



City of Charleston

South Carolina

Flood Design Guidance for Elevators in the Special Flood Hazard Area (SFHA)

<p>Location of Equipment</p> <ul style="list-style-type: none">- Equipment must either be elevated to the DFE or use flood resistant construction below the DFE. (2014 ASCE 24-14 §7.1, City Code §27-116 (a)(2))- Specifically, electric boxes, electric control panels, electric conduits and wiring, electric hoist motors and hydraulic pumps/tanks, backup power and emergency systems <u>must</u> be located at or above the DFE. (2014 ASCE 24-14 §7.5)- In the Coastal-A Zone/V-Zone, equipment may not be located on a breakaway wall. (2021 SCRC §R322.3.5, 2014 ASCE 24-14 §4.6.1)	<p>Elevator Pits</p> <ul style="list-style-type: none">- Drainage shall be provided for the elevator pit, such as using a sump pump installed per manufacturer's specifications. Alternative methods include using a trench/channel discharging to an approved drainage location. (2014 ASCE 24-14 §7.5)- Floodplain management regulations do not consider elevator pits to be basements or the building's lowest floor if they are the minimum size necessary and designed in accordance with the requirements of the FEMA Technical Bulletin 4.
<p>Elevator Shafts</p> <ul style="list-style-type: none">- Elevator shafts shall be designed to resist flood loads including hydrostatic, hydrodynamic, and debris impact forces, as well as erosion, scour, and waves. (2014 ASCE 24-14 § 7.5.1, ASCE-7)- <u>Elevator shafts are not required to have flood openings and/or breakaway walls; however, the shaft must be designed to resist flood loads.</u> Structural and architectural plan sets should explicitly state that the shaft has been designed to withstand applicable loads without the use of flood openings and/or breakaway walls. Conversely, if flood openings are provided, they may need to meet fire resistance ratings. (FEMA Technical Bulletin 4, 2014 ASCE 24-14 §7.5.1, ASCE 7)*- In the Coastal-A Zone/V-Zone, elevator shafts with non-breakaway walls causing a potential obstruction must also be certified to cause <u>No Adverse Impact</u>. (FEMA Technical Bulletin 5, 2021 SCRC §R322.3.3 (1), City Code §27-117 (6))	<p>Materials</p> <ul style="list-style-type: none">- Building materials below DFE are required to be flood resistant per FEMA Technical Bulletin 2, such as stainless-steel or marine grade doors. (2021 SCRC §R322.1.8, City Code §27-116 (a)(2))- For hydraulic elevators below the DFE, hole-less hydraulic elevators should be used where cylinders are placed in the shaft sides and do not extend below the pit floor. Additionally, hydraulic lines below the DFE can be painted or coated with galvanic or rust-preventive paint to help prevent corrosion, which is particularly damaging in saltwater conditions. (FEMA Technical Bulletin 4, 2014 ASCE 24-14 §7.5)- For traction elevator systems, most components can be protected from flood damage, except for governor tail cables, which typically must be replaced after flooding. (FEMA Technical Bulletin 4)
<p>Elevator Cabs</p> <ul style="list-style-type: none">- Per FEMA Technical Bulletin 4, elevators servicing areas below the DFE must have a shut-off system (i.e. float switches) or automatic recall programmed to return the cab to a floor above the DFE to prevent an occupied cab from descending into floodwater. (2014 ASCE 24-14 §7.5)	<p>Dry Floodproofing</p> <ul style="list-style-type: none">- Non-residential, commercial, or mixed-use buildings <i>only</i> may use dry floodproofing with flood panels in accordance with FEMA Technical Bulletin 3 to protect elevator shafts and their components. Dry floodproofing is not permitted in residential spaces or for buildings in the Coastal A-Zone/V-Zones. (2021 SCBC §1612, 2014 ASCE 24-14 §6.2, City Code §27-117 (2))

*Note, flood insurance premiums may be higher if elevator shafts do not have flood openings or breakaway walls (FEMA Technical Bulletin 4 Section 4.1).

References

- ❖ American Society of Civil Engineers. *2014 ASCE 24-14: Flood Resistant Design and Construction*, Chapter 7.5: Elevators. [\(Overview\)](#)
- ❖ FEMA National Flood Insurance Program. [*Technical Bulletin 2: Flood Damage-Resistant Materials Requirements.*](#)
- ❖ FEMA National Flood Insurance Program. [*Technical Bulletin 3: Non-Residential Floodproofing – Requirements and Certification.*](#)
- ❖ FEMA National Flood Insurance Program. [*Technical Bulletin 4: Elevator Installation for Buildings Located in Special Flood Hazard Areas.*](#)
- ❖ FEMA National Flood Insurance Program. [*Technical Bulletin 5: Free of Obstruction Requirements for Buildings Located in Coastal High Hazard Areas.*](#)
- ❖ International Code Council. [*2021 South Carolina Residential Code \(SCRC\).*](#)
- ❖ International Code Council. [*2021 South Carolina Building Code \(SCBC\).*](#)