



Measuring a Stack of Liquid - BBBB (Buy)

Industrial Pressure, Level, and Density Measurement, Second Edition

By Donald R. Gillum

Reviewed by Nick Sands

There are literally dozens of ways to measure level, which is a good thing because there are some very challenging levels to measure. In the second edition of Industrial Pressure, Level, and Density Measurement, Donald Gillum describes the technologies and applications for many of the common instruments. Gillum worked as a process operator and instrument technician before joining Texas State Technical College where he served as an assistant professor, department chair, and division director. He is PE, a life member of ISA, and a past commissioner of ABET's Technical Accreditation Commission. Gillum helped develop ISA's CCST program and was recognized with ISA's Golden Achievement award.

The introductory chapters provide some history of instrumentation technology and measurement. The basics concepts of pressure, density and level are explained, as well as accuracy and a thorough discussion of calibration.

The chapters on pressure measurement describe every kind of pressure sensor, gage, and transmitter. Pressure gages have different designs, including the bourdon tube, spiral, helical, bellows, and digital. The application notes cover industry uses, materials of construction, and installation. The information on pressure transmitters includes the circuits used in common pressure sensors like capacitance, strain gages, LVDTs (linear variable differential transformers), and resonant frequency. Applications include safety, differential pressure, flow, and tank levels. Gillum includes an excellent discussion on digital, HART, Fieldbus, and wireless transmitters.

Gillum covers so many types of level measurement that it takes three chapters. The first covers classic measurements like dipsticks, sight glasses, and several types of floats and displacers. The next chapter is on head type measurements including the time tested bubbler. The topic of the other chapter is the variety of electronic level measurements including resistance, capacitance, ultrasonic, radar, nuclear, laser, and many more. Gillum describes the strengths and weakness of the different technologies.

The density of liquids can be measured by nuclear, microwave, displacer, vibration, coriolis, or hygrometer sensors. There are advantages and disadvantages to the different technologies. Nuclear for example can non-intrusively measure level in pressure vessels, but shielding and other consideration may add to the cost.

Some applications require a more accurate volume measurement; gaging of petroleum tanks for example. The temperature of the material and more accurate tank dimensions can be used to calculate the volume of material in the tank. Gillum covers some standard approaches to tank gaging and application like LPG (liquid petroleum gas) and more complex multi-function gaging systems that measure stratified layers of different compositions.

The final chapter provides a summary of the different measurement technologies and guidance on sensor selection along with further application guidance.

Gillum's second edition uses dozens of diagrams to help explain measurement technology and applications. A bonus is the information on calibration for many devices. Industrial Pressure, Level, and Density Measurement is a reference for every automation professional that works with instruments, making it a buy (BBBB). It is available from ISA for \$89, (member price).