

2018 Code Requirements for ASTs at Motor Vehicle-Dispensing Stations

NFPA 1 Fire Code and the International Fire Code (IFC) establish the U.S. model fire code requirements for aboveground storage tanks at motor vehicle fuel dispensing facilities. NFPA 1 simply duplicates or references provisions in NFPA 30A, which governs motor vehicle fuel dispensing stations, for these requirements. Therefore, the NFPA column in the table below compares the 2018 editions of NFPA 30A and the IFC. This table is only a summary of significant provisions and is not intended for use as a substitute for the actual codes.

	NFPA 30A 2018 EDITION	IFC 2018 EDITION
Approval/ General Provisions	<ul style="list-style-type: none"> • The use of aboveground storage tanks at motor fuel dispensing facilities, fleet vehicle motor fuel dispensing facilities, and marine motor fuel dispensing facilities is permitted when (must meet all 3 of the following): <ol style="list-style-type: none"> 1. Installed in accordance with the requirements of Section 4.3. 2. In compliance with all applicable requirements of Chapters 21, 22 and 27 of 2018 NFPA 30. 3. For tanks other than tanks in vaults, prior approval for the specific installation has been obtained from the AHJ. (30A: 4.3.2.1). • Aboveground tanks are also allowed to be installed in vaults, not subject to the above restrictions (30A: 4.3.3) 	<ul style="list-style-type: none"> • Aboveground tanks used for outside, aboveground storage of motor fuels classified as Class I, II or III liquids must comply with IFC Chapter 57 (Flammable and Combustible Liquids) and one of the following 6 options. For Options 1 and 2, individual tanks are limited to 12,000 gallons capacity, and the aggregate capacity for any group of tanks is limited to 48,000 gallons. Additional tank groups must be separated by not less than 100 feet: <ol style="list-style-type: none"> 1. Class I liquid fuels stored in protected aboveground tanks that are listed and labeled per UL 2085 (IFC: 2306.2.3(1)). 2. Class II and IIIA liquid fuels stored in protected aboveground tanks that are listed and labeled per UL 2085 unless the fire code official specifically approves use of another aboveground tank type (IFC: 2306.2.3(2)). 3. For aboveground tanks at farms, construction projects and rural areas, use Section 5706.2 (IFC: 2306.2.3(3)). 4. Class IIIB liquid fuels stored in tanks that are listed and labeled per UL 2085 or UL 142 (IFC: 2306.2.3(5)). 5. Where approved by the code official, Class I, II or III liquids in temporary portable tanks without public access. 6. Class I, II and III liquids in aboveground tanks in vaults or in special enclosures (IFC 2306.2.4 and 2306.2.6).
Terminology	<ul style="list-style-type: none"> • Protected Aboveground Tank. An atmospheric aboveground storage tank with integral secondary containment and thermal insulation that has been evaluated for resistance to physical damage; for limiting the heat transferred to the primary tank when exposed to a hydrocarbon pool fire; and is listed in accordance with UL 2085, or an equivalent test procedure (30A:3.3.15.3). • Fire-Resistant Tank: An atmospheric aboveground storage tank with thermal insulation that has been evaluated for resistance to physical damage; for limiting the heat transferred to the primary tank when exposed to a hydrocarbon pool fire; and is listed in accordance with UL 2080 or equivalent test procedure (30A: 3.3.15.2). • Special Enclosure: (Note: NFPA 30A does not use the term or recognize “special enclosures”) <p style="text-align: center;">(continued)</p>	<ul style="list-style-type: none"> • Tank, Protected Aboveground: A listed tank system consisting of a primary tank provided with protection from physical damage and fire-resistive protection from a high intensity liquid pool fire exposure. The tank system may provide these protection elements as a unit, or may be an assembly of components or a combination thereof (IFC: 202). • Fire-Resistant Tank: (Note: The IFC does not use the term or recognize “fire-resistant tanks” listed to UL 2080) • Special Enclosure: Enclosures constructed in accordance with Section 2306.2.6². Note: special enclosures are a legacy/early type of tank vault. <p style="text-align: center;">(continued)</p>

2018 Code Requirements for ASTs at Motor Vehicle-Dispensing Stations

	NFPA 30A 2018 EDITION	IFC 2018 EDITION
Terminology (cont.)	<ul style="list-style-type: none"> • Vault. Vaults must be constructed in accordance with UL 2245. Construction and installation requirements include liquid-tightness; designed to withstand loading from soil, water, traffic, etc.; provided with approved vapor and liquid detection systems with onsite audible and visual warnings; ventilation for vaults containing Class I liquids; and more (30A: 4.3.3).³ 	<ul style="list-style-type: none"> • Vaults. Vaults must be constructed in accordance with UL 2245, or when approved, constructed on-site in accordance with the International Building Code, Section 1707 based on an engineered design and subject to special inspections. Vault requirements in the IFC are very similar to those in NFPA 30A (IFC: 5704.2.8).
Installation	<ul style="list-style-type: none"> • NFPA 30 Chapters 21 and 22 are referenced for tank installation requirements for aboveground tank systems, including spill control, normal and emergency venting, corrosion control, tank supports and foundation (30A: 4.3.2). 	<ul style="list-style-type: none"> • Fuel dispensing systems are required to be installed in accordance with Chapter 23, which incorporates all the motor fuel dispensing facilities controls. Tank installations are to be in accordance with Chapter 57, as modified by Chapter 23 (IFC: 2306.1).
Maximum Capacities	<ul style="list-style-type: none"> • Tanks storing liquid motor fuels at an individual site: 12,000 gallons individual and 48,000 gallons aggregate (30A: 4.3.2.3)¹. • Tanks storing Class II and Class III liquids at fleet vehicle motor fuel dispensing facilities are allowed increased quantities of: 20,000 gallons individual and 80,000 gallons aggregate (30A: 4.3.2.5). • Individual tanks in vaults may store up to 15,000 gallons (30A: 4.3.2.3). 	<ul style="list-style-type: none"> • Protected Aboveground Steel Tanks: 6,000 gallons individual for Class I liquids, with reduced separation requirements (IFC, Table 2206.2.3); or 12,000 gallons individual, 48,000 aggregate for Class I, II or III liquids at increased separation distances. (IFC: 2306.2.3(3)). • Vaults at Public Motor Fuel-Dispensing Facilities: For tanks storing Class I and Class II liquids: 15,000 gallons individual, 48,000 gallons aggregate (IFC: 2306.2.4.1). • Vaults at Fleet Vehicle Motor Fuel-Dispensing Facilities: For tanks storing Class II and Class IIIA liquids: 20,000 gallons individual, 80,000 gallons aggregate (IFC: 2306.2.4.2). • Special Enclosures: 6,000 gallons individual, 18,000 gallons aggregate (IFC: 2306.2.6(6)). • Other Aboveground Tanks: When approved by the AHJ, other tanks meeting construction requirements in Chapter 57, such as UL 142 tanks, may be allowed for Class II and IIIA liquids up to the same capacities as for protected tanks noted above (IFC: 2306.2.3(2) and (3)).
Overfill/Spill Prevention	<ul style="list-style-type: none"> • Overfill: Alarm at 90% capacity plus either automatic shut-off at 98% capacity or restricted flow at 95% capacity (30A: 4.3.6.3). • Means to determine liquid level must be accessible to delivery operator (30A: 4.3.6.2). 	<ul style="list-style-type: none"> • Spill Containers: Minimum 5 gallons (IFC: 2306.6.2.6). • Protected and Vaulted Tanks [and other tanks, if allowed per IFC 2306.2.3(2)]: Overfill: alarm at 90% plus shut-off at 95%; or reduce flow rate to not overfill for 30 minutes plus auto-shut-off of flow prior to wetting tank top fittings (IFC: 5704.2.9.7.5). • Procedure: The filling procedure must provide for the person filling the tank to determine the gallonage needed to fill to 90 percent of capacity before commencing the fill operation (IFC: 5704.2.9.7.5.2)

2018 Code Requirements for ASTs at Motor Vehicle-Dispensing Stations

	NFPA 30A 2018 EDITION	IFC 2018 EDITION
Secondary Containment	<ul style="list-style-type: none"> • Accidental releases of liquid must be contained by remote impounding, diking or secondary containment tanks (30: 22.11) • Secondary containment tanks used to provide spill control, as an alternative to diking or remote impounding are limited to 50,000 gallons tank capacity for Class I, II or IIIA liquids (30: 22.11.4.1). • Enclosed secondary containment must be provided with emergency vents (30: 22.11.4.8).⁴ • The interstitial space must be tested with air pressure, vacuum, or hydrostatics at the specified limits. This tightness testing shall not be required for tanks that continue to maintain a factory-applied vacuum (30: 21.5.2). • Tightness testing with air pressure is not allowed on tanks that contain flammable or combustible liquids or vapors (30:21.5.2.2). • Protected aboveground tanks are always required to be provided with secondary containment per the UL 2085 listing. 	<ul style="list-style-type: none"> • Drainage control or diking in accordance with Section 5704.2.10 or listed secondary containment tanks are required to contain accidental releases (IFC: 2306.5). • Enclosed secondary containment spaces are required to have emergency venting (IFC: Section 2306.5). • Protected aboveground tanks are always required to be provided with secondary containment per the UL 2085 listing • A means must be provided to verify the integrity of the secondary containment for secondary containment tanks (IFC: 5704.2.9.7.3).
Physical Protection	<ul style="list-style-type: none"> • 6-foot-high security fence located at least 10 feet from tank and a gate properly secured against unauthorized entry. When required, provide protection against vehicular collision by suitable barriers, such as 4-inch diameter steel pipe filled with concrete set 3 feet deep in a concrete footing and spaced no more than 4 feet apart (30A: 4.3.7.1 and 4.3.7.2). 	<ul style="list-style-type: none"> • Tanks must be safeguarded from public access in approved manner (IFC: 2306.3). • Impact protection required by system design, barriers or posts. Steel posts of 4-inch diameter, concrete filled, spaced 4 feet on center, 3 feet deep in concrete, protruding 3 feet above grade, set 3 feet from the protected object. Barriers a minimum of 3 feet high, resisting 12,000 pounds of force. (IFC: 2306.4 and 312)
Normal Venting	<ul style="list-style-type: none"> • Atmospheric storage tanks must be vented so as not to exceed the tank's design operating pressure or a gauge pressure of 1.0 psi, whichever is less, and shall be vented to prevent the development of vacuum. (30: 21.4.3.4) • Tanks that store Class IA liquids must be equipped with venting devices that are normally closed (30: 21.4.3.8). • Tanks that store Class IB and Class IC liquids must be equipped with normally closed venting devices or with listed flame arresters (30: 21.4.3.9). 	<ul style="list-style-type: none"> • Pressure-vacuum vents for normal venting must comply with NFPA 30 or API 2000 (IFC: 5704.2.7.3.2). • Tanks containing Class IB or IC liquids must be equipped with normally-closed pressure-vacuum vents or a flame arrester (IFC: 5704.2.7.3.2).

2018 Code Requirements for ASTs at Motor Vehicle-Dispensing Stations

	NFPA 30A 2018 EDITION	IFC 2018 EDITION
Emergency Venting	<ul style="list-style-type: none"> • Aboveground tanks must be provided with emergency relief venting in the form of construction that fails above the liquid level in the event of excessive over-pressure or a device or devices that will relieve excessive internal pressure caused by an exposure fire (30: 22.7.1.1 and tank listing requirements). • Emergency venting requirements apply to each compartment of a compartmented tank, the interstitial space (annulus) of a secondary containment tank, and the enclosed space of tanks of closed-top dike construction (30: 22.7.1.1.1). • Tanks that are larger than 12,000 gallons capacity storing Class IIIB liquids and which are not within the diked area or the drainage path of Class I or II liquids do not require emergency relief venting (30: 22.7.1.1.3). • Total emergency relief venting capacity of both normal and emergency venting devices (which are permitted to be combined into a single device of adequate capacity if desired, must be not less than that determined in Table 22.7.3.2, except for the following reductions (30: 22.7.3.2). <ul style="list-style-type: none"> • Emergency vent capacity reductions are allowed for certain types of liquids and tanks that are provided with drainage, water spray protection and/or thermal insulation. Protected tanks and fire-resistant tanks are excluded from some of these reductions (30: 22.7.3.5, 22.7.3.6, 22.7.3.7) (30A: 4.3.4(2) and 4.3.5.1(2)). • Weak roof-to-shell seams are allowed for API 650 tanks but are no longer allowed as a means of emergency venting for shop-fabricated atmospheric tanks built to UL 142 (30: 22.7.2).⁵ • For tanks in vaults, emergency vents must be of a type that is normally vapor tight and such vents are allowed to have a discharge location inside the vault. Long-bolt manhole covers are not allowed to be used on tanks in vaults (30A: 4.3.3.5.2). • Commercial emergency venting devices are required to have the start-to-open pressure, full-open pressure, and flow capacity at the full open pressure either stamped or cast into the metal body of the device or included on a permanently affixed metal nameplate. (30: 22.7.3.10) 	<ul style="list-style-type: none"> • Emergency venting must be provided on aboveground tanks in accordance with Section 22.7 of NFPA 30 (IFC: 5704.2.7.4). • Tanks that are larger than 12,000 gallons capacity storing Class IIIB liquids and which are not within the diked area or the drainage path of Class I or II liquids do not require emergency relief venting (IFC: 5704.2.7.4 Exception #1). • Emergency vents for Class I, II and IIIA liquids are not allowed to discharge inside buildings except for vents on protected above-ground tanks containing Class II or IIIA liquids (IFC: 5704.2.7.4). • For tanks in vaults, emergency vents must be of a type that is normally vapor tight and such vents are allowed to have a discharge location inside the vault. Long-bolt manhole covers are not allowed to be used on tanks in vaults (IFC: 5704.2.8.14). • For protected tanks, use of vent capacity reduction factors sometimes allowed by NFPA 30 is not permitted (IFC: 5704.2.9.7.2).

2018 Code Requirements for ASTs at Motor Vehicle-Dispensing Stations

	NFPA 30A 2018 EDITION	IFC 2018 EDITION
Separation Distance (minimum)	<ul style="list-style-type: none"> • Protected tank 6,000 gallons or less: To buildable property line – 15 feet To building or public way – 5 feet To fuel dispensers – 0 feet Between tanks – 3 feet • Protected tank over 6,000 gallons: To buildable property line – 25 feet To building or public way – 15 feet To fuel dispensers – 0 feet Between tanks – 3 feet • Vaulted tank 15,000 gallons or less: No required separations⁶ • Fire-resistant tank 12,000 gallons or less: To buildable property line – 50 feet To building or public way – 25 feet To fuel dispensers – 25 feet⁷ Between tanks – 3 feet • Other tanks that comply with NFPA 30 - 12,000 gallons or less: To buildable property line – 100 feet To building or public way – 50 feet To fuel dispensers – 50 feet Between tanks – 3 feet (30A: Table 4.3.2.4) 	<ul style="list-style-type: none"> • Protected tank 6,000 gallons or less: To buildable property line – 15 feet To building or public way – 5 feet To fuel dispensers – 25 feet (0 feet for IIIB liquid tanks and fleet fueling) Between tanks – 3 feet • Protected tank over 6,000 gallons: To buildable property line – 25 feet To building or public way – 15 feet To fuel dispensers – 25 feet (0 feet for IIIB liquid tanks and fleet fueling) Between tanks – 3 feet • Vaulted Tanks 20,000 gallons or less: No required separations⁶ • Other tanks that comply with NFPA 30 To buildable property line – 100 feet To building or public way – 50 feet To fuel dispensers – 50 feet Between tanks – 3 feet (IFC Table 2306.2.3).
Piping	<ul style="list-style-type: none"> • Openings in tank must be located above the maximum liquid level (30A: 4.3.6.1). • Means to prevent release of liquid by siphon flow required (30A: 4.3.6.4). • Shut-off and check valves require pressure relief devices to relieve pressure generated by thermal expansion (30A: 4.3.6.5). • Use of low melting point materials restricted (30A: 5.2.7) 	<ul style="list-style-type: none"> • Openings in tank must be located on top of tank (IFC: 2306.6.2.1) • Means to prevent release of liquid by siphon flow required (IFC: 2306.6.2.4) • Fill pipes for above-ground tanks are required to have a means for making a direct connection to the tank vehicle's fuel delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. Where any portion of the fill pipe exterior to the tank extends below the level of the top of the tank, a check valve is required in the fill pipe within 12 inches of the fill-hose connection. (IFC: 2306.6.2.2)
Remote Pumps and Dispensers	<ul style="list-style-type: none"> • Unless all piping is visible, a listed leak detection device and alarm or flow control is required on the discharge side of pumps supplying dispensers (30A: 6.4.2). • Dispensing of fuel by gravity or from a pressurized tank is prohibited (30A: 4.3.6.6). • For pressurized systems, a listed, rigidly-anchored double-poppet type emergency shutoff valve, incorporating a fusible link or other thermally actuated device designed to close upon severe impact or fire exposure is required for each dispenser (30A: 6.3.9). • For suction systems where a gravity head is present on the dispensing device, a listed vacuum-actuated shutoff valve with a shear section, or equivalent valve, is required directly under dispensing device (30A: 6.3.10). • Equipment for alcohol-blended motor fuels must be listed or approved for that purpose (30A: 6.2.3). 	<ul style="list-style-type: none"> • Unless all piping is visible, a listed leak detection device and alarm is required on the discharge side of pumps supplying dispensers (IFC: 2306.7.7.1). • Dispensing of Class I liquids by gravity is prohibited. Dispensing of fuel by pressurization of the tank is prohibited (IFC: 2306.7.8). • For pressurized systems, an approved emergency shutoff valve designed to close upon severe impact or fire exposure is required for each dispenser (IFC: 2306.7.4). • Design, construction and maintenance of motor vehicle fuel-dispensing stations dispensing alcohol blended fuels requires special listed compatible equipment (IFC: 2306.8).

2018 Code Requirements for ASTs at Motor Vehicle-Dispensing Stations

	NFPA 30A 2018 EDITION	IFC 2018 EDITION
Tank Filling Operations	<ul style="list-style-type: none"> • Minimum separation of delivery vehicle to tank as follows, and an approved barrier must be provided to ensure the distance: None - protected tanks None - tanks in vaults 15 feet - fire-resistant tanks 15 feet - other tanks Class II or III liquid 25 feet - other tanks Class I liquid (30A: Table 9.2.2.3, Section 9.2.2.3 and 9.2.2.3.1). • Means must be provided to prevent accidental releases from flowing under aboveground tanks (30A: 9.2.2.3.2). • Liquid-tight hose connections are required (30A: 9.2.2.6) • Where an aboveground tank is filled via fixed piping, either a check valve and shutoff valve with a quick connect coupling or a check valve with a dry-break coupling is required at the connection point between the tank and the delivery vehicle (30A: 9.2.2.6.1). 	<ul style="list-style-type: none"> • Delivery vehicles using positive pressure must be located not less than 25 feet away from the receiving tank during delivery of Class I liquids and 15 feet away from the receiving tank during delivery of Class II or IIIA liquids, measured from the tank to the nearest unloading valve on the tank vehicle (IFC: 2305.1.1). • Liquid-tight hose connections are required (IFC: 5704.2.9.7.6). • A spill container having a capacity of not less than 5 gallons is required for each fill connection (IFC: 5704.2.9.7.7).

Footnotes

1. Section 4.3.2.7 of NFPA 30A permits **existing** tanks up to 6,000 gallons to be used at private fleet facilities, provided the tank complies with NFPA 30. New installations must follow Section 4.3 of NFPA 30A.
2. For tanks containing Class I, II or IIIA liquids, special enclosure maximum capacities are 6,000 gallons individual and 18,000 gallons aggregate (IFC: 2306.2.6(6)).
3. Vaults with Class I liquid storage shall be ventilated at a rate not less than one cfm per square foot of floor area, but not less than 150 cfm. (30A: 4.3.3.6.1; IFC: 5704.2.8.9).
4. Emergency vents are also required for each a) tank compartment, b) enclosed space of a closed-top dike construction, and c) other spaces or enclosed volumes, such as those intended for insulation, membranes, or weather shields that might contain liquid due to a leak from the primary vessel and can inhibit venting during a fire exposure (see the Emergency Venting row in the table for additional information).
5. Tanks designed to UL 142 after December 2006 are not permitted to use “weak shell to roof design” for emergency venting.
6. Separate vaulted compartments are required for each tank. Adjacent vaults are permitted to share a common wall (30A: Table 4.3.2.4 and Sec. 4.3.3.3.1.3; IFC: 5704.2.8.7).
7. At fleet vehicle motor fuel dispensing facilities, no minimum separation is required between the dispensing device and protected tank or fire-resistant tank (30A: 4.3.2.6).

NFPA 30A	<i>Code for Motor Fuel Dispensing Facilities and Repair Garages</i> , National Fire Protection Association, 2018 Edition.
NFPA 30	<i>Flammable and Combustible Liquids Code</i> , National Fire Protection Association, 2018 Edition.
NFPA 1	<i>Fire Code</i> , National Fire Protection Association, 2018 Edition. (Note that this code refers to the 2018 NFPA 30A for all its requirements relating to ASTs at Motor Fuel Dispensing Stations)
IFC	<i>International Fire Code</i> , International Code Council, 2018 Edition. (Note that IFC Chapter 80, Referenced Standards, references the 2018 edition of NFPA 30A and the 2018 edition of NFPA 30 for some requirements).

Table compiled by STI with help and guidance from:

- Marshall Klein, P.E. of Marshall A. Klein & Associates, Inc., Eldersburg, MD
- Jeffrey Shapiro, P.E. of International Code Consultants, Austin, TX