STATE OF WISCONSIN
Department of Safety and
Professional Services

Approval # 20120001
(Renewal for 20080010)

Environmental & Regulatory Services Division
Bureau of Petroleum Products and Tanks
201 West Washington Avenue
P.O. Box 7837
Madison, WI 53707-7837

Wisconsin SPS 310 Material Approval

Equipment: Automatic Tank Gauging Systems

Manufacturer: OPW Fuel Management Systems
6900 Santa Fe Drive
Hodgkins, IL 60525-9909

Expiration of Approval: December 31, 2014

SCOPE OF EVALUATION

The Site Sentinel I, II, III and the iTouch automatic tank gauges (ATGs) were evaluated as a means of monthly monitoring in accordance with **s. SPS 310.510(3)(a)** and **s. SPS 310.515 (5),** and as a means of tank tightness testing in accordance with **s. SPS 310.515(4)** of the Wisconsin Flammable and Combustible Liquids Code.

This evaluation summary is condensed to provide the specific installation, application and operation parameters necessary to maintain the subject systems in compliance with the Wisconsin Administrative Code – SPS 310.

DESCRIPTION AND USE

Automatic Tank Gauge Systems:

- Site Sentinel I, II,III & iTouch ATG w/ Model 924 Probes

The Site Sentinel ATGs are approved as complying with **section COMM 10.515 (5)** under the following criteria:

The **Site Sentinel I, II, III & iTouch ATG with Model 924 probes** may be used for tanks containing gasoline, diesel fuel, aviation fuel, solvents, and other products that will not physically damage the probe and are covered by API Standard 2540 volume correction tables.

The ATGs do not determine the level of groundwater above the bottom of the tank. The systems test for water incursion. Tank deformation effects are addressed by beginning the test only after the waiting period has passed and the tank is stabilized. Level changes are converted to volume changes using the theoretical ratio calculated from tank geometry or interpolation from the tank manufacturer's chart. The minimum water level (threshold) in the tank that the system can detect was found to be 0.37 inches. The minimum change in water level that can be tested by the system was found to be 0.0062 inches provided the water level is above the threshold.

Leak Detection Sensors:

Part No.	HC Polymer	Float Switch	Vapor Sensor	Optical Sensor	Water Sensor	Description
30-3206	X				X	short polymer cable with water sensor
30-3221-2-		Dual				brine tank monitor
30-3219-12	X					polymer strip in 12" plastic housing
30-3221-1A		Single				float switch in 3" plastic housing
30-3221-1		Single				float switch in large plastic housing
30-3222			X			Vapor sensor
30-3223				X		Optical sensor
30-3207-nn*	X					polymer cable for interstice w/o water sensor
30-3210-nn*	X				X	polymer cable for interstice with water sensor
30-3221-2		Dual				bottom float reversed for alarm
30-3221-1B		Single				float switch w/brass housing
30-3224	X	Single				combination of 30-3221-1A and 30-3219-12
30-3225	X	Dual				combination of 30-3221-2 and 30-3219-12

*nn = length in feet

Optical Sensor - The optical sensor detects changes in the index of refraction when the sensor passes from air to liquid. Alarm occurs when the threshold liquid level is reached.

Single Float Switches - Single float switches come in a variety of configurations. These may be used for-sump monitoring and interstitial monitoring for steel tank.

Dual Float Switches - Dual float switches can be configured to alarm in several ways. The switch may be either on or off when wet or dry by turning the float over. For reservoir applications they may alarm when the level is either too high or too low. They may also be programmed to give a warning at low level followed by an alarm at high level.

Hydrocarbon Sensitive Polymer Cables - These cables are constructed of a polymeric material that changes resistance (that affects the voltage at the controller) when exposed to hydrocarbons. When the voltage reaches the threshold (which can be programmed at the controller) an alarm occurs. These cables can be housed in either a flexible sheath of any length or in a rigid plastic housing. These systems were found to be capable of detecting a layer of product of less than 1/8 inch in thickness floating on water. These cables do not alarm in water.

Vapor Sensors- The vapor sensor uses a metal oxide semiconductor, which changes resistance when exposed to hydrocarbon vapors. The voltage change produced by the resistance change will result in an alarm when the threshold voltage is reached. The reuse of sensors exposed to diesel fuel requires threshold voltage adjustment after each time they alarm.

Water Sensors - The water sensors are based on conductivity. Any conductive liquid such as brine or water will produce a voltage change that will result in an alarm. These sensors are unaffected by nonconductive materials such as gasoline or diesel fuel. These sensors can be incorporated into the flexible sheath of the polymer cable or mounted in rigid plastic housings. The alarm turns off if the sensor is removed from water.

OPW Leak Detection Sensors can be installed in a variety of applications including sump and pan monitoring, and interstitial monitoring of double wall tanks.

Site Sentinel Vapor Detectors

The Site Sentinel vapor detectors both provide quantitative output and continuous sampling frequency. The Site Sentinel consoles when used with the Model 30-3201 vapor sensor are approved for use as vapor phase out-of-tank product detectors to be installed as interstitial monitors in systems that comply with **s. SPS 310.515 (7)**, and to detect products specified in the Description and Use section.

Site Sentinel Liquid Detector for Interstitial and Groundwater Monitoring

The Site Sentinel liquid sensors are product permeable and provide continuous monitoring. Sensor 30-3206 is designed for interstitial monitoring; sensors 30-3207 and 30-3210 are designed for groundwater monitoring. The detectors were evaluated for their ability to detect a layer of liquid floating on water.

The Liquid Sensor 30-3200 is a point sensor that detects liquids using thermal conductivity; the sensor has a qualitative output and continuous sampling frequency. The Liquid Sensor has a product activation height of less than 2 cm for the products tested: gasoline, synthetic fuel, diesel fuel, #2 fuel oil, and water.

The Universal Sump sensor 30-3204 is a float switch, providing qualitative output and continuous sampling. The Universal Sump sensor has a product activation height of less than 3.5 cm. for the products tested: gasoline, synthetic fuel, diesel fuel, #2 fuel oil and water. The Universal Reservoir Probe 30-3205 is a float switch designed to monitor changes in the level of either ethylene glycol or calcium chloride solutions in interstitial or annular spaces in double walled tanks. The Universal Reservoir Probe is capable of detecting increases in solution height of 20 cm. or more and decreases in solution height of 6 cm. or more.

The Site Sentinel consoles used with the Liquid Sensor 30-3200, and Universal Sump sensor 30-3204, or liquid sensor 30-3206 are approved as interstitial monitors to be installed in systems that comply with **s. SPS 310.515 (7)** to detect products specified in the Description and Use section.

The Site Sentinel consoles used with the Universal Reservoir Probe 30-3205 are approved for monitoring the level of solutions in the interstitial or annular space of double walled tanks where the geometry of the interstice allows detection of leaks in accordance with **s. SPS 310. 515 (7)(b)**.

TESTS AND RESULTS

The performance of the Site Sentinel I, II, III and the iTouch automatic tank gauges (ATGs) was determined in accordance with the EPA testing protocol for automatic tank gauging methods. When using leak declaration thresholds of 0.05 gph and 0.10 gph, the probabilities of detection of a leak of 0.10 and 0.20 gph, respectively, were certified to within the 95-5 ranges required by the EPA protocols.

The performance of the OPW leak sensors were evaluated in accordance with the EPA standard test procedure for liquid-phase and vapor-phase out-of-tank product detectors by Ken Wilcox Associates, Inc.

LIMITATIONS / CONDITIONS OF APPROVAL

- All monitoring equipment shall be installed, calibrated, operated, and maintained in accordance with the manufacturer instructions, and certified every 12 months for operability, proper operating condition, and proper calibration in accordance with **s. SPS 310.510 (2)**. Records of sampling, testing, or monitoring shall be maintained in accordance with **s. SPS 310.510 (2)**.

- The manufacturer shall submit for a revision to this Wisconsin Material Approval application if any of the functional performance capabilities of this equipment are revised. This would include, but not be limited to changes in software, hardware, or methodology.

- While 3rd party testing does determine a required minimum tank level, EPA leak detection regulations require testing of the portion of the tank system which routinely contains product. Consistent testing at low levels could allow a leak to remain undetected.

  During leak testing, a minimum level of product in tank shall be maintained so as to ensure testing of the portion of the tank and/or piping that routinely contains product, regardless of testing system capability. For instance, if product levels are routinely maintained at 60%, but the leak detection system is capable of testing at 15% product level, then testing shall be performed at 60% levels.

- If performing a tank tightness test, minimum tank level shall be 95%, regardless of leak detection system minimum capability, in accordance with **s. SPS 310.515 (4)**.

Automatic Tank Gauge Systems:

The Site Sentinel I, II, III & iTouch ATG with Model 924 probes:

0.2 g/hr leak rate	
Wait time after fill	8 hours
Minimum product level for 30 minute and 1 hour test	50% or greater
Minimum product level for 2 and 3 hour test	14% of capacity or greater
Maximum tank size	20,000 gallons

The Site Sentinel I, II & III VTTT w/ Model 924 Probes for Tank Tightness Testing:

0.1 g/hr leak rate	
Wait time after fill	12 hours
Minimum product level for 2 and 3 hour test	Greater than 90% capacity
Maximum tank size w/ Model 924 probe	20,000 gallons

Leak Detection Sensors:

- All equipment shall be installed, operated and maintained in accordance with procedures specified by OPW Fuel Management Systems.

- The interstitial probes shall be placed in the lowest point of the interstice and be able to detect a leak in any portion of the primary containment that routinely contains product.

This approval will be valid through December 31, 2014, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The Wisconsin Material Approval Number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The Department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement unless specified in this document.

Effective Date: January 1, 2012

Reviewed by: Signature on file
Greg Bareta, P. E.
Engineering Consultant
Bureau of Petroleum Products and Tanks

Approved by: Signature on file Date: _____