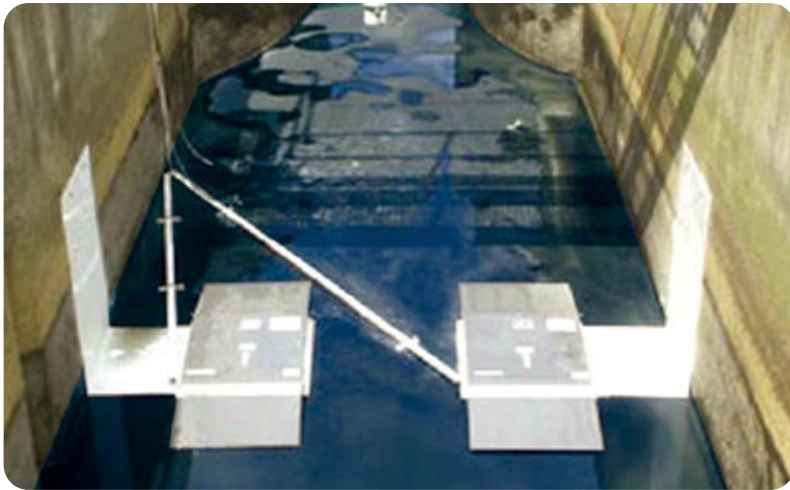


what is a channelmag?



Conventional Electromagnetic Flow meter

We are all familiar with the conventional pipe installed electromagnetic flowmeter.

The technology is older than most available technologies today, based on Faradays Law of Induction, whereby **Flow-rate = Velocity x Area (F=VxA)**, which states that if you pass a conductive liquid through a magnetic field, at right angles to it, it will induce a voltage across the measuring electrodes.

The principal is simple an electromagnetic field is set up in the flow sensor (pipe) and we measure the voltage across the electrodes. According to the above equation:-

Flow rate = Velocity (this we are measuring) x Area (which we know as we manufactured the sensor 80mm, 100mm etc.)

Example:

$2\text{mts/sec (V)} \times 100\text{mm} (\cdot \times r^2 = 0.007853981)(A) = 0.0157 \text{ m}^3/\text{sec}$

This, in conventional terms, is 56m³/hr.

Channelmag Electromagnetic Flow meter

The Channelmag works on exactly the same principal as conventional electromagnetic flow meters.

In today's current strict environmental climate there is a big responsibility on factories and water companies to accurately measure the amount of waste water being discharged into water courses, rivers, lakes and the sea.

Many of these discharge points are using rectangular concrete channels for this duty, all of which have to be measured. The conventional method for doing this in the past has been to install flumes in the channel and measure the head of water through the flume with an ultrasonic level sensor and refer this to flow tables such as British Standards. This has many disadvantages as the table below shows.

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channelmag verses standing wave flumes

Feature	ChannelMag	Standing Wave Flume
Accuracy	<p>± 2% of rate > 0.6 m/s (2 fps)</p> <p>± 0.012 m/s < 0.6 m/s</p> <p>± 4% of rate > 0.6 m/s optional</p> <p>± 0.024 m/s < 0.6 m/s optional</p> <p>Revenue metering possible</p>	Often not specified, but typically ± 5 -10% of full scale. Revenue metering should be avoided.
Calibration	Calibrated with NIST traceable computerised Calibration Certificate. Internationally recognised. Accuracy guaranteed on site.	Calculated from recognised formulae. Accuracy cannot be guaranteed on site, particularly with dirty media.
Signal Linearity & Resolution	Signal inherently linear. Will resolve flow signal typically 100:1	Non linear and bad resolution. Typical head change 50mm (2") represents 2:1 flow change
Rangeability	Digitally adjustable 0 -0.6 m/s (2fps) to 0-3 m/s (10 fps). 100 :1 turndown.	Each flume designed for fixed range, typically 10:1 turndown
Available Channel Width	Up to 6m (20 feet) ChannelMags	Palmer-Bowlus < 2.75m (9 ft.) Parshall Flume < 3.6m (12 ft.)
Cost	Including civil engineering costs, typically the same cost as flumes.	Including civil engineering costs typically same as ChannelMag.
Maintenance	Zero maintenance. No cleaning necessary. Accurace unaffected bycoatings, grease or solids.	Requires sensor and still well cleaning to a avoid excessive errors. High maintenance costs.
By-pass Pumping (Over Pumping)	May be installed in a flowing channel. No by-pass pumping. Enormous cost savings.	Must be installed in dry Channel with huge over pumping costs.
Supply of System	Complete metering system available from single source manufacturer.	Flumes and instruments normally from separate sources.
Bi-directional Flow	Bi-directional flow accounts for storm water back-up, with net forward flow totals.	Uni-directional flow only. Storm water back up gives unacceptable errors.
Affect of Flooding	Unaffected by flooding to 10m (30ft) water column.	Levels typically > 60 -90% full scale cannot be tolerated, or must be specially measured.
Civil Engineering Concerns	May be simply installed in existing channels of various cross sections. No concerns on specific gradients. Straight length 7 widths up, 2 down.	Costly installation. Reductions. Gradient must be typically <2%. Straight length including flume typically 20-30 x widths.

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The main advantages of the Channelmag over the flume are price, ease of installation, can be retrofitted and much more accurate, but the biggest advantage is that without either velocity or head of water there is no flow. This is because that with a flume you always have to assume a velocity, but if something happens further down the process, in say a water treatment works and a back up occurs, you will have a head of water in the channel and the ultrasonic level will give a flow output even if the water is static and NOT flowing. **This is costing money even without flow.**

The Channelmag measures both velocity and level and without both signals there is no flow even if there is a backup.

It operates exactly as a conventional electromagnetic flow meter; we install a flat electromagnetic velocity sensor in the base of the channel for the velocity measurement and an ultrasonic level transmitter for the level measurement. We measure the change of both level and velocity in the channel and the 2 signals are fed to the Smart transmitter which has already been pre calibrated and programmed with the channel dimensions.

Therefore: $\text{Flow} = \text{Velocity} \times \text{Area}$ and if V or A change (Velocity & Level) then it is measured and displayed. Without both V and A there is no flow, unlike a conventional flume.

One final major advantage of the Channel is that if the installation has to be audited for accuracy, as is the requirement in the UK, then it is a very expensive inaccurate procedure for Flume installations.

The Channelmag accuracy can be revalidated simply and cheaply for a further 2 year period.



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