



PHOENIX FIRE CODE SUMMARY

Aboveground Storage Tanks for Motor Vehicle Fuel Dispensing

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| REFERENCE FIRE CODE SECTION | Phoenix Fire Code – Chapters 22, 27, 34, and NFPA 30 and 30A, 2003 editions as adopted and amended by the City of Phoenix. |
| SCOPE OF THIS FIRE CODE SUMMARY | An explanation of the hazards of flammable and combustible liquid storage and the City of Phoenix requirements for constructing, installing and operating an aboveground storage tank and dispenser(s) installed at grade outside of a building. |

HAZARDS OF FUEL STORAGE

The primary hazards of any aboveground fuel storage and fuel dispensing activities are ensuring that the system is liquid tight, limiting the potential for spills and that the storage tank is properly constructed. The violations most commonly identified are aboveground fuel storage tanks (ASTs) that are not equipped with the proper emergency venting or the AST is not listed. An AST without an emergency vent represents a serious risk to firefighters because if the tank is subjected to the energy of a pool or exposure fire, a pressure explosion could result.

COMMONLY USED HAZARDOUS MATERIALS AND THEIR CLASSIFICATION

Unleaded gasoline and diesel fuel are the most common motor vehicle fuels. Gasoline, regardless of octane rating, has a Chemical Abstract Service (CAS) Number 8006-61-9 and is classified as a Class I-B Flammable Liquid. Gasoline has the following NFPA 704 hazard ratings: Health: 1, Flammability: 3, Reactivity: 0, Special Hazards: Blank. Diesel fuel is assigned CAS Number 62435-54-2 and is classified as a Class II Combustible Liquid. Diesel fuel has the following NFPA 704 hazard ratings: Health: 1, Flammability: 2, Reactivity: 0, Special Hazards: Blank.

SUMMARY OF FIRE CODE REQUIREMENTS

1. **Phoenix Fire Code Requirements.** Chapter 22 of the Phoenix Fire Code and NFPA 30 A has requirements for Motor Fuel Dispensing. Chapter 34 of the Phoenix Fire Code and NFPA 30 has requirements for the storage and handling of Flammable and Combustible Liquids. Chapter 27 of the Phoenix Fire Code has requirements for the storage, use and handling of hazardous materials. The following summarizes the requirements for the construction and installation of the fuel tank and piping system as well as the dispensing operation.

1.1. Fuel Storage Tank - Construction

1.1.1. The tank shall bear a permanent nameplate or marking indicating the standard used as a basis for design. At a minimum, atmospheric storage tanks shall be labeled as being constructed using Underwriters Laboratories 142, Standard for the Construction for Steel Flammable & Combustible Liquid Storage Tanks. Fire-Resistant Tanks shall be labeled as being constructed to Underwriters Laboratories 2080 Standard for Fire-Resistant Tanks for Flammable and Combustible Liquids. Protected aboveground storage tanks shall be labeled as being constructed to Underwriters Laboratories 2085 Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids. (PFC 3404.2.7).

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- 1.1.2. The tank nameplate shall state the required flow rate for the emergency vent. If a tank is constructed with integral secondary containment, the nameplate shall indicate the required flow rate for the primary and secondary containment tank. (UL 142, Section 43.6).

1.2. Fuel Storage Tank – Secondary Containment

- 1.2.1. Secondary containment is required for aboveground AST in accordance with PFC 2704.2.
- 1.2.2. The permit applicant shall submit plans for the secondary containment system to PFD that demonstrate the design meets PFC 2704.2.2.3, Indoor Design for Secondary Containment or PFC 2704.2.2.4, Outdoor Design for Secondary Containment.

(NOTE: Tanks labeled as “Secondary Containment Tanks” or “Integral Secondary Containment” do not require additional secondary containment.)

1.3. Fuel Storage Tank – Normal Vent

- 1.3.1. The tank normal vent shall be terminated outside of the building. The vent shall be terminated at least 12 feet above grade, 5 feet from property lines and 5 feet from building openings. (PFC 3404.2.7.3.3)
- 1.3.2. Normal vents shall be installed so they will drain toward the tank without traps in which liquids can collect. The normal vent shall not be subject to physical damage or vibration. (PFC 3404.2.7.3.4)
- 1.3.3. The minimum required diameter of a normal vent is 1 ¼ -inch. (NFPA 30, Section 4.2.5.1.2)

1.4. Fuel Storage Tank – Emergency Vent

- 1.4.1. An emergency vent shall be provided for the primary tank and when provided, the secondary containment tank except ASTs larger than 12,000 gallons which contain Class III-B liquids. (PFC 3404.2.7.4)
- 1.4.2. Emergency vents shall be the commercially produced type that is stamped at the factory to indicate its flow rate and opening pressure. (PFC 3404.2.7.4.3)
- 1.4.3. The flow rate of the emergency vent shall be equal to or exceed the flow rate specified on the tank nameplate which was calculated using NFPA 30 Table 4.2.5.2.3 and PFC 3404.2.7.4.2.
- 1.4.4. In instances where the tank manufacturer desires to use the flow rate of the normal and the emergency vent to satisfy the minimum emergency vent flow rate, the normal vent shall be stamped to indicate its flow rate. (PFC 3404.2.7.4.2)

1.5. Fuel Storage Tank – Tank Openings Other Than Vents

- 1.5.1. For top-loaded tanks, a metallic fill pipe fill pipe shall be installed to minimize the generation of static electricity by terminating the pipe within 6-inches of the bottom of the tank, and shall be installed in such a manner that avoids excessive vibration. (PFC 3404.2.7.5.5)



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- 1.5.2. When a fill pipe extends below the liquid level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12 inches from the fill hose connection. (PFC 2206.6.2.2)
- 1.5.3. An approved antisiphon method shall be provided in the piping system to prevent flow of liquid by siphon action. (PFC 2206.6.2.4)
- 1.5.4. Protected ASTs shall be equipped with overfill prevention that prevents the tank from being filled in excess of 95% of its capacity. Overfill Prevention shall be in accordance with PFC 3404.2.9.6.6
- 1.5.5. ASTs used for Motor Fuel Dispensing shall be provided with a spill container having a capacity of not less than 5 gallons for each tank fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain valve that drains into the primary tank. For tanks with a remote fill connection, a portable spill container is allowed. (PFC 2206.6.2.6)
- 1.5.6. ASTs with a volume of 500 gallons or more and any tank inside a buildings shall be equipped with overfill prevention. (PFC 3404.2.7.5.8)

1.6. Fuel Storage Tank – Location

- 1.6.1. The location of aboveground storage tanks shall meet the distance requirements in PFC Table 2206.2.3):

| Class of Liquid and Tank Type | Tank Capacity in gallons | Minimum Distance to Buildings in feet | Minimum Distance to Property Lines in feet. | Minimum Distance to Nearest Dispenser in feet. |
|--|----------------------------|---------------------------------------|---|--|
| Class I Liquids in Protected ASTs and Tanks in Vaults | Less than or equal to 6000 | 5 | 15 | 25 |
| | Greater than 6000 | 15 | 25 | 25 |
| Class II and III Liquids in Protected ASTs and Tanks in Vaults | Same as Class I | Same as Class I | Same as Class I | Same as Class I |
| Other Tanks | All | 50 | 100 | 50 |

- 1.6.2. At Fleet Vehicle Motor Fuel Dispensing Facilities, no minimum separation shall be required between the dispenser and a tank in a vault, a protected tank or a fire-resistant tank. (NFPA 30A, Section 4.3.2.6)

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1.7. Fuel Storage Tank – Support Columns

- 1.7.1. If the Aboveground Tank is elevated more than 12 inches above grade, supports or columns shall have a fire-resistant rating of not less than 2 hours in accordance with the fire exposure criteria specified in ASTM E 1529. (PFC 3404.2.9.1.3)

1.8. Installation of Motor Vehicle Fuel Dispensers

- 1.8.1. Dispensing devices shall be located in accordance with PFC 2203.1:
 - 1.8.1.1. 10 feet or more from property lines.
 - 1.8.1.2. 10 feet or more from buildings having combustible exterior wall surfaces or noncombustible wall surfaces without a fire resistance rating.
 - 1.8.1.3. The dispenser shall be located such that when the hose and nozzle is fully extended, it will not reach within 5 feet of building openings.
 - 1.8.1.4. Twenty feet or more from fixed sources of ignition.
- 1.8.2. Dispensers shall be protected against physical damage. (PFC 2206.7.3)
- 1.8.3. Emergency shutdown devices (ESDs) shall be provided for all fuel dispensers. ESDs shall be located within 100 feet, but not less than 20 feet from dispensers. Activation of an ESD shall stop the transfer of fuel to the dispensers and close all valves that supply fuel to the dispensers. (PFC 2203.2)
- 1.8.4. Dispenser hoses shall be listed for use with flammable or combustible liquids and shall not exceed 18 feet in length. (PFC 2206.7.5)
- 1.8.5. Dispenser hoses for Class I and II liquids shall be equipped with a listed emergency breakaway device in accordance with PFC 2206.7.5.1.
- 1.8.6. Fuel Delivery Nozzles shall have a listed automatic closing-type hose nozzle. (PFC 2206.7.6)

1.9. Other PFC Requirements

- 1.9.1. The tank cannot be filled or placed in service until it is inspected and approved by the Phoenix Fire Department
- 1.9.2. ASTs more than 100 gallons in capacity shall bear a label and placard identifying the contents in accordance with NFPA 704. (IFC 3404.2.3.2)
- 1.9.3. Provide impact protection if the above ground storage tank is located in an area subject to vehicle traffic. (IFC 3403.6.4)
- 1.9.4. Unattended self-service motor fuel dispensing facilities shall comply with PFC 2204.3.
- 1.9.5. Dispensing equipment used at unsupervised locations shall either be: programmed or set to limit uninterrupted fuel delivery to 25 gallons and require a manual action to resume delivery **OR** the amount of fuel being dispensed shall be limited in quantity by a preprogrammed card as approved. (PFC 2204.3.7)



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- 1.9.6. Unattended self-service motor fuel dispensing facilities shall post an approved Emergency Procedures sign in a conspicuous location in accordance with PFC 2204.3.4.

REQUIRED FIRE CODE PERMITS

The following permits are required for ASTs used to store Flammable or Combustible liquids and used for motor vehicle fuel dispensing:

- ❑ A PFD construction permit is required when installing an aboveground storage tank. (PFC 105.7.11) Before this permit can be issued, a minimum of two sets of tank shop drawings and site plans shall be submitted to the Fire Department for review and approval. The drawings shall include a design detail illustrating the location of the emergency shutoff devices. Include equipment data sheets for the transfer pump, dispenser, hose, nozzles, dispenser shear valve and any other components installed on the tank or dispenser. For dispensers installed remotely from the tank, provide the pipe specification, diameter, wall thickness, and the methods of assembly, support, and testing (e.g., pneumatic or hydrostatic, test pressure, duration and medium). The plan review deposit fee is \$200 and the construction permit fee for one tank is \$450.00. (PFC Table 4605.13)
- ❑ The building owner or tenant is required to obtain a Flammable/Combustible Liquids Storage, Handling and Use permit. The permit application and Hazardous Materials Inventory Statement is available at Fire Department Headquarters, Fire Prevention Division located at 150 S. 12th Street. The permit application and fee schedule is available on-line at www.phoenix.gov/fire/shu.html and click on "Hazardous Materials Application." (PFC 105.6.14)
- ❑ The following is the permit fee and the annual assessment fee for Flammable/Combustible Liquids Storage, Handling and Use permits issued to owners of ASTs that contain Class I, II or III-A liquids:

| Number of Tanks | Annual Assessment Fee |
|-----------------|--|
| 1 | \$550.00 |
| 2 or more | \$550.00 + \$125.00 for each additional tank |

OTHER REQUIRED CITY OF PHOENIX PERMITS

Installation of an electrical system to provide power to pumps or dispensers requires a plan review and construction permit issued by the Development Services Department.

The fee for the construction permit is calculated using the value of the project, building, or area. To obtain an accurate fee calculation, contact the Development Services Department Business Customer Service Center at 602-534-2000.

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HOW CAN I OBTAIN MORE INFORMATION?

If this fire code summary does not answer your questions, please feel free to contact one of the Special Hazards Unit Fire Captains at 602-262-6771. E-mail inquiries can be sent to special.hazards.unit@phoenix.gov

Requests for information about Building, Plumbing, Mechanical and Electrical Code requirements should be directed to the Development Services Department at 602-534-2000.

Telephony or e-mail messages regarding particular code requirements to the Phoenix Fire Department are not official interpretations. An official interpretation requires a plan review or written correspondence that requests an official interpretation, the referenced code section(s) **AND** includes sufficient information to interpret if the applicable code section(s) applies.

PREPARED BY

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Date: November 7, 2006

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