Measuring Principle of Magnetic Flow Meters

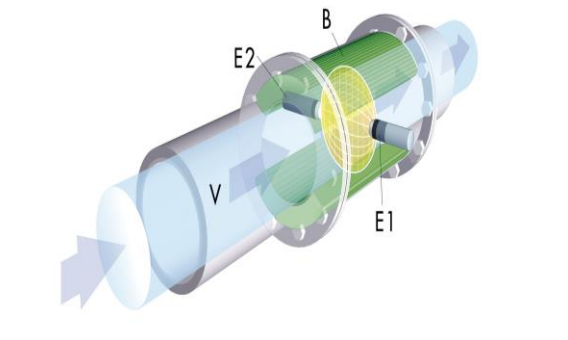
The operating principle of magnetic flow meters is explained by Faraday's Law of electromagnetic induction which states that *'a voltage will be induced in a conductor moving through a magnetic field'*.
The magnitude of the induced voltage ***e*** is directly proportional to the velocity ***v*** conductor length ***L***, and magnetic field strength ***B***.

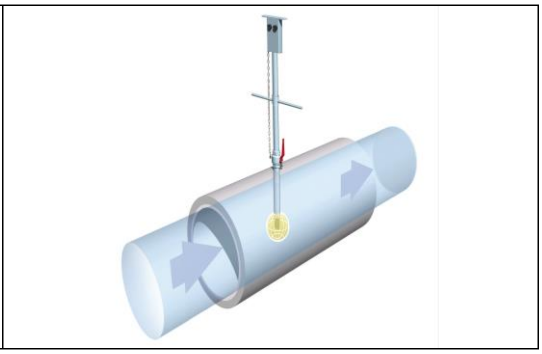
This is the formula: $e = k \times B \times L \times v$

Magnetic field coils placed on opposite sides of the pipe generate the magnetic field. As the conductive liquid moves through the field with velocity ***v***, electrodes sense the induced voltage. The length of the conductor is represented by the distance between electrodes. An insulating liner prevents the emf from shorting to the pipe wall. The only variable in Faraday's law is the velocity of the liquid ***v***, because field strength is controlled constant and electrode spacing is fixed.

Therefore, the output voltage ***e*** is directly proportional to liquid velocity, resulting in the linear output of the magnetic flow-meter.
Flowrate ***Q*** is calculate as $Q = const. \times e$

Insertion probes are an alternative to full bore meters for use in applications such as leakage monitoring and network analysis and in permanent locations where cost or space limitations preclude the use of full bore meters. The principle is the same, but the magnetic field in this case is limited in size, while in the full bore meter the entire cross-section area of the pipe contributes to the measurement.





JOHANNESBURG
(011) 435 1080
enquiries@nz.co.za

CAPE TOWN
(021) 939 9134
cape@nz.co.za

DURBAN
(031) 205 5265
kzn@nz.co.za

www.nz.co.za