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Mesa Engineering

Mesa 2-D Method with ACT v1 Water Level Sensor

NON-VOLUMETRIC TANK TIGHTNESS TEST METHOD (VACUUM)

- Certification** Leak rate of 0.1 gph with PD = 100% and PFA = 1.6%.
- Leak Threshold** A tank system should not be declared tight when an acoustic signal is detected above the background or baseline noise by a computer data acquisition system, or when water ingress is detected by the water sensor.
- Applicability** Gasoline, diesel, aviation fuel, fuel oil #4, fuel oil #6, solvents, and waste oil. Other liquids may be tested after consultation with the manufacturer.
- Tank Capacity** Maximum of 30,000 gallons.
Evaluated at product levels between 8%* and 91% full.
Maximum of 30,000 gallons per tank for manifolded tank systems. If isolation cannot be performed, the tanks can be tested simultaneously using two sondes (sound amplifier modules) or else they must be pressurized simultaneously and tested separately, depressurizing between tests.
- Waiting Time** None between delivery and testing.
- Test Period** When groundwater level in tank excavation backfill is below bottom of tank: After the Vacuum conditions are established on the tank, the data collection times are very short, typically one minute or less.
When groundwater level in tank excavation backfill is above bottom of tank or when the groundwater level in the tank excavation backfill has not been determined: The time it takes for water ingress to increase the water level in the tank to allow the water sensor to detect the "minimum detectable change in water level" (see "Water Sensor" section below).
Test period based on water ingress is dependent on tank size. For example, the test period is 0.97 hours for a 10,000 gallon (96" dia x 319" lg) tank.
The correct test period is always determined from the field calibration on each specific tank. Before starting test, water sensor must be calibrated to "minimum detectable water level" (see "Water Sensor" section below) according to manufacturer's instructions.
There must be no dispensing or delivery during test.
- Test Pressure** A vacuum of 60 inches of water or -2.16 psig must be used.
- Temperature** Acoustic signal is independent of product temperature.
- Water Sensor** Conductivity water sensor must be used to detect water ingress and must be calibrated for every test when groundwater level in tank excavation backfill is above bottom of tank or when the groundwater level in the tank excavation backfill has not been determined.
Minimum detectable change in water level is 0.016 inch.
Minimum water level in tank must be adjusted to at least 0.14 inch (sensor's minimum detectable water level) before calibrating sensor and starting test.
- Groundwater** Groundwater level in tank excavation backfill must be determined by observation well or soil probe in tank excavation backfill.
If groundwater level in tank excavation backfill is above bottom of tank or the groundwater level in the tank excavation backfill has not been determined, water sensor must be used and test time extended to ensure water ingress detection during test.

Comments

*Although not evaluated using empty tanks, a third party acoustics specialist has certified the device is equally effective when tanks are empty as when tanks contain product.
Test may be inconclusive if there is high background noise.
Vacuum test method may not be effective in some tank excavation backfill (such as clay) because it may plug holes in tank.
If free product is present in tank excavation backfill, a leak in the free product zone may not be detected by a vacuum test method.
An observation well or soil probe in tank excavation backfill may help determine backfill material, water level in tank excavation backfill, and presence of free product. Manufacturer must certify test operator at least every 2 years.
More than 4 psi pressure differential across the tank wall at any location in the tank could damage tank.

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