NEIWPCC

Tanks Program

- Webinar Series
- L.U.S.T.Line
- National Tanks Conference

UST INSPECTOR TRAINING WEBINAR SERIES:

UST SYSTEMS AT MARINAS

11/15/2021

Today's Speakers

Tim Smith | ***U.S. EPA***

J. David Stone | ***Tennessee DEC***

Steve Latimer | ***Wilson/Rogers & Associates***

NEIWPCC's
UST Systems at Marinas Webinar
November 15, 2021

Tim Smith

EPA Office of Underground Storage Tanks

Introduction

1. What are the release detection (RD) requirements - which are applicable?

2. Features of these systems that present a challenge to meeting federal UST piping RD requirements.

3. Release detection and broader release response concerns.

Release Detection Requirements

- Original UST regulation became effective December 22, 1988.

- All tank and piping release detection requirements apply.
  - General requirements:
    - Use a method or combination methods that can detect a release from any portion of the tank and the connected underground piping that routinely contains product.
    - Is installed and calibrated in accordance with manufacturer's instructions.
  - Tank and piping specific requirements.

Release Detection Requirements (Tank Specific)

- **Monitor for releases at least every 30 days**
- **Tank method options**
  - Interstitial monitoring
  - ATG
  - SIR, CITLD
  - Manual tank gauge
  - Groundwater or vapor monitoring
  - Other method

Release Detection Requirements (Piping Specific)

Piping requirements / options

- Suction piping
  - Safe: No release detection required
  - American/"non-safe": 3-year LTT or 30-day monitoring
- Pressurized piping – Use ALLD (3 opts.)

  PLUS

  - Annual LTT, or
  - 30-day tank method applicable to piping
- Variations/recommendations by codes of practice

Release Detection Requirements (Piping Specific Cont.)

Excerpts from RP1000-14, **section 4.2.1 – Leak Detection for Underground Piping**

- If a submersible pump is used, install a listed mechanical or electronic line leak detector. If an electronic line leak detector is installed, it should provide positive shutdown if a leak rate of 3 gallons per hour or greater is detected. If the piping system includes an anti-siphon valve (see Section 4.4.1) at the tank, install the leak detector in an appropriate fitting immediately downstream of the anti-siphon valve. Verify that the line leak detector is certified to function with the type of fuel that will be stored and with the material, length and diameter of the underground piping.

Release Detection Requirements (Piping Specific Cont.)

- The line leak detector in a marina fueling system is intended to monitor only the buried portion of the piping. This is because the temperature changes that will likely occur in the above-grade portions of the piping on the dock will be beyond the design parameters of the leak detector and will produce unreliable results. In addition, monitoring the aboveground portion of the piping may also substantially increase the volume of the piping to be monitored. The increased piping volume may exceed the rated capacity of available line leak detectors.

Release Detection Requirements (Revised Federal UST Regulation)

- April 11, 2016 (Tank and Piping)
  - Installed on or before – All RD method options available
  - Installed after this date
    - Must be secondarily contained and use interstitial monitoring
    - Install UDC
- Walkthrough inspections (30-day RD equip. checks, annual containment sump check)
- 3-year test containment sumps used for piping I.M.

Release Detection Requirements (Revised Federal Cont.)

Annual release detection equipment testing (Piping)

- Ensure release detection equipment is operating properly.
  - ALLD, sensors, ATG/system controller, etc.
  - Manufacturer's instructions, code of practice, or agency requirements.
- Keep records for 3 years.

Features Of These Systems That Present A Challenge To Meeting Piping RD

- Pipe runs
  - ✓ Long piping runs.
  - ✓ Changing grade of piping runs.
  - ✓ Lack of isolation between underground and aboveground segments.
    - ✓ Scope of federal UST regulation.
  - ✓ Compliance with other requirements.

Release Detection And Broader Release Response Concerns

- Full environmental protection - addressing release detection for the entire facility.
- Impacts to aboveground areas from releases.
- Impacts to navigable waters.

Release Detection And Broader Release Response Concerns (Cont.)

- Facilities subject to the SPCC regulation
  - Intended to help facilities prevent a discharge of oil into navigable waters or adjoining shorelines) are required to follow certain federal reporting requirements.
  - In general, SPCC requires that any person in charge of an onshore or offshore facility must notify the National Response Center (NRC) immediately after he or she has knowledge of the discharge. Oil discharges that reach navigable waters must be reported to the NRC at 1-800-424-8802 or 1-202 426-2675. The NRC is the federal government's centralized reporting center, which is staffed 24 hours per day by U.S. Coast Guard personnel.

QUESTIONS?

Contact Info

- Tim Smith
  - (202) 564-0643
  - smith.timr@epa.gov

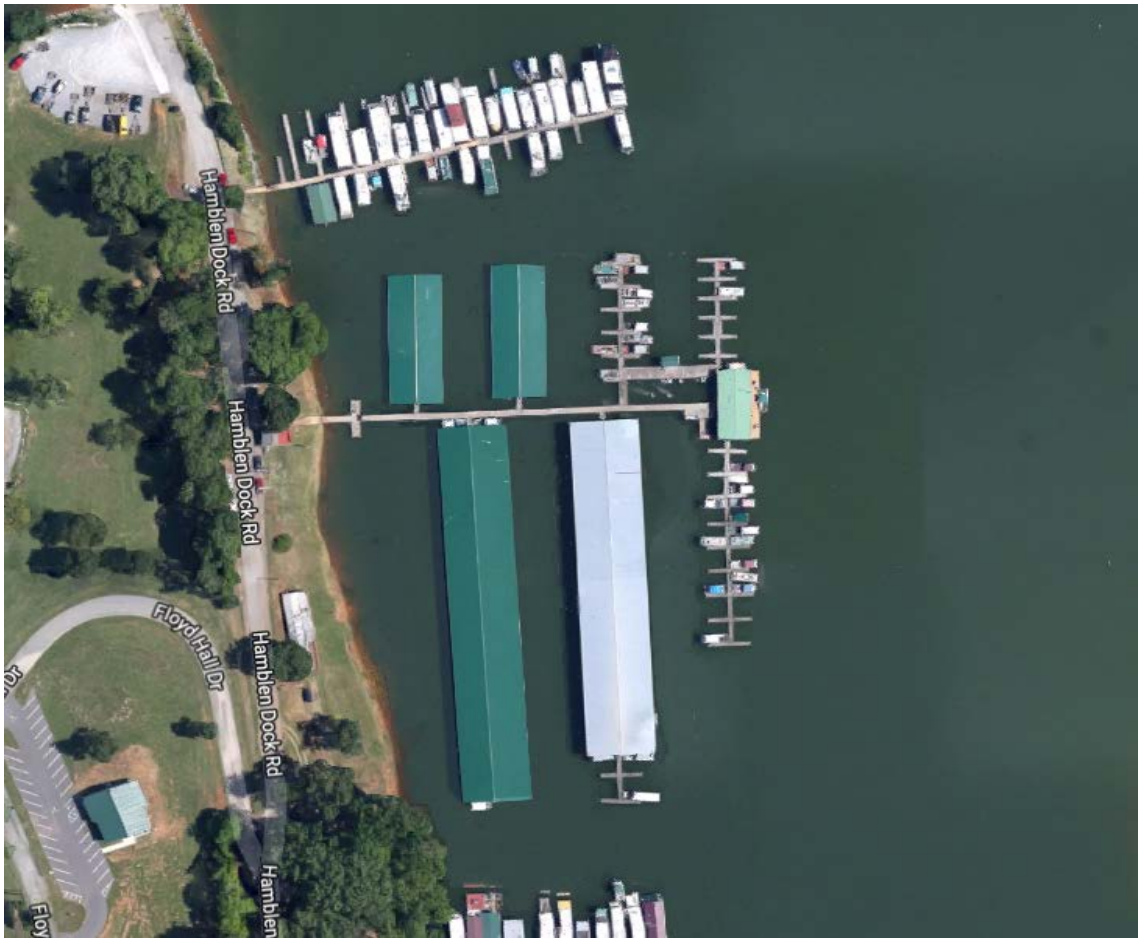
Department of
Environment &
Conservation

NEIWPCC UST Inspector Training Webinar Series

UST Systems at Marinas

David Stone, TDEC UST Division, November 15, 2021

Marina UST systems in Tennessee



Background

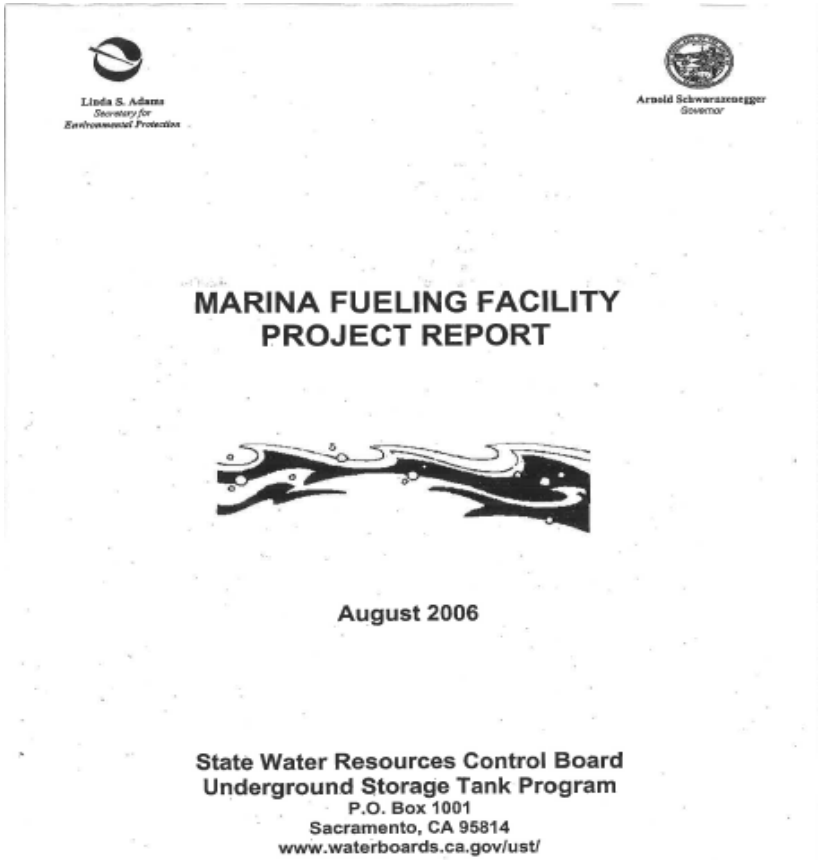
Increased pipe length

Elevation loss from the tanks to dispensers

Unfamiliar pipe materials and equipment

Time for some research

What did we research?



Linda S. Adams
Secretary for
Environmental Protection

Arnold Schwarzenegger
Governor

MARINA FUELING FACILITY
PROJECT REPORT

August 2006

State Water Resources Control Board
Underground Storage Tank Program
P.O. Box 1001
Sacramento, CA 95814
www.waterboards.ca.gov/ust/

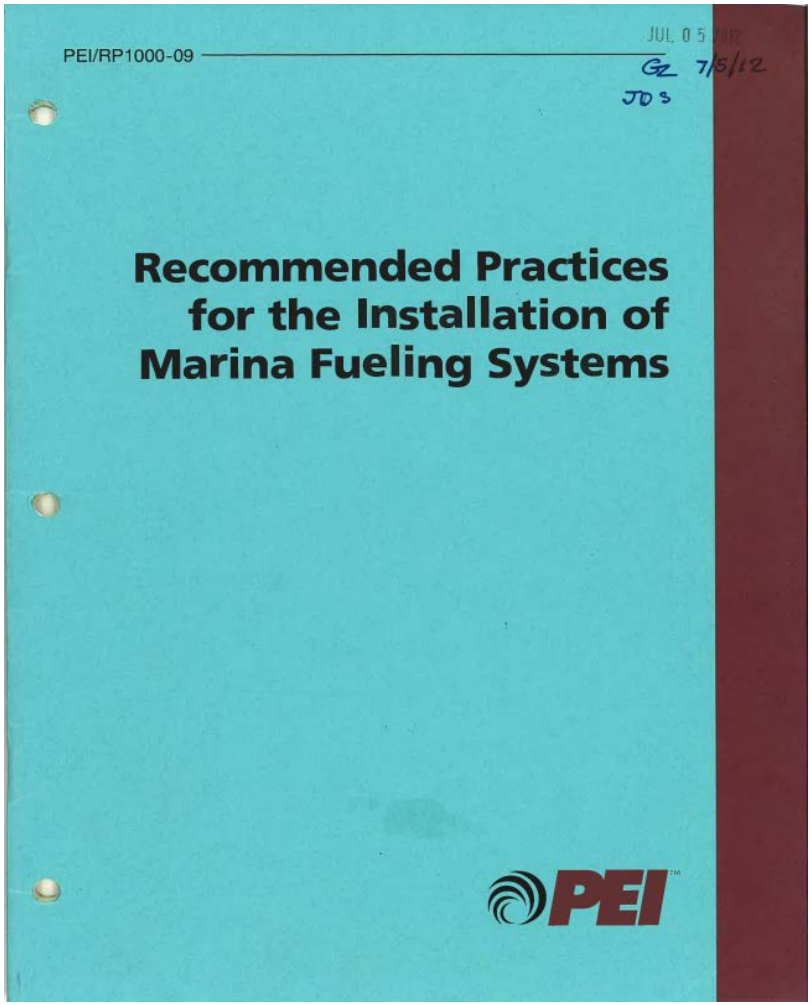
What did the California report find?

- Marine fueling systems are not designed, constructed, or operated to prevent fuel releases.
- 183 marine fueling facilities reviewed: 75% of fuel pipe is single wall; approximately 50% of fuel pipe is over water, underwater, or floating on water; and approximately 80% of fuel pipe is not monitored for fuel releases.
- Releases from the poorly designed systems can be detected only after hazardous substances have entered the environment.
- Existing laws and regulations are inconsistent across regulatory programs and in many cases no requirements exist at all.

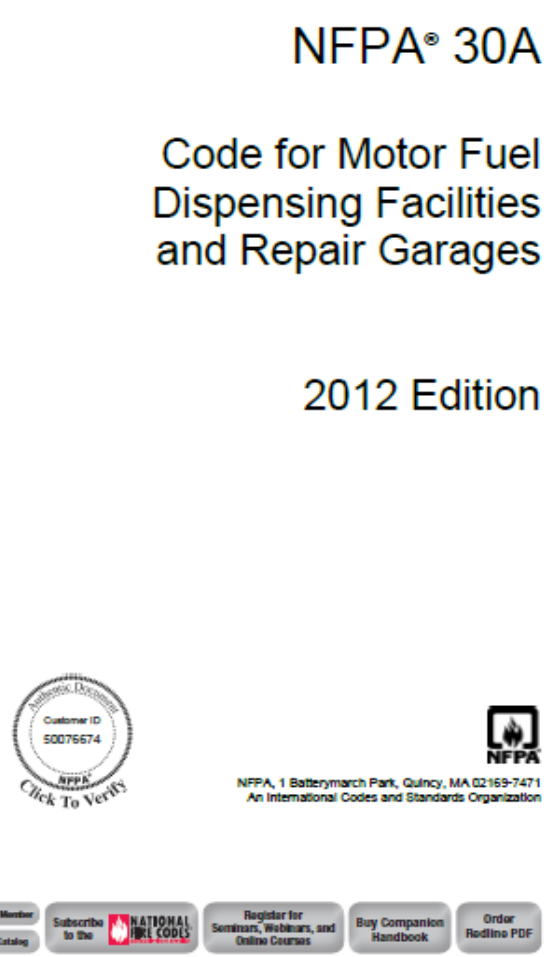
What did the California report suggest?

- Upgrade marina fueling systems. This would include:
  - Installing fully double wall systems.
  - Using continuous electronic leak detection between the primary and secondary containment.
  - Having all pipe used in aboveground applications to be approved by an independent testing organization in accordance with industry standards.
  - Using anti-siphon devices.
  - And having emergency shutoff switches.
- Regulate AST's and UST's at marine fueling facilities under the same requirements.

PEI RP-1000-09:



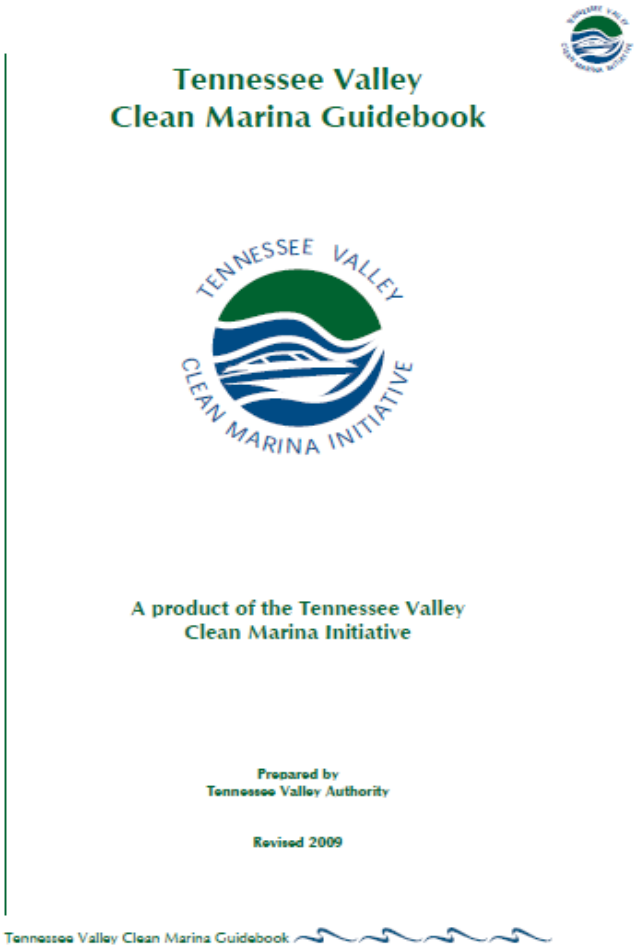
NFPA 30A, Chapter 11 Marine Fueling:



Marina UST systems and fire code:

- National Fire Protection Association (NFPA) 30A Chapter 11 Marine Fueling
  - Downgradient Piping needing an anti-siphon device (normally closed solenoid) installed at the tank. (11.2.3)
  - Shutoff valves to be provided at the shoreline and at the shore end of dock pipe. (11.3.5)
  - Marina pipe to be protected against physical damage and stresses arising from impact, settlement, vibration, expansion, contraction, and tidal action. (11.3.2)
  - Hose lengths exceeding 5.5m(18 ft), to be secured so as to protect it from damage. (11.4.1)
  - Dispensing nozzles to be of the automatic-closing type without a latch-open device. (11.4.2)
  - And each marine motor fuel dispensing facility to have an attendant or supervisor on duty whenever the facility is open for business. The attendant's primary function will be to supervise, observe, and control the dispensing of liquids. (11.4.7)

Tennessee Valley Authority (TVA):



Tennessee Valley
Clean Marina Guidebook

TENNESSEE VALLEY CLEAN MARINA INITIATIVE

A product of the Tennessee Valley
Clean Marina Initiative

Prepared by
Tennessee Valley Authority

Revised 2009

Tennessee Valley Clean Marina Guidebook

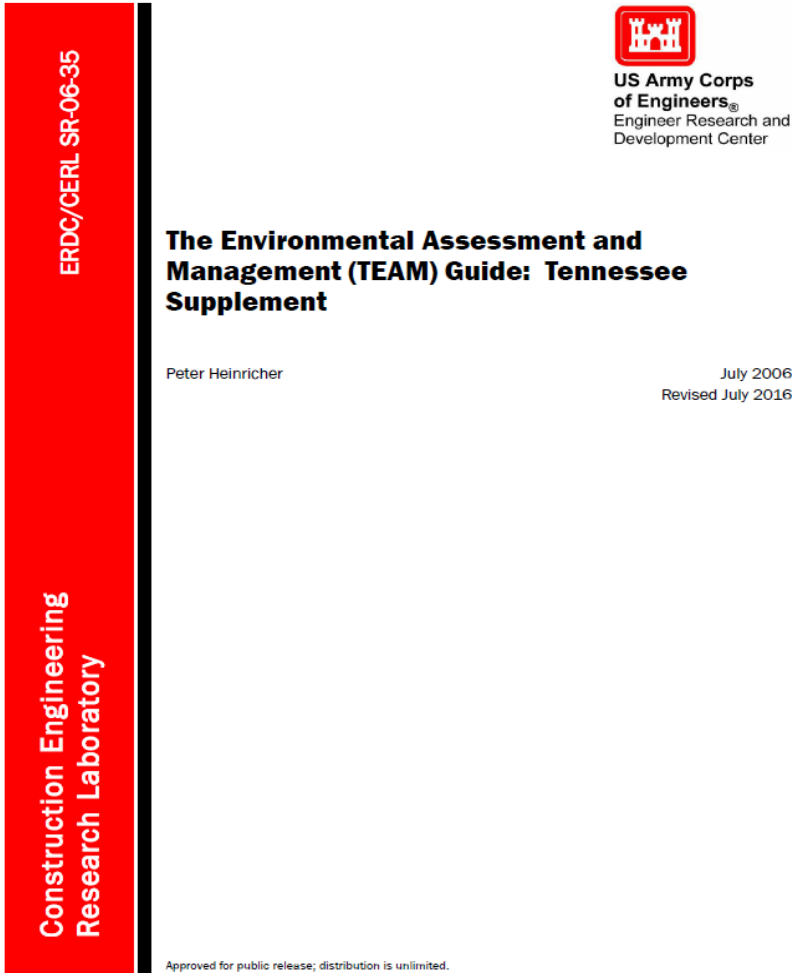
Marina UST systems and land managers:

- Section 26a of the TVA Act
  - § 1304.405 Fuel storage tanks and handling facilities

(a) TVA requires the following to be included in all applications submitted after September 8, 2003, to install an UST or any part of an UST system below the 500-year flood elevation on a TVA reservoir, or regulated tailwater:
(1) A copy of the state approval for the UST along with a copy of the application sent to the state and any plans or drawings that were submitted for the state's review;
(2) Evidence of secondary containment for all piping or other systems associated with the UST;
(3) Evidence of secondary containment to contain leaks from gas pumps(s);
(4) Calculations certified by a licensed, professional engineer in the relevant state showing how the tank will be anchored so that it does not float during flooding; and
(5) Evidence, where applicable, that the applicant has complied with all spill prevention, control and countermeasures (SPCC) requirements.

Marina UST systems and land managers:

US Army Corps of Engineers
Section 10, Storage Tank Management, Pages 1-58



What are the UST regulations?:

- Rule 0400-18-.02(1)(b)
  - All underground storage tank systems shall be installed in accordance with the manufacturer's installation instructions.
- Rule 0400-18-01-.02(1)(a)2.
  - Owners and/or operators of UST systems shall provide a method, or combination of methods, of release detection that is installed and calibrated in accordance with the manufacturer's instructions and is operated and maintained in accordance with one of the following:
    - The manufacturer's instructions;
    - A code of practice developed by a nationally recognized association or independent testing laboratory; or
    - Requirements determined by the Division to be no less protective of human health and the environment than the two options listed in subparts(i)and (ii) of this part.

What are the UST regulations (continued)?

- Rule 0400-18-01-.04(1)(a)5.
  - Owners and/or operators of UST systems shall provide a method, or combination of methods, of release detection that has had a third-party evaluation reviewed by the National Work Group on Leak Detection Evaluations (NWGLDE) and a listing of the leak detection equipment or method appears on the list maintained by the NWGLDE. However, any NWGLDE listed leak detection equipment or method for which there is no longer any technical support available may not be used to meet the requirements of this paragraph.

What are the manufacturer's instructions?

RED JACKET PETROLEUM EQUIPMENT

FIELD SERVICE BULLETIN

Bulletin: RJ-23-B
Revision: B
Product: Mechanical Leak Detectors
Reference: Marine Application
Date: April 1988

When installing a mechanical leak detector in a typical marine application (or the like) where there is a severe slope downward toward the dispensers (see Fig. 1), NFPA Code 30A (1984) states:

Sec. 2-1.7

"Where tanks are at an elevation which produces a gravity head on the dispensing unit, the tank outlet shall be equipped with a device, such as a solenoid valve, positioned adjacent to and downstream from the valve specified in Sec. 2-2.71 of NFPA 30, Flammable and Combustible Liquids Code, so installed and adjusted that liquid cannot flow by gravity from the tank in case of piping or hose failure when the dispenser is not in use."

Sec. 2-2.71

"Each connection to an above ground tank through which liquid can normally flow shall be provided with an internal or an external valve located as close as practical to the shell of the tank."

Please check the latest edition of these NFPA codes and proper authorities to meet all specifications in your area. To provide adequate leak detection (per the design parameters of the Red Jacket mechanical leak detectors), we suggest in Fig. 1 this type of installation utilizing a solenoid valve (or the like) before the leak detector and a Red Jacket Part #038-072 leak detector adapter to enable the leak detector to detect a leak downstream if a leak does occur.

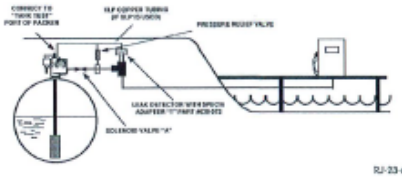
CAUTION: Be sure to utilize the Red Jacket adapter when installing a mechanical leak detector this way. A regular "T" does not have the special lip to allow the leak detector to go through its three-step test for a leak downstream.) A pressure relief valve must be installed as shown to avoid excess pressure build up in the line due to product expansion. The discharge of the pressure relief valve must be vented to the tank through the "Tank Test" port on the packer of the pump.

If a leak did occur, after the submersible pump turned off, the solenoid valve would shut tight, preventing any syphoning effect from the tank through the submersible pump and, yet, allowing the leak detector to detect a leak. We suggest the electrical power to subject solenoid valve must begin and end simultaneously to that of the submersible pump. The solenoid valve in the dispenser should be delayed, if necessary, for approximately four seconds after the submersible pump starts up to help prevent nuisance tripping by the leak detector due to thermal contraction.

NOTICE: If a Piston-type Leak Detector is used, the copper tubing must still be vented to the tank test port of the submersible pump. Extra tubing might be needed to reach this port. Any hardware store should carry 1/4" standard copper tubing.)

Please keep this bulletin for your future reference.

FIGURE 1



RJ-23-6 REV. B 6/94

What are the manufacturer's instructions?

ARM-4073

AST-4010
AST-4012

CFOSI

FST-200

ISM-4080
ISM-4081
ISM-4080 MC

LD-2000
LD-2000\E

LD-2200
LD-2200\75

LD-3000
LD-3000\E
LD-3000\FL

LDT-890
LDT-890\AF

OFP-2\1
OFP-2\2
OFP-3\1
OFP-3\2
OFP-HHP
OFP-FTK

PLC-5000

SUMP-300

VMI-PMTT

Vaporless Manufacturing, Inc.

Quality Petroleum Equipment
Solutions for Over 20 Years

Technical Bulletin 120904 (Revised 12/26/12)

AST Bleed-back Testing

Problem: Above Ground Storage Tanks, Marinas Scenario:

Fuel storage for a marina typically sits high above the water level and flows downhill to a docking area. In some rural areas, above ground storage tanks are fairly common for normal fuel dispensing. There are other scenarios where the leak detector may sit higher than the dispensing system.

Our recommended equipment placement for a system such as this is as follows:

A. On discharge of submersible pump install a normally closed solenoid.
B. Install a VMI Leak Detector Adaptor (Part # LD99-5040)
C. Install VMI 99LD-2000 Leak Detector

When trouble-shooting possible leak detector problems, it is very helpful to know what the resiliency (bleed-back) of the line is. It is also necessary to know the bleed-back when installing an ARM-4073 Automatic Repressurization Module or an ISM-4080/4081 Integrated Shutdown Module. An important programming feature of these two products depends upon setting the proper timing sequence to assure the leak detector has time to reset if a leak is present.

When testing a typical service station, it would be performed at the farthest or highest dispenser in the piping system. When measuring the bleed-back, we turn the pump on, let it go to full pump pressure, turn the pump off, and measure how much fuel goes into the beaker as line pressure drops to zero. A typical bleed-back may be 100 ml.

If you did this on a system where the leak detector is higher than the dispensers you will probably drain the entire pipe and you would not get an accurate bleed-back reading.

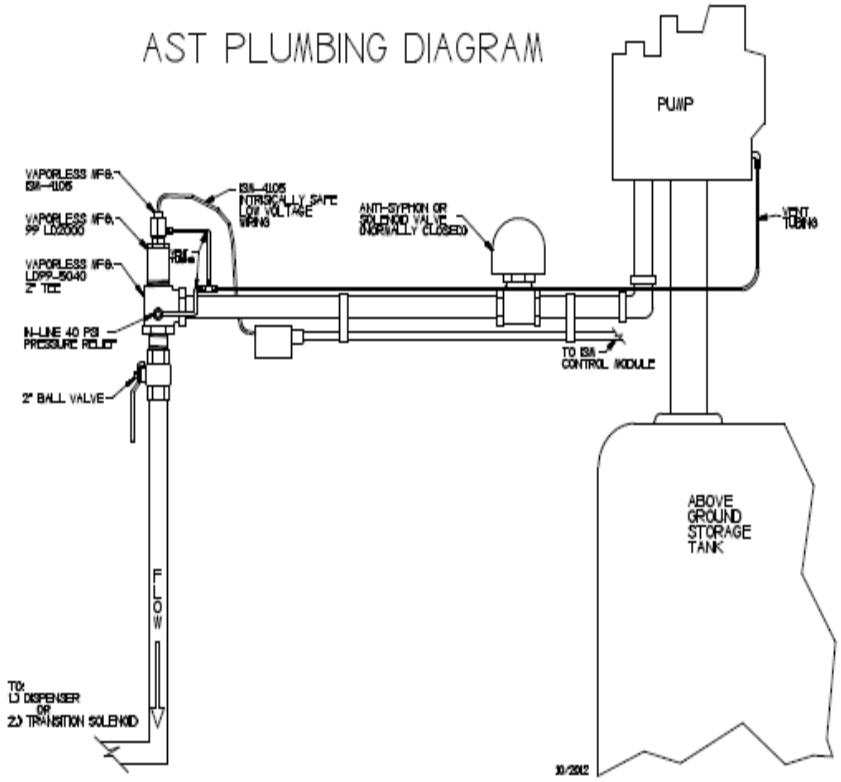
The proper method of measuring the resiliency in the above scenario is as follows:

1. Turn the pump off.
2. Install the LDT-890 Leak Detector Tester into the line test port of the LD99-5040 Leak Detector Adaptor
3. Turn the pump on.
4. Watch the right hand gauge of the LDT-890 as it attains full pump pressure.
5. Turn the pump off.
6. Put the large beaker under the drain hose of the LDT-890.
7. Open the 4-way valve to Dispensing Nozzle position.

Whatever amount of fuel drains into the beaker when the pressure gauge drops to 0 psi is the bleed-back.

Test the leak detector as per normal LDT-890 instructions to assure it functions properly.

Vaporless Manufacturing, Inc.
8700 E. Long Mesa Drive, Prescott Valley, Arizona 86314
800-367-0185 928-775-5191 Fax: 928-775-5309
Email: vmi@vaporless.com Web Site: www.vaporless.com



What are the manufacturer's instructions?

FE PETRO®
Franklin Fueling Systems

STP-MLD

Installation and Owner's Manual

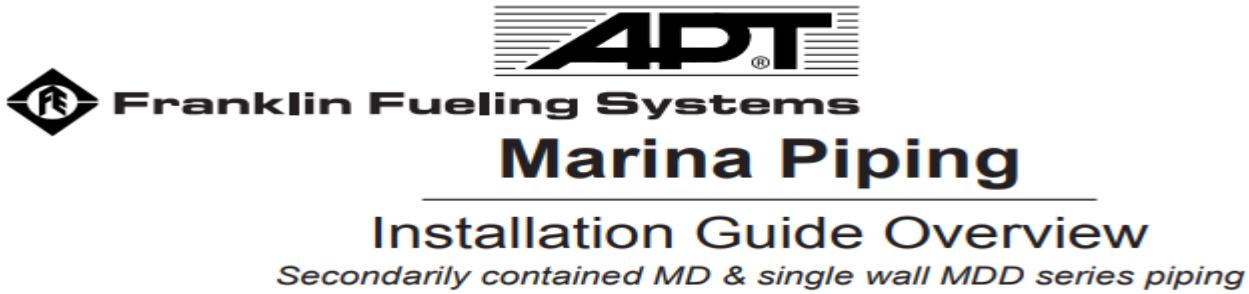
Warning ⚠ Follow all federal, state, and local laws governing the installation of this product and its associated systems. When no other regulations apply, follow NFPA codes 30, 30A, and 70 from the National Fire Protection Association. Failure to follow these codes could result in severe injury, death, serious property damage, and/or environmental contamination.

Warning ⚠ This leak detector is designed for use in certain applications and in compliance with industry standards and practices. Use in different applications or failure to follow industry standards and practices may cause the product to malfunction or fail.

Caution ⚠ STP-MLD units are designed to detect leaks from where the STP-MLD is installed and downstream of it. A leak in the piping upstream of the STP-MLD, which includes the pump, would require a second means of monitoring to be detected. Thus, install the STP-MLD as close to the pump as possible to minimize upstream piping.

Franklin Fueling Systems • 3760 Marsh Rd. • Madison WI 53718 USA
Tel: +1 608 838 8786 • 800 225 9787 • Fax: +1 608 838 6433 • www.franklinfueling.com

What are the manufacturer's instructions?



- Franklin Fueling System's Metallic Ducted Marina Pipe (MD pipe) is a combination of APT™'s XP Series pipe and metallic conduit. MD pipe is specifically designed for use on aboveground installations and is commonly used in marinas, fuel oil lines and emergency generator feed and return lines. The metallic ducting provides a liquid-tight protective covering to enhance resistance to crushing, kinking, abrasion and other types of physical damage. It also provides added fire and UV protection and it can be used in both freshwater and saltwater marina applications.

What are the manufacturer's instructions?

APT XP-MD

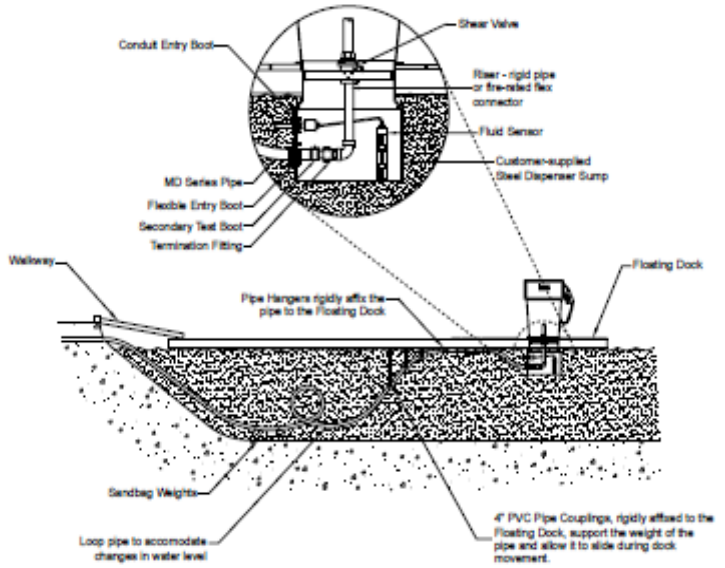


Figure 2: Floating Dock Typical Install #1

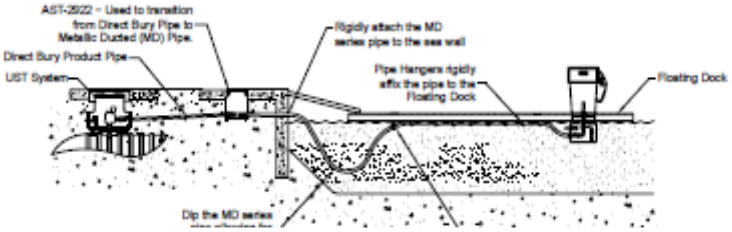


Figure 3: Floating Dock Typical Install #2

Additional pipe manufactured for marina use:

- Brugg Flexwell
- NUPI
- Omega Flex Doubletrac

Other issues with marina pipe:

“Bonnie” Beaver

“Clyde” Otter

Aquatic bandits:

- Suspected of destroying fuel pipe at the following facilities in Tennessee:
  - Defeated Creek Marina
  - Paris Landing Marina
  - Center Hill Marina (on Memorial Day weekend)
- Also rumored to destroy outdrive transom seals that has sank a few boats

Pipe release detection limitations:

- Calculating line volume:
  - ~10gal/100ft (1.5”pipe)

Veeder-Root Line Leak Application Guide

Supported Pipe Types and Line Lengths* - For DPLLD, PLLD and WPLLD

*lengths approved are for 3.0, 0.2, & 0.1 gph line leak tests using single pipe types. For mixed line types with DPLLD or PLLD, see footnote 1 , 6 &7 respectively.

PIPE TYPE	TLS-4XX w/ DPLLD[6,7] (Length Feet)	TLS-350 w/ PLLD[1] (Length Feet)	TLS-350 w/ WPLLD[2] (Length Feet)	BULK MODULUS[3] (PSI)	VOLUME (Gallons/Foot)
RIGID PIPE					
FIBERGLASS (2 INCH)	10-3660	10-500	10-500	25,000	0.204
FIBERGLASS (3 INCH)	10-2619	10-220	10-220	35,000	0.461
STEEL (2 INCH)	30-3000	30-500	30-500	50,000	0.190
COPPER (1 INCH, TYPE K)	10-500	10-500	No	55,000	0.041
FLEXIBLE PIPE - ADVANCED POLYMER TECHNOLOGY					
1.5-INCH (P150SC)	20-3000	20-1100	No	8800	0.092
1.75-INCH (P175SC)	20-3000	20-850	No	7400	0.125
2.0-INCH (P200SC)	20-3000	20-650	No	5600	0.163
2.5-INCH (P250SC)	20-3000	20-430	No	4400	0.255
1.5-INCH (XP-150-SC)	20-3000	20-1100	No	5042	0.092
2.0-INCH (XP-200-SC)	20-3000	20-650	No	5420	0.163

Line leak detector 3rd party evaluations:

- Red Jacket FX MLLD
  - Maximum of 49 gallons for flexible pipe (FX1 and FX2).
  - Maximum of 316 gallons for rigid pipe (FX1).
  - Maximum of 362 gallons for rigid pipe (FX2).
- Vaporless LD2000
  - Maximum of 59.6 gallons for flexible pipe.
  - Maximum of 129 gallons for rigid pipe.
- Franklin Fueling STP-MLD+
  - Maximum for rigid system is 165.1 gallons.
  - Maximum for flexible system is 109.8 gallons.
  - Maximum combined capacity is 274.9 gallons, not to exceed the above individual capacity limitations for rigid or flexible pipelines.

Line tightness test 3rd party evaluations:

- Petro Tite
  - Maximum of 49.6 gallons for flexible pipe.
  - Maximum of 129 gallons for rigid pipe.
- Estabrook EZY-CHEK
  - Maximum of 101 gallons for flexible pipe.
  - Maximum of 426 gallons for rigid pipe.
- Leighton O'Brien Technologies, Ltd. Qualitative Dry Line Test PM2
  - Maximum of 165 gallons in rigid piping.
  - Maximum of 110 gallons in flexible piping.
  - Maximum total of 275 gallons in combination rigid and flexible (the capacity of the flexible component cannot exceed 110 gallons).

What did we do with our new knowledge?

- The committee visited each marina UST facility with the local compliance inspector to determine if there were issues with materials, equipment or release detection.
- The committee met after each compliance inspection to discuss the findings and develop a plan for each facility.
- The committee issued Return to Compliance plans for each facility with material, equipment or release detection issues and provided an extended deadline so the owners/operators could budget for the repairs and complete the work in the off season.

What was changed?

- We added anti-siphon normally closed solenoids to USTs with downgradient piping that did not already have one installed.
- We made sure the line leak detectors were installed downstream of the anti-siphon solenoid per the manufacturer's instructions.
- We made sure that a sump and sensor was installed to monitor the portion of pipe upstream of the line leak detector.
- We made sure that fuel transfer hose and pipe not designed for protection from physical damage and UV exposure was replaced with pipe designed for marina use.
- And we made sure that line leak detectors and line tightness test methods were adequate for the pipeline volume at the marina.

What was the result?

- As expected, facilities with a good compliance history made the needed changes.
- Those that did not meet the extended compliance deadline were sent to enforcement for another chance to make the needed changes.
- We have drafted some marina specific Rules to include in an upcoming Rule package.
- We even had a marina owner take the opportunity to add slips and extra dispensers to his fueling dock and he was very happy with his customer's positive comments and increased business.

And we're finished!

- Thank you for your time!!

- Any questions?

NEIWPCC UST INSPECTOR TRAININIG WEBINAR SERIES

UST Systems at Marinas

Marina Fuel Piping and Accessories

Presented by:

Steve Latimer

Wilson/Rogers & Associates

Lynnwood, WA

Marina Fuel Piping & Accessories

- Industry Advancements – UL-1369
- Underground Piping
- Aboveground Piping
- Onshore Piping Sump
- Dock Transition Sump
- Valves and Accessories

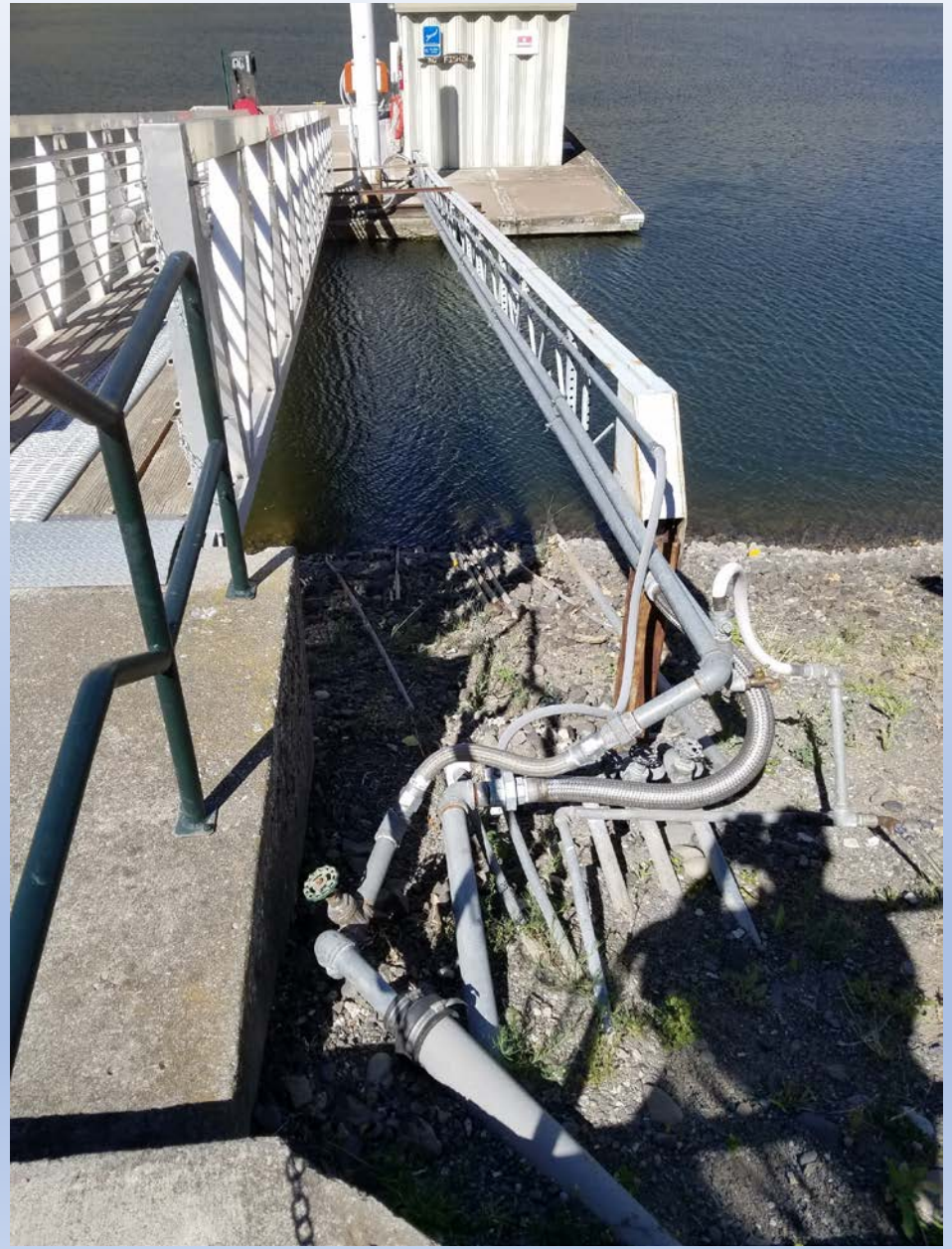
Industry Advancements – UL-1369

Amazingly, until August of 2018, there was no defined standard for aboveground piping installed over the water for marina fueling applications.

These were considered acceptable:

Industry Advancements – UL-1369

Industry Advancements – UL-1369



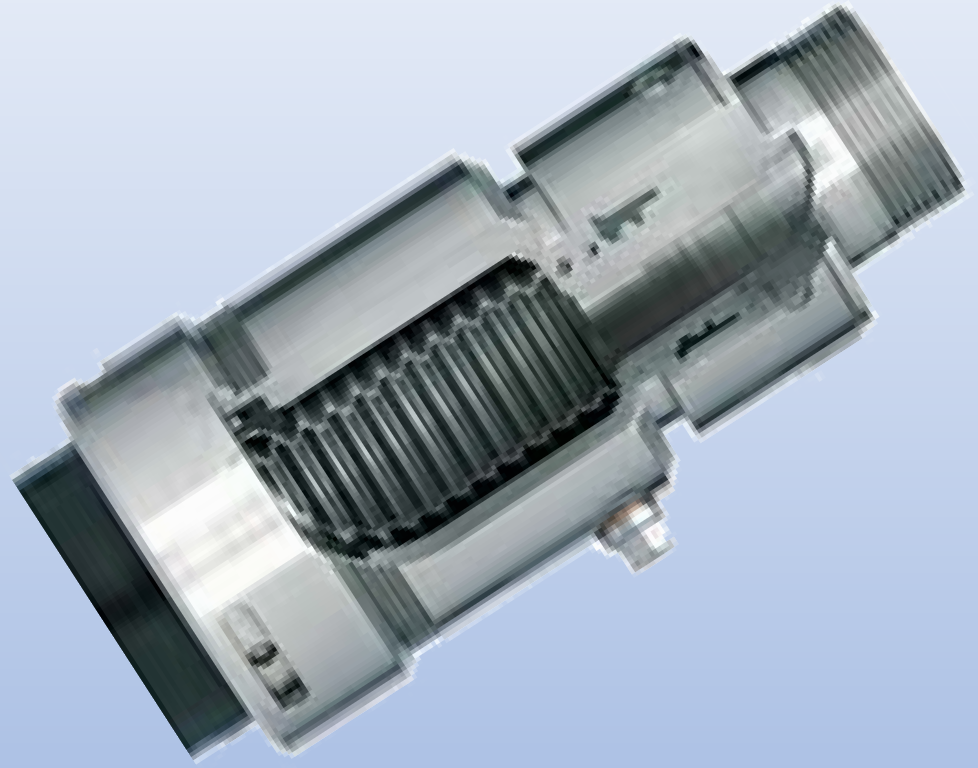
Industry Advancements – UL-1369

Thankfully, that is no longer the case.
UL-1369, released in August 2018, is the Standard for Aboveground Piping for Flammable and Combustible Liquids.

UL-1369 is applicable to aboveground indoor, outdoor and marina fuel handling applications.

In October of 2020, two manufacturers were awarded the UL-1369 designation.

Industry Advancements – UL-1369



Industry Advancements – UL-1369

To earn the UL-1369 designation, manufacturers must meet or exceed specification and testing criteria, including but not limited to:

- Pressure Testing
- Physical Testing (Drop, Puncture, Impact, Torque, Pull, Crush & Bend)
- Severe Corrosion Resistance
- Tide Cycle Testing
- UV Exposure
- Fire Resistance (min. 30 minutes @ 1,800 degrees F)*
- Fuel Compatibility
- Anchorage & Support

**Currently listed manufacturers both achieved 2-hour fire test.*

Industry Advancements – UL-1369

The scope of UL-1369 covers primary, secondary and coaxial types of aboveground pipes intended for transfer and containment of flammable and combustible liquids.

These pipes may be flexible or rigid, constructed of metallic, nonmetallic or composite materials in single continuous or multiple joined lengths in nominal sizes from ½” to 6” diameter.

Industry Advancements – UL-1369

Vehicular fueling systems, aviation fueling, boiler/generator systems and marina fueling systems are the intended applications to utilize UL-1369 piping.

Products covered by UL-1369 are intended to be installed and used in accordance with applicable Codes and Regulations as determined by the Authority Having Jurisdiction (AHJ), including but not limited to:

Industry Advancements – UL-1369

1. NFPA 20 - Standard for the Installation of Stationary Pumps for Fire Protection
2. NFPA 30* - Flammable and Combustible Liquids Code

**2021 Edition already includes UL-1369 verbiage in Chapter 27.4.7.2.*

1. NFPA 30A - Code for Motor Fuel Dispensing Facilities and Garages
2. NFPA 31 - Standard for the Installation of Oil-Burning Equipment
3. NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines
4. NFPA 407 - Standard for Aircraft Fuel Servicing
5. NFPA 1 - Uniform Fire Code
6. IFC - International Fire Code published by the International Fire Council; and/or
7. Other applicable federal & state regulations for piping.

Industry Advancements – UL-1369

Manufacturers of approved systems are allowed to dual list piping that carry's both UL-971/971A (Underground Piping) and UL-1369 (Aboveground Piping) approval.

This allows for a single approved piping system manufacturer to be utilized throughout the fueling system from UST to transition sump, through the bulkhead wall, down the gangway and out to the dispenser.

Industry Advancements – UL-1369

IMPORTANT NOTE:

To be considered a UL-1369 compliant installation, all sections of double-wall piping are required to be continuously monitored.

This can be accomplished with sensors connected to the facility ATG system, or by stand-alone sensor systems.

Positive shut-down is NOT a requirement of UL-1369.

Underground Piping

Underground piping must be UL-971 (non-metallic) or UL-971A (metallic) listed.

Systems may be:

- Rigid (fiberglass)
- Semi-rigid (fusion-weld thermoplastic)
- Flexible

Considerations for material selection should include distance, routing, flow rate and, for the purpose of line leak detection, pipeline volume.

Underground Piping

Wilson/Rogers & Associates

Representing Manufacturers to the states of Alaska, Washington, Oregon, Idaho, Montana, Hawaii and California since 1989

We are Independent Manufacturer's Agents;
A Professional Sales, Marketing and Customer Service Organization.

Underground Piping

Pressurized systems, those using submersible turbine pumps in the UST to deliver fuel to the dispenser(s), should be equipped with line leak detection, either Mechanical or Electronic, with positive shut-down.

Only the underground portion of piping is required to be equipped with line leak detection per EPA 40 CFR 280.

Aboveground Piping

As we discussed previously, many jurisdictions currently do not require a listed piping system at this time.

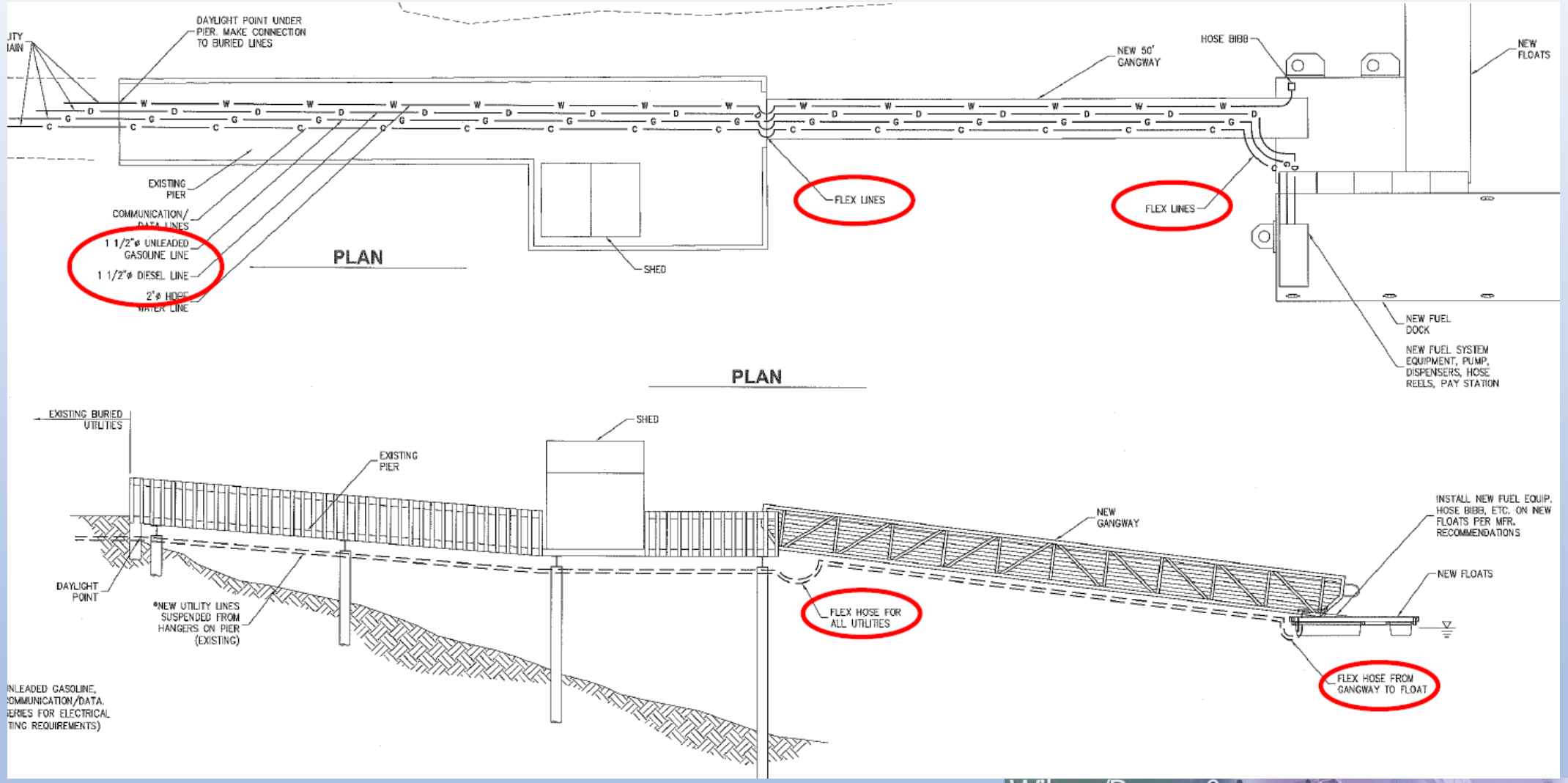
Therefore, steel (threaded or welded), fiberglass or thermoplastic piping, rubber hose, or a combination of these are frequently used for marina fuel piping.

Prior to a UL-1369 listed system option, aboveground piping in marina fueling applications often included a Frankenstein approach to piping.

Aboveground Piping

A section of UL-971(A) listed piping extending from the Onshore Transition Sump through the bulkhead wall, an uncontained transition to a USCG certified tidal loop hose, an uncontained transition to steel running down the gangway, another uncontained transition to tidal loop hose and finally an uncontained transition to steel or flexible piping running down the dock to the dispenser was not at all uncommon.

Aboveground Piping



Aboveground Piping

This project, designed in 2017, was specified with a double wall plastic pipe intended for underground use as the fuel piping under the pier, down the gangway and out on the fuel dock.
Rubber hoses were used as the Flex Lines at the top and bottom of the gangway. Transitions were not contained.

The piping installed is not impact resistant, fire resistant or UV stable.
It is not a matter of *if*, **but when**, this system will fail.

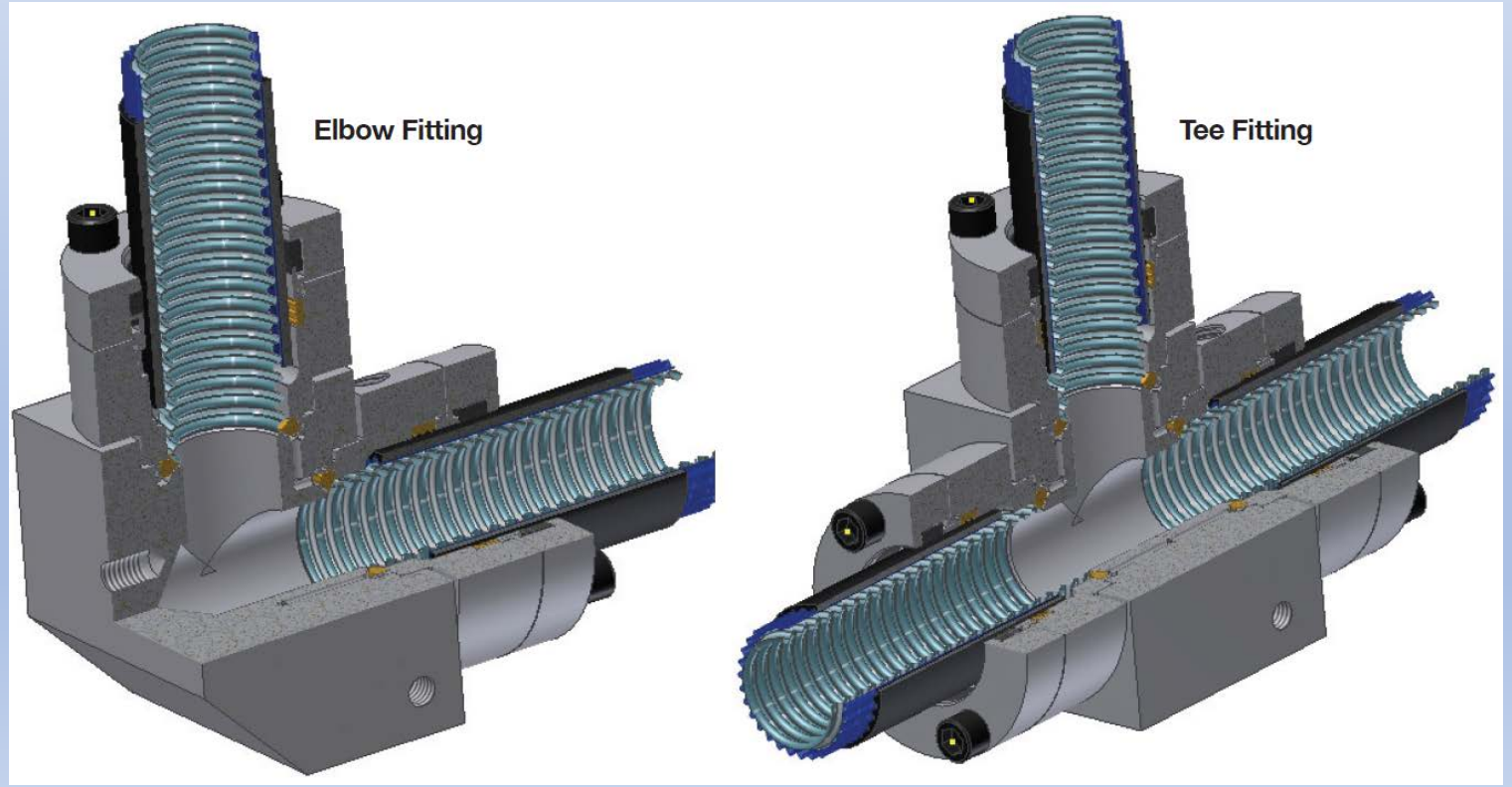
Aboveground Piping

There are many ways to install aboveground marina fuel piping, but few ways to do it correctly with the knowledge UL-1369 will soon be incorporated into Codes and Standards.

UL-1369 allows for a system approach, eliminating most, if not all, uncontained joints while providing a robust tide cycle tested, fire rated, UV stable and salt spray / corrosion resistant installation that will withstand the test of time in the harshest environments.

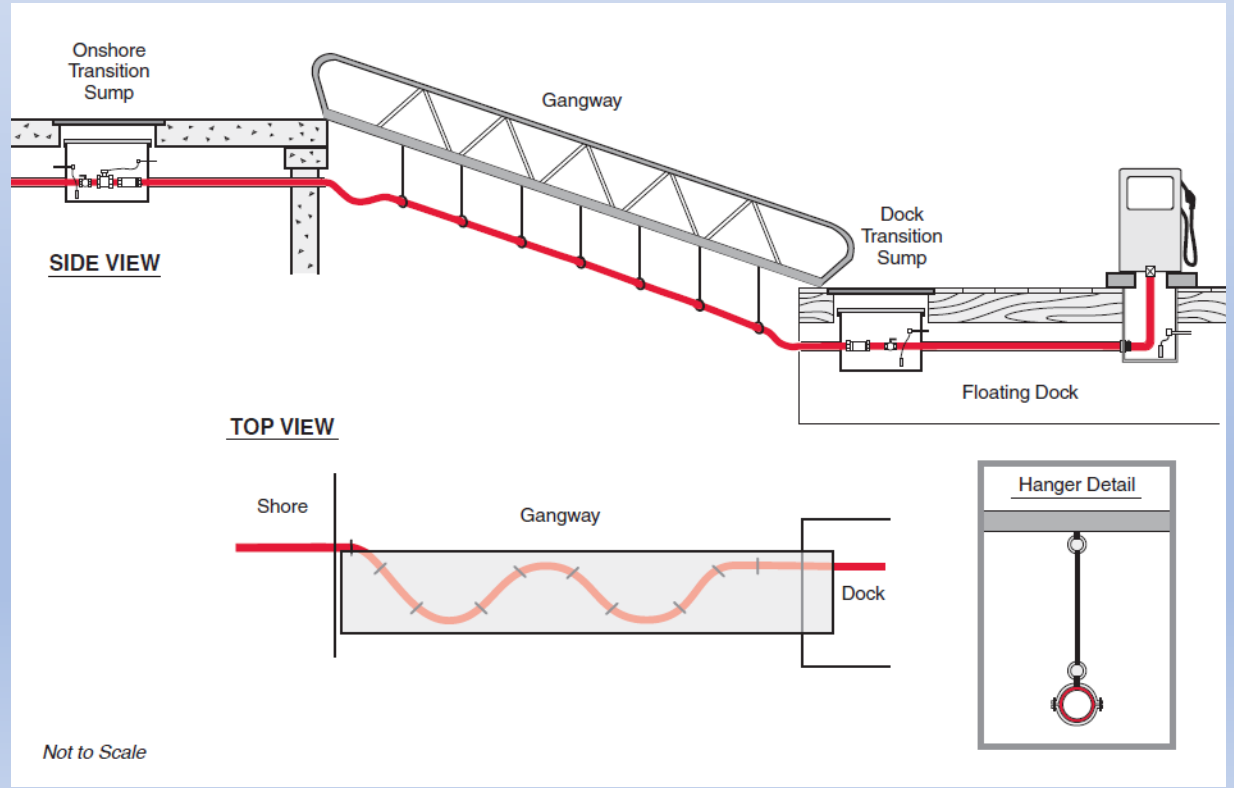
Aboveground Piping

Secondarily contained Tee's and 90's are available options to facilitate branches to multiple dispensers and/or hard changes in direction.

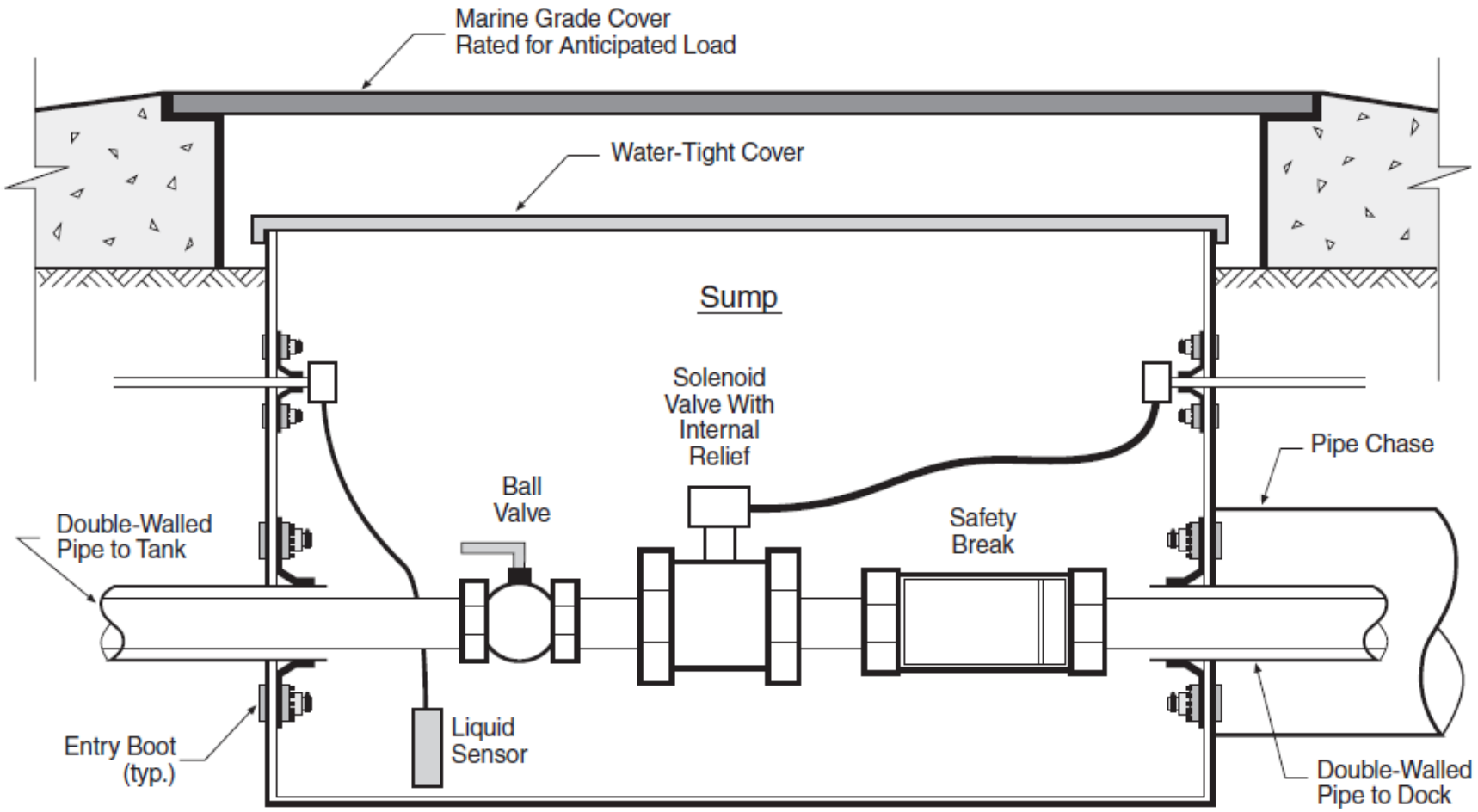


Aboveground Piping

By utilizing common installation practices such as an “S” curve and/or rolling hangers, piping can be installed in a continuous length without transitioning to rubber flex hose sections.



Onshore Transition Sump



CREDIT: PEI RP1000-14

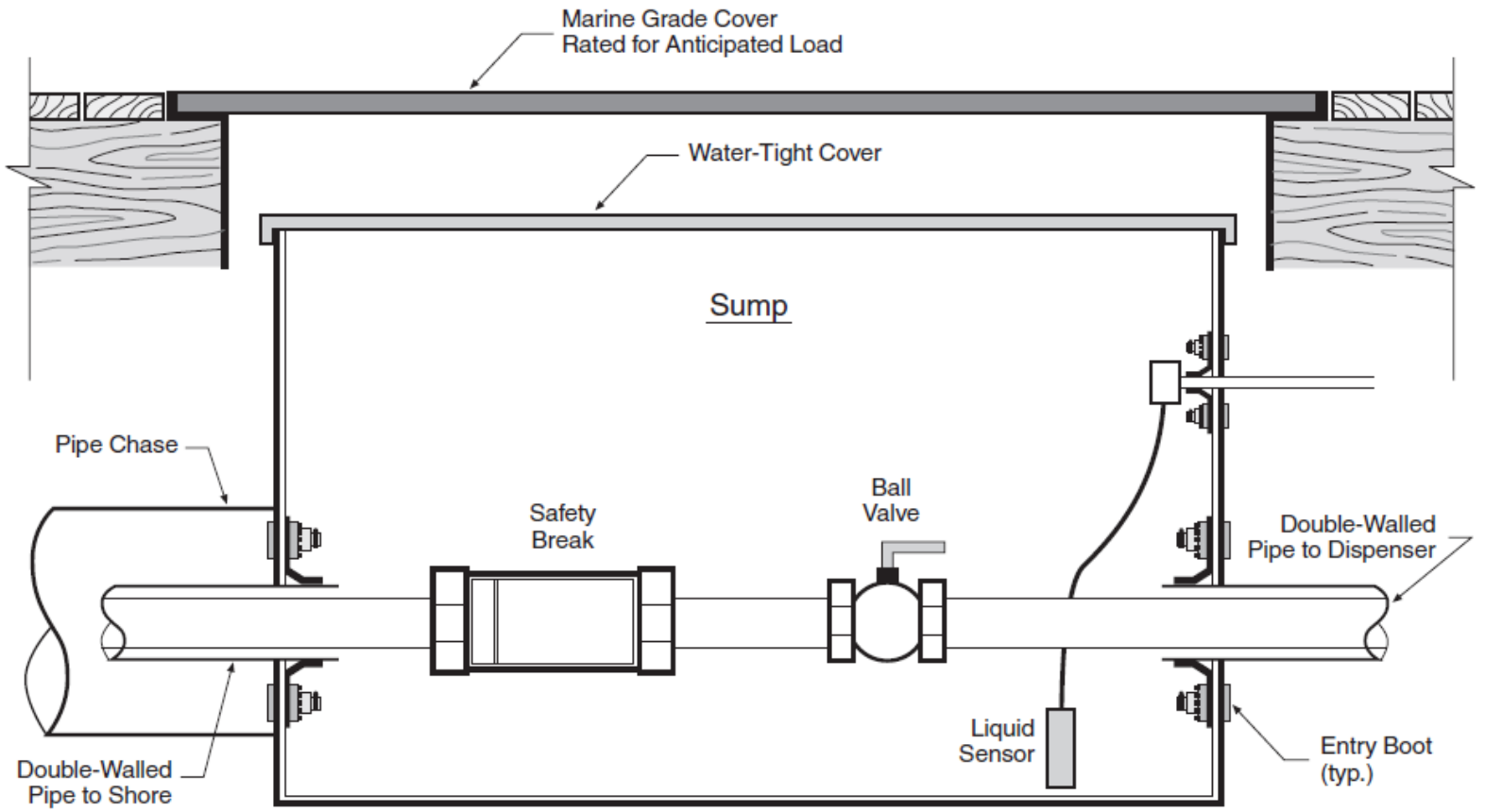
Onshore Transition Sump

The Onshore Piping Sump provides containment for the transition from underground to aboveground piping.

In addition, it also houses the isolation valve, a solenoid valve for testing underground pressurized piping and the safety breakaway valve.

A sump leak detection sensor should also be installed to detect the presence of liquids.

Dock Transition Sump



CREDIT: PEI RP1000-14

Dock Transition Sump

The Dock Transition Sump for provides containment for the safety break valve on the floating dock pipe section.

In addition, it also houses the isolation valve for line isolation, testing and, in some cases, disconnects to remove sections of piping in extreme tidal of lake level fluctuation.

A sump leak detection sensor should also be installed to detect the presence of liquids.

Dock Transition Sump

An example of a stainless-steel dock sump with Safety Breakaway, Isolation Valve and Leak Sensor.

Valves and Accessories

Solenoid Valves may be used for both anti-siphon protection and line tightness testing applications.

For line testing, the valve should be installed in the Onshore Transition Sump just prior to penetrating the bulkhead wall and becoming exposed pipe.

For anti-siphon protection, the valve must be installed at the high point of the piping, at an elevation higher than the top of the tank.

Mechanical Anti-Siphon Valves (ASV) are designed to withstand a specified negative head pressure to prevent the contents of the tank from being siphoned out in the event of a line break below the fluid level. As with the solenoid valve above, the ASV should be placed at the high point of the fuel line.

Valves and Accessories

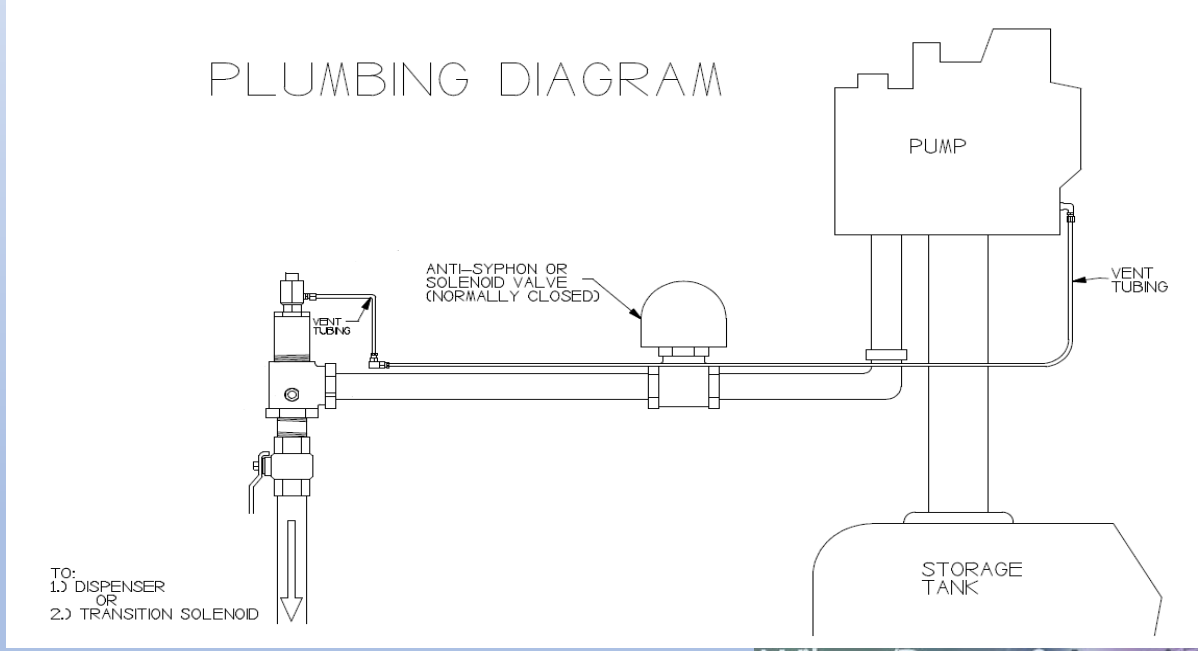
Mechanical Line Leak Detectors (MLLD's) test the underground portion of piping from the UST to the solenoid valve in the Onshore Transition Sump at the beginning of a fueling process. MLLD's detect a leak rate greater than 3 GPH @ 10 PSI.

A time delay of solenoid valve actuation is required when using MLLD's.

Electronic Line Leak Detectors (ELLD's) test the underground portion of piping similar to MLLD's, but at the conclusion of a fueling process rather than the beginning. ELLD systems are capable of detecting 3 GPH catastrophic leaks, as well as performing precision 0.1 / 0.2 GPH line leak testing.

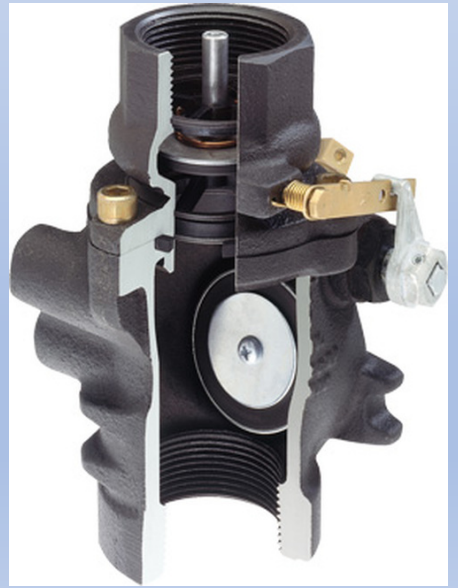
Valves and Accessories

Leak Detector Tee may be used to install the MLLD or ELLD downstream of the anti-siphon valve in the UST sump. Leak detector tee's have special threads to accept the leak detector in the designated port, with a direction specific inlet and outlet port.



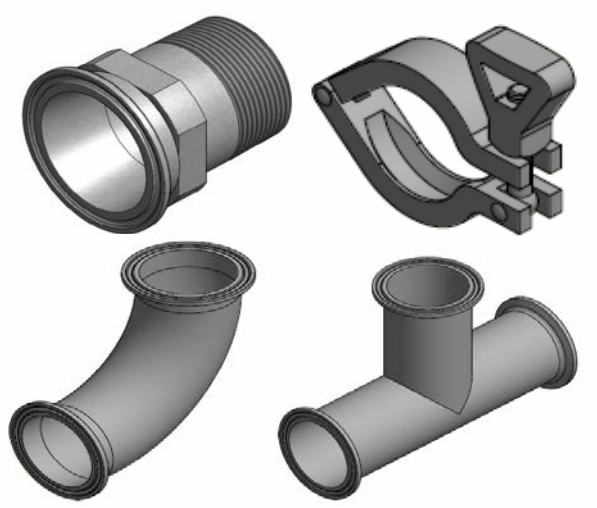
Valves and Accessories

Marine Fuel Breakaway Valves are installed in the Onshore Transition Sump and the Dock Transition Sump. These breakaways will separate with 300 – 600 lbs of force (depending on manufacturer) and prevent a fuel release.
Most breakaways may be repaired or reassembled after activation. Some are “single use” and must be replaced.



Emergency Shear Valves, or Impact Valves are installed beneath the dispenser in the sump. These valves protect against a fuel release if the dispenser is impacted. The shear section will break, causing the spring-loaded hold-open arm to slam closed.
The hold-open arm is held by a fusible link which will melt at 165 degrees F.

Valves and Accessories

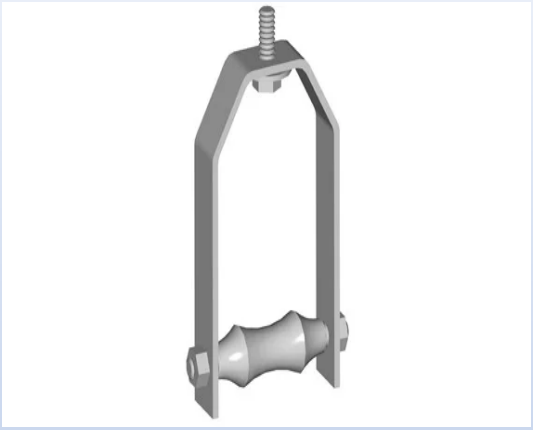


Quick-connect fittings may be used to facilitate tight sump spaces, or where pipe sections may be added or removed to accommodate elevation changes throughout the season.

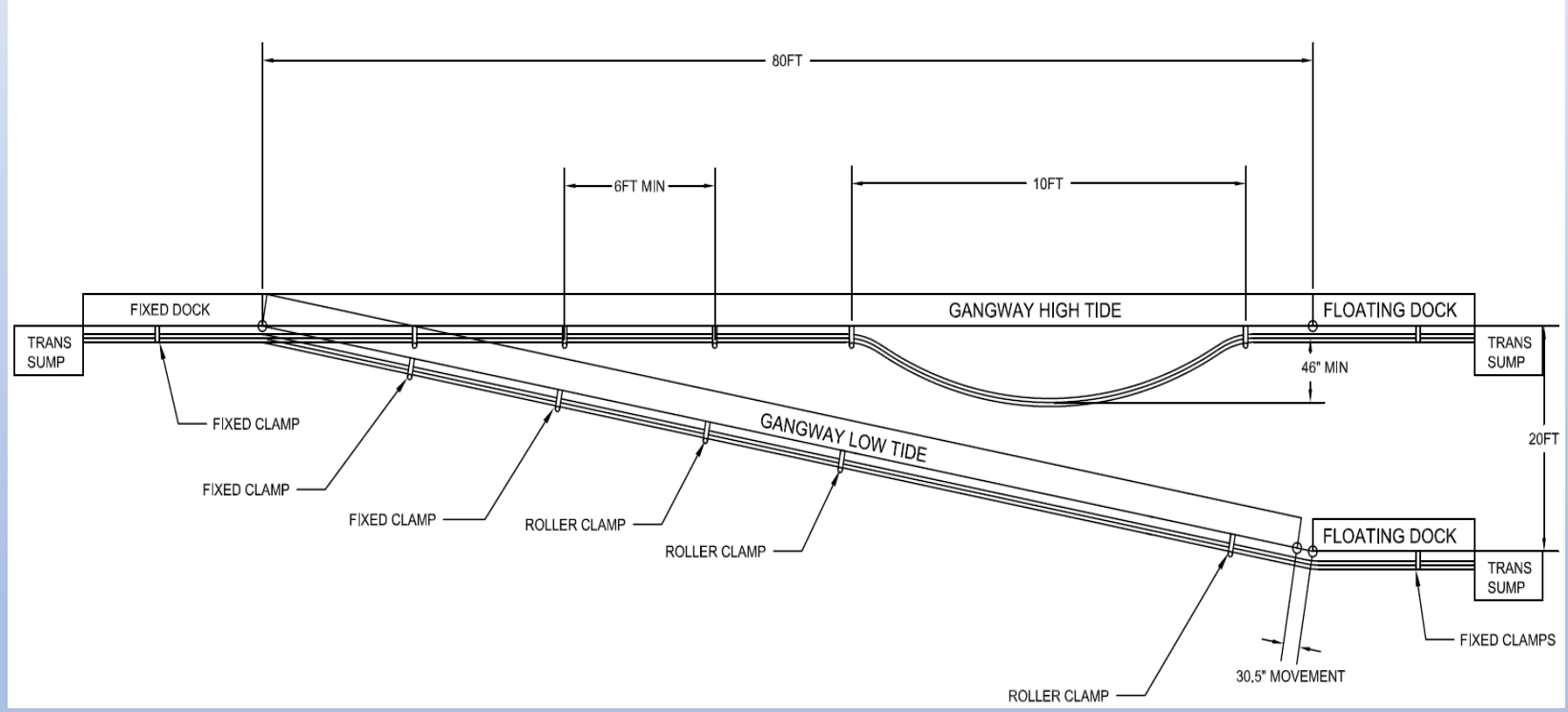
All quick-connect fittings should be located within sumps.

Isolation Valves should be installed anywhere fuel line isolation may be required for testing, repair or adding/removing piping sections.

Valves and Accessories



Rolling Hanger Pipe Supports can be used to support flexible piping while leaving slack for movement due to wave action or tidal / elevation changes.



Marina Fuel Piping & Accessories

Marina fueling systems are going to experience minor fuel releases at the dispense point.

Marina fuel system operators have a responsibility to preserve and protect the environment from release to the extent possible.

The best way to limit potential for catastrophic release is to utilize a system approach to marina fuel conveyance piping and keep the fuel where it belongs.

Marina Fuel Piping & Accessories

Questions?

Steve Latimer

Wilson/Rogers & Associates

(206) 743-4592

Steve@WilsonRogers.com

www.WilsonRogers.com

Thank You, Speakers!

Tim Smith | *U.S. EPA*

J. David Stone | *Tennessee DEC*

Steve Latimer | *Wilson/Rogers & Associates*

UST Inspector Training Series: https://neiwpcc.org/our-programs/underground-storage-tanks/ust-training-resources-inspection-leak-prevention/webinar-archive-inspector-training/

LUST Corrective Action Series: https://neiwpcc.org/our-programs/underground-storage-tanks/lust-training-resources-corrective-action/webinar-archive-corrective-action/

LUST Line: https://neiwpcc.org/our-programs/underground-storage-tanks/l-u-s-t-line/

National Tanks Conference: https://neiwpcc.org/our-programs/underground-storage-tanks/national-tanks-conference/

UST INSPECTOR TRAINING WEBINAR SERIES:

UST SYSTEMS AT MARINAS

11/15/2021

Thank you for your participation!