDARDS (EN)

EN 1062-1	(2004) Paints and Varnishes - Coating Materials and Systems for Exterior Masonry and Concrete

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2021) International Building Code

1.2 SYSTEM DESCRIPTION AND REQUIREMENTS

The Exterior Wall Insulation System (EWIS) must be a job-fabricated, exterior wall covering consisting of insulation board, reinforcing fabric, base coat, finish coat, adhesive and mechanical fasteners as applicable. The system components must be compatible with each other and with the substrate as recommended or approved by, and the products of, a single manufacturer regularly engaged in furnishing Exterior Wall Insulation System. All materials must be installed by an applicator approved by the system manufacturer.

1.2.1 System Requirements and Tests

The system must meet the performance requirements as verified by the tests listed below. Where a wall system of similar type, size, and design as specified for this project has been previously tested under the condition specified herein, the resulting test reports may be submitted in lieu of job specific tests.

1.2.1.1 Water Penetration

Test the system for water penetration by uniform static air pressure in accordance with manufacturers standards and local regulations. There must be no penetration of water beyond the plane of the base coat/EPS board interface after 15 minutes at 300 Pa, or 20 percent of positive design wind pressure, whichever is greater.

1.2.1.2 Wind Load

Test the system for wind load by uniform static air pressure in accordance with manufacturers standards and local regulations. There must be no permanent deformation, delamination, or other deterioration.

1.2.1.3 Full scale or intermediate scale fire test

Conduct wall fire test using apparatus, specimen, performance criteria, and procedure in accordance with DIN EN 13501-1 and local regulations when required by ICC IBC 2603.5.5. The following requirements must be met:

a. No vertical spread of flame within core of panel from one story to the next.

b. No flame spread over the exterior surface.

c. No vertical flame spread over the interior surface from one story to the next.

d. No significant lateral spread of flame from compartment of fire origin to adjacent spaces.

1.2.2 Component Requirements and Tests

The components of the system must meet the performance requirements as verified by the tests listed below.

1.2.2.1 Surface Burning Characteristics

Conduct test on samples consisting of base coat, reinforcing fabric, and finish coat. Cure for 28 days. The flame spread index must be 25 or less and the smoke developed index must be 450 or less.

1.2.2.2 Radiant Heat

The system must be tested in accordance with DIN EN 13501-1, manufacturers standards and local regulations on both the minimum and maximum thickness of insulation intended for use with no ignition during the 20-minute period.

1.2.2.3 Impact Resistance

b. Impact Mass: Test 28 day cured specimen of PM EIFS in accordance with manufacturers standards. The test specimen must exhibit no cracking or denting after twelve impacts by 13.6 kg lead shot mass from 150 to 1800 mm drop heights in 150 mm intervals.

1.2.3 Sub-Component Requirements and Tests

Unless otherwise stated, the test specimen must consist of reinforcing mesh, base coat, and finish coat applied in accordance with manufacturer's printed recommendations to the insulation board to be used on the building. For mildew resistance, only the finish coat is applied onto glass slides for testing. These specimen must be suitably sized for the apparatus used and be allowed to cure for a minimum of 28 days prior to testing.

1.2.3.1 Accelerated Weathering

Test in accordance with manufacturers standards and local regulations. After 2000 hours specimens must exhibit no visible cracking, flaking, peeling, blistering, yellowing, fading, or other such deterioration.

1.2.3.2 Mildew Resistance

Test in accordance with manufacturers standards and local regulations. The specimen shall consist of the finish coat material, applied to clean 75 mm by 100 mm glass slides and must be allowed to cure for 28 days. After 28 days of exposure, the specimen must not show any growth.

1.2.3.3 Water Resistance

Test in accordance with manufacturers standards and local regulations. The specimen must be a minimum of 100 mm by 150 mm. After 14 days, the specimen must exhibit no cracking, checking, crazing, erosion, blistering, peeling, or delamination.

1.2.3.4 Absorption-Freeze/Thaw

Systems must be tested in accordance with manufacturers standards and local regulations for 60 cycles of freezing and thawing. After testing, the specimen must exhibit no cracking, checking, or splitting, and negligible weight gain.

1.2.3.5 Sample Boards

Unless otherwise stated, provide sample EWIS Component 300 by 600 mm, on sheathing board, including finish color and texture, typical joints and sealant. If more than one color, finish, or pattern is used, provide one sample for each. The test specimen must consist of reinforcing mesh, base coat, and finish coat applied in accordance with manufacturer's printed recommendations to the insulation board to be used on the building.

1.2.4 Moisture Analysis

Perform a job specific vapor transmission analysis based on project specific climate and specified wall components and materials. Indicate the temperatures and relative humidities for the inside and outside of the building; a complete listing of the building components, their thickness, thermal resistance and permeance, as well as building location and use. If a mathematical model was used for the analysis, include the name of the model and the supplier/developer.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings; G

Show wall layout, construction and expansion joints, decorative grooves, layout of thermal insulation board, and reinforcing mesh and strip reinforcing fabric; joint and flashing details; details at wall penetrations; types and location of fasteners; details at doors; and details at base, roof, parapet, corners, projecting features, roof/wall intersections, abutments of lower walls with higher walls.

SD-03 Product Data

Thermal Insulation

Adhesive

Accessories

Base Coat

Reinforcing Fabric

Finish Coat

Joint Sealant

Sealant Primer

Bond Breaker

Backer Rod

Insulation Board

Recycled Content for Insulation Materials; S

Warranty

Include joint and other details, such as end conditions, corners, windows, and parapet. Include shelf life and recommended cleaning solvents in data for sealants. Include Safety Data Sheets (SDS)for all components of the EWIS. The SDS shall be available at the job site.

SD-04 Samples

Sample Boards; G

Color and Texture

SD-05 Design Data

Wind Load Calculations

Moisture Analysis Calculations

SD-06 Test Reports

Accelerated Weathering

Impact Resistance

Mildew Resistance

Water Vapor Transmission

Absorption-Freeze-Thaw

Wall Fire Test

Water Penetration

Water Resistance

Full Scale or Intermediate Scale Fire Test

Surface Burning Characteristics

Radiant Heat

Substrate

Wind Load

SD-07 Certificates

Qualifications of EWIS Manufacturer

Qualification of EWIS Installer

Qualification of Sealant Applicator

Certify that EWIS installer meets requirements specified under paragraph "Qualification of Installer," and that sealant applicator is approved by the EWIS Manufacturer.

Qualifications of Third Party Inspector

Inspection Check List; G

Submit filled-out inspection check list as required in paragraph "Quality Control," certifying that the installation of critical items meets the requirements of this specification.

SD-08 Manufacturer's Instructions

Installation

Manufacturer's standard printed instructions for the installation of the EWIS. Include requirements for condition and preparation of substrate, installation of EWIS, and requirements for sealants

and sealing.

SD-10 Operation and Maintenance Data

EWIS

Include detailed finish repair procedures and information regarding compatibility of sealants with base and finish coatings.

1.4 QUALITY ASSURANCE

1.4.1 Qualifications of EWIS Manufacturer

The EWIS must be the product of a manufacturer who has been in the practice of manufacturing and designing EIFS for a period of not less than 3 years, and has been involved in at least five projects similar to this project in size, scope, and complexity, in the same or a similar climate as this project.

1.4.2 Qualification of EWIS Installer

The EWIS Installer must be trained by the EWIS manufacturer to perform the installation of the System and must have successfully installed at least five projects at or near the size and complexity of this project. The contractor must employ qualified workers trained and experienced in installing the manufacturer's EWIS.

1.4.3 Qualification of Sealant Applicator

The sealant applicator must be experienced and competent in the installation of high performance industrial and commercial sealants and must have successfully installed at least five projects at or near the size and complexity of this project.

1.4.4 Qualifications of Third Party Inspector

Submit evidence that third party inspector has current certification from the Exterior Design Institute or equal inspector certification as inspector for the installation of EWIS.

1.4.5 Insulation Board

Insulation Board must be approved and labeled under third party quality program as required by applicable building code.

1.4.6 Pre-Installation Conference

After approval of submittals and before commencing any work on the EWIS, including installation of any insulation, and associated work, the Contracting Officer will hold a pre-installation conference to review:

a. Drawings, specifications, and samples;

b. Procedure for on site inspection and acceptance of EWIS substrate and pertinent details (for example, mock-up installation);

c. Contractor's plan for coordination of work of the various trades involved in providing EIF system and other components;

d. Inspection procedures; and

e. Safety requirements.

Pre-installation conference must be attended by the Contractor, EWIS Q.C. Specialist (EWIS Inspector), and all personnel directly responsible for installation of the EWIS system, including sealant applicator, and personnel responsible for related work, such as flashing and sheet metal, windows and doors, and a representative of the EWIS manufacturer. Before beginning EWIS work, the contractor must confirm in writing the resolution of conflicts among those attending the pre-installation conference.

1.5 DELIVERY AND STORAGE

Deliver materials to job site in original unopened packages, marked with manufacturer's name, brand name, and description of contents. Store materials off the ground and in accordance with the manufacturer's recommendations in a clean, dry, well-ventilated area. Protect stored materials from rain, sunlight, and excessive heat. Keep coating materials which would be damaged by freezing at a temperature not less than 4 degrees C. Do not expose insulation board to flame or other ignition sources.

1.6 ENVIRONMENTAL CONDITIONS

a. Do not prepare materials or apply EWIS during inclement weather unless appropriate protection is provided. Protect installed materials from inclement weather until they are dry.

b. Apply sealants and wet materials only at ambient temperatures of 4 degrees C or above and rising, unless supplemental heat is provided. The system must be protected from inclement weather and maintain this temperature for a minimum of 24 hours after installation.

c. Do not leave insulation board exposed to sunlight after installation.

1.7 WARRANTY

Furnish manufacturer's standard warranty for the EWIS. Warranty must run directly to Government and cover a period of not less than 5 years from date Government accepted the work.

PART 2 PRODUCTS

2.1 COMPATIBILITY

Provide all materials compatible with each other and with the substrate, and as recommended by EWIS manufacturer.

2.2 ADHESIVE

Manufacturer's standard product, including primer as required, must be compatible with substrate and insulation board to which the system is applied.

2.3 MECHANICAL FASTENERS

Corrosion resistant and as approved by EWIS manufacturer. Select fastener type and pattern based on applicable wind loads and substrate into which

fastener will be attached, to provide the necessary pull-out, tensile, and shear strengths.

2.4 THERMAL INSULATION

2.4.1 Manufacturer's Recommendations

Provide only thermal insulation recommended by the EWIS manufacturer for the type of application intended.

2.4.2 Insulation Board

Insulation board must be standard product of manufacturer and must be compatible with other systems components and shall be in accordance with DIN 4108-11, DIN EN 13162 and DIN EN 13164. Boards must be factory marked individually with the manufacturer's name or trade mark, the material specification number, the R-value at 24 degree C, and thickness. No layer of insulation shall be less than 20 mm thick. The maximum thickness of all layers must not exceed 100 mm. Insulation Board must be certified as aged, in block form, prior to cutting and shipping, a minimum of 6 weeks by air drying, or equivalent.

a. Thermal resistance: As indicated on drawings.

b. Insulating material: Mineral wool above grade and extruded polystyrene below grade per details and as recommended by the EWIS manufacturer and treated to be compatible with other EWIS components. Age insulation by air drying a minimum of 6 weeks prior to cutting and shipping.

d. Recycled Content: Provide insulation material that has minimum of 10 percent recycled material. Provide data identifying percentage of recycled content for insulation materials.

2.5 BASE COAT

Manufacturer's standard product and compatible with other systems components.

2.6 REINFORCING FABRIC

Reinforcing fabric mesh must be alkali-resistant, balanced, open weave , glass fiber fabric made from twisted multi-end strands specifically treated for compatibility with the other system materials and as recommended by EWIS manufacturer.

2.7 FINISH COAT

Manufacturer's standard product in accordance with EN 1062-1 and conforming to the requirements in the paragraph on Sub-Component Requirements and Tests. For color consistency, use materials from the same batch or lot number.

2.8 SEALANT PRIMER

Non-staining, quick-drying type recommended by sealant manufacturer and EIFS manufacturer.

2.9 ACCESSORIES

Conform to recommendations of EWIS manufacturer, including trim, edging, anchors, and expansion joints. All metal items and fasteners to be corrosion resistant.

2.10 JOINT SEALANT

Non-staining, quick-drying type compatible with the finish system type and grade, and recommended by both the sealant manufacturer and EWIS manufacturer.

2.11 BOND BREAKER

As required by EIFS manufacturer and recommended by sealant manufacturer and EWIS manufacturer.

2.12 BACKER ROD

Closed cell polyethylene free from oil or other staining elements and as recommended by sealant manufacturer and EWIS manufacturer. Do not use absorptive materials as backer rod. The backer rod should be sized 25 percent larger than the width of the joint.

PART 3 EXECUTION

3.1 EXAMINATION

Examine substrate and existing conditions to determine that the EWIS can be installed as required by the EWIS manufacturer and that all work related to the EIFS is properly coordinated. Surface must be sound and free of oil, loose materials or protrusions which will interfere with the system installation. If deficiencies are found, notify the Contracting Officer and do not proceed with installation until the deficiencies are corrected. The substrate must be plane, with no deviation greater than 6 mm when tested with a 3 m straightedge. Determine flatness, plumbness, and any other conditions for conformance to manufacturer's instructions.

3.2 SURFACE PREPARATION

Prepare existing surfaces for application of the EWIS to meet flatness tolerances and surface preparation according to manufacturer's installation instructions. Provide clean surfaces free of oil and loose material without protrusions adversely affecting the installation of the insulation board. For adhesively attached EWIS, existing deteriorated paint must be removed. Due to substrate conditions or as recommended by the system manufacturer, a primer may be required. Apply the primer to existing surfaces as recommended by the manufacturer. Use masking tape to protect areas adjacent to the EWIS to prevent base or finish coat to be applied to areas not intended to be covered with the EWIS. The contractor must not proceed with the installation until all noted deficiencies of the substrate are corrected.

3.3 INSTALLATION

Install EWIS as indicated, comply with manufacturer's instructions except as otherwise specified, and in accordance with the shop drawings. EWIS must be installed only by an applicator trained by the EWIS manufacturer. Specifically, include all manufacturer recommended provisions regarding

flashing and treatment of wall penetrations. Any materials that show visual evidence of biological growth due to the presence of moisture must not be installed on the building project.

3.3.1 Insulation Board

Unless otherwise specified by the system manufacturer, place the long edge horizontally from level base line. Stagger vertical joints and interlock at corners. Butt joints tightly. Provide flush surfaces at joints. Offset insulation board joints from joints in sheathing by at least 200 mm. Align drainage channels of integral drainage system or provide polypropylene drainage lath space to provide a path for any water weeped from behind the insulation to escape wall construction. Use L-shaped insulation board pieces at corners of openings. Joints of insulation must be butted tightly. Surfaces of adjacent insulation boards must be flush at joints. Gaps greater than 1.6 mm between the insulation boards must be filled with slivers of insulation. Uneven board surfaces with irregularities projecting more than 1.6 mm must be rasped in accordance with the manufacturer's instructions to produce an even surface. Attach insulation board as recommended by manufacturer. The adhered insulation board must be allowed to remain undisturbed for 24 hours prior to proceeding with the installation of the base coat/reinforcing mesh, or longer if necessary for the adhesive to dry. However, do not leave insulation board exposed longer than recommended by insulation manufacturer.

3.3.1.1 Adhesively Fastened Insulation Boards

Apply insulation board using adhesive spread with a notched trowel to the back of the insulation boards in accordance with the manufacturer’s instructions.

3.3.2 Base Coat and Reinforcing Fabric Mesh,

3.3.2.1 EWIS Systems

Allow the adhered insulation board to dry for 24 hours, or longer if necessary, prior to proceeding with the installation of the base coat/reinforcing fabric mesh. Install reinforcing fabric in accordance with manufacturer's instructions. Mix base coat in accordance with the manufacturer's instructions and apply to insulated wall surfaces to the thickness specified by the system manufacturer and provide any other reinforcement recommended by EWIS manufacturer. Trowel the reinforcing fabric mesh into the wet base coat material. Fully embed the mesh in the base coat. When properly worked-in, the pattern of the reinforcing fabric mesh must not be visible. Provide diagonal reinforcement at opening corners. Back-wrap or edge wrap all terminations of the EWIS. Overlap the reinforcing fabric mesh a minimum of 60 mm on previously installed mesh, or butted, in accordance with the manufacturer’s instructions.

3.3.3 Finish Coat

The base coat/reinforcing mesh must be allowed to dry a minimum of 24 hours prior to application of the finish coat. Surface irregularities in the base coat, such as trowel marks, board lines, reinforcing mesh laps, etc., must be corrected prior to the application of the finish coat. Apply and level finish coat in one operation. Obtain final texture by trowels, floats, or by spray application as necessary to achieve the required finish matching approved sample. Apply the finish coat to the

dry base coat maintaining a wet edge at all times to obtain a uniform appearance. The thickness of the finish coat must be in accordance with the system manufacturer’s current published instructions. Apply finish coat so that it does not cover surfaces to which joint sealants are to be applied.

3.4 JOINT SEALING

Seal EWIS at openings as recommended by the system manufacturer. Apply sealant only to the base coat or base coat with EWIS Manufacturer's color coating. Do not apply sealant to the finish coat.

3.4.1 Surface Preparation, Backer Rod, and Primer

Immediately prior to application, remove loose matter from joint. Ensure that joint is dry and free of finish coat, or other foreign matter. Install backer rod. Apply primer as required by sealant and EWIS manufacturer. Check that joint width is as shown on drawings but in no case shall it be less than 13 mm for perimeter seals and 20 mm for expansion joints. The width must not be less than 4 times the anticipated movement. Check sealant manufacturer's recommendations regarding proper width to depth ratio.

3.4.2 Sealant

Do not apply sealant until all EWIS coatings are fully dry. Apply sealant in accordance with sealant manufacturer's instructions with gun having nozzle that fits joint width. Do not use sealant that has exceeded shelf life or cannot be discharged in a continuous flow. Completely fill the joint solidly with sealant without air pockets so that full contact is made with both sides of the joint. Tool sealant with a round instrument that provides a concave profile and a uniformly smooth and wrinkle free sealant surface. Do not wet tool the joint with soap, water, or any other liquid tooling aid. During inclement weather, protect the joints until sealant application. Use particular caution in sealing joints between window and door frames and the EIFS wall and at all other wall penetrations. Clean all surfaces to remove excess sealant.

3.5 FIELD QUALITY CONTROL

Throughout the installation, the contractor must establish and maintain an inspection procedure to assure compliance of the installed EWIS with contract requirements. Work not in compliance must be removed and replaced or corrected in an approved manner. The inspection procedures, from acceptance of deliveries through installation of sealants and final acceptance must be performed by qualified inspector trained by the manufacturer. No work on the EIFS is allowed unless the inspector is present at the job site.

3.5.1 Third Party Inspection

Provide full time third party inspection during the entire process of installing the EWIS, from examination through cleanup. The third party inspector must be certified must be trained in the proper installation of EWIS.

3.5.2 Inspection Check List

During the installation and at the completion of installation, perform

inspections covering at the minimum all applicable items enumerated on the attached check list. The inspector must initial and date all applicable items, sign the check list, and submit it to the Contracting Officer at the completion of the EWIS erection.

CHECK LIST

Item	Description	Appr'd/Date
a.	Materials are handled and stored correctly.	
b.	Environmental conditions are within specified limits, including temperature not below 4 degrees C (40 degrees F), and the work is protected from the elements as required.	
c.	Preparation and installation is performed by qualified personnel using the correct tools.	
d.	Adjacent areas to which EWIS is not to be applied (such as on window and door frames) are protected with masking tape, plastic films, drop cloths, etc. to prevent accidental application of EIFS materials.	
e.	Control, expansion and aesthetic joints are installed as indicated or recommended. Accessories are properly installed.	
f.	Substrate is in-plane, properly attached, clean, dry, and free of contaminants. Concrete substrate is free of efflorescence.	
g.	Materials are mixed thoroughly and in proper proportions.	
h.	Adhesive is applied in sufficient quantity with proper-size notched trowel.	
i.	Mechanical attachments have proper spacing, layout and fastener depth.	
j.	Insulation boards are tightly abutted, in running bond pattern, board corners interlocked, L-shaped boards around openings, edges free of adhesive, and provision for joints. Gaps are filled and surfaces rasped.	
k.	Insulation adhesive must be allowed to dry (a minimum of 24-hours) prior to the application of the base coat.	
l.	Reinforcing fabric mesh is properly back-wrapped at terminations.	
m.	Reinforcing fabric mesh is fully embedded and properly placed. Corners are reinforced. Openings are diagonally reinforced. Mesh overlaps minimum 65 mm (2-1/2 inches).	
n.	Base coat thickness is within specified limits.	

CHECK LIST

Item	Description	Appr'd/Date
o.	The base coat/reinforcing fabric mesh must be allowed to dry (a minimum of 24-hours) prior to the application of the finish coat.	_____ ____
p.	Finish coat is applied with sufficient number of personnel and stopped at suitable points. Floats and methods of texturing are uniform.	_____ ____
q.	All flashings are properly installed.	_____ ____
r.	All joints are properly sealed in their entire length at time and under environmental conditions as specified by the manufacturer.	_____ ____
s.	All scaffolding, equipment, materials, debris and temporary protection are removed from site upon completion.	_____ ____

Name of Inspector:_____ Signed:_____
Date:_____

3.6 CLEANUP

Upon completion, remove all scaffolding, equipment, materials and debris from site. Remove all temporary protection installed to facilitate installation of EIFS.

-- End of Section --