

15.3.2 Greater Than or Equal to 25 Percent Combined Weight Condition

For the condition where the weight of the nonbuilding structure is equal to or greater than 25 percent of the combined effective seismic weights of the nonbuilding structure and supporting structure, an analysis combining the structural characteristics of both the nonbuilding structure and the supporting structures shall be performed to determine the seismic design forces as follows:

1. Where the fundamental period, T , of the nonbuilding structure is less than 0.06 s, the nonbuilding structure shall be considered a rigid element with appropriate distribution of its effective seismic weight. The supporting structure shall be designed in accordance with the requirements of Chapter 12 or Section 15.5 as appropriate, and the R value of the combined system is permitted to be taken as the R value of the supporting structural system. The nonbuilding structure and attachments shall be designed for the forces using the procedures of Chapter 13 where the value of R_p shall be taken as equal to the R value of the nonbuilding structure as set forth in Table 15.4-2, and a_p shall be taken as 1.0.
2. Where the fundamental period, T , of the nonbuilding structure is 0.06 s or greater, the nonbuilding structure and supporting structure shall be modeled together in a combined model with appropriate stiffness and effective seismic weight distributions. The combined structure shall be designed in accordance with Section 15.5 with the R value of the combined system taken as the lesser R value of the nonbuilding structure or the supporting structure. The nonbuilding structure and attachments shall be designed for the forces determined for the nonbuilding structure in the combined analysis.

15.3.3 Architectural, Mechanical, and Electrical Components

Architectural, mechanical, and electrical components supported by nonbuilding structures shall be designed in accordance with Chapter 13 of this standard.

15.4 STRUCTURAL DESIGN REQUIREMENTS

15.4.1 Design Basis

Nonbuilding structures having specific seismic design criteria established in reference documents shall be designed using the standards as amended

herein. Where reference documents are not cited herein, nonbuilding structures shall be designed in compliance with Sections 15.5 and 15.6 to resist minimum seismic lateral forces that are not less than the requirements of Section 12.8 with the following additions and exceptions:

1. The seismic force-resisting system shall be selected as follows:
 - a. For nonbuilding structures similar to buildings, a system shall be selected from among the types indicated in Table 12.2-1 or Table 15.4-1 subject to the system limitations and limits on structural height, h_n , based on the seismic design category indicated in the table. The appropriate values of R , Ω_o , and C_d indicated in the selected table shall be used in determining the base shear, element design forces, and design story drift as indicated in this standard. Design and detailing requirements shall comply with the sections referenced in the selected table.
 - b. For nonbuilding structures not similar to buildings, a system shall be selected from among the types indicated in Table 15.4-2 subject to the system limitations and limits on structural height, h_n , based on seismic design category indicated in the table. The appropriate values of R , Ω_o , and C_d indicated in Table 15.4-2 shall be used in determining the base shear, element design forces, and design story drift as indicated in this standard. Design and detailing requirements shall comply with the sections referenced in Table 15.4-2.
 - c. Where neither Table 15.4-1 nor Table 15.4-2 contains an appropriate entry, applicable strength and other design criteria shall be obtained from a reference document that is applicable to the specific type of nonbuilding structure. Design and detailing requirements shall comply with the reference document.
2. For nonbuilding systems that have an R value provided in Table 15.4-2, the minimum specified value in Eq. 12.8-5 shall be replaced by

$$C_s = 0.044S_{DS}I_e \quad (15.4-1)$$

The value of C_s shall not be taken as less than 0.03.

And for nonbuilding structures located where $S_1 \geq 0.6g$, the minimum specified value in Eq. 12.8-6 shall be replaced by

$$C_s = 0.8S_1/(R/I_e) \quad (15.4-2)$$

EXCEPTION: Tanks and vessels that are designed to AWWA D100, AWWA D103, API