TANK CONSTRUCTION

<table>
<thead>
<tr>
<th>SW/DW Steel</th>
<th>Steel Tank that may be painted or coated.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW /DW Fiberglass</td>
<td>Fiberglass Tank that may be either single or double wall construction</td>
</tr>
<tr>
<td>STIP-3 SW</td>
<td>This is a single wall tank meeting the certain specifications of the Steel Tank Institute. This specification indicates the design and fabrication of coated and cathodically protected steel tanks.</td>
</tr>
<tr>
<td>STIP-3DW</td>
<td>This is a double walled tank meeting the certain specifications of the Steel Tank Institute. This specification indicates the design and fabrication of coated and cathodically protected steel tanks.</td>
</tr>
<tr>
<td>Plasteel</td>
<td>These three tanks are categorized as the same tank.</td>
</tr>
<tr>
<td>Permatank</td>
<td>They are steel tanks that have a fiberglass outer cover.</td>
</tr>
<tr>
<td>Steel Fiberglass Lined SW (Rarely DW)</td>
<td>Steel Tank with a fiberglass lining.</td>
</tr>
</tbody>
</table>

TANK LEAK DETECTION AND PROTECTION

<table>
<thead>
<tr>
<th>Painted and or Coated</th>
<th>Steel tanks that have been painted or coated with a material to resist corrosion.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Monitoring</td>
<td>A probe permanently installed in the tank is wired to a monitor to provide information on product level and temperature. These systems automatically calculate the changes in product volume that can indicate a leaking tank and usually include a daily printout.</td>
</tr>
<tr>
<td>Common types of electronic monitors are listed here:</td>
<td>Red Jacket; INCON; Veedee-Root; EECO System/EMCO Electronics; Tidel; Auto-Stick; EBW</td>
</tr>
<tr>
<td>Interstitial Space</td>
<td>The space between the inner and outer walls of a double walled tank or a secondary containment system. May also be called “annular” space.</td>
</tr>
<tr>
<td>Interstitial Monitoring</td>
<td>Monitors are used to check the area between the tank and the barrier for leaks and alert the operator if a leak is suspected. Some monitors indicate the physical presence of the leaked product, either liquid or gaseous. Other monitors check for a change in condition that indicates a hole in the tank, such as a loss of vacuum or a change in the level of a monitoring liquid between the walls of a double-walled tank. ...cont.</td>
</tr>
</tbody>
</table>
Monitors can be as simple as a dipstick used at the lowest point of the containment to see if liquid product has leaked and pooled there. Monitors can also be sophisticated automated systems that continuously check for leaks. If the system is equipped with an electronic sensor, an alarm will sound and it will shut down the system if a leak is detected.

**Interstitial Monitoring** ...

**Monitoring Wells**

Groundwater monitoring involves the use of permanent monitoring wells placed close to the UST. The wells are checked at least monthly for the presence of product that has leaked from the UST and is floating on the groundwater surface.

The two main components of a groundwater monitoring system are the monitoring well (typically a well of 2-4 inches in diameter) and the monitoring device.

Detection devices may be permanently installed in the well for automatic, continuous measurements for leaked product. If installed with a sensor, an alarm will sound if product is detected as leaking.

**Daily Dipstick**

Manual tank gauging can be used only for tanks of 2,000 gallons or less capacity. Frequently those with Automatic Tank Guages will stick weekly or monthly as a double check.

**Secondary Containment with Interstitial Monitoring**

Secondary containment often uses a barrier, an outer wall, a vault, or a liner around the UST or piping. Tanks can be equipped with inner bladders that provide secondary containment. Leaked product from the inner tank or piping is directed towards an “interstitial” monitor located between the inner tank or piping and the outer barrier. Interstitial monitoring methods range from a simple dipstick to a continuous, automated vapor or liquid sensor permanently installed.

**Cathodic Protection**

This is a method of protecting steel tanks and piping from corrosion. This is accomplished either by a chemical method or an electrical method.

**Overfill Prevention**

An audible, visible or mechanical means of warning and/or preventing against overfilling a tank.

**Ground Water Monitoring**

Groundwater monitoring senses the presence of liquid product floating on the groundwater. This method requires installation of monitoring ...cont.
Ground Water Monitoring ...cont. | wells at strategic locations in the ground near the tank and along the piping runs. To discover if leaked product has reached groundwater, these wells can be checked periodically by hand or continuously with permanently installed equipment.

Tank Tightness Testing with Monitoring | This method combines periodic tank tightness testing with monthly inventory control. Inventory control involves taking measurements of tank contents and recording amount pumped each operating day, as well as reconciling all this data at least once a month. This combined method must also include tightness tests, which are sophisticated tests performed by trained professionals.

Vapor Monitoring | Vapor monitoring measures product “fumes” in the soil around the UST to check for a leak. This method requires installation of carefully placed monitoring wells. Vapor monitoring can be performed manually on a periodic basis or continuously using permanently installed equipment.

Other | Any technology can be used if it meets a performance standard of detecting a leak of 0.2 gallons per hour with a probability of detection of at least 95 percent and a probability of false alarm of no more than 5 percent.

Statistical Inventory Reconciliation (SIR) | In this method, a trained professional uses sophisticated computer software to conduct a statistical analysis of inventory, delivery, and dispensing data, which you must supply regularly.

SIR analyzes inventory, delivery, and dispensing data collected over a period of time to determine whether or not a tank system is leaking.

PIPING CONSTRUCTION

| Steel DW | Bare Steel Double wall piping |
| Steel SW | Bare Steel Single wall piping |
| FG/FLEXDW | As suggested by the name, this is flexible piping made of a variety of materials. It is composed of a primary and secondary pipe. |
| FG/FLEXSW | Similar to the above, but with only a single wall. |

PIPING LEAK DETECTION AND PROTECTION

None

Secondary Containment with Interstitial Monitoring | An interstitial barrier is placed between the primary piping and the secondary piping and the environment and is capable of being monitored for leakage. Double-walled piping or a leak proof liner in the piping trench can be used. ...cont.
A monitor is placed between the piping and the barrier to sense a leak if it occurs. Monitors range from a simple stick that can be put in a sump to see if a liquid is present, to continuous automated systems that monitor for the presence of liquid product or vapors.

This is a method of protecting steel tanks and piping from corrosion. This is accomplished either by a chemical method or an electrical method.

An Automatic Line Leak Detector:
Automatic flow restrictor; or
Automatic flow shutoff; or
Continuous alarm system.

And One Other Method:
Annual line tightness test; or
Monthly interstitial monitoring; or
Monthly vapor monitoring; or
Monthly groundwater monitoring; or
Monthly statistical inventory reconciliation; or Other monthly monitoring that meets performance standards.

A liquid-tight compartment enclosing the piping connections at the top of an UST providing containment of product leaks. If equipped with a sensor an alarm will sound when a leak is detected.

Flow restrictors and flow shutoffs can monitor the pressure within the line in a variety of ways: whether the pressure decreases over time; how long it takes for a line to reach operating pressure; and combinations of increases and decreases in pressure. If a suspected leak is detected, a flow restrictor keeps the product flow through the line well below the usual flow rate. If a suspected leak is detected, a flow shutoff completely cuts off product flow in the line or shuts down the pump.

A continuous alarm system constantly monitors line conditions and immediately triggers an audible or visual alarm if a leak is suspected. Automated internal, vapor, or interstitial line monitoring systems can also be set up to operate continuously and sound an alarm, flash a signal on the console, or even ring a telephone in a manager’s office when a leak is suspected.

Both automatic flow restrictors and shutoffs are permanently installed directly into the pipe or the pump housing.

Vapor, interstitial, or other monitoring systems can be installed to shut off flow, restrict flow, or trigger an alarm whenever a leak is detected. If it meets the applicable standards, such a setup meets the monthly monitoring requirement as well as the LLD requirement.

For Additional Information Contact:
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