

Coating Investigation Flowtube Troubleshooting (Tube in the Line)

KEY POINTS

- Equipment Needed
- Electrode Test
- Coil Drive Frequency Coating Check
- Solutions to Non-Conductive Coatings in Magmeter Applications

APPLICATION

Magnetic Flowmeter Electrode Coating Evaluation

Equipment needed

B&K 878 LCR meter or Monacor LCR 3500 (This meter will measure resistance with an AC signal and give a stable resistance reading). This equipment can be purchased through Newark or Allied Electronics.

Note: Always check the operation of your test equipment before each test.

All measurements should be taken at the flowtube with all wires disconnected. This measurement can be taken at the transmitter if the distance from the flowtube is less than 100 feet.

Electrode Test (Pipe Full)

With the B&K 878 LCR meter set to Resistance and 120 Hz, make the following measurements with the flowtube in the line. Check the meter by shorting the leads together, it should read less than 1 ohm.

TABLE 1.

Test 1	Test 2	Test 3
17 to 18 (Gnd to Positive Electrode)	17 to 19 (Gnd to Negative Electrode)	18 to 19 (Positive to Negative Electrode)

The difference between Test 1 and Test 2 should be less than a few hundred ohms in most cases. This measurement is most effective when compared to a previous measurement on the same tube and process (If you can baseline the readings in a process where you know there is no coating go on at that time, you will get the best results). Large differences between the electrode to ground resistance values indicate a shorted electrode, coated electrode or an electrode not in contact with the process.

You can do routine checks of these values to see if coating is occurring. If you get values with an increase of more than 200 ohms in difference over your original reading, you may be experiencing coating or a change in the conductivity of the process. You can track these readings over time to refine your ability to detect coating. If in question, the tube should be pulled for further investigation. If there is no visual indication of coating, lightly sand the electrodes to ensure that no clear coating is present.

The resistance value for test 1 and 2 will vary from flowtube to flowtube due to differences in fluid conductivity, diameter of the electrode head, line size, or the presence of an IS resistor in series with the electrode.

Coil Drive Frequency Coating Check

If baseline readings are unavailable, you may be able to validate that non-conductive coating is occurring, by changing the coil drive frequency and monitor the output for a significant change. This can only be done on flowtubes that are smaller than 18" in diameter and should have a cable length of less than 100 ft.

Monitor the output of the magmeter at 6 Hz. Make of note of the typical flowrate. Change the coil drive frequency to 30 Hz. Again, monitor the output of the magmeter. If the typical flowrate drops significantly (>10%), this is an indication that a non-conductive coating is likely building on the electrode head.

Solutions to Non-Conductive Coatings in Magmeter Applications

1. Increase the flowrate, or decrease the line size if possible.
2. Remove the magmeter periodically and clean the electrode heads.
3. Upgrade the magmeter system to use bulletnose electrodes.
4. Upgrade the magmeter to use removable electrodes to make cleaning easier.

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Emerson Process Management

Rosemount Division
8200 Market Boulevard
Chanhassen, MN 55317 USA
T (U.S.) 1-800-999-9307
T (International) (952) 906-8888
F (952) 949-7001
www.rosemount.com

Emerson Process Management Flow

Groeneveldselaan 6-8
3903 AZ Veenendaal
The Netherlands
Tel 31 (0) 318 549 549
Fax 31 (0) 318 549 559
Tel 0800-966 180 (U.K. only)
Fax 0800-966 181 (U.K. only)

Emerson Process Management

Emerson Process Management Asia Pacific
Private Limited
1 Pandan Crescent
Singapore 128461
T (65) 6777 8211
F (65) 6777 0947
Enquiries@AP.EmersonProcess.com

ROSEMOUNT[®]

For more information:
www.rosemount.com


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