



MagCheck™

Wireless Self-Testing Level Sensor

Fully Automated, Self-Testing Level Sensor, Wireless, Battery-Powered, Intrinsically Safe

Many State and local ordinances now require redundant overfill protection on most large liquid storage vessels. Also, the USEPA has proposed new legislation (**Spill Prevention, Control and Countermeasures (SPCC) regulation (40 CFR Part 112)**), which will mandate overfill protection on most large storage vessels.

Compliance with these requirements can be extremely costly, largely due to the expense of installing electrical wiring and conduits to power the level sensors and convey alarm signals back to a central control point. Our previous patent (US 6,229,448) describes **FillCheck®** which is a cost-effective alternative to electrical wiring and conduit for power and control signals. **FillCheck®** is an intrinsically-safe approved, battery-powered, radio transmitter used to transmit alarm signals from hazardous areas to safe areas. Its internal battery can also power level switch circuits for several years, thus eliminating the need for electrical service at the vessels being monitored.

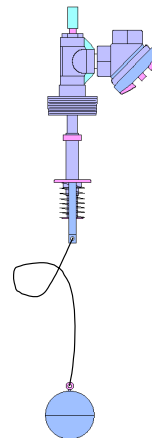
This ability to provide overfill protection without the expense of installing electrical service at a vessel does limit the selection of level sensors. Because **FillCheck®** is completely battery-powered, it must employ level sensors that require little or no electrical power in order to be long-lived. This generally requires the application of mechanical sensors such as float or displacer switches. Because these types of sensors come into contact with the various fluids in the vessels, they tend to be more prone to fouling than non-contact sensors such as capacitive or acoustical.

One significant requirement of virtually all existing and proposed regulations is routine, periodic testing of the overfill instrumentation. This means that the level-sensing device must be equipped with some method of simulating a level alarm condition and initiating the alarm annunciation sequence to verify the entire system is functioning properly. This process usually involves having an operator manually activate the level sensor testing mechanism at each vessel on a weekly or monthly interval. With the mechanical level switches typically used with **FillCheck®**, this necessitates physically moving the floats or displacers.

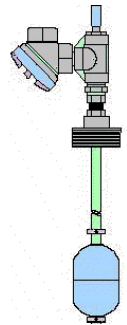


MagLift™-Equipped Level Sensors

VersaLevel™
Displacer Switch for Internal Floating Roof Tanks

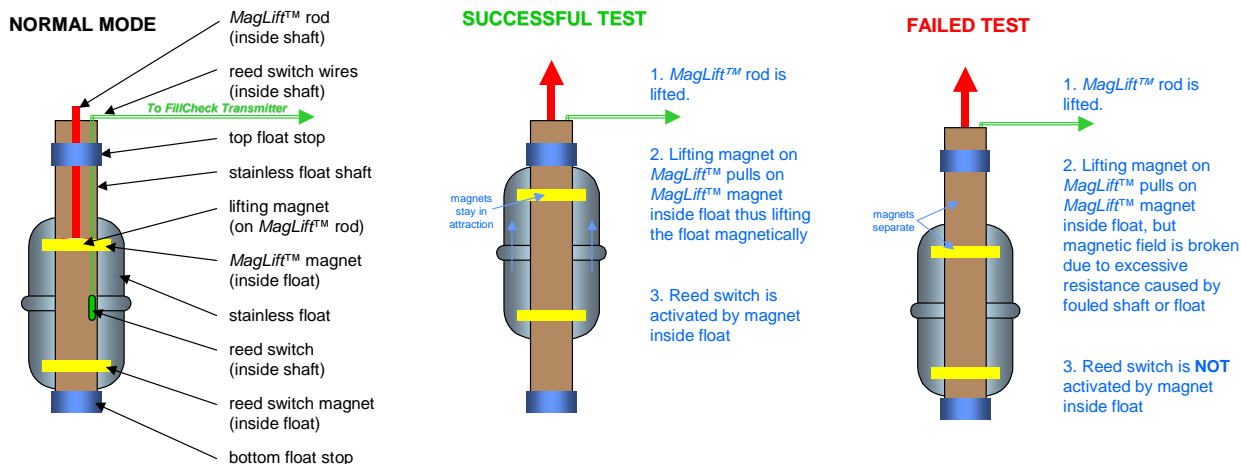


MonoCheck™
Single Setpoint Float Switch for Standard Tanks



As many facilities have hundreds of vessels, manual routine testing of their overfill protection systems is extremely labor-intensive and costly. **MagCheck™** a completely self-contained and automatic method for testing the overfill protection system.

This system must include a reliable mechanical level sensor system, such as **Versalevel™**, **Monocheck™**, and



DuoCheck™, provided by National Magnetic Sensors, Inc. These sensors employ a unique testing mechanism known as MagLift™ where the displacers or floats are lifted magnetically. Diagrams of these sensors are shown at left.

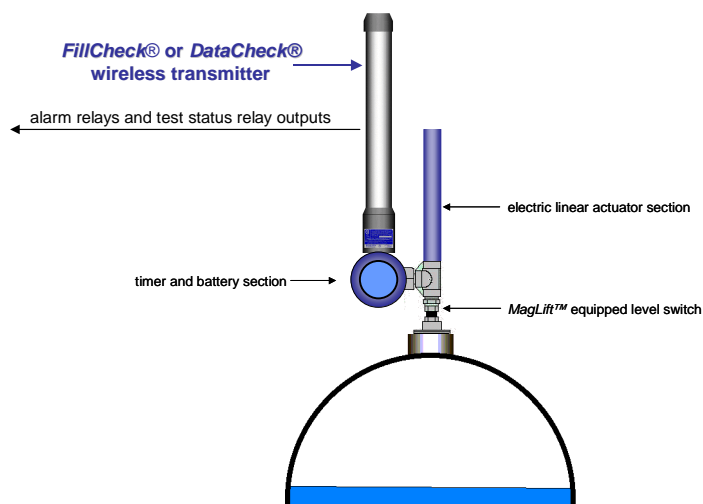
Again, this new invention provides a device and methodology for performing the required periodic testing of the overflow protection system without the need for labor-intensive human intervention. This device and its related methodology can be applied to virtually any mechanical level switch; however, we will again use the example of the National Magnetic Sensors, Inc. devices since they employ the magnetically-coupled lifting mechanism.

MagCheck™ consists of a linear electric actuator coupled with 2 batteries and an electronic timer circuit. The timer circuit, powered by a battery, is programmed to periodically activate the linear actuator, thus testing the level sensor to which it is attached. The timer can be programmed to activate the actuator at 1, 7, 14 or 28 day intervals.

When used with Fill-Check®, the entire system becomes “stand-alone”; that is, absolutely no wiring is needed at the vessel.



MagCheck™ Conceptualization
Wireless



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