

9 LIMITATIONS OF THERMAL MASS FLOW METERS AND HOW TO OVERCOME THEM

No gas measurement technology is perfect. Here are nine limitations of thermal mass flow meters and tips on how to overcome them.

1

CONDENSED MOISTURE CAUSE INACCURACIES

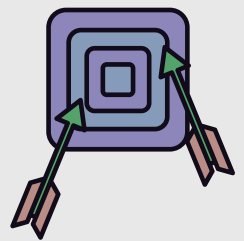
Using a knockout drum removes moisture from the gas, or angling the flow sensor can prevent condensation from reaching the sensor.



2

DIMINISHED SENSITIVITY AT HIGHER VELOCITIES

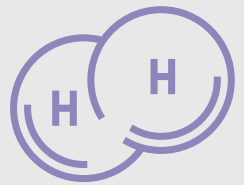
In compressed gas systems where pressure exceeds 150 PSI, consider vortex-shedding or DP flow meters rather than the thermal mass flow meter.



3

UNABLE TO CALIBRATE WITH THE ACTUAL GAS TYPE

When it is impossible to calibrate with the actual gas because of safety or hazardous conditions, some manufacturers, including Sage, can calibrate with a surrogate gas having similar heat transfer characteristics.



4

ANNUAL RECALIBRATIONS ARE EXPENSIVE AND INCONVENIENT

Some mass flow meter manufacturers, including Sage Metering, have developed calibration verification ways to verify that the meter remains calibrated.



5

GAS FLOW COMPOSITION VARIATION

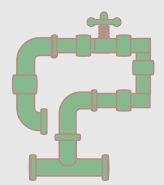
Some manufacturers can develop correction factors for gas with varying compositions. For example, with biogas, the changes may impact accuracy by less than 5% and be acceptable vs. the expensive ultrasonic meter.



6

UNDEVELOPED FLOW PROFILE

When the recommended straight run is not available to deliver a fully developed flow profile, rather than sacrificing accuracy (yet having repeatability), consider using a flow conditioner to provide a uniform flow profile.



7

FLOW SENSOR BUILDUP REDUCES ACCURACY

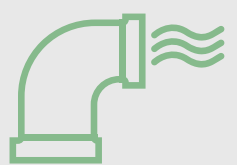
Some thermal mass flow meters, including Sage meters, have a way to easily remove the flow sensor from the pipe and clean it without disrupting service.



8

OBTAINING ACCURATE FLOW IN LARGE DUCTS

Recommended straight run is predicated on pipe diameter, making accuracy nearly impossible in large duct runs. Using multiple flow meters at different locations across the duct and averaging the measurements improve accuracy.



9

NOT ALL COMPANIES CALIBRATE AT LOW VELOCITIES

If you have a low-velocity application, contact the manufacturer you are considering to ensure they can calibrate the meter over the specified velocity range correctly.



For more information on how to overcome these limitations, visit [SageMetering.com/back-to-basics/overcoming-thermal-mass-flow-meter-limitations/](https://www.sagemetering.com/back-to-basics/overcoming-thermal-mass-flow-meter-limitations/), or call (831) 242-2030.

