esmerCoriolis ™

TECHNOLOGY OVERVIEW

esmerCoriolis is a low cost flow meter for measuring the liquid flow rate and water cut in low GVF oil flow (<5%) or high GVF (>95%) wet gas flow. The system is particularly suitable for use in the exit leg of separators taking care of gas carry under (liquid leg) or liquid carry over (gas leg).

esmerCoriolis comprises ***Endress Hauser Promass 80 Coriolis*** and a flow computer enclosed in an Exe or Exd enclosure (customer choice).

esmerCoriolis Runtime Software runs on the **esmerCoriolis Flow Computer** and applies correction due to presence of gas and converts the basic transmitter signals to liquid – gas flow rates and water cut. The software is founded on a combination of empirical fluid dynamic and thermodynamic models. The system is configured (field calibrated) by means of the **esmerCoriolis Configurator** software running on the Windows PC platform.

esmerCoriolis Field Unit

ELECTRO-MECHANICAL SYSTEM

esmerCoriolis can be installed horizontally or vertically and does not require flow conditioning. Sizes between 2" and 10" can be supplied depending on process conditions.

esmerCoriolis Flow Computer (comprising ***Beckhoff*** embedded Windows microprocessor) can be mounted in an Exe/Exd enclosure as customer choice. The Flow Computer executes the I/O and processing tasks in real time and outputs measurements to the SCADA via MODBUS.

A desktop PC / notebook PC / tablet is required to run the **esmer Configurator** software. The PC can be connected to the Flow Computer via Bluetooth, Wifi or ethernet.

Electro-Mechanical System Summary

Materials: NACE and ASME standards.
Meter sizes: 2" to 10"
Transmitters: Endress Hauser Promass 80
Certification: ATEX Zone 1 Gas Group IIB
Power Supply: 220VAC / 20 W
Communication: RS485 MODBUS
Flow Computer Enclosure: Choice of Exd or Exe

Typical Weights and Dimensions

SIZE	L mm	H mm	W mm	WEIGHT kg
2" Field Unit	714	760	165	33
4" Field Unit	1128	1060	235	149
Flow Computer Enclosure	315	415	250	20

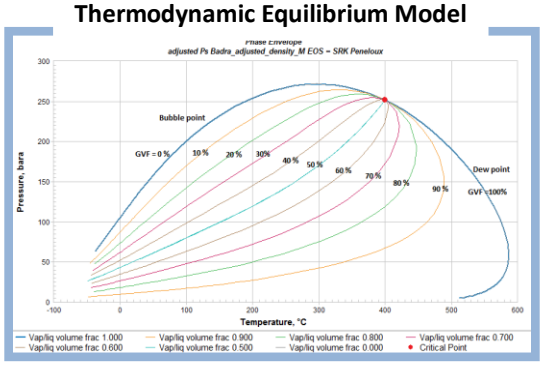
SOFTWARE

esmerCoriolis Runtime Software hosted on the Flow Computer performs all the required signal processing, calculation and I/O tasks.

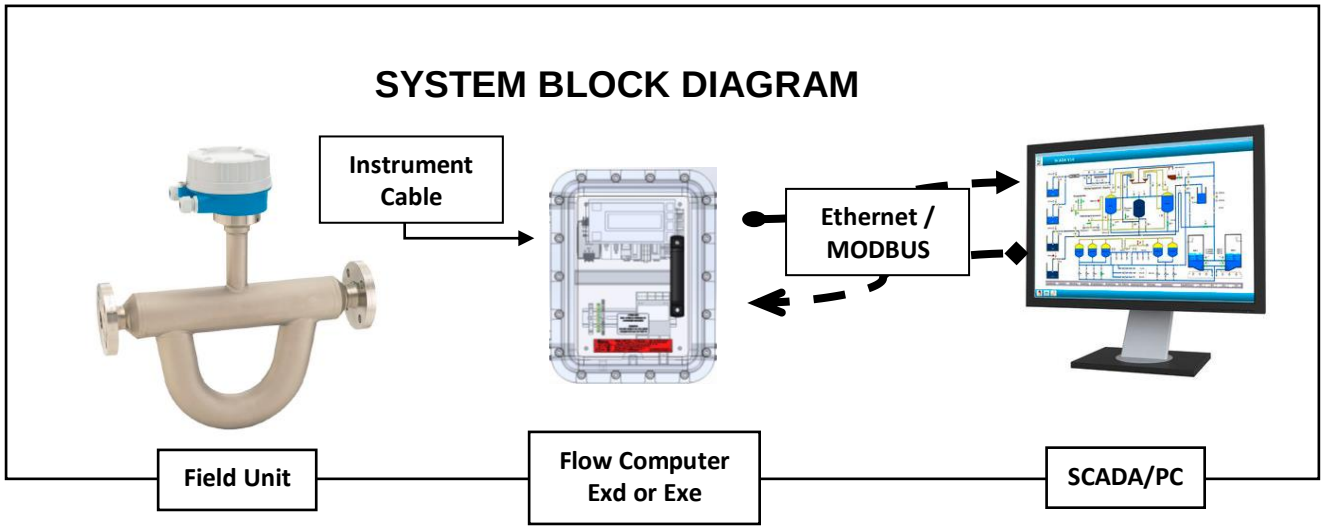
The principal functions of the software are:

- **to predict GVF from an EOS model**
- **to apply correction to expected deviation of original measurements** (mass rate and density) due to presence of gas and low flow velocity (two principal causes for deviation of the measurement)
- **to determine water cut.**

Thermodynamic Equilibrium Model



Compositional PVT data is required to perform these functions. The user can *tune-up* the laboratory PVT data to match particular process conditions by means of the **esmerCoriolis Configurator** (that runs off-line on the PC – Windows platform). By *tune-up* we mean that the Configurator will create an EOS model matching the actual phase behavior of the process fluid and the correction functions based on empirical flow loop data.



RANGE & UNCERTAINTY

esmer Coriolis Operating Envelope	esmerCoriolis Measurement Accuracy
Flow Range: Each application is sized specially based on process conditions. **GVF:** 0 – 5% and 95-100% **Pressure:** up to 150 bar **Temperature:** up to 120 ˚C	Accuracy will depend on GVF, extent of PVT data available and field tune-up capability. A specific accuracy target will be provided for each application. Typically: **Total flow rate mass:** better than 2% Relative Full Scale **Total liquid rate mass:** better than 3% Relative Full Scale **Watercut:** better than 3% absolute

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