## Code Requirements

What follows is a detailed chart developed by Steel Tank Institute's executive vice president, Wayne Geyer, P.E. Fire codes play a prominent role in tank purchase decisions. As such, it's important to know which codes apply to your particular situation and how you will be affected by these varied and complex codes. Mr. Geyer has boiled down the volumes of code details into the easy-to-use chart below.

### Code Requirements on Aboveground Storage Tanks Dispensing Fuels At Motor Vehicle Fuel-Dispensing Stations

#### Approval/General Provisions

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| Tanks located aboveground at automotive service stations must have approval of AHJ and installed in accordance with Sections 2–4.[1,2] | Aboveground tanks shall be permitted for the storage of motor fuels on premises to which the public does not have access when installed in accordance with and complementary to Section 32 and the requirements for fire resistant tanks or tanks in vaults specified in NFPA 30A (1996 edition). |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| When approved by the Fire Official, aboveground tanks may be used at service stations not open to the public. Installation shall be in accordance with NFPA #30A (1993 edition). | The dispensing of Class I and Class II liquids into motor vehicles from aboveground tanks is prohibited, except that dispensing from special enclosures and, when approved, from protected tanks and below grade vaults is allowed when underground tanks are impractical. However, Appendix II-K, which establishes requirements for dispensing from nonprotected tanks at private motor vehicle fuel dispensing stations is accepted when installed in districts or zones established by the jurisdiction or in approved locations. |

## Terminology

### NFPA 30A 1996 EDITION

**Fire Resistant Tank (Protected Tank)**
Fire Resistant Tank that provides the required fire resistive protection, shall prevent release of liquid, failure of the primary tank, failure of the supporting structure, and impairment of venting for 2 hours using the fire exposure environment described in UL 2085 or equivalent.

**Vault**
NFPA 30A has elaborate language defining requirements. The vault must completely enclose each tank, either above or below grade, with at least 6" of concrete. The vault must have continuous ventilation, secured against unauthorized entry, and be equipped with a liquid detection system.

### BOCA 1999 EDITION

**Fire Resistant Tank**
References NFPA 30A, 1996 edition.

**Special Enclosures**
Constructed per NFPA 30A.

### SBCCI / SFPC 1996 EDITION

**Fire Resistant Tank (Protected Tank)**
References NFPA 30A (1993 edition)

**Special Enclosure**
Constructed per NFPA 30A. (1993 edition)

### UFC, 1997 EDITION 1998/9 SUPPLEMENTS

**Protected Tank**
Tank system consisting of a primary tank protected from physical damage and from high intensity liquid pool fire exposure. The system must be listed, labeled, and meet requirements of UFC Standard 79.7 “Requirements for Protected Aboveground Tanks.” Two hour fire exposure, average thermocouple not to exceed 260°F with 400°F individual thermocouple maximum. Structural integrity maintained and emergency venting operational. Post fire hose stream and leak test.

**Special Enclosure**
Tank enclosed by 6" of liquid tight, vapor tight concrete.

**Nonprotected Tank**
Tank systems must be listed, labeled, and designed in accordance with 7902.1.8.2, UL 142, and Appendix II-K.

**Vaulted Tank**
Vaults shall be listed in accordance with UL 2245 or, when approved, constructed on-site, and the design shall bear the stamp of a PE. Vaults shall be constructed in accordance with the UBC and 7902.1.10.[3]

## Installation

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| Per NFPA 30 (references PEI RP200-92, *Recommended Practices for Installation of Aboveground Storage Systems for Motor Vehicle Fueling*) | All fuel-dispensing systems shall be installed in accordance with the mechanical code and NFPA 30 or 30A listed in Chapter 44. |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| Per NFPA 30 (references PEI RP200-92, *Recommended Practices for Installation of Aboveground Storage Systems for Motor Vehicle Fueling*) | Fuel dispensing systems are to be installed in accordance with Article 52 which incorporates all the motor vehicle service station controls. However, nonprotected tank installation must comply with Appendix II-K requirements also. |

## Maximum Capacities

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| 12,000 gal individual/public & private[1,2]<br><br>40,000 gal aggregate<br><br>Tanks storing Class II and Class IIIA liquids at fleet vehicle fueling facilities are limited to 20,000 gallon individual and 80,000 gallon aggregate | 6,000 gal individual/private<br><br>18,000 gal aggregate |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| 12,000 gal individual/public & private[1,2]<br><br>40,000 gal aggregate | 12,000 gal individual/public and private: protected tank<br>15,000 gal individual/public and private: vaulted tank (Each vault may contain only one tank, but may share common walls.)<br>48,000 gal aggregate protected tank[3]<br>6,000 gal individual/private nonprotected tank<br>18,000 gal aggregate nonprotected |

## Spill Prevention

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| Containment/spill control per NFPA 30, 1993 edition<br><br>Overfill — alarm at 90% capacity & shut-off at 95%[4] | Tanks shall be provided with automatic fuel shutoff devices capable of stopping the delivery of fuel into the storage tank at a 90% tank capacity |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| Containment/spill control per NFPA 30<br><br>Overfill — alarm at 90% capacity & shut-off at 95%[4] | Containment — 5 gal capacity or greater<br><br>Overfill — alarm at 85% capacity and shut-off at 90% |

## Secondary Containment

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| An exception to diking or remote impounding in NFPA 30, section 2-3.4.1 is given to secondary containment tanks of capacity of 12,000 gallons or less. Means shall be provided to prevent release of liquid by siphon flow, and with all openings at the top of the tank. Means to determine the level of liquid during deliveries, and to meet spill prevention requirements are noted herein. Enclosed secondary containment shall be provided with emergency vents.[5] The interstitial space shall be tested with air pressure or vacuum to assure integrity. | |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| References NFPA 30A (1993) | Protected ASTs shall be provided with drainage or diking per Section 7901-8 & 7902.2.8 or with secondary containment that is a component of the listed protected or nonprotected aboveground tank. Enclosed secondary containment shall be provided with emergency relief vents. |

## Separation Distance

### NFPA 30A 1996 EDITION

**Uninsulated Tanks/Private & Public (UL 142)[1]:**
- 100’ from property line
- 50’ from buildings on same property
- 50’ from fuel dispensers
- 50’ from nearest side of public way

**Fire Resistant Tanks/Public (Protected Tank):**
- 50’ from property line
- 25’ from buildings on same property[6]
- 25’ from fuel dispensers

**Tanks in Vaults/Public (Uninsulated):**
- 50’ from property lines
- 25’ from buildings on same property[6]
- 25’ from fuel dispensers

**Fire Resistant Tanks and Tanks in Vault/Private:**
- Same as with public facilities, except dispenser can be mounted directly atop tank/vault

### BOCA 1999 EDITION

**Fire Resistant Tanks or Tanks in Vaults at Facilities Where the Public Does Not Have Access:**
- 50’ from property lines
- 25’ from buildings on same property
- 25’ from fuel dispensers
- 25’ from nearest side of public way
- 3’ between tank assemblies
- 100’ between 18,000 gallon aggregates
- Dispensing devices can be mounted directly atop tank

**ASTs at Facilities Where the Public Has Access:**
- Not permitted

### SBCCI / SFPC 1996 EDITION

**Uninsulated Tanks/Private (UL 142)[1]:**
- 100’ from property line
- 50’ from buildings on same property
- 50’ from fuel dispensers
- 50’ from nearest side of public way

**Fire Resistant Tanks/Private (Protected Tank):**
- 50’ from property line
- 25’ from buildings on same property[4]
- 25’ from fuel dispensers

**Tanks in Vaults/Private (Uninsulated):**
- 50’ from property lines
- 25’ from buildings on same property[4]
- 25’ from fuel dispensers

**ASTs at Retail Facilities:**
- Not permitted

### UFC, 1997 EDITION 1998/9 SUPPLEMENTS

**Protected Tank**
Less than 6,000 gallons
- 15’ from property line
- 5’ from building or public way
- 3’ between each tank

More than 6,000 gallons
- 25’ from property line
- 25’ from building or public way
- 3’ between each tank
- 100’ between 40,000 gallon aggregates
- Dispensing devices can be mounted directly atop any protected tank regardless of capacity

**Nonprotected Tank**
100’ from property line
100’ from building or public way
3’ between each tank
100’ between 18,000 gallon aggregates
50’ from dispensing devices

Vaulted tanks shall be located no less than 3’ from property lines, walls of basements, and may not be located under buildings.

## Piping

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| • Openings in tank top only[5]<br>• Expansion relief devices and anti-siphon devices required<br>• Route piping to minimize exposure from damage<br>• Listed emergency shut-off valves at dispensers where submersible pumps are used<br>• Anti-siphon (Solenoid valve(s)) at tank outlet(s) at tank which produce a “gravity head” at the dispenser<br>• Listed automatic shutoff shear valves to be rigidly anchored in each supply line at dispenser. | • Openings in tank top only<br>• Anti-siphon devices required<br>• Additional piping requirements per NFPA 30A, 1996 edition, for instance, piping shall be located so as to be protected from damage. |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| • Openings in tank top only<br>• Expansion relief devices and anti-siphon devices required<br>• Route piping to minimize exposure from damage<br>• Listed emergency shut-off valves at dispensers where submersible pumps are used<br>• Anti-siphon (Solenoid valve(s)) at tank outlet(s) at tank which produce a “gravity head” at the dispenser<br>• Listed automatic shutoff shear valves to be rigidly anchored in each supply line at dispenser. | • Openings in tank top only<br>• Anti-siphon devices required<br>• Guardposts for connected piping subject to vehicle impact<br>• Installed in accordance with Article 52 & 79 which addresses construction, corrosion, supports, joints, etc. |

## Physical Protection

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| 6’ high security fence located at least 10’ from tank and a gate that is properly secured against unauthorized entry. In addition, provide protection against vehicular collision by suitable barriers. | Barrier protection: Guard posts within 3’ from the tank spaced 4’ on centers and minimum 30" height to withstand 12,000 pound force. |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| 6’ high security fence located at least 10’ from tank and a gate that is properly secured against unauthorized entry. In addition, provide protection against vehicular collision by suitable barriers. | No security fence required. Guard posts within 5’ of tank, spaced no more than 4’ on center, not less than 3’ in height, constructed of not less than 4" diameter steel and concrete filled. Note: Vaults shall include means to remove liquid and be properly ventilated. |

## Tank Filling Operations

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| Separation of delivery vehicle by 25’ for Class I and 15’ for Class II or Class III liquids except gravity feed with underground (UG) vaults enables 0’ separation from tank. Liquid tight connection options. | No minimum separation distance of delivery vehicles from tanks specified.<br><br>Transfer via fixed pumps designed to prevent leakage. |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| Separation of delivery vehicle by 25’ except gravity feed with underground (UG) vaults enables 0’ separation from tank. Liquid tight connection options. | Separation of 25’ from parked tank vehicles except when the tank is being filled from the vehicle, except 0’ separation using gravity feed.<br><br>Fill pipe shall be provided with a means of making a direct connection. |

## Miscellaneous

| NFPA 30A<br>1996 EDITION | BOCA<br>1999 EDITION |
|---|---|
| Requirements for fuel dispensing devices, electrical equipment, vapor recovery and processing systems, and operational requirements.<br><br>Testing provisions of secondary containment are given.<br><br>Listed automatic-close nozzles required.<br><br>Special chapter on marine service stations. | Requirements for fuel dispensing devices, electrical equipment, vapor recovery and processing systems, and operational requirements. |
| **SBCCI / SFPC<br>1996 EDITION** | **UFC, 1997 EDITION<br>1998/9 SUPPLEMENTS** |
| Requires plans to be submitted for permit application incorporating details on vehicle access, seismic design, secondary containment, venting and vapor recovery, emergency controls which are required by the Fire Official. It appears the fire official would use their judgement to assess whether these requirements are adequate as no guidance language is given.<br><br>Existing language for dispensing and controls remains. | Requirements for fuel dispensing, electrical equipment, vapor recovery, operation, labeling, signage, and permits. When subject to external corrosion, ASTs must be coated, provided with corrosion protection, or made from non-corrosive materials. |

**Footnotes**

(1) Section 9-3.5 enables tanks up to 6,000 gallon / 12,000 aggregate to be installed at private fleet facilities and separated per Tables 2-6 and 2-7 in NFPA 30. New installations must follow section 2-4.

(2) When installation of tanks is impractical because of property or building limitations, tanks may be installed in buildings when enclosed within 6" of concrete (special enclosures) which is liquid and vapor tight. Tanks in parking facilities of large buildings storing Class I liquids are limited to 6,000 gallon / 18,000 aggregate.

(3) Special enclosure maximum capacities are 6,000 / 18,000 gallons respectively.

(4) This provision is only required on fire resistant tanks and on secondary containment type tanks when provisions of 2-3.4.1 of NFPA 30 are met for control of spillage.

(5) Emergency vents are also required for each a) tank compartment, b) an enclosed space of a closed top dike construction, and c) other spaces or enclosed volumes, such as those intended for insulation, membrances or weather shields, that can contain liquid because of a leak from the primary vessel and can inhibit venting during exposure.

(6) Includes 25 feet from nearest side of a public way.

Source: Steel Tank Institute, April, 1999