

Cargo management technology

Roundup of the latest developments in tank gauging, gas detection, cargo monitoring, cargo information displays, tank venting and compressors - by Keith Forward

Tanksystem UTImeter

Tanksystem of Switzerland has produced the HERMetric UTImeter, for gauging the temperature, ullage and oil/water interface level. The tank stays completely sealed while the gauging takes place.

Tanksystem designed the UTImeter based on feedback from end-users, so it is lighter, easier to handle and operate, and simpler to clean and maintain, while still achieving the highest standards of measurement accuracy.

A compact ball valve, specially designed, is permanently fixed on the tank.

The UTImeter is connected to this valve via a quick coupler. Then a single penetration of the tank can establish ullage, oil/water interface level and product temperature.

The measuring tape, sensor and electronic board can be exchanged with no effect on the accuracy of measurement.

The new UTImeter does not require any subsequent calibration of the temperature function over time.

Each sensor contains a high precision Platinum Resistance Temperature Detector (RTD) element. The RTD element signal is digitised, and all errors (offset, non-linearity and drift) are corrected and compensated by a micro-controller directly located in the sensor probe itself. This means that the UTImeter will give the same consistently accurate temperature readings over the life of the sensor.

The RTD element characteristics are stored in the sensor memory and are dedicated to each sensor, so changing a sensor does not require a new calibration.

That means the units used onboard vessels by the crew, by vetting inspectors, or the ones used at terminals, will always give the same results. This should result in reducing the time consumed in reconciling figures between the different parties involved in cargo inspection operations.

Owners more flexibility to optimise their pool of gauging devices, as exchanging parts between units will not downgrade their individual accuracy.

The new UTImeter is light. Compared to the current units available on the market, the UTImeter weighs between 30 and 40% less, and is 15% to 25% less bulky,

Tanksystem claims. Its weight varies from 3,4 kg to 7,5 kg.

Tanksystem has used technologies never used previously for PEGDs: the aluminium housing is injected instead of cast, a lot of parts are made in high tech plastics that are unaffected by contact with petroleum, solvents and chemicals, and the measuring tape is thinner than before, just to mention some of the improvements.

Most PEGDs are not immune to electromagnetic fields, because the measuring tape can act as an antenna and the transmission of the signal from the sensor to the processor/display unit can be affected by interference.

However the UTImeter has digitised transmission of the signal from the sensor to the display, and other protective special features. It fulfils the requirements of the EN 50081 (emission) and EN 50082 (immunity) standards for electromagnetic compatibility.

Tanksystem also believes that the UTImeter is an improvement over rival equipment because of its reduced maintenance requirements.

Over the years the maintenance costs are usually what makes the difference between PEGDs, Tanksystem believes. This includes the ease of changing parts, re-calibration frequency, transport costs, labour.

The UTImeter from TS Tanksystem SA has been designed to simplify and minimise the cost of maintenance. The tape, sensor and electronic display unit components can all be changed without special tools or soldering; just plug-in and plug-out. The verification of the temperature accuracy is achieved by a simple ice point check that is easy to carry out without sending the unit to a laboratory, and without the need for a reference thermometer. These features translate into significant savings in transportation and repair costs, and also to a high degree of operational readiness.

Magnetrol

C.E. van 't Hof, a leading Dutch supplier of tank measurement and alarm systems to the maritime industry, is including the Eclipse level transmitter solution as part of its product portfolio for tankers.

Magnetrol is new to the shipping sector but established as a supplier of measurement devices for underground sensing and geo-mechanical applications. C.E. van 't Hof claims to have introduced this new technology into the maritime industry because of its reliability, measurement capabilities and low maintenance needs.

The Eclipse Transmitter uses guided wave radar (GWR) technology, a spin-off from underground sensing applications that has been adapted for level measurement.

Magnetrol claims that the system has a marked reduction in susceptibility to process conditions such as vapour and turbulence.

The signal is protected from most forms of interference, including vapour, ship turbulence, foam, agitation, low or changing dielectrics and shifting densities. This means the Eclipse probes can handle tough applications where coating media and viscous liquids are present.

The system can be entirely set-up in the workshop - no shipboard level calibration is required, reducing installation times.

The electronics is housed and protected in one compartment while the connector terminals are situated in the second.

Both compartments are tilted at an angle of 45 degrees for ease of wiring and calibration, also so they are easy to access when mounted on a probe.

The housing can be easily attached and dismantled, and can be rotated through 360 degrees for ease of wiring and viewing.

The system can operate at 320°C at 110bar and at full vacuum up to 345bars, and media with dielectric values down to 1.4.

Bergan

Bergan's new tank information display has super-bright LEDs visible from a distance of 30m, and an explosion proof brass housing.

Orders have already been taken for 13 coastal tankers (36 units) for European trade, the US Military Sealift Command (T-AKE series of 12 ships / 60units), and for 5 US Articulated Tug/Barges (29 units).

Data is distributed from the Bergan Tank Control System via standard duplex cables and operators can access the full parameters for any tank, including tank level/ullage, volume, tank pressure and average tank temperature.

High level and overflow alarms are displayed using separate amber and red lights, and the same alarm is displayed and can be acknowledged using any unit, so the operator can take action wherever he is located on deck.

Optical switches are used to scroll through the display and to select each tank (each with a unique identification number and with position indicated).

The unit is protected with a cast bronze housing with the display behind tempered, polished glass, making it water and explosion proof and an optional stainless steel sunshade is available.

Martek's LNG detector

Martek Marine claims to have developed the first ever detector to monitor methane gas levels in gas dangerous spaces ("intrinsically safe"). It uses infrared technology, rather than taking gas samples.

The company has already received 3 LNG orders. The system is being installed on four 148,000m³ Moss type LNG carriers (Hull's 1469 - 1472) being built by Hyundai Heavy Industries for the Shell Nigeria LNG project.

Martek claims this system is safer than other alternatives, as it removes problems with the sample tubing and valves becoming blocked or damaged, and provides virtually continuous sampling, rather than a reading being taken at best about every 30 minutes. It also removes the need to move gas into non-gas dangerous spaces, an obvious safety risk.

The new detector has onboard diagnostics that ensure reliable operation and requires calibration about once a year.

Installation of steel tubing for sampling is generally more expensive than installing electric cabling for the Martek Marine system.

Pres-Vac - tank venting

Pres-vac has purpose designed a tank venting system for Samco, aimed at eliminating the loss of cargo through VOC emissions.

The principle is to keep the cargo vapour in the tanks within a narrow band of pressure variation, while removing the need for manual releases through a failsafe automatic system.

The system is installed on two recent newbuilds, Samco America and Samco Asia, both VLCCs.

Pres-vac claims that the VOC emissions from these vessels cannot be further reduced, and that the vast majority of lost cargo has been saved.

This translates into a cost saving that will pay for the equipment within a few voyages.

The saving is accomplished as the valves used do not cause pressure surges at any time and are either full open or full shut without oscillating.

This means that the pressure setting can be increased without causing false alarms (from surges). The valve also has a low closing pressure of 15% above the opening setting, as compared to 50-70% for normal equipment.

The pressure inside the tank is confined within a narrow range, with only a few automatic releases are required during a voyage. The valve setting, which is controlled by a knob on the outside of the valve, will determine the pressure level that is acceptable.

Since this system removes the operator's control in determining when a release occurs, it must be reliable and easy to maintain.

Wearing parts are mounted on bolt-in modules, making replacement a simple job and does not require any calibration. Inspection of the device is also possible without removing it.

Pres-vac states that, "during a number of voyages, the upper tank pressure recorded has been in compliance with the design parameters, with very few automatic releases.

"The ordinary in-transit tank pressure has travelled above the minimum indicated in the VOCON procedure and below the valves' setting.

"The SAMCO VLCCs have effectively eliminated the vast bulk of VOC normally lost in crude oil transportation, with only a single or two automatic pressure reductions recorded for each voyage."

Tamrotor compressors

Tamrotor marine compressors (TMC) has launched an interesting range of variable speed marine compressors designed to save money by adapting to the requirements of compressed air onboard.

Since the consumption of compressed air is rarely as high as the maximum output of the compressor, the TMC range adapts the production to meet demand.

Using the pump at a lower setting will save power and money.

TMC estimates that the most tasks require the pump to be running at 40-60% capacity. Assuming the cost of energy production onboard to be around 0.2 USD / kW this runs into a potential saving of thousands of dollars a year.

Since the pump is operating at a lower capacity, it can build up speed slowly from a cold start and is maintaining

constant pressure in the network by varying its speed, it puts less strain on parts such as drive belts and couplings. This results in additional savings in spare part consumption.