Preparing Activity: NAVFAC

Superseding
UFGS-07 14 00 (February 2012)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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SECTION 07 14 00

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08/23

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SECTION 07 14 00

FLUID-APPLIED WATERPROOFING
08/23

NOTE: This guide specification covers the requirements for fluid-applied elastomeric waterproofing systems for horizontal applications where this membrane is protected by a separate wearing course.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

NOTE: This guide specification should not be used to specify waterproofing of structures subject to hydrostatic pressure. Use Section 07 13 53 ELASTOMERIC SHEET WATERPROOFING to specify waterproofing structures subject to hydrostatic pressure. This waterproofing system includes the fluid-applied membrane, protection board, drainage layer, and insulation. It does not include structural deck, protection slab, or wearing course; these elements influence performance of the waterproofing system. See UFC 3-110-03, "Roofing" for design recommendations.

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Technical Reference: ASTM C898, "Standard Guide for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Separate Wearing Course." This document contains guidelines for design of the waterproofing system and may be used as a source of supplementary information.

1. Slope: Provide slope toward drains (after deflections due to applied load and creep) of not less than one percent 10 mm per meter 1/8 inch per foot. Slope should not exceed 20 mm per meter 1/4 inch per foot for structures subject to ASTM D5957 flood testing.

2. Wall Flashing: Extend wall flashing to at least 200 mm 8 inches above wearing surface for roof slopes exceeding 3:12 and to at least 150 mm 6 inches for slopes at or less than 3:12. Also, extend flashing minimum 300 mm 12 inches at roof hatch and skylight curbs. If top of flashing is recessed under a concrete wall, counterflashing is not necessary. Metal counterflashing is necessary at masonry wall intersections. Flash right-angle intersection of deck and wall with an elastomeric sheet.

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NOTE: Sketches are available in association with this Section to assist in preparing project drawings. These sketches are available at the following location: https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/forms-graphics-tables. This section contains both metric and inch-pound graphics.

NUMBER	TITLE
1	Basic Components of Cold Liquid-Applied Elastomeric Membrane Waterproofing System with Separate Wearing Course
2	Flashing at Cracks and Nonmoving Joints in the Concrete
3	Expansion Joint Flashing
4	Expansion Joint Flashing at Wall
5	Wall Flashing on Concrete Wall
6	Terminal Condition with Masonry Above Finish Wearing Surface at Grade
7	Wall - Deck Flashing

NUMBER	TITLE
8	Penetration Flashing
9	Drain Flashing

DO NOT INCLUDE THE SKETCHES OR LIST OF SKETCHES IN THE PROJECT SPECIFICATIONS. USE SKETCHES FOR PREPARING DETAILS ON THE DRAWINGS.
****

PART 1 GENERAL

1.1 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.
****

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.

ASTM INTERNATIONAL (ASTM)

ASTM C33/C33M	(2018) Standard Specification for Concrete Aggregates
ASTM C578	(2022) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM C836/C836M	(2018; R 2022) Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use With Separate Wearing Course
ASTM D1056	(2020) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D1751	(2018) Standard Specification for

	Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	(2018) Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D5957	(1998; R 2021) Standard Guide for Flood Testing Horizontal Waterproofing Installations
ASTM D7877	(2014) Standard Guide for Electronic Methods for Detecting and Locating Leads in Waterproof Membranes

1.2 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G". Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force, and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are

[for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Fluid-Applied Membrane

Membrane Primer

Elastomeric Sheet

Flexible Foam-Backed Elastomeric Sheet

Solvent

Moisture Meter

Protection Board

Bond Breaker

SD-06 Test Reports

Flood Testing; G[, [_____]]

Electronic Leak Testing; G[, [_____]]

SD-11 Closeout Submittals

Warranty

Information Card

Maintenance and Repair Training

Include copies of Safety Data Sheets for maintenance/repair materials.

1.3 PREWATERPROOFING CONFERENCE

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NOTE: Include the requirement for a prewaterproofing conference when the waterproofing system will be used on large areas, e.g., promenade decks over occupied space, and will require work by other trades, e.g., mechanical subcontractors, electrical subcontractor, or tile setters on the membrane.

****

Prior to starting application of waterproofing system, arrange and attend a prewaterproofing conference to ensure a clear understanding of drawings and specifications. Give the Contracting Officer 7 days advance written notice of the time and place of meeting. Ensure that the mechanical and electrical subcontractor, flashing and sheetmetal subcontractor, and other trades that may perform other types of work on or over the membrane after installation, attend this conference.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver waterproofing materials in manufacturer's original, unopened containers, with labels intact and legible. Containers of materials covered by a referenced specification number must bear the specification number, type, and class of the contents. Deliver materials in sufficient quantity to continue work without interruption. Store and protect materials in accordance with manufacturer's instructions, and use within their indicated shelf life. When hazardous materials are involved, adhere to special precautions of the manufacturer, unless precautions conflict with local, state, and federal regulations. Promptly remove from the site materials or incomplete work adversely affected by exposure to moisture or freezing. Store materials on pallets and cover from top to bottom with canvas tarpaulins.

1.5 ENVIRONMENTAL CONDITIONS

Apply materials when ambient temperature is 4 degrees C 40 degrees F or above for a period of 24 hours prior to the application and when there is no ice, frost, surface moisture, or visible dampness on the substrate surface. Apply materials when air temperature is expected to remain above 4 degrees C 40 degrees F during the cure period recommended by the manufacturer. Moisture test for substrate is specified under paragraph MOISTURE TEST. Work may be performed within heated enclosures, provided the surface temperature of the substrate is maintained at a minimum of 4 degrees C 40 degrees F for 24 hours prior to the application of the waterproofing, and remains above that temperature during the cure period recommended by the manufacturer.

1.6 WARRANTY

Provide system material and workmanship warranties meeting specified requirements. Provide revisions or amendment to standard membrane manufacturer warranty to comply with the specified requirements. Provide a manufacturer's warranty that has no dollar limit, covers full system water-tightness, and has a minimum duration of 20 years.

1.6.1 Membrane Manufacturer Warranty

****

NOTE: Insulated and routinely occupied facilities or facilities containing sensitive equipment or operations require a warranty of not less than 15 years. Designer may specify 5- or 10-year manufacturer warranty on facilities of small roof area and of minor importance where interiors and contents are not severely impacted by potential water intrusion. Environmentally controlled interiors require minimum 10-year warranty regardless of small size.

****

Provide the membrane manufacturer's 20-year no dollar limit system materials and installation workmanship warranty, including flashing, insulation, and accessories necessary for a watertight system construction. Write the warranty directly to the Government commencing at time of Government's acceptance of the work. Provide the following statements for such warranty:

a. If within the warranty period the system, as installed for its intended use in the normal climatic and environmental conditions of the facility, becomes non-watertight, shows evidence of moisture intrusion within the assembly, blisters, splits, tears, cracks, delaminates, separates at the seams, or shows evidence of excessive weathering due to defective materials or installation workmanship, the repair or replacement of the defective and damaged materials of the system assembly and correction of defective workmanship are the responsibility of the membrane manufacturer. All costs associated with the repair or replacement work are the responsibility of the membrane manufacturer.

b. The warranty must remain in full force and effect, including emergency temporary repairs performed by others, when the manufacturer or his approved applicator fail to perform the repairs within 72 hours of notification.

1.6.2 Roofing System Installer Warranty

The system installer must warrant for a minimum period of two years that the system, as installed, is free from defects in installation workmanship, to include the membrane, flashing, insulation, accessories, attachments, and sheet metal installation integral to a complete watertight system assembly. Write the warranty directly to the Government. The system installer is responsible for correction of defective workmanship and replacement of damaged or affected materials. The system installer is responsible for all costs associated with the repair or replacement work.

1.6.3 Continuance of Warranty

Repair or replacement work that becomes necessary within the warranty period must be approved and accomplished in a manner so as to restore the integrity of the system assembly and validity of the membrane manufacturer warranty for the remainder of the manufacturer warranty period.

PART 2 PRODUCTS

2.1 FLUID-APPLIED MEMBRANE

****
NOTE: ASTM C836/C836M is a materials performance specification; it does not specify any particular elastomer or elastomeric-extender combination.
****

ASTM C836/C836M.

2.2 MEMBRANE PRIMER

As recommended by the fluid-applied membrane manufacturer unless specifically prohibited by the manufacturer of the fluid-applied membrane.

2.3 SEALANT

****
NOTE: Specify sealant conforming to FS TT-S-227 or FS TT-S-230 in Section 07 92 00 JOINT SEALANTS. If

no such section is required, specify sealant in this section.
****

As specified in Section 07 92 00 JOINT SEALANTS.

2.4 SEALANT PRIMER

As specified in Section 07 92 00 JOINT SEALANTS.

2.5 BACKING MATERIAL

****
NOTE: Include the following paragraph in Section 07 92 00 JOINT SEALANTS.

"Special Backing Material: Backing materials used for sealants in conjunction with fluid-applied waterproofing are specified in this section."
****

Premolded, closed-cell, polyethylene, or polyurethane foam rod having a diameter 25 percent larger than joint width before being compressed into joint. Provide bond breaker of polyethylene film or other suitable material between backing material and sealant.

[2.6 JOINT FILLER

****
NOTE: Include this section where joints are required to be filled. Include the reference to Section 03 30 00 CAST-IN-PLACE CONCRETE where that specification includes the joint filler requirements. Include the appropriate ASTM here where the requirements are not in another spec section.
****

As specified in [Section 03 30 00 CAST-IN-PLACE CONCRETE,] [ASTM D1751] [or] [ASTM D1752].

]2.7 BOND BREAKER

As recommended by the fluid-applied membrane manufacturer. Bond breaker must not interfere with the curing process or other performance properties of the fluid-applied membrane. Submit material description and physical properties, application details, and recommendations regarding shelf life, application procedures, and precautions on flammability and toxicity.

2.8 ELASTOMERIC SHEET

Preformed; as recommended by the fluid-applied membrane manufacturer. Bond strength between the fluid-applied membrane and the preformed elastomeric sheet must be a minimum of 7 kPa one psi when tested in accordance with ASTM C836/C836M.

2.9 ELASTOMERIC SHEET ADHESIVE

As recommended by the elastomeric sheet manufacturer.

2.10 FLEXIBLE FOAM-BACKED ELASTOMERIC SHEET

Flexible foam-backed elastomeric sheet for protection over preformed elastomeric sheet at expansion joints must be 13 mm 1/2 inch thick, minimum, closed cell foam conforming to ASTM D1056, Type 2, Class B, Grades 2 or 3, factory-bonded to 2 mm 1/16 inch thick, minimum, preformed elastomeric sheet.

2.11 PROTECTION BOARD

Premolded bitumen composition board, 3 mm 1/8 inch minimum thickness or other composition board compatible with the fluid-applied membrane.

2.12 DRAINAGE COURSE AGGREGATE

ASTM C33/C33M, size No. 8.

2.13 INSULATION

Polystyrene foam conforming to ASTM C578, Class IV, thickness as [indicated] [required by indicated R-value].

PART 3 EXECUTION

3.1 PREPARATION

Coordinate work with that of other trades to ensure that components to be incorporated into the waterproofing system are available when needed. Inspect and approve surfaces immediately before application of waterproofing materials. Remove laitance, loose aggregate, sharp projections, grease, oil, dirt, curing compounds, and other contaminants which could adversely affect the complete bonding of the fluid-applied membrane to the concrete surface.

3.1.1 Flashings

Make penetrations through sleeves in structural slab watertight before application of waterproofing. After flashing is completed, cover elastomeric sheet with fluid-applied waterproofing during waterproofing application.

3.1.1.1 Drains

Make drain flanges flush with surface of structural slab. Apply a full elastomeric sheet around the drain, with edges fully adhered to drain flange and to structural slab. Do not adhere elastomeric sheet over joint between drain and concrete slab. Do not plug drainage or weep holes. Cover elastomeric sheet with fluid-applied waterproofing during waterproofing application. Lap elastomeric sheet a minimum of 100 mm 4 inches onto concrete slab.

3.1.1.2 Penetrations and Projections

Flash penetrations and projections through structural slab with an elastomeric sheet adhered to the concrete slab and the penetration. Leave elastomeric sheet unadhered for 25 mm one inch over joint between penetration and concrete slab. Adhere elastomeric sheet a minimum of 150 mm 6 inches onto horizontal deck.

3.1.1.3 Walls and Vertical Surfaces

Flash wall intersections which are not of monolithic pour or constructed with reinforced concrete joints with an elastomeric sheet adhered to both vertical wall surfaces and concrete slab. Flash intersections which are monolithically poured or constructed with reinforced concrete joints with either an elastomeric sheet or a vertical grade of fluid-applied waterproofing adhered to vertical wall surfaces and concrete slab. Leave sheet unadhered for a distance of 25 mm one inch from the corner on both vertical and horizontal surfaces.

3.1.2 Cracks and Joints

Prepare visible cracks and joints in substrate to receive fluid-applied waterproofing membrane by placing a bond breaker and an elastomeric slip sheet between membrane and substrate. Apply a 50 mm 2 inch bond breaker to cracks that show movement followed by an elastomeric sheet adhered to the deck. Nonmoving cracks must be double coated with fluid-applied waterproofing.

3.1.3 Priming

Prime surfaces to receive fluid-applied waterproofing membrane. Apply primer as required by membrane manufacturer's printed instructions.

3.2 SPECIAL PRECAUTIONS

Protect waterproofing materials during transport and application. Do not dilute primers and other materials, unless specifically recommended by materials manufacturer. Keep containers closed except when removing contents. Do not mix remains of unlike materials. Thoroughly remove residual materials before using application equipment for mixing and transporting materials. Do not permit equipment on the project site that has residue of materials used on previous projects. Use cleaners only for cleaning, not for thinning primers or membrane materials. Ensure that workers and others who walk on cured membrane wear clean, soft-soled shoes to avoid damaging the waterproofing materials.

3.3 APPLICATION

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NOTE: Select second set of brackets with thicker application for vegetative roofs, and select first set of brackets for most other applications. Insert desired thickness if different than these two options.

****

Over primed surfaces, provide a uniform, wet, monolithic coating of fluid-applied membrane, [1.5 mm 60 mils thick, plus or minus 0.125 mm 5 mils] [5.5 mm 215 mils minimum] [_____] by following manufacturer's printed instructions. Apply material by trowel, squeegee, roller, brush, spray apparatus, or other method recommended by membrane manufacturer. Check wet film thickness as specified in paragraph FILM THICKNESS and adjust application rate as necessary to provide a uniform coating of the thickness specified. Where possible, mark off surface to be coated in equal units to facilitate proper coverage. At expansion joints, control joints, prepared cracks, flashing, and terminations, carry membrane over

preformed elastomeric sheet in a uniform 1.5 mm 60 mil thick, plus or minus 0.125 mm 5 mils, wet thickness to provide a monolithic coating. If membrane cures before next application, wipe previously applied membrane with a solvent to remove dirt and dust that could inhibit adhesion of overlapping membrane coat. Use solvent recommended by the membrane manufacturer, as approved.

3.3.1 Work Sequence

Perform work so that protection board is installed prior to using the waterproofed surface. Do not permanently install protection board until the membrane has passed the flood test specified under paragraph FLOOD TESTING. Move material storage areas as work progresses to prevent abuse of membrane and overloading of structural deck.

3.3.2 Protection Board

Protect fluid-applied membrane by placing protection board over membrane at a time recommended by the membrane manufacturer. Protect membrane application when protection board is not placed immediately. Butt protection boards together and do not overlap.

3.3.3 Drainage Course

Place drainage course where shown after flood tests are completed and concrete protection slab or wearing course is ready to be installed.

3.3.4 Insulation

Place insulation of thickness indicated, on top of drainage course just prior to placement of concrete protection slab.

3.4 FIELD QUALITY CONTROL

3.4.1 Moisture Test

Prior to application of fluid-applied waterproofing, measure moisture content of substrate with a moisture meter in the presence of the Contracting Officer. Do not begin application until meter reading indicates "dry" range as per manufacturer's installation instructions.

3.4.2 Film Thickness

Measure wet film thickness every 10 square meters 100 square feet during application by placing flat metal plates on the substrate or using a mil-thickness gage especially manufactured for the purpose.

3.4.3 Flood Testing

After application and curing is complete, flood test the waterproofed area in accordance with ASTM D5957. Flood test area with water to achieve a minimum cover of 25 mm one inch but not exceed a maximum depth of 100 mm 4 inches at the lowest point. Maintain water height so as not to exceed a minimum level of 50 mm 2 inches below the edge of flashings. Plug drains and fill waterproofed area with water to a depth of 50 mm 2 inches. A minimum 48-hour cure time, or longer cure time if recommended by the membrane manufacturer, is required prior to flood testing. Allow water to stand 24 hours. Test watertightness by measuring water level at beginning and end of the 24-hour period. If water level falls, drain water, allow

installation to dry, and inspect. Make repairs or replace as required and repeat the test. Do not proceed with work before approval of repairs or replacement.

[3.4.4 Electronic Leak Testing

****
NOTE: Include this section to require electronic leak testing where spaces below the waterproofed area will be occupied or critical to operations.
****

After application and curing is complete, and prior to installation of any wearing course, conduct electronic testing to test for leaks in accordance with ASTM D7877. The test agency must be consulted prior to installation of the waterproofing system regarding issues such as conductivity, grounding, and insulating membranes to confirm requirements for the system to ensure safe and thorough electronic testing.

]3.5 MAINTENANCE AND REPAIR TRAINING

Provide written and verbal instructions on proper maintenance procedures to designated Government personnel. Verbal instructions must be provided by a competent representative of the membrane manufacturer and include a minimum of 4 hours on maintenance and emergency repair of the membrane. Include a demonstration of membrane repair, and give sources of required special tools. Provide information on safety requirements during maintenance and emergency repair operations.

3.6 INFORMATION CARD

For each system application, provide a minimum 215 mm 8-1/2 inch by 11 inch information card for facility records and a card laminated in plastic and framed for interior display at access point, or a photoengraved one mm 0.032 inch thick aluminum card for exterior display. Identify facility name and number; location; Contract number; approximate area; detailed system description, including deck type, membrane, number of plies, method of application, manufacturer, insulation and cover board system and thickness; presence of tapered insulation for primary drainage, presence of vapor retarder; date of completion; installing Contractor identification and Contract information; membrane manufacturer warranty expiration, warranty reference number, and contact information. Install card at system access location as directed by the Contracting Officer and provide a paper copy to the Contracting Officer.

FORM 1
FLUID-APPLIED WATERPROOFING SYSTEM COMPONENTS
1. Contract Number
2. Date Work Completed
3. Project Specification Designation
4. Substrate Material
5. Slope of Substrate
6. Drains Type/Manufacturer
7. Waterproofing
a. Membrane
b. Sealant
c. Elastomeric Sheet
d. Materials Manufacturer(s)
8. Protection Board
a. Type
b. Thickness
c. Manufacturer's Name
9. Drainage Course Material Graduation
10. Insulation
a. Type
b. Thickness
c. Manufacturer's Name
11. Protection Slab
a. Material
b. Thickness
c. Support

FORM 1	
FLUID-APPLIED WATERPROOFING SYSTEM COMPONENTS	
d. Joint System	
12. Wearing Course	
a. Type	
b. Slope	
c. Joint System	
d. Sealant/Gasket Type	
13. Wearing Surface Type	
Manufacturer's Name	
14. Warranty	
a. Manufacturer warranty expiration	
b. Warranty reference number	
15. Statement of Compliance or Exception	
Contractor's Signature	Date Signed
Inspector's Signature	Date Signed

-- End of Section --