13.6.9 Boilers and Pressure Vessels

Boilers or pressure vessels designed and constructed in accordance with ASME BPVC shall be deemed to meet the force, displacement, and other requirements of this section. In lieu of the specific force and displacement requirements provided in the ASME BPVC, the force and displacement requirements of Sections 13.3.1 and 13.3.2 shall be used. Materials meeting the toughness requirements of ASME BPVC shall be considered high-deformability materials. Other boilers and pressure vessels designated as having an I_p = 1.5, but not designed and constructed in accordance with the requirements of ASME BPVC, shall comply with the requirements of Section 13.6.11.

13.6.10 Elevator and Escalator Design Requirements

Elevators and escalators designed in accordance with the seismic requirements of ASME A17.1 shall be deemed to meet the seismic force requirements of this section, except as modified in the following text. The exceptions of Section 13.6.8.3 shall not apply to elevator piping.

13.6.10.1 Escalators, Elevators, and Hoistway Structural System

Escalators, elevators, and hoistway structural systems shall be designed to meet the force and displacement requirements of Sections 13.3.1 and 13.3.2.

13.6.10.2 Elevator Equipment and Controller Supports and Attachments

Elevator equipment and controller supports and attachments shall be designed to meet the force and displacement requirements of Sections 13.3.1 and 13.3.2.

13.6.10.3 Seismic Controls for Elevators

Elevators operating with a speed of 150 ft/min (46 m/min) or greater shall be provided with seismic switches. Seismic switches shall provide an electric signal indicating that structural motions are of such a magnitude that the operation of the elevators may be impaired. Seismic switches in accordance with Section 8.4.10.1.2 of ASME A17.1 shall be deemed to meet the requirements of this section.

EXCEPTION: In cases where seismic switches cannot be located near a column in accordance with ASME A17.1, they shall have two horizontal axes of sensitivity and have a trigger level set to 20 percent of the acceleration of gravity where located at or near the base of the structure and 50 percent of the acceleration of gravity in all other locations.

Upon activation of the seismic switch, elevator operations shall conform to requirements of ASME A17.1, except as noted in the following text.

In facilities where the loss of the use of an elevator is a life-safety issue, the elevator shall only be used after the seismic switch has triggered provided that:

1. The elevator shall operate no faster than the service speed.
2. Before the elevator is occupied, it is operated from top to bottom and back to top to verify that it is operable.

13.6.10.4 Retainer Plates

Retainer plates are required at the top and bottom of the car and counterweight.

13.6.11 Other Mechanical and Electrical Components

Mechanical and electrical components, including conveyor systems, not designed and constructed in accordance with the reference documents in Chapter 23 shall meet the following:

1. Components, their supports and attachments shall comply with the requirements of Sections 13.4, 13.6.3, 13.6.4, and 13.6.5.
2. For mechanical components with hazardous substances and assigned a component importance factor, I_p, of 1.5 in accordance with Section 13.1.3, and for boilers and pressure vessels not designed in accordance with ASME BPVC, the design strength for seismic loads in combination with other service loads and appropriate environmental effects shall be based on the following material properties:
   a. For mechanical components constructed with ductile materials (e.g., steel, aluminum, or copper), 90 percent of the minimum specified yield strength.
   b. For threaded connections in components constructed with ductile materials, 70 percent of the minimum specified yield strength.
   c. For mechanical components constructed with nonductile materials (e.g., plastic, cast iron, or ceramics), 10 percent of the material minimum specified tensile strength.
   d. For threaded connections in components constructed with nonductile materials, 8 percent of the material minimum specified tensile strength.