

# NIVUS Pipe Sensor v Mag Meter



Some time ago NIVUS were invited by Water Company Directors asking how we could show savings in AMP 5...

## The story then begins...

Seeing our NIVUS pipe sensor they said "could we use your sensor rather than a Mag meter", "Yes" we said. "How many £ millions would you like to save by using a proven and efficient solution?"

Engineering and Delivery Managers told us the real cost of refitting a Mag meter and why they would like to use NIVUS!

## The Measurable Benefits

The benefits of using our solution are numerous, in terms of ease of use, accuracy, cost, time and low carbon footprint so to offer a direct comparison to the usual time and cost implications of traditional Mag Meter replacement water companies typically incur significant costs namely excavation, over pumping and related downtime often making such projects even cost prohibitive. Pound for pound this is a direct cost comparison based upon real figures provided to us.

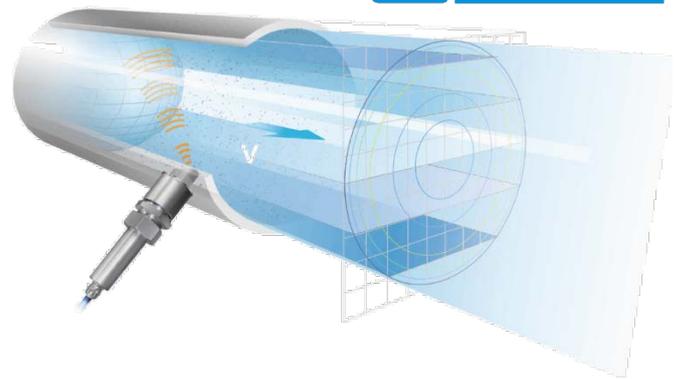
Data provided by UK Water Company Delivery Managers, and not specific to Anglian Water

Real Cost	Mag Meter	NIVUS
Unit Cost	£ 2,500	£ 5,572
Installation	£ 43,000	£ 1,500
Time on site	4 days	½ day
Total : one unit	£ 45,500	£ 7,072
X 48 units	£ 2,184,000	£ 339,000

Above costs based upon a 300mm pipe application larger savings can be realised on larger applications.

## NIVUS Cross Correlation Technology

NIVUS Cross Correlation technology is an innovative and patented ultrasonic flow measurement technique. By scanning reflectors within the water (particles, gas bubbles or minerals), an ultrasonic impulse is saved as an echo pattern. Further scans follow milliseconds later. Correlating all signals allows us to measure the flow velocity either in full or partially filled applications and show YOUR flow profile on the screen.



## The NIVUS Pipe Sensor

Field trials and fully operational installations have been running for over 3 years with accuracies proven comparable with validated alternatives, with zero failures. Velocity measurement accuracy is  $\pm 1\%$  which is unmatched in its field proving this unit as a realistic alternative to MAG meters.

*"The meter results are good enough that it will be proposed to be developed into one of the @one Alliance standard products to be used by @one Alliance and Anglian Water"*

*Peter Caldwell of Jacobs  
Part of the @one Alliance working on behalf of Anglian Water*

## MCERTS Approved



*As part of their MCERTS programme Anglian Water has used both the wedge sensor and the insertion flow meter to great effect. Installing the wedge sensor at one of our sites in Bedfordshire proved to be a simple and cost-effective way of measuring flow as an alternative to replacing a weir or installing an electro-magnetic flow meter which would have taken extended periods of time and site disturbance to install. The NIVUS solution provided a better solution at a cheaper price with a minimum of site disturbance. Anglian Water has also saved money and hassle in using the Insertion Meter for flow meter verification purposes where a "Time of Flight" meter cannot be used.*

*Both the Wedge and the Insertion Flow Meters have given the Anglian Water MCERTS Programme a valuable alternative to the traditional solutions of using ultrasonic and electro-magnetic flow meters"*

*Oliver Grievson,  
Flow Compliance & Regulatory Manager, Anglian Water*



## The Innovation behind the Product

NIVUS Cross Correlation patented technology stands us ahead of the competition for accuracy. The Pipe Sensor (insertion flow meter) is compact by design, one size sensor for all diameters, manufactured for a low carbon footprint, and suitable for partial or full pipes. Developed for easy insertion and removal is our unique extraction tool designed for pipes under pressure, therefore in any scenario offering little or no site disruption. When cost and time savings are paramount as is accuracy of data, the Pipe Sensor is increasingly the preferred choice for the validation and/or replacement of Mag Meters. Cross Correlation is an ultrasonic measurement principle and received its patented status due to the innovative measurement technique. The accuracy is achieved through the comprehensive profiling of the entire flow which is made possible with this method. We measure the transition of every particle to pass the sensor and data is calculated in milliseconds providing a continuous and highly accurate flow profile.

*Peter Caldwell of Jacobs, working in the @one Alliance for Anglian Water says, on novel Wastewater developments, we saw a potential benefit from using this technology. We worked together to arrange a trial of a NIVUS insertion pipe sensor to directly compare against a new magflow meter. The trial was at Caister WWTW where we developed comparison data for mixed liquor flows to a final settlement tank. The results showed very good correlation. NIVUS were allowed to use this data as part of their application to gain MCERTS approval for their meter – their channel based meter already had MCERTS approval. The data was used to justify the installation of a NIVUS pipe meter as a magflow replacement that arose on a separate project on the works.*

*Peter Caldwell of Jacobs  
Part of the @one Alliance working on behalf of Anglian Water*

## NIVUS unique extraction tool

Maintenance is simple. Designed specifically for pipes under pressure allowing easy insertion and extraction of the Pipe Sensor without the need to shut down the flow.



## CASE STUDY

### Caister WWTW Anglian Water

To cut into existing main and fit a new Mag meter with 2 valves



- Over pump
- Excavation of site
- Plant stoppages
- Crane
- 4 workmen
- Days of site disruption
- Total cost **£ 52,000**

## The NIVUS Solution

To drill and tap into existing main under pressure

- Strap and fit NIVUS Pipe Sensor
- 2 workmen half a day
- Total cost **£ 9,200**

*Any site preparation costs not included above*



*An @one Alliance briefing note and poster were developed and publicised at a sustainability in design drop in session in September 2012 and were seen / discussed by approximately 100 designers and project personnel.*

*@one Alliance projects for Anglian Water have purchased 10 NIVUS meters in tandem with this development.*

*Peter Caldwell of Jacobs  
Part of the @one Alliance working on behalf of Anglian Water*

## Development & Design

In development for a year by NIVUS, it came to market in 2008 primarily targeted at challenging the Mag Meter market. First introduced to the German Market and then the UK Market 2 years later, received official MCERTS status in 2012, and today it is fast becoming recognised as the preferred solution for the validation and/or replacement of Mag Meters in the UK.

Life cycle costs for Mag Meter installation and maintenance is expensive, and listening to market needs NIVUS identified the potential for a more cost effective and removable flow measurement device for full and partially full pipes that can match the accuracy and applications of a Mag Meter. The robust stainless steel outer casing and compact design is far easier for handling, particularly in confined spaces, and suitable for diameters ranging from 80mm. The sensor is situated at the very tip which is the only part to sit in the flow thus minimising any ragging or debris failures with the added advantage of being self-cleaning, and can be installed to any pipe material and dependant on application can be placed at almost any circumference point for a full and accurate reading. The Pipe Sensor uses the NIVUS patented Cross Correlation principle and requires no calibration, being truly versatile it can deliver flow velocity and/or level accuracy whether mounted e.g. on a boat system for open channel

monitoring as well as a pipe insertion meter. NIVUS also enabled the Pipe Sensor to connect to the lower priced NFP transmitter, for smaller applications, to keep solution costs low. Ease of installation measures the biggest impact of our product, with comparative installation costs being typically 75% cheaper we are literally saving the Water Industry thousands. A NIVUS pipe sensor can be fitted in hours, rather than the days of site disruption associated with Mag Meters, with no interruption to the flow. Comparing unit prices of the Sensor v the Mag Meter, at 300DN for example, pound for pound the sensor is a little higher than a Mag meter at this size yet with the significant costs saved on a quick and easy installation mean NIVUS is always the more cost effective solution overall, and also becomes the far cheaper alternative for both material and labour on larger applications. The sensor comes in standard length sizes of 20/30/40cm, and when access space is confined extendable rods can also be fitted for sensor insertion/removal using a guide tube. NIVUS also made maintenance simple and designed a unique extraction tool for the easy insertion and removal of the sensor for pipes under pressure, so the process does not need to be interrupted. Designed to last, to be cost effective, to be easy to use, easy to maintain and deliver the accuracy and reliability Water Companies need. And not least, comparable studies show that using NIVUS Pipe Sensors over the more traditional Mag Meters can reduce your carbon footprint by as much as 80%.



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*Always looking to find a Solution without compromising quality*