SECTION 09220

Continuous Insulation under

Portland Cement Plaster (PWA104)

PART I –GENERAL

1.01 SUMMARY

A. Provisions of Division 01 apply to this section

B. Section Includes: all materials and installation for Portland Cement Plaster (Stucco) assembly as shown and detailed on the drawings and specified herein. System shall be as described as PWA 104 in the Western Conference Plaster and Energy Code Brochure.

C. Related Sections:

1. Section 05400: Metal Framing
2. Section 06100 : Rough Carpentry
3. Section 09100: Metal Support Assemblies & Suspended Ceilings
4. Section 09250: Gypsum Sheathing
5. Section 6160: Wood Sheathing

1.02 REFERENCES:

A. American Society for Testing and Materials (ASTM)

B. Technical Services Information Bureau (TSIB)

C. Western Conference of the Wall and Ceiling Institute

D. ICC-ES Evaluation Service

E. International Building Code

F. The Energy Code and Plaster Assemblies brochure (WCWCI)

1.03 DEFINITION

A. Three coat (7/8”) Plaster over Expanded Polystyrene (EPS) or Extruded Polystyrene (XPS) Foam insulation over Water-resistive Barrier, over Sheathed Framing.

B. A lamina (optional) is a fiberglass mesh embedded into an acrylic modified cement skim coat applied over the brown (base) coat that is compatible with finish coat. Contractor to provide square foot/yard installed price as an option.

1. Fiberglass Mesh is alkali resistant. (4-6 oz)
2. Acrylic Modified basecoat .

1.04 SUBMITTALS

A. Product Data: Submit manufacturer’s data sheets of all products to be installed, describing product size, finish and verify compliance with applicable code or approval (i.e., ICC Evaluation Report.). Do not proceed until submittals are approved in writing by Architect.

B. Samples: Submit 12 inch by 12 inch samples of each type of finish for review. Samples shall include color and texture variations expected.

C. Substitution Requests: Material or product substitutions will not be reviewed without a written cover statement from contractor explaining why and how the substitution will benefit the owner, including cost impact or savings, time impact or savings, warranty impact and service life. Reference letters are recommended.

D. Certificates: Provide certificates of any proprietary materials and/or systems to be installed for the product and that contractor is approved by manufacturer to install that product.

E. Submitted Mock-Up: Contractor to submit a 24 inch x 24 inch sample of Portland cement plaster with representative sample of workmanship, color and texture. Once approved by Architect, sample shall remain on project site for reference until project is complete.

1.05 Site Mock-Up: Contractor shall build a mock-up on site that includes a window, all metal trims to be used including decorative reveals, and any through wall penetrations such as vents and/or pipes. All sealants (by others) must be in place where required. Use workman, equipment and techniques proposed for use on the project. Mock-up may be constructed as part of the finished work provided it is clearly identified for future reference. Mock-up shall remain onsite and intact until final completion of job.

1.06 QUALITY ASSURANCE

A. Contractor shall be licensed, bonded and financially sound to complete project.

B. Contractor shall meet the following requirements:

1. Specialize in the scope of work, Lathers and Plasterers employed shall have completed a State approved apprenticeship program for Lathing and Plastering. Apprentices shall be currently enrolled in such program.

2. Contractor shall be able to meet scheduling requirements set at time of bid.

3. Document experience in quality work of similar scope.

4. Member in good standing of the Western Wall and Ceiling Contractors Association (www.wwcca.org), or approved by Architect.

C. Contractor shall comply with the following Standards:

1. ASTM C 1063- Installation of Lathing and Furring to Receive Portland Cement Plaster

2. ASTM C 926- Application of Portland Cement Plaster

3. International (or local) Building Code (most current edition)

4. Technical Service Information Bureau (TSIB) Technical Bulletins and “Plaster Textures & Acrylic Finishes” brochure.

5. Details provided by the TSIB for PWA-104

6. Manufacturer's product specifications and application guidelines.

7. The Energy Code and Plaster Assemblies Brochure.

D. Inspection: TSIB may be requested to provide visual inspections of wall surface conditions prior to installation, installation process and/or completed work. WWCCA Contractor agrees to follow any and all recommendations directed by the TSIB. WWW.TSIB.ORG

PART 2 – PRODUCTS

2.01 SHEATHING

A. Gypsum Sheathing: Comply with IBC Section 2506 Gypsum Board Materials.
B. Wood-based sheathing: Comply with IBC Chapter 23 Wood and/or Engineered Wood Association (APA)

2.02 WATER-RESITANT BARRIER (WRB)

A. A Minimum two layers of Grade D 30-minute or 60-minute building paper
B. Liquid Applied WRB Complying with ICC-ES AC 212 Acceptance Criteria for Water-resistive Coatings Used as Weather Resistive Barriers over Exterior Sheathing.
C. Spun-bonded olefin weather barriers manufactured and designed specifically for stucco.

2.03 FLASHINGS

A. Flashing at all fenestrations shall be reinforced coated vapor-barrier, grade A or B, sheet metal, vinyl or other code approved flashing material.

B. Self Adhered Flashing (SAF) must be compatible with the WRB, minimum 25 mils thick, self sealing and waterproof.

2.04 EPS/XPS FOAM INSULATION BOARD

A. Manufactured to comply with IBC Chapter 26 Plastic and/or ICC-ES AC 12 Acceptance Criteria for Foam Plastic Insulation, grooved for drainage. Flat

foam is acceptable when used in conjunction with an approved drainage matt. Foam shall be a type that allows the cement to bond. Rigid foam properties shall meet:

1. Minimum density 1.35 pounds per cubic foot (Type II)
2. Maximum thickness 2 inches.

2.05 SUSPENDED CEILINGS:

A. General: Comply with material provisions of ASTM C 1063; Proprietary Suspension Systems for plaster must be pre-approved by the Architect.

1. Hanger Wire: No. 8 galvanized and annealed low carbon steel.

~~2.~~ Runner and Cross Furring Channels: Cold-rolled galvanized steel channels, 1 ½ inches (runners) and ¾ inches (cross furring) a minimum of 33,000 psi yield strength and minimum .0538-inch bare steel thickness.

2.06 LATH:

A. Comply with ASTM C 847 for type and configuration. Paper-backed lath not recommended.

1. For metal framing:

a. Expanded metal: Galvanized diamond mesh, 2.5 or 3.4 lbs/sq yd, self-furred, complying with ASTM C 847.

b. 1.14lbs/sq ft or 1.95 lbs/sq yd welded wire lath with double parallel wires for attachment.

2. For wood framed walls

a. Woven Wire: Galvanized, self-furred, 17 gage with openings not to exceed 1 ½ inch, complying with ASTM C 1032.

b. Welded Wire: Galvanized, self-furred, 17 gage with openings not to exceed 1 ½ inch, complying with ASTM C 933. Not for use on ceilings (unless specifically designed)

2.07 ACCESSORIES:

1. Steel accessories to conform to ASTM A 653

2. Aluminum Accessories to conform to ASTM B221

3. Foundation Weep Screeds: Minimum 26 gage galvanized steel with a minimum 3 ½ inch solid attachment flange. Must be type that is designed to allow moisture to weep.

4. Control Joints: single-piece minimum 26 gage galvanized steel with a flange designed to engage plaster. Grounds to provide full 7/8 inch thickness of cement plaster.

5. Expansion joint: Two-piece joint designed to allow for movement in multiple directions. Made from aluminum, PVC or galvanized steel (see drawings for profile and material designation). Drip Screed: Minimum 26 gage galvanized steel with ground and holes to allow for drainage. Industry generic name #10 Drip.

6. Casing Beads: Minimum 26 gage galvanized steel with 7/8 inch grounds. Expanded flange casing beads to be approved by Architect.

7. Reveals: Size, shape and profile as designated on drawings. Actual sample must be submitted for approval. Reveals shall be aluminum, 4 – way intersections shall be factory mitered. Contractor to use intersection and termination clips as supplied by manufacturer.

8. Corner reinforcement: Welded wire corners made from galvanized steel. Square or Bullnose as per drawings. Plastic or (PVC) nose bead shall be used when an acrylic finish coat is used in lieu of a cement finish coat.

9. “Butterflies”: 5 inch by 16 inch strips of metal lath or cornerite, when the lamina option is not used.

10. Fasteners: All fasteners shall be corrosion resistant, delivered in sealed packages and clearly labeled

a. Wire: shall be galvanized annealed and 18 gage or 16 gauge as appropriate for use, comply with Federal Spec. FSQQ-W-461g.AS.

b. Screws: Wafer head “lathers” Type S with length that penetrates steel a minimum three (3) full threads or into wood framing ¾” Comply with ASTM C646

c. Nails: Galvanized 11 gage with a 3/8 inch diameter head and a length to penetrate wood framing (exclusive of sheathing) minimum ¾”inch. Comply with FS FF-N-105

d. Staples: Galvanized 16 gage with a minimum ¾ inch crown and legs that penetrate wood framing (exclusive of sheathing) minimum 1 inch. Comply with FS-FF-N-105

e. Powder Actuated Fasteners: for concrete and masonry substrates only. Comes with a factory washer (disc) and shall have manufacturer’s recommendation for the specific use intended. Must demonstrate a minimum 50 pound pull out value.

2.08 PLASTER AND RELATED MATERIALS

A. Portland Cements:

1. Portland Cement Type I or I/II , Comply with ASTM C 150

2. Masonry Cement Type I or I/II , Comply with ASTM C 91

3. Proprietary Blended Basecoats must demonstrate compliance with ASTM C 926 and provide a manufacturer’s warranty, and be pre-approved by Architect.

4. Plastic Cement, Comply with ASTM C 1328

B. Lime: Hydrated and Type S and complying with ASTM C 206

C. Sand: Washed, free of deleterious or friable material and well graded, conforming to ASTM C 144 or demonstrate sand has a successful performance of at least five (5) years.

D. Water: Clean and potable

E. Additives to the basecoat:

1. Fibers: ¼ to ½ inch long alkali resistant , polypropylene, nylon or fiberglass, complying with ASTM C 1116

2. Pumping Additive: May be used when approved by Architect and a letter from manufacturer that the pump additive will have no deleterious effect on the plaster mix.

3. Other Additives (air-entrainers, water reducers, accelerators and alternate plasticizers): To be approved as submitted.

F. Basecoat Mix Proportions:

1. Contractor shall select one of the following approved mix ratios and not alternate, switch or modify through the duration of the project unless approved by architect, follow TSIB recommendations: Scratch coat may be slightly richer in cement than brown coat: Proportions are listed in parts per volume. Sand is parts per "sum" of cementitious materials, lime is considered a cement. Fibers may be added to all mixes except proprietary basecoats. Pumping aids may be used if manufacturer's recommendations are closely followed. Quantities are volume and in parts:

a.

Option #1 -	Portland Cement	1
	Masonry Cement	1
	Sand	3 ½ to 4 ½
Option #2 -	Portland Cement	1
	Lime	¼ to ½
	Sand	2 ½ to 4
Option #3	Plastic Cement	1
	Sand	3 to 5

Option #4 Proprietary Basecoat

Follow all manufacturers' recommendations to ensure warranty

G. Lamina:

1. Acrylic modified cement basecoat with embedded 4 oz fiberglass mesh.

   ~~a.~~ Option 1: No lamina, plaster may crack.

   b. Option 2: Skim coat of acrylic modified cement only will crack less than conventional cement plaster system, but more than option 3.

   c. Option 3: Skim coat of acrylic modified cement and embedment of 4 oz mesh, provides superior crack resistance.

2. Verify lamina coating is compatible with selected finish.

H. Finish Coat:

1. Architect to select cement or acrylic finish and note on elevations.

2. Cement Finish: Cement, Lime, Sand

   a. Sand Finish (16-20)

   b. Machine Spray "Dash" (Light – Heavy)

   c. Lace or Spanish trowel

   d. Semi-smooth- (Santa Barbara or Mission) – shall include a polymer basecoat and mesh over the brown coat compatible with the cement finish coat

   a. Pre-blended colored finishes shall be bagged by a manufacturer member of the Stucco Manufacturers Association (SMA).

3. Acrylic Finish: Pre-blended and colored by a manufacturer that is a member of EIMA or the SMA.

a. Sand Finish (fine, medium, coarse)

b. Swirl

c. Semi-smooth finish

d. Natural Stone Aggregate

e. Ceramic bead finish

f. Metallic finish

4. Use a primer coat for the acrylic finish to ensure color uniformity

5. Fog coat for pre-blended colored stucco finishes manufactured by manufacturer for cement finish to ensure color uniformity (as needed)

PART 3 –EXECUTION

3.01 EXAMINATION

A. Verify that substrate and/or framing is complete and adequate to support rigid foam, lath and Portland cement plaster before starting work.

B. Notify Architect, owner or General contractor in writing of any unsatisfactory conditions not in compliance with industry or TSIB standards. Proceed as directed.

C. Do not cover wet substrate materials, i.e. wood, gypsum sheathing, or rigid foam.

D. A pre-construction meeting is recommended with the Architect and/or Owner, Primary Contractor and representatives of interfacing trades. (Windows, framing, flashing, roofing, sealants and any other stucco interfacing component.)

3.02 WATER-RESISTANT BARRIER (WRB) INSTALLATION

A. General: WRB is installed in a continuous fashion directly over gypsum or wood based sheathing and under foam board insulation.

B. Install two (2) layers WRB with the equivalent of 60 minute Grade D building paper over all sheathings.

1. Individual layer, double layer, fifty percent method/s are acceptable.

2. “Synthetic” or spun-bonded olefin weather barrier with drainage channels can be substituted for one or both layers of WRB.

C. Integrate with flashings to always create a “weatherboard” or “Shingling” configuration. (Upper layer always overlaps lower layers.)

D. Install WRB with a minimum two (2) inch horizontal laps and six (6) inch vertical laps. WRB is not required on ceilings or soffits.

E. Repair holes, tears or rips as recommended by the TSIB.

F. A Self Adhered Flashing (SAF) shall be used under the cement plaster in any locations where the plaster will be in less than a 60° plane or where water can pond. Apply SAF and WRB in a “Shingle Fashion”.

G. Liquid applied WRB to be installed per manufacturer’s specifications. Ensure compatibility with rigid foam.

H. Cement plaster shall not be installed in a horizontal position and subject to water ponding. The surface and framing shall be sloped and have a layer of SAF to extend over the WRB to six (6) inches onto the vertical wall surface.

3.03 EPS / XPS FOAM BOARD INSTALLATION

A. Install metal weep screed at base, and termination points when applicable, and WRB before installation of foam boards. Mark stud locations on WRB with visible marker.

B. Foam boards shall be installed in a running bond pattern (vertical joints staggered). Abut board edges tightly. Sliver gaps larger than ¼ inch. Do not align board edges with sheathing joints. Interlock and stagger inside and outside corners of board.

C. Secure foam boards to substrate with galvanized fasteners, sufficient to keep board in place, and to engage stud members. Do not counter sink fasteners excessively. Transfer stud location to face of foam boards. (marker or indentation line on face of foam)

D. Do not allow foam to remain on wall without application of lath in windy conditions.

3.04 LATH AND TRIM ACCESSORY INSTALLATION

A. Apply lath horizontally across framing or furring supports and lap lath in accordance with C 1063. Lath shall lap flanges of solid flanged trim accessories by a minimum of 50%.

B. Attach lath to framing supports approximately seven (7) inches on center along framing supports only.

C. Install trim accessories, i.e., casing beads, reveals, drip molds, corner reinforcement and control/expansion joints plumb, level and straight.

D. Trims that are not of sufficient dimension to encase foam board, those fastened directly to substrate, can be wire tied to lath. Use extreme care when using long fasteners, those of sufficient dimension to fasten through foam board, to not bend accessories.

E. All intersections and terminations shall be neatly mitered and align with adjoining trims. The grounds shall be set to provide a full 7/8 inch thick cement plaster.

F. Attach trim accessories to remain firm and solid during plastering. Attachment should not exceed 24 inches on center. Install longest length possible

G. Two-piece Expansion Joints must have the foam board and lath cut, and be attached to framing. Expansion joints govern over control joints (i.e. control joints shall terminate into expansion joints).

1. Place control joints as indicated on elevations. Typically this will be at corners of window and door openings. Panels should be as square as possible and should not exceed 144 square feet in size (unless otherwise noted on plans)

2. WRB shall be continuous behind all control joints and vertical reveals.

3. Horizontal reveals or two-piece expansion joints “may” have the WRB lap over the upper nail flange of the reveal. When this method is used;

the WRB must extend up from below the horizontal reveal continuous behind and up past the reveal a minimum of six (6) inches. The upper layers of WRB lap over the nail flange.

H. Walls subject to wind-driven rain shall have the trim accessory terminations, intersections and miters embedded in a daub of sealant.

3.05 SOFFITS AND CEILINGS

A. Suspended soffits/ceilings shall be erected so that stucco basecoat is true to line and level with an allowable minimum tolerance of ¼ inch in 10 feet.

B. Refer to ASTM C 1063 or TSIB for framing and lathing of suspended soffits/ceilings.

3.06 PLASTER INSTALLATION

A. General: Areas not to be plastered shall be protected and/or kept clean and free of cement. Basecoat at shall be plumb and level, tolerance shall be ¼ inch in ten (10) feet. Texture and color shall match mock-ups.

B. Cement plaster to be applied with hand tools or machine at contractor's option (Best Means & Methods).

C. Do not mix more plaster that can be used in 30 minutes. Do not re-temper. Add only enough water allow proper application of cement plaster.

D. Verify lath is complete, substrates sound and solid prior to plastering.

E. Ensure foam boards have not experienced UV degradation. (Yellowing)

F. Remove any UV degradation via brushing or washing of affected areas. Degraded foam may inhibit adhesion of the stucco scratch coat.

3.06 SCRATCH COAT

A. Apply from architectural break to architectural break with sufficient pressure to ensure keying into lath. No cold joints shall be allowed.

B. Apply in sufficient thickness to substantially cover the lath.

C. Immediately score (scarify) in a predominately horizontal direction.

D. Wipe down all corners and trim accessories and leave no cement protrusions that will interfere with application of brown coat.

E. Place “butterflies” in a diagonal direction delicately onto fresh scratch coat at the apex of window and door penetrations.

C. Keep scratch coat hydrated for a period of 48 hours. Follow ASTM and/or TSIB recommendations for curing.

D. Do not apply brown coat until scratch coat is firm and hard.

3.07 BROWN COAT

A. Pre-wet the scratch coat or concrete/masonry substrate (if required) to avoid excessive suction of moisture from brown coat to avoid accelerated evaporation.

B. Apply from architectural break to architectural break. No cold joints will be allowed.

C. Brown coat shall be applied and filled to the accessory trim grounds. Surface to be immediately darbied and/or rodded to a level and plumb plane.

D. When the initial moisture has left brown coat, “hard” float the brown coat to densify, consolidate and prepare for a finish coat. Sponge floats are not acceptable. A hard float shall be considered made from wood shingle, cork, plastic, compact felt or neoprene.

Option: Lamina may be applied 48 hours after brown coat is set.

3.08 ALTERNATE METHOD

A. Building codes and standards recognize the “alternate” method or “double-back” application method to apply the brown coat. This method is acceptable only after approval from Architect.

B. The brown coat may be applied to the scratch coat as soon as the scratch coat has attained sufficient rigidity to allow brown coat application if the application does not fracture the scratch. Hard floating and curing still applies.

3.09 CURING

A. It is important to keep cement basecoat hydrated and allow the cement to chemically cure and harden. Moist cure as needed, morning and/or evening as required producing a hard basecoat. Refer to TSIB recommendation.

B. Basecoat shall be allowed to cure a minimum of seven (7) days before applying a finish coat. If feasible allow the basecoat to cure 14 days prior to applying the finish coat.

C. No wet curing required for lamina coat.

3.10 FINISH COAT

A. Apply finish coat to match mock-ups in color and texture.

B. Acrylic finish coat: apply a primer coat for all finishes.

C. Provide sufficient crew size to maintain a wet edge. Cold joints are not to be tolerated. Scaffold lines should be kept to a minimum.

D. Maintain consistency and uniformity in application procedures and techniques.

E. Leave adjacent surfaces clean and free of plaster (stucco).

F. Leave protection of the plaster in place until finish coat is set.

G. Repair scaffold tie-is to maintain water-resistance of plaster assembly and blend with finish coat.

3.11 QUALITY CONTROL

A. Finish tolerance shall be ¼" in ten (10) feet. No "eye-catching" discrepancies shall be allowed. Refer to TSIB Technical bulletin on "Judging Exterior Plaster".

B. Avoid performing work that will result in patching.

C. In the event of a dispute over quality or an installation, the architect shall call on the TSIB. Contractor agrees to abide by TSIB decision for repair, alteration or remedy.

END OF SECTION

This is a guide specification and the TSIB cannot accept liability expressed or implied for alterations, deletions or modifications to this guide specification.