

Orange County Fire Authority

Community Risk Reduction

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Installation and Modification of Aboveground Equipment Components of Fuel Dispensing Operations



Guideline G-08

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Installation and Modification of Aboveground Equipment Components of Fuel Dispensing Operations

PURPOSE

To facilitate the design, installation, and plan review of aboveground equipment components of vehicle fuel dispensing and to ensure that their installation complies with all applicable standards. All installations and modifications shall comply with the 2016 California Fire Code (CFC) and 2016 California Building Code (CBC). The purpose of these standards is to minimize the potential hazards associated with these installations.

SCOPE

The Orange County Fire Authority (OCFA) has established the following requirements for the installation and modification of aboveground equipment components of motor vehicle fuel dispensing operations. Plans not conforming to these minimum requirements will be returned for correction. This guideline applies to all new installations and all modifications to existing aboveground equipment components at fuel dispensing stations. This guideline contains requirements for:

- Installation of new aboveground equipment.
- Modifications or upgrades to existing aboveground equipment.
- Modifications to dispensers for EMV chip credit card compliance.

Note: This guideline does not apply to marine and aircraft fuel dispensing stations.

PLAN SUBMITTAL REQUIREMENTS

1. Permits and Plans

CFC permits are required for the following:

- A. To install, construct or alter equipment, tanks and fuel-dispensing stations and similar facilities where flammable and combustible liquids are stored or dispensed. *CFC 105.7.8 (2)*
- B. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at facilities accessible to both the public and private operations. *CFC 105.5.17 (10)*
- C. For replacement of existing vehicle fuel pump dispensers where the dispenser is replaced (without change to the location) and shear valves remain in place and are not moved and/or replaced (common during EMV chip card compliance improvements); inspections and permits **will not** be required by the OCFA and the work will be considered as a repair with like-for-like replacement. To qualify for this, plans will need to be reviewed to verify work to be performed. Plans within the scope of

this paragraph will be reviewed at a reduced fee (time and materials charged on an hourly rate) and will be returned noting that additional inspections and permits are not required. Plans outside the scope of this paragraph will be reviewed as a PR310 and will require normal inspections and permits. *The replacement of the dispenser may include equipment above the shear valve such as hose, break-away couplings, nozzles, swivels, and conversion frames and still be considered repair with "like-for-like" replacement.*

2. General Plan Requirements

- A. All new plan submittals and revisions will consist of **2** plan hard copies and **1** electronic copy. All electronic formats will be accepted and may be submitted via email or on CD, DVD or Memory Stick. *If plans are being submitted concurrently for review by a building department, additional plan sets may be required.*
- B. Plans shall be reviewed and approved by the Orange County Health Care Agency **prior** to being submitted for review to the OCFA.
- C. Specify a clear scope of work on the coversheet of the plan.
- D. Specify the legal address on the coversheet of the plan.
- E. The plan shall contain an equipment list that identifies all equipment to be installed. The equipment list shall specify the equipment, model number, location reference, and UL listing for each piece of equipment.
- F. Provide the manufacturers' specification sheets for the following items; highlight the style, type, model, etc., and the UL listing for each piece of equipment:
 - Piping
 - Hoses
 - Valves
 - Joints
 - Hose nozzles
 - Valves
 - Fire checks or flame prevention
 - Equipment in vapor processing systems
 - Electrical equipment
 - Dispensers
 - Controls
 - Flame arresters
 - Vapor pumps
- G. Clearly identify existing equipment.
- H. Plans shall be scaled to a national recognized standard.
- I. Plans shall contain all notes outlined in Section 12.

Site Plan Requirements

The following information shall be specified on a scaled site plan:

- A. Contents and maximum holding capacity of each tank in gallons.
- B. Location of fire hydrants.
- C. Property line location.
- D. Buildings and all building openings within 30 feet of the existing or proposed UST.

- E. Location and labeling of emergency disconnect devices. Emergency shutdown devices shall be provided for all fuel dispensers. Emergency shutdown devices for fuel dispensers shall be clearly labeled “EMERGENCY FUEL SHUTOFF” with signs in an approved location(s). Emergency disconnect switches shall be located within 100 feet of, but not less than 20 feet from, dispensers. *CFC 2303.2*
 - F. Location of dispensers. Dispensing devices shall be located as follows:
 - 1) Ten feet or more from property lines.
 - 2) Ten feet or more from buildings with combustible exterior wall surfaces or buildings having non-combustible exterior wall surfaces that are not part of a one-hour fire-resistive assembly, except canopies constructed in accordance with the CBC.
 - 3) Such that all portions of the vehicle being fueled will be on the premises of the motor vehicle fuel dispensing station.
 - 4) Such that the nozzle, when the hose is fully extended, will not reach within five feet of building openings.
 - 5) Such that the nozzle, when the hose is fully extended, will be 20 feet or more from fixed sources of ignition. *CFC 2303.1*
 - G. The method of preventing spills from flowing into buildings, sidewalks, streets, highways, drainage canals, ditches, storm drains, sewers, flood-control channels, etc. Acceptable methods include grading driveways or raising doorsills. *CFC 2305.3*
 - H. Vehicular protection: where dispensing devices are mounted on grade, they shall be protected at each end with a minimum of two concrete-filled steel posts, 6 inches in diameter, having a minimum 3 foot deep footing not less than 15 inches in diameter and projecting above grade at a minimum of 3 feet. They shall be located not less than 4 feet nor more than 5 feet from fuel dispensers or point-of-sale devices, or equivalent means approved by the chief. *CFC 2303.1.1*
 - I. Location and rating of fire extinguisher(s). Fire extinguishers in compliance with Section 906 of the CFC, with a minimum rating of 2-A:20-B:C shall be provided and located not more than 75 feet from any pump, dispenser, or storage tank fill-pipe openings. *CFC 2305.5*
3. Filling and Dispensing Operations
- Openings for manual gauging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. Covers shall be kept closed when not gauging. If inside a building, such openings shall be protected against liquid overflow and possible vapor release by means of a spring-loaded check valve or other approved device. *CFC 5704.2.7.5.4*
4. Fuel dispensers
- Fuel dispensers shall comply with the following:

- A. Only listed equipment including but not limited to electrical, shall be used
 - B. Class I and II liquids shall be transferred from underground tanks by means of fixed, listed/approval pumps designed and equipped to allow control of the flow and to prevent leakage or accidental discharge. *CFC 2306.7.2*
 - C. Dispensers shall be installed and securely fastened in accordance with the manufacturers specifications. Fastening by hose or conduit alone is not allowed. Dispensers shall either be secured to an elevated island or be secured and provide vehicle impact protection per Section 312. *CFC 2306.7.3*
 - D. Class I and II liquids shall be transferred from tanks by means of fixed pumps designed and equipped to allow control of the flow and prevent leakage or accidental discharge. *CFC 2306.7.2*
 - E. A listed automatic-closing-type hose nozzle valve with or without a latch-open device shall be provided on island-type dispensers used for dispensing Class I, II or IIIA liquids. Overhead-type dispensing units shall be provided with a listed automatic-closing-type hose nozzle valve without a latch-open device. *CFC 2306.7.6*
5. Containment, Leak Detection, Monitoring, and Corrosion Protection
- The containment, leak detection, monitoring, and corrosion protection systems shall comply with the following:
- A. Underground storage tank systems shall be provided with an approved method of detecting leaks from any component of the system that is designed and installed in accordance with NFPA 30. *CFC 5704.2.11.3*
 - B. Where remote pumps are used to supply fuel dispensers, each pump shall have installed on the discharge side a listed leak detection device that will detect a leak in the piping and dispensers and provide an indication. A leak detection device is not required if the piping from the pump discharge to under the dispenser is above ground and visible. *CFC 2306.7.7.1*
 - C. To control spillage during filling of underground tanks, each tank must have a spill container that is noncombustible and permanently fixed to the tank. The fill pipes shall be equipped with a spill container and an overflow prevention system in accordance with NFPA 30. *CFC 5004.2*
 - D. Where subject to external corrosion, piping, related fluid-handling components and supports for both underground and aboveground applications shall be fabricated from noncorrosive materials, and coated or provided with corrosion protection. Dissimilar metallic parts that promote galvanic action shall not be joined. *CFC 5703.6.5*
6. Piping
- Piping system shall comply with the following:
- A. Piping systems shall contain a sufficient number of manual control valves and check valves to operate the system properly and to protect the plant under both normal and emergency conditions. Piping systems in connection with pumps shall contain a sufficient number of such valves to

control properly the flow of liquids in normal operation and in the event of physical damage or fire exposure. *CFC 5703.6.6*

- B. An approved automatic emergency shutoff valve designed to close in the event of a fire or impact shall be properly installed in the liquid supply line at the base of each dispenser supplied by a remote pump. The valve shall be installed so that the shear groove is flush with or within ½ inch of the top of the concrete dispenser island and there is clearance provided for maintenance purposes around the valve body and operating parts. The valve shall be installed at the liquid supply line inlet of each overhead-type dispenser. Where installed, a vapor return line located inside the dispenser housing shall have a shear section or approved flexible connector for the liquid supply line emergency shutoff valve to function. Emergency shutoff valves shall be installed and maintained in accordance with the manufacturer's instructions, tested at the time of initial installation and at least yearly thereafter in accordance with Section 2305.2.4. *CFC 2306.7.4*
- C. Fiberglass-reinforced plastic piping need not be provided with flexible joints in locations where both of the following conditions are present:
 - 1) Piping does not exceed four inches in diameter; and
 - 2) Piping has a straight run of not less than four feet on one side of the connection when such connections result in a change of direction. In lieu of the minimum four-foot straight run length, approved and listed flexible joints are allowed in dispensers and suction pumps, at submerged pumps and tanks, and where vents extend aboveground. *CFC 5703.6.9.1*
- D. Pipe and tubing shall be bent in accordance with ASME B31.9. *CFC 5703.6.11*

7. Venting

Venting systems shall comply with the following:

- A. Vent pipe outlets for tanks storing Class I, II or III-A liquids shall be located such that the vapors are released at a safe point outside of buildings and not less than 12 feet above the adjacent ground level. Vapors shall be discharged upward or horizontally away from closely adjacent walls to assist in vapor dispersion. Vent outlets shall be located such that flammable vapors will not be trapped by eaves or other obstructions and shall be at least five feet from building openings or lot lines of properties that can be built upon. Class IIIB liquids are allowed to discharge inside a building if the vent is a normally closed vent. *CFC 5704.2.7.3.3*
- B. Vent piping shall be designed, sized, constructed and installed in accordance with Section 5703.6. Vent pipes shall be installed such that they will drain toward the tank without sags or traps in which liquid can collect. Vent Pipes shall be installed in such a manner as to not be subject to physical damage or vibration. *CFC 5704.2.7.3.4*

- C. For underground tanks, manifolded vent pipes shall be sized to prevent system pressure limits from being exceeded when manifolded tanks are filled simultaneously. *CFC 5704.2.7.3.5*
 - D. Use of flame arresters in piping systems shall be in accordance with API 2000. *CFC 5704.2.7.3.2*
 - E. Tank vent piping shall not be manifolded unless required for special purposes such as vapor-recovery, vapor conservation or air pollution control. *CFC 5704.2.7.3.5*
 - F. Vent piping for tanks storing Class I liquids shall not be manifolded with vent piping for tanks storing Class II or III liquids unless positive means are provided to prevent contamination and possible changes in classification of the less volatile liquid. *CFC 5704.2.7.3.5*
 - G. Tanks and pressure vessels storing Class IB or IC liquids shall be equipped with venting devices which shall be normally closed except when venting under pressure or vacuum conditions, or with listed flame arrestors. The vents shall be installed and maintained in accordance with Section 4.2.5.1 of NFPA 30 or API 2000. *CFC 5704.2.7.3.2*
8. Vapor Recovery
- Vapor recovery systems shall comply with *CFC 2306.2.7.3.2*:
- A. Dispensing devices incorporating provisions for vapor recovery shall be listed and labeled. *CFC 2306.7.9.2.1*
 - B. Means shall be provided to shut down fuel dispensing in the event the vapor-return line becomes blocked. *CFC 2306.7.9.1.1*
 - C. An acceptable method shall be provided to close off the vapor-return line from dispensers when the product is not being dispensed. *CFC 2306.7.9.1.2*
 - D. Nonmetallic piping shall be installed in accordance with the manufacturer's installation instructions. *CFC 2306.9.1.3*
 - E. An approved shear joint shall be rigidly mounted and connected by a union in the vapor-return piping at the base of each dispensing device. The shear joint shall be mounted flush with the top of the surface on which the dispenser is mounted. *CFC 2306.7.9.1.4*
 - F. Flexible joints shall be listed and approved and shall be installed on underground liquid, vapor, and vent piping at the following locations:
 - 1) Where piping ends at pump islands and vent risers; and
 - 2) At points where differential movement in the piping can occur. *CFC 5703.6.9*
 - G. Fiberglass-reinforced plastic piping need not be provided with flexible joints in locations where both of the following conditions are present:
 - 1) Piping does not exceed four inches in diameter; and
 - 2) Piping has a straight run of not less than four feet on one side of the connection when such connections result in a change of direction. In lieu of the minimum four-foot straight run length, approved and listed flexible joints are allowed to be used under dispensers and suction

- pumps, at submerged pumps and tanks, and where vents extend aboveground. *CFC 5703.6.9.1*
- H. Vapor-processing systems that introduce air into the underground piping or storage tanks shall be provided with equipment for prevention of flame propagation that has been tested and listed as suitable for the intended use. *CFC 2306.7.9.2.1*
- I. Vapor-processing equipment shall be located at or above grade. Sources of ignition shall be located not less than 50 feet from fuel-transfer areas and not less than 18 inches above tank fill openings and tops of dispenser islands. *CFC 2306.7.9.2.2*
- J. Vapor-processing units shall be located not less than 10 feet from the nearest building or property line of a lot that can be built upon, except where the required distances to buildings, property lines, or fuel-transfer areas cannot be obtained, in which case means shall be provided to protect equipment against fire exposure. Acceptable means include:
- 1) Approved protective enclosures, which extend at least 18 inches above the equipment, constructed of fire-resistant or noncombustible materials; or
 - 2) Fire protection using an approved water-spray system. *CFC 2306.7.9.2.2*
- K. Vapor-processing equipment shall be located a minimum of 20 feet from dispensing devices. Processing equipment shall be protected against physical damage by guardrails, curbs, protective closures or fencing. Where approved protective enclosures are used, approved means shall be provided to ventilate the volume within the enclosure to prevent pocketing of flammable vapors. *CFC 2306.7.9.2.2*
- L. Where a down slope exists towards the location of the vapor-processing unit from a fuel-transfer area, the fire code official is authorized to require additional separation by distance and height. *CFC 2306.7.9.2.2.3*
- M. Vapor-processing units shall be securely mounted on concrete, masonry, or structural steel supports on concrete or other noncombustible foundations. *CFC 2306.7.9.2.3*
- N. Vapor-recovery and vapor-processing equipment is allowed to be installed on roofs when approved. *CFC 2306.7.9.2.3*
- O. Vapor-return lines shall be installed in a manner that drains back to the tank, without sags or traps in which liquid can become trapped. If necessary due to grade, condensate tanks are allowed in vapor-return piping. Condensate tanks shall be designed and installed so that they can be drained without being opened. *CFC 2306.7.9.1.3*
- P. Equipment in vapor-processing systems, including hose nozzle valves, vapor pumps, flame arresters, fire checks or systems for prevention of flame propagation and controls and shall be individually listed for the intended use in a specified manner. *CFC 2306.7.9.2.1*
- Q. Electrically energized vapor-recovery equipment shall be directly connected to and controlled by the emergency pump shutoff switch. *CFC 2306.7.4*

9. Electrical

Electrical equipment including heat-producing appliances must be approved for the particular hazards anticipated at the facility and the hazardous nature of flammable and combustible liquids. Electrical equipment and appurtenances shall comply with the following:

- A. Chapter 8 of NFPA 30A, NFPA 70 and the 2016 Electrical Code and CFC Table 5703.1.1

10. Testing and Inspection

Testing and Inspections shall comply with the following:

- A. The Orange County Health Care Agency (OCHCA) inspector will require proof of OCFA approval at the first inspection. Maintain a copy of the OCFA stamped approved plans at the job site.
- B. The OCHCA inspector will require evidence of OCFA final approval prior to releasing an OCHCA Certificate of Compliance.
- C. An OCFA field inspector shall conduct a final inspection of all operating systems. Call for inspection at least two working days ahead of test (714-573-6150):

11. Notes

Place the following notes, verbatim, on the plans:

- A. Fire department final inspection required. Schedule inspection at least two days in advance: (714) 573-6150. Inspections cancelled after 1 pm on the day before the inspection date will be subject to a reinspection fee.
- B. Activation of the emergency shutdown devices shall stop the transfer of fuel to the dispensers and close all valves that supply fuel to the dispensers.
- C. Emergency shutdown devices shall be distinctly labeled "EMERGENCY FUEL SHUTDOWN DEVICE".
- D. The dispensing of fuel into the fuel tanks of motor vehicles or portable containers shall be under the supervision of a qualified attendant at all times, except at approved unsupervised locations.
- E. Flammable and combustible liquids and petroleum waste products shall not be discharged or released to sidewalks, streets, highways, drainage canals, ditches, storm drains, sewers, flood-control channels, lakes, rivers, tidal waterways, etc.
- F. The attendant's primary function shall be to supervise, observe, and control the dispensing of motor fuels. The attendant shall prevent the dispensing of flammable and combustible liquids into containers not in compliance with code, control sources of ignition, give immediate attention to accidental spills or releases and shall be prepared to use fire extinguishers. A method of communicating with the fire department shall be provided for the attendant.

- G. Electrical equipment shall be in accordance with the 2016 California Electrical Code.
 - H. Signs prohibiting smoking, prohibiting dispensing into unapproved containers, and requiring vehicle engines to be stopped during fueling shall be conspicuously posted within sight of each dispenser.
 - I. Weeds, grass, brush, trash, and other combustible materials shall be kept not less than ten feet from fuel storage vessels and fuel-handling equipment.
12. Installation of new aboveground equipment components at unsupervised fuel dispensing stations—additional requirements.
- All the above requirements for supervised fuel dispensing apply as well as the following:
- A. Provide a letter signed by the owner/operator of the unsupervised dispensing station that details the following:
 - 1) Hours of operation
 - 2) The owner or operator provides, and is accountable for, daily site visits, regular equipment inspection and maintenance, conspicuously posted instructions for the safe operation of dispensing equipment, and posted telephone numbers for the owner or operators. *CFC 2304.3.1*
 - B. Specify the location and provide a detail of the following sign on the plan; the sign shall be posted in a conspicuous location reading:

IN CASE OF FIRE, SPILL, OR RELEASE

- 1. Use emergency pump shutoff!
- 2. Report the accident to the Fire Department: 911
This facility's address is _____

CFC 2304.3.5

- C. Specify on the plan the location and method the user of the fuel dispensing equipment will have for transmitting a fire alarm. *CFC 2304.3.6*
Please read this code section! If okay then leave as is.
 - D. Dispensing equipment used at unsupervised locations shall comply with one of the following. Specify on the plan which one and provide any additional details or documentation as needed:
 - 1) The amount of fuel being dispensed is limited in quantity by a preprogrammed card; or
 - 2) Dispensing devices are programmed or set to limit uninterrupted fuel delivery to 25 gallons and require a manual action to resume continued delivery. *CFC 2304.3.7*
13. Modifications or upgrades to existing aboveground equipment at supervised and unsupervised fuel dispensing stations.
- A. Provide a clear and specific scope of work on the coversheet of the plan.

- B. Provide the manufacturers' specification sheets for the new and/or replaced equipment. Sheets shall have the style, type, model, and UL listing for each piece of equipment highlighted.
- C. When existing listed or labeled dispensing devices are modified for vapor recovery, such modifications shall be listed by report by a nationally recognized testing laboratory. The listing by report shall contain a description of the component parts laboratory. The listing by report shall contain a description of the component parts used in the modification and recommended method of installation on specific dispensers. Such report shall be submitted with the modification plan. *CFC 2306.7.9.1.1.*