The only limitation on liquid measurement is that it must meet a minimum standard of electrical conductivity.

The principle of operation for magnetic flowmeters is Michael Faraday's Law of Electromagnetic Induction. This law states that a conductor, when moving across lines of force in a magnetic field, will induce a voltage within the conductor and the magnetic field. (For a more detailed description of this operating principle, refer to the ISA book *Flow Measurement: Practical Guides for Measurement and Control*, 2nd edition, D.W. Spitzer, editor).

The process fluid serves as the conductor in the flow tube. If the tube is metal it must have a lining (flourcarbon resin, polyurethane, neoprene, etc) that serves as an electrical insulator on the inside of the tube wall. A pair of electrodes, extending through the wall of the tube are flush with the inside surface of the lining. The tube end connections are usually flanged to simplify mounting in a pipeline.
Magmeter sizes range from 0.01 to 96 inches and can measure flows from 0.01 GPM to 500,000 GPM. Measurement accuracy is better than 1 percent of the flow rate.

Magmeters can measure flow rates of clean fluids, dirty fluids and slurries. The meter is sensitive to changes in density and viscosity. The meter can not be used with most hydrocarbons because of their low conductivity.

Magmeter sizing

To properly size a magmeter, the following formula should be used:

$$V = \frac{0.4085 * GPM}{d^2}$$

Where: V = velocity in Feet/sec.
d = nominal diameter of the flowmeter (inches)

The following table lists typical sizing guidelines. These guidelines are based on Rosemount Magnetic flow meters and may vary slightly by manufacturer.

Application	Velocity Range (ft/s)	Velocity Range (m/s)
Normal Service	2-20	0.6-6.1
Abrasive Slurries	3-10	0.9-3.1
Non-Abrasive Slurries	5-15	1.5-4.6