

BinMaster Level Measurement Systems



Selecting Continuous Level Sensors

SmartBob Weight & Cable



PROS

- Not affected by dust or other adverse process conditions
- Not affected by material buildup on sensor
- Can be used in extremely light, signal-absorbing materials
- Measures bins up to 180 feet (SmartBob-TS1 up to 60 feet)
- Not affected by material characteristics such as low dielectric constant or angle of repose
- Remote sensor requires no calibration
- High temperature models available up to 1000°F
- Low purchase cost (\$900 to \$1,600)
- Very simple setup and installation
- Consistent, repeatable, and accurate measurements
- Minimal contact with stored material
- Leading-edge eBob networkable PC software available
- A variety of digital and analog outputs available
- Cable replacing, wireless communications available
- Hazardous location approvals available

CONS

- On-demand system, does not provide an instantaneous response to change in the material level
- Seasonal maintenance may be required to clean out mechanical cavity in very dusty conditions, if air-purge is not used
- Not recommended in high pressure bins

GWR-1000 Guided Wave Radar



PROS

- Continuous level measurement in powders, granules, bulk solids, and liquids
- Performs in vessels prone to dust, humidity, temperature, pressure, and bulk density changes
- Suitable for vessels of most any shape or diameter, including narrow tanks
- Can be used on high pressure vessels (232 psi max.)
- High temperature range up to 392°F
- Accuracy of ± 0.2 inches (5 mm)
- Microwave energy is focused and travels along a wave guide, concentrating the radar beam within a small diameter

CONS

- Sensing probe is in constant contact with material
- Minimum dielectric constant of material must be above 2.2
- Maximum range is limited to 78 feet, and may be limited for heavier materials due to tensile load
- Material like large rock may damage probe and be difficult to sense
- Large dead zone at top limits use in short vessels

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SmartWave Open Air Radar



PROS

- Continuous level measurement
- Non-intrusive, non-contact design
- Ranges up to 100 feet
- High temperature applications up to 350°F
- In liquid applications, radar is not adversely affected by steam or foam
- Measurement is virtually unaffected by changes in process temperature, pressure, density, or gas/vapor composition within the vessel

CONS

- Low dielectric products are difficult to measure. Not enough radar energy can be reflected from the product surface. Requires a minimum dielectric constant of 2.0.
- Susceptible to condensation and product buildup on the antenna. This causes signal attenuation that will adversely affect the performance. The higher the frequency, the more signal attenuation. The higher frequency units have smaller antennas, thus the same level of coating or condensation on a smaller antenna naturally has a greater affect on the performance.
- Cone-bottom vessels can sometimes be problematic when nearing empty. The cone acts as an excellent reflector, throwing energy around the vessel sometimes confusing the transmitter.
- High purchase cost (\$2,500)

SmartSonic Ultrasonic



PROS

- Continuous level measurement
- Non-intrusive, non-contact design
- Ranges up to 90 feet (liquids)
- High temperature applications up to 260°F
- Sanitary models are available with tri-clover fittings
- Low purchase cost (\$675 to \$1,200)
- Self-cleaning transducer face
- Automatic compensation for temperature changes
- Analog and digital communication options
- PC software used to diagnose and calibrate sensor is free with purchase of SmartSonic unit
- Very easy to install and calibrate
- Available in multiple voltages

CONS

- Performance affected by dusty conditions, pressure fluctuations, turbulence in vessel, and large particulate size
- Not recommended if steam will be present in vessel
- Will measure the surface of the foam, if present
- Maximum pressure of 29 psi

3DLevelScanner Acoustic



PROS

- Continuous level measurement
- Non-intrusive, non-contact design
- Measures uneven powder or solid material surfaces
- Detects cone up, cone down and sidewall buildup
- Provides minimum, maximum and average distances
- Performs in extreme levels of dust
- Calculates highly accurate bin volume due to mapping the surface of the material with multiple measuring points.
- Measuring range up to 200 feet
- Self-cleaning with minimal maintenance
- High temperature applications up to 365°F
- Automatic compensation for temperature changes
- Analog and digital communication options
- Leading-edge 3D MultiVision networkable PC software available for multiple vessel monitoring
- Can generate a 3D image of material surface
- Cable-replacing, wireless interfaces available
- Approved for hazardous locations
- Not affected by material characteristics or low dielectric constants

CONS

- The 3DLevelScanner is an acoustic device and elevated background noise can have an affect on its performance.
- Setup requires care in mounting the sensor in the proper location, and mapping the vessel
- Time required to process multiple pulse echoes limits the sample rate
- Not recommended for liquid applications
- Corrugation on small vessels can cause false echoes
- Not recommended for materials with a bulk density under 11 lb./cu. ft. due to absorbing the acoustic pulse

LL-100 Laser Level Sensor



PROS

- Measures in a very tight 1° beam with no beam divergence
- Accuracy of +/- 1 inch with range up to 160 feet
- Can track during fill in low dust environments
- Ideal for very narrow vessels or constrained spaces
- Unaffected by corrugated bin walls
- Can be precisely targeted to avoid structure inside vessel
- Use for plugged chute detection or monitoring sidewall buildup
- Versatile for bulk solids, pellets, granular materials, and opaque liquids
- Can be used in most any dielectric material
- Unaffected by heavy vapors and pressure
- Adjustable 10° mounting flange for precise aiming
- Integrated dust protection for minimal maintenance
- Easily configured in the field using a USB port
- Configuration can be performed without filling or emptying vessel

CONS

- Single point measurement will not take into account material topography
- Volume estimations may be less accurate in materials that pile unevenly
- Laser will penetrate clear liquids
- Dusty environments will diminish performance
- Air purge may be required to keep lenses clean in dusty environments