

MAGFLOW TECH ISSUES -e.g. Delivery trucks - Conductivity or Hydraulics

My experience with some over 300 truck tanker installations makes good historical experience to determine common issues with reported measurement inaccuracies.

Usually the issue is that some chemicals are synthetic or hydro-carbon based and hence very low to nil conductivity. In these cases there are large discrepancies in measurement as the flowmeter relies on conductivity. In this case for standard Magflows the customer must use the traditional dip stick or visual volume sight glass tube for a particular very low conductive chemical.

In the meantime ... if some of the chemicals have **low conductivity** below 50-microsiemens/cm² (or what the magflow conductivity minimum trigger setpoint is -if adjustable) this could cause issues... as per for example the flowmeter KMS102 setting on your truck. Or if the chemical consistency is not good and not well mixed.

Hydraulic -Air pockets, empty pipe or no or faulty non-return valve can be the another issue.

Followed by the flowmeter must be primed with fluid and allow to settle for 20 seconds from the empty pipe period to properly sense the pipe is full and ready to measure.

So in summary its either a **chemical incompatibility** or **hydraulic issue** or combination of both.

In this case to have a flowmeter which will cover the full scope of chemicals we would offer;

1/ KMS302 or RMS8732

These flowmeters measure chemical from 5-microsiemens/cm² and has strong signal field processing electronics



2/ KMS307W

This CAPCAITIVE MAG flowmeter measures chemicals from low conductivity from 0.05-microsiemens/cm².

This flowmeter is the ultimate solution but more costly of course at \$AUD \$ 6395.00 for 80mm

2/ Coriolis flowmeters

For this flowmeter the Fluid does not need conductivity and as used by Petroleum industry etc where fluids have no conductivity. Problem is higher headlosses and lower flowrate capacities. These are upward of \$15K

Flowmeters- Magnetic Flowmeters ?

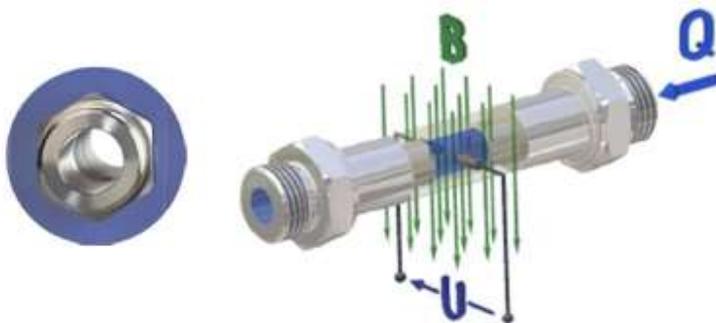
Principle of Operation:

The magnetic inductive Mag flow sensor operates by the principle of induction, That is, a DC voltage is induced by the movement of a conductor in a magnetic field: The measuring sensor tube generates the magnetic field (B).

An electrically conductive liquid (Q) flows through the measuring sensor tube.

This generates a micro voltage which is captured by the two sensing probes (U).

The faster the flow velocity through the tube then the larger proportional voltage that is induced, Processed by the electronics and transmitted as a known volume of liquid passed.



Measures volumetrically with negligible accuracy changes regardless of specific gravities, densities or viscosities. Means: No product specific re-calibration issues !!

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Other technical CASE Observations below Q&A:

CLIENT Questions application ISSUE

We are still facing the issue with the flowmeter which we purchased for the Admixture.

We are facing almost more than 1000 liters of variation for every batch.

Initially we could not able to fix the readings in flowmeter, but then we fixed the readings but now there is an variation between flowmeter and the filled volume in the tank.

There is also difference between ME3000 and KMS mag.

I will share the details of reading which we got between ME3000 and KMS Mag

We will be having the specific gravity between 1.02 to 1.23.

Sometimes ME3000 is not all displaying the readings when we are loading

Kindly find the some of the systems we are following right now;

1. We are using several pumps for loading of materials between storage tank and loading pipes
2. Sometime we are getting air lock inside the pump due to change the connection of storage tank (Maybe this may also cause the error in reading)
3. Is any NRV required between the flowmeter and the pumps which is connected to the pump start button
4. There are 8 storage tanks which are lying in quite distance between the flowmeter and the pump
5. Any difference in the viscosity of the material will affect the flow.

Apart from all these can you give us easy understandable operation method, which can be user friendly.

MANUFLO Questions to obtain necessary answers;

Please provide me with information request below:

- i) Batch quantity selected and indicated after batch on ME3000 batch controller display.
- ii) Display total reading before and after batch on KMS mag flowmeter display.
- iii) Associated chemical used for the batch (provide msds)

I will the data pass to the technical team and personally monitor the case.

The magflow accuracy should be largely unaffected by the varying viscosity and SG of various chemicals as long as the conductivity of the liquids are above the internal variable or fixed microsiemens/cm setting on the magflow.

If there are variations... we will advise of some program settings that may assist.

MANUFLO CASE Answers

1) The ME3000 batch controller is under reading around 6.3% against the Magflow but the good thing is that this difference is extremely repeatable no matter what qty you put through it. Any variation between the ME3000 batch controller and actual volume can be corrected in the ME3000 by changing calibration input value (more on this later).

2) The difference between the ME3000 batch controller readings and the actual volume in the tanks is not so consistent, with the ME3000 varying from 0.6 – 4.6% accuracy. Based on your advice in email the discrepancies are most likely due to the air in the pipes when you connect them up and start pumping. What happens is you get moist laden air pushed through past the electrodes which messes with the 'Empty Pipe' Detection' of the flowmeter. The flowmeter should be mounted so that it is always full of product when measuring volume, a **non return** valve is important and should always be installed down stream of the flowmeter to keep the meter purged (we suggest simple rubber flap type). In your case since you are connecting up various tanks and pumping out various admixtures in order to maintain accuracy you really need to be making sure you purge the lines before you start the batch proper. I think if you cannot do this procedure then you will always have inaccuracies with this system. This is the reason that the KMS Magflows are over reading because they are most likely registering flow when the pumps turn on and the pipe only contains air and a bit of moisture.

With regards to S.G and **viscosity** of admixture this is not relevant as the Magnetic flowmeter only measures volume they are unaffected by varying sg or viscosity and do not need to distinguish between varying density or viscosity of product. This would only matter if you were comparing the volume through the meter against a weighed measurement but since you are comparing volume through the flowmeter against volume in the tank the comparison is OK to make.

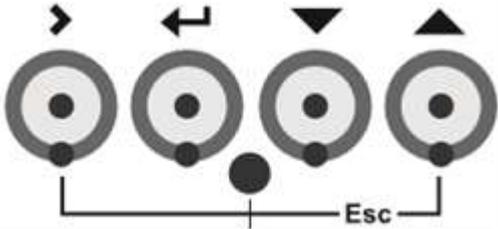
Re procedure to use the ME3000 batch controller, the method is clearly set out in the operation manual but it's like any piece of new equipment you have to have a play with it and familiarize yourself.

There is no software required for the flowmeter and we don't recommend any adjustment as it was calibrated very accurately and this technology is incredibly sound.

We suggest the first thing you do is to see if you can iron out the situation with the **air by purging the lines** before starting the batch if you can fix this try the system again and see what discrepancies you get. If you can't fix the air issue we should apply a calibration input change to the batch controller a decrease of 5% will improve the readings (though still won't be perfect if air present) this would mean the setting will change from 10.00 to 9.50. Refer attached operating instructions for the ME3000 and also the programming sheet including the cal input change from 10.00 to 9.50.

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KMS series converter – conductivity setting



Procedure to Change the Conductivity Threshold

First you need to make sure the pipe is filled with water then follow instructions

Press for 2.5 secs then to take out of run mode with **> quick start** showing on the screen

Press then then then with **> empty pipe detect** showing on screen

Press then with **limit empty pipe - 60 μ S/cm** showing on screen

Press and then use the or buttons to reduce this figure down to **20 μ S/cm**

Press until the screen reads **save configuration 'YES'**

Press once more which saves the parameter change you have made and returns the screen to the run mode.

This completes the procedure to Reduce the Change the conductivity threshold. (P.W.King 03/21)

OTHER ISSUES

Magnetic sensing electrodes are coated with excessive buildup of insulating compound on the inner walls of the pipes. If the flowmeter sensor tube is constantly emptied and in contact with air and not flushed with water, eventually a coating will buildup on electrodes which over time leads to inability to sense and process the induced voltage generated from the conductivity of the magnetic field. The electrodes then need to be cleaned. Also make sure the grounding earth-ring (where fitted -usually plastic pipes) is properly making contact with fluid or ground loop wire carries across to metal pipe arrangements

In case of the KMS307 CAPCAITIVE MAG this is not an issue, as there are no exposed electrodes. A.T.Manu 3/2021

