



TEASISTEMI

ENERGY AND ENVIRONMENT TECHNOLOGIES

MULTIPHASE FLOW METERING



Multiphase Flow Metering

- TEA Sistemi is a research company founded in 1990 as a spin-off of the University of Pisa in the field of Process and Petroleum Engineering.
- The Multiphase Flow Metering branch of TEA Sistemi has been active since the early 1990's, conducting relevant R&D activities supported by the Oil Industry, the EU and self supported.
- First field installation of a MFM by TEA Sistemi has been in 1994 (Trecate, Italy). Since then, about 50 MFMs have been installed all over the World.
- In Spring 2014, ABB and TEA Sistemi signed a three-years Strategic Supply Agreement which assigns to ABB the exclusive right of sale of the Wet Gas Meter VIS worldwide.

Isokinetic Sampling Meters

These meters are based on the concept of isokinetic sampling, which is a method developed to extract a known fraction of a multiphase stream flowing in a pipe, in a position where the multiphase mixture is well mixed and single phase velocities are uniform across the flow area. This requires a careful design of the sampling section and of the method adopted to extract the sample.

VEGA

- The first isokinetic sampling meter developed by TEA Sistemi has been VEGA, a wet gas meter based on phase sampling. This meter makes use of a calibrated orifice to set the sampling flow rate at the desired value.
- The first installation of this meter (2002) regarded the Allegheny TLP in the GOM. The results obtained in this installation have been excellent.
- The accuracy and the rangeability of the VEGA meter can be extremely high. The detection limit of the liquid volume fraction is many orders of magnitude smaller than the competitors.



DOME

- In the last two years, TEA Sistemi developed and patented DOME (Dual Orifice MEter), a new isokinetic sampling meter based on the use of two flow restrictions placed in the same pipe cross section, immediately after a mixing section. This method permits to extend the sampling concept to the full range of GVF.
- The differences between VEGA and DOME only regard the sampling section. DOME is (slightly) more expensive, but also more versatile, simpler to use and as accurate as VEGA. It is then expected that it will replace VEGA also for wet gas applications.

Meters based on DP signals analysis, iVIM

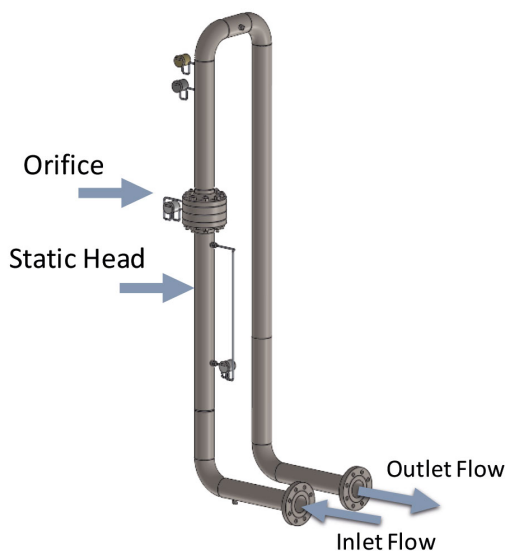
Virtual flow meters derive the gas and liquid flow rates from the pressure drop through a valve. Recently, TEA Sistemi developed iVIM, a low-cost gas-liquid meter based on a calibrated orifice and the measurement of the pressure gradient in a vertical pipe. iVIM can be coupled with a sampling section to measure the Water-Cut.

These signals are interpreted with physical models based on an extensive data base.

In practice, in this flow meter a differential pressure transmitter replaces a gamma-densitometer.

A continuous check on the quality of the readings can be made connecting the meter via Internet to an expert operator.

This meter only uses conventional field instrumentation and its cost can be very low.





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