Kerrville Fire Marshal

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Section 5

Underground Storage Tanks

Flammable and Combustible Liquid Storage Tanks

These guidelines are to be followed when an underground storage tank is moved, installed, or otherwise added, within the City of Kerrville City Limits.

All underground storage tank requirements for the purposes of these guidelines and any other guidelines or requirements of the Kerrville Fire Marshal shall conform to the *International Fire Code* as adopted and amended by the City of Kerrville. Additional requirements will apply to Motor Fuel-Dispensing Facilities.

This guide does not replace, nor supersede any codes and/or ordinances adopted by the City of Kerrville, or determinations and positions of the Fire Chief or Fire Marshal.

General Requirements

1. The tank must be installed by a Texas Commission on Environmental Quality licensed underground storage tank installer.
2. No underground storage tank(s) or associated equipment may be installed, located, or otherwise manipulated on the site until a permit is issued for the location.
3. Approved flame arrestors and venting devices shall be installed in the vent lines. (*IFC*, Section 5704.2.7.3.1)
4. An approved method of secondary containment shall be provided for underground tank and piping systems. Plans shall indicate method for compliance with this requirement such as secondary containment (double-wall) tanks and piping or vaults.
5. A leak detection system must be installed and provided with approved vapor and liquid detection, equipped with on-site audible and/or visual warning devices with battery backup, as approved by *IFC* and *NFPA 30.*
6. Leak detection. Underground storage tank systems shall be provided with an approved method of leak detection from any component of the system that is designed and installed in accordance with NFPA 30 and as specified by *IFC*, Section 5704.2.11.4.
7. Dry Sumps. Approved sampling tubes of a minimum 6 inches in diameter shall be installed in the backfill material of each underground flammable or combustible liquid storage tank. The tubes shall extend from a point 12 inches below the average grade of the excavation to ground level and shall be provided with suitable surface access caps. Each tank site shall provide a sampling sump at the corners of the excavation with a minimum of 4 sumps. Sampling tubes shall be placed in the product line excavation within 10 feet of the tank excavation and one every 50 feet routed along the product lines towards the dispensers, a minimum of two are required.
8. The design, fabrication and construction of tanks shall comply with *NFPA 30*. Each tank shall bear a permanent nameplate or marking indicating the standard used as the basis of design.
9. The tank fill connection shall be provided with a means for making a direct connection to the tank's vehicle fuel delivery hose so that no fuel is exposed to the open air during the filing operation.
10. A permanent sign shall be placed at the fill point for the tank, documenting the filling procedure and tank calibration chart.
11. Emergency shut-offs shall be provided during filling and dispensing operations.

12. Relief valves, both emergency and normal, shall be provided and shall normally be in the closed position.
13. Thrust blocks, safety straps/deadman's or other suitable means of restraint must be installed at each change in direction of the pipe.
14. Underground tanks and their piping shall be protected by either of the following:
    a. A properly engineered, installed, and maintained cathodic protection system in accordance with recognized engineering standards of design.
    b. Approved or listed corrosion-resistant materials or systems

Tanks

15. Flammable and combustible liquid storage tanks located underground, either outside or under buildings, shall be in accordance with all of the following:
    a. Tanks shall be located with respect to existing foundations and supports such that the loads carried by the latter cannot be transmitted to the tank.
    b. The distance from any part of a tank storing liquids to the nearest wall of a basement, pit, cellar, or lot line shall not be less than 3 feet (914 mm).
    c. A minimum distance of 1 foot (305 mm), shell to shell, shall be maintained between underground tanks.
16. Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks shall be set on firm foundations and surrounded with at least 12 inches of noncorrosive inert material, such as clean sand.
17. Underground tanks shall be covered with one of the following:
    a. At least 12 in. (300 mm) of backfill, covered with 12 in. (300 mm) of clean earth
    b. At least 12 in. (300 mm) of compacted backfill, on top of which a slab of reinforced concrete at least 4 in. (100 mm) thick is placed
18. Where the tanks are, or are likely to be, subjected to traffic, they shall be protected against damage from vehicles passing over them by one of the following:
    a. At least 36 in. (900 mm) of backfill
    b. At least 18 in. (450 mm) of compacted backfill of a type recommended by the tank manufacturer and at least 6 in. (150 mm) of reinforced concrete
    c. At least 18 in. (450 mm) of compacted backfill of a type recommended by the tank manufacturer and at least 8 in. (200 mm) of asphaltic concrete
19. When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least 12 in. (300 mm) horizontally beyond the outline of the tank in all directions.
20. Thrust blocks, safety straps/deadman's or other suitable means of restraint must be installed for each underground storage tank.

Piping

21. Underground piping shall be installed on at least 6 in. (150 mm) of well-compacted bedding material.
22. In areas subject to vehicle traffic, the pipe trench shall be deep enough to permit a cover of at least 18 in. (450 mm) of well-compacted backfill material and pavement.
23. In paved areas where a minimum 2 in. (50 mm) of asphalt is used, backfill between the pipe and the asphalt shall be permitted to be reduced to 8 in. (200 mm) minimum.
24. In paved areas where a minimum 4 in. (100 mm) of reinforced concrete is used, backfill between the pipe and the asphalt shall be permitted to be reduced to 4 in. (100 mm) minimum.
25. In areas not subject to vehicle traffic, the pipe trench shall be deep enough to permit a cover of at least 6 in. (150 mm) of well-compacted backfill material.
26. Piping within the same trench shall be separated horizontally by at least two pipe diameters. Separation need not exceed 9 in. (230 mm).
27. Two or more levels of piping within the same trench shall be separated vertically by a minimum 6 in. (150 mm) of well-compacted bedding material.

Spill/Overfill Prevention

28. Fill pipes shall be equipped with a spill container.
29. An overfill prevention system shall be provided for each tank that operates as follows:
    a. Automatically shut off the flow of fuel to the tank when the quantity reaches 95 percent of tank capacity and
    b. Alert the transfer operator when the tank is no more than 90 percent full by restricting the flow of liquid into the tank or triggering the high-level alarm

Leak Prevention

30. Daily inventory records shall be maintained for underground storage tank systems.
31. Approved sampling tubes of a minimum 6 inches in diameter shall be installed in the backfill material of each underground flammable or combustible liquid storage tank. The tubes shall extend from a point 12 inches below the average grade of the excavation to ground level and shall be provided with suitable surface access caps. Each tank site shall provide a sampling sump at the corners of the excavation with a minimum of four sumps. Sampling tubes shall be placed in the product line excavation within 10 feet of the tank excavation and one every 50 feet routed along the product lines towards the dispensers, a minimum of two are required.

Tank openings other than vents

32. Filling, emptying and vapor recovery connections to tanks containing Class I, II or IIIA liquids shall be located outside of buildings at a location free from sources of ignition and not less than 5 feet (1524 mm) away from building openings or lot lines of property that can be built on. Such openings shall be provided with a liquid-tight cap, which shall be closed when not in use, and properly identified.
33. For underground tanks, fill pipe and discharge lines shall enter only through the top. Fill lines shall be sloped toward the tank. Underground tanks for Class I liquids having a capacity greater than 1,000 gallons (3785 L) shall be equipped with a tight fill device for connecting the fill hose to the tank.

Vents

34. Relief valves, both emergency and normal, shall be provided and shall normally be in the closed position.
35. Vent pipes from underground tanks storing Class I liquids shall be located so that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 ft (3.6 m) above the adjacent ground level.
36. Vent pipe outlets shall be located and directed so that vapors will not accumulate or travel to an unsafe location, enter building openings, or be trapped under eaves and shall be at least 5 ft (1.5 m) from building openings and at least 15 ft (4.5 m) from powered ventilation air intake devices.
37. Vent pipes from tanks storing Class II or Class IIIA liquids shall terminate outside of the building and higher than the fill pipe opening.
38. Vent pipes shall not be obstructed by devices provided for vapor recovery or other purposes unless the tank and associated piping and equipment are otherwise protected to limit back-pressure development to less than the maximum working pressure of the tank and equipment by the provision of pressure-vacuum vents, rupture discs, or other tank-venting devices installed in the tank vent lines.
39. Vent outlets and devices shall be protected to minimize the possibility of blockage from weather, dirt, or insect nests.
40. Vent pipes shall be permitted to be fitted with return bends, coarse screens, or other devices to minimize ingress of foreign material.
41. Vent pipes and vapor return piping shall be installed without sags or traps in which liquid can collect.
42. Where tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they could be required to handle when manifolded tanks are filled simultaneously.
43. Piping systems shall be bonded and grounded in accordance with NFPA 30 6.5.4.
44. Each loading and unloading riser shall be marked to identify the product for which it is to be used.

Submittal Requirements

45. Plans and specifications/cut sheets shall be submitted in PDF Format into the online platform. A second set of plans shall be submitted on paper at the request of AHJ if needed. Plans shall contain sufficient detail to enable the plan reviewer to accomplish a complete review.
46. Each submittal shall have a completed:
    a. Kerrville Fire Marshal Permit Application.
    b. Texas Commission on Environmental Quality permit
    c. Copy of Contractors Texas Commission on Environmental Quality License.
47. Provide a written description of the operation and contents of the tank(s) and any associated piping and/or system(s).
48. The submittal package must include documentation identifying compliance with all above requirements.
49. A site plan drawing of the installation location and layout, to include:
    a. All buildings and structures
    b. Fire lanes and fire hydrants
    c. Location(s) of tanks, vent lines, underground product lines, leak detection, dry sumps, and dispensing locations
50. A full equipment listing of all tanks, piping, valves, and other equipment.
51. Manufacturer documentation for all parts and materials used in the project, this is to include the pumps, relief valves, and tank.
52. Plan drawings shall show the actual install layout, including all piping and pumps.
53. Plan drawings shall show both plan view, section view, and other pertinent information.
54. Plan drawings shall be generated by the installing company, and shall not be copied and marked according to installation.
55. Provide documentation of tank testing and ability to hold a vacuum. This is in addition to any testing required by the Fire Marshal.

Additional Information

56. Plans approved by the City of Kerrville, Fire Marshal give authorization for construction. Final approvals are subject to field verification. Any approval issued by the Fire Marshal does not release the contractor or property owner from the responsibility of full compliance with all applicable codes and ordinances relating to the construction project.
57. All installations must concur with the approved plans. Any deviation from the approved plans requires a resubmittal to the Fire Marshal's Office.
58. All fire marshal inspection forms and permits shall be kept in a permit packet on the job site until final inspection.