

Section 07 14 16

COLD FLUID-APPLIED HIGH BUILD WATERPROOFING

SPEC NOTE: This Guide Specification includes materials and methods for the application of Hyload LAM System, a cold applied, moisture cure, solvent free, elastomeric waterproofing membrane system. Typical applications include plaza decks, terraces, and parking structures preventing the penetration of water under hydrostatic pressure. This specification should be adapted to suit the requirements of individual projects. It is prepared in CSI-NMS three part format and should be included as a separate section under Division 7-Thermal and Moisture Protection.

PART 1: GENERAL

- 1.01 Section Includes
 - A. The General Conditions, the Supplementary Conditions, the Instructions to Bidders and Division One General Requirements shall be read in conjunction with and govern this section.
 - B. The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their work.

- 1.02 DESCRIPTION
 - A. Supply labor, materials, plant, tools and equipment to complete the Work as shown on the Drawings and as specified herein including, but not limited to the following:
 - 1. Plaza decks, Terraces and Parking Structures (by others),
 - 2. Elastomeric Waterproofing Membrane,
 - 3. Drain Board/Protection Board,

- 1.03 Related Work
 - A. Division 2 Site Work]
 - B. Division 3 Concrete Structural]
 - C. Division 4 Masonry
 - D. Division 5 Structural Steel
 - E. Division 7 Sealants & Flashings
 - F. Division 6 Rough Carpentry Thermal
 - G. Division 15 Mechanical

- 1.04 References
 - A. ASTM C 836: High Solid Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane.

- 1.05 Submittals
 - A. Prior to commencing the Work, submit references clearly indicating that the materials proposed have been installed for not less than five years on projects of similar scope and nature. Submit references for a minimum of ten projects.
 - B. Prior to commencing the Work, submit manufacturers complete set of standard details for sheet waterproofing.

- 1.06 Quality Assurance
 - A. Perform Work in accordance with the printed requirements of the membrane manufacturer and this specification. Advise designer of any discrepancies prior to commencement of the Work.
 - B. Maintain one copy of manufacturer's literature on site throughout the execution of the Work.
 - C. At the beginning of the Work and at all times during the execution of the Work, allow access to site by the waterproofing membrane manufacturers representative.
 - D. Materials used in this Section, including, primers, mastics and membranes, protection boards, composite drainage boards and expansion joint membranes shall be fully compatible and shall be sourced and or produced by one manufacturer.

- 1.07 Delivery, Storage and Handling
- A. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
 - B. Cold applied elastomeric membrane should be stored in closed containers.
 - C. Store membrane at temperature of 40 degrees F and above to facilitate handling.
 - D. Store adhesives and primers at temperatures of 40 degrees F and above to facilitate handling.
 - E. Keep solvents away from open flame or excessive heat.
- 1.08 Co-ordination
- A. Ensure continuity of the waterproofing membrane throughout the scope of this section.
 - B. Work shall be so scheduled as to provide a watertight seal at the end of each working day on the areas worked upon during the day.
- 1.09 SITE CONDITONS
- A. Environmental Requirements
 1. No installation work shall be performed during rainy or inclement weather and on frost or wet covered surfaces.
 - B. Protection
 1. Provide adequate protection of materials and work of this section from damage by weather backfilling operations and other causes.
 2. Protect work of other trades from damage resulting from work of this section. Make good such damage at own expense to satisfaction of the consultant.
 3. Apply protection board as soon as possible after installation of membrane.
- 1.10 ALTERNATES
- A. Submit requests for alternates in accordance with Section [XXXXXX] - [XXXXXX].
 - B. Alternate submission format to include:
 1. Submit evidence that alternate materials meet or exceed performance characteristics of Product requirements and documentation from an approved independent testing laboratory certifying that the performance of the waterproofing membrane system including drain boards and transition sheets, exceed the requirements of the National Building Code.
 2. Submit references clearly indicating that the membrane manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of fifteen years.
 3. Submit manufacturers' complete set of standard details for the roofing membrane systems showing a continuous plane of water tightness throughout the building envelope.
 - C. Submit requests for alternate to this specification a minimum of ten (10) working days prior to tender closing for evaluation. Include a list of 15 projects executed over the past ten (10) years.
 - D. Acceptable alternates will be confirmed by addendum. Substitute materials not approved in writing prior to tender closing shall not be permitted for use on this project.

SPEC NOTE: This Guide Specification includes a standard contractor's 2 year warranty and manufacturer's 5 year material warranty. An extended 10 year material warranty (5 + 5) is available for multi-ply systems provided Hyload LAM waterproofing systems are installed in accordance with the manufacturers written instructions.

- 1.11 WARRANTY
- A. For the Work of this Section, the 12 month warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to 24 months.
 - B. Contractor hereby warrants the waterproofing membrane for leak coverage in [accordance with GC24], but for two years.
 - C. Waterproofing membrane manufacturer hereby warrants the waterproofing membrane for leak coverage as a result of faulty materials for a period of ten years [five years for single ply application). Scope of warranty shall include materials required to return the membrane to a watertight condition.

PART 2: MATERIALS

2.01 MATERIALS

- A. Waterproofing membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.
 - 1. Acceptable Manufacturer: Hyload Waterproofing
5020 Panther Pkwy
Seville, Ohio 44273
(800) 457-4056
Web Site: www.hyloadhyproof.com

2.02 WATERPROOFING MEMBRANE (Basis-of-Design)

- A. Primary waterproofing membrane shall be Hyload LAM Cold Applied Elastomeric Membrane as manufactured by Hyload Inc., a moisture cure, solvent free elastomeric waterproofing compound having the following characteristics:
 - 1. Conforms to ASTM C 836
 - 2. Solvent content: 0%
 - 3. Non Flammable, Flash point > 450 F,
 - 4. Elongation: 200%,
 - 5. V.O.C < 40 grams/ Liter,
 - 6. Can be applied to "green" concrete.

2.03 FABRIC REINFORCEMENT

- A. Fabric reinforcement shall be Polyester Fabric as supplied by Hyload, a polyester reinforcement sheet capable of allowing the membrane to bleed through adequately to provide a monolithic reinforced membrane system.

SPEC NOTE: For concealed flashing, crack treatment, reinforcement & slip sheet membranes, CTEM waterproofing membranes may be either applied in LAM or self-adhered. The specifier may allow the contractor to choose or may select *CTEM* for applications set in LAM, or, for self-adhered applications.

2.04 CRACK TREATMENT:

- A. CTEM membrane shall be *Hyload Hyflash*[®] manufactured by Hyload Inc., a coal tar elastomeric (CTEM) waterproofing membrane having a minimum thickness of 35 mils. Hyload Hyflash shall be set in Hyload LAM (Liquid Applied Membrane)
- B. Self-Adhering waterproofing transition membrane for vertical walls shall be *Hyload Hyflash*[®] manufactured by Hyload, a coal tar elastomeric (CTEM) waterproofing membrane having a minimum thickness of 35 mils, self-adhering sheet membrane with a cross-laminated polyethylene film, and having a tensile strength of 1050 psi min to ASTM D638 and Elongation of 300% to ASTM D412.

2.05 FLASHING MEMBRANE

- A. Flashing membrane shall be *Hyload Hyflash*[®] as manufactured by Hyload Inc., a coal tar elastomeric (CTEM) waterproofing membrane having a minimum thickness of 35 mils. Product shall be tested in accordance with CGSB 37-GP-56M Type 2 Class C Grade 2. The upper and lower surface shall be sanded.
- B. Flashing membrane shall be set in Hyload LAM

2.06 Protection Course/Separation Sheet:

- A. Protection course board shall be *Hyload Hyglass*[®] manufactured by Hyload, Inc. Non-sanded prefabricated board with a mineral filled high melt point asphalt core, between non-woven glass fiber mats. Thickness shall be 3/16" with a nominal board size of 4' x 5', as supplied by Hyload, Inc., or approved equal.
- OR
- B. Protection course fabric shall be Hyload Protection Fabric, a 10.5 oz/sq yd, 100 mil thick puncture resistant polyester fabric.

- 2.07 PREFABRICATED DRAIN BOARDS: Two part prefabricated geocomposite drain board consisting of a formed polystyrene or PVC core covered on one side with a woven or non-woven polypropylene filter fabric:
- A. Hydrain 220: For vertical and horizontal installations, shallower depths with additional film attached to back side of membrane.
 - B. Hydrain 520: For vertical installations requiring high compressive strength and high flow capacity with additional film attached to back side of membrane.
 - C. Hydrain 650: For horizontal applications requiring high compressive strength, high flow capacity & woven geotextile. Suitable for use under topping slab in split slab applications.
- 2.08 PREFABRICATED DRAIN BOARD ACCESSORIES
- A. Securement Bars: Continuous 1/4 inch x 3/4 inch HDPE bar for screw attachment.
 - B. Moulding Strip: Continuous 3 1/2 inch wide 'Z' flashing strip to fit over exposed top edge of drain board.
 - C. Drain Board Plugs & Nails: HDPE pre-moulded washer to fit dimples c/w high strength, corrosion resistant concrete nails, UCAN AFH 37 or equal.
- 2.09 PENETRATION & TERMINATION SEALANT
- A. Sealant shall be a gun grade, one component, non-sag, silyl terminated polyether that is totally solvent free and contains no v.o.c.'s. The sealant shall be designed for use in active exterior joints, and shall meet or exceed Federal Specification No. 1 TT-S-00230C, Type II, Class A, ASTM C 90. The sealant shall be Hyload Structural Sealant or approved equal.
 - B. The sealant shall also have the following performance properties:
 1. Shear Strength 300 psi + (seven day ambient cure) ASTM D-1002.
 2. Elongation @ Break 300% ASTM D-412.
 3. Hardness Shore A 50-55 (fourteen day ambient cure) ASTM C-661
 4. Tack Free Time 35 minutes ASTM C-679
 5. Low Temperature Flex -20 degrees F. PASS
 6. Slump- Zero slump ASTM C-639
 7. Shrinkage No measurable shrinkage(fourteen day cure) ASTM D-2453
 8. Service Temperature -40 degrees F to 200 degrees F.

PART 3: EXECUTION

- 3.01 EXAMINATION
- A. Acceptable substrates are cast-in-place and precast concrete and plywood. Metal pan decks to which concrete is poured must be venting type. Lightweight concrete is not an acceptable substrate.
 - B. Verify that surfaces and conditions are ready to accept the work of this section. Commencement of the work or any parts thereof shall mean acceptance of the substrate.
- 3.02 PREPARATION
- A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar, frost or other contaminants. Fill spalled areas in substrate to provide an even plane and remove scaling or latent concrete. Remove curing compounds or any foreign matter detrimental to the adhesion of the primary waterproofing membrane or membrane flashings.
 - B. New concrete should be cured for a minimum of 3 days and must be dry before waterproofing membranes are applied. Concrete in vented metal pan decks must be cured a minimum of seven days.
 - C. Concrete shall have a wood float finish. Steel float finishes are too smooth and compromise the adhesion of the waterproofing system. Decks with a steel float finish must be sandblasted or equivalent prior to the application of the waterproofing system.
 - D. Prefabricated expansion joint assemblies should be in place prior to the application of the primary waterproofing assembly.
 - E. Substrate Preparation For Plywood
 1. Secure sheathing mechanically with self-tapping, non-corroding screws and 3 inches diameter metal plates spaced a maximum of 24 inches in either direction and to only the top flanges of the metal deck.

2. Lay sheathing with tightly butted joints at right angles to flute direction. Joints occurring along the widths of the sheathing to be continuously supported on a top flange of the metal deck.
3. Check tightness of joints and flatness of wood decking prior to proceeding with application of membrane. Ensure sheathing is continuously supported on framing.
4. The joints between boards of plywood decks shall be taped with a self-adhered crack treatment membrane prior to the application of protection sheet. Loose lay mop grade protection sheet over plywood sheathing and back nail, provide 6 inches end laps and 2 1/2 inches side laps. Stager end laps.
5. Before application of elastomeric waterproofing membrane, the substrate shall be clean and dry, free from surface water, ice, snow or frost, dust, dirt, oil, grease, of any other foreign matter detrimental to the adhesion of the elastomeric waterproofing membrane.
6. The contractor shall review all surfaces to receive the membrane and report any discrepancies prior to installing the waterproofing system.

3.03 INSTALLATION OF CRACK TREATMENT AND FLASHINGS

A. Joint Treatment For Precast Concrete Deck:

1. Reinforce joints along length of units with a strip of 12 inches wide Hylaod Hyproof set in an 18 inches wide, 55 mils thick coat of Hylaod LAM waterproofing membrane.
2. At joints occurring along the width of the precast units, reinforce with a minimum 12 inches wide crack treatment sheet embedded into an 18 inches wide, 55 mils thick coat of membrane.

B. Deck to Vertical Junctures:

1. Apply elastomeric membrane to provide a thickness of approximately 55 mils to the vertical faces and a minimum of 4 inches out onto the horizontal surface.
2. Embed flashing sheet in the wet elastomeric membrane, avoiding any wrinkles or fishmouths, extending a minimum of 3 inches out onto the horizontal surface.
3. Mechanically attach the flashing sheet to vertical surfaces with metal securement bar where height of flashing exceeds 12 inches. Lap flashing sheet minimum 3 inches on ends and bond together with 55 mils thick coat of elastomeric membrane.
4. At monolithic pour, use fabric reinforcement as option to flashing sheet. At monolithic wall/slab junctures, apply elastomeric waterproofing membrane at a minimum thickness of 55 mils to required height on the wall and at least 4 inch on the slab and embed Polyester Fabric into wet membrane.

C. Expansion Joints (Neoprene):

1. Expansion joint membrane can be applied in a bed of primary waterproofing membrane or adhered to substrate with expansion joint adhesive. Place expansion joint membrane into expansion joint adhesive as recommended by manufacturers' written instructions.
2. Loop expansion joint membrane down into expansion joint, embedded into a 55 mil thick layer of elastomeric membrane. Ensure that the depth of loop is a minimum 1-1/2 inches.
3. Extend expansion joint membrane minimum of 3 inches on each side of joint. Seal end joints a minimum of 6 inches and seal with a 55 mils coat of membrane. Fill loop with membrane as required.
4. Secure top of expansion joint membrane with continuous fixing bar at vertical wall locations.

D. Crack Treatment:

1. Seal cracks and joints 1/16 inch to 1/8 inch in width with a 12 inches wide, 55 mils thick coat of elastomeric membrane and a 6 inch wide strip of fabric reinforcement, centered over joint.
2. Seal cracks and joints 1/8 inch to 1/4 inch in width with a 12 inches wide, 55 mils thick coat of elastomeric membrane and a 6 inches wide strip of crack treatment or expansion joint membrane, centered over joint. Alternatively, apply 6 inch wide crack treatment membrane centered over cracks.

E. Membrane Flashing At Drains:

1. Coat areas around the drains with a 55 mils thick coat of elastomeric membrane.
2. Place flashing sheet over the coated drain flange and extending a minimum 6 inches around the flange.

3. Apply a second coat of 55 mils thick elastomeric membrane over the flashing sheet.
4. Apply clamping ring exerting sufficient pressure to affect a seal between clamping ring and membrane. Temporarily block all drains during the application of ballast, or other materials that might block the drains. Remove blocking when work is not in progress and upon completion.

F. Membrane Flashing At Protrusions:

1. At mechanical vent, protrusions and pipe penetrations provide flashing sheet set into 55 mils thick coat of elastomeric membrane. Overcoat and seal with membrane. Install clamps as required.
2. At pitch pockets, place pan on top of a 55 mils thick coat of elastomeric membrane and attach into roof deck. Set flashing sheet into 55 mils thick coat of elastomeric membrane over top of flange. Fill pitch pocket rubber asphalt sealer in order to shed water.

G. Membrane Flashing At Vertical Junctures:

1. Apply waterproofing membrane to prepared substrate in lengths of 6 feet or less.
2. Horizontal to vertical inside corner transition areas are to be pre-treated with a fillet bead of termination sealant extending 1/2 inch vertically and horizontally from the corner. Apply a minimum 8 inches wide strip of waterproofing membrane centred at the joint.
3. All outside corners are to be pre-treated with a minimum 8 inches strip of waterproofing membrane centred at the joint.
4. Where three or more planes come into contact reinforce with cut sections of waterproofing membrane reinforcing sheet as per manufacturer's instructions.
5. Provide 2-1/2 inches laps at both sides and ends. Press firmly into place. Promptly roll all laps with a counter top roller to effect seal. If more than one length is required on a vertical surface, apply in a shingle fashion.
6. Terminate membrane using termination sealant and counter flashing as indicated.
7. All laps within 12 inches of a 90 degree change in plane are to be sealed with termination sealant.

3.04 LAM COLD APPLIED ELASTOMERIC MEMBRANE APPLICATION

A. Application of First Layer (Base Coat):

1. Ensure deck and all substrates are ready to receive elastomeric waterproofing membrane.
2. Apply membrane by squeegee, roller or trowel ensuring full bond of membrane to substrate.
3. Apply first layer of elastomeric membrane evenly to a minimum thickness of 55 mils to form a continuous monolithic coating over horizontal and vertical surfaces including previously reinforced areas.
4. Apply fabric reinforcing sheet by embedding Polyester Fabric into coating ensuring no fish mouths or wrinkles are created and allow to set and firmly press into first layer of elastomeric membrane. Overlap fabric approximately 1/4 inch.

B. Application of Second Layer (Top Coat)

1. Allow first layer to firm up and cure prior to application of second layer.
2. Apply second layer of membrane over the fabric to a minimum thickness of 110 mils on horizontal surfaces providing a total thickness of 165 mils and 55 mils on vertical surfaces providing a total thickness of 110 mils.

3.05 INSTALLATION OF PROTECTION COURSE/SEPARATION SHEET (Horizontal)

- A. Protection course shall be placed onto top layer of elastomeric membrane while it is still wet and not skinned over.
- B. If using protection board, snugly place boards next to each other. If using protection fabric, lap 2 inches on side laps and 6 inches on end laps.
- C. For protection fabric, starting at the low points or drains lay the protection course membrane in full continuous sheets in a shingle pattern. Stager all end laps.

3.06 CURING AND PROTECTION:

- A. Allow membrane to dry thoroughly. Protect from rain until fully cured. Allow membrane to fully cure prior to installing protection board, drainage composite, covering material or backfilling. Patch or repair damaged areas using same material as original coating.
- B. Protect cured membrane from damage caused by backfilling by using Drainage Composite prior to commencing backfill.

3.07 QUALITY ASSURANCE TESTING

OPTION 1: FLOOD TEST

- A. Upon the completion of the Primary Waterproofing Membrane, Protection Course and all associated terminations the contractor shall flood test the system.
- B. Provide temporary stops and plugs for the roof drains within the test area.
- C. Flood test with minimum 2 inches of water for no less than 24 hours.
- D. Repair and retest the system for no less than 24 hours, report all deficiencies to the Consultant.
- E. Remove temporary stops and plugs.
- F. No other Work is to proceed with out prior direction from the Consultant.

OPTION 2: ELECTRIC FIELD VECTOR MAPPING (EFVM) TEST

- A. Leak detection of horizontal waterproofing shall be done prior to placement of protection board utilizing electrical conduction method as provided by International Leak Detection, phone 866-282-5325.
- B. Provide testing to verify membrane is free of holes, open seams and capillary defects that will allow water to pass.
- C. For areas to receive EFVM testing provide following:
 - 1. Thoroughly wet waterproofing membrane in area of test. Wetting can be accomplished by hand or mechanical spray devises. Membrane shall be wet during testing procedures. Poned water shall not be necessary.
 - 2. Place conductor wire on wetted, bare membrane. Secure wire with small strips of waterproofing or other compatible membrane or tape. Overburden, insulation, drainage composites and filter fabric shall not be installed prior to initial test.
 - 3. Allow testing technician to locate membrane breaches, if any. Technician shall mark on waterproofing membrane or surface exact location of defect and assign an identification number to each location.
 - 4. Visually inspect entire membrane area and repair breaches found. An EFVM retest shall be performed to confirm integrity of repair(s).
- D. Technician shall prepare a report of each day's test results containing a written description and photograph of defect(s) located and a schematic CAD drawing indicating location of conductor wire and of defect(s) located in testing field to within 1" of accuracy. This report shall be made available in hard copy.
- E. Submit written report of EFVM tests to Architect within 7 days following testing. Report results of tests, both successful and unsuccessful. In addition to results, report shall include date of test, project name, list of products being applied and tested, name of applicator, name of Contractor, and conditions causing failure of waterproofing in event of an unsuccessful test.

3.08 INSTALLATION OF DRAINAGE BOARD (Horizontal)

- A. Loose lay boards starting an low point of roof, the edge of the core flange shall be at the higher edges of the substrate, away from drains.
- B. Overlap in the direction of water flow. Pull back loose fabric to expose drain core and position core of second panel over the overlap flange of first panel.
- C. Bend drain board to create inside corners and cut board to create outside corners, provide 3 inches of extra fabric to wrap corner.
- D. Stagger or offset joints of drain board sheets.
- E. Place all subsequent sheets in an overlapping single fashion.

3.09 COVERING MATERIALS

- A. Insulation Application
 - 1. Install insulation loose over the separation sheet, firmly butting each insulation board to surrounding board.
 - 2. The end joints of the insulation shall be staggered.
 - 3. The insulation shall be cut to fit closely to all cants, protrusions and obstructions.
- B. Installation of Filter Fabric:
 - 1. Install filter fabric over the insulation as indicated on drawings. Overlap all edges a minimum 6 inches. Do not use lengths of less than 6 feet.
 - 2. At all penetrations and roof drains cut and fit sections of filter fabric to surround the penetration or drain, extend up vertically and secure. Slit fabric to fit tightly over penetrations, cut out around roof drains and other openings.
 - 3. Extend fabric up perimeter and vertical surfaces where required or as indicated on drawings.
 - 4. Provide temporary ballasting over Filter Fabric as required preventing displacement until permanent covering material installed.
- C. Installation Concrete Pavers
 - 1. Installation of concrete pavers to be completed after placement of curbs details as indicated on drawings.
 - 2. Place concrete pavers, where indicated, on pedestals, accurately aligned, and leveled with upper surface of pavers in plane with adjacent units. Cut pavers to fit irregularly shaped areas and around protrusions. Install according to manufacturer's instructions.

3.10 FIELD QUALITY CONTROL

- A. Final Inspection and Approval:
 - 1. Final inspection of completed work shall be carried out by the owner's representative, the contractor and Hyload.

3.11 CLEAN-UP

- A. Promptly as the work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing work.
- B. Clean to the consultant's approval, soiled surfaces, spatters, and damage caused by work of this Section.
- C. Check area drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from the site.

END OF SECTION