

<p>July 1, 2010</p>	<p>SANTA ROSA FIRE DEPARTMENT FIRE PREVENTION BUREAU STANDARD</p>
	<p>UNDERGROUND STORAGE TANK (UST) INSTALLATION</p>

Purpose

This standard outlines the general requirements for the installation of Underground Storage Tanks (UST). Information contained herein applies to typical instances and may not address all circumstances.

Code References

2007 California Fire Code (CFC) Chapter 22 & 34
California Health and Safety Code Ch. 6.7
California Code of Regulations Title 23 Ch. 16

Permit(s) Required

A UST Installation permit is required for the installation of all underground storage tanks intended to be utilized for the storage of hazardous substances. Categories and fee amounts can be found at: <http://ci.santa-rosa.ca.us/doclib/Documents/IB%20018.pdf>

For all electrical work associated with the UST installation a separate permit shall be obtained from the City of Santa Rosa Building Department.

Attachments

- 1) Plan Review Checklist - UST Installation
- 2) Inspection Checklist – UST Installation

Required Inspections

- 1) UST Tank Placement – The UST must be inspected and a pressure test verified by the Fire Department Inspector prior to placing it into the ground.
- 2) UST Pipe Test – All piping shall be tested as per the manufacture specifications.
- 3) UST Monitoring Test – A complete functional test must be performed for the monitoring system. The Fire Department Inspector must witness testing.
- 4) Enhanced Leak Detection Test (ELD) – A State Water Resources Control Board approved ELD test must be completed and passed prior to start-up.

- 5) UST Final Inspection - A final UST facility inspection must be completed by the Fire Department.

Inspections shall be scheduled a minimum of 48 hours in advance. Directions for scheduling are found at: <http://ci.santa-rosa.ca.us/news/Pages/AutomatedFireInspectionRequestSystem.aspx>

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Permit Information

The UST system shall be designed and installed in accordance with Title 23 CCR CH. 16, Title 24 CFC 2007 and the California Health and Safety Code Chapter 6.7.

Working plans shall be submitted for approval to the Santa Rosa Fire Department before any UST's are installed. A completed Permit and Plan Review Application Form and fee shall be submitted along with not less than three (3) sets of plans and calculations as required. A Santa Rosa Tax Certificate, a HazWoper Certification for all contractors on site, a site safety plan, current appropriate contractor's license and proof of worker's compensation insurance shall be provided or shall be on file at the time of application.

Any deviation from plans as submitted during the installation requires Fire Department approval. Plans shall include the information specified below and failure to provide all of the required information may result in the plans being rejected. Rejected plans will be returned with a Plan Review Correction Form. Review the form and make the required additions/ changes which shall be clouded for identification. Provide a legend to describe the addition or change. Allow ten (10) working days for review of submitted plans.

GENERAL PROVISIONS

All new underground storage tanks including associated piping used for the storage of hazardous substances shall have primary and secondary containment. Primary containment shall be product-tight. Secondary containment may be manufactured as an integral part of the primary containment or it may be constructed as a separate containment system. Secondary containment systems shall be designed and constructed such that the secondary containment system can be periodically tested.

The interstitial space of the underground storage tank shall be maintained under constant vacuum or pressure such that a breach in the primary or secondary containment is detected before the liquid or vapor phase of the hazardous substance stored in the underground storage tank is released into the environment. The use of interstitial liquid level measurement methods satisfies this requirement.

The underground tank system shall be designed and constructed with a continuous monitoring system capable of detecting the entry of the liquid- or vapor-phase of the hazardous substance stored in the primary containment, into the secondary containment, and capable of detecting water intrusion into the secondary containment.

The underground storage tank shall be provided with equipment to prevent spills and overfills from the primary tank.

Working plans shall be drawn to an indicated scale, on sheets of uniform size and shall contain the following data:

- **Project Scope “Scope of Work”** – The project scope is a general description of the project, installation time lines, procedures and should include a description of associated areas where equipment, tanks, piping and hazardous materials storage will be located. Also include a description of operations, hazardous materials handling procedures and safety systems. A schedule indicating projected start and completion dates.
- **Groundwater Wells** – Are wells being removed? All wells being removed or destroyed require separate permit from the Sonoma County Permit and Resources Management Division - Well & Septic (PRMD @ (707) 565-1680). Provide copy of PRMD permit to the SRFD.
- **Underground Service Alert** – Plan shall include locations of all utilities. Contact Service Alert at 800-642-2444 prior to the start of any excavation.
- **Subsurface Contamination** - Ensure subsurface is not contaminated (If contamination is detected an additional remediation permit from the Santa Rosa Fire Department will be required).
- **Site Security** – Provide for site security.
- **Training** – Training certifications for OSHA Hazwoper must be provided.
- **Site Safety Plan** - Is a plan provided which covers:
 - PPE – Personal protective equipment.
 - Health and safety officers.
 - Training requirements.
 - Monitoring – Environmental air monitoring.
 - Site Safety meetings.
 - Hazard Evaluations – Chemical, Physical and Natural.
 - Decontamination – Procedures for each.
 - Emergency response procedures – Phone numbers, site map, route to nearest hospital (map and written directions).
- **Fire Extinguisher** – On site during Construction. Provide at least one 40BC-rated portable fire extinguisher onsite and readily accessible within 50 feet of work area for UST Systems. Hot work or spark-producing operations shall not be conducted if UST System previously contained flammable/combustible liquids unless UST System is decontaminated and free of hazardous vapors.
- **Contractor’s License** – A copy of contractor’s license.
- **Certificate of Liability Insurance** –A copy of workers compensation certificate of liability insurance.
- **Business Tax Certificate** – A copy of City of Santa Rosa business tax certificate.
- **Manufacturers Installation Certifications** - Copy of manufacturer(s) certification(s) verifying contractors are trained and certified to install their equipment (UST’s, piping, sumps, under dispenser containment, and monitoring systems). Installation contractors must be re-certified as required by the equipment manufacturers or every 3 years.
- **ICC Certifications** – At least one person to be on site must be certified by the International Code Council as a CA UST SYSTEM INSTALLER and as a CA UST

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SYSTEM SERVICE TECHNICIAN - Information regarding the ICC exams can be found at <http://www.iccsafe.org/certification/ust.html> or 866-422-3926

Electrical

- Electrical wiring shall be per the 2007 California Electrical Code. Contact the City of Santa Rosa Building Department for permit requirements.

Forms

Provide the following:

- Completed Unified Program Consolidated Forms (UPCF) at www.unidocs.org :
 - UPCF Facility Information - Business Activities;
 - UPCF Facility Information - Business Owner/Operator Identification;
 - UPCF Underground Storage Tank Facility
 - UPCF Underground Storage Tank (one form for each tank); and
- UPCF Underground Storage Tank - Installation Certification of Compliance (one form for each tank) **to be submitted and signed by owner upon completion of installation.**
- New or revised Underground Storage Tank Monitoring Plan.
- New or revised Underground Storage Tank Response Plan.
- Completed Underground Storage Tank Certification of Financial Responsibility form along with any required attachments.
- Copy of "AS BUILT" plans accurately showing final locations of tanks, piping, dispensers, and any changes of materials or equipment used.

Design

Provide the following:

- **Scaled Drawing** - Showing the location and details of all UST's, piping, monitoring system, sensors, fill pipes, overfill prevention, spill containment, vent piping, pumps, sumps, anchoring, distances to the property lines, distance from buildings, distance from streets, etc.
- **UST System Setback Distances** - UST's and piping shall not be less than 3 feet from any basement wall, pit, cellar or property line.
- **Equipment Specifications** - Documentation that the equipment is approved by an independent testing organization (e.g., UL listing, etc.) for its particular use including tanks, piping, pumps, overfill prevention system, spill containment system, foot valves, swiveling fill pipe adapters, swiveling vapor return pipe adapter, monitoring systems, leak sensors, tank gauges, and other devices. UST tanks and piping must bear appropriate markings.

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- **California Air Resources Board (CARB)** - Approved fill riser caps are required.
- **Secondary Contained Sumps AND Under Dispenser Containment** – Required for all installations. UDC's shall be of a type approved by the State of California Division of Water Quality, Underground Storage Tank Program.
- **Monitoring Equipment** - Listed in the California State Water Resources Control Board local guidance LG-113. Must utilize vacuum, pressure or hydrostatic monitoring.
- **Piping for Flammable or Combustible Product** - All underground piping conveying flammable or combustible liquids must be approved by an independent testing organization (e.g., UL 971 Standard and marked with "UL 971").
- **Secondarily Contained Piping** – All piping must be secondarily contained. Including risers, product piping, vent piping and vapor return piping.
- **Aboveground Piping** – All piping for flammable or combustible liquids shall be metal, including the vent piping.
- **Compatibility** - Provide certification that materials of construction for UST's, piping, and secondary containment systems are compatible with the stored hazardous substances.
 - **Ethanol/Methanol Compatible** - Submit certification whether UST Systems (UST, piping, pumps, materials, equipment, adhesives, etc.) can store ethanol or methanol-containing gasoline.
 - **Bio-Diesel** - Submit certification whether UST Systems (UST, piping, pumps, materials, equipment, adhesives, etc.) can store Bio-Diesel.
- **Sump and Under Dispenser Containment (UDC) Penetration Sealants.** – Provide type of sealant to be used. Sealants must be approved by the manufacturer for their compatibility with equipment. All sump and UDC penetration pipe boots and sealants must be compatible with the hazardous substances conveyed in the piping.
- **Corrosion Protection** – Provide method for corrosion protection. UST's and underground piping shall be properly designed, installed and maintained, and protected from corrosion by cathodic protection and/or corrosion-resistant materials. All underground metal parts (including stainless steel) shall be dry and liberally coated with a water sealant (resin, asphalt, etc.)
- **UST Separation Distances** – Provide separation distances for all UST's to be installed. Distances between UST's must meet manufacturer installation guidelines.
- **UST Fill Locations** - Provide dimensions for fueling locations.
- **UST Foundation** – Provide material type to be used for backfill around UST's. UST's shall be set on firm foundations and surrounded with at least 6 inches of non-corrosive inert material such as clean sand or gravel well tamped in place or in accordance with manufacturer's installation instructions.
- **UST Slope** – Indicate proposed slope for UST's. All UST's shall be sloped in accordance with manufacturer requirements.
- **Excavation, Shoring and Sloping** – Provide method of shoring excavation. Methods shall be conducted in accordance with the Site Safety Plan. Excavation sloping, benching, sheet pile shoring and trench jacks are examples of acceptable methods. Any excavation depth greater than 4 feet requires a CAL-OSHA evacuation permit prior to worker entering the excavation. The minimum distance between piping and stable soils and/or shored excavations must meet manufacturer installation guidelines. The minimum distances between adjacent piping in an excavation must meet manufacturer installation

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guidelines.

- **UST Buoyancy Protection** - Provide type of uplift protection to be used. UST uplift protection shall be as per the manufacturer or NFPA 30. If concrete dead mans are poured on-site, they shall cure for at least 21 days before the UST can be attached. If dead-men are poured in place, all construction debris must be removed from the excavation.
- **UST Tie-Downs** - Must be constructed of non-corrosive material or coated steel and wider than the strapping and placed where required by the manufacturer. Tie-down cable saddle clamps must be installed so every other one is facing the opposite direction for greater holding strength.

MONITORING

- **UST (Tank) Monitoring** – Provide documentation of the following:
 - Double-walled tanks with continuous monitoring using continuous vacuum, pressure, or hydrostatic monitoring of the double-wall annular space.
 - Any leak shall initiate an audible and visual alarm that can immediately be detected by the UST operator.
- **UST Piping Monitoring** – Provide documentation of the following:
 - All double-walled piping shall have continuous monitoring of the secondary containment using continuous vacuum, pressure, or hydrostatic monitoring of the double-wall annular space as follows:
 - Product conveying piping (continuous vacuum or pressure);
 - Vent piping; (continuous vacuum, pressure, or hydrostatic);
 - Vapor recovery piping; (continuous vacuum, pressure, or hydrostatic).
 - Any leak shall initiate an audible and visual alarm that can immediately be detected by the UST operator.
 - For pressurized piping, the monitoring system shall shut down the turbine pump if a leak is detected or if the monitoring system fails.
- **UST Sump Monitoring for Piping, Riser, and Man-ways** – Provide documentation that the UST sumps will be continuously monitored by one of the following methods:
 - For single-walled sumps with single walled piping inside sumps (e.g., flex piping, fill piping, all riser piping, etc.). The interior sump space shall be continuously monitored for pipe joint leaks by using continuous vacuum or pressure.
 - For single-walled sumps with continuously monitored double-walled piping inside sumps using continuous vacuum, pressure, or hydrostatic monitoring of the double-walled piping (e.g., NO single-walled flex connections, fill piping, or riser piping).
 - For double-walled sumps continuously monitored by using continuous vacuum, pressure, or hydrostatic monitoring of the double-wall, the inside sump piping can be single walled (e.g., flex piping; fill piping, all riser piping, etc.). The internal sump space must have continuous liquid leak sensors to detect any piping leaks.

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- Sumps must be installed on all UST riser piping and man-ways (e.g., fill pipes, tank openings, automatic tank gauging, etc.).
 - A leak shall initiate an audible and visual alarm that can immediately be detected by the UST operator.
 - For pressurized piping, the monitoring system shall shut down the turbine pump if a leak is detected or if the monitoring systems fail.
 - All sumps must have water-tight lids.
 - Double-walled sumps must be installed with the secondary containment portion as close as possible to the underside of the concrete pad (or higher), so it reduces a potential pathway for chemicals to enter the backfill.
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- **UST Under Dispenser Containment (UDC) Monitoring** – Provide documentation that the UDC will be continuously monitored by one of the following methods:
 - Single-walled UDC with continuously monitored double-walled piping inside UDC using continuous vacuum, pressure, or hydrostatic monitoring of the double-walled piping (no single-walled flex connections). The double-walled piping must extend all the way to the emergency shutoff impact valve (shear valve). Since the UDC is single walled and a leak can occur from dispenser parts outside the double-walled piping, secondary containment testing must be conducted upon installation and every 3 years thereafter; OR
 - Double-walled UDC continuously monitored by using continuous vacuum, pressure, or hydrostatic monitoring of the double-wall. Inside UDC piping can be single walled (e.g., flex piping, etc.). The internal UDC space must have a continuous liquid leak sensor for any piping, fuel filter, or other leaks within the UDC as follows:
 - Liquid sensor which activates an audible and visual alarm display and positive shut down; OR
 - Mechanical float connected to emergency shutoff impact valve (shear valve).
 - Any leak shall initiate an audible and visual alarm that can immediately be detected by the UST operator, except mechanical float shut off.
 - Double-walled UDC's must be installed with the secondary containment portion as close as possible to the underside of the concrete pad (or higher), so it reduces a potential pathway for chemicals to enter the backfill.
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- **Automatic Line Leak Detectors (LLD's) for Pressurized Piping** – Provide manufacturer and model of all LLD's to be installed.
 - ALL pressurized piping must have automatic LLD's listed in [LG 113](#) and approved by an independent testing organization (e.g., UL Listing, etc.) for its particular use. Must, at a minimum, detect release within 1 hour, equivalent to 3.0 gph at 10 psi, with >95% probability of detection and <5% probability of false alarm. There are 2 types of LLD's, mechanical and electronic. LLD's must be tested every year.
 - Manual Line Leak Detectors (MLLD's):

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- Must be able to respond to simulated 3.0 gph leak annually; AND
- Must be able to restrict liquid flow, but not shut down pump, if it detects a leak.
- Electronic Line Leak Detectors (ELLD's):
 - Normally connected to ATG control panels; AND
 - Can be programmed to respond to simulated 0.2 gph leak monthly; AND
 - Can be programmed to respond to simulated 0.1 gph leak annually; AND
 - Must automatically shut off turbine pump if:
 - Leak is detected; AND
 - Any portion of monitoring system is disabled or disconnected; AND
 - Any portion of monitoring system malfunctions or fails a test.
- **Automatic Line Leak Detector Certification for Pressurized Piping –**
 - Date of certification.
 - Software version installed.
 - Manufacturer, model, and serial numbers.
 - Audible and visual alarms were operational, and if printable, a copy attached.
 - If alarms are relayed to remote monitoring station, must show all communications equipment (e.g. modem) were operational.
 - Monitoring system set-up has proper settings, and if printable, a copy attached;
 - Testing apparatus properly calibrated.
 - All equipment manufacturers' maintenance checklist are completed and attached.
 - All LLD's were operational and accurate within regulatory requirements.
 - If deficiencies were found, how and when they would be corrected.
 - All LLD's were operational and accurate within regulatory requirements.
 - If deficiencies were found, how and when they would be corrected.

Refer to the following documents for further information.

[SWRCB Local Guidance letter 162-1 \(LG 162-1\)](#)

And

[SWRCB "Summary Table of Underground Storage Tank \(UST\) Leak Prevention & Enforcement Provisions of Assembly Bill \(AB\) 2481 & AB 1702"](#)

Construction Verifications/Testing Notes

- **Tank Set – Ensure the following;**
 - All coated steel tanks are tested with an electric resistance holiday detector prior to install.
 - All double walled fiberglass tanks are received on site with a vacuum on the annular space.
 - Pressure test of the tank shall be performed prior to placement of tank in the pit.
 - Tanks are set gently as to not damage the tank.
 - Post installation testing conducted to verify condition
 - Dead-men are non-ferrous metal.

- **Piping install- Ensure the following;**
 - Piping slope. Minimum ¼ inch per foot.
 - Contractor verified primary and secondary soap test.
 - Double walled product lines, vent, vapor riser and annular.

- **Sump install – Ensure the following**
 - Double walled sumps. If sections, confirm attachment method will maintain an intact annular.
 - Transition of vacuum to other sumps is through double walled monitored piping.
 - If hydrostatically monitored, verify method to fill (bottom up/vacuum)
 - Boots installed to maintain annular communication.

- **UDC install – Ensure the following**
 - Double walled UDC's
 - If hydrostatically monitored, verify method to fill (bottom up/vacuum)

- **Monitoring system – Ensure the following**
 - Float sensors capable of detecting a leak at the earliest opportunity (at the lowest point).
 - Located to provide continuous audible and visual alarms.
 - Vacuum sensors functional. Verify communication throughout system (end to end)
 - Leak detectors functional at 3.0 gph.