Global Coatings Advisors
Specification

GCA 6839: 2022

Water Resistant Membrane for Waterproofing Concrete and Insulated Concrete Form (ICF) Foundation Walls

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Specification Developer
Global Coatings Advisors

Global Coatings Advisors Board of Directors

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PART 1 GENERAL

1.1 Scope

The purpose of this specification is to establish the minimum level of requirements for recognition of both sheet and liquid water resistant membranes in Global Coatings Advisors certification and evaluation reports under Division B of the National Building Code of Canada 2015 (NBC 2015), the 2003 International Building Code (IBC), the 2003 International Residential Code (IRC), the BOCA National Building Code /1999 (BNBC), the 1999 Standard Building Code (SBC) and the 1997 Uniform Building Code (UBC), in the areas defined by the objectives and functional statements attributed to the applicable acceptable solutions for foundation wall waterproofing. The product is meant to be installed on cast-in-place concrete, concrete block, unit masonry, sheathing, or insulated concrete form (ICF) substrates.

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1.2 Definition

In this specification, the following definitions shall apply:

1.2.1 Water-resistant membrane: The term water-resistant membrane describes a material that is designed to serve as a secondary barrier behind an exterior cladding, providing a mechanism to resist penetration of liquid water that penetrates into the structural parts of a building or its finished spaces. Its principal purpose is to resist hydrostatic pressure exerted by moisture in the liquid form. Waterproofing membranes consist of waterproof plastic, polymeric or rubber-coated-fabric materials. When appropriately installed, the materials prevent water penetration into foundations, roofs, walls, basements, buildings, and structures.

1.2.2 Insulated concrete form (ICF): Insulated Concrete Forms or ICFs are forms used to hold fresh concrete that remain in place permanently to provide insulation for the structure they enclose, resulting in cast-in-place concrete walls that are sandwiched between two layers of

insulation material. The forms are often manufactured from high density styrofoam or other sorts of lightweight materials. The insulated concrete forms are either pre-formed interlocking blocks or separate panels joined with plastic or metal links. ICF evaluations will have a distinct GCA Evaluation Report as there will be important elements in the requirements and restrictions of the GCA Evaluation Report that are special to ICF applications.

1.2.3 Proponent – the manufacturer or sub-manufacturer of a product or its sole Canadian distributor

1.3 References

1.3.1 Division B of the National Building Code of Canada 2015 (NBC 2015),

1.3.2 2003 International Building Code (IBC)

1.3.3 2003 International Residential Code (IRC)

1.3.4 BOCA National Building Code /1999 (BNBC)

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1.3.5 1999 Standard Building Code (SBC)

1.3.6 1997 Uniform Building Code (UBC)

1.3.7 Canadian Construction Materials Centre (CCMC) Technical Guide for Cold, Spray- or Roller-Applied, Water-based Acrylic Elastomeric Membrane for Waterproofing Concrete and ICF Foundation Walls, CCMC-TG-071416.03, issued January 20, 2022.

1.3.8 American Society for Testing and Materials (ASTM)

1. C 836: Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
2. D 412: Standard Test Methods for Rubber Properties in Tension
3. D 522: Standard Test Method for Mandrel Bend Test of Attached Organic Coatings
4. D 570: Standard Test Method for Water Absorption of Plastics
5. D 903: Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
6. D 1876: Standard Test Method for Peel Release of Adhesives (T-Peel)
7. D 1970: Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
8. D 2370: Standard Test Method for Tensile Properties of Organic Coatings

9. D 3767: Standard Practice for Rubber - Measurements of Dimensions

10. D 5385: Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes

11. E 96: Standard Test Methods for Water Vapor Transmission of Materials

12. E 154: Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs, on Walls, or as Ground Cover

1.4 Submittals

1.4.1 Submit the following for approval:

1.4.1.1 Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations. Include certification of data indicating VOC (Volatile Organic Compound) content of all components of waterproofing system.

1.4.2 Samples: Submit representative samples of the following for approval:

1.4.2.1 Sheet membrane

1.4.2.2 Protection board

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1.5 Quality Assurance

1.5.1 Perform waterproofing work in accordance with NRCA ML104, The NRCA Roofing and Waterproofing Manual, National Roofing Contractors Association, Fifth Edition.

1.5.2 Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.

1.5.3 Mockups: Before beginning installation, install waterproofing to 100 sq. ft. of surface to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, texture, and execution quality. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 Project Conditions

1.6.1 Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer.

1.6.2 Proceed with installation only when substrate construction and preparation work is

complete and in condition to receive sheet membrane waterproofing.

1.6.3 Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.

1.6.4 Maintain adequate ventilation during application and curing of waterproofing materials.

1.7 Warranty

1.7.1 Waterproofing Membranes:

1.7.1.1 Special Installer's Warranty: Signed by Installer, covering Work of this Section, for warranty period of two years. Warranty includes removing and reinstalling protection board, drainage panels, insulation, and other over-burdens.

1.7.1.2 Special Manufacturer’s Water-tightness Warranty: Manufacturer’s standard form in which waterproofing manufacturer agrees to make, or cause to be made, repairs necessary to correct leaks resulting from ordinary wear and tear and the effects thereof and improper workmanship by the Installer. Conditions:

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a. Project pre-approved by manufacturer.
b. Project installed by approved Installer.
c. Independent inspector shall be engaged by manufacturer.
d. Warranty Period: ten years from date of Substantial Completion.

1.7.1.3 Exclusion: Warranty does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or information of new joints and cracks in substrate exceeding l/8 inch in width.

1.7.1.4 Repairs required, either permanent or temporary, to waterproofing membrane under this warranty to keep the decks watertight shall be made within 3 days after notice of the need for repairs. Should the Installer fail to make such repairs within the time period, the Owner may have such repairs made and charge the cost to the Installer.

1.8 Delivery, Storage, Handling

1.8.1 Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer’s instructions, recommendations and material safety data sheets. Remove damaged material from the site and dispose of in accordance with applicable regulations.

1.8.1.1 Do not double-stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.

1.8.1.2 Protect mastic and adhesive from moisture and potential sources of ignition.

1.8.1.3. Store drainage composite or protection board flat and off the ground. Provide cover on top and all sides.

1.8.2 Sequence deliveries to avoid delays, but minimize on-site storage.

1.8.3 Protect from damage from sunlight, excessive temperatures weather, and construction operations.

PART 2 PRODUCTS

2.1 Compliance

2.1.1 All manufacturers must comply with the requirements of this specification, and, additionally, with the requirements of a specific manufacturer's product if mentioned. Products of other manufacturers will be considered for acceptance if they equal or surpass the material criteria and functional attributes of the specification. Provide the "Substitution Request Form" with complete technical data for review for GCA's approval.

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2.2 Sheet Samples of the Water-Resistant Membrane

2.2.1 Installation, Sampling, and Testing: The proponent must arrange for an independent third-party organization acceptable to the GCA to obtain a random selection of installed samples on concrete substrates, ICF foam substrates, and free-films applied by a certified installer. The organization performing the product sampling must clearly identify the samples and produce a report providing detailed information on the material sampling (sampling date, method of sampling, sites where sampling was performed and sample reference number/identification, application/spray date, method, and other details). The identified samples must be prepared at, or transmitted directly to, the testing laboratory by the proponent or the sampling organization. The proponent must bear the costs of the material sampling and authorize the sampling organization to transmit the original sampling report directly to GCA. The submitted report is retained by GCA. The proponent must also authorize the sampling organization to submit a copy of the sampling report directly to the testing laboratory so that the identification of the samples it received can be verified and documented in the test report.

Testing must be performed at a recognized laboratory. The proponent must provide copies of the complete GCA specification, including appendices, to each testing laboratory in order to

obtain information regarding fees and the number of samples required for testing in accordance with the specification. The proponent must cover the costs of testing and authorize the testing organization to forward the original test report for each sample directly to GCA. The submitted test reports are retained by GCA.

2.2.2 Physical Properties:

Table 2.2.2.1 Material Physical Properties of the Membrane

Property	Unit	Test Method	Requirement
Dry film thickness	-	ASTM D4138	+/- 10% of the manufacturer's declared minimum
Tensile Strength	psi	ASTM D 412/D2370	250 minimum
Ultimate Elongation	%	ASTM D 412/D2370	200 minimum
Pull-off Adhesion	MPa/psi	ASTM D4541	>Cohesive strength of concrete/foam
Pliability/Flexibility	Bent 180 degrees over a 1 inch mandrel	ASTM D522	No cracks
Puncture Resistance	lbf	ASTM E 154	40 minimum
Hydrostatic-Head Resistance	feet	ASTM D 5385	150 minimum
Water Absorption	percent weight gain	ASTM D 570	1% maximum after 48 hour immersion
Water Permeance	Perm	ASTM E96	1 perm maximum
Low Temperature Flex	-	ASTM D522	Pass after 1000 hrs QUV at 0°F/-17°C

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2.3 ACCESSORIES

2.3.1 Primer: If necessary, water-based, surface treatment, VOC compliant primer recommended for substrate by manufacturer of the water-resistant membrane material.

2.3.2 Termination Bar: 1 inch wide by .I25 inch thick extruded aluminum with continuous sealant ledge and pre-punched 6 inches O.C. and 1 inch from ends.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

3.1.1 Inspection: Engage a site representative qualified by the waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, and application of the membrane, flashings, protection, and drainage components, and to furnish periodic reports to GCA as required.

3.2 EXAMINATION

3.2.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance. Verify that concrete has cured and aged (minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete).

3.2.2 Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

3.2.3 Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of Work shall imply acceptance for application.

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3.3 SUBSTRATE PREPARATION

3.3.1 Patch honeycomb, form tie holes (after removal of form tie cones), and grossly irregular surfaces of concrete. Patch with Portland cement grout, concrete, or epoxy grout.

3.3.2 Remove concrete fins and projections, concrete splatter, general surface dirt, and other foreign materials so as to leave wall and horizontal surfaces in a generally clean condition suitable for application of membrane. Clean surfaces with high pressure air to remove dust, loose stones, and debris.

3.3.3 For existing masonry or concrete surfaces, pressure clean using power washer unit at pressures of 2,000- 5,000 psi with flow rates of 4 to 14 gallons per minute. Use only clean, fresh water to remove oil, dirt, grease, chalk and other debris. Vary tip size and distance from the surface to be cleaned according to type/amount of contaminants on surface. Wash surface with clean water after cleaning to remove residue.

3.3.4 Apply the primer, if necessary, as per recommended by manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of primer. Delay application of membrane until primer is completely dry. Dry time will vary with weather conditions.

3.3.5 Seal cracks greater than l/16 inch in width with polyurethane sealant or covered with the same membrane as recommended by manufacturer. Remove dust and dirt from joints and cracks according to ASTM D4258.

3.3.6 Corners: Prepare, prime, and treat inside and outside corners.

3.3.7 Prepare, treat, and seal vertical surfaces at terminations and penetrations through waterproofing, and at drains and protrusions.

3.4 JOINT AND CRACK TREATMENT

3.4.1 Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C898 and waterproofing manufacturer's written instructions. Remove dust and dirt from joints and cracks, complying with ASTM D4258, before coating surfaces.

3.4.2 Prime substrate if necessary, as per Manufacturer’s recommendation and apply a single thickness of preparation strip/or liquid membrane extending a minimum of 6 inches along each side of joint. Apply waterproofing in two separate applications and embed a joint reinforcing strip in the first preparation coat.

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3.5 WATER RESISTANT MEMBRANE INSTALLATION

3.5.1 General Requirements:

3.5.1.1 Install materials and products in strict accordance with manufacturer’s written installation instructions and recommendations.

3.5.1.2 Install membrane within temperature limits recommended by manufacturer.

3.5.1.3 Prime all surfaces if necessary, with products manufactured by the membrane manufacturer in accordance to their instructions.

3.5.1.4 Apply waterproofing membrane on outside face of foundation walls where elevation of interior floors are below the ground level and elsewhere as indicated. Extend waterproofing up from top of footings to top of foundation wall or from top of foundation wall at interior locations to a point at least 12 inches below the lower floor grade.

3.5.1.5 Apply waterproofing membrane from the low point to the high point across the fall line so that laps shed water. Apply membrane in double thickness over properly sealed joints. Stagger membrane joints from those of the substrate.

3.5.1.6 At conclusion of work, cut out and patch all fish-mouths and wrinkles.

3.5.2 Edges:

3.5.2.1 Apply membrane waterproofing over the edge of the slab or over the top of the foundation.

3.5.2.2 At exterior walls, cover top edges of membrane with continuous termination bar, located 3 inches below top surface of required finish grades. Maintain straight bar lines horizontally and at slopes in grade, as approved by the Architect. Make bar ends square, tightly butt lengths together, and miter at changes of direction.

a. Back-coat bar with elastomeric mastic and secure to wall with termination bar fasteners. Locate a fastener one inch from a cut edge and space others uniformly at 6 inch centers.

b. Fill gap between top of bar and wall with multi-part polyurethane sealant.

c. Coat exposed surface of bar with elastomeric mastic.

3. At exterior walls, extend membrane horizontally over top of foundation wall footing in one continuous piece as recommended by the manufacturer.

4. Where vertical and horizontal membranes meet, extend membrane horizontally over top of foundation wall footing in one continuous piece, overlap underslab membrane 3 inches minimum and apply tape recommended by manufacturer centered over the lap. Roll firmly to assure tight seal.

3.5.3 Seams:

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3.5.3.1 For applications, overlap seams at least 2-1/2 inches. Apply succeeding sheet with a minimum 2- l/2-inch overlap and roll the entire membrane firmly and completely as soon as possible to minimize bubbles caused by out gassing of air or water vapor from the concrete.

3.5.3.2 Slit fish-mouths and overlap flaps, and repair with a patch, pressed, or rolled to make the seal, and seal edges of the patch with a troweled bead of Mastic.

3.5.3.3 Patch misaligned or inadequately lapped seams with membrane.

3.5.3.4 For vertical applications, use heavy hand pressure and a seam roller on the laps.

3.5.4 Terminations, Drains, Corners, and Flashing:

3.5.4.1 Double cover outside corners with an initial strip of sheet membrane 11 inches minimum width centered on the axis of the corner. Completely cover by the regular application (36 inches wide) of membrane waterproofing. Outside comers must be free of sharp edges. Inspect surfaces adjacent to corners and repair if necessary to provide a smooth dense surface.

3.5.4.2 At inside corners apply a fillet formed with epoxy mortar or latex modified cement mortar and a double coverage of membrane. Do not use fiber or wood cant strips.

3.5.4.3 Apply a double layer of membrane waterproofing around posts or projections at least 6 inches in directions and seal terminations with mastic.

3.5.5 Vertical installation requirements:

3.5.5.1 Instruct masonry contractor to strike all joints flush.

3.5.5.2 Install compatible drainage board system per membrane manufacturer and board system manufacturer’s recommendations.

3.5.5.3 Instruct contractor to carefully backfill over membrane and drainage systems.

3.6 COMPLETION

3.6.1 Cure waterproofing according to manufacturer's written recommendations, taking care to prevent contamination and damage during application stages and curing.

3.6.2 Protect installed insulation drainage panels from damage due to ultraviolet light, harmful weather exposures, physical abuse, and other causes. Immediately after installation, provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction.

4 Reporting

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4.1 The following information shall be provided by testing laboratories in report(s) intended for GCA’s evaluation and certification:

- Detailed information on material sampling identification, including the date the samples were received;
- The start and end date(s) of test(s);
- Detailed specimen preparation methods;
- Test procedure identification, including:
  - any deviations from the referenced test procedure,
  - reasons for the deviations,
  - additional instrumentation requirements, and
  - photos;
- All information mentioned in the reporting section of the referenced standards or standard test methods;
- Test results including explanations to account for any discrepancies;
- A concluding statement on the product’s performance with respect to the testing performed and the results obtained.
- Detailed observations, including photographs if applicable, describing the performance of the product and any comments the testing laboratory deems necessary to include. In the case of a revised test report, the document should contain a clear description of why the report was revised and what the revisions entailed; and

- The following statement: "Tested for GCA Evaluation Purposes."

4.2 At least once a year, an AMPP Senior Coating Inspector (NACE International Level 3) shall be sent by the waterproofing membrane manufacturer to the site to inspect substrate conditions, surface preparation, and application of the GCA certified membrane, flashings, protection, and drainage components, and to furnish a field inspection report to GCA. The following information shall be provided by the field inspector in report(s) intended for GCA's evaluation and certification:

- Detailed information on field installation identification, including the date of the installation and the date of the field inspection were conducted;
- Detailed installation scope, environmental conditions, installation methods, and quality control records;
- A concluding statement on the product's performance with respect to the field quality inspection performed and the results obtained.
- Detailed observations, including photographs if applicable, describing the identification of GCA certified membrane, the performance of the product and any comments the field coating inspector deems necessary to include. In the case of a revised field test report, the document should contain a clear description of why the field report was revised and what the revisions entailed; and
- The following statement: "Field Inspected for GCA Evaluation Purposes."

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