TAC: Special Occupancy

This document created by the Florida Department of Business and Professional Regulation -

850-487-1824

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Approved as Submitted : 4**

Total Mods for report: 29

Sub Code: Building

1

SP12068

Date Submitted	02/13/2025	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Requires professional engineer or architect to design to meet wind load requirements of the FBC.

Rationale

Revises the name of the section to Roof not "Roofing" because it has to do more with other items than "roofing" . Revises the requirement for structural systems to be designed by a structural engineer for each location to meet wind load requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

SP12068-A1

Proponent James gregory **Submitted** 8/22/2025 2:42:08 PM **Attachments** No

Rationale:

Although this modification was previously approved, this comment is meant to replace it. After consultation with AHCA and BOAF and to better a line the language in all of these similar sections, this comment offers revised language. Instead of requiring a PE or architect, it relies on engineering to meet the wind load requirements. This could be through and NOA or Product approval process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code

There is no impact to industry.

Impact to small business relative to the cost of compliance with code

There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code

SP12068-A1Text Modification

449.4.2.4 Roofing and roof standards.

449.4.2.4.2 All new roof appendages such as ducts, tanks, ventilators, receivers, dx condensing units and decorative mansard roofs and their attachment systems shall be structurally engineered to meet the wind load requirements of ~~the applicable building code~~ this code.

Page: 1

Mod12068_A1_TextOfModification.pdf

SP12068Text Modification

449.4.2.4 ~~Roofing~~ Roof standards.

449.4.2.4.2.

All new roof appendages such as ducts, tanks, ventilators, receivers, dx condensing units and decorative mansard roofs and their attachment systems shall be ~~structurally engineered~~ designed to meet the wind load requirements of ~~the applicable building code~~ this code by a professional engineer or architect

Page: 1

Mod12068_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Approved as Submitted : 4**

Total Mods for report: 29

Sub Code: Building

2

SP12081

Date Submitted	02/13/2025	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Revises this section to exclude exhaust fans from the impact requirements and limit the height of protective enclosures to 30 feet above finished grade.

Rationale

Exhaust fans are not disabled when impacted but are subject to be blown off the roof so they require special anchoring systems but not impact protection.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FSP12081-A1

Proponent James gregory **Submitted** 8/22/2025 2:18:59 PM **Attachments** No

Rationale:

Although this modification was previously approved, this comment is meant to replace it. After consultation with AHCA and to better aline the language in all of these similar sections, this comment offers revised language.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

SP12081-A1Text Modification

450.4.2.5.4

~~Critical systems and utilities identified in this section shall be protected from debris impact by a housing or enclosure complying with the impact protection standards in Sections 1626.2 through 16.26.4 when located at or below 30 feet above the finished grade of the building. Roof mounted equipment shall have fastening systems designed to meet the wind load requirements of the *Florida Building Code*.~~

Utilities identified in Section 450.4.2, shall be protected from debris impact by an equipment housing or a screening enclosure complying with the impact protection standards in accordance with Section 1626 when located at or below 30 feet above the finished grade of the building. Where screening enclosures are used, the height of the enclosure shall be not less than the height of the protected equipment up to 30 feet above finished grade, and shall provide clearances required for the maintenance and continuous operation of the equipment. Where the housing and louvers are designed to provide the required equipment protection, sufficient standoff shall be provided to prevent damage to internal components from deflection of the cladding as a result of impact. All roof mounted equipment shall have fastening systems structurally engineered to meet the wind load requirements of the code.

Page: 1

Mod12081_A1_TextOfModification.pdf

SP12081Text Modification

450.4.2.5.4

~~Critical systems and utilities identified in this section shall be protected from debris impact by a housing or enclosure complying with the impact protection standards in Sections 1626.2 through 16.26.4 when located at or below 30 feet above the finished grade of the building. Roof mounted equipment shall have fastening systems designed to meet the wind load requirements of the *Florida Building Code*.~~

Systems and utilities identified in section 450.4 for impact protection, except exhaust fans, shall be protected from damage by large missile impact by an equipment housing or a screening enclosure complying with the impact protection standards in accordance with Section 1626 when located at or below 30 feet above the finished grade of the building. Where screening enclosures are used, the height of the enclosure shall be not less than the height of the protected equipment up to 30 feet above finished grade, and shall provide clearances required for the maintenance and continuous operation of the equipment. Where the housing and louvers are designed to provide the required equipment protection, sufficient standoff shall be provided to prevent damage to internal components from deflection of the cladding as a result of impact. Roof mounted equipment shall have fastening systems designed to meet the wind load requirements of the *Florida Building Code*, *Building*.

Page: 1

Mod12081_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Approved as Submitted : 4**

Total Mods for report: 29

Sub Code: Building

3

SP12082

Date Submitted	02/13/2025	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Requires professional engineer or architect to design to meet wind load requirements of the FBC.

Rationale

Revises the name of the section to Roof not "Roofing" because it has to do more with other items than "roofing" . Revises the requirement for structural systems to be designed by a structural engineer for each location to meet wind load requirements.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

SP12082-A1

Proponent James gregory **Submitted** 8/22/2025 2:38:25 PM **Attachments** No

Rationale:

Although this modification was previously approved, this comment is meant to replace it. After consultation with AHCA and BOAF and to better a line the language in all of these similar sections, this comment offers revised language. Instead of requiring a PE or architect, it relies on engineering that to meet the wind load requirements. This could be through and NOA or Product approval process.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code

There is no impact to industry.

Impact to small business relative to the cost of compliance with code

There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

SP12082-A1Text Modification

450.4.2.4 Roofing and roof standards.

450.4.2.4.2. All new roof appendages such as ducts, tanks, ventilators, receivers, dx condensing units and decorative mansard roofs and their attachment systems shall be structurally engineered to meet the wind load requirements of ~~the applicable building code~~ this code.

Page: 1

Mod12082_A1_TextOfModification.pdf

SP12082Text Modification

450.4.2.4 ~~Roofing~~ Roof standards.

450.4.2.4.2.

All new roof appendages such as ducts, tanks, ventilators, receivers, dx condensing units and decorative mansard roofs and their attachment systems shall be ~~structurally engineered~~ designed to meet the wind load requirements of ~~the applicable building code~~ this code by a professional engineer or architect

Page: 1

Mod12082_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Approved as Submitted : 4**

Total Mods for report: 29

Sub Code: Building

4

SP11980

Date Submitted	02/11/2025	**Section**	1612.4.2	**Proponent**	Dallas Thiesen
Chapter	16	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Approved as Submitted				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

Summary of Modification

Modifies the requirements for pool equipment installed in Special Flood Hazard Zones.

Rationale

Swimming pool and spa equipment is designed for outdoor use and is generally weather resistant. Pool and spa equipment is not designed to work at a substantially different elevation than the pool or spa that it is serving, requiring pool and spa equipment to be installed above grade can cause loss of prime, can damage to the equipment, and can shorten the service life of the equipment. Pool and spa equipment is also expressly excluded from flood insurance coverage under the National Flood Insurance Program (NFIP) and there is no duty to mitigate or minimize damage to such equipment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

This will save consumers the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Impact to industry relative to the cost of compliance with code

This will save industry the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Impact to small business relative to the cost of compliance with code

This will save industry the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This will save consumers the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Allows swimming pool and spa equipment to be installed in a manner that maximizes its efficiency and design limitations.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal does not specify a product or material.

Does not degrade the effectiveness of the code

Allows swimming pool and spa equipment to be installed in a manner that maximizes its efficiency and design limitations.

Alternate Language

2nd Comment Period

SP11980-A1

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 10:11:05 AM **Attachments** No

Rationale:
Rather than completely remove any requirement (original proposal), this modification clarifies the requirements for pool equipment installed in Special Flood Hazard Areas to add that elevation to the extent practical should maintain functionality and safe conditions. This change is based on the original intent when “to the extent practical” requirement was proposed by FEMA, referring to guidance that advises full elevation to the BFE, but if that height “would result in problems with pump function and performance, equipment is to be elevated as high as possible while allowing safe functioning.” The objective of regulating development in flood hazard areas is to minimize the impact of flooding on the activity, and the impact of the activity on flooding. Partial elevation achieves some damage reduction during frequent, low-level flooding. Whether something is or isn’t insurable under NFIP flood insurance policies has no bearing on what is regulated (see NFIP definition for “development,” which is broad, including any man-made change).

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Adds clarify for determining practicality of elevation.

Impact to building and property owners relative to cost of compliance with code
No change from original requirement.

Impact to industry relative to the cost of compliance with code
Adds functionality and safety to determining practicality.

Impact to small business relative to the cost of compliance with code
This will save industry the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Clarifies that safe conditions is part of determining practicality of elevation.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Adds clarity.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not require any different equipment.

Does not degrade the effectiveness of the code
Improves interpretation and enforceability.

1st Comment Period History

SP11980-G1

Proponent Michael Weinbaum Submitted 4/9/2025 9:05:24 PM Attachments No

Comment:

Martin Aquatic Design and Engineering supports this code change.

SP11980-A1Text Modification

1612.4.2 Modification of ASCE 24 9.6 Pools. Modify Section 9.6 of ASCE 24 by adding an exception as follows:

9.6 Pools. In-ground and above ground pools shall be designed to withstand all flood-related loads and load combinations. Mechanical equipment for pools such as pumps, heating systems, and filtering systems, and their associated electrical systems shall comply with Chapter 7.

Exception: Equipment for pools, spas and water features shall be permitted below the elevation required in Table 7-1 provided it is elevated to the extent practical while maintaining functionality and safe conditions, ~~is~~ anchored to prevent flotation and resist flood forces, and ~~is~~ supplied by branch circuits that have ground-fault circuit interrupter protection.

Page: 1

Mod11980_A1_TextOfModification.pdf

SP11980Text Modification

1612.4.2 Modification of ASCE 24 9.6 Pools.

Modify Section 9.6 in ASCE 24 by adding an exception as follows:

9.6 Pools. In-ground and above-ground pools shall be designed to withstand all flood-related loads and load combinations. Mechanical equipment for pools such as pumps, heating systems and filtering systems, and their associated electrical systems, shall comply with Chapter 7.

Exception: Equipment for pools, spas and water features shall be permitted below the elevation required in Table 7-1, provided it ~~is elevated to the extent practical,~~ is anchored to prevent flotation and resist flood forces, and is supplied by branch circuits that have ground-fault circuit-interrupter protection.

Page: 1

Mod11980_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

5

SP11962

Date Submitted	02/13/2025	**Section**	107.3.5	**Proponent**	Rebecca Quinn obo FL Div Emerg Mgnt
Chapter	1	**Affects HVHZ**	No	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

11963

Summary of Modification

Certain documentation is required for construction in flood hazard areas: elevation to which Lowest Floors are elevated, the elevation to which dry floodproofing will extend, and design of dry floodproofing. Proposal specifies use of FEMA certificates specifically designed for those purposes.

Rationale

Certain documentation is required to be submitted for construction in flood hazard areas: elevation to which Lowest Floors are elevated, the elevation to which dry floodproofing will extend, and design of dry floodproofing measures. The proposal specifies use of FEMA certificates that are specifically designed for those purposes. More than half of Florida NFIP communities participate in the NFIP Community Rating System (244 out of 469). A basic requirement for all CRS Communities is use of the FEMA Elevation Certificate. FDEM reports use of the Elevation Certificate by non-CRS Communities. FEMA requires use of the Dry Floodproofing Certificate when building owners obtain NFIP flood insurance policies that take into account the dry floodproofing measures. NFIP Elevation Certificate: FEMA Form FF-206-FY-22-152 (3/22) - fema_form-ff-206-fy-22-152.pdf NFIP Non-Residential Certificate for Non-Residential Structures: https://www.fema.gov/sites/default/files/documents/fema_form-ff-206-fy22-153.pdf

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Lessens burden caused when permittees use other forms of certification.
Impact to building and property owners relative to cost of compliance with code
None, because owners must submit the documentation in some form.
Impact to industry relative to the cost of compliance with code
The change does not affect the technical requirements of the code.
Impact to small business relative to the cost of compliance with code

The change does not affect the technical requirements of the code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, especially the FEMA Dry Floodproofing Certificate because it requires certification of compliance with ASCE 24.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change does not affect the technical requirements of the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change does not affect the technical requirements of the code.

Does not degrade the effectiveness of the code

No; improves effectiveness because the FEMA Forms are designed to collect the information necessary to help determine compliance

Alternate Language

2nd Comment Period

SP11962-A3

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 7:57:00 AM **Attachments** No

Rationale:
Two things are changed in the comment. First, we removed the requirement to use the FEMA Elevation Certificate at the plan review stage. At that time, there is nothing to be surveyed and certified. Many communities request that the top sections of the form be completed (property location, FIRM panel, flood zone, BFE, etc.) so they can verify the information. This avoids having to make corrections when the form is submitted as required for inspections. We note that sec. 42.0366, F.S., requires surveyors to submit Elevation Certificates to FDEM (certificates are posted online and accessible to the public). Second, in every instance where a FEMA form is specified we added “or equivalent.” The value of the forms is the completeness of the requested information, which is still valuable even if provided in a substantially equivalent format.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Lessens burden because whether FEMA form or equivalent is used, the information necessary is provided.

Impact to building and property owners relative to cost of compliance with code
None, because owners must submit the documentation in some form.

Impact to industry relative to the cost of compliance with code
The change does not affect the technical requirements of the code.

Impact to small business relative to the cost of compliance with code
The change does not affect the technical requirements of the code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Improves compliance and ensures records are complete whether the FEMA forms or equivalents are used. The FEMA Dry Floodproofing Certificate because it requires certification of compliance with ASCE 24.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
The change does not affect the technical requirements of the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
The change does not affect the technical requirements of the code.

Does not degrade the effectiveness of the code
No; improves effectiveness because whether the FEMA Forms or equivalent are used, the are designed to collect the information necessary to help determine compliance is provided.

2nd Comment Period

SP11962-G1

Proponent Rosanna Catalano Submitted 7/16/2025 8:41:45 AM Attachments Yes

Comment:

Please see the attached letter from my client, Garrison Flood. Thank you. Rosanna Catalano, Esq. rcatalano.arrow@gunster.com

SP11962-A3Text Modification

107.3.5 [Examination of Documents] Minimum plan review criteria for buildings. The examination of the documents by the building official shall include the following minimum criteria and documents: a floor plan; site plan; foundation plan; floor/roof framing plan or truss layout; all fenestration penetrations; flashing; and rough opening dimensions; and all exterior elevations:

Commercial Buildings: ***[partial shown]***

Building

1. Site requirements:

Flood hazard areas, flood zones, base flood elevations, and design flood elevations

8. Structural requirements shall include:

Flood requirements in accordance with Section 1612, including proposed lowest floor elevations, enclosures, flood damage-resistant materials, and dry floodproofing design certification on a FEMA Dry Floodproofing Certificate or equivalent

* * *

Residential (one- and two-family): ***[partial shown]***

6. Structural requirements shall include:

Flood hazard areas, flood zones, base flood elevations, design flood elevations, proposed lowest floor elevations, enclosures, equipment, and flood damage-resistant materials.

110.3 Required inspections. The building official upon notification from the permit holder or his or her agent shall make the following inspections, and shall either release that portion of the construction or shall notify the permit holder or his or her agent of any violations which must be corrected in order to comply with the technical codes. The building official shall determine the timing and sequencing of when inspections occur and what elements are inspected at each inspection.

Building *[partial shown]*

1. Foundation inspection. To be made after trenches are excavated and forms erected and shall at a minimum include the following building components:

·Stem-wall

·Monolithic slab-on-grade

·Piling/pile caps

·Footers/grade beams

1.1. In flood hazard areas, upon placement of the lowest floor, including basement, and prior to further vertical construction, the FEMA Elevation Certificate or equivalent ~~elevation certification~~ shall be submitted to the building official ~~authority having jurisdiction~~.

6. Final inspection. To be made after the building is completed and ready for occupancy.

6.1. In flood hazard areas, as part of the final inspection, a final FEMA Elevation Certificate or equivalent ~~certification~~ of the lowest floor elevation or an as-built FEMA Dry Floodproofing Certificate or equivalent for the elevation to which a building is dry floodproofed, as applicable, shall be submitted to the building official ~~authority having jurisdiction~~.

111.2 [Certificate of Occupancy] Certificate issued. After the *building official* inspects the building or structure and does not find violations of the provisions of this code or other laws that are enforced by the department of building safety, the *building official* shall issue a certificate of occupancy that contains the following: *[partial shown]*

Page: 1

Mod11962_A3_TextOfModification.pdf

6. For buildings and structures in flood hazard areas, a statement that documentation of the as-built lowest floor elevation has been provided and is retained in the records of the building official ~~authority having jurisdiction~~.

1612.5 Flood hazard documentation. The following documentation shall be prepared and sealed by a licensed professional surveyor and mapper or a registered design professional, as applicable, and submitted to the building official:

1. For construction in flood hazard areas other than coastal high hazard areas or coastal A zones:

1.1 The elevation of the lowest floor, including the basement, provided on a FEMA Elevation Certificate or equivalent as required by the lowest floor elevation inspection in Section 110.3, Building, 1.1 and for the final inspection in Section 110.3, Building, 6.1.

1.2 For fully enclosed areas below the design flood elevation where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

1.3. For dry floodproofed nonresidential buildings, construction documents shall include a statement provided on a FEMA Dry Floodproofing Certificate or equivalent that the dry floodproofing is designed in accordance with ASCE 24 and shall include the flood emergency plan specified in Chapter 6 of ASCE 24.

1.4 For *dry floodproofed* nonresidential buildings, the elevation to which the building is *dry floodproofed* provided on a FEMA Dry Floodproofing Certificate or equivalent as required for the final inspection in Section 110.3, Building, 6.1.

2. For construction in coastal high hazard areas and coastal A zones:

2.1 The elevation of the bottom of the lowest horizontal structural member provided on a FEMA Elevation Certificate or equivalent as required by the lowest floor elevation inspection in Section 110.3, Building, 1.1 and for the final inspection in Section 110.3, Building, 5.1.

2.2 Construction documents shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and flood loads acting simultaneously on all building components, and other load requirements of Chapter 16.

2.3 For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m2) determined using allowable stress design, construction documents shall include a statement that the breakaway wall is designed in accordance with ASCE 24.

2.4 For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

SP11962Text Modification

107.3.5 [Examination of Documents] Minimum plan review criteria for buildings. The examination of the documents by the building official shall include the following minimum criteria and documents: a floor plan; site plan; foundation plan; floor/roof framing plan or truss layout; all fenestration penetrations; flashing; and rough opening dimensions; and all exterior elevations:

Commercial Buildings: ***[partial shown]***

Building

1. Site requirements:

Flood hazard areas, flood zones, base flood elevations, and design flood elevations

8. Structural requirements shall include:

Flood requirements in accordance with Section 1612, including proposed lowest floor elevations provided on a FEMA Elevation Certificate, enclosures, flood damage-resistant materials, and dry floodproofing design certification on a FEMA Dry Floodproofing Certificate

* * *

Residential (one- and two-family): ***[partial shown]***

6. Structural requirements shall include:

Flood hazard areas, flood zones, base flood elevations, design flood elevations, proposed lowest floor elevations provided on a FEMA Elevation Certificate, enclosures, equipment, and flood damage-resistant materials.

110.3 Required inspections. The building official upon notification from the permit holder or his or her agent shall make the following inspections, and shall either release that portion of the construction or shall notify the permit holder or his or her agent of any violations which must be corrected in order to comply with the technical codes. The building official shall determine the timing and sequencing of when inspections occur and what elements are inspected at each inspection.

Building *[partial shown]*

1. Foundation inspection. To be made after trenches are excavated and forms erected and shall at a minimum include the following building components:

·Stem-wall

·Monolithic slab-on-grade

·Piling/pile caps

·Footers/grade beams

1.1. In flood hazard areas, upon placement of the lowest floor, including basement, and prior to further vertical construction, the FEMA Elevation Certificate ~~elevation certification~~ shall be submitted to the building official ~~authority having jurisdiction~~.

6. Final inspection. To be made after the building is completed and ready for occupancy.

6.1. In flood hazard areas, as part of the final inspection, a final FEMA Elevation Certificate ~~certification~~ of the lowest floor elevation or an as-built FEMA Dry Floodproofing Certificate for the elevation to which a building is dry floodproofed, as applicable, shall be submitted to the building official ~~authority having jurisdiction~~.

111.2 [Certificate of Occupancy] Certificate issued. After the *building official* inspects the building or structure and does not find violations of the provisions of this code or other laws that are enforced by the department of building safety, the *building official* shall issue a certificate of occupancy that contains the following: ***[partial shown]***

6. For buildings and structures in flood hazard areas, a statement that documentation of the as-built lowest floor elevation has been provided and is retained in the records of the building official ~~authority having jurisdiction.~~

1612.5 Flood hazard documentation. The following documentation shall be prepared and sealed by a licensed professional surveyor and mapper or a registered design professional, as applicable, and submitted to the building official:

1. For construction in flood hazard areas other than coastal high hazard areas or coastal A zones:

    1.1. The elevation of the lowest floor, including the basement, provided on a FEMA Elevation Certificate as required by the lowest floor elevation inspection in Section 110.3, Building, 1.1 and for the final inspection in Section 110.3, Building, 6.1.

Page: 1

Mod11962_TextOfModification.pdf

1.2 For fully enclosed areas below the design flood elevation where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

1.3. For dry floodproofed nonresidential buildings, construction documents shall include a statement provided on a FEMA Dry Floodproofing Certificate that the dry floodproofing is designed in accordance with ASCE 24 and shall include the flood emergency plan specified in Chapter 6 of ASCE 24.

1.4 For *dry floodproofed* nonresidential buildings, the elevation to which the building is *dry floodproofed* provided on a FEMA Dry Floodproofing Certificate as required for the final inspection in Section 110.3, Building, 6.1.

2. For construction in coastal high hazard areas and coastal A zones:

2.1. The elevation of the bottom of the lowest horizontal structural member provided on a FEMA Elevation Certificate as required by the lowest floor elevation inspection in Section 110.3, Building, 1.1 and for the final inspection in Section 110.3, Building, 5.1.

2.2. Construction documents shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to be anchored to resist flotation, collapse and lateral movement due to the effects of wind and flood loads acting simultaneously on all building components, and other load requirements of Chapter 16.

2.3. For breakaway walls designed to have a resistance of more than 20 psf (0.96 kN/m^2) determined using allowable stress design, construction documents shall include a statement that the breakaway wall is designed in accordance with ASCE 24.

2.4 For breakaway walls where provisions to allow for the automatic entry and exit of floodwaters do not meet the minimum requirements in Section 2.7.2.1 of ASCE 24, construction documents shall include a statement that the design will provide for equalization of hydrostatic flood forces in accordance with Section 2.7.2.2 of ASCE 24.

Public Comments to the Florida Division of Emergency Management, MOD #11962, Sec. 107.3.5
From: Arnon Rosen, CEO & President, Garrison Flood, arnon@garrisonflood.com
Date: June 30, 2025

Dear Members of the Florida Building Commission, Building Structural Technical Advisory Committee,

As the CEO of Garrison Flood, a Florida-based manufacturer and installer of emergency flood mitigation panels, I appreciate the Division's ongoing commitment to the safety and resilience of our state's communities. I am writing to highlight a critical issue in the current regulatory framework that affects the ability of homeowners to protect their properties from flood damage, and to respectfully request clarification and action to address this gap.

Rationale for Allowing Retrofit of Flood Mitigation Products Below BFE

We seek clarification on the rationale behind the current prohibition on retrofitting existing residential structures below the Base Flood Elevation (BFE) with flood mitigation products, even when a qualified engineer can demonstrate that the structure is capable of withstanding the necessary hydrostatic and hydrodynamic loads. Notably, the code permits—and in some cases mandates—such retrofits for mixed-use and commercial structures, yet does not extend the same allowance to residential properties. This inconsistency raises questions about the underlying reasoning and creates barriers for homeowners seeking to enhance their flood protection.

Gap in Code Provisions for Temporary Flood Mitigation Solutions

The Florida Building Code (FBC) and ASCE 24-14 provide comprehensive requirements for flood protection in new construction and substantial improvements. However, they do not adequately address the use of temporary or removable flood mitigation products—such as aluminum flood panels—particularly for retrofitting existing residential structures. This omission has led to inconsistent interpretations among local building departments. Some departments prohibit the use of such panels entirely, while others apply requirements intended for new construction, which are often impractical or unnecessarily burdensome for retrofit applications.

Need for a Dedicated "Mitigation" Category

Temporary flood mitigation panels are a proven, cost-effective, and environmentally friendly solution that can be rapidly deployed to protect homes and businesses from floodwaters. These panels are designed for easy installation and removal, safeguarding vulnerable openings without redirecting water to neighboring properties. Their use can significantly reduce property damage, lower recovery costs, and support community resilience in the face of increasing hurricane activity and rising sea levels.

Despite these benefits—including flood protection, job creation, minimized environmental impact, and the potential to reduce insurance costs—these products are not contemplated in the current code framework. The absence of clear standards for temporary flood mitigation products creates

uncertainty for manufacturers, installers, and homeowners, and may result in the use of inferior products.

Challenges with Current Code Interpretation

The lack of clarity in the FBC has resulted in a patchwork of local requirements. In many cases, building departments apply the same requirements to existing homes as to new construction, which are not always feasible or appropriate for retrofitting. This not only discourages the adoption of effective mitigation measures but also places an undue burden on homeowners and manufacturers striving to comply with the intent of the code. Importantly, these mitigation panels are not intended to replace building requirements for substantial improvements where homes have already suffered significant damage and are required to elevate in the rebuild. Our intent is not to recommend anything that would degrade a community's NFIP rating, but rather to make it more straightforward for homeowners to install temporary flood barriers to safeguard their homes and garages.

Request for Guidance and Action

We respectfully request that the Division:

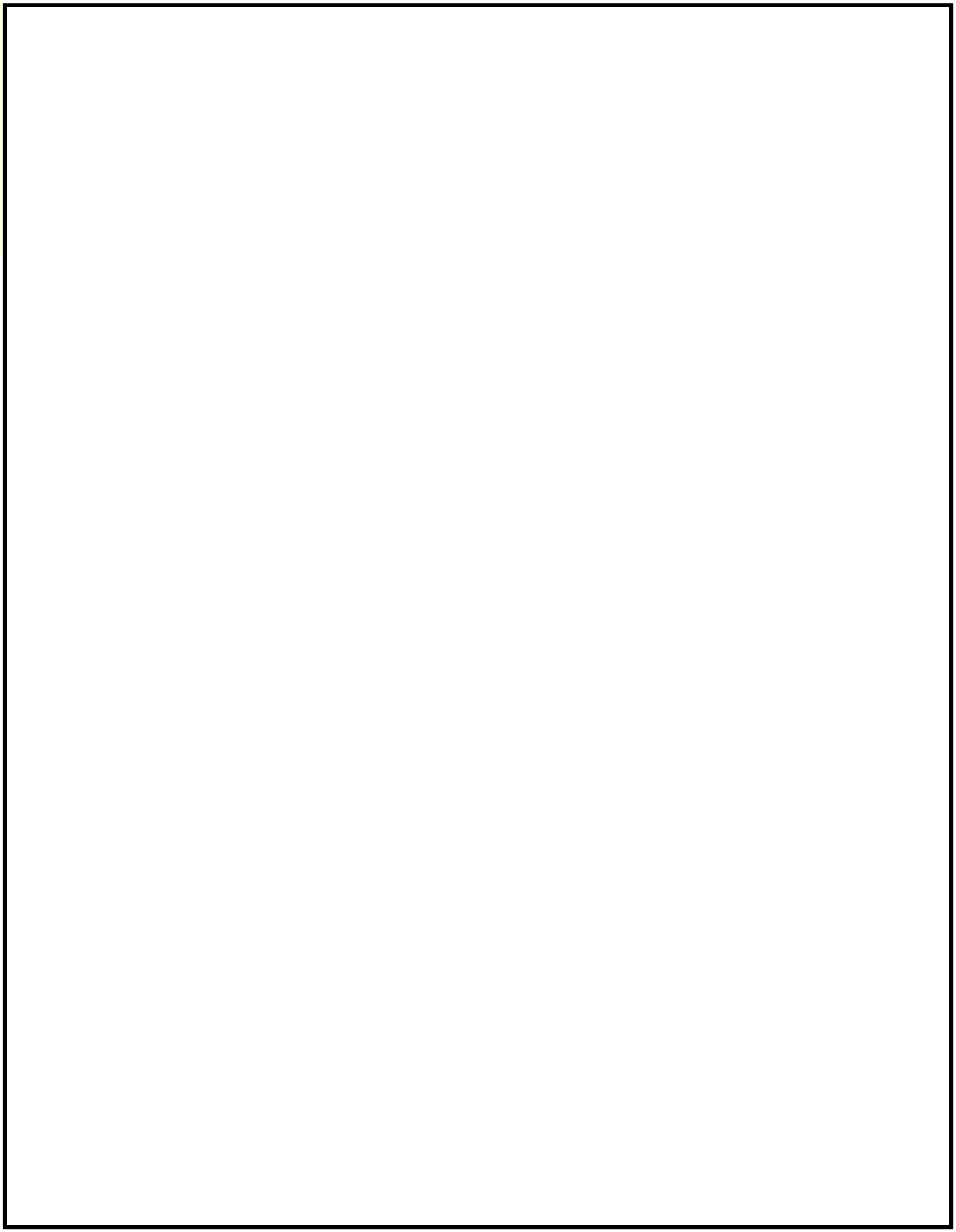
- Provide the rationale for prohibiting retrofit of flood mitigation products on existing residential structures that are below the BFE and not required to elevate, when an engineer can demonstrate structural adequacy for hydrostatic and hydrodynamic loads and the products won't impact adjacent structures.
- Engage with stakeholders—including manufacturers, installers, local governments, and the insurance industry—to develop standards that ensure safety and effectiveness without imposing unnecessary barriers to adoption.
- Facilitate the installation process for temporary flood barriers, enabling homeowners to more readily protect their residences and garages from flood risks.

We are committed to working collaboratively with the Division and other stakeholders to ensure that these innovative products are properly evaluated and approved for use in Florida. We have already engaged with DBPR staff on product approval and are in the process of submitting our product for approval in the coming months. However, we believe that product approval alone will not fully address the issue, and we welcome any suggestions or guidance regarding the most effective approach to achieving this goal.

Thank you for your attention to this important matter. We look forward to your response and to supporting the Division's efforts to enhance the resilience of Florida's communities.

Respectfully,
Arnon Rosen
CEO & President
Garrison Flood
arnon@garrisonflood.com

SP11962-G1General Comment



Page: 3

Mod_11962_G1_General_Garrison Flood - Public Comment - FDEM July 2025 v1.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

6

SP12015

Date Submitted	02/11/2025	**Section**	453	**Proponent**	Don Whitehead
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Require an isolation room in the school clinic.

Rationale

To control the spread of contagious viruses in the school clinic.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Minimal impact, requiring code review of one additional small room.

Impact to building and property owners relative to cost of compliance with code

Cost will increase approximately $6150 per school. This is less than one tenth of one percent of the cost of an average new school.

Impact to industry relative to the cost of compliance with code

Industry will have a very small benefit of approximately $6150 per school. This is less than one tenth of one percent of the cost of an average new school.

Impact to small business relative to the cost of compliance with code

Very minimal impact, depending on the size of the businesses that provide and install the clinic isolation room.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

An isolation room will protect the health of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This modification improves the code by protecting against the spread of contagious viruses in the school clinic.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This modification does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FP12015-A2

Proponent Don Whitehead **Submitted** 7/21/2025 9:34:02 AM **Attachments** No

Rationale:

Provide requirements for an optional isolation room.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Unknown, since isolation room is optional.

Impact to building and property owners relative to cost of compliance with code
Unknown, since isolation room is optional.

Impact to industry relative to the cost of compliance with code
Unknown, since isolation room is optional.

Impact to small business relative to the cost of compliance with code
Very minimal impact, depending on the size of the businesses that provide and install the clinic isolation room.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Yes

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
This modification does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code
This modification does not degrade the effectiveness of the code.

SP12015-A2Text Modification

453.22.4 The bed area shall be designed to maintain constant visual supervision from the office. Space for student beds shall be provided in each clinic at 50 square feet (4.6 m2) per bed. Space for beds in secondary and VTC schools shall be equally divided for male and female students. Beds shall be provided based on student capacity in the following ratios:

453.22.6 Isolation room. An isolation room may be provided in the clinic. The room, designed for a single bed, shall be a minimum of 10 feet by 10 feet (3048 mm by 3048 mm).

-

453.22.6.1 Door requirements. The door shall swing out of the room and shall be equipped with a nonlocking latch, a closer, and a view panel, with minimum dimensions of 8 inches (203 mm) by 42 inches (1067 mm) and a maximum of 1,296 square inches (0.84 m2), of 1/4-inch (6 mm) tempered or safety glass installed with the bottom edge of the panel at 30 inches (762 mm) AFF.

-

453.22.6.2 Window requirements. At least one window shall be provided to maintain constant visual supervision from the nurses' station, with a minimum area of 1,944 square inches (1.25 m2), of 1/4-inch (6 mm) tempered or safety glass installed with the bottom edge of the panel at 30 inches (762 mm) AFF.

-

453.22.6.3 Finishes. All walls, floor, and ceiling of the isolation room shall be impervious.

-

453.22.6.4 Mechanical. The HVAC system shall maintain a negative pressure with an exhaust fan vented through the roof providing a minimum of 12 air changes of exhaust per hour and a minimum 0.01-inch WC negative-pressure differential to the adjacent space whether or not an ante-room is utilized.

-

453.22.6.5 Electrical. Lighting shall be at least 100 footcandles (1000 lux) at the bed plane, which can be dimmed to ½ footcandle (5 lux). A minimum of five duplex electrical outlets shall be provided with at least two outlets at the head of the bed.

Page: 1

Mod12015_A2_TextOfModification.pdf

SP12015Text Modification

453.22.4 The bed area shall be designed to maintain constant visual supervision from the office. Space for student beds shall be provided in each clinic at 50 square feet (4.6 m2) per bed. Space for beds in secondary and VTC schools shall be equally divided for male and female students. An isolation room shall be provided for at least one bed with constant visual supervision from the office. Beds shall be provided based on student capacity in the following ratios:

Page: 1

Mod12015_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

7

SP12055

Date Submitted	02/13/2025	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Exempts Class 1 Mobile Units from review under this section.

Rationale

The Class I mobile units provide imaging diagnostic and treatment services that do not require invasive procedures. These procedures are like those that take place in a doctor's office, unlike Class 2 and 3 mobile units where more invasive procedures are performed. As such, a patient in a Class 1 mobile unit is unlikely to be compromised by the physical environment. The FGI Guidelines has revised the name of the document to FGI Facility Code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FSP12055-A4

Proponent James gregory **Submitted** 8/22/2025 2:07:19 PM **Attachments** No

Rationale:

This comment is to be used if the FGI Code is approved by the TAC. It updates the codes and provides an exception for Class 1 mobile units.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by updating the standards.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

2nd Comment Period

FSP12055-A3

Proponent James gregory **Submitted** 8/22/2025 11:15:03 AM **Attachments** No

Rationale:

This 12055-A3 is to be used if the FGI Guidelines are not updated to the FGI Code for Planning and Design of Hospitals. If the FGI Code is approved, it will be withdrawn.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by updating the standards.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

SP12055-A4Text Modification

449.3.3.2

The mobile ~~facility~~ unit shall comply with the applicable requirements of ~~the Florida Building Code, Building, The Guidelines~~ The Hospital Code. ~~including Part 1 General and Part 2, Chapter 2.7 Specific Requirements for Mobile/Transportable Medical Units.~~ For Class 1 mobile units, only the mobile unit's connections to the hospital's utilities and the architectural elements of the hospital building serving the mobile unit shall be reviewed to meet the requirements of the Hospital Code.

Page: 1

Mod12055_A4_TextOfModification.pdf

SP12055-A3Text Modification

449.3.3.2

The mobile ~~facility~~ unit shall comply with the applicable requirements of ~~the Florida Building Code, Building~~, ~~T~~the Guidelines,. ~~including Part 1 General and Part 2, Chapter 2.7 Specific Requirements for Mobile/Transportable Medical Units.~~

Exception: Class 1 Mobile Units. Only the mobile unit's connections to the hospital's utilities and the architectural elements of the hospital building serving the mobile unit shall be reviewed to meet the requirements of the Guidelines.

Page: 1

Mod12055_A3_TextOfModification.pdf

SP12055Text Modification

449.3.3.2

The Class 1 Mobile Unit itself is exempt from further review by this section.

The ~~mobile facility~~ hospital's utilities and architectural elements serving the Class 1 mobile unit and all Class 2 and 3 Mobile Units shall comply with the applicable requirements of the Florida Building Code, Building, The ~~Guidelines~~ FGI Facility Code including Part 1 General and Part 2, Chapter 2.7 *Specific Requirements for Mobile/Transportable Medical Units*.

Page: 1

Mod12055_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

8

SP12057

Date Submitted	02/13/2025	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Revises verbiage for clarification of requirement.

Rationale

There has been constant confusion regarding the meaning of this paragraph. This revision clarifies what this paragraph is requiring.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

Proponent James gregory **Submitted** 8/19/2025 2:00:42 PM **Attachments** No

RE SP12057-A1

Rationale:

After speaking with flood control experts, the use of the term "level" was revise to "elevation" so it is understandable by all who must administer and design by this code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

SP12057-A1Text Modification

~~Where an o?-site public access route is available to the new facility at or above the base ?ood elevation, a minimum of one on-site emergency access route shall be provided that is located at the same elevation as the public access route~~. An on-site access route designed to resist fooding shall be provided for all new hospitals. At a minimum, the route shall be located at or above the required elevation for the lowest floor elevation of the facility.

Exception: Where public roadways providing access to the facility site are below the required elevation of the lowest floor elevation of the facility, the on-site access route shall be at or above the elevation of the public access road.

Page: 1

Mod12057_A1_TextOfModification.pdf

SP12057Text Modification

449.4.2.2.4

~~Where an off-site public access route is available to the new facility at or above the base flood elevation, a minimum of one on-site emergency access route shall be provided that is located at the same elevation as the public access route.~~ An on-site access route designed to resist flooding shall be provided for all new hospitals. At a minimum, the route shall be located at or above the required elevation for the lowest level of the facility.

Exception: Where public roadways providing access to the facility site are below the required elevation of the lowest level of the facility, the on-site access route shall be at or above the elevation of the public access road

Page: 1

Mod12057_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

9

SP12058

Date Submitted	02/13/2025	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Add new section limiting the types of hospitals that can be designed or constructed in Florida.

Rationale

Provides a new section that adds information to the FBC found only in Florida Statutes to help direct and clarify the statue for those users who do are not familiar with all of the Florida statutes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

SP12058-A1

Proponent James gregory **Submitted** 8/20/2025 10:41:56 AM **Attachments** No

Rationale:

This revised language was coordinated with the Office of Plans and Construction at AHCA and with the Licensure office at AHCA. It is meant to alert anyone who is planning a new hospital with limited clinical services to first go to the referenced Floria statute. This will save time and money for the applicant and will insure that a hospital will not get approved by the Office of Plans and construction that would not meet the requirements of this Florida statute.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code

There is no impact to industry.

Impact to small business relative to the cost of compliance with code

There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

SP12058-A1Text Modification

449.2.3

The design or construction of hospital facilities shall not be approved for the delivery of clinical services as described in Section 395.003(8) Florida Statutes.

Page: 1

Mod12058_A1_TextOfModification.pdf

SP12058Text Modification

449.2.3

Hospital facilities shall not be design or constructed for the delivery of limited range(s) of service prohibited by Florida Statues 395.003(8).

Page: 1

Mod12058_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

10

SP12060

Date Submitted	02/13/2025	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Revises this section to exclude exhaust fans from the impact and exclude items listed in 449.2.5.1 from the 30 feet restriction so that opening protection will include small missile impact requirements.

Rationale

Exhaust fans are not disabled when impacted but are subject to be blown off the roof so they require special anchoring systems but not impact protection. Opening protections should include protection from small missile impact above 30 feet.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FSP12060-A1

Proponent James gregory **Submitted** 8/22/2025 2:27:02 PM **Attachments** No

Rationale:

After consultation with AHCA and to better a line the language in all of these similar sections, this comment offers revised language. It removes exhaust fans from exception and specifies wind load to be engineered to meet this code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code

There is no impact to industry.

Impact to small business relative to the cost of compliance with code

There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

SP12060-A1Text Modification

449.4.2.5.4

~~Systems and u~~ Utilities identified in Section 449.4.2, shall be protected from debris impact by an equipment housing or a screening enclosure complying with the impact protection standards in accordance with Section 1626 when located at or below 30 feet above the finished grade of the building. Where screening enclosures are used, the height of the enclosure shall be not less than the height of the protected equipment up to 30 feet above finished grade, and shall provide clearances required for the maintenance and continuous operation of the equipment. Where the housing and louvers are designed to provide the required equipment protection, sufficient standoff shall be provided to prevent damage to internal components from deflection of the cladding as a result of impact. All ~~R~~ roof mounted equipment shall have fastening systems ~~designed~~ structurally engineered to meet the wind load requirements of ~~the Florida Building Code, Building.~~ this code.

-

Page: 1

Mod12060_A1_TextOfModification.pdf

SP12060Text Modification

449.4.2.5.4

~~Systems and~~ ~~u~~Utilities identified in Section 449.4.2 except exhaust fans, shall be protected from debris impact by an equipment housing or a screening enclosure complying with the impact protection standards in accordance with Section 1626 when located at or below 30 feet above the finished grade of the building. Where screening enclosures are used, the height of the enclosure shall be not less than the height of the protected equipment up to 30 feet above finished grade, and shall provide clearances required for the maintenance and continuous operation of the equipment. Where the housing and louvers are designed to provide the required equipment protection, sufficient standoff shall be provided to prevent damage to internal components from deflection of the cladding as a result of impact. Roof mounted equipment shall have fastening systems designed to meet the wind load requirements of the *Florida Building Code, Building*.

Page: 1

Mod12060_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

11

SP12061

Date Submitted	02/13/2025	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Revises this section to exclude exhaust fans from the impact.

Rationale

Exhaust fans are not disabled when impacted but are subject to be blown off the roof so they require special anchoring systems but not impact protection.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

SP12061-A1

Proponent James gregory **Submitted** 8/22/2025 2:56:03 PM **Attachments** No

Rationale:

Exhaust fans are not disabled when impacted but are subject to be blown off the roof so they require special anchoring systems but not impact protection. This section would either require the exhaust fan to be located inside of a penthouse, or be enclosed in protective screening neither of which are necessary to protect the building occupants from an extreme wind event.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code

There is no impact to industry.

Impact to small business relative to the cost of compliance with code

There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

SP12061-A1Text Modification

449.4.2.6.1
All new and replacement air-moving equipment, dx condensing units, through-wall units and other HVAC equipment, except exhaust fans, located outside of, partially outside of, or on the roof of the facility at or below 30 feet above the finished grade of the building and providing service to the facility shall be permitted only when either of the following are met:

Page: 1

Mod12061_A1_TextOfModification.pdf

SP12061Text Modification

449.4.2.6.1

All new and replacement air-moving equipment, dx condensing units, through-wall units and other HVAC equipment, except exhaust fans, located outside of, or partially outside of the building, or on the roof of the facility at or below 30 feet above the finished grade of the building and providing service to the facility shall be permitted only when either of the following are met:

Page: 1

Mod12061_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

12

SP12072

Date Submitted	02/13/2025	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Revises verbiage for clarification of requirement.

Rationale

There has been constant confusion regarding the meaning of this paragraph. This revision clarifies what this paragraph is requiring.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

Proponent James gregory **Submitted** 8/19/2025 1:55:45 PM **Attachments** No

SP12072-A1

Rationale:

After speaking with flood control experts, the use of the term "level" was revise to "elevation" so it is understandable by all who must administer and design by this code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

SP12072-A1Text Modification

~~Where an o?-site public access route is available to the new facility at or above the base ?ood elevation, a minimum of one on-site emergency access route shall be provided that is located at the same elevation as the public access route~~. An on-site access route designed to resist ?ooding shall be provided for all new nursing homes. At a minimum, the route shall be located at or above the required elevation for the lowest floor elevation of the facility.

Exception: Where public roadways providing access to the facility site are below the required elevation of the lowest floor elevation of the facility, the on-site access route shall be at or above the elevation of the public access road.

Page: 1

Mod12072_A1_TextOfModification.pdf

SP12072Text Modification

450.4.2.2.4

~~Where an off-site public access route is available to the new facility at or above the base flood elevation, a minimum of one on-site emergency access route shall be provided that is located at the same elevation as the public access route.~~ An on-site access route designed to resist flooding shall be provided for all new nursing homes. At a minimum, the route shall be located at or above the required elevation for the lowest level of the facility.

Exception: Where public roadways providing access to the facility site are below the required elevation of the lowest level of the facility, the on-site access route shall be at or above the elevation of the public access road

Page: 1

Mod12072_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

13

SP12080

Date Submitted	02/13/2025	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Revises this section to exclude exhaust fans from the impact.

Rationale

Exhaust fans are not disabled when impacted but are subject to be blown off the roof so they require special anchoring systems but not impact protection.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

SP12080-A1

Proponent James gregory **Submitted** 8/22/2025 2:51:41 PM **Attachments** No

Rationale:

Exhaust fans are not disabled when impacted but are subject to be blown off the roof so they require special anchoring systems but not impact protection. This section would either require the exhaust fan to be located inside of a penthouse, or be enclosed in protective screening neither of which are necessary to protect the building occupants from an extreme wind event.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code

There is no impact to industry.

Impact to small business relative to the cost of compliance with code

There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

SP12080-A1Text Modification

All new and replacement air-moving equipment, dx condensing units, through-wall units and other HVAC equipment, except exhaust fans, located outside of, partially outside of, or on the roof of the facility at or below 30 feet above the finished grade of the building and providing service to the new facility shall be permitted only when either of the following are met:

Page: 1

Mod12080_A1_TextOfModification.pdf

SP12080Text Modification

450.4.2.6.1

All new and replacement air-moving equipment, dx condensing units, through-wall units and other HVAC equipment, except exhaust fans, located outside of, or partially outside of the building, or on the roof of the facility at or below 30 feet above the finished grade of the building and providing service to the facility shall be permitted only when either of the following are met:

Page: 1

Mod12080_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

14

SP12084

Date Submitted	02/13/2025	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Does not permit air ducts using fiberglass materials.

Rationale

With nursing homes taking more elderly and frail residents, fiberboard is subjective material that can shed microscopic fibers into the air, potentially irritating the respiratory tract and skin. This is particularly concerning for individuals with asthma or other respiratory conditions. In humid environments, the porous nature of duct board can harbor mold growth, releasing spores into the air and triggering allergies or respiratory problems. Duct board can be difficult to clean effectively, allowing dust, debris, and allergens to accumulate over time, further compromising indoor air quality.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by making it clearer and easier for the user to apply.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

SP12084-A4

Proponent James gregory **Submitted** 8/19/2025 11:37:30 AM **Attachments** No

Rationale:

This revision allows certain types of air duct when protected by MERV 13 filters such as those for a resident room. As provided in the original rational, nursing homes are providing service to advanced aged populations who often have medical issues that may be exacerbated by poor indoor air quality. This revised comment does not discriminate against any particular duct manufacturer or material and does allow its use in Florida nursing homes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code

There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code

There is no impact to industry.

Impact to small business relative to the cost of compliance with code

There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens and improves the code by making it clearer and easier for

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

SP12084-A4Text Modification

450.3.9.3

Friable duct lining exposed to air movement shall not be used in ducts unless minimum MERV 13 filters are installed downstream of linings. Duct lining that is factory manufactured to be impervious or provided with an impervious cover may be allowed in terminal units, sound attenuators, and air distribution devices downstream of filters.

Page: 1

Mod12084_A4_TextOfModification.pdf

SP12084Text Modification

450.3.9.3

Air ducts and exhaust duct systems shall not be constructed of fiberglass duct board.

Page: 1

Mod12084_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

15

SP12090

Date Submitted	02/18/2025	**Section**	464	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Updates reference code for this occupancy/

Rationale

Revises the name to fit with the reference chapter of the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.
Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FSP12090-A2

Proponent James gregory **Submitted** 8/22/2025 9:00:29 AM **Attachments** No

Rationale:

Updates this section to the correct name of the FGI Code 2026 edition.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by updating the standards.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

SP12090-A2Text Modification

464.3.1
Except as modified and required by this section of the code, Chapter 59A-36, Florida Administrative Code or Chapter 429 Part I, Florida Statutes, all new assisted living facilities and all additions, alterations, or renovations to existing assisted living facilities with more than 16 licensed beds shall also be in compliance with The ~~Guideline~~s FGI Code for Planning and ~~the~~ Design ~~and Construction~~ of Residential ~~Health,~~ Care, and Support ~~Facilitie~~s Settings (The ~~Guidelines~~ Residential Code) Part 1 General, and Chapter 4.1 ~~Special~~ Specific Requirements ~~for~~ Assisted Living ~~Facilities~~ Settings as referenced in Chapter 35 of this code

Page: 1

Mod12090_A2_TextOfModification.pdf

SP12090Text Modification

464.3.1

Except as modified and required by this section of the code, Chapter 59A-36, *Florida Administrative Code* or Chapter 429 Part I, *Florida Statutes*, all new assisted living facilities and all additions, alterations, or renovations to existing assisted living facilities with more than 16 licensed beds shall also be in compliance with *The ~~Guidelines~~ FGI Facility Codefor the Design and Construction of Residential Health, Care, and Support Facilities (The ~~Guidelines~~ FGI)* Part 1 General, and Chapter 4.1 Special Requirements for Assisted Living Facilities as referenced in Chapter 35 of this code.

Page: 1

Mod12090_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

16

SP12091

Date Submitted	02/13/2025	**Section**	449	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Updates code reference to Chapter 35.

Rationale

Revises the name to fit with the reference chapter of the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.
Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FSP12091-A2

Proponent James gregory **Submitted** 8/22/2025 9:04:37 AM **Attachments** No

Rationale:

Updates this section to the correct name of the FGI Code 2026 edition

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by updating the standards.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

SP12091-A2Text Modification

449.2.2

The ~~Guidelines~~ FGI Code for Planning and Design ~~and Construction~~ of Hospitals (The ~~Guidelines~~ Hospital Code), as referenced in Chapter 35 of this code.

Page: 1

Mod12091_A2_TextOfModification.pdf

SP12091Text Modification

449.2.2

The ~~Guidelines~~ FGI Facility Code for Design and Construction of Hospitals (The ~~Guidelines~~ FGI), as referenced in Chapter 35 of this code.

Page: 1

Mod12091_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

17

SP12092

Date Submitted	02/13/2025	**Section**	450	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Updates code reference to Chapter 35.

Rationale

Revises the name to fit with the reference chapter of the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.
Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FSP12092-A3

Proponent James gregory **Submitted** 8/22/2025 10:17:43 AM **Attachments** No

Rationale:

Updates this section to the correct name of the FGI Code 2026 edition.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by updating the standards.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

SP12092-A3Text Modification

450.2.2 The ~~Guidelines~~ FGI Code for Planning and Design ~~and Construction~~ of Residential ~~Health,~~ Care, and Support ~~Facilities~~ Settings (The ~~Guidelines~~ Residential Code), ~~including Chapter 3.21 Specific Requirements for Nursing Homes~~ as referenced in Chapter 35 of this code.

Page: 1

Mod12092_A3_TextOfModification.pdf

SP12092Text Modification

450.2.2

The ~~Guidelines~~ FGI Facility Code for Design and Construction of Residential Health, Care, and Support Facilities (The ~~Guidelines~~ FGI), including Chapter 3.~~2~~1 Specific Requirements for Nursing Homes as referenced in Chapter 35 of this code

Page: 1

Mod12092_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

18

SP12093

Date Submitted	02/13/2025	**Section**	451	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Updates code reference to Chapter 35.

Rationale

Revises the name to fit with the reference chapter of the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.
Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FSP12093-A2

Proponent James gregory **Submitted** 8/22/2025 10:22:49 AM **Attachments** No

Rationale:

Updates this section to the correct name of the FGI Code 2026 edition.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by updating the standards.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

SP12093-A2Text Modification

451.2.2

The ~~Guidelines~~ FGI Code for Planning and Design ~~and Construction~~ of Outpatient ~~Facilities~~ Settings (The ~~Guidelines~~ Outpatient Code~~), including Part 1 General, and Part 2 Outpatient Facility Types, Chapter 2.7 Specific Requirements for Outpatient Surgery Facilities~~ as referenced in Chapter 35 of this code

Page: 1

Mod12093_A2_TextOfModification.pdf

SP12093Text Modification

451.2.2

The ~~Guidelines~~ FGI Facility Codefor Design and Construction of Outpatient Facilities (The ~~Guidelines~~ FGI), including Part 1 General, and Part 2 Outpatient Facility Types, Chapter 2.7 Specific Requirements for Outpatient Surgery Facilities as referenced in Chapter 35 of this code.

Page: 1

Mod12093_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

19

SP12095

Date Submitted	02/13/2025	**Section**	469	**Proponent**	James gregory
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Updates code reference to Chapter 35.

Rationale

Revises the name to fit with the reference chapter of the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.
Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.
Impact to industry relative to the cost of compliance with code
There is no impact to industry.
Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the user to apply.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.
Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

FSP12095-A3

Proponent James gregory **Submitted** 8/20/2025 2:22:05 PM **Attachments** No

Rationale:

This is a revision to the original text indicating the new title of the FGI reference.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
There is no impact on local entity relative to enforcement.

Impact to building and property owners relative to cost of compliance with code
There is no impact to building and property owners.

Impact to industry relative to the cost of compliance with code
There is no impact to industry.

Impact to small business relative to the cost of compliance with code
There is no impact to small business relative to the cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
It has a reasonable and substantial connection to HSW of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens and improves the code by making it clearer and easier for the

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not discriminate against materials or products or methods.

Does not degrade the effectiveness of the code
Does not degrade the effectiveness of the code.

SP12095-A3Text Modification

469.2.1.2 Part 1 General and Part 2: Outpatient ~~Facility Types~~ Facilities, Chapter 2.1, Common Elements for Outpatient Facilities of *The ~~Guidelines~~ FGI Code for Planning and Design ~~and Construction~~ of Outpatient ~~Facilities~~ Settings* (*The ~~Guidelines~~ Outpatient Code*), as referenced in Chapter 35 of this code~~.~~ for those areas and details not described in this section.

Page: 1

Mod12095_A3_TextOfModification.pdf

SP12095Text Modification

469.2.1.2

Part 1 and Part 2: Outpatient Facility Types, Chapter 2.1, Common Elements for Outpatient Facilities of *The ~~Guidelines~~ FGI Facility Code for Design and Construction of Outpatient Facilities* (*The ~~Guidelines~~ FGI*), for those areas and details not described in this section as referenced in Chapter 35 of this code.

Page: 1

Mod12095_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

20

SP12178

Date Submitted	02/16/2025	**Section**	452	**Proponent**	scott waltz
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language No**

Related Modifications

Summary of Modification

Modification creates standards for Advanced Birth Centers. As directed by statute, it references to the codes for ambulatory surgery centers as minimum standards. Additionally, other reference standards provide appropriate requirements for the postpartum care of the mother and infant.

Rationale

Advance Birth Centers are newly created designation for birth centers which require additional physical plants to ensure the health, safety and welfare of the patients using these centers.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
none.
Impact to building and property owners relative to cost of compliance with code
None.
Impact to industry relative to the cost of compliance with code
None.
Impact to small business relative to the cost of compliance with code
None.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Yes
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Yes

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No

Does not degrade the effectiveness of the code

No

2nd Comment Period

SP12178-G1

Proponent scott waltz Submitted 8/15/2025 8:59:26 AM Attachments No

Comment:

Submitting for reconsideration of TAC rejection. The new language is needed to establish standards for Advanced Birth Center (ABC), but the text proposes to use a version of the FGI codes that may not be finalized in time for adoption. The intent is to align the reference standards for ABCs with those referenced for hospital and ambulatory surgery centers (ASCs) in FBC-B 449 and 451 respectively. A comment with alternative language is being proposed to coordinate with the current reference standards for hospitals and ASCs should the TAC be unable to approve adoption of the new standards.

SP12178Text Modification

452.1.2

For state licensure purposes of birthing centers designated as advance birth centers, these codes and standards shall be applicable to the project on the effective date of this code at the time of Stage II preliminary plan approval by the Agency for Health Care Administration (the Agency) as described in Chapter 59A-5 *Florida Administrative Code* or at the first Stage III construction document review if there has been no previous Stage II preliminary plan approval for that project.

452.3 Additional codes and standards for the design and construction of advanced birth centers as described in 383.302, *Florida Statutes*.

In addition to the minimum standards required by Section 452 of this code, Chapter 59A-11 *Florida Administrative Code*, or by Chapter 383, *Florida Statutes*, all new advanced birth centers and all additions, alterations or renovations to an existing advanced birth centers, shall also be in compliance with the following referenced codes and standards on the effective date of this code, as described in Section 452.1.2 of this code:

452.3.1

Section 451, Ambulatory Surgery Centers, of this code and all referenced codes and standards therein.

452.3.2

Section 2.2-2.10 Obstetrical Unit, The Guidelines for Design and Construction of Hospitals (The Guidelines), as referenced in Chapter 35 of this code.

452.3.3

Dietary facilities to support the postpartum care unit shall be provided. These facilities shall comply with Section 2.1-4.3 *Food and Nutrition Services, The Guidelines for Design and Construction of Hospitals (The Guidelines)*, as referenced in Chapter 35 of this code.

Page: 1

Mod12178_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

21

SP11976

Date Submitted	02/13/2025	**Section**	1612.4	**Proponent**	Rebecca Quinn obo FL Div Emerg Mgnt
Chapter	16	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Rectifies disconnect with the NFIP minimum requirements that was created in the 2024 IBC (see 11175/S116-22 AMPC4). ASCE 24 has provisions for temporary structures (less than 180 days), which are Flood Design Class 1. They may be at-grade and 'wet floodproofed.' FEMA proposing same for 2027 IBC.

Rationale

The 2024 IBC language completely circumvents all flood requirements for "public occupancy structures" (see 11175/S116-22 AMPC4). The "controlled occupancy procedures" have nothing to do with reducing flood damage, including collateral damage by debris generated by unregulated temporary structures. In addition to what ASCE 24 has for temporary structures, local floodplain management regulations have similar requirements for structures other than buildings. FEMA submitted a proposal to make the same changes in 2027 IBC (which would carry forward to the 10th Ed FBC). In addition, FEMA proposes, and FDEM concurs, to restrict temporary structures from high-risk areas, including floodway (thus no encroachment analysis required) and Zone V (which would require significant anchoring).

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Clarifies requirements for temporary structures in flood hazard areas.

Impact to building and property owners relative to cost of compliance with code

There may be some cost impact for those who would proposing 'public occupancy temporary structures" and those who would propose putting temporary structures in floodways and Zone V.

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

There may be some cost impact for those who would otherwise propose putting temporary structures in floodways and Zone V (e.g., event planners)

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, reduces damage and debris.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes, reduces damage and debris.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No change to flood damage-resistant material requirement.

Does not degrade the effectiveness of the code

No, code already allows temporary structures.

Alternate Language

2nd Comment Period

SP11976-A1

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 8:46:59 AM **Attachments** No

Rationale:
This comment does three things. First, it does not keep the prohibition on putting temporary structures in floodways and coastal high hazard areas. Second, it was pointed out during the International Code Council first Committee Action Hearing that other environmental loads for temporary structures are “scaled-back” from full loads required for other structures. At this time, there is no rational basis for a reduction of flood loads; satisfying the wind load provisions in Sec. 3103 provides some resistance to flooding and is equivalent to “techniques that minimize damage” in ASCE 24. The second-period submission is the same that the proponent worked out with a representative of the ASCE 7 temporary structure load committee and was submitted for the second Committee Action Hearing scheduled for October. That subcommittee is expected to consider reduction factors for flood loads, and the outcome may be in the 2028 edition of ASCE 7. The proposal also clarifies flood openings only required in rigid walls (not flexible fabrics). Third, a definition for Flood Design Class, based on the definition in ASCE 24, is added. The term is used in Sec. 1603.1.7 and this proposal.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Meets the intent to minimize flood damage and clarifies requirements for temporary structures in flood hazard areas.

Impact to building and property owners relative to cost of compliance with code
No additional cost to anchor to resist wind, some added cost for temporary structures with rigid walls and those that have mechanical and electric.

Impact to industry relative to the cost of compliance with code
Some for those that manufacture rigid-walled temporary structures and mechanical equipment for temporary structures.

Impact to small business relative to the cost of compliance with code
There may be some cost impact for those who would otherwise propose putting temporary structures in floodways and Zone V (e.g., event planners)

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Yes, reduces damage and debris.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Yes, reduces damage and debris.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
No change to flood damage-resistant material requirement.

Does not degrade the effectiveness of the code
no, code already allows temporary structures

FLOOD DESIGN CLASS. Classification of buildings and other structures for determination of flood loads and conditions, and determination of minimum elevation requirements on the basis of risk associated with unacceptable performance.

-

1612.4 Design and construction. The design and construction of *buildings* and *structures* located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24. Elevators, escalators, conveying systems and their components shall conform to ASCE 24 and ASME A17.1/CSA B44 as applicable.

Exception: *Temporary structures* complying with Section 3103.6.1.3.

3103.5.1.3 Flood loads. ~~Public-occupancy temporary structures need not be designed for flood loads specified in Section 1612. Controlled-occupancy procedures in accordance with Section 3103.8 shall be implemented.~~ Temporary structures located in flood hazard areas shall conform with the wet floodproofing requirements of ASCE 24 for structures assigned Flood Design Class 1 as modified by the following:

1. Design for wind loads in accordance with Sec. 3103.5.1.2 shall be permitted in lieu of design for flood loads in ASCE 7.

2. Temporary structures with rigid walls shall have flood openings in those walls.

3. Mechanical equipment and electric service shall elevated to or above the base flood elevation.

Controlled occupancy procedures in accordance with Section 3103.6 shall be implemented for public-occupancy temporary structure.

SP11976Text Modification

1612.4 Design and construction. The design and construction of *buildings* and *structures* located in *flood hazard areas*, including *coastal high hazard areas* and *coastal A zones*, shall be in accordance with Chapter5 of ASCE7 and ASCE24. Elevators, escalators, conveying systems and their components shall conform to ASCE 24 and ASME A17.1/CSA B44 as applicable.

Exception: ~~*Temporary structures* complying with Section 3103.6.1.3.~~

Delete and substitute as follows:

3103.6.1.3 Flood loads. ~~*Public occupancy temporary structures* need not be designed for flood loads specified in Section 1612. Controlled occupancy procedures in accordance with Section 3103.8 shall be implemented.~~ Temporary structures shall not be located in floodways and coastal high hazard areas. Temporary structures located in flood hazard areas other than floodways and coastal high hazard areas shall comply with Section 1612.

Page: 1

Mod11976_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

22

SP12017

Date Submitted	02/13/2025	**Section**	1612.4	**Proponent**	Rebecca Quinn obo FL Div Emerg Mgnt
Chapter	16	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

Summary of Modification

Add provisions for structures in flood hazard areas other than buildings, including structures that are roofed but not walled. Such structures include pole barns, gazebos, platforms, boat shelters, and RV shade structures.

Rationale

Fills an apparent gap in floodplain requirements for structures other than buildings. Adds provisions for those structures , including structures that are roofed but not walled. Such structures include pole barns, gazebos, platforms, boat shelters, and recreational vehicle shade structures. There are no elevation requirements for these structures because unlike buildings that shelter occupancies, they do not have ‘lowest floors.’ However, they must resist flooding to minimize damage to the structures and to minimize damage caused by battering debris when those structures do not resist loads.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Provides clarity for structures that do not have explicit requirements in the FBC when those structures are located in flood hazard areas.

Impact to building and property owners relative to cost of compliance with code
Some increase cost for structures that have mechanical, plumbing and electrical service.

Impact to industry relative to the cost of compliance with code
Clarifies general performance expectations for structures other than buildings.

Impact to small business relative to the cost of compliance with code
Clarifies general performance expectations for structures other than buildings.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, minimize damage.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Clarifies general performance expectations for structures other than buildings.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Repeats general expectation that materials below flood levels must resist flood damage.

Does not degrade the effectiveness of the code

Clarifies general performance expectations for structures other than buildings.

Alternate Language

2nd Comment Period

SP12017-A1

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 8:57:12 AM **Attachments** No

Rationale:
This comment retains the original proposal and adds “unwalled,” the term used in Dec Statement 2024-026. Unwalled can be taken to mean no walls. Not fully walled means can have one, two or three walls – but the fourth side is open. The original proposal, as modified, fills an apparent gap in floodplain requirements for structures other than buildings. Adds provisions for those structures, including structures that are roofed but are not fully walled or are unwalled (term used in DS-2024-026). Such structures include pole barns, animal run-in shelters, gazebos, platforms, boat shelters, and recreational vehicle shade structures. There are no elevation requirements for these structures because unlike buildings that shelter occupancies, they do not have ‘lowest floors.’ However, they must resist flooding to minimize damage to the structures and to minimize damage caused by battering debris when those structures do not resist loads.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Provides clarity for structures that do not have explicit requirements in the FBC when those structures are located in flood hazard areas.

Impact to building and property owners relative to cost of compliance with code
Some increase cost for structures that have mechanical, plumbing and electrical service.

Impact to industry relative to the cost of compliance with code
Clarifies general performance expectations for structures other than buildings.

Impact to small business relative to the cost of compliance with code
Clarifies general performance expectations for structures other than buildings.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Yes, minimize damage, unchanged with the addition of "unwalled."

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Clarifies general performance expectations for structures other than buildings.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Repeats general expectation that materials below flood levels must resist flood damage.

Does not degrade the effectiveness of the code
Clarifies general performance expectations for structures other than buildings.

SP12017-A1Text Modification

1612.4.3 Structures other than buildings. Structures other than buildings, including structures with roofs that are unwalled or not fully walled, shall:

1. Be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy, during conditions of the base flood.

2. Be constructed of flood damage-resistant materials.

3. Have mechanical, plumbing, and electrical systems above the base flood elevation or meet the requirements of ASCE 24, except that minimum electric service required to address life safety and electric code requirements is permitted below the base flood elevation provided it conforms to the provisions of the electrical part of building code for wet locations.

Page: 1

Mod12017_A1_TextOfModification.pdf

SP12017Text Modification

1612.4.3 Structures other than buildings. Structures other than buildings, including structures with roofs that are not fully walled, shall:
1. Be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy, during conditions of the base flood.
2. Be constructed of flood damage-resistant materials.
3. Have mechanical, plumbing, and electrical systems above the base flood elevation or meet the requirements of ASCE 24, except that minimum electric service required to address life safety and electric code requirements is permitted below the base flood elevation provided it conforms to the provisions of the electrical part of building code for wet locations.

Page: 1

Mod12017_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Building

23

SP12034

Date Submitted	02/13/2025	**Section**	1612.4	**Proponent**	Jaime Gascon
Chapter	16	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

12040

Summary of Modification

Provides reference to an acceptable test standard to qualify passive flood resistant products based on performance testing.

Rationale

Guidance to a flood testing protocol or approved flood resistance test for products being qualified for use in Special Flood Hazard Areas is needed. It will serve to properly qualify flood resistance performance of passive systems.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Saves time by making available an adopted standard that is acceptable for code compliance.
Impact to building and property owners relative to cost of compliance with code
Saves costs by knowing what is acceptable for code compliance.
Impact to industry relative to the cost of compliance with code
Saves costs by testing to an adopted standard that is acceptable for code compliance.
Impact to small business relative to the cost of compliance with code
Saves costs by testing to an adopted standard that is acceptable for code compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Improves the code by use of an adopted standard that is acceptable for code compliance.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens the code by use of an adopted standard that is acceptable for code compliance.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

It does not discriminate since it allows for other approved testing to also be used.

Does not degrade the effectiveness of the code

It does not degrade the code, but serves to improve it by providing guidance with a standard.

Alternate Language

2nd Comment Period

SP12034-A2

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/24/2025 11:51:10 AM **Attachments** Yes

Rationale:
ANSI/FM Approvals 2510-2020, standard for “flood mitigation equipment,” was published in 2020. It applies to “flood barriers for opening barrier and perimeter barrier applications” (passive and active) and mitigation valves and pumps. It is cited in ASCE 24, Flood Resistant Design and Construction (2024). Alternate Language adds ANSI/FM standard and provides for use of measures, passive and active, with approval of building officials –necessary clarification. Some manufacturers have not completed testing and FM 2510 certification, and likely even fewer satisfied TAS 204. RDPs might develop individual designs for unique situations that manufactured and certified products cannot address. Miami-Dade proposes to require all dry floodproofing passive measures (“flood resistance materials”) used in every jurisdiction to meet TAS 204-26. Other TASs cited are related to HVHZ and wind-borne debris regions. See separate comment submitted for SP12040 (the TAS). • TAS 204 is not applicable in Coastal A Zones, yet the FBC allows dry floodproofing in those areas. Alt Language addresses by stating it applies “where dry floodproofing is permitted by this code.” • TAS 204 is explicitly only for “passive” measures. The obvious question is about measures that require people to take action. Requiring passive measures only if tested by TAS 204 or another resistance test would end the standard of practice for +50 years by precluding individual certification. Alt Language addresses by providing for approval by the building official as an option. FBC defines Dry Floodproofing and 1612.4 refers to ASCE 24 for design and construction. Dry floodproofing includes those that are passive and do not rely on people (e.g., solid walls, special flood glass, special doors that seal every time closed), and those that require human intervention (e.g., to install panels and barriers). See attachment for additional paragraph about construction documents and design in accordance with ASCE 24.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Saves time and increases confidence when certified products are specified in designs.

Impact to building and property owners relative to cost of compliance with code
Saves some costs when design professionals specify use of certified products.

Impact to industry relative to the cost of compliance with code
Design industry will save time and costs when they can specify certified products. Manufacturing industry incurs costs for testing, but whether to seek certification is a choice.

Impact to small business relative to the cost of compliance with code
Saves costs by testing to an adopted standard that is acceptable for code compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Improves reliability of dry floodproofed buildings when certified products are used.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Improves reliability of dry floodproofed buildings when certified products are used.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
In addition to offering two testing standards, allows continuation of standard practice over last +50 years by relying on design professional certification.

Does not degrade the effectiveness of the code
Improves effectiveness when certified products are specified.

2nd Comment Period

SP12034-A1

Proponent Jaime Gascon **Submitted** 8/13/2025 1:19:20 PM **Attachments** No

Rationale:

This MOD was denied by the Special OCC TAC and Approved as Submitted (9/2) by the Structural TAC. This alternative language intends to clarify the questions raised on the proposed charging language as to when the new testing protocol can be used. It is intended for 'passive' systems only and the language has been adjusted accordingly.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Saves time by making available and directing users of the code to a standard for testing passive flood resistance products.

Impact to building and property owners relative to cost of compliance with code

Saves cost by knowing what is acceptable for code compliance.

Impact to industry relative to the cost of compliance with code

Saves cost by knowing what is acceptable for code compliance.

Impact to small business relative to the cost of compliance with code

Saves costs by testing to an adopted standard that is acceptable for code compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Improves the code by referencing an adopted standard that is acceptable for code compliance.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens the code by referencing an adopted standard that is acceptable for code compliance.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

It does not discriminate since it allows for other approved testing to also be used.

Does not degrade the effectiveness of the code

It does not degrade the code, but enhances it by providing guidance with a new standard protocol.

SP12034-A2Text Modification

Replace:

1612.4.3 Testing of Dry Floodproofing Measures. Where dry floodproofing is permitted by this code, materials, products and assemblies specified by registered design professionals as part of dry floodproofing measures shall meet the following, as applicable:

here human intervention is not required (passive), meet the test requirements of ANSI/FM 2510, TAS 204 or an approved test standard, unless otherwise approved by the building official.

here human intervention is required (active), meet the test requirements of ANSI/FM 2510 or an approved test standard, unless otherwise approved by the building official.

ADD to Chapter 35:

ANSI/FM 2510—20. American National Standard for Flood Mitigation Equipment.

Page: 1

Mod12034_A2_TextOfModification.pdf

FM Approvals

ANSI American National Standards Institute

ANSI/FM APPROVALS 2510-2020
REVISION OF ANSI/FM APPROVALS 2510-2014
APPROVED SEPTEMBER 14, 2020

American National Standard for Flood Mitigation Equipment

September 2020

FOREWORD

NOTE: This foreword is introductory only and is not part of American National Standard FM 2510.

This standard is intended to be used to evaluate the components and performance of flood mitigation equipment.

This American National Standard has been developed by the canvass method of standards development of the American National Standards Institute (ANSI). FM Approvals is an ANSI-accredited standards developing organization (SDO).

Approval of an American National Standard requires verification by ANSI that the principles of openness and due process have been followed and that a consensus of those directly and materially affected by the standard has been achieved. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution. Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached.

The American National Standards Institute does not develop standards nor will it in any circumstances give an interpretation of any American National Standard. Requests for interpretations of this test standard shall be addressed to FM Approvals.

ANSI regulations require that this American National Standard shall be revised, reaffirmed or withdrawn within five years of the date of publication.

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TABLE OF CONTENTS

1. INTRODUCTION

1.1. PURPOSE

1.1.1. This standard states the examination and test requirements for flood mitigation equipment for use in riverine, tidal, or rainfall related flood conditions.

1.2. SCOPE

1.2.1. This standard encompasses the design and performance requirements for flood mitigation equipment for use in controlling riverine tidal or rainfall related flood conditions. Flood mitigation equipment is categorized for specific flood protection applications which are designated by:

- Function (permanent or contingent)
- Operation (active or passive)
- For flood barriers, the intended application for protection (i.e., opening vs. perimeter)

1.2.2. This standard sets performance requirements for flood abatement equipment in the following product categories:

- Flood Barriers for Opening Barrier Applications
- Flood Barriers for Perimeter Barrier Applications
- Flood Mitigation Valves
- Flood Mitigation Pumps
- Penetration Sealing Devices

1.2.2.1. Flood glazing, as defined in Section 1.9, is considered a type of flood barrier that may be evaluated for opening barrier or perimeter barrier applications. The evaluation of flood glazing shall include the seal made between the glazing panel and the structural frame as well as the seal made between the frame and the structural opening.

1.2.2.2. For the purposes of evaluation to this Standard and applying the appropriate protocol, sluice gates, as defined in Section 1.9, are considered a type of flood barrier for opening barrier applications.

1.2.2.3. Penetration sealing devices include products used to seal the area around a surface penetration or the area within the penetration itself, the later which includes pipe plugs.

1.2.3. Flood barriers for opening barrier applications are evaluated and tested for quasi-static flood conditions.

1.2.4. Flood barriers for perimeter barrier applications are evaluated and tested for quasi-static and riverine flood conditions.

1.2.5. Flood barriers for coastal applications are not included in the scope of this Standard. Protection from tidal-related flood events is included in the scope of the Standard only for applications away from the coast where only quasi-static flood conditions are present.

1.2.6. Wind loading effects on flood barriers are not included in the scope of the evaluation. A full engineering analysis must be conducted by persons acceptable by the Authorities Having Jurisdiction (AHJ) to determine possible wind loading, as well as combined hydrostatic and wind loading, on a barrier structure.

1.2.7. The certification of flood barriers applies only at water levels up to the maximum depth rating, as identified on the product label. Water levels exceeding this amount are outside the scope of this certification.

1.2.8. Flood mitigation pump types included in the scope of this standard consist of submersible and pedestal type sump pumps as well as self-priming pumps.

1.2.9. Flood mitigation pumps are evaluated and Approved as pump packages only, complete with pump, driver, controller, coupling, and other components listed in Appendix C.

1.2.10. Certification to this Standard is limited to the flood mitigation product. Flood waters may produce high hydrostatic or hydrodynamic loading on a protected structure. Appropriate measures must be taken to ensure that an external wall structure (or similar) is able to withstand anticipated flood loading, including any site specific concerns. Some wall construction assemblies often are able to withstand 3 ft (0.9 m) or less of flood loading without needing reinforcement or additional waterproofing. A full engineering analysis must be conducted by persons acceptable by the Authorities Having Jurisdiction (AHJ).

1.2.11. In addition to the general design requirements specified in this Standard, local construction codes and/or agency regulations must also be considered in the design of a flood mitigation product or system.

1.3. BASIS FOR REQUIREMENTS

1.3.1. The requirements of this standard are based on experience, research and testing, and/or the standards of other organizations. The advice of manufacturers, users, trade associations, jurisdictions and/or loss control specialists was also considered.

1.3.2. The requirements of this standard reflect tests and practices used to examine characteristics of flood mitigation equipment. Flood mitigation equipment having characteristics not anticipated by this standard may be tested if demonstrated performance is equal or superior to that required by this standard, or if the intent of the standard is met.

Alternatively, flood mitigation equipment that has met all of the requirements identified in this standard may not be acceptable if other conditions which adversely affect performance exist or if the intent of this standard is not met. It is the sole discretion of the testing laboratory.

1.4. BASIS FOR ANSI SPECIFICATION

1.4.1. Certification is based upon satisfactory evaluation of the product and the manufacturer. Examination and tests on production samples shall be performed to evaluate:

- The suitability of the product
- The performance of the product as specified by the manufacturer
- The durability and reliability of the product

1.4.2. Since each flood mitigation system is unique in its operation and design, component testing shall be performed on a case-by-case basis. If deemed necessary, additional tests which are not included in this standard may be required at the discretion of the test laboratory.

1.4.3. A satisfactory evaluation of the flood abatement equipment's "Design, Installation, Operation and Maintenance Manual" is required. The evaluation shall be performed to ensure that the document is accurate and complete.

1.5. SYSTEM OF UNITS

Units of measurement used in this standard are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximated. Conversion of U.S. customary units is in accordance with the Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing and Materials (ASTM) SI 10. Two units of measurement (liter and bar), outside of, but recognized by SI, are commonly used in the international scientific community and are used in this standard.

1.6. NORMATIVE REFERENCES

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

ASME Publications
The American Society
of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990
www.asme.org

ASME *Boiler and Pressure Vessel Code, Section VIII- Rules for Construction of Pressure Vessels, Division 1*

ASTM Publications American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959	ASTM A351 – *Standard Specification for Castings, Austenitic, for Pressure Containing Parts* ASTM B16 - *Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines* ASTM B117 – *Standard Practice for Operating Salt Spray (Fog) Apparatus* ASTM D412 – *Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Elastomers – Tension* ASTM D395 – *Standard Test Methods for Rubber Property – Compression Set* ASTM D572 - *Standard Test Method for Rubber – Deterioration by Heat and Oxygen* ASTM D573 – *Standard Test Method for Rubber – Deterioration in an Air Oven* ASTM D1056 – Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber ASTM D5602 – *Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens* ASTM G155 – *Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials*
International Standards Organization 1 rue de Varembé Case Postale 56 CH-1211 Geneve 20 Switzerland	IISO 17025 – *General Requirements for the Competence of Testing and Calibration Laboratories*
United States Department of Transportation (D.O.T.) Washington, DC	*Code of Federal Regulations, Title 49, Transportation*, Parts 171 through 180

1.7. DEFINITIONS

For purposes of this standard, the following terms apply.

Accepted	This term refers to installations acceptable to the authority having jurisdiction and enforcing the applicable installation rules. Acceptance is based upon an overall evaluation of the installation. Acceptance is not a characteristic of a product. It is installation specific. A product accepted for one installation may not be acceptable elsewhere.
Active Flood Barrier or Flood Mitigation Product	A flood barrier or other flood mitigation product which requires human intervention for manual deployment. Active flood barriers or flood mitigation products may either be permanent or contingent.
Automatic Flood Barrier or Flood Mitigation Product	A permanent passive barrier or other flood mitigation product that automatically deploys without need for human intervention when flood conditions are detected. Types of automatic barriers may include, but are not limited to, buoyancy driven (horizontal or vertical) and (pneumatic or hydraulic activated by water sensors).
Backwater Valve	Backwater valves are a type of flood mitigation valve typically installed in drainage or sanitary systems and designed to prevent reverse flow into a protected structure and/or area. Standard flapper or swing type check valves are a common example. Backwater valves may be configured in either a normally open position or normally closed position and may be used for in-line or end of line applications.
Characteristic Curve	Graphic representation of the variation of a pump's outlet pressure (total head), efficiency and/or brake horsepower versus the pump's capacity at a constant speed. Multiple rated speeds may be represented with multiple curves on a single plot.

Contingent Flood Barrier or Flood Mitigation Product	A barrier or flood mitigation product that is not permanently installed and affixed to a structure and which requires some level of transportation and manual deployment. Some elements of the barrier/product may be permanently pre-installed (i.e. frame), but the main components are temporary and require manual deployment. Contingent flood barriers or flood mitigation products may only be classified as active protection
Deflection	The distance a flood barrier has moved from its original location during an applied force event. Deflection may be movement/displacement or distortion of the barrier structure itself. Permanent deflection is the distance the flood barrier has moved from its original location after the applied force is removed.
Deployment Time	The amount of time required for deployment and/or operation of an active flood mitigation product.
Dry-Side (or Land Side)	The side of a flood barrier or flood mitigation product that is protected from flood waters.
Flexible Rubber Type Valves	Flexible rubber type valves, also commonly referred to as duckbill check valves, are a type of flood mitigation valve which uses flexible rubber material to function as the valve mechanism. The position of the flexible rubber flap, or duckbill, is directly manipulated by the water and direction of flow. This provides for automatic open/close function resulting in flow only in the desired direction. Flexible rubber type valves may be constructed entirely of flexible rubber material or may be encased in a solid body.
Flood Doors	Any door, permanent or otherwise, which provides complete coverage of an exterior or interior door opening with the principle function of preventing flood waters into a structure.
Flood Glazing	A permanent, passive flood barrier constructed of reinforced glass material that is set and sealed within a structural frame. The frame is then installed and sealed within the structural opening. Flood glazing barriers may be configured as single panels (i.e. windows) or as multiple panels in a modular series to form a wall structure of the desired length. Flood glazing may also be installed within another permanent barrier structure such as a flood wall. Flood glazing may be used for opening barrier and/or perimeter barrier applications.
Flood Mitigation Pumps	A pump used for the removal of unwanted flood water. Types of flood mitigation pumps include but are not limited to submersible, pedestal, and self-priming pumps. Flood mitigation pumps may be utilized in one or more of the following applications; as part of a flood barrier system to remove water resulting from leakage past the barrier, permanently installed in a building as part of a water removal system (i.e. drainage system with sump), and/or a portable device used for removal of unwanted flood waters from a desired location.
Flood Mitigation Valve	This term refers to any style of valve that is used to mitigate the passage of water into a protected area during flood events. These products may be installed in-line or at the end of line outflow locations. Backwater valves are a type of flood mitigation valve. Other non-standard designs may also be utilized for this intended purpose, such as flexible rubber type valves.
Flood Panel Barrier	A flood barrier consisting of a large rigid panel(s) as the main structural element. During a flood event, the panel is manually affixed to a pre-installed barrier frame, or other pre-installed receiver components, at the location of deployment.
Flood Plank Barrier	A flood barrier consisting of multiple rigid planks which are guided through a vertical frame and stacked on top of each other to form a wall structure.
Leakage Rate	The rate at which water moves past or through a flood barrier or other flood mitigation product from the wet-side to the dry-side of the barrier, expressed as gallons per hour per linear foot (liters per hour per linear meter) length of seal.
Major Repair	A repair made to a flood barrier during the performance testing that requires changes to barrier design by the manufacturer.

Maximum Load	Maximum radial hydraulic load on the impeller of a flood mitigation pump at any point on the performance curve based on a specific gravity of 1.0. This usually occurs at the point of maximum total discharge head.
Maximum Power	The greatest speed-corrected power required to drive a flood mitigation pump at rated speed and at any point along its characteristic curve, and through the pumps total run out condition.
Minor Repair	A small repair made to a flood barrier during the performance test series. A repair will constitute as a "minor repair" only if; (1) the repair can be easily replicated by the end user, and (2) the Design, Installation, Operation, and Maintenance Manual instructs how to conduct the repair. If a minor repair becomes part of the deployment procedure in the Design, Installation, Operation, and Maintenance Manual, it will no longer be considered a repair.
Nationally Recognized Testing Laboratory (NRTL)	A laboratory which is listed and recognized by the United States Department of Labor, Occupational Safety & Health Administration's (OSHA) Directorate of Science, Technology, and Medicine program. The program recognizes private sector organizations as NRTL's, and recognition signifies that an organization has met the necessary qualifications specified in the regulations for the Program. The NRTL determines that specific equipment and materials ("products") meet consensus-based standards of safety to provide the assurance, required by OSHA, that these products are safe for use in the U.S. workplace.
Normally Closed Backwater Valve	A backwater valve designed in such a manner that when installed, the backflow prevention element remains closed until flow causes it to open.
Normally Open Backwater Valve	A backwater valve designed in such a manner as not to interfere with the movement of the air through the connected pipework. When installed, the backflow prevention element is in a normally open position.
Opening Barrier Applications	Applications in which a flood barrier is used to protect against water entering through an opening in a structure between two linear points (i.e. doorway, window, receiving bay, etc.). The barrier is supported by the permanent structure on both sides or along the full perimeter of the barrier/opening. Typical products used in opening barrier applications include flood doors, flood panels, and flood planks. Other products may include, but are not limited to, flexible membrane barriers, sluice gates, and flood glazing. Flood barriers certified for opening barrier applications are evaluated/tested to withstand quasi-static flood conditions.
Overtopping	The action of water flowing over the top of a flood barrier.
Passive Barrier or Flood Mitigation Product	A permanent barrier or other flood mitigation product that, after its initial installation, either requires no deployment or requires no human intervention for deployment. Examples of passive protection are engineered flood walls, flood glazing, penetration seals around pipes/cables, and automatic flood barriers. Passive barriers or flood mitigation products may only be classified as permanent.
Pedestal Pump	A pump that is comprised of; a pumping element in a sump, pit, or a low point, and a motor mounted on a column or pedestal extended vertically above the pumping element. The motor is not be exposed to the water in the sump, pit, or low point.
Perimeter Barrier	Applications in which a flood barrier is used to prevent flood water from entering an area surrounding a protected structure. Flood barriers evaluated for perimeter barrier applications may be contingent or permanent. The barrier is installed at some distance away from the protected structure allowing for additional flood mitigation methods (i.e. flood mitigation pumps) to be used to control any seepage before it reaches the protected structure. Perimeter barriers may be configured as a full perimeter wall or a terminating wall which may or may not be supported by a permanent structure. Flood barriers Approved for perimeter barrier applications are evaluated/tested to withstand quasi-static and riverine flood conditions.

Permanent Flood Barrier or Flood Mitigation Product	A barrier or flood mitigation product that is pre-installed and permanently affixed to a structure. Permanent barriers or flood mitigation products may or may not require manual deployment. Examples of permanent barriers requiring manual deployment include flood doors, hinged gates, sluice gates, etc.
Rated Capacity	The rate at which a flood mitigation pump delivers water, in gal./min. (L/min), at rated pressure and rated speed.
Rated Pressure	The outlet pressure in pounds per square inch - psi (kilopascals -kPa) developed by a flood mitigation pump when operating at rated capacity.
Riverine Flood Conditions	Flooding of or produced by a river causing water, debris and sediments to be transported onto a flood plain. Riverine flood conditions include various degrees of wave action and water currents, as well as the potential for large debris impact.
Seal	The location on a barrier where the product meets the ground or wall of the structure to prevent water from moving from the wet-side to the dry-side. A seal can also be made between different components or sections within a flood barrier. The linear length of seal, as determined based on the product type, is used for calculation of the leakage rate.
Self-Priming Pump	A flood mitigation pump which, when activated, will evacuate its passages of air and automatically draw in water to the suction side to commence pumping without the need for human intervention.
Shutoff Pressure	The net pressure in psi (kPa) developed by a flood mitigation pump at rated speed with zero flow.
Sluice Gate	A gate installed at the end of a sluice used to control water level and the flow from one area to another.
Structural Opening	Any opening where water can flow through such as doors, windows, air bricks/vent bricks, portals, garage entrance/loading dock entrance, etc.
Submersible Pump	A pump that consists of both the pumping element and the motor in a protective housing which allows the system to run properly when submerged in a liquid.
Sump Pump	A pump powered by an electric motor used for the removal of ground water drainage from a sump, pit or low point in a foundation. Types of sump pumps include, but are not limited to, pedestal and submersible.
Total Discharge Head	The gauge reading in psi (kPa) at the discharge of a flood mitigation pump converted to feet of liquid and corrected to the pump centerline elevation.
Total Dynamic Head	The difference between the total discharge head and the total suction head, or between the total discharge head and the total suction lift, whichever is applicable.
Total Suction Head	The gauge reading in psi (kPa) at the suction of a flood mitigation pump, converted to feet of liquid and corrected to the pump centerline elevation. This condition is present when the liquid supply level is above the pump centerline and the suction pressure is above atmospheric.

Total Suction Lift	The gauge reading in inHg (mmHg) at the suction of a flood mitigation pump, converted to feet of liquid and corrected to the pump centerline elevation. This condition is present when the liquid supply level is below the pump centerline and the suction pressure is below atmospheric.
Wet-Side (or River-Side)	The side of a flood barrier or flood mitigation product that is subjected to flood waters.

2. GENERAL INFORMATION

2.1. PRODUCT INFORMATION

2.1.1. Flood mitigation equipment is designated and categorized by function (permanent vs, contingent) and operation (active vs. passive). This standard defines protection with the following types of flood mitigation equipment.

- Flood barriers for perimeter barrier applications
- Flood barriers for opening barrier applications
- Flood mitigation valves
- Penetration sealing devices
- Flood mitigation pumps

2.1.2. In order to meet the intent of this standard, mitigation equipment shall be examined on a model-by-model, type-by-type, manufacturer-by-manufacturer, and plant-by-plant basis. This is predicated on the basis that identical designs, fabricated in identical materials by different manufacturers have been seen to perform differently in testing. Sample flood mitigation equipment, selected in conformance to this criterion, shall satisfy all of the requirements of this standard.

2.2. APPLICATION REQUIREMENTS

The manufacturer shall provide the following preliminary information that gives a full description of the construction of the flood abatement equipment. All documents shall identify the manufacturer's name, document number or other form of reference, title, date of last revision, and revision level.

Test programs will be scheduled only upon receipt of all material listed herein. All foreign language documents shall be provided with English translation.

2.2.1. Marketing/Ordering Literature - Showing general specifications and functions of the system.

2.2.2. Model Number Breakdown - A specification or drawing showing all system variations and options to be examined.

2.2.3. The Design, Installation, Operation, and Maintenance Manual.

2.2.4. Quality Control Procedures - Document(s) detailing routine testing and final inspection procedures: receiving inspection; in-process inspection; final inspection, and calibration of measuring and testing equipment used. In addition, procedures must detail the system acceptance testing once the flood mitigation equipment system is installed.

2.2.5. Documentation Control Specification - Proposed method of controlling critical documents which may be identified in the Documentation Section of the Test Report. These drawings shall be listed in the report issued at the conclusion of the test program. The testing laboratory shall be notified of changes to these documents.

2.2.6. Production Drawings - The following drawings shall be provided:

- Electrical schematic(s)
- Final assembly drawings and parts lists sufficient to detail primary components (all), operator controls, and their locations
- Complete set of mechanical drawings for all machined parts
- Complete part specifications (including manufacturer's model numbers, size, ratings, etc.) for all purchased parts
- Specification sheets for all parts/components
- Drawings showing all construction details
- Product label drawing(s) showing all required marking information. The label drawing shall show the proposed label location on the equipment and artwork showing the manufacturer's name, address, model and serial numbers, equipment ratings, and warning markings.

2.2.7. The number and location of manufacturing facilities.

2.3. REQUIREMENTS FOR SAMPLES FOR EXAMINATION

Sample requirements are to be determined by the testing laboratory following review of the preliminary information. Sample requirements may vary depending on design features and/or the results of any testing. It is the manufacturer's responsibility to submit samples representative of production. Any decision to use data generated utilizing prototype components or prototype systems is at the sole discretion of the testing laboratory.

3. GENERAL REQUIREMENTS

3.1. REVIEW OF DOCUMENTATION

During the initial investigation and prior to testing, the manufacturer's specifications, technical data sheets, and design details shall be reviewed to assess the ease and practicality of installation and use. The system and its components shall be capable of being used within the limits of the investigation.

3.2. PHYSICAL OR STRUCTURAL CONSTRUCTION FEATURES

3.2.1. Flood Barries for Opening Barrier and Perimeter Barrier Applications

3.2.1.1. All materials used in flood barriers shall be suitable for the intended application. Flood barrier components shall be constructed of corrosion resistant materials. When unusual materials are used, additional testing may be necessary to verify their suitability.

3.2.1.2. Flood glazing is considered a type of flood barrier that may be configured for opening barrier or perimeter barrier applications, and shall be evaluated as such.

3.2.1.3. Flood glazing shall be constructed with reinforced glass designed to crack but not shatter, when subjected to debris impact. The glass shall demonstrate the ability to withstand debris impact without compromising structural integrity while maintaining an acceptable amount of leakage.

3.2.1.4. Air / Nitrogen / other gas cylinder(s) for pressurized seal systems shall meet the applicable requirements of either the ASME Boiler and Pressure Vessel Code, Section VIII or Code of Federal Regulations, Title 49, Transportation, Parts 171 through 180; or equivalent national standard of the country of use, reference section 4.9.

3.2.1.5. Manually operated caps, valves, and other mechanisms required for proper functioning of the barrier, must have a securing, locking, and/or supervising component

3.2.1.6. The design of automatic barriers shall be such that major debris that could impact the barrier's functionality is prevented from entering the system prior to deployment. Other debris shall be able to be flushed from the system during periodic maintenance

3.2.1.7. Automatic barriers shall have a method for manual deployment

3.2.1.8. Automatic barriers shall be evaluated for reliability when any component is exposed to an outside load condition (i.e. vehicular, personnel traffic, etc.) while in the open position. The manufacturer shall provide a complete analysis which illustrates the product's ability to withstand any anticipated load conditions over the expected life of the barrier. The analysis shall include at a minimum; maximum deflection under load, permanent deflection based on simulated live loads, and a failure analysis of the deployment equipment. The analysis shall be reviewed for accuracy and completeness by the testing laboratory.

3.2.1.9. Flood barriers for opening barrier and perimeter barrier applications shall be constructed so as to be reasonably watertight and shall mitigate seepage to a level within the maximum requirement. Maximum seepage rates of flood barriers for opening barrier applications are provided in Appendix D for various opening widths and design water heights

3.2.2. Flood Mitigation Valves

3.2.2.1. Flood mitigation valves shall be designed and evaluated for in-line and/or end of line applications

3.2.2.2. Backwater valves designed to be normally closed shall be constructed that when the device is installed at the required 1:48 slope (1/4 in. per foot) with respect to the direction of flow, the check member will be in a closed position when no fluid is discharged. The valve shall be designed so that any solids accumulated under low flow conditions are flushed through the valve during full design flow conditions.

3.2.2.3. Backwater valves designed to be normally open shall be constructed that when the device is installed at the required 1:48 slope (1/4 in. per foot) with respect to the direction of flow, the check member will be in an open position but will close when fluid backflow occurs.

3.2.2.4. The internal working parts of a backwater valve, such as valve seat, flap, hinge pins, and stems, shall be copper alloy in accordance with ASTM B16, stainless steel in accordance with ASTM A351, or equally corrosion resisting material.

3.2.2.5. A backwater valve shall be designed and constructed that when installed in its proper operating position, the upper face of the device shall be parallel to the invert of the outlet so that the slope of the device can be readily determined by placing a level on the top of the face.

3.2.2.6. Flood mitigation valves shall be designed to provide access to working components for repair or replacement. The size of the access shall be based upon the requirements necessary to perform the repair or maintenance. The access cover shall be water and air tight once installed. This does not apply to flexible rubber type flood mitigation valves with no mechanical moving parts requiring maintenance and/or replacement.

3.2.2.7. Parts that are used to affect sealing in flood mitigation valves shall be secured in a manner that will maintain proper alignment of mating surfaces. Movement of any stationary parts shall not loosen or detach them during handling or operation of the unit. All seals and parts used to affect sealing shall be replaceable.

3.2.3. Flood Mitigation Pumps

3.2.3.1. Flood Mitigation Pump Packages

A flood mitigation pump manufacturer shall be able to supply the necessary pump accessories (See Appendix C) to provide a complete pump package installation. This responsibility includes control for: design, component sourcing, manufacturing, certification testing, production testing, proper operation and sizing of the pump and the accessories (Appendix C), quality control, and assembly locations.

3.2.3.2. Physical or Design Features

3.2.3.2.1. Connections to suction and discharge piping shall be made with flanged or threaded connections that are compliant to a recognized national or international standard. The use of other styles of connections will be at the sole discretion of the testing laboratory.

3.2.3.2.2. Manufacturers must provide a characteristic curve for each flood mitigation pump. Characteristic curves of discharge pressure (total dynamic head) vs. capacity shall be provided for all rated pump speeds. For submersible pumps, discharge pressure shall be in terms of total dynamic head. For self-priming pumps with suction lift capabilities, multiple performance curves shall be generated for varying degrees of suction lift, up to the maximum rated suction lift.

3.2.3.2.3. A flood mitigation pump shall have solids handling capability to protect against clogging caused by potential floating debris in flood waters. The solids handling capability, expressed as a maximum solid diameter, shall be clearly stated in the manufacturer's technical literature. Pumps shall be fitted with a means of protection from clogging by use of a strainer, or screening, sized to limit the maximum solid size entering the pump to within the stated capability.

3.2.3.2.4. Pump casings shall be designed for easy clean out/flushing in case of clogging, without the use of specialized tools.

3.2.3.2.5. Sealing at the pump shaft may be accomplished with either traditional packing, or mechanical seals.

3.2.3.2.6. Flood mitigation pumps shall be capable of turning on and off manually. In addition, pumps can have the capability of an optional automatic start and stop feature. Automatic operation shall turn on or off by responding to the appropriate water levels in a sump as indicated by the operation of a mechanical float switch, liquid level sensor, or pressure transducer.

3.2.3.2.7. Flood mitigation pumps shall be provided with a manual means for stopping the equipment. This may be located on the control panel on the assembly itself, or via a remote switch.

3.2.3.2.8. Flood mitigation pumps that may be installed in different orientations, shall be tested in each orientation, or it shall be stated which orientation for which the Approval has been granted.

3.2.3.2.9. Electrical devices used as part of a flood mitigation pump package intended for hazardous (classified) locations, requiring explosionproof or submerged service, the examination of electrical components is to include applicable Hazloc evaluations per applicable standards.

3.2.3.2.10. Submersible pumps require a minimum submergence level for continuous operation. Operation under conditions outside of this range may cause significant damage to the pump. Performance ratings for submersible pumps shall be in reference to the pump while at the minimum submergence level and minimum total suction head.

3.2.3.2.11. Self-priming pumps may be designed to utilize various means of drawing water into the pump casing. The manufacturer's literature shall clearly outline the proper operation of the equipment in order to establish prime within the pump. It shall also indicate the amount of lift that each model of pump can produce.

3.2.3.2.12. Skid mounted or frame encased units shall have lifting points clearly marked in order to avoid damage to the unit during transportation.

3.2.3.2.13. Trailer mounted units shall be identified as compliant for over the road travel, or not. All trailer mounted units shall be provided with adjustable supports that may be used to level the unit for operation.

3.2.3.2.14. In order to account for the application, flood mitigation pumps may be driven by electric motors or internal combustion engines.

3.2.3.2.15. Due to the range of pumps considered for flood mitigation applications, the requirements for internal combustion engine drivers have been written around the use of gasoline powered engines up to 15 hp, and diesel engines from 15 hp and larger. Evaluation of engines utilizing other fuels will be on a case-by-case basis at the sole discretion of the testing laboratory.

3.2.3.2.16. Internal combustion engines may be started either by electrical or mechanical means. Where practical, smaller internal combustion engines units with electric start shall also have a manual recoil starting method as a back-up in case of low battery level. Larger engines shall be fitted with an integral starter motor, storage battery, and alternator / generator as a means for cranking the engine.

3.2.3.3. Internal Combustion Engines – Gasoline Engines

3.2.3.3.1. Gasoline engines shall be designed to close-couple to the pump only.

3.2.3.3.2. A manual starting method shall be provided as a means to start the engine. Electric start is permitted, but only with manual recoil as a back-up means for starting the equipment. The addition of electric start shall also be accompanied by a starter motor, solenoid, battery provided to crank the engine, and a means to recharge the battery while the engine is running.

3.2.3.3.3. Gasoline engines may be provided as air cooled or liquid cooled. Any integral fans used to draw cooling air over the engine shall be guarded to provide protection for personnel operating the equipment. Liquid cooled engines shall be provided with a fill port and expansion reservoir in order to reduce the loss of primary coolant due to thermal expansion.

3.2.3.3.4. Gasoline engines may be provided as single speed, or with an adjustable throttle. If provided with an adjustable throttle, markings shall be provided to indicate the direction for increase and decrease of engine speed in proximity to the point of adjustment. Gasoline engines shall not be designed to operate above 3600 rpm.

3.2.3.3.5. Gasoline engines shall be internally lubricated with engine oil that is mechanically circulated throughout the engine. Oil fill and drain ports shall be readily identified either by color, marking, or symbol. The engine oil lubrication path shall pass through a readily replaceable engine oil filter that is readily identifiable, and requires no specialized tools to access or change during maintenance.

3.2.3.3.6. Gasoline engines shall draw their fuel from a fuel tank provided as part of the entire pump assembly. The fuel tank shall be mounted so that fuel is fed to the carburetor via gravity, or with a manual push bulb initial priming assistance. The fuel line between the storage tank and the carburetor shall have a quarter turn valve in it with markings for OPEN and CLOSE clearly marked. The fuel pick-up within the tank shall be located above the lowest point in order to reduce chances for debris making it into the combustion chamber or shall be fitted with a strainer / screen.

3.2.3.3.7. Gasoline engines shall draw their combustion air through a readily replaceable filter media in order to prevent air borne debris from entering the combustion chamber.

3.2.3.3.8. Gasoline engines shall be provided with a muffler to reduce the sound generated. The exhaust and muffler shall be guarded to provide protection from operators of the equipment.

3.2.3.3.9. Gasoline engines shall be designed for use in outdoor environments. Therefore, the electrical connections, air intake, and fuel system shall be designed to operate in dry and rainy environments.

3.2.3.4. Internal Combustion Engines – Diesel Engines

3.2.3.4.1. Diesel engines used with flood mitigation pumps are generally long-coupled to the pump shaft via a power transmission coupling or drive-shaft. Smaller diesel engines (1 or 2 cylinders) however can be supplied as close-coupled to the flood mitigation pump.

3.2.3.4.2. Diesel engines may be supplied as naturally aspirated, turbocharged, or twin turbocharged, and those fitted with after coolers.

3.2.3.4.3. This document does not address the National or Local Codes which require specific emission levels to be met by diesel engines.

3.2.3.4.4. Diesel engines shall be provided with electric starting as the primary means of cranking engines for all engines 3 cylinders and larger. All diesel engines with electric start shall be provided with starter motor, solenoid, storage battery provided to crank the engine, and means to recharge the battery when the engine is running. Single and dual cylinder close-coupled diesel engines may be provided with manual recoil starting as primary means of cranking the engine. Electric start is permitted on single and dual cylinder engines, but only with manual recoil as back-up means for starting the equipment.

3.2.3.4.5. Diesel engines shall be provided as liquid cooled or radiator cooled for all engines 3 cylinders and larger. All liquid cooled and radiator cooled diesel engines shall be provided with a fill port and expansion reservoir in order to reduce the loss of primary coolant due to thermal expansion. Any integral fans used to draw cooling air over the engine, across air heat exchanger, or through a radiator shall be guarded to provide protection for personnel operating the equipment. Single and dual cylinder close-coupled diesel engines may also be provided as air cooled.

3.2.3.4.6. Diesel engines shall be provided with an adjustable throttle for all engines 3 cylinders and larger. Markings shall be provided to indicate the direction for increase and decrease of engine speed in proximity to the point of adjustment. It shall be designed to provide positive locking for any setting. Single and dual cylinder close-coupled diesel engines may be provided as single speed, or with a manually adjustable throttle. Diesel engines shall not be designed to operate above 3600 rpm.

3.2.3.4.7. All diesel engines shall be internally lubricated with engine oil that is mechanically circulated throughout the engine. Oil fill and drain ports shall be readily identified either by color, marking, or symbol. The engine oil lubrication path shall pass through a readily replaceable engine oil filter that is readily identifiable, and requires no specialized tools to access or change during maintenance.

3.2.3.4.8. Diesel engines with 3 cylinders or more shall draw their fuel from a fuel tank provided as part of the entire flood mitigation pump assembly. For assemblies that do not rely on gravity feed of fuel to the engine, a fuel pump shall be provided. The fuel pickup shall not be at the lowest point within the fuel tank in order to reduce the chances of debris from entering into the combustion chamber. As an additional means of protection, fuel will be passed through a minimum of one filter prior to entering the engine. The fuel level shall be indicated either by mechanical fuel gauge or by electrical fuel gauge in the case of pump assemblies fitted with a control panel.

3.2.3.4.9. Diesel engines shall draw their combustion air through a readily replaceable filter media in order to prevent air borne debris from entering the combustion chamber.

3.2.3.4.10. Diesel engines with 3 cylinders or more shall be either provided with a muffler to reduce the sound generated, or shall state the requirements for a silencer if supplied by others. The exhaust and muffler shall be guarded to provide protection from operators of the equipment.

3.2.3.4.11. Diesel engines shall be designed for use in outdoor environments. Therefore, the electrical connections, air intake, and fuel system shall be designed to operate in dry and rainy environments.

3.2.3.4.12. Diesel engines with 3 or more cylinders shall be provided with an engine controller as part of the pump assembly. The engine controller shall provide the operator with the following minimum information and have the following construction features:

- A tachometer shall be provided to indicate the engine speed. The tachometer shall read zero when the engine is not running (or have no reading in the tachometer is digital) and engine battery power is supplied to the controller. If the tachometer is not of the totalizing type, a separate hour meter shall be provided to indicate total time of operation.
- An oil pressure gauge shall be provided to indicate the engine oil pressure.
- A temperature gauge shall be provided to indicate temperature of primary coolant loop for radiator cooled engines. An additional temperature sensor or switch shall be provided to signal an alarm if the primary coolant temperature exceeds manufacturers' predetermined limits.
- All control devices, starting and shutdown switches, and indicator lamps shall be located on the control panel.
- The control panel shall not be allowed to be used as a junction box or conduit for any wiring that is not part of the flood mitigation pump package.
- The control panel shall be located in an area that does not subject the operator to unreasonable hazards from hot surfaces, moving parts, or noise.
- The mounting of the control panel shall be able to withstand the forces associated with equipment transportation, operation, heat, and mechanical damage.
- The control panel shall have, as a minimum, a NEMA Type 2 dripproof enclosure or an enclosure with an ingress protection (IP) rating of IP X1.
- The wiring outside the control panel shall be harnessed, attached, protected and/or enclosed to minimize mechanical, thermal, or engine fluid damage. All electrical connections shall have positive locking mechanisms or screw terminals.
- A speed sensitive switch shall be provided to indicate the engine is running and to terminate the need to crank the engine.
- If the adjustable throttle is electronic, then it shall be either mounted within the engine control panel, or otherwise protected against unauthorized re-adjustment of the speed setting.
- If the engine operation parameters can be changed at the engine control panel, then it shall be either mounted inside the control panel, or be password protected to limit un-authorized changes.
- Engine control panels that contain microprocessors shall be capable of starting manually in the event of failure of any of the microprocessors.

3.2.3.4.13. All diesel driven flood mitigation pump models shall be marked with the allowable fuel specification on /near the fill port. While fuel storage size may vary by assembly design, the anticipated continuous run time for a given full tank of fuel at maximum flow shall be clearly marked on the unit. In addition, fuel level shall be indicated either by mechanical fuel gauge or by electrical fuel gauge in the case of assemblies fitted with control panel.

3.2.3.5. Electric Motors

3.2.3.5.1. Electric motors used in flood mitigation pump packages shall be designed per NEMA MG 1, IEC 60034-1, or equivalent. Functionally equivalent motors designed per other standards will be considered on a case-by-case basis. The manufacturer shall specify which standard is to be referenced, and certify that the motor used is in compliance with said standard, providing any supporting documentation requested to verify compliance.

3.2.3.5.2. The motor shall be sized (in horsepower or kilowatts) such that the maximum motor current in any phase under any anticipated condition of pump load and voltage unbalance does not exceed the motor rated full-load current multiplied by the motor service factor.

3.2.3.5.3. To protect against water ingress, electric motors for flood mitigation pump packages require a minimum rating equivalent to a NEMA open drip proof type or have a minimum IEC rating of IP22.

3.2.3.5.4. If applicable, eyebolts or equivalent lifting points shall be provided on the electric motor to lift the motor safely.

3.2.3.5.5. Electric motors used with flood mitigation pumps shall be provided with a protection device that will prevent damage to the electric motor in case of elevated temperature due to loss of cooling for the enclosure, or temperature rise due to locked rotor current draw. Activation of the device will open the input power circuit directly as a means to prevent damage from continued operation. The electric motor shall be able to be restarted only after the temperature has returned to within pre-determined range and the protection device closes, thus completing the power circuit.

3.2.3.6. Liquid Level Sensors

3.2.3.6.1. Liquid level sensors and switches used to provide ON/OFF signals for automatic operation of flood mitigation pumps may be the float type, mechanical float type, or transducers which react to static water pressure.

3.2.3.6.2. Liquid level sensors and/or switches may be directly assembled, or tethered, to the flood mitigation pump, or located within the water collection area.

3.2.3.6.3. Due to the environments where these devices are intended to operate, the liquid level sensor or switch may also need to be evaluated for ordinary locations, hazardous (classified) locations, or explosionproof as discussed in Section 3.2.3.2.9.

3.2.4. Penetration Sealing Devices

3.2.4.1. Penetration sealing devices shall be rated for a maximum nominal size of penetration (i.e. nominal pipe diameter).

3.2.4.2. Penetration sealing devices designed to seal the area around flexible cable shall have sufficient retention of the cable to prevent significant slippage. The design shall be such that applied forces to the cable do not affect the sealing capabilities.

3.2.4.3. All non-metallic materials used in penetration sealing device construction shall be resistant to deterioration or loss of sealing function under adverse conditions of temperature extremes, long term aging, and, if applicable, UV light exposure.

3.2.4.4. Penetration sealing devices may be permanent or contingent. Permanent or pre-installed metallic components (i.e. frames, structural components) shall be corrosion resistant, having resistance to corrosion equal to or exceeding that of bronze alloy having a minimum copper content of 80 percent, or constructed of Series 300 stainless steel.

3.2.4.5. Penetration sealing devices utilizing inflatable membrane materials shall be provided with a means for measuring fill pressure.

3.2.4.6. Permanently installed penetration sealing devices are susceptible to rodent damage over time, which may impact the product's sealing ability. The manufacturer shall detail periodic maintenance inspections which provide guidelines for assessment of rodent damage and whether the product needs to be replaced.

3.3. POST-INSTALLATION CHECKLIST

3.3.1. As it relates to all flood mitigation products with pre-installed components (permanent or contingent), the manufacturer shall be required to submit a post-installation checklist. This is to ensure proper installation of the product (or pre-installed components) by any installer, whether it be the manufacturer or a 3rd party contractor. Improper installation issues, such as gaps between the barrier and gaskets, gaps between the barrier and the structure, improper installation of frames, and others, may render the flood mitigation product completely ineffective or cause significantly higher leakage than is expected.

3.3.2. The post-installation checklist shall contain all critical aspects of the installation. The installer is to inspect and confirm all items on the checklist have been met after installation is complete in order to ensure proper operation and function of the product. The installer is to complete and sign off on the checklist, leave a copy on site, and send a copy back to the manufacturer to keep on file.

3.3.3. Review and acceptance of the post-installation checklist is to be considered a part of the examination. The test engineer shall review the checklist for accuracy and to ensure that all critical installation aspects are adequately represented.

3.4. COMPONENTS

At a minimum, components required for the flood mitigation equipment shall be designed for proper system functionality, and maximum long term reliability. Flood mitigation equipment designs should take into account the possibility of component failure and the potential for that failure to impair the effectiveness of the system. Such impairments shall be minimized through failsafe, redundant component, over-design, de-rating, or other means demonstrating equivalent reliability.

3.5. MARKINGS

3.5.1. A permanently-marked, legible, corrosion-resistant nameplate shall be securely attached to the equipment where practical and it shall be easily visible. The nameplate shall include the following information, at a minimum:

- Manufacturer's name or trademark
- Model identification

Additional marking requirements for flood barriers include:

- Maximum design water depth
- Approved application (opening or perimeter barrier applications)
- Fill pressure range (as applicable for products with inflatable seals)

Additional marking requirements for flood mitigation valves include;

- Maximum working pressure
- Maximum backpressure
- For plastic valves, the letters "ABS" or "PVC" (as applicable to the material of the valve body)
- Nominal size
- Direction of flow

Additional marking requirements for flood mitigation pump packages, permanently marked on a suitable data plate on the pump, shall include;

- Rated flow
- Rated head
- Speed
- Hertz
- Horsepower
- Voltage
- Amperage
- Phase
- Approximate continuous run time
- Maximum rated suction lift (if applicable)

Note: Pump performance shall be de-rated if it is paired with a driver that is not able to produce the speed and/or power required to operate the pump at full rated capacity.

Additional marking requirements for penetration sealing devices include:

- Maximum design water depth
- Maximum leakage rate
- Fill pressure range (as applicable for products with inflatable seals)

When a penetration sealing device design is such that permanently marking the product is impossible, all information included in the marking requirements shall be represented on a suitable label applied to the product container.

3.5.2. An automatic barrier shall be permanently marked with manual deployment instructions. Alternatively, the barrier's "Design, Installation, Operation, and Maintenance Manual" shall include instructions for manual deployment. The instruction manual must be permanently stored in an easily accessible location within close proximity to the barrier.

3.5.3. The marking for flood mitigation valves shall be located on the cover plate so that it is visible after the valve has been installed.

3.5.4. Any other pertinent marking information required by the referenced standards or other national or international standard to which the system is manufactured shall be permanently marked on a suitable data plate.

3.5.5. The model identification shall correspond with the manufacturer's catalog designation. The manufacturer shall not place this model identification on any other product.

3.6. MANUFACTURER'S DESIGN, INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

The manufacturer shall provide complete instructions required to properly design, install, operate, and maintain a flood mitigation product or system. Such documentation shall be furnished by the manufacturer and submitted to the testing laboratory as a part of the examination.

At a minimum, the manufacturer's Design, Installation, Operation, and Maintenance Manual shall include the following:

- A description of the product and the parts/components needed for installation and/or operation/ deployment
- A procedure for installation of the product (as applicable), including pre-installed components

The installation manual and operation manual may be separate documents

- A procedure for operation/deployment of the product (as applicable)
- Details regarding periodic maintenance required to ensure product function/performance
- Details regarding trouble shooting/repairs during deployment or flood conditions
- Guidelines for storage of barrier and/or components when not in use (as applicable)
- Reference Sections 4.2.1, 4.3.1, and 4.3.2 for additional details regarding requirements for deployment procedures related to flood barriers.

3.7. CALIBRATION

All examinations and tests performed in evaluation to this standard shall use calibrated measuring instruments traceable and certified to acceptable national standards.

The calibration of recently purchased new equipment is also required. Documentation indicating either the date of purchase or date of shipment, equipment description, model and serial number is required for identification. The period from the time the equipment was put into service to the date of testing must be within an interval that does not require the equipment to be calibrated as determined on the basis of the parameters mentioned above.

3.8. TEST FACILITIES

If review of all required information indicates suitability for testing, representative samples of the flood mitigation equipment for specific application will be scheduled. The range of component, material and performance tests shall be specified by the testing laboratory. If testing cannot be completed at the testing laboratory, the manufacturer shall provide facilities and all properly calibrated instrumentation required to perform these tests. The manufacturer shall also provide personnel to install, operate, and maintain the flood mitigation equipment. For testing not conducted at a testing laboratory, a representative of the testing laboratory shall witness all the tests and shall receive copies of the data and calibration certificates.

3.9. TOLERANCES

Tolerances on units of measure shall be as described in Appendix A, unless otherwise specified.

4. PERFORMANCE REQUIREMENTS

The performance requirements for flood mitigation equipment are composed of two different categories; General Component and Material Testing (Section 4.1) and Performance Testing (Sections 4.2 – 4.6). All flood mitigation equipment, and their applicable components, is subject to the General Component and Material Testing described in Section 4.1. In addition to this component testing, performance testing of the system/assembly is required as described in the performance test section (Sections 4.2 - 4.6) specific to the product category, as shown below in Table 4.

Table 4 – Applicable Performance Requirements

Product Category	**Applicable Test Sections**
Flood Barriers for Opening Barrier Applications	4.1, 4.3
Flood Barriers for Perimeter Barrier Applications	4.1, 4.2
Flood Mitigation Valves	4.1, 4.4
Penetration Sealing Devices	4.1, 4.5
Flood Mitigation Pumps	4.1, 4.6

4.1. GENERAL COMPONENTS AND MATERIALS TESTING - FLOOD MITIGATION EQUIPMENT

The components and materials of a flood mitigation product shall be examined and tested in accordance with this standard. However, not all tests within this section of the standard are applicable to every product design. In addition, if the design of a component or assembly cannot be adequately examined with the tests listed in this standard, additional testing may be necessary. Applicable tests will be determined at the sole discretion of the testing laboratory.

Component testing may be conducted on an individual component, component assembly, or as part of an entire flood mitigation system as deemed appropriate.

Material related testing may be waived at the discretion of the testing laboratory if prior testing has been completed by an OSHA Directorate of Science, Technology and Medicine certified NRTL (National Research and Testing Laboratory). Documentation shall be submitted demonstrating compliance to the requirements and confirmation that these tests have been carried out as described in the applicable ASTM Standard and completed with ISO 17025 calibrated equipment.

4.1.1. Examination

4.1.1.1. Requirements

Flood mitigation equipment shall conform to the manufacturer's drawings and specifications, and to the physical and structural requirements described in Section 3, General Requirements.

4.1.1.2. Test/Verification

Flood mitigation equipment and all its individual components shall be examined and compared to the manufacturer's production drawings and engineering specifications. All test samples shall be consistent with the drawings/specifications.

In addition, it shall be verified that the representative test samples conform to the physical and structural requirements described in Section 3, General Requirements.

4.1.2. Hydrostatic Test Strength

4.1.2.1. Requirements

Pressure retaining components or barriers, such as bladders, tubes, or inflatable seals shall withstand 150 percent of the maximum system operating pressure without rupture, cracking or permanent distortion and shall remain fully functional.

4.1.2.2. Test/Verification

Components or barriers shall be subjected to a hydrostatic test pressure of 150 percent of the maximum system operating pressure, for five minutes. Components or barriers subject to external stresses while pressurized (i.e. inflatable seals, inflatable pipe plugs or penetration seals) shall be pressurized while installed as intended. No rupture, cracking, or permanent distortion of the component is allowed. After the pressure test, the components or barrier shall be checked for proper functionality.

4.1.3. System Leakage Test

4.1.3.1. Requirements

Pressure retaining components susceptible to leakage such as caps, fill ports, and valves shall not leak when subjected to a hydrostatic test pressure of 120 percent of the maximum system operating pressure.

4.1.3.2. Test/Verification

Pressure retaining components shall be subjected to a hydrostatic test pressure of 120 percent of the maximum system operating pressure, while installed as intended in the flood mitigation system. Any observation of visible leakage shall be recorded.

4.1.4. Component Durability - Cycling

4.1.4.1. Requirements

Components with moving parts shall not show excessive wear or damage after 500 cycles of operations.

Permanent flood barriers with moving parts (i.e. flood doors and automatic flood barriers) shall be fully deployed and redeployed 500 times through their full range of operation. For automatic flood barriers which operate via subjecting the barrier to flood water, this cycle testing may be conducted by mechanical means.

4.1.4.2. Tests/Verification

The sample component or system shall be cycled 500 times through its full operational range; through its full open to close and close to open positions, or its full range of travel, etc. After cycle testing, the components or system shall be visually inspected for any signs of excessive wear or damage which would impair proper operation or function. If deemed necessary, the component or system shall be subjected to any of the appropriate tests outlined in this standard.

4.1.5. Vibration Resistance

4.1.5.1. Requirements

Components or assemblies containing moving parts susceptible to vibration shall withstand vibration without cracking, loosening, separation, or excessive wear, or other damage that would impair its proper operation or function. This test applies to permanently installed components including those in pre-installation assemblies.

4.1.5.2. Tests/Verification

One of each type of component assembly shall be installed and secured on a vibration table as it would be in its intended installation configuration. The orientation of the sample shall be so that the plane of vibration occurs along the plane that is deemed to be the most susceptible to vibration damage. If no such determination can be made, the sample shall be subjected to the vibration test conditions in all 3 planes.

The test samples shall be subjected to the vibration conditions outlined in Table 4.1.5. The frequency shall be continuously variable with a cycle period of 25±5 seconds. After one (1) hour If one or more resonant point(s) is detected, the component or component assemblies shall be vibrated for the remainder of the duration at such frequency(ies) for a period of time proportionate to the number of resonant frequencies. Otherwise the component or component assemblies shall be subjected to the variable frequency condition for the full 5 hour period.

Table 4.15 Vibration Conditions

Total Displacement/Stroke		*Frequency*	*Time*
Inch	*(mm)*	*Hz*	*Hours*
0.020	(0.51)	18 to 37 (variable)	5

4.1.6. Impact and Wear Resistance

4.1.6.1. Requirement

Plastic securement components which are susceptible to stress, and/ or an outside force during installation, construction, and or during the life span of the flood mitigation product shall not crack or show signs of degradation when subjected to applied stress and/or impact.

4.1.6.2. Test/Verification

A. Each plastic component susceptible to an applied force or torque shall be placed in a refrigeration chamber and exposed to a temperature of 10°F (-12°C) for a 24 hour period. The component(s) shall then be removed from the chamber and the maximum force or torque specified by the manufacturer shall be applied. The sample shall be visually inspected for any damage.

B. Each plastic component shall be placed in a refrigeration chamber and exposed to a temperature of 10°F (-12°C) for a 24 hour period. The component(s) shall then be removed from the chamber and impacted with a spherical steel weight dropped from a height necessary to produce an impact energy of 68 Joules (50 ft-lbf). Impact energy is calculated using the formula W*H, where "W" is the weight of the impact object and "H" is the drop height. The weight shall be dropped three separate times in three different locations and shall be prevented from impacting the test sample more than once for each drop. The sample shall be visually inspected for any damage.

4.1.7. Salt Spray Corrosion – Residue Build-Up

4.1.7.1. Requirements

Components or component assemblies with dissimilar metals shall not deteriorate, crack, fail, or lose functionality due to galvanic corrosion.

4.1.7.2. Test/Verification

Each component or component assembly shall be supported and oriented in its intended installation position. The sample(s) shall be exposed to salt spray (fog) as specified by ASTM B117, Standard Practice for Operating Salt Spray (Fog) Apparatus with the exception of the salt solution. The salt solution shall consist of 20 percent (by weight) of common salt (sodium chloride) dissolved in deionized water with a pH between 6.5 and 7.2 and specific gravity from 1.126 to 1.157.The sample shall be exposed for a period of 240 hours.

Following the exposure, the sample shall be removed from the test chamber and permitted to air dry for a two- to four-day drying period. Subsequently, the component shall be visually inspected to meet the stated requirements and, if deemed necessary, shall be subjected to any of the appropriate tests outlined in this standard.

4.1.8. Tensile Strength, Ultimate Elongation, and Tensile Set Tests

4.1.8.1. Requirements

Elastomeric components which are subjected to tensile type loading shall have a;

- Tensile strength of not less than 1500 psi (103.4 bar)
- Ultimate elongation of not less than 200 percent
- Tensile set of not more than 19 percent

Elastomeric parts constructed of silicone rubber material shall have a tensile strength of not less than 500 psi (34.5 bar) and at least 100 percent ultimate elongation.

Elastomeric parts constructed of open or closed cell expanded foam/cellular rubber materials are not applicable to this test.

4.1.8.2. Tests/Verification

Tensile strength, ultimate elongation, and tensile set shall be determined in accordance with ASTM D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension, Method A, with the following exceptions:

For tensile strength and ultimate elongation:

- If a test sample breaks outside the benchmarks or if the measured tensile strength or ultimate elongation is less than the required value; an additional test sample shall be tested and those results shall be considered final.
- It shall be acceptable for a test sample to break in the curved portion just outside the benchmarks if the measured strength and elongation values are within the minimum requirements.

For tensile set:

- The spacing of the benchmark shall be 3 in. (76 mm)
- The elongation shall be maintained for 3 minutes
- The tensile set shall be measured 3 minutes after the release of the specimen

4.1.9. Accelerated Aging Test

4.1.9.1. Requirements

A. Elastomer components other than open or closed cell expanded foam/cellular rubber materials shall not have less than 80 percent of the as-received tensile strength and 50 percent of the as-received ultimate elongation after accelerating the age of the material.

B. Elastomeric components constructed of open or closed cell expanded foam/cellular rubber materials which are subjected to compression type loading shall not have a compression deflection change of greater than ± 20% for open cell sponge type materials and ± 30% for closed cell expanded type materials, when comparing as-received and air-oven aged results.

4.1.9.2. Tests/Verification

A. Elastomeric Components (other than sponge or expanded rubber material):

Test samples shall be prepared in the same manner as for tensile strength and ultimate elongation tests outlined in Section 4.1.8, except that benchmarks spaced 1 in. (25 mm) apart shall be stamped on the specimens after the air oven exposure.

Test samples shall be exposed to 212°F (100°C) for 70 hours in accordance with ASTM D 573, Standard Test Method for Rubber - Deterioration in an Air Oven. After exposure, samples shall be tested in accordance with ASTM D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers C Tension. The results shall be compared to those obtained on the non-air oven aged samples for comparison and verification of the requirement.

B. Sponge or Expanded Rubber Material Subjected to Compression Type Loading:

Test samples shall be prepared in accordance with ASTM D1056, Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber.

Test samples shall be exposed to 212°F (100°C) for 70 hours in accordance with ASTM D573, Standard Test Method for Rubber - Deterioration in an Air Oven. After exposure, samples shall be tested in accordance with ASTM D1056, Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber. Compression deflection results shall also be obtained for non-air oven aged samples for comparison

4.1.10. Compression Set Test

4.1.10.1. Requirements

For elastomer components which are subjected to compression type loading, a compression set of the material in the as-received condition shall not be more than 20 percent.

For materials constructed of open or closed cell expanded foam/cellular rubber materials, the compression set shall not be more than 50 percent. Materials of this type exceeding this requirement shall be designated as one-time use only.

4.1.10.2. Tests/Verification

Testing shall be conducted in accordance with ASTM D 395, Standard Test Methods for Rubber Property C Compression Set, Method B. Type I specimens of the material shall be prepared and then exposed for 22 hours at 70°F ± 2°F (21°C ± 1°C).

In the case of open cell sponge type materials, testing shall be conducted in accordance with ASTM D1056, Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber. ASTM D1056 makes reference to ASTM D395 but includes minor changes to the test specimen and test procedure.

4.1.11. Ultraviolet Light and Water Test

4.1.11.1. Requirements

Non-metallic components or sealant materials, exposed to outdoor environmental conditions either during standby or during deployment shall be exposed to ultraviolet light and water for 720 hours in accordance with Table X3.1, Condition 1, of ASTM G 155-05a, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials. At the conclusion of the test, there shall be no cracking or crazing of the component. Following exposure, all functions such as securement, adjustment, etc., shall operate properly.

4.1.11.2. Tests/Verification

A sample of each non-metallic component shall be exposed to ultraviolet light and water for 720 hours in accordance with Table X3.1, condition 1 of ASTM G155, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials. During each operating cycle, each sample shall be exposed to light and water spray for 18 minutes and to only light for 102 minutes (total 120 minutes). The air temperature within the apparatus during operations shall be 109 ± 4.5°F (43 ± 2.5°C) and the relative humidity 30 ± 5 percent. The component shall be inspected for cracking and crazing after 360 hours. If no cracking or crazing is apparent, the exposure shall continue for the full 720 hours. After testing, the barrier and/or components shall be visually inspected to meet the stated requirements and, if deemed necessary, shall be subjected to any of the appropriate tests outlined in this standard.

4.1.12. Air-Oven Aging Tests of Nonmetallic Components and Gasket Adhesives

4.1.12.1. Requirements

A. Non-metallic components, other than rubber gaskets, shall not deteriorate, crack or craze following air-oven aging exposure for 180 days 158°F (70°C).

B. All gasket adhesives used in barrier construction shall not deteriorate and lose their adhesive function, following air-oven aging exposure for 180 days at 158°F (70°C). The force required to separate the gasket from a representative sample of barrier material shall not decrease by more than 50%.

4.1.12.2. Test/Verification

A. Samples shall be subjected to an air-oven aging test for 180 days at 158°F (70°C), and then allowed to cool at least 24 hours in air at 74°F (23°C) at 50 percent relative humidity. After the test, the samples shall be inspected to meet the stated requirements and, if deemed necessary, shall be subjected to any of the appropriate tests outlined in this standard.

4.1.13. Environmental Corrosion Resistance (Barriers/Components which are Exposed to Environmental Conditions when Stored or Not in Use)

4.1.13.1. Requirement

Securement components or component assemblies shall be resistant to corrosion resulting from exposures to a moist carbon dioxide-sulfur dioxide-air mixture. Following the exposure period, the samples shall be examined for deterioration or failure to their functionality.

4.1.13.2. Test/Verification

Each component or component assembly shall be supported and oriented in its intended installation position. Each test sample shall be exposed to a moist carbon dioxide-sulfur dioxide-air mixture for a period of 10 days.

Sulfur dioxide and carbon dioxide are to be supplied to the test chamber from commercial cylinders. An amount of sulfur dioxide equivalent to one percent of the volume of the test chamber, and an equal volume of carbon dioxide shall be introduced into the chamber each day after the chamber has been purged. Approximately 0.53 gallons (2.0 liters) of deionized water shall be maintained in the bottom of the chamber.

Following the exposure, the samples shall be removed from the test chamber and permitted to air dry for a two to four-day drying period. Following this drying period, the component or component assembly shall meet the stated requirements and, if deemed, necessary, shall be subjected to any of the appropriate tests outlined in this standard.

4.1.14. Extreme Temperatures Operation (Barriers/Components which are Exposed to Environmental Conditions when Stored or Not in Use)

4.1.14.1. Requirements

A flood barrier or barrier component(s) that requires unfolding, unrolling, etc. to deploy shall operate properly after being exposed to extreme high and low temperatures. In addition, barrier gaskets under tension or compression shall not show signs of cracking or degradation.

4.1.14.2. Test/Verification

The test sample shall be submerged in water for 30 minutes. The sample shall then be conditioned in an environmental chamber set at -40 °F (-40 °C) for a period of 24 hours. Immediately upon removal from the chamber the test sample shall be tested for proper function.

The same test sample shall then be conditioned in an environmental chamber set at 130 °F (54.4 °C) for a period of 24 hours. Immediately upon removal from the conditioning chamber, the barrier and/or components shall be tested for proper function. Subsequently, the barrier and/or components shall be visually inspected to meet the stated requirements and, if deemed necessary, shall be subjected to any of the appropriate tests outlined in this standard.

4.1.15. Abrasion Resistance (Flood Barriers for Perimeter Barrier Applications)

4.1.15.1. Requirement

Membranes, shells, etc. shall be capable of resisting normal wear from anchoring components.

4.1.15.2. Tests/Verification

The test sample shall be orientated and set-up in the same manner as the end-use application. A Norton standard 5 x 2 x 1/2 in. (130 x 50 x 15 mm) nominal size abrasion wheel with the designation 37C36-KVK or equivalent shall be moved to and fro for 3000 cycles along the sample. The wheel shall be prevented from rotating and shall exert its full weight plus the weight of the moving arm, 1/2 lb (0.5 kg), on to the sample. The frequency of cycles shall not exceed 30 per minute. After the 3000 cycles, the sample shall be visually examined for any signs of wear or damage that would cause failure to the flood barrier.

4.1.16. Hail Resistance (Flood Barriers for Perimeter Barrier Applications)

4.1.16.1. Requirement

Membranes, shells, etc., including joints and seams of the membrane, shall show no signs of cracking, crazing, peeling, puncture, rupture or splitting when impacted from potentially damaging hail.

4.1.16.2. Test/Verification

A 2 ft × 4 ft (0.6 m × 1.2 m) test sample is placed on a panel support. The panel support is a 2 ft × 4 ft (0.6 × 1.2 m), outside dimension, box that is open on the top and bottom. The box is comprised of 1- 1/2 in. (38 mm) wide × 3-1/2 in. (89 mm) high wooden panels which are nailed together at its corners. The sample is secured to the box with self-drilling fasteners spaced 12 in. (305 mm) on center along its perimeter. A 1- 3/4 in. (45 mm) diameter steel ball is dropped onto the sample from a height of 17 ft 9- 1/2 in. (5.4 m). A minimum of ten drops of the steel ball is required, five of which shall be conducted on a fabricated seam. Subsequently, the sample shall be visually inspected to meet the stated requirements and, if deemed necessary, shall be subjected to any of the appropriate tests outlined in this standard.

4.1.17. Tear and Puncture Resistance Test (Flood Barriers for Perimeter Barrier Applications)

4.1.17.1. Requirements

An impermeable portion of a barrier (i.e. barrier membrane and any other non-metallic construction material that may come into contact with debris) shall be capable of withstanding the impacts from potentially damaging objects.

4.1.17.2. Tests/Verification

Testing shall be conducted in accordance with ASTM D5602 - Standard Test Method for Static Puncture Resistance of Roofing Membrane Specimens, with the following exceptions;

- The applied weight shall be 35 lbs (16 kg)
- The sample material shall be secured to each side of the test fixture using C-clamps or a similar device

After the test, the sample shall be examined for tears and/or punctures. Any damage that could result in a catastrophic failure of the barrier shall constitute a failure.

4.2. PERFORMANCE TESTING FOR PERIMETER BARRIER APPLICATIONS

The performance testing of flood barriers for perimeter barrier applications has been designed to simulate quasi-static as well as riverine flooding conditions including hydrostatic load, large waves, multiple debris impacts, strong currents, and overtopping conditions.

All tests in this section replicate events that can be anticipated during a single flood occurrence. As a result, all tests listed in Table 4.2 must be completed in sequence with the same barrier assembly.

Performance testing is typically conducted at a facility similar to the US Army Corps of Engineers, Engineering Research and Development Center (ERDC) Coastal and Hydraulics Laboratory, located in Vicksburg, Mississippi.

The design, description, and capabilities of the facility are described in Appendix B. Construction of the barrier must comply with the test set-up and constraints of the facility. Note: A special construction may be required to connect a barrier to the wing walls of the test basin. Leakage from this construction will be included in the test results. However, the construction is not required to be part of the design of the flood barrier. Additionally, special construction may be required for any pre-installed foundation components. Alternative test facilities may be accepted for testing at the sole discretion of the testing laboratory.

Major and minor repairs to the flood barrier during any portion of the performance test series are only allowed at the discretion of the testing laboratory. A major repair may require re-testing of the entire performance test series and/or additional testing. A maximum of three minor repairs shall be allowed, but may require adjustments to the barrier's Design, Installation, Operation, and Maintenance Manual. No repairs shall be allowed that can put facility personnel into harm's way.

Table 4.2 *Test Series – Flood Barriers for Perimeter Barrier Applications*

Test Description	Water Condition(s)		Duration
	Water Depth*	Other	
Deployment	N/A	N/A	Per Manufacturer's Specification
Hydrostatic Load	1.0 ft (0.30 m)	N/A	22 hr
	2.0 ft (0.61 m)	N/A	22 hr
	100 percent x h	N/A	22 hr
Wave-Induced Hydrodynamic Load	66.7 percent x h	low waves 2-3 in (51-76 mm)	7 hr
	66.7 percent x h	medium waves 6-8 in (152-203 mm)	10 min (3 times)
	66.7 percent x h	high waves 10-12 in (254-305 mm)	10 min
	80 percent x h	low waves 2-3 in (51-76 mm)	1 hr (min) - 7 hr (max)
	80 percent x h	medium waves 6-8 in (152-203 mm)	10 min (3 times)
	80 percent x h	high waves 10-12 in (254-305 mm)	10 min
Overtopping	≥1 in (25 mm) overflow	N/A	1 hr
Debris Impact	66.7 percent x h	12 in (30 cm) diameter log 610 lb (277 kg) weight at 7 ft/s (2.13 m/s)	N/A
	66.7 percent x h	17 in (43 cm) diameter log 790 lb (358 kg) weight 7 ft/s (2.13 m/s)	N/A
Current	66.7 percent x h	7 ft/s (2.13 m/s) current	1 hr
Post Hydrostatic Load	100 percent x h	N/A	1 hr (min) - 22 hr (max)

* The manufacturer's specified maximum design water depth for the barrier is defined as "*h*".

At the discretion of the testing laboratory, the maximum deflection requirement, included as part of each test in the test series, may be waived for certain barrier designs where distortion beyond the requirement is expected and does not affect overall barrier stability or function. Deflection measurements may be taken at the conclusion of the series, after the water has been drained from the basin, to demonstrate no permanent distortion or displacement.

4.2.1. Deployment

4.2.1.1. Requirements

The barrier system shall be deployed within the construction base area as described in Appendix B. The barrier's Design, Installation, Operation, and Maintenance Manual shall be verified for accuracy and completeness of the deployment process. The following items related to the barrier's deployment shall be confirmed:

4.2.1.1.1. Barrier Packaging

No cracks, tears, or other damage that may have occurred during shipping shall be visible. At the discretion of the testing laboratory, minor repairs maybe allowed (i.e. repositioning of a seal). If minor repairs are required, the manual shall include details on how to identify and repair the damage prior to deployment.

4.2.1.1.2. Material, Tools, and Equipment Required

The manual shall include a list of all the materials, tools, and equipment used during the unpacking and deployment of the barrier. In addition, the manual shall indicate if the materials, tools, and/or equipment are supplied or not supplied with the barrier.

4.2.1.1.3. Person-Power Requirements

The manual shall include the number and skill level of the personnel required to deploy the barrier as described below:

- Skilled personnel; a person with specific knowledge of the deployment method of the barrier
- Unskilled personnel: a person that has no knowledge of the barrier design or deployment
- Heavy machine operator

4.2.1.1.4. Deployment Time

The deployment time shall be equal to or less than the time listed in the manual. The deployment time shall be measured in terms of personnel requirements, total man-hours, and length of the barrier.

4.2.1.1.5. Deployment Procedure

The manual shall clearly detail all steps for the deployment of the barrier. The procedure shall be written in such a way so that it can be readily understood by a person with no prior knowledge of the barrier design or deployment.

4.2.1.1.6. Additional Deployment Requirements

The manual shall adequately detail any of the following deployment requirements if identified by the manufacturer and/or preformed during the deployment test process:

- Special construction considerations
- Application limitations
- Foundation requirements
- What to do if damage should occur during deployment

4.2.1.1.7. Barrier Reusability

The manual shall indicate if that barrier is suitable for multiple uses. If multiple use is indicated then the manual shall contain a procedure for how the barrier shall be disassembled and restored to a similar pre-test condition.

4.2.1.2. Tests/Verification

Document the unpacking and deployment of the barrier with a video camera while simultaneously reviewing the Design, Installation, Operations, and Maintenance Manual. At the completion of the deployment, compare the video recording to the manual to assure that all of the requirements listed in Section 4.2.1.1 have been properly documented. The manual must be corrected of any inaccuracies and/or missing information.

If the barrier is reusable, document and verify the disassembling procedure at the completion of the performance testing in the same manner as the deployment, Section 4.2.1.

4.2.2. Hydrostatic Load

4.2.2.1. Requirements

Flood barriers for perimeter barrier applications barrier shall be capable of withstanding the hydrostatic loads created by floodwaters of various heights. The leakage rate shall not exceed 15 gallons per hour per foot length (186 liters per hour per meter length), where the barrier's length is measured along the center point of the barrier's seal to the ground.

In addition, the permanent deflection of the barrier shall be less than or equal to 6 in. (15 cm), as measured from the horizontal and vertical center of each wall.

4.2.2.2. Tests/Verification

Conduct three different hydrostatic load tests at the following water heights;

- 1 ft ± 0.5 in (0.30 m ± 13 mm)
- 2 ft ± 0.5 in (0.61 m ± 13 mm)
- 100 percent x h ± 0.5 in (13 mm)

Where "h" is the manufacturer's specified maximum design water depth of the barrier. If this water depth is less than or equal to 2.0 ft, the tested water depths may be changed as deemed appropriate by the testing laboratory.

Fill the wet-side of the basin to the desired water level at a maximum rate of 2/3 ft (10.0 cm) per hour. The desired water level shall be held for a minimum of 22 hours at each water depth specified above.

The leakage rate shall be calculated in intervals no greater than 15 minutes at the following times (at a minimum);

- During the filling process
- During the first hour
- During the last two hours

Measure the barrier's deflection from the horizontal and vertical center of each wall (three locations) at the completion of each test. Additional locations (up to 6 total) shall be required if deemed appropriate for the design of the barrier.

The Hydrostatic Load Test at a water depth of 100 percent x "h" shall be repeated subsequent to the Current Test, as a post test to the Overtopping, Debris Impact, and Current Tests. The test duration for the post test shall be 1 hour, at a minimum. If negative effects (i.e. increased leakage rates or deflection measurements) are observed during the first hour of the post test, then the post test shall be conducted for a maximum of 22 hours.

4.2.3. Wave-Induced Hydrodynamic Load

4.2.3.1. Requirements

Flood barriers for perimeter barrier applications shall be capable of withstanding wave-induced hydrodynamic load conditions from various water depths and wave heights. The permanent deflection of the barrier shall be less than or equal to 6 in. (15 cm), as measured from the horizontal and vertical center of each wall.

In addition, during low wave conditions, the leakage rate shall not exceed 15 gallons per hour per foot length (186 liters per hour per meter length), where the barrier's length is measured along the center point of the barrier's seal to the ground.

There is no leakage rate requirement for medium and high wave conditions. However, during these wave conditions the barrier shall not fatigue, experience fill-loss, wall sliding, overturning, or other permanent deflection in excess of the requirement.

4.2.3.2. Tests/Verification

Six tests shall be conducted; consisting of three different size wave heights (low, medium, and high) at each of the following two still water depths:

- 66.7 percent x h
- 80 percent x h

Where "h" is the manufacturer's specified maximum design water depth of the barrier. If this water depth is less than or equal to 2.0 ft, the tested water depths may be changed as deemed appropriate by the testing laboratory.

Drain the wet-side of the basin to the desired water level, or fill the wet-side of the basin at a maximum rate of 2/3 ft (10.0 cm) per hour, as applicable.

Impact the barrier with waves generated perpendicular to the face of the center wall of the barrier as detailed in Table 4.2.3.2.

At the end of each test condition, allow the waves to dissipate before starting the next test.

Table 4.2.3.2 Wave Spectrums

Wave Description	*Wave Height (Measured from trough to crest)*	*Mean Wave Period*	*Test Duration*
Low Waves	2-3 in (51-76 mm)	2 seconds	7 hr*
Medium Waves	6-8 in (152-203 mm)	2 seconds	10 min (3 times)
High Waves	10-12 in (254-305 mm)	2 seconds	10 min

*For a water depth of 80 percent x h, if no negative effects are observed during the first hour of testing (i.e. increased leakage rates or deflection measurements), the test duration may be reduced to 1 hour.

Measure the leakage rate for the duration of each low wave test at intervals no greater than 15 minutes.

Measure the barrier's deflection at the completion of each test from the horizontal and vertical center of each wall (three locations). Additional locations (up to 6 total) shall be required if deemed appropriate for the design of the barrier.

4.2.4. Overtopping

4.2.4.1. Requirements

Flood barriers for perimeter barrier applications shall not float, overturn, or experience catastrophic failure if the water level of a flood exceeds the height of the barrier.

In addition, the permanent deflection of the barrier shall be less than or equal to 6 in. (15 cm), as measured from the horizontal and vertical center of each wall.

4.2.4.2. Tests/Verification

Fill the river-side of the basin at a maximum rate of 2/3 ft (10.0 cm) per hour until the water level equals 100 percent of structure height plus one inch. Maintain the water level for one hour.

At the completion of the test, measure the barrier's deflection from the horizontal and vertical center of each wall (three locations). Additional locations (up to 6 total) shall be required if deemed appropriate for the design of the barrier.

4.2.5. Debris Impact Test

4.2.5.1. Requirements

Flood barriers for perimeter barrier applications barrier shall be capable of withstanding multiple impacts from floating debris. The leakage rate shall not exceed 15 gallons per hour per foot length (186 liters per hour per meter length), where the barrier's length is measured along the center point of the barrier's seal to the ground.

In addition, the permanent deflection of the barrier shall be less than or equal to 6 in. (15 cm), as measured from the horizontal and vertical center of each wall.

4.2.5.2. Tests/Verification

Drain the wet-side of the barrier until the water level equals 66.7 percent x h ± 0.5 in (13 mm), where *h* is the manufacturer's specified maximum design water depth.

Two tests shall be conducted with two different size logs; 12 in. (30 cm) and 17 in. (43 cm) in diameter, 610 lb (277 kg) and 790 lb (358 kg) in weight respectively. The logs shall be southern pine or similar density and conditioned by submerging in water for a minimum of 2 weeks prior to testing. The cut edges of the logs shall be perpendicular saw-cut with no round edges.

Each floating log shall be pulled into the center wall of the barrier with a velocity of 7.0 ft/s (2.1 m/s) [~5.0 mph (8.0 km/h)] at a trajectory angle of approximately 70 degrees, see Figure 4.2.5.2. The pulling action shall be shut-off immediately prior to the log's impact to the barrier.

Measure the leakage rate during each test at intervals no greater than 15 minutes.

At the completion of each test, measure the barrier's deflection from the horizontal and vertical center of each wall (three locations). Additional locations (up to 6 total) shall be required if deemed appropriate for the design of the barrier.

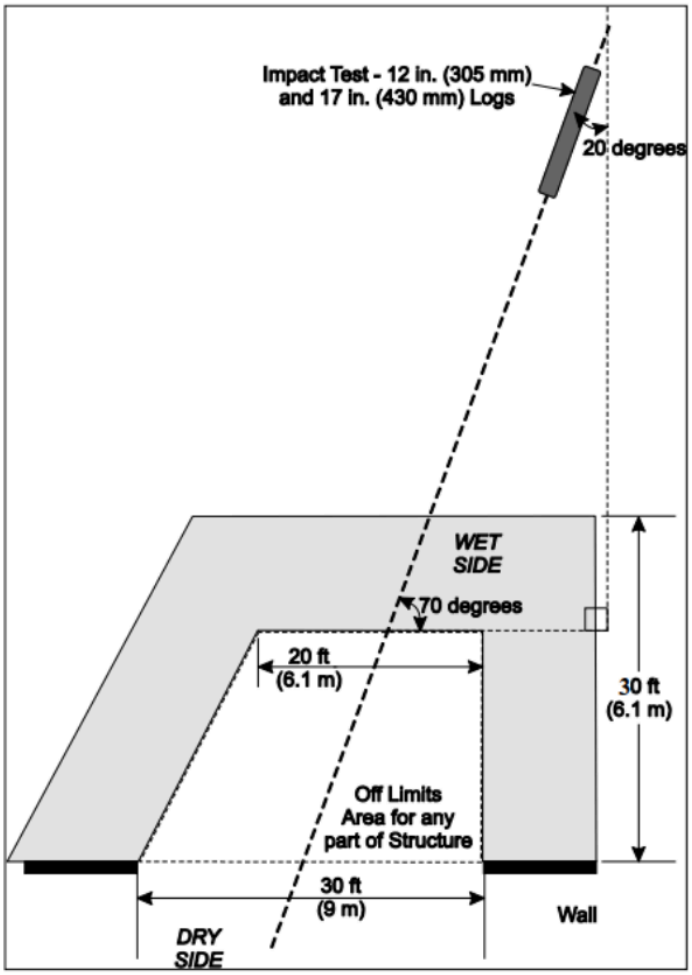

Figure 4.2.5.2 Debris Impact Test Layout

4.2.6. Current Test

4.2.6.1. Requirements

Flood barriers for perimeter barrier applications shall be capable of withstanding forces created by a 7.0 ft/s (2.1 m/s) current. The leakage rate shall not exceed 15 gallons per hour per foot length (186 liters per hour per meter length), where the barrier's length is measured along the center point of the barrier's seal to the ground.

In addition, the permanent deflection of the barrier shall be less than or equal to 6 in. (15 cm), as measured from the horizontal and vertical center of each wall.

4.2.6.2. Tests/Verification

Testing shall be conducted at a water height of 66.7 percent h ± 0.5 in (13 mm), where h is the manufacturer's specified maximum design water depth. A minimum channel width of 6 in. (15 cm) should be created for the water flow. Current shall be applied parallel to the face of the barrier. The water velocity shall be slowly increased to 7.0 ft/s (2.1 m/s) [~5.0 mph (8.0 km/h)] and then maintained steady for a duration of 1 hour.

The water velocity shall be measured at 50 percent of the water depth approximately 6 in. (15 cm) from the front face of the barrier, and the horizontal midpoint of the section of barrier exposed to the current; or 1/2 the distance from the barrier to the wall, which ever is less.

Measure the leakage rate for the duration of the test at intervals no greater than 15 minutes.

At the completion of the test, measure the barrier's deflection from the horizontal and vertical center of each wall (three locations). Additional locations (up to 6 total) shall be required if deemed appropriate for the design of the barrier.

4.3. PERFORMANCE TESTING – FLOOD BARRIERS FOR OPENING APPLICATIONS

The performance testing of flood barriers for opening barrier applications has been designed to simulate quasi-static flood conditions. All tests in this section must be completed in sequence as shown in Table 4.3, with the same flood barrier system.

If the product under evaluation is available in a range of sizes, a worst case system representing the maximum protected opening width shall be tested to the manufacturer's maximum design water depth. Depending on design consistency across size ranges, testing of the worst case may allow for smaller sizes to be considered for certification with little or no further testing.

If a barrier is submitted for modular configurations having intermediate support mullions (or similar) between multiple barrier sections, a minimum of two sections with one intermediate support shall be performance tested. Approval will be restricted to the maximum width measured between each section (between one edge and the intermediate support). Single-span configurations shall also be tested if the maximum width of the single-span configuration exceeds the maximum section width of the modular configuration

Table 4.3 *Performance Test Series – Flood Barriers for Opening Barrier Applications*

Test Description	***Condition****	***Duration***
Deployment	N/A	Per Manufacturer's Specifications
Hydrostatic Load	10 percent x h ± 0.25 in (0.6 cm)**	2 hr
Hydrostatic Load	100 percent x *h* ± 0.25 in (0.6 cm) **	20 hr
Redeploy	Disassemble and redeploy	Per Manufacturer's Specifications
Dynamic Impact Load	Water drained, two 600J impacts (minimum)	N/A
Post Hydrostatic Load	10 percent x h ± 0.25 in (0.6 cm)**	1 hr
Post Hydrostatic Load	100 percent x h ± 0.25 in (0.6 cm)	1 hr

*The manufacturer's specified maximum design water depth for the barrier is defined as "h."

** Hydrostatic load testing may be required at additional water depths, at the discretion of the testing laboratory, if the design of the barrier is such that increased leakage may occur at other depths besides those prescribed above. Additional water depths shall be tested for a minimum duration of 1 hr. Hydrostatic Load testing at 10 percent x h may be waived if the design of the barrier is such that compression forces applied by the water column do not influence the barrier's sealing capabilities.

The tests shall be conducted with a test enclosure that is capable of withstanding the maximum design water depth without significant leakage. A method to maintain the water level at the required depths within the specified degree of accuracy throughout the specified durations shall be established. Some leakage through the test enclosure is permitted provided that the tested water depth is able to be maintained. The test enclosure must be of sufficient size to accommodate the requirements for each test procedure outlined in this performance test series.

Major and minor repairs to the flood barrier during the performance test series are only allowed at the discretion of the testing laboratory. Up to a maximum of three minor repairs are allowed. In addition, each minor repair may require adjustments to the barrier's Design, Installation, Operation, and Maintenance Manual. Any major repair may require retesting of the entire performance test series and/or additional testing. No repairs shall be allowed that can put facility personnel into harm's way.

4.3.1. Pre Deployment Installation Configurations

4.3.1.1. Requirements

The installation of barrier components which are designed to be permanently installed in the protected opening prior to barrier deployment (i.e. frames, tracks, etc.) does not require to be witnessed by FM Approvals. However, the barrier's Design, Installation, Operation, and Maintenance Manual shall include reference to each possible installation configuration and shall be verified for accuracy and completeness (see Section 3.3). These documents shall be furnished prior to the commencing of the test series.

When multiple installation configurations exist, (i.e. externally mounted to a structure, internally mounted to a structure, door jamb mounting, etc.), the performance test series shall be conducted on all configurations desired for certification.

4.3.1.2. Tests/Verification

Verify that the barrier's manual and post-installation checklist accurately details all applicable installations of the barrier components to the test enclosure(s). All installation configuration options shall be represented during testing.

4.3.2. Deployment

4.3.2.1. Requirements

The barrier shall be deployed within the test enclosure as it would be deployed during a flood event to protect the simulated structure opening.

The barrier's Design, Installation, Operation, and Maintenance Manual shall be verified for accuracy and completeness of the deployment process. The manual shall include at a minimum;

4.3.2.1.1. Material, Tools, and Equipment Required

The manual shall include a list of all the materials, tools, and equipment used during the deployment of the barrier. In addition, the manual shall indicate if the materials, tools and/or

4.3.2.1.2. Person-Power Requirements

The manual shall include the number of personal used to deploy the barrier. The same number of personnel shall be used for the deployment process.

4.3.2.1.3. Deployment Time

The measured deployment time shall be equal to or less than the time listed in the manual. The deployment time shall be measured in terms of personnel requirements and total deployment time.

4.3.2.1.4. Deployment Procedure

The manual shall clearly detail the steps for how to deploy the barrier. The procedure shall comply with all of the requirements of Section 4.3.2.1.

4.3.2.1.5. Additional Deployment Requirements

The manual shall adequately detail any of the following deployment requirements if identified by the manufacturer and/or preformed during the deployment test process:

- Foundation requirements

- Special construction considerations
- Application limitations
- What to do if damage should occur during deployment

4.3.2.1.6. Barrier Reusability

For contingent barriers, the manual shall include a procedure for proper disassembly and storage of barrier components to restore the system to a similar pre-test condition.

4.3.2.2. Tests/Verification

Document the deployment of the barrier with a video camera while simultaneously reviewing the Design, Installation, and Operation, and Maintenance Manual. At the completion of the deployment, compare the video recording to the manual to assure that all of the requirements listed in Section 4.3.2.1 have been properly documented. If the disassembly process differs from the inverse of the deployment process, the disassembly process shall also be documented. The manual must be corrected of any inaccuracies and/or missing information.

In addition, the barrier shall be removed or opened (as applicable) and evaluated for wear or damage after each of the Hydrostatic Loads tests, as shown in Table 4.3. The barrier shall then be re-deployed in accordance with Section 4.3.2 before the start of the next test in the sequence. For automatic type barriers, the deployment test shall be conducted at the beginning of the Hydrostatic Load Tests during the filling process of the test apparatus.

4.3.3. Hydrostatic Load Test

4.3.3.1. Requirements

Flood barriers for opening barrier applications shall be capable of withstanding the hydrostatic loads created by quasi-static floodwaters. The leakage rate shall not exceed 0.08 gallons per hour per linear foot (1 L/h/m) of seal over any 15-minute period, where the linear length of seal is the opening width (measured from barrier seal-to-seal) plus two times the water depth. For barriers with a maximum design water height greater than the barrier height (i.e. fully submerged window), the linear length of seal is considered to be the opening width plus two times the water height, or the barrier perimeter, whichever is less. For barriers which are parallel to the ground surface (i.e. subway stair barriers, subway grate barriers, etc.) the linear length of seal is considered to be the perimeter.

4.3.3.2. Tests/Verification

Fill the wet-side of the test apparatus to 10 percent x h ± 0.25 in (0.6 cm), where "h" is the manufacturer's specified maximum design water depth. Measure the leakage rate over 15 minute intervals until the leakage rate has either stopped or stabilized. Maintain the desired water level for a minimum duration of 2 hrs. Measure the leakage rate during the final 15 minutes. If leakage rate continues to increase, additional time shall be added until stabilization is reached

Increase the water height to 100 percent x h ± 0.25 in (0.6 cm), where h is the maximum design water depth.

Maintain the desired water level for a minimum of 22 hours. Measure the leakage rate over 15 minute intervals until the leakage rate has either stopped or stabilized. Measure the leakage rate during the final 15 minutes. If leakage rate does not stabilize, then measure the leakage rate for 15 minute intervals elapsing at the following time increments, at a minimum:

- 15 min
- 30 min
- 45 min
- 1 hour
- 20 hours

If leakage rate continues to increase, additional time shall be added until stabilization is reached.

The Hydrostatic Load Test shall be repeated as a post test to Dynamic Impact Load testing as shown in Table 4.3. The duration of the post tests shall be a minimum of 1 hour at each water level. If leakage rate is increasing, additional time may be added at the discretion of testing laboratory.

Hydrostatic Load Testing at 10 percent x h water depths may be waived if the design of the flood barrier is such that the compression force applied by the water column does not increase the barrier's sealing capability.

4.3.4. Dynamic Impact Load Tests

4.3.4.1. Requirements

Flood barriers for opening barrier applications shall be capable of withstanding a minimum of two impacts of 600J each from a rigid falling object simulating floating debris. Any damage sustained as a result of the impacts shall not impair functionality/performance of the barrier.

4.3.4.2. Tests/Verification

Drain the wet-side of the test apparatus before conducting the test.

The impact object shall be a piece of saw-cut log with a diameter of 12 in (30.5 cm) and a density similar to wet southern pine [30 lb/ft^3 (48 kg/m^3)]. One end of the log shall have a straight perpendicular cut and the other shall be cut at an angle of 15 degrees off-center with no round edges. The straight cut end of the log shall be attached to a steel block so that the total mass of object is 110 lbs (50 kg). A similar impact object can be substituted at the discretion of the testing laboratory as long as the trajectory of impact and impact energy criteria are met.

The first impact location shall be the predetermined weak point of the barrier structure, or at the horizontal center point of the barrier at 80 percent *x h,* where *h* is the manufacturer's specified maximum water depth of the barrier.

The second location shall be as close to the barrier perimeter as possible, at roughly the same height as the first impact. This location is intended to evaluate the barrier connection to the supporting structure. Additional impact locations on the barrier may be required at the discretion of the testing laboratory (e.g. hinges, plastic parts, etc.).

The impact to the barrier shall be such that the leading edge of the impacting object hits the predetermined location on the barrier. Figure 4.3.4 contains a suggested layout for this test.

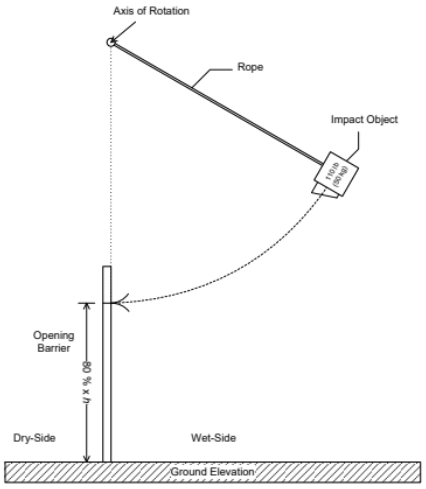

Figure 4.3.4 Impact Test Layout

Impact the barrier by lifting the object to a height of 4 ft (1.22 m) above the point of impact. Then drop the object so that it falls under gravitational acceleration, through a circular trajectory, and impacts the barrier in the horizontal position. The impact force *E* (600J), calculated as potential energy, is determined by the length of trajectory and weight of the impacting object:

$$E = mgh$$

where, *m* is the mass of the impacting object (50 kg), g is gravitational acceleration (9.81 m/s2), and *h* is the height through which the impacting object falls (1.22 m).

After each impact, make observations of any damage sustained and any possible detriments to the barrier functionality and ability to hold back water. Post-hydrostatic load testing shall be conducted as specified in Section 4.3.3.

4.4. PERFORMANCE TESTING FLOOD MITIGATION VALVES

4.4.1. Examination

4.4.1.1. Requirements

Flood mitigation valves shall conform to the manufacturer's drawings and specifications.

4.4.1.2. Test/Verification

A flood mitigation valve shall be representative of the manufacturer's final production equipment shall be examined and compared to drawings and engineering specifications. It shall be verified that the representative sample conforms to the physical and structural requirements described in Section 3, General Requirements.

4.4.2. Debris Passage

4.4.2.1. Requirements

The opening through a flood mitigation valve shall permit the passage of a cylinder 12 in. (305 mm) long and a diameter as follows:

Nominal Size, Inches	*Diameter of Cylinder, Inches (mm)*
1.5	0.75 (19)
2	1.00 (25)
2.5	1.25 (32)
3	1.50 (38)
4	2.00 (51)
6	3.00 (76)
8	4.00 (102)
10	5.00 (127)
12	6.00 (152)

4.4.2.2. Tests/Verification

The test cylinder as indicated in section 4.4.2.1 shall be passed through the flood mitigation valve in the direction of flow.

4.4.3. Watertightness

4.4.3.1. Requirements

When exposed to a range of backflow pressures, the leakage through a flood mitigation valve shall not exceed the values in the following table.

Nominal Size, Inches	***Maximum Leakage Volume, Fl oz (mL)***
1.5	5.5 (163)
2	9.5 (281)
2.5	15.0 (444)
3	21.5 (636)
4	38.5 (1,139)
6	87.0 (2,573)
8	153.0 (4,525)
10	240.0 (7,098)
12	345.0 (10,202)

4.4.3.2. Tests/Verification

The valve shall be positioned in its normal operating position as prescribed by the manufacturer. A water source capable of maintaining the maximum rated backpressure shall be affixed to the outlet of the flood mitigation valve. The water pressure shall be increased in the following steps:

Water Pressure, psi (kPa)
0.25 (1.7)
0.50 (3.4)
1.0 (6.9)
5.0 (34.5)
Maximum Rated Backpressure

At each step, the pressure shall be maintained for 10 min. ±15 sec. During each test period, any water that is emitted from the entrance side of the fitting shall be collected, measured, and recorded. The total leakage volume over any given 10-minute step period shall be less than the maximum limitation requirement specified above.

4.4.4. Pressure Loss

4.4.4.1. Requirements

For flood mitigation valves designed for in-line applications, the pressure loss through the valve shall be determined throughout the manufacturer's rated flow range and shall be included in the manufacturer's design/maintenance manual. Pressure loss shall be determined at a minimum of four different flow rates to allow for the development of a pressure loss vs. flow curve.

4.4.4.2. Tests/Verification

Each sample shall be installed between two test pipes equipped with a means for attaching a pressure gauge. The test pipes shall be of the same nominal diameters as the sample. Using water as a test medium, the pressure loss between the inlet and outlet shall be measured at a minimum of four flow rates. The test sample shall be removed from the test configuration, and the pressure losses at the same flow rates determined. The pressure loss of the sample is determined by subtracting the loss of the pipe from the loss of the pipe/test sample combination.

4.4.5. Aging

4.4.5.1. Requirements

For resilient seated flood mitigation valves (non-metallic seal), aging of the seat material shall not promote any cracking when tested in accordance with Section 4.4.6.2.

For flood mitigation valve designs constructed of non-metallic material (i.e. flexible rubber type valves), the valve assembly shall be subjected to the 180 day air-oven aging test as described in Section 4.1.12. Following the aging exposure period, the valve shall be subjected to 500 cycles of normal operation, as described in Section 4.1.4, using water as the test medium. The valve shall then undergo the watertightness test described in Section 4.4.3.

4.4.5.2. Tests/Verification

For resilient seated flood mitigation valves (non-metallic seal), a specimen of the valve rubber seat material, approximately 1 x 3 in. (25 x 75 mm) by 1/8 in. thick, supplied by the manufacturer, shall be subjected to an accelerated aging test in accordance with ASTM D572, "Standard Test Method for Rubber – Deterioration by Heat and Oxygen". The test duration shall be 96 hours. After the test, the specimen shall be examined for resilience by being bent double (i.e. bend radius of 180°). Observations of any cracking or deterioration shall be made.

4.5. PERFORMANCE TESTING – PENETRATION SEALING DEVICES

4.5.1. Examination

4.5.1.1. Requirements

Penetration sealing devices shall conform to the manufacturer's drawings and specifications and to the Approval requirements.

4.5.1.2. Test/Verification

A penetration sealing device assembly representative of the manufacturer's final production equipment shall be examined and compared to drawings and engineering specifications. It shall be verified that the representative sample conforms to the physical and structural requirements described in Section 3, General Requirements.

4.5.2. Hydrostatic Pressure Leakage Test

4.5.2.1. Requirements

Penetration sealing devices shall be capable of withstanding the hydrostatic loads created by floodwaters without significant leakage. The leakage rate shall not exceed 0.08 gallons per hour per linear foot (1 L/h/m) of protected opening, where the linear foot of protected opening is the perimeter of the penetration. If the sample being tested accommodates multiple penetrations, the sum of the perimeter of each penetration shall be used. For modular products that include additional sealing surfaces between modular sections, the length of these

additional sealing surfaces shall not be included in calculation for linear length of protected opening. For pipe plugs or similar devices used to seal the entire area within a penetration, the perimeter of the maximum protected area shall be represented.

4.5.2.2. Test/Verification

Each sample penetration sealing device shall be installed in the wall of a test enclosure having a penetration of the size specified by the manufacturer. The test enclosure shall be capable of hydrostatically pressurizing the sample to a pressure equivalent to that exerted by a water column at the manufacturer's specified maximum design water depth, plus 10%, and maintaining that pressure throughout the stated duration. A means for collecting leakage through the penetration throughout the duration shall be established.

All pre-installed frame components, if applicable, shall be included in the tested assembly. If the product is designed to seal the area around a penetrating object (i.e. pipe, flexible wire cables), a representative penetrating object of the size specified by the manufacturer shall also be included in the tested assembly. Schedule 40 steel pipe shall be considered representative of piping and standard, round, smooth, PVC cable shall be considered representative of flexible wire cables. Assemblies designed for both pipe and flexible cable type penetrating objects shall be tested with both objects. If Approval for armored type corrugated cables is desired, an additional assembly including armored cable shall be tested.

The test enclosure shall be hydrostatically pressurized to the pressure equivalent to that exerted by a water column at the manufacturer's specified maximum design water depth, plus 10%. The pressure shall be maintained for 72 hours. Leakage through the penetration shall be collected throughout the duration. After each 24 hours, the leakage shall be measured and recorded.

4.5.3. Low Temperature and Impact Resistance

4.5.3.1. Requirements

Penetration sealing devices shall not show any evidence of cracking or deterioration as a result of low temperature conditioning. While at the low temperature, there shall be no damage following impact testing that would impair product function, performance, or installation.

4.5.3.2. Test/Verification

Each sample penetration sealing device shall be immersed in a water bath at 70 ± 10°F (21 ± 5.5°C) for 24 hours. The sample shall then be conditioned to a temperature of 10°F (-12°C) for an additional 24 hours. The sample shall then be removed and inspected for any cracking or other deterioration. While still at that temperature, a 2.2 lb. (1 kg) steel sphere shall be dropped from a height of 3.3 ft. (1 m) onto the sample so that the impact occurs at a predetermined worst case location. Tubing may be used as a guide for the sphere to ensure the impact occurs at the intended location. A minimum of three drops shall be performed at three different locations. Additional drops may be required at the discretion of the testing laboratory.

4.5.4. Aging

4.5.4.1. Requirements

After a penetration sealing device is subjected to the Air-Oven Aging Test for Nonmetallic Components and Gasket Adhesives, as described in Section 4.1.12, the sample shall meet the requirements of the Hydrostatic Pressure Leakage Test, as detailed in Section 4.5.2.

4.5.4.2. Test/Verification

Penetration sealing devices shall be subjected to the Air-Oven Aging Test for Nonmetallic Components and Gasket Adhesives, as described in Section 4.1.12, except the conditioning temperature shall be at the manufacturer's maximum rating. Subsequently, the sample shall be subjected to the Hydrostatic Pressure Leakage Test, as detailed in Section 4.5.2, for verification that leakage remains within the requirement.

4.5.5. Cable Retention Test

4.5.5.1. Requirements

Penetration sealing devices designed to seal around flexible cables shall sufficiently retain the cable during applied forces. When the force is applied along the same axis of the cable, the cable slippage shall be less than .25 in. (6.4 mm). Subsequently, the sample shall meet the requirements of the Hydrostatic Pressure Leakage Test, as detailed in Section 4.5.2.

4.5.5.2. Test/Verification

Each sample penetration sealing device shall be installed as described in Section 4.5.2 - Hydrostatic Pressure Leakage Test. After installation is complete, a marked line shall be made on the cable along the interface between the cable and the penetration sealing device. A static force of 40 lbf (178 N) shall be applied to the cable, along the same axis of the cable, in a direction moving away from the penetration. The force shall be applied for a duration of 5 minutes before being released. Determine the cable slippage by measuring the distance between the inside of the marked line and the penetration sealing device.

Apply a static pull or push force of 40 lbf (178 N) to the cable, at an approximate distance of 6 in. (15cm) from the penetration sealing device, along the axis perpendicular to the cable, in a direction moving vertically upward. The force shall be applied for a duration of 1 minute before being released. Similarly, the same force shall be applied in the vertically downward, right, and left directions.

Subsequently, the sample shall be subjected to the Hydrostatic Pressure Leakage Test, as detailed in Section 4.5.2, for verification that leakage remains within the requirement.

4.6. PERFORMANCE TESTING - FLOOD MITIGATION PUMPS

4.6.1. Examination

4.6.1.1. Requirements

Flood mitigation pumps shall conform to the manufacturer's drawings and specifications.

4.6.1.2. Test/Verification

A pump representative of the manufacturer's final production equipment shall be examined and compared to drawings and engineering specifications. It shall be verified that the representative sample conforms to the physical and structural requirements described in Section 3, General Requirements.

4.6.2. Debris Clearance/ Solid Handling Capability

4.6.2.1. Requirements

A pump shall conform to the manufacturer's maximum rated solids handling capability, expressed as diameter of solid. Compliance shall be verified by the passage of a rigid sphere through the waterway of the pump.

4.6.2.2. Tests/Verification

A sample pump, with no power, shall be capable of passing a rigid sphere from the discharge of the pump to the water inlet. The size of the sphere must be equal to, or greater then, the clearance specifications listed by the manufacturer. The pump shall be rotated from its intended installation position to pass the sphere though the pump but only if the rotation of the pump does not increase the clearance of any opening or passageway.

4.6.3. Pump Performance Testing

4.6.3.1. Requirements

The pump shall develop its rated pressure when delivering its rated capacity as specified by the manufacturer. Pump characteristic curves shall be confirmed for accuracy.

4.6.3.2. Tests/Verification

A sample pump of each rated capacity shall be operated at various flow rates, from shut-off, all the way to full open downstream valve, to verify the manufacturer's characteristic curve. The pump shall be tested at each rated speed (if applicable). A minimum of four flow readings (min, max, and two intermediate points) shall be taken to generate discharge pressure (total dynamic head) vs. capacity curves. At each flow rate, the total discharge head and total suction head, or total suction lift shall be measured. Power measurements may also be measured for the purpose of qualifying additional pump drivers, as described in Section 4.6.5. All test speeds must be within ± 4 percent of the rated speed. Test data shall be corrected to rated speed to develop the characteristic curves.

For self-priming pumps with suction lift capabilities, characteristic curves shall be developed for various degrees of suction lift. Characteristic curves for a minimum of four suction lift values shall be generated, including zero suction lift, maximum suction lift, and two evenly spaced intermediate values.

For submersible pumps, characteristic curves shall be developed at the minimum suction pressure, or the minimum submergence required for operation.

4.6.4. Endurance Test

4.6.4.1. Requirements

A pump assembly shall be capable of continuous operation for 336 hours at its maximum rated capacity without excessive vibration, loosening of parts (fasteners, etc.), visible distortion of the baseplate, excessive generation of heat in the bearings, or rubbing of the rotor.

4.6.4.2. Tests/Verification

A sample pump shall be operated continuously for 336 hours at its maximum rated capacity. No loose parts, distortion, overheating, or degradation of performance shall be allowed. During this test, measurements for flow and discharge pressure shall be recorded at 15 minute intervals. Depending on the construction of the overall pump assembly, additional measurements for rotational speed, fuel consumption rate, lubricant temperature, and power, as applicable, will also be recorded.

Ideally, the pump is to be operated with a driver and coupling that will be included in the submitted pump package(s) (see Appendix C). Each driver and coupling design that is included in the submitted pump package(s) and which is not subjected to this endurance test, shall be subjected to the pump package endurance test described in Section 4.6.5.

Once the test is started, it shall be left to run as near continuous as practical. Stopping for refueling, end of business day, or to make adjustments to the test equipment (not the pump assembly) is allowed. Other than the normal starting / priming procedures, no adjustments are permitted to be made to the pump assembly. Stopping the test for reasons other than indicated above shall be considered a failure. No loose parts, distortion, overheating, or degradation of performance shall be allowed. Following the test, the pump shall be disassembled and examined for signs of rubbing.

4.6.5. Endurance Test – Pump Package

4.6.5.1. Requirements

A minimum of 1 of each pump driver, whether it be a diesel engine or electric motor, shall be endurance tested as part of a flood mitigation pump package. Each coupling design shall also be represented and tested. Drivers and couplings shall be tested with the pump requiring the greatest amount of power for which it is specified to be used. Whenever possible, representative testing may be justified, at the discretion of the testing laboratory, for drivers or couplings having similar designs.

There shall be no excessive vibration, loosening of parts (fasteners, etc.), visible distortion of the baseplate, excessive generation of heat, or loss of pump performance.

Alternative to performing the endurance test on each pump driver, rated power levels obtained as part of the US EPA emission certification or other third party certification process may be considered, at the discretion of the testing laboratory. Power measurements are required to be recorded during the pump performance testing

described in Section 4.6.3 to allow for comparison. The rated power shall be greater than the maximum power required by the pump, plus an additional safety factor of 1.1.

4.6.5.2. Tests/Verification

Flood mitigation pump drivers and couplings which were not tested as part of Section 4.6.4 shall be installed in pump packages and run continuously at maximum rated capacity for a duration of 4 hours. During this test, measurements for flow and discharge pressure shall be recorded at 15 minute intervals. Depending on the construction of the overall pump assembly, additional measurements for rotational speed, fuel consumption rate, lubricant temperature, and power, as applicable, will also be recorded.

Throughout the endurance test, observations shall be made for excessive vibration, loosening of parts (fasteners, etc.), distortion of the baseplate, or excessive generation of heat. No loss of pump performance shall also be verified.

4.6.6. Hydrostatic Strength

4.6.6.1. Requirements

A flood mitigation pump shall withstand an exposure to hydrostatic pressure without rupturing, cracking, or exhibiting permanent distortion of any component of the pump. For pumps with mechanical seals, no leakage shall be detected. For pumps with stuffing box packing, no leakage shall be detected with the exception of the stuffing box packaging.

4.6.6.2. Tests/Verification

A sample pump shall be hydrostatically tested for 5 minutes at a pressure equal to, or greater than, twice the maximum shutoff pressure ($2 \times P_{max}$), where P_{max} is the maximum shutoff pressure specified by the pump manufacturer. No rupture, cracking or permanent distortion shall be observed.

4.6.7. On/Off Switch Durability - Cycling

4.6.7.1. Requirements

The on/off switch of a flood mitigation pump, under full electrical load, shall not show excessive wear or damage after 1000 cycles of operations.

4.6.7.2. Tests/Verification

The on/off switch assembly of a flood mitigation pump shall be cycled 1000 times through its full range of travel while under full electrical load. After testing, all parts of the assembly shall be visually inspected. No excessive wear or damage shall be observed.

4.6.8. Voltage Variation and Temperature Extremes

4.6.8.1. Requirements

Electrically operated motors or components used in a flood mitigation pump shall operate at ±85 and 110 percent of the rated voltage specified by the manufacturer, while conditioned to the maximum and minimum rated installation temperatures. The motor/component shall display no hesitation, partial operation, or other failures to operate properly.

4.6.8.2. Tests/Verification

The electrically operated motor or component shall be conditioned at the maximum rated installation temperature for a minimum of 16 hours. Immediately upon removal from the chamber, the motor/component shall be supplied with minus 15 percent of the rated voltage for a period of 2 minutes. The motor/component shall then be supplied with plus 15 percent of the rated voltage for a period of 2 minutes. The motor/component shall display no hesitation, partial operation, or other failures to operate properly. The test shall be repeated with the motor/component conditioned to the minimum rated installation temperature.

4.6.9. Dielectric Withstand

4.6.9.1. Requirements

Electrically operated motors or components used in a flood mitigation pump shall withstand an applied voltage between all terminals provided for external connections and ground, as well as between all combinations of individual connections. There shall be no breakdown of the insulation between the test points. The motor and pump shall continue to function normally subsequent to this test.

4.6.9.2. Tests/Verification

For a motor/component with a rated voltage not exceeding 90 V, the test voltage shall be equal to 500 V. For all other devices, the test voltage shall be calculated as 1000 V plus two times the rated voltage of the circuit. The required voltage shall be applied between each terminal and ground, and between all individual terminals. The voltage shall be increased steadily to the specified value in a period of not less the 10 seconds, and maintained for a minimum of 60 seconds.

4.6.10. Maximum Suction Lift Capability

4.6.10.1. Requirements

Self-priming flood mitigation pumps designed for suction lift applications shall be operated to verify maximum suction lift capability. The priming mechanism shall produce a vacuum pressure equivalent to or exceeding the maximum rated suction lift.

4.6.10.2. Tests/Verification

The pump suction shall be suitably sealed by closing the suction valve or other means used to plug the suction end of the pump and shall be fitted with a vacuum pressure gauge. While the pump suction is sealed, the pump shall be operated, as directed in the manufacturer's priming instructions. The maximum vacuum pressure developed by the priming mechanism shall be recorded. A conversion factor of 2.3 ft. (0.7m) of water per 1.0 psi (2.04 mmHg) vacuum pressure shall be used to determine the equivalent suction lift capability in feet (meters).

4.7. ADDITIONAL TESTS

Additional tests may be required, depending on design features, results of any tests, material application, or to verify the integrity and reliability of the flood mitigation equipment barriers, at the discretion of the testing laboratory.

Unexplainable failures shall not be permitted. A re-test shall only be acceptable at the discretion of the testing laboratory and with adequate technical justification of the conditions and reasons for failure.

5. BIBLIOGRAPHY

ASCE/SEI 24-14, Flood Resistant Design and Construction

ASME A112.14.1, Backwater Valves

ASTM D471, Standard Test Method for Rubber Property Effect of Liquids

ASTM D1242, Standard Test Method for Resistance of Plastic Materials to Abrasion

ASTM D6382, Standard Practice for Dynamic Mechanical Analysis and Thermogravimetry of Roofing and Waterproofing Membrane Material

ASTM E290, Standard Test Methods for Bend Testing of Material For Ductility

ASTM G154, Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

ASTM SI10 - American National Standard for Use of The International System of Units (SI): The Modern Metric System

United States Army Corps of Engineers (USACE), Engineering Research and Development Center (ERDC), Standardized Testing Protocol for Evaluation of Expedient Floodfight Structures

APPENDIX A: Tolerances

Unless otherwise stated, the following tolerances shall apply:

Angle:	± 2°
Flow	± 3 percent of value
Frequency (Hz):	± 5 percent of value
Length:	± 5 percent of value
Volume:	± 5 percent of value
Rotation:	± 1 RPM
Pressure:	± 5 percent of value
Temperature:	± 5 percent of value
Time:	+ 5/- 0 seconds + 0.1/- 0 minutes + 0.1/- 0 hours + 0.25/- 0 days

Unless stated otherwise, all tests shall be carried out at a room (ambient) temperature of 68°F ± 18°F (20°C ± 10°C).

APPENDIX B: USACE Coastal and Hydraulics Laboratory Test Facility Description

Performance testing of flood barrier for perimeter barrier applications is typically conducted at a facility similar to the wave basin at the ERDC Coastal and Hydraulics Laboratory, located in Vicksburg, Mississippi. The research facility consists of a 100 ft. (30.48 m) wide by 150 ft. (45.72 m) long basin. One end of the facility contains three electric-driven piston-type wave generators, each driving a 25 ft. (7.62 m) wide wave paddle. The three wave generators are synchronized so that they all run together as a 75 ft. (22.86 m) wide generator. Guide vanes contain the wave train for the first 50 ft. (15.24 m) in front of the wave generators. The generators are computer controlled and capable of producing monochromatic or spectral wave fields.

Two wing walls, 30 ft. (9.14 m) apart, are centered at the end of the basin away from the wave generators. The wing walls are each 30 ft. (9.14 m) long then turn towards the sides of the basin for 10 ft. (3.05 m) Between the wing walls is an 8 ft. (2.44 m) diameter by 8 ft. (2.44 m) deep sump. The sump is equipped with two 4 in. (10.2 cm) diameter pipes with float-controlled submersible pumps and flow meters, and also two external diesel-powered pumps with 15 in. (0.38 cm) diameter intakes and 12 in. (0.31 m) diameter outfalls.

During testing of a flood-fighting product, seepage through the structure shall be collected in the sump and pumped back into the basin via the sump pumps and 4-in diameter pipes. The diesel pumps are used during the overtopping tests to return the water to the basin and during the current test to provide water flow.

Seepage rates through the test structures are measured by the flow meters in the 4 in. (10.2 cm) diameter pipes and also by a laser pointing at a float in a standpipe in the sump measuring changes in water surface elevation. Several capacitance-type wave gauges measure the changes in water surface elevation within the basin to determine the incident wave fields. Eight lasers record any movement of the structure during testing.

A cable take-up reel has been modified to tow a log into the structure at a calibrated 5 mph (7 ft/s) (for a debris impact test. The log trips a wire set a few in. in front of the test structure which turns off the drive motor on the take-up reel prior to impact. Two web cams with 360-degree pan and telephoto zoom capabilities are used to record construction, testing, and disassembly of each product. The web cams may also be used to broadcast so that the tests may be viewed in real time by anyone with web access.

Due to the restrictive height of the research basin walls, the height of each structure shall be limited to 4 ft (1.2 m). The layout of the base of the barrier construction area is shown in Figure A-1. The ground surface of the wave basin is a smooth, flat, and impervious concrete slab with little elevation changes. The water supply for performance testing shall be the available non-potable (e.g. city water) water supply to the test facility. No purposely contaminated water shall be allowed into the facility.

The wet-side, or river-side, of the wave basin refers to the side of the basin that imposes the flood water. The dry-side of the wave basin refers to the side protected by the flood barrier.

Two web cams with 360-degree pan and telephoto zoom capabilities are used to record construction, testing, and disassembly of each product. The web cams may also be used to broadcast so that the tests may be viewed in real time by anyone with web access.

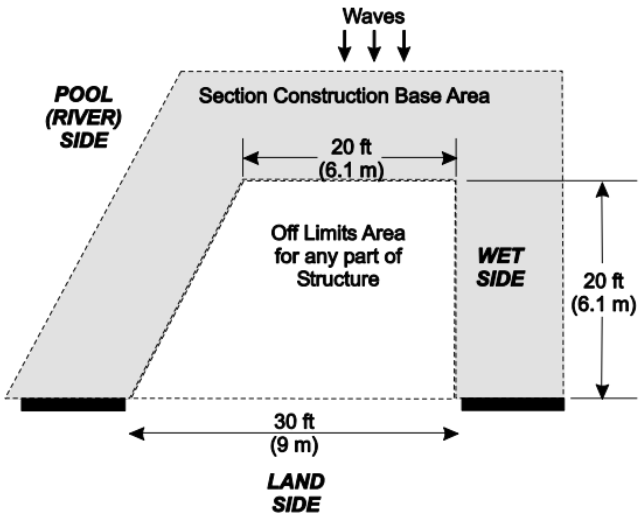

Figure B-1. Layout and Barrier Construction

APPENDIX C: FLOOD MITIGATION PUMP PACKAGE COMPONENTS

The flood mitigation pump package shall consist of the following components which are furnished by the flood mitigation pump manufacturer:

1. Flood mitigation pump
2. Driver – diesel engine or electric motor
3. Pump controller (if applicable)
4. Flexible coupling or drive shaft (if applicable)
5. Suction and discharge pressure gauges (if applicable)
6. Substantial bedplate for pump and driver (if applicable)
7. Diesel engine accessories (if applicable):
    a. starting batteries
    b. rigid cooling water and fuel lines for stationary installations (may have short flexible elements in close proximity to engine to minimize vibration)
    c. exhaust piping and muffler
    d. fuel tank
8. Liquid level sensor (if applicable)
9. Instruction, operation, and maintenance manual in local language

APPENDIX D : MAXIMUM SEEPAGE RATE ALLOWANCE - FLOOD BARRIERS FOR OPENING BARRIER APPLICATIONS

The following table was developed based on the maximum leakage rate criteria and calculation methods described in Section 4.3.3. This table does not apply to flood barriers which have a maximum design water depth greater than the barrier height (i.e. fully submerged windows), if the barrier perimeter is less than the opening width plus two times the water depth. This table also does not apply to flood barriers which are parallel to the ground surface.

Note: To determine maximum seepage flow rate allowances for flood barriers for perimeter barrier applications, simply multiply the barrier length by the maximum leakage rate requirement specified in Section 4.2. Water height is not factored into the calculation.

Maximum Seepage Rate Allowance, (gal/hr)

	Opening Width, (ft.)											
Maximum Design Water Depth, (ft.)	1	2	3	4	5	6	8	10	12	15	20	25
0.5	0.16	0.24	0.32	0.4	0.48	0.56	0.72	0.88	1.04	1.28	1.68	2.08
1	0.24	0.32	0.4	0.48	0.56	0.64	0.8	0.96	1.12	1.36	1.76	2.16
1.5	0.32	0.4	0.48	0.56	0.64	0.72	0.88	1.04	1.2	1.44	1.84	2.24
2	0.4	0.48	0.56	0.64	0.72	0.8	0.96	1.12	1.28	1.52	1.92	2.32
2.5	0.48	0.56	0.64	0.72	0.8	0.88	1.04	1.2	1.36	1.6	2	2.4
3	0.56	0.64	0.72	0.8	0.88	0.96	1.12	1.28	1.44	1.68	2.08	2.48
3.5	0.64	0.72	0.8	0.88	0.96	1.04	1.2	1.36	1.52	1.76	2.16	2.56
4	0.72	0.8	0.88	0.96	1.04	1.12	1.28	1.44	1.6	1.84	2.24	2.64
4.5	0.8	0.88	0.96	1.04	1.12	1.2	1.36	1.52	1.68	1.92	2.32	2.72
5	0.88	0.96	1.04	1.12	1.2	1.28	1.44	1.6	1.76	2	2.4	2.8
5.5	0.96	1.04	1.12	1.2	1.28	1.36	1.52	1.68	1.84	2.08	2.48	2.88
6	1.04	1.12	1.2	1.28	1.36	1.44	1.6	1.76	1.92	2.16	2.56	2.96
7	1.2	1.28	1.36	1.44	1.52	1.6	1.76	1.92	2.08	2.32	2.72	3.12
8	1.36	1.44	1.52	1.6	1.68	1.76	1.92	2.08	2.24	2.48	2.88	3.28
9	1.52	1.6	1.68	1.76	1.84	1.92	2.08	2.24	2.4	2.64	3.04	3.44
10	1.68	1.76	1.84	1.92	2	2.08	2.24	2.4	2.56	2.8	3.2	3.6
11	1.84	1.92	2	2.08	2.16	2.24	2.4	2.56	2.72	2.96	3.36	3.76
12	2	2.08	2.16	2.24	2.32	2.4	2.56	2.72	2.88	3.12	3.52	3.92
13	2.16	2.24	2.32	2.4	2.48	2.56	2.72	2.88	3.04	3.28	3.68	4.08
14	2.32	2.4	2.48	2.56	2.64	2.72	2.88	3.04	3.2	3.44	3.84	4.24
15	2.48	2.56	2.64	2.72	2.8	2.88	3.04	3.2	3.36	3.6	4	4.4
16	2.64	2.72	2.8	2.88	2.96	3.04	3.2	3.36	3.52	3.76	4.16	4.56
17	2.8	2.88	2.96	3.04	3.12	3.2	3.36	3.52	3.68	3.92	4.32	4.72
18	2.96	3.04	3.12	3.2	3.28	3.36	3.52	3.68	3.84	4.08	4.48	4.88
19	3.12	3.2	3.28	3.36	3.44	3.52	3.68	3.84	4	4.24	4.64	5.04
20	3.28	3.36	3.44	3.52	3.6	3.68	3.84	4	4.16	4.4	4.8	5.2

SP12034-A1Text Modification

1612.4 Design and construction.

The design and construction of buildings and structures located in flood hazard areas, including coastal high hazard areas and Coastal A Zones, shall be in accordance with Chapter 5 of ASCE 7 and with ASCE 24.

1612.4.1Modification of ASCE 24.

Table 6-1 and Section 6.2.1 in ASCE 24 shall be modified as follows:

1.The title of Table 6.1 shall be “Minimum Elevation of Floodproofing, Relative to Base Flood Elevation (BFE) or Design Flood Elevation (DFE), in Coastal A Zones and in Other Flood Hazard Areas that are not High Risk Flood Hazard Areas.”

2.Section 6.2.1 shall be modified to permit dry floodproofing in Coastal A Zones, as follows: “Dry floodproofing of nonresidential structures and nonresidential areas of mixed-use structures shall not be allowed unless such structures are located outside of High Risk Flood Hazard areas and Coastal High Hazard Areas. Dry floodproofing shall be permitted in Coastal A Zones provided wave loads and the potential for erosion and local scour are accounted for in the design. Dry floodproofing of residential structures or residential areas of mixed-use structures shall not be permitted.”

1612.4.2Modification of ASCE 24 9.6 Pools.

Modify Section 9.6 in ASCE 24 by adding an exception as follows:

9.6 Pools. In-ground and above-ground pools shall be designed to withstand all flood-related loads and load combinations. Mechanical equipment for pools such as pumps, heating systems and filtering systems, and their associated electrical systems, shall comply with Chapter 7.

Exception: Equipment for pools, spas and water features shall be permitted below the elevation required in Table 7-1, provided it is elevated to the extent practical, is anchored to prevent flotation and resist flood forces, and is supplied by branch circuits that have ground-fault circuit-interrupter protection.

~~**1612.4.3** Flood Resistance Materials for Dry Flood Proofing of Special Flood Hazards Areas of A-zones shall meet TAS 204 or an approved flood resistant test.~~

1612.4.3 Testing of Dry Floodproofing Measures (Passive). Flood Resistance Materials for passive Dry Flood Proofing shall meet TAS 204 or an approved flood resistance test.

Page: 1

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SP12034Text Modification

1612.4 Design and construction.
The design and construction of buildings and structures located in flood hazard areas, including coastal high hazard areas and Coastal A Zones, shall be in accordance with Chapter 5 of ASCE 7 and with ASCE 24.

1612.4.1Modification of ASCE 24.
Table 6-1 and Section 6.2.1 in ASCE 24 shall be modified as follows:
1.The title of Table 6.1 shall be "Minimum Elevation of Floodproofing, Relative to Base Flood Elevation (BFE) or Design Flood Elevation (DFE), in Coastal A Zones and in Other Flood Hazard Areas that are not High Risk Flood Hazard Areas."
2.Section 6.2.1 shall be modified to permit dry floodproofing in Coastal A Zones, as follows: "Dry floodproofing of nonresidential structures and nonresidential areas of mixed-use structures shall not be allowed unless such structures are located outside of High Risk Flood Hazard areas and Coastal High Hazard Areas. Dry floodproofing shall be permitted in Coastal A Zones provided wave loads and the potential for erosion and local scour are accounted for in the design. Dry floodproofing of residential structures or residential areas of mixed-use structures shall not be permitted."

1612.4.2Modification of ASCE 24 9.6 Pools.
Modify Section 9.6 in ASCE 24 by adding an exception as follows:
9.6 Pools. In-ground and above-ground pools shall be designed to withstand all flood-related loads and load combinations. Mechanical equipment for pools such as pumps, heating systems and filtering systems, and their associated electrical systems, shall comply with Chapter 7.

Exception: Equipment for pools, spas and water features shall be permitted below the elevation required in Table 7-1, provided it is elevated to the extent practical, is anchored to prevent flotation and resist flood forces, and is supplied by branch circuits that have ground-fault circuit-interrupter protection.

1612.4.3 Flood Resistance Materials for Dry Flood Proofing of Special Flood Hazards Areas of A-zones shall meet TAS 204 or an approved flood resistant test.

Page: 1

Mod12034_TextOfModification.pdf

SP12034-A2Rationale

SUBMITTED: Rebecca Quinn, obo FDEM Office of Floodplain Management

ALTERNATE LANGUAGE for SP12034

Text of Modification:

1612.4.3 Testing of Dry Floodproofing Measures. Where dry floodproofing is permitted by this code, materials, products and assemblies specified by registered design professionals as part of dry floodproofing measures shall meet the following, as applicable:

1. Where human intervention is not required (passive), meet the test requirements of ANSI/FM 2510, TAS 204 or an approved test standard, unless otherwise approved by the building official.
2. Where human intervention is required (active), meet the test requirements of ANSI/FM 2510 or an approved test standard, unless otherwise approved by the building official.

ADD to Chapter 35:

ANSI/FM 2510—20. American National Standard for Flood Mitigation Equipment.

Rationale:

ANSI/FM Approvals 2510-2020, a standard for "flood mitigation equipment," was published in 2020. This standard applies to "flood barriers for opening barrier and perimeter barrier applications" (passive and active) and mitigation valves and pumps. ANSI/FM 2510 is cited in the 2024 edition of ASCE 24, Flood Resistant Design and Construction.

This Alternate Language proposal adds the ANSI/FM standard to the Miami-Dade proposal. It also provides for use of measures, both passive and active, with approval of the building officials – this is a necessary clarification. Some manufacturers have not yet completed testing and ANSI/FM 2510 certification, and likely even fewer have satisfied TAS 204. Plus, there are instances where a design professional might develop individually designed measures for unique situations that manufactured and certified products cannot address.

Miami-Dade County proposes to require all dry floodproofing passive measures ("flood resistance materials") used in every jurisdiction in the State to meet Testing Application Standard (TAS), 204-26, that was developed by the County. Other Miami-Dade TASs cited in the FBC are related to High-Velocity Hurricane Zone and wind-borne debris regions. See separate comment submitted for SP12040, which is the TAS. It is also notable that:

- TAS 204 is not applicable in Coastal A Zones, yet the FBC allows dry floodproofing in those areas. The Alternate Language addresses this by stating it applies "where dry floodproofing is permitted by this code."
- TAS 204 is explicitly only for "passive" measures. The obvious question is what about measures that require people to take action? Requiring passive measures only if tested by TAS 204 or another resistance test would end the standard of practice for +50 years by

Commented [RQ1]: Reminder, FBC defines: **DRY FLOODPROOFING.** A combination of design modifications that results in a building or structure, including the attendant utilities and equipment and sanitary facilities, being water tight with walls substantially impermeable to the passage of water and with structural components having the capacity to resist loads as identified in ASCE 7.

Commented [RQ2]: This captures 1612.4.1 that allows dry FP in CAZ

Commented [RQ3]: Reminder, ASCE 24 defines: **Human Intervention**—Required presence and active involvement of people to implement a *floodproofing* measure prior to the onset of *flooding*.

Commented [RQ4]: This phrase allows acceptance of untested things, with BO approval. From what I can tell, there aren't yet a lot of things tested to meet ANSI/FM 2510

Page: 1

Mod_12034_A2_Rationale_FDEM Alt Lang_SP12034 M-D Passive.pdf

precluding individual certification. The Alternate Language addresses this by providing for approval by the building official as an option.

The FBC defines the term "dry floodproofing" and Sec. 1612.4 refers to ASCE 24 for design and construction requirements. Dry floodproofing measures fall into two categories – those that are passive and do not rely on people to take action (e.g., solid walls, special flood glass, special doors that seal every time closed), and those that require human intervention (e.g., to install panels and barriers).

As spelled out in ASCE 24, Sec. 6.2, performance of all measures used to achieve dry floodproofing must result in the structure being substantially impermeable to the passage of floodwater, and the walls, floors, and flood shields must be designed and constructed to resist hydrostatic, hydrodynamic, and other flood-related loads, including buoyancy. FBC Sec. 1612.5 requires construction documents to include a "statement that the dry floodproofing is designed in accordance with ASCE 24." This is required when buildings are proposed to be dry floodproofed, whether with active or passive measures, or as is most common, a combination.

Fiscal Impact Statement:

Impact to local entity relative to enforcement of code (553.73(9)(b),F.S.):
Saves time and increases confidence when certified products are specified in designs.

Impact to building and property owners relative to cost of compliance with code (553.73(9)(b),F.S.):
Saves some costs when design professionals specify use of certified products.

Impact to industry relative to the cost of compliance with code (553.73(9)(b),F.S.):
Design industry will save time and costs when they can specify certified products. Manufacturing industry incurs costs for testing, but whether to seek certification is a choice.

Requirements:

Has a reasonable and substantial connection with the health, safety, and welfare of the general public (553.73(9)(a)2,F.S.):
Improves reliability of dry floodproofed buildings when certified products are used.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction (553.73(9)(a)3,F.S.):
Improves reliability of dry floodproofed buildings when certified products are used.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities (553.73(9)(a)4,F.S.):
In addition to offering two testing standards, allows continuation of standard practice over last +50 years by relying on design professional certification.

Does not degrade the effectiveness of the code (553.73(9)(a)5,F.S.):
Improves effectiveness when certified products are specified.

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Existing Building

24

SP12018

Date Submitted	02/13/2025	**Section**	401.5	**Proponent**	Rebecca Quinn obo FL Div Emerg Mgnt
Chapter	4	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

12019, 12020

Summary of Modification

For clarity, carry into other codes the change made in 8th to require elevation of exterior equipment and exterior appliances that are damaged by flood (see FBC EB Sec. 701.3 and FBCR Sec. R322.1.6).

Rationale

Many buildings in floodplains were built before communities started regulating and requiring buildings to be elevated and constructed to minimize exposure to flooding. During floods, exterior equipment that serves those buildings gets damaged, even when the building itself is not substantially damaged. When buildings are flooded and elevated exterior equipment remains functional, clean up and drying out are easier and faster. This means dangerous mold conditions are less likely to develop and buildings can more quickly be reoccupied. The code change clarifies the existing requirement in FBCEB Sec. 701.3 and FBCR Sec. R322.1.6) by adding it to FBCEB Repairs, FBC Mechanical, and FBC Fuel Gas so that it is clear that the requirement that is already in the code applies, whether it is called an alteration or repair, and whether a permit is issued under only the Mechanical or Fuel Gas codes. Methods used to raise the replacement exterior equipment are the same as the methods used when equipment is installed to serve new construction (pedestal, platforms, platforms that are cantilevered from or knee braced to the structure; wall brackets for mini-splits). FEMA's Mitigation Assessment Team reports prepared after some significant flood events document widespread damage to non-elevated exterior equipment. Elevating equipment at the time of replacement also saves building owners from having to pay for replacement equipment after the subsequent flood event.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to building and property owners relative to cost of compliance with code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to industry relative to the cost of compliance with code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to small business relative to the cost of compliance with code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not degrade the effectiveness of the code

No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Alternate Language

2nd Comment Period

SP12018-A2

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 9:46:40 AM **Attachments** No

Rationale:
At the TACs we asked for disapproval to bring back comment to scale-back original proposal which would have required full-height elevation of exterior equipment and exterior appliances damaged by flood and to fix an unintended consequence in original language. The proposal has always addressed replacement of equipment, not repair (there are no flood requirements if the items can be repaired and restored to service, unless part of repairing buildings that sustain substantial damage). The proposal has always addressed exterior equipment and appliances, not items in crawlspaces. A plain reading is that equipment in a crawlspace is not “exterior.” When we explored scaling back the elevation requirement, we landed on the higher of matching the floor height above grade of the existing building (thus protecting the equipment to the same height at the primary occupied space) or 4 feet above grade. Platforms 4 ft above grade protect equipment from frequently low-level flooding, while allowing for routine maintenance without stairs or ladders. One community recently advised they get push-back against the current full elevation of flood-damaged equipment when equipment must be higher than 4 ft above grade. This comment also clarifies that flood-damaged exterior equipment and appliances that serve nonresidential buildings and nonresidential portions could be “put in a bathtub” – which is a way to describe having equipment inside walled enclosures that are designed to keep water away from the equipment, called “dry floodproofed.” Sometimes this option is called “component protection.” FBCB uses the term “nonresidential” in three sections pertaining to dry floodproofing requirements and it, along with “residential,” are defined in ASCE 24. In addition to ASCE 24 commentary, see guidance in FEMA P-936 Floodproofing Non-Residential Buildings, and FEMA P-348 Protecting Building Utility Systems from Flood Damage: Principles and Practices.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Less resistance from owners when full elevation would require platforms taller than the existing living level or 4 ft.

Impact to building and property owners relative to cost of compliance with code
Somewhat increases risk of damage over current full elevation requirements, but satisfies the original intent to minimize damage by frequent, low-level (not BFE) flooding. Some reduction in costs where full elevation would be higher than this proposed.

Impact to industry relative to the cost of compliance with code
None; some degree of elevation or protection still required.

Impact to small business relative to the cost of compliance with code
None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Achieves original intent with respect to frequent, low-level flooding.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Improves enforceability in those situations where full elevation is challenging due to small setbacks

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not degrade the effectiveness of the code
Although the elevation requirement is scaled back, the proposed change will still result in reduction in damage and improved ability to reoccupy after low-level flooding.

SP12018-A2Text Modification

FBCEB CHAPTER 7 ALTERATIONS

701.3 Flood hazard areas. In *flood hazard areas*:

1. *Alterations* that constitute *substantial improvement* shall require that the building comply with Section 1612 of the *Florida Building Code, Building*, or Section R322 of the *Florida Building Code, Residential*, as applicable.

2. Unless part of substantial improvement or repair of substantial damage, replacement ~~Replacement~~ of exterior equipment and exterior appliances that are damaged by flood shall meet one of the following; ~~the requirements of Section 1612 of the *Florida Building Code, Building*, or Section R322.1.6 of the *Florida Building Code, Residential*, as applicable.~~

2.1. Be elevated to or above the same height above grade as the first floor of the building, or 4 ft above grade, whichever is higher.

2.2. For nonresidential buildings and nonresidential portions of buildings, be elevated in accordance with 2.1 or located in an enclosure that is dry floodproofed to 4 ft above grade, or the same height above grade as the first floor of the building, whichever is higher, in accordance with the dry floodproofing requirements of ASCE 24 for attendant utilities and equipment.

FBCEB CHAPTER 5, SEC. 503 ALTERATIONS (bring in to pair with 701.3)

[BS] 503.2 Flood hazard areas.

For buildings and structures in *flood hazard areas*; ~~established in Section 1612.3 of the *Florida Building Code, Building*, or Section R322 of the *Florida Building Code, Residential*, as applicable, any~~

1. *Alterations* ~~*alteration*~~ that constitute~~s~~ *substantial improvement* of the existing structure shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

2. Alterations ~~For buildings and structures in *flood hazard areas* established in Section 1612.3 of the *Florida Building Code, Building*, or Section R322 of the *Florida Building Code, Residential*, as applicable, any alterations~~ that do not constitute *substantial improvement* of the existing structure are not required to comply with the flood design requirements for new construction.

3. Unless part of substantial improvement or repair of substantial damage, replacement of exterior equipment and exterior appliances that are damaged by flood shall meet one of the following:

2.1. Be elevated to or above the same height above grade as the first floor of the building, or 4 ft above grade, whichever is higher.

2.2. For nonresidential buildings and nonresidential portions of buildings, be elevated in accordance with 2.1 or located in an enclosure that is dry floodproofed to 4 ft above grade, or the same height above grade as the first floor of the building, whichever is higher, in accordance with the dry floodproofing requirements of ASCE 24 for attendant utilities and equipment.

Page: 1

Mod12018_A2_TextOfModification.pdf

NEW ADDITION FBC RESIDENTIAL

R322.1.6 Protection of mechanical, plumbing and electrical systems. Electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall be located at or above the elevation required in Section R322.2 or R322.3. ~~Replacement of exterior equipment and exterior appliances damaged by flood shall meet the requirements of this section.~~ If replaced as part of a substantial improvement, electrical systems, equipment and components; heating, ventilating, air conditioning and plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exceptions:

1. Unless part of substantial improvement or repair of substantial damage, replacement of exterior equipment and exterior appliances that are damaged by flood shall be elevated to or above the same height above grade as the first floor of the building, or 4 ft above grade, whichever is higher.

2. Locating electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the required elevation in accordance with ASCE 24. Equipment for pools, spas and water features shall be permitted below the elevation required in Section R322.2 or R322.3 provided it is elevated to the extent practical and is anchored to prevent floatation and resist flood forces and is supplied by branch circuits that have ground-fault circuit interrupter protection. Electrical wiring

SP12018-A2Text Modification

systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

SP12018Text Modification

401.5 Flood hazard areas. In *flood hazard areas*~~, repairs~~

1. Repairs that constitute *substantial improvement* shall require that the building comply with Section 1612 of the *Florida Building Code, Building* or Section R322 of the *Florida Building Code, Residential*, as applicable.

2. Replacement of exterior equipment and exterior appliances damaged by *flood* shall meet the requirements of Section 1612 of the *Florida Building Code, Building* or Section R322 of the *Florida Building Code, Residential*, as applicable.

Page: 1

Mod12018_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Fuel Gas

25

SP12020

Date Submitted	02/13/2025	**Section**	301.11	**Proponent**	Rebecca Quinn obo FL Div Emerg Mgnt
Chapter	3	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

12018, 12019

Summary of Modification

For clarity, carry into other codes the change made in 8th to require elevation of exterior equipment and exterior appliances that are damaged by flood (see FBC EB Sec. 701.3 and FBCR Sec. R322.1.6).

Rationale

Many buildings in floodplains were built before communities started regulating and requiring buildings to be elevated and constructed to minimize exposure to flooding. During floods, exterior equipment that serves those buildings gets damaged, even when the building itself is not substantially damaged. When buildings are flooded and elevated exterior equipment remains functional, clean up and drying out are easier and faster. This means dangerous mold conditions are less likely to develop and buildings can more quickly be reoccupied. The code change clarifies the existing requirement in FBCEB Sec. 701.3 and FBCR Sec. R322.1.6) by adding it to FBCEB Repairs, FBC Mechanical, and FBC Fuel Gas so that it is clear that the requirement that is already in the code applies, whether it is called an alteration or repair, and whether a permit is issued under only the Mechanical or Fuel Gas codes. Methods used to raise the replacement exterior equipment are the same as the methods used when equipment is installed to serve new construction (pedestal, platforms, platforms that are cantilevered from or knee braced to the structure; wall brackets for mini-splits). FEMA's Mitigation Assessment Team reports prepared after some significant flood events document widespread damage to non-elevated exterior equipment. Elevating equipment at the time of replacement also saves building owners from having to pay for replacement equipment after the subsequent flood event.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to building and property owners relative to cost of compliance with code
None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to industry relative to the cost of compliance with code
None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to small business relative to the cost of compliance with code
None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not degrade the effectiveness of the code
No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Alternate Language

2nd Comment Period

SP12020-A1

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 9:54:49 AM **Attachments** No

Rationale:
At the TACs we asked for disapproval to bring back comment to scale-back original proposal which would have required full-height elevation of exterior equipment and exterior appliances damaged by flood and to fix an unintended consequence in original language. The proposal has always addressed replacement of equipment, not repair (there are no flood requirements if the items can be repaired and restored to service, unless part of repairing buildings that sustain substantial damage). The proposal has always addressed exterior equipment and appliances, not items in crawlspaces. A plain reading is that equipment in a crawlspace is not “exterior.” When we explored scaling back the elevation requirement, we landed on the higher of matching the floor height above grade of the existing building (thus protecting the equipment to the same height at the primary occupied space) or 4 feet above grade. Platforms 4 ft above grade protect equipment from frequently low-level flooding, while allowing for routine maintenance without stairs or ladders. One community recently advised they get push-back against the current full elevation of flood-damaged equipment when equipment must be higher than 4 ft above grade. This comment also clarifies that flood-damaged exterior equipment and appliances that serve nonresidential buildings and nonresidential portions could be “put in a bathtub” – which is a way to describe having equipment inside walled enclosures that are designed to keep water away from the equipment, called “dry floodproofed.” Sometimes this option is called “component protection.” FBCB uses the term “nonresidential” in three sections pertaining to dry floodproofing requirements and it, along with “residential,” are defined in ASCE 24. In addition to ASCE 24 commentary, see guidance in FEMA P-936 Floodproofing Non-Residential Buildings, and FEMA P-348 Protecting Building Utility Systems from Flood Damage: Principles and Practices.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Less resistance from owners when full elevation would require platforms taller than the existing living level or 4 ft.

Impact to building and property owners relative to cost of compliance with code
Somewhat increases risk of damage over current full elevation requirements, but satisfies the original intent to minimize damage by frequent, low-level (not BFE) flooding. Some reduction in costs where full elevation would be higher than this proposed.

Impact to industry relative to the cost of compliance with code
None; some degree of elevation or protection still required.

Impact to small business relative to the cost of compliance with code
None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Achieves original intent with respect to frequent, low-level flooding.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Improves enforceability in those situations where full elevation is challenging due to small setbacks

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not degrade the effectiveness of the code
Although the elevation requirement is scaled back, the proposed change will still result in reduction in damage and improved ability to reoccupy after low-level flooding.

SP12020-A1Text Modification

301.11 Flood hazard. For structures located in flood hazard areas, the appliance, equipment and system installations regulated by this code shall be located at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment.

Exceptions:

1. Unless part of substantial improvement, replacement of exterior equipment and exterior appliances that are damaged by flood shall meet one of the following:

    1.1. Be elevated to or above the same height above grade as the first floor of the building, or 4 ft above grade, whichever is higher.

    1.2. For nonresidential buildings and nonresidential portions of buildings, be elevated in accordance with 1.1 or located in an enclosure that is dry floodproofed to 4 ft above grade, or the same height above grade as the first floor of the building, whichever is higher, in accordance with the dry floodproofing requirements of ASCE 24 for attendant utilities and equipment.

2. The *appliance*, *equipment* and system installations regulated by this code are permitted to be located below the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to such elevation.

Page: 1

Mod12020_A1_TextOfModification.pdf

SP12020Text Modification

301.11 Flood hazard. For structures located in flood hazard areas, the appliance, equipment and system installations regulated by this code shall be located at or above the elevation required by Section 1612 of the International Building Code for utilities and attendant equipment. Replacement of exterior equipment and exterior appliances damaged by flood shall meet the requirements of this section.

Exception: The *appliance*, *equipment* and system installations regulated by this code are permitted to be located below the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to such elevation.

Page: 1

Mod12020_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Mechanical

26

SP12019

Date Submitted	02/13/2025	**Section**	301.16	**Proponent**	Rebecca Quinn obo FL Div Emerg Mgnt
Chapter	3	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

12018, 12020

Summary of Modification

For clarity, carry into other codes the change made in 8th to require elevation of exterior equipment and exterior appliances that are damaged by flood (see FBC EB Sec. 701.3 and FBCR Sec. R322.1.6).

Rationale

Many buildings in floodplains were built before communities started regulating and requiring buildings to be elevated and constructed to minimize exposure to flooding. During floods, exterior equipment that serves those buildings gets damaged, even when the building itself is not substantially damaged. When buildings are flooded and elevated exterior equipment remains functional, clean up and drying out are easier and faster. This means dangerous mold conditions are less likely to develop and buildings can more quickly be reoccupied. The code change clarifies the existing requirement in FBCEB Sec. 701.3 and FBCR Sec. R322.1.6) by adding it to FBCEB Repairs, FBC Mechanical, and FBC Fuel Gas so that it is clear that the requirement that is already in the code applies, whether it is called an alteration or repair, and whether a permit is issued under only the Mechanical or Fuel Gas codes. Methods used to raise the replacement exterior equipment are the same as the methods used when equipment is installed to serve new construction (pedestal, platforms, platforms that are cantilevered from or knee braced to the structure; wall brackets for mini-splits). FEMA's Mitigation Assessment Team reports prepared after some significant flood events document widespread damage to non-elevated exterior equipment. Elevating equipment at the time of replacement also saves building owners from having to pay for replacement equipment after the subsequent flood event.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to building and property owners relative to cost of compliance with code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to industry relative to the cost of compliance with code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Impact to small business relative to the cost of compliance with code

None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not degrade the effectiveness of the code

No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Alternate Language

2nd Comment Period

SP12019-A1

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 9:51:37 AM **Attachments** No

Rationale:
At the TACs we asked for disapproval to bring back comment to scale-back original proposal which would have required full-height elevation of exterior equipment and exterior appliances damaged by flood and to fix an unintended consequence in original language. The proposal has always addressed replacement of equipment, not repair (there are no flood requirements if the items can be repaired and restored to service, unless part of repairing buildings that sustain substantial damage). The proposal has always addressed exterior equipment and appliances, not items in crawlspaces. A plain reading is that equipment in a crawlspace is not “exterior.” When we explored scaling back the elevation requirement, we landed on the higher of matching the floor height above grade of the existing building (thus protecting the equipment to the same height at the primary occupied space) or 4 feet above grade. Platforms 4 ft above grade protect equipment from frequently low-level flooding, while allowing for routine maintenance without stairs or ladders. One community recently advised they get push-back against the current full elevation of flood-damaged equipment when equipment must be higher than 4 ft above grade. This comment also clarifies that flood-damaged exterior equipment and appliances that serve nonresidential buildings and nonresidential portions could be “put in a bathtub” – which is a way to describe having equipment inside walled enclosures that are designed to keep water away from the equipment, called “dry floodproofed.” Sometimes this option is called “component protection.” FBCB uses the term “nonresidential” in three sections pertaining to dry floodproofing requirements and it, along with “residential,” are defined in ASCE 24. In addition to ASCE 24 commentary, see guidance in FEMA P-936 Floodproofing Non-Residential Buildings, and FEMA P-348 Protecting Building Utility Systems from Flood Damage: Principles and Practices.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Less resistance from owners when full elevation would require platforms taller than the existing living level or 4 ft.

Impact to building and property owners relative to cost of compliance with code
Somewhat increases risk of damage over current full elevation requirements, but satisfies the original intent to minimize damage by frequent, low-level (not BFE) flooding. Some reduction in costs where full elevation would be higher than this proposed.

Impact to industry relative to the cost of compliance with code
None; some degree of elevation or protection still required.

Impact to small business relative to the cost of compliance with code
None; the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Achieves original intent with respect to frequent, low-level flooding.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Improves enforceability in those situations where full elevation is challenging due to small setbacks

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
No change because the 8th Ed requirements already apply to exterior equipment/appliances replaced because of flood damage.

Does not degrade the effectiveness of the code
Although the elevation requirement is scaled back, the proposed change will still result in reduction in damage and improved ability to reoccupy after low-level flooding.

SP12019-A1Text Modification

FBC MECHANICAL

301.16 Flood hazard. For structures located in flood hazard areas, mechanical systems, *equipment* and *appliances* shall be located at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant *equipment*.

Exceptions:

1. Unless part of substantial improvement, replacement of exterior equipment and exterior appliances that are damaged by flood shall meet one of the following:

    1.1. Be elevated to or above the same height above grade as the first floor of the building, or 4 ft above grade, whichever is higher.

    1.2. For nonresidential buildings and nonresidential portions of buildings, be elevated in accordance with 1.1 or located in an enclosure that is dry floodproofed to 4 ft above grade, or the same height above grade as the first floor of the building, whichever is higher, in accordance with the dry floodproofing requirements of ASCE 24 for attendant utilities and equipment.

2. Mechanical systems, *equipment* and *appliances* are permitted to be located below the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such elevation.

Page: 1

Mod12019_A1_TextOfModification.pdf

SP12019Text Modification

301.16 Flood hazard. For structures located in flood hazard areas, mechanical systems, *equipment* and *appliances* shall be located at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant *equipment*. Replacement of exterior equipment and exterior appliances damaged by *flood* shall meet the requirements of this section.

Exception: Mechanical systems, *equipment* and *appliances* are permitted to be located below the elevation required by Section 1612 of the *International Building Code* for utilities and attendant equipment provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding up to such elevation.

Page: 1

Mod12019_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Residential

27

SP11963

Date Submitted	02/13/2025	**Section**	322.1.10	**Proponent**	Rebecca Quinn obo FL Div Emerg Mgnt
Chapter	3	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments No **Alternate Language Yes**

Related Modifications

11962

Summary of Modification

Certain documentation is required to be submitted for residential construction in flood hazard areas to document the elevation to which Lowest Floors are elevated. The proposal specifies use of the FEMA Elevation Certificate that is specifically designed for those purposes.

Rationale

Certain documentation is required to be submitted for residential construction in flood hazard areas to document the elevation to which Lowest Floors are elevated. The proposal specifies use of the FEMA Elevation Certificate that is specifically designed for those purposes. More than half of Florida NFIP communities participate in the NFIP Community Rating System (244 out of 469). A basic requirement for all CRS Communities is use of the FEMA Elevation Certificate. NFIP Elevation Certificate: FEMA Form FF-206-FY-22-152 (3/22) - fema_form-ff-206-fy-22-152.pdf

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Lessens burden caused when permittees use other forms of certification.
Impact to building and property owners relative to cost of compliance with code
None, because owners must submit the documentation in some form.
Impact to industry relative to the cost of compliance with code
The change does not affect the technical requirements of the code.
Impact to small business relative to the cost of compliance with code
The change does not affect the technical requirements of the code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, provide information needed for final inspection.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change does not affect the technical requirements of the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change does not affect the technical requirements of the code.

Does not degrade the effectiveness of the code

No; improves effectiveness because the FEMA Forms are designed to collect the information necessary to help determine compliance.

Alternate Language

2nd Comment Period

SP11963-A1

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 8:02:47 AM **Attachments** No

Rationale:

Where a FEMA form is specified we added “or equivalent.” The value of the form is the completeness of the requested information, which is still valuable even if provided in a substantially equivalent format.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Lessens burden because whether the FEMA form or equivalent is used, the information necessary is provided

Impact to building and property owners relative to cost of compliance with code

None, because owners must submit the documentation in some form.

Impact to industry relative to the cost of compliance with code

The change does not affect the technical requirements of the code.

Impact to small business relative to the cost of compliance with code

The change does not affect the technical requirements of the code.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Improves compliance and ensures records are complete whether the FEMA forms or equivalents are used. We note that sec. 42.0366, F.S., requires surveyors to submit Elevation Certificates to FDEM (certificates are posted online and accessible to the public).

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change does not affect the technical requirements of the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change does not affect the technical requirements of the code.

Does not degrade the effectiveness of the code

No; improves effectiveness because whether the FEMA Forms or equivalent are used, the are designed to collect the information necessary to help determine compliance is provided..

SP11963-A1Text Modification

R322.1.10 As-built elevation documentation. A licensed professional surveyor and mapper or registered design professional shall prepare and seal the FEMA Elevation Certificate or equivalent to document the as-built ~~documentation of the~~ elevations specified in Section R322.2 or R322.3.

Page: 1

Mod11963_A1_TextOfModification.pdf

SP11963Text Modification

R322.1.10 As-built elevation documentation. A licensed professional surveyor and mapper or registered design professional shall prepare and seal the FEMA Elevation Certificate to document the as-built ~~documentation of the~~ elevations specified in Section R322.2 or R322.3.

Page: 1

Mod11963_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Residential

28

SP11984

Date Submitted	02/11/2025	**Section**	322.1.6	**Proponent**	Dallas Thiesen
Chapter	3	**Affects HVHZ**	No	**Attachments**	No
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

Summary of Modification

Updates requirements for pool and spa equipment installed in special flood hazard zones.

Rationale

Swimming pool and spa equipment is designed for outdoor use and is generally weather resistant. Pool and spa equipment is not designed to work at a substantially different elevation than the pool or spa that it is serving, requiring pool and spa equipment to be installed above grade can cause loss of prime, can damage to the equipment, and can shorten the service life of the equipment. Pool and spa equipment is also expressly excluded from flood insurance coverage under the National Flood Insurance Program (NFIP) and there is no duty to mitigate or minimize damage to such equipment.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

This will save consumers the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Impact to industry relative to the cost of compliance with code

This will save industry the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Impact to small business relative to the cost of compliance with code

This will save industry the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Simplifies enforcement by eliminating potential confusion.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Simplifies enforcement by eliminating potential confusion.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal does not specify a product or material.

Does not degrade the effectiveness of the code

Simplifies enforcement by eliminating potential confusion.

Alternate Language

2nd Comment Period

SP11984-A1

Proponent Rebecca Quinn obo FL Div Emerg Mgnt **Submitted** 8/7/2025 10:14:57 AM **Attachments** No

Rationale:
Rather than completely remove any requirement (original proposal), this modification clarifies the requirements for pool equipment installed in Special Flood Hazard Areas to add that elevation to the extent practical should maintain functionality and safe conditions. This change is based on the original intent when “to the extent practical” requirement was proposed by FEMA, referring to guidance that advises full elevation to the BFE, but if that height “would result in problems with pump function and performance, equipment is to be elevated as high as possible while allowing safe functioning.” The objective of regulating development in flood hazard areas is to minimize the impact of flooding on the activity, and the impact of the activity on flooding. Partial elevation achieves some damage reduction during frequent, low-level flooding. Whether something is or isn’t insurable under NFIP flood insurance policies has no bearing on what is regulated (see NFIP definition for “development,” which is broad, including any man-made change).

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Adds clarity for determining practicality of elevation.

Impact to building and property owners relative to cost of compliance with code
no change from original requirement

Impact to industry relative to the cost of compliance with code
Adds functionality and safety to determining practicality.

Impact to small business relative to the cost of compliance with code
This will save industry the unnecessary cost of elevating swimming pool and spa equipment and by extending the service life of the equipment.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Clarifies that safe conditions is part of determining practicality of elevation.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Adds clarify.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities
Does not require any different equipment.

Does not degrade the effectiveness of the code
Improves interpretation and enforceability.

1st Comment Period History

SP11984-G1

Proponent Michael Weinbaum Submitted 4/9/2025 9:06:22 PM Attachments No

Comment:

Martin Aquatic Design and Engineering supports this code change.

SP11984-A1Text Modification

R322.1.6 Protection of mechanical, plumbing and electrical systems. Electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall be located at or above the elevation required in Section R322.2 or R322.3. Replacement of exterior equipment and exterior appliances damaged by flood shall meet the requirements of this section. If replaced as part of a substantial improvement, electrical systems, equipment and components; heating, ventilating, air conditioning and plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Locating electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the required elevation in accordance with ASCE 24. Equipment for pools, spas and water features shall be permitted below the elevation required in Section R322.2 or R322.3 provided it is elevated to the extent practical while maintaining functionality and safe conditions, ~~and is~~ anchored to prevent floatation and resist flood forces, and ~~is~~ supplied by branch circuits that have ground-fault circuit interrupter protection. Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

Page: 1

Mod11984_A1_TextOfModification.pdf

SP11984Text Modification

R322.1.6 Protection of mechanical, plumbing and electrical systems.

Electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall be located at or above the elevation required in Section R322.2 or R322.3. Replacement of exterior equipment and exterior appliances damaged by flood shall meet the requirements of this section. If replaced as part of a substantial improvement, electrical systems, equipment and components; heating, ventilating, air conditioning and plumbing appliances and plumbing fixtures; duct systems; and other service equipment shall meet the requirements of this section. Systems, fixtures, and equipment and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

Exception: Locating electrical systems, equipment and components; heating, ventilating, air conditioning; plumbing appliances and plumbing fixtures; duct systems; and other service equipment is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the required elevation in accordance with ASCE 24. Equipment for pools, spas and water features shall be permitted below the elevation required in Section R322.2 or R322.3 provided it ~~is elevated to the extent practical,~~ is anchored to prevent flotation and resist flood forces, and is supplied by branch circuits that have ground-fault circuit-interrupter protection. Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

Page: 1

Mod11984_TextOfModification.pdf

TAC: Special Occupancy

Total Mods for **Special Occupancy** in **Denied : 25**

Total Mods for report: 29

Sub Code: Test Protocols

29

SP12040

Date Submitted	02/13/2025	**Section**	204	**Proponent**	Jaime Gascon
Chapter	1	**Affects HVHZ**	Yes	**Attachments**	**Yes**
TAC Recommendation	Denied				
Commission Action	Pending Review				

Comments

General Comments Yes **Alternate Language Yes**

Related Modifications

12034

Summary of Modification

New Testing Application Standard (TAS) 204 - Flood Resistant Test Procedures for passive in place system.

Rationale

This protocol serves to cover the procedures for conducting the flood resistance test of materials as required by the FBC Building Section 1612 and is applicable to Dry Flood Proofing in special hazard areas of A-Zone.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code
Saves the local entity time by having a standard to reference for compliance.
Impact to building and property owners relative to cost of compliance with code
Saves cost by knowing what standard is acceptable for code compliance.
Impact to industry relative to the cost of compliance with code
Saves cost by having an available test standard to use to show code compliance.
Impact to small business relative to the cost of compliance with code
Saves cost by having an available test standard to use to show code compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public
Improves the code by use of an adopted standard that is acceptable for code compliance.
Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction
Strengthens the code by providing a standard to reference for code compliance.
Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

It does not discriminate since the test is designed to be performance-based.

Does not degrade the effectiveness of the code

It does not degrade the code, but improves it by supplementing the code with an additional TAS.

Alternate Language

2nd Comment Period

SP12040-A1

Proponent Jaime Gascon **Submitted** 8/13/2025 12:54:53 PM **Attachments** No

Rationale:

This MOD was denied by the Special Occ TAC and Approved and Submitted by the Structural TAC. The code lacks guidance on how to test passive flood resistant systems and this new protocol serves to address the need. The protocol was derived through collaboration with testing laboratories and product manufacturers in Florida. This Alternative Language comment corrects a typo in the text of section 6.2.2.2 of the protocol to match the impactor's cut angle with that shown on the sketch.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Saves time by making available a standard that is acceptable for code compliance.

Impact to building and property owners relative to cost of compliance with code

Saves cost by providing an acceptable standard for code compliance.

Impact to industry relative to the cost of compliance with code

Saves costs by testing to an adopted standard that is acceptable for code compliance.

Impact to small business relative to the cost of compliance with code

Saves cost by having an available test standard to use to show code compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Improves the code by providing guidance on use of a test standard.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens the code by referencing a standard that is acceptable for code compliance.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

It does not discriminate since it allows for other approved testing to also be used.

Does not degrade the effectiveness of the code

It does not degrade the code, but serves to improve it by providing guidance with a standard for testing.

2nd Comment Period

SP12040-G1

Proponent Rebecca Quinn obo FL Div Emerg Mgnt | Submitted 8/24/2025 11:16:43 AM | Attachments Yes

Comment:
At the first TAC meetings the FDEM Office of Floodplain Management representative raised a number of concerns and asked questions about the Miami-Dade proposal to require passive dry floodproofing measures/materials to meet the County's TAS 204 or an "approved flood resistance test." We offer the following for consideration by the TACs before approving the proposal (SB12034) and the TAS (SP12040): 1. What was the make-up of the committee that developed TAS 204 and did it include jurisdictions from other parts of the State where dry floodproofing is common? TAS 204 would be required statewide, unlike most of the TAS which are cited in the High Velocity Hurricane Zone sections of the FBC that apply only to Miami-Dade and Broward. 2. The TAS refers to testing of materials, which is confusing given the FBC defines "flood damage-resistant materials." We think "material" isn't the appropriate term to use for passive measures. It does define "specimen" as "entire assembled unit." 3. The TAS states it is not applicable in Coastal A Zones, which may be appropriate if the test protocol doesn't include moderate waves – but the FBC modifies ASCE 24 to permit dry floodproofing in Coastal A Zones. 4. The TAS defines "floodproofing" based on the NFIP Code of Federal Regulations definition instead of ASCE 24 definition or the FBC definition "dry floodproofing." 5. The SP12034 proposal requires all passive measures to meet the TAS or "approved flood resistance test." Approved by whom? 6. By requiring all passive measures to meet a test, design professionals would not be able to certify use of ANY untested products, ending +50 years of practice. 7. The TAS footer indicates it is "for HVHZ," yet the SP12034 proposal would be statewide. 8. It's not clear that the TAS could be used for permanently installed flood doors that provide protection every time they are closed.

SP12040-A1Text Modification

6.2.2.2 The impactor for the debris impact load test fixture consists of a 12-inch+/- ½ inch diameter by 30 inch long Southern Pine #2 wood log having a density of 36-41 lbs./ft^3 at 19-20% moisture contents. The impactor must have a ~~25~~15-degree cut on the impact leading edge and be suspended from a carriage and support system using two 1/8-inch diameter steel cables or other suitable device as shown in Figure 1. The total weight of the impactor assembly must be…

Page: 1

Mod12040_A1_TextOfModification.pdf

SP12040Text Modification

See attached file.

Mod12040_TextOfModification.pdf

Page: 1

TESTING APPLICATION STANDARD (TAS) 204-26

FLOOD RESISTANT TEST PROCEDURES (FOR PASSIVE IN PLACE SYSTEMS)

1. Scope:

1.1 This protocol covers procedures for conducting the flood resistance test of materials as required by Section 1612 of the *Florida Building Code, Building*. This protocol is applicable to *Dry Flood Proofing* in *Special Flood Hazards Areas* (*SFHAs*) of A-zone (A, AE, A1-30, AH, AO or AR on FEMA's *FIRM* maps), other Coastal High Hazard Areas (V, VO, VE or VI-30) or Coastal A-zones, are not covered under this protocol.

2. Referenced Documents:

2.1 *The Florida Building Code, Building*

2.2 ASCE 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures

2.3 ASCE 24: Flood Resistant Design and Construction

2.4 FEMA: Federal Emergency Management Agency

2.5 USACE: (US Army Corps of Engineers)

2.6 NFIP: National Flood Insurance Program

3. Terminology:

3.1 *Specimen*—The entire assembled unit containing all the parts needed to install the product onto a building's substrate submitted for testing.

3.2 *Test Chamber*—A watertight enclosure (flood simulation tank) of sufficient depth to allow proposed flood water design height (H_D), capable of resisting imposed flood loads, and capable of accommodating the debris impact load fixture and the impactor movement to the specified level.

3.3 *Exposed linear foot of perimeter* (ft) – the linear distance along the test chamber's submerged perimeter in contact with the specimen.

3.4 *L*eakage *P*erimeter (ft): The exposed perimeter of test specimen with total base lineal width + 2X flood water design height (H_D).

3.5 *Maximum Deflection*—The maximum displacement of the specimen measured to the nearest $^1/_8$ of an inch attained from the original position, while the maximum Hydro Static Load is being applied.

3.6 *Permanent Deformation*—The permanent displacement of the specimen measured to the nearest $^1/_8$ of an inch from the original position to the final position that remains after the maximum Hydro Static Load has been removed.

3.7 *Flood water design height* (H_D) (ft) – The depth of the water in the chamber used to simulate the flood design depth corresponding to FBC Section 1612.

3.8 *Special Flood Hazards Area* (*SFHA*): Land in flood plain subjected to 1% or greater chance of flooding in any given year.

3.9 *Design Flood Elevation* (*DFE*) – Elevation of design flood, including wave height, relative to datum specified the community's flood hazard map.

3.10 *Hydro Static Load* – Load imposed on an object by the standing mass of water.

3.11 *Hydro Dynamic Loads* – Loads imposed on an object by the water flowing against and around it.

3.12 *Impact loads* - Loads that result from the debris, ice, or any debris transported by the flood water striking against structure or parts thereof.

3.13 *Flood glazing* – A passive permanent in-place, flood resistant system constructed of single or multiple glazed panels, where reinforced glass is set, captured or sealed in a frame with structural silicone or other adhesive, gaskets, glazing beads and/or flood water resistant materials to prevent flood water into the interior (dry side) of the glazed system.

3.14 *Design flood height (ft)* – Manufacturer selected *design flood height* (HD) or *DFE* +1 ft, whichever is greater.

3.15 *Flood Insurance Rate Map* (*FIRM*) – An official map of the community on which Federal Management Agency (FEMA) has delineated *Special Flood Hazards Areas* (*SFHAs*) and the risk premium zones applicable to the community.

3.16 *Floodproofing* – Any combination of structure and non-structure addition, changes or adjustment to structure which reduces or eliminate flood damage to real estate or improved real property, water and sanitary facilities structure and contents (Title 44 code of Federal Regulations (CFR) 59.1.)

3.17 *Specimen F*ailure – A change in condition of the specimen indicative of deterioration under flood load or incipient failure, such as material cracking, fastener loosening, local yielding, or loss of adhesive bond. For a glazed system that resists flood loads and dynamic impact loads, a crack forming larger than 5 inches by 1/16 inch in width through which air and water can pass constitutes failure.

4. Significance and Use:

4.1 The test procedures outlined in this protocol provide a means of determining whether a particular product used as *flood glazing*; window walls, curtain walls, storefront, exterior fixed windows, sidelites, glass blocks and any other similar devices (passive permanent in place systems) used as external protection to maintain the envelope of the building, provides sufficient resistance to flood loads and flood debris, as required per Section 1612 of the *Florida Building Code, Building*, ASCE 24 and ASCE-7.

5. Test Specimen:

5.1 *Test specimen* – All parts of the test *specimen* shall be full size, using the same materials, components, details, methods of construction and methods of attachment as proposed for actual use. The *specimen* shall consist of the entire assembled unit attached to a given type of structural framing of the building and shall contain all devices used to resist flood induced forces and flood debris. Such substrates shall become part of the approval. The test *specimen* must be fully assembled in a factory or in the field per the manufacturer's installation instructions. The test *specimen* must be secured and sealed to the test frame/stand/chamber.

6 Apparatus:

6.1 The description of the apparatus is general in nature. Any equipment, properly certified, calibrated, and approved by the Authority Having Jurisdiction (AHJ) capable of performing this test within the allowable tolerance is permitted.

6.2 Major Components:

6.2.1 Hydrostatic Load Test

6.2.1.1 The *test chamber*, as defined in 3.2.

6.2.1.2 A water collection device capable of capturing and measuring the total amount of water managing to seep through the installed *specimen* must be provided. Water collected for a prescribed period must be quantified. The measuring devices shall have a +/- 2% accuracy.

6.2.2 Debris Impact Load Test Fixture (see Figure 1).

6.2.2.1 A flood test chamber with removable frame used to attach test *specimen* is required to simulate the *flood water design height* (HD) and accommodate the debris impact load test fixture in Figure 1.

6.2.2.2 The impactor for the debris impact load test fixture consists of a 12-inch+/- ½ inch diameter by 30 inch long Southern Pine #2 wood log having a density of 36-41 lbs./ft^3 at 19-20% moisture contents. The impactor must have a 25-degree cut on the impact leading edge and be suspended from a carriage and support system using two 1/8-inch diameter steel cables or other suitable device as shown in Figure 1. The total weight of the impactor assembly must be 111 lbs. +/- 1 lb. and capable of delivering 444 ft-lb (600 J) energy from a height of 4 feet. The impactor must

be conditioned at room temperature for 1 hour before the test and must impact the test specimen when it reaches 0.25 to 1 inch off the surface of the water in the flood test chamber. See Figure 2 for impactor assembly design construction details.

6.2.2.3 A suitable timing device with +/- 2% accuracy is required.

6.2.2.4 Test temperature – The test shall be conducted at a test temperature range of 59° F to 95° F.

6.2.2.5 Deflection-Measuring System—The deflection-measuring system must measure the deflection within a tolerance of 0.01 of an inch.

7. Calibration:

7.1 All pressure, temperature, deflection, impactor, timing, scales and water head measuring devices, shall be calibrated to be within the tolerance provided, and be no more than six months prior to testing.

7.2 The calibration report shall include: the date of the calibration, the name of the agency conducting the calibration, methods and equipment used in the calibration process, the equipment being calibrated and any pertinent comments.

8. Acceptance Requirements

8.1 Flood resistant glazed systems shall withstand *Hydro Static Loads* as specified for the test. The maximum leakage rate shall not exceed 0.011 ft^3/hr. (0.08 gph) of flood water *per exposed lineal foot of perimeter*.

8.2 Glass edge support systems must be sufficiently stiff to limit the lateral Hydro Static Load deflections of the glazed flood systems per ASTM E-1300 requirements. The *Permanent deformation* shall not exceed 0.2% of the glass frame supporting members or spans.

8.3 The *specimen* shall be capable of withstanding impactor energy per 6.2.2.2 without damage that may affect intended functions.

8.4 The measured *leakage rates*, after the Hydro Static Test, Dynamic Impact Test and Post Hydro Static test, shall not exceed *leakage rate* per section 8.1 per *exposed lineal foot of perimeter*.

8.5 The *specimen* does not exhibit failure criteria per 3.17.

9 Test Procedures

9.1 Hydro Static Load Test:

9.1.1 Install the test *specimen* in the *test chamber*.

9.1.2 Apply and maintain *Hydro Static Load* at 1/3 *design flood height* H_D (ft) +/-0.5" for 2 hr. duration.

9.1.3 Repeat *Hydro Static Load* at 2/3 design flood height (ft) +/-0.5" for 4-hr duration.

9.1.4 Repeat *Hydro Static Load* Test at the design flood height (ft) +/-0.5" for 24 hours duration.

9.1.5 Water leakage to be measured at 1-hour, 2-hours, 4-hours, 6-hours and at end of the 24-hour periods.

9.1.6 *Permanent deformation* and *maximum deflection* must be measured at the end of 24 hours *Hydro Static Load* Test with *design flood height* at the center of vertical and horizontal mullion spans or the glazing supporting frame members, as applicable.

9.1.7 The *specimen* is deemed compliant to the *Hydro Static Load* Test requirements if it does not exceed the *maximum leakage rate* specified in section 8.1, the *permanent deformation* of the framing system is no greater than 0.2% where measured, *maximum deflection* of the specimen mullions (if used) was no greater than span/180 criteria and the specimen did not exhibit any *specimen failure* per section 3.17.

9.2 Hydro Dynamic Impact Load Test:

9.2.1 Upon completion of the *Hydro Static Load* Test, the *Hydro Dynamic Impact Load* Test is to be conducted.

9.2.2 Keep the chamber flood tank water level up to the specified *design flood height* H_D (ft).

9.2.3 Apply the first impact at the center of the *specimen* using impact energy as defined in 6.2.2.2, and as shown in Figure 1.

9.2.4 Lower the flood water level to 2/3 of the *design flood height* (HD).

9.2.5 Apply the second impact to the specimen at 2/3 of the *design flood height* (HD) as shown in Figure 1.

9.2.6 Measure the total water leakage, the *maximum deflection* and *permanent deformation* upon completion of the test.

9.2.7 The *specimen* is deemed compliant to the Hydro Dynamic Impact Load Test requirements if it does not exceed the *maximum leakage rate* specified in section 8.1, the *permanent deformation* of the framing system is no greater than 0.2% where measured, *maximum deflection* of the specimen mullions (if used) is no greater than span/180 criteria and did not exhibit any *specimen failure* per section 3.17.

9.3 Post Hydro Static Load Test:

9.3.1 This test is to be performed upon completion of the Hydro Static Load Test and Hydro Dynamic Impact Load Tests.

9.3.2 Apply Post Hydro Static Load at 100% *design flood height* (HD) +/-0.5" for 4-HRS duration.

9.3.3 Measure the total water leakage, the maximum *deflection* and *permanent deformation* upon completion of the test.

9.3.4 The *specimen* is deemed compliant to the Post Hydro Static Load Test requirements if it does not exceed the *maximum leakage rate* specified in section 8.1, the *permanent deformation* of the framing system is no greater than 0.2% where measured, *maximum deflection* of the specimen mullions (if used) is no greater than span/180 criteria and did not exhibit any *specimen failure* per section 3.17.

10. Test Notification

The manufacturer shall notify the Authority Having Jurisdiction seven (7) working days prior to the per- forming of the test. The Authority Having Jurisdiction reserves the right to observe the test. The Authority Having Jurisdiction must be notified of the place and time the test will take place. The test must be recorded on video and retained by the laboratory per TAS 301.

11 Test Report

The following minimum information shall be included in the submitted report:

11.1 Date of the test, date of the report, and the report number.

11.2 The name and address of the requester of the test.

11.3 Identification of the *specimen* (manufacturer, source of supply, dimension, model types, material, procedure of selection and any other pertinent information).

11.4 Detailed drawings of the *specimen* showing dimensioned section profiles, type of framing to which the *specimen* was attached to, panel arrangement, installation and spacing of anchorage, sealants, adhesive, hardware, product markings and their location, and any other pertinent construction details. Any deviation from the drawings or any modifications made to the *specimen* to obtain the reported values shall be noted in the drawings and in the report.

11.5 *Maximum deflection* recorded.

11.6 *Permanent deformation* (identify measurement locations).

11.7 Name, address, signature and seal of Florida professional engineer, witnessing the test and preparing the report.

11.8 The results of the testing shall be reported for each tested *specimen.*

11.9 Result of *leakage* and *deflection/deformation*, as applicable and locations after Hydro Static Load Test.

11.10 Location of dynamic impacts on the test *specimen*.

11.11 Result of *leakage*, *deflection/deformation* after Hydro Dynamic Impacts Load Test.

11.12 Result of *leakage* and *deflection/deformation*, as applicable and locations, after Post Hydro Static Test.

11.13 A description of the condition of the *test specimens* after testing, including details of any damage and any other

pertinent observations.

11.14 A statement that the tests were conducted in accordance with this test protocol.

11.15 A statement of whether, upon completion of all testing, the *specimen* meets the acceptance requirements per Section 8.

11.16 Signatures of persons responsible for supervision of the tests and a list of official observers.

11.17 All data not required herein, but useful for a better understanding of the test results, conclusion, or recommendations, should be appended to the report.

12 Additional Testing

The Authority Having Jurisdiction reserves the right to require any additional testing necessary to assure full compliance with the intent of the *Florida Building Code, Building*.

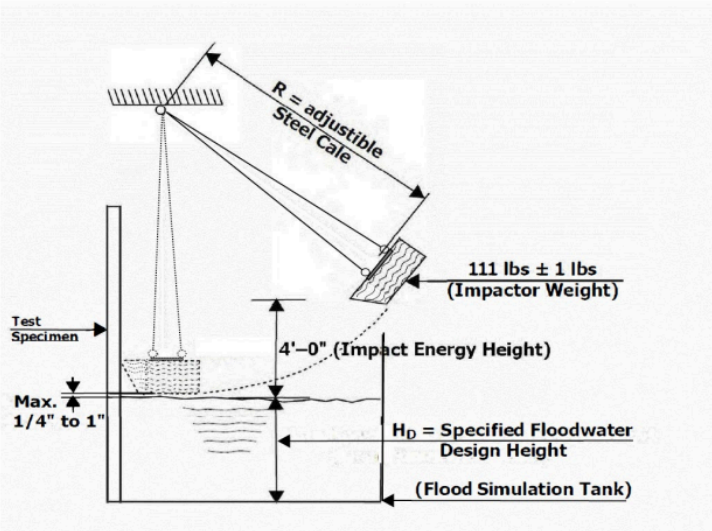
13 Flood Hazards Documentation

Compliance with this standard serves to document flood resistance performance of the tested *specimen* pursuant to FBC 1612.4.

14 Product Marking

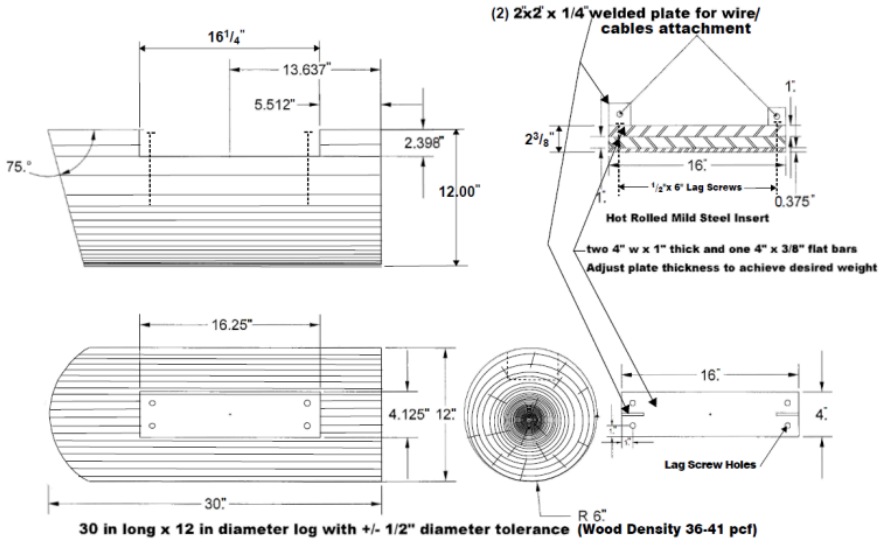
14.1 All approved products shall be permanently labeled with the manufacturer's name, city, state, and the following statement: "Miami-Dade County Product Approved."

14.2 Permanently labeled shall be a metallic label fixed permanently to the frame of the specimen by rivets or permanent adhesive.



Dynamic Impact Test (Flood Debris Impact Load Simulation)

Fig. 1



30 in long x 12 in diameter log with +/- 1/2" diameter tolerance (Wood Density 36-41 pcf)

Weight of Wood Impactor: 67.11 lbs @0.023 lbs/in3
Weight of mild steel plates: 43.74 nominal density 0.284 lbs/in3
Weight of 1/2" x 6" lag bolt to attach steel plates to wood impactor:1.1 lbs (Total of 4)

Fig. 2 (Impactor Design)

SUBMITTED: Rebecca Quinn, obo FDEM Office of Floodplain Management

COMMENT for SP12040, the TAS

At the first TAC meetings the FDEM Office of Floodplain Management representative raised a number of concerns and asked questions about the Miami-Dade proposal to require passive dry floodproofing measures/materials to meet the County's TAS 204 or an "approved flood resistance test." We offer the following for consideration by the TACs before approving the proposal (SB12034) and the TAS (SP12040):

1. What was the make-up of the committee that developed TAS 204 and did it include jurisdictions from other parts of the State where dry floodproofing is common? TAS 204 would be required statewide, unlike most of the TAS which are cited in the High Velocity Hurricane Zone sections of the FBC that apply only to Miami-Dade and Broward.
2. The TAS refers to testing of materials, which is confusing given the FBC defines "flood damage-resistant materials." We think "material" isn't the appropriate term to use for passive measures. It does define "specimen" as "entire assembled unit."
3. The TAS states it is not applicable in Coastal A Zones, which may be appropriate if the test protocol doesn't include moderate waves – but the FBC modifies ASCE 24 to permit dry floodproofing in Coastal A Zones.
4. The TAS defines "floodproofing" based on the NFIP Code of Federal Regulations CFR definition instead of ASCE 24 definition, or the FBC definition "dry floodproofing."
5. The SP12034 proposal requires all passive measures to meet the TAS or "approved flood resistance test." Approved by whom?
6. By requiring all passive measures to meet a test, design professionals would not be able to certify use of ANY untested products, ending +50 years of practice.
7. The TAS footer indicates it is "for HVHZ," yet the SP12034 proposal would be statewide.
8. It's not clear that the TAS could be used for permanently installed flood doors that provide protection every time they are closed.