

Flood-Resistant Provisions of the 2018 IAPMO Codes

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Introduction

This document contains excerpts of the flood-resistant provisions from the 2018 editions of the following IAPMO Uniform Codes:

- Uniform Mechanical Code® (UMC)
- Uniform Plumbing Code® (UPC)
- National Standard Plumbing Code™ (NSPC)
- Uniform Swimming Pool, Spa and Hot Tub Code® (USPSHTC)
- Uniform Solar, Hydronics and Geothermal Code™ (USEHC)



FEMA

2018 Uniform Mechanical Code® (UMC)

Compilation of flood-resistant provisions prepared by FEMA

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Coastal High Hazard Areas. An area within the flood hazard area that is subject to high-velocity wave action, and shown on a Flood Insurance Rate Map or other flood hazard map as Zone V, VO, VE, or V1-30.

Design Flood Elevation. The elevation of the “design flood,” including wave height, relative to the datum specified on the community’s legally designated flood hazard map. In areas designated as Zone AO, the design flood elevation is the elevation of the highest existing grade of the building’s perimeter plus the depth number (in feet) specified on the flood hazard map. In areas designated as Zone AO where a depth number is not specified on the map, the depth number is taken as being equal to 2 feet (610 mm).

Flood Hazard Area. The greater of the following two areas:

1. The area within a floodplain subject to a 1 percent or greater chance of flooding in any given year.
2. The area designated as a flood hazard area on a community’s flood hazard map, or otherwise legally designated.

305.0 Location.

305.2 Flood Hazard Areas. For buildings located in flood hazard areas, heating, ventilating, air-conditioning, refrigeration, miscellaneous heat-producing, and energy-utilizing equipment and appliances shall be elevated at or above the elevation in accordance with the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher.

Exception: Equipment and appliances shall be permitted to be located below the elevation in accordance with the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher, provided that the systems are designed and installed to prevent water from entering or accumulating within their components and the systems are constructed to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to such elevation.

305.2.1 Coastal High Hazard Areas. Mechanical systems in buildings located in coastal high hazard areas shall be in accordance with the requirements of Section 305.2, and mechanical systems, pipes, and appurtenances shall not be mounted on or penetrate through walls that are intended to breakaway under flood loads in accordance with the building code.

305.2.2 Air Exhaust and Intake Openings. Outside air exhaust openings and air intake openings shall be located at or above the elevation required by the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher.

603.0 Installation of Ducts.

603.9 Protection Against Flood Damage. In flood hazard areas, ducts shall be located above the elevation required by the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher, or shall be designed and constructed to prevent water from entering or accumulating within the ducts during floods up to such elevation. Where the ducts are located below that elevation, the ducts shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to such elevation.

607.0 Use of Under-Floor Space as Supply Plenum for Dwelling Units.

607.1 General. An under-floor space shall be permitted to be used as a supply plenum.

607.2 Dwelling Units. The use of under-floor space shall be limited to dwelling units not more than two stories in height. Except for the floor immediately above the under-floor plenum, supply ducts shall be provided extending from the plenum to registers on other floors levels.

Exception: In flood hazard areas, under-floor spaces shall not be used as supply plenums unless the flood opening requirements in the building code are met.

1308.0 Gas Piping System Design, Materials, and Components.

1308.7 Gas Pressure Regulators. *[text not shown]*

1308.7.4 Venting of Line Pressure Regulators. Line pressure regulators shall comply with the following : *[partial shown]*

2. The vent shall be designed to prevent the entry of water, insects, or other foreign material that could cause blockage.
4. At locations where regulators might be submerged during floods, a special antiflood-type breather vent fitting shall be installed, or the vent line shall be extended above the height of the expected flood waters.

1308.13.1 Special Local Conditions. Where local conditions include earthquake, tornado, unstable ground, or flood hazards, special consideration shall be given to increased strength and flexibility of piping supports and connections.

APPENDIX E SUSTAINABLE PRACTICES

E 501.0 Heating, Ventilation, and Air-Conditioning Systems and Equipment – Energy Efficiency.

E 508.0 Installation.

E 508.7 Flood Hazard. Piping located in a flood hazard area shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation.

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Design Flood Elevation. The elevation of the “design flood,” including wave height, relative to the datum specified on the community’s legally designated flood hazard map. In areas designated as Zone AO, the design flood elevation is the elevation of the highest existing grade of the building’s perimeter plus the depth number (in feet) specified on the flood hazard map. In areas designated as Zone AO where a depth number is not specified on the map, the depth number is taken as being equal to 2 feet (610 mm).

Flood Hazard Area. The greater of the following two areas:

1. The area within a floodplain subject to a 1 percent or greater chance of flooding in any given year.
2. The area designated as a flood hazard area on a community’s flood hazard map, or otherwise legally designated.

301.4 Flood Hazard Areas. Plumbing systems shall be located above the elevation in accordance with the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher.

Exception: Plumbing systems shall be permitted to be located below the elevation in accordance with the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher, provided that the systems are designed and installed to prevent water from entering or accumulating within their components, and the systems are constructed to resist hydrostatic and hydrodynamics loads and stresses, including the effects of buoyancy, during the occurrence of flooding to such elevation.

301.4.1 Coastal High Hazard Areas. Plumbing systems in buildings located in coastal high hazard areas shall be in accordance with the requirements of Section 301.4, and plumbing systems, pipes, and fixtures shall not be mounted on or penetrate through walls that are intended to breakaway under flood loads in accordance with the building code.

1208.0 Gas Piping System Design, Materials, and Components.

1208.8 Gas Pressure Regulators. *[text not shown]*

1208.8.4 Venting of Line Pressure Regulators. Line pressure regulators shall comply with all of the following:
[partial shown]

2. The vent shall be designed to prevent the entry of water, insects, or other foreign materials that could cause a blockage.
4. At locations where regulators might be submerged during floods, a special antiflood-type breather vent fitting shall be installed, or the vent line shall be extended above the height of the expected flood waters.

1208.14.1 Special Local Conditions. Where local conditions include earthquake, tornado, unstable ground, or flood hazards, special consideration shall be given to increased strength and flexibility of piping supports and connections.

APPENDIX H. PRIVATE SEWAGE DISPOSAL SYSTEMS

H 101.5 Flood Hazard Areas. Disposal systems shall be located outside of flood hazard areas.

Exception: Where suitable sites outside of flood hazard areas are not available, disposal systems shall be permitted to be located in flood hazard areas on sites where the effects of inundation under conditions of the design flood are minimized.

H 501.11 Structural Design. The structural design of septic tanks shall comply with the following requirements:

1. Each such tank shall be structurally designed to withstand all anticipated earth or other loads. Septic tank covers shall be capable of supporting an earth load of not less than 500 pounds per square foot (lb/ft²) (2441 kg/m²) where the maximum coverage does not exceed 3 feet (914 mm).
2. In flood hazard areas, tanks shall be anchored to counter buoyant forces during conditions of the design flood. The vent termination and service manhole of the tank shall be not less than 2 feet (610 mm) above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or the outflow of the contents of the tanks during conditions of the design flood.

2018 National Standard Plumbing Code™ (NSPC)

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2.31 Plumbing in Flood Hazard Areas

Plumbing in buildings and structures that are located in flood hazard areas shall comply with the requirements of the Authority Having Jurisdiction for the design and construction of utility systems in flood-prone areas.

2018 Uniform Swimming Pool, Spa and Hot Tub Code® (USPSHTC)

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Design Flood Elevation. The elevation of the “design flood,” including wave height, relative to the datum specified on the community’s legally designated flood hazard map. In areas designated as Zone AO, the design flood elevation is the elevation of the highest existing grade of the building’s perimeter plus the depth number (in feet) specified on the flood hazard map. In areas designated as Zone AO where a depth number is not specified on the map, the depth number is taken as being equal to 2 feet (610 mm).

Flood Hazard Area. The greater of the following two areas:

1. The area within a floodplain subject to a 1 percent or greater chance of flooding in any given year.
2. The area designated as a flood hazard area on a community’s flood hazard map, or otherwise legally designated.

Floodway. The channel of a river, creek or other watercourse and the adjacent land areas that shall be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Floodways shall be permitted to be delineated on flood hazard maps.

301.0 General.

301.4 Swimming Pools in Flood Hazard Areas. Where located in flood hazard areas, aboveground swimming pools, inground swimming pools that involve the placement of earthen fill, and onground swimming pools shall comply with this section.

301.4.1 Controls, Equipment, Appurtenances, and Associated Components. Where swimming pools are located in flood hazard areas:

1. Pool controls shall be inside an elevated building or, where located in a non-elevated accessory structure, the controls shall be elevated to or above the design flood elevation.
2. Pool equipment, appurtenances, and other associated components shall either:
 - a. Be elevated and securely anchored to a platform; the height of the platform shall either be at or above the design flood elevation or as high as practical, given limitations on the owner's access.
 - b. Where not elevated, be anchored to prevent flotation and protected to prevent water from entering or accumulating within the components during flooding.
3. Tanks shall either be elevated or anchored to resist anticipated flood loads during conditions of the design flood.

301.4.2 Swimming Pools Located in Floodways. Where swimming pools are located in floodways designated on flood hazard maps, documentation shall be submitted to the Authority Having Jurisdiction that demonstrates that the proposed swimming pool will not increase the design flood elevation at any point within the jurisdiction.

301.4.3 Swimming Pools Located where Floodways have not been Designated. Where swimming pools are located in flood hazard areas where design flood elevations are specified, but floodways have not been designated, the applicant shall provide a floodway analysis that demonstrates that the proposed swimming pool will not increase the design flood elevation more than 1 foot (305 mm) at a point within the jurisdiction.

301.4.4 Swimming Pools Located in Coastal High Hazard Areas. Where pools are located in coastal high hazard areas, swimming pools shall:

1. Be elevated so that the lowest horizontal structural member is elevated to or above the design flood elevation.
2. Be designed and constructed to break away during design flood conditions without producing debris capable of causing significant damage to any structure.
3. Be sited to remain in the ground during design flood conditions without obstructing flow that results in damage to adjacent structures.

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Design Flood Elevation. The elevation of the “design flood,” including wave height, relative to the datum specified on the community’s legally designated flood hazard map. In areas designated as Zone AO, the design flood elevation shall be the elevation of the highest existing grade of the building’s perimeter plus the depth number in feet (m) specified on the flood hazard map. In areas designated as Zone AO where a depth number is not specified on the map, the depth number shall be taken as being equal to 2 feet (610 mm).

Flood Hazard Area. The greater of the following two areas:

1. The area within a floodplain subject to a 1 percent or greater chance of flooding in any given year.
2. The area designated as a flood hazard area on a community’s flood hazard map, or otherwise legally designated.

Solar Energy System Components. Any appliance, assembly, device, equipment, or piping used in the conversion of solar energy into thermal energy for service water heating, pool water heating, space heating and cooling, and electrical service.

302.0 Standards and Alternates.

302.3 Flood Hazard Areas. Systems shall be located above the elevation in accordance with the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher.

Exception: Systems shall be permitted to be located below the elevation in accordance with the building code for utilities and attendant equipment or the elevation of the lowest floor, whichever is higher, provided that the systems are designed and installed to prevent water from entering or accumulating within their components and the systems are constructed to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to such elevation.

302.3.1 Coastal High Hazard Areas. Systems in buildings located in high hazard areas shall be in accordance with the requirements of Section 302.3, and the systems, pipes, tubing, and appurtenances shall not be mounted on or penetrate through walls that are intended to break away under flood loads in accordance with the building code.

302.3.2 Flood Resistant Materials. System components installed in flood hazard areas and below the design flood elevation shall be made of flood damage-resistant materials.

305.0 Installation.

305.9 Structural Design Loads. System components, including building components and attachments, shall be designed and constructed to withstand the following loads in accordance with the building code:

1. Dead loads
2. Live loads
3. Snow loads
4. Wind loads
5. Seismic loads
6. Flood loads
7. Expansion and contraction loads resulting from temperature changes

322.0 Other Systems.

322.2 Duct Systems. Ducts and plenums that are portions of a heating, cooling, absorption or evaporative cooling, or exhaust system shall comply with the requirement of the Mechanical Code.