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Keep measurements on the level

This article looks at six technologies — mechanical floats and displacers, differential pressure, capacitance, ultrasonic, radar, and guided wave radar — that are used most often for automated control, and provides practical guidance for choosing among them.

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Achieving effective automated control at a plant may well depend upon accurately knowing the level at any given time in a vessel, silo or other container. Unfortunately, with more than 20 technologies for continuous level measurement available, it can be confusing to sort out the most appropriate option for a given application. Variables such as temperature, pressure, vapor density, dielectric properties and many more come into play in making the right selection.

So, in this article, we will look at six technologies — mechanical floats and displacers, differential pressure, capacitance, ultrasonic, radar, and guided wave radar — that are used most often, and provide practical guidance for choosing among them.

The technologies

Let's start with how the various methods work and their basic advantages and limitations.

Mechanical floats and displacers. This technology utilizes the Archimedes principle — the buoyant force on an immersed object equals the weight of fluid displaced. When liquid level rises, the weight of the displacer decreases linearly with the level (Figure 1). Outputs can be pneumatic or analog 4-to-20-mA DC.