

Table C15-1 Standards, Industry Standards, and References

Application	Reference
Steel storage racks	RMI
Welded steel tanks for water storage	ACI 371R, AWWA D100
Welded steel tanks for petroleum and petrochemical storage	API 620, API 650, API 653, Wozniak and Mitchell (1978)
Bolted steel tanks for water storage	AWWA D103
Bolted steel tanks for petroleum and petrochemical storage	API 12B
Concrete tanks for water storage	ACI 350.3, AWWA D110, AWWA D115
Pressure vessels	ASME BPVC
Refrigerated liquids storage:	
Liquefied natural gas	NFPA 59A
Concrete silos and stacking tubes	ACI 313
Petrochemical structures	ASCE (1997b)Seismic Guidelines [Ref. C15.1]
Impoundment dikes and walls:	
Liquefied natural gas	NFPA 59A
General	ASCE (1997a)Design of Secondary Containment [Ref. C15.2]
Guyed steel stacks and chimneys	Troitsky (1990)

Some of the standards listed are not consensus documents. As done in Chapter 13, the standards have been divided into “Consensus Standards” and “Accepted Standards.” Several “Industry References” are listed in the commentary.

Many of the referenced standards contain seismic design provisions, appropriate design stress levels, or both for the particular nonbuilding structure. In many cases, the proposed revisions to Chapter 15 modify these requirements found in the industry standards. A summary of some of the changes are shown in the following text:

API 620, API 650, AWWA D100, AWWA D103, AWWA D110, AWWA D115, and ACI 350.3 all have seismic requirements based on earlier editions of seismic codes (Mean Recurrence Interval [MRI] = 475 years) and all are working stress design based. The proposed revisions to ASCE 7 provide working stress-based substitute equations for each of these industry standards to bring the seismic design force level up to speed with that required in the NEHRP document.

NFPA 59A has seismic requirements considerably in excess of ASCE 7. ASCE 7 provides analysis methods that can augment this industry standard.

Other standards, such as NFPA 30 and API 2510, provide guidance on safety, plant layout, and so forth. These documents have significant impact on the actual level of risk to which the general public is exposed.

All nonbuilding structures supported by other structures were contained in Chapter 13 of previous

editions of ASCE 7. Significant nonbuilding structures (where the weight of nonbuilding structure equals or exceeds 25 percent of the combined weight of the nonbuilding structure and the supporting structure) cannot be analyzed or designed for seismic forces independent of the supporting structure. The requirements of Section 9.14 are more appropriate for the design of these combined systems.

C15.4.4 Fundamental Period

Nonbuilding structures that are similar to buildings may use the equations for approximate period found in Section 12.8.2 when these structures are truly similar to buildings incorporating floor and roof diaphragms, wall cladding, and a reasonably uniform distribution of mass throughout the structure. The limitation on period found in Table 12-6 is not appropriate for nonbuilding structures even if the structures are truly similar to buildings.

C15.4.9.3 Post-Installed Anchors in Concrete and Masonry

Post-installed anchors in concrete and masonry should be qualified for seismic loading through appropriate testing. The requisite tests for expansion and undercut anchors in concrete are given in the ACI standard ACI 355.2, *Qualification of Post-Installed Mechanical Anchors in Concrete and Commentary*. Testing and assessment procedures based on the ACI standard that address expansion, undercut, screw, and adhesive anchors are incorporated in ICC-ES acceptance criteria AC193, *Acceptance*