

talkline



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service technicians are
dedicated to keeping your
plant running 24/7
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Your best choice for long-term reliability and accuracy in Custody Transfer

Coriolis mass flowmeters
offer great advantages



Endress+Hauser 

People for Process Automation

Custody Transfer Defined: The exchange of goods between two parties

3 Types of Legal Trade:



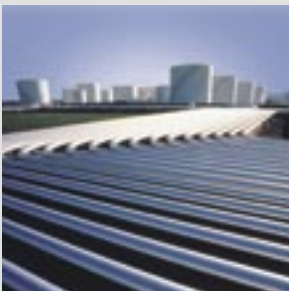
Retail

Exchange of goods between an unknown buyer and seller. Typically the goods are consumed by the buyer.



Commercial

Exchange of goods between a known or unknown buyer and seller. The goods are of substantial quantity, and are typically not consumed by the buyer.



Contractual

Exchange of goods between two known parties. The parties agree on quantities, method of transfer, measurement and dispute.

Top: Retail sales of gasoline to consumers. Endress+Hauser high pressure Promass flowmeters are used in compressed natural gas retail motor fuel dispensers.

Middle: Loading a truck using a Coriolis mass flowmeter where the installation was tested and approved by the local state weights and measures department for use in trade.

Bottom: An Endress+Hauser Coriolis mass flowmeter is used as the billing meter to measure a chemical transported by pipeline between two companies. The meter is periodically tested against a reference flowmeter by a calibration service company.

Endress+Hauser means long-term reliability & accuracy

AGA & API approved Coriolis mass flowmeter as viable technology

The demand and the costs of natural gas are constantly on the rise. With crude oil and natural gas prices at an all-time high, most industries are feeling the pinch of high feedstock and fuel prices.

New technologies allow for higher accuracies and lower maintenance for petroleum and natural gas flow measurement and therefore better monitoring of consumption and usage.

The American Gas Association (AGA) has recognized Coriolis mass flowmeters in AGA Report #11 as a viable technology for natural gas flow measurement.

The American Petroleum Institute (API) recognizes the use of Coriolis mass flowmeters for use in the custody transfer measurement of liquid hydrocarbons in the Manual of Petroleum Measurement Standards. Endress+Hauser Promass flowmeters are commonly used to measure refined petroleum products and liquefied gas.



Mass flowmeters outperform volumetric measurement

Coriolis mass flow measurement for liquids and gasses minimizes the uncertainties associated with volumetric flow measurement. Since Coriolis flowmeters like the Proline® Promass F (pictured at right) measure direct mass, many issues are eliminated which affect the uncertainty of volumetric-based metering. The installation requirements and overall costs can be greatly simplified and reduced. The need for proper straight run and flow profile dependencies are shown to be virtually eliminated. During simulated high level perturbation and installation effects, Coriolis performs well within the accuracy specifications of the AGA and API over an extended range of flow.

Endress+Hauser Promass Coriolis mass flowmeters offer great advantages over volumetric based flow measurement technologies in the following ways:

- No moving parts or bearings to wear in dry gas
- No straight run requirements needed
- No flow conditioning needed
- Tolerable to solids/liquid particulates which can damage orifice plates and turbines in volumetric flowmeters
- Can handle an over-range of flow which can damage mechanical metering
- No external temperature or pressure measurement required in most cases
- Immune to fluid property and compositional changes
- Coating of the tubes can be detected
- Onboard diagnostics which allow for continuous monitoring of corrosion, erosion or build-up
- No sensing lines to plug, freeze or leak
- Wide turndown ratio demonstrated at 150:1*

*Typical spec. of 50:1 and dependent on allowable dp, (gas density and velocity). 150:1 was on testing of high pressure natural gas at CEESI (1190 psi, 77°F)



Proline Promass F 10” Coriolis Mass Flowmeter

The new Endress+Hauser 10” Coriolis sensor is **big in flow and small in dimensions**. Promass Coriolis flow meters have become the key to improving many processes.

Users appreciate the benefits of direct mass flow measurement with **no moving parts and the ease of installation**. The robust design of Promass F ensures stable measurement as it is immune to external forces like vibrations. The Proline Promass F sensor, with its wide application range, is suitable for most tasks.

The introduction of the size 10” extends the **flow range up to 80,840 lb/min** and opens up an even wider application area. The fully welded stainless steel design, excellent accuracy, hazardous area approvals, as well as a variety of process connections, are features that make Promass F the perfect choice for mass flow measurement.





Do you know your acronyms?

OIML	Organisation Internationale de Métrologie Légale
NIST	National Institute on Standards and Technology
NCWM	National Conference on Weights and Measures
NTEP	National Type Evaluation Program
AGA	American Gas Association
API	American Petroleum Institute
MPMS	Manual of Petroleum Measurement Standards

Stability and accuracy

Endress+Hauser Proline® Promass Coriolis mass flowmeters are designed to isolate the measuring tubes from mechanical stress and external forces. This allows for immunity to pipeline vibration, with excellent measurement stability and accuracy. The stability of the zero point is very important when evaluating the performance of a Coriolis flowmeter. Stability ensures performance accuracy during flowing conditions.

No brackets or supports are required for this installation. If the piping system will support the meter, there is no need to provide isolative support, which lowers installation costs.



6" and 10" Coriolis mass flowmeters installed in gas pipe application
- no additional brackets or supports required

Benefits of mass flow

The benefits that come with mass flow are enormous. There is a substantial installed base and several reports that confirm the superiority of this technology with gas flow measurement. In addition, independent testing performed by Colorado Engineering Experiment Station, Inc., (CEESI) in Iowa and by Southwest Research Institute (SwRI) showed that the "bent tube designs showed insignificant flow measurement error when subjected to a variety of upstream piping configurations."

Endress+Hauser has the only 10" compact Coriolis Mass Flowmeter in the market that can handle applications at typical velocities and gas flow rates for a 10" gas pipe. The tests by CEESI confirmed that the Promass F 10" performed well within the custody transfer gas accuracy specifications of 1.0% as described in the American Gas Association Report #11.*



Testing being performed by CEESI of Proline® Promass F 10" Coriolis Mass Flowmeter

***In fact, turndown ratio or range ability exceeded all expectations and demonstrated custody transfer level accuracies in the range of 150:1. Typical specs would more likely be in the range of 50:1 - or less, depending on the gas density and allowable pressure drop. Velocities tested at CEESI were way beyond typical pipeline or gas flow standard practices.**

Mass flowmeter commercial trade applications

Case study

Railcar filling (pictured right middle)

This application uses an Endress+Hauser Promass Coriolis 6" mass flowmeter to fill railcars with magnesium hydroxide. With a density of 1.6 SGU, magnesium hydroxide is used as a water treatment chemical to raise the pH of water after chlorination in order to comply with EPA water quality requirements for domestic water. The flowmeter was tested by the state weights and measures department and approved for use in trade.

This production operation has experienced real benefits using Endress+Hauser Promass mass flowmeters. The meter was tested for accuracy by filling a truck tankwagon, weighing the truck and comparing the net weight to the flowmeter delivery total. After 6 months of continuous service, the company is now planning to duplicate the railcar filling process due in part to the accuracy of the flowmeter, the cost savings realized, reduced shipping costs and customer satisfaction.

Truck loading

- Prevents overspilling
- Reduces demurrage charges
- Variable product types

Railcar loading

- Fill and bill
- Eliminates weighment fees
- Variable product types

Pipeline

- Reduces need for ancillary equipment; temperature, pressure, density
- Empty pipe detection



Truck loading of chemicals using Promass M mass flow measurement



Railcar filling of water treatment chemical using mass flowmeters



Petroleum truck loading application using mass flowmeters in conjunction with Coriolis for custody transfer verification

Helpful information on-line at www.us.endress.com



Applicator is an easy-to-use selection and design tool to determine and select the suitable product for the respective measuring task. During the planning process, you obtain a selection of suitable products and solutions by entering specific application parameters. Find out more at: www.us.endress.com/applicator

Technical Information Coriolis flow measuring system

Proline® Promass 80/83 F, M - Simultaneous measurement of mass, density and temperature for a broad range of applications for liquids and gases

To order complete technical information, go to www.us.endress.com/literature or call 1-888-ENDRESS - ask for TI 053D/24/ae.



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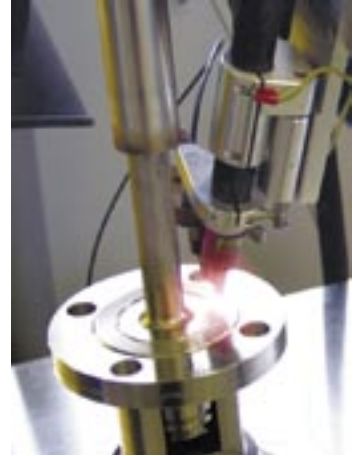
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Close to you

Driven by the knowledge that powers a global company

Endress+Hauser is a global supplier of process automation solutions. The power of this global company is realized by its local support to you. This support starts with excellent manufacturing facilities located within the US. ISO 9001-2000 certified manufacturing facilities and ISO 17025 certified calibration capability assure Endress+Hauser delivers highly reliable measuring instruments to customers throughout North and South America.

A network of skilled sales and service personnel are located throughout the US and Canada, ready to provide the support required. Regional sales and service locations assure there is someone available, in your time zone, to support you.



Level and pressure instruments may be subject to extreme conditions once installed, each step in their manufacture has to be precise.



Flow calibration rig is accredited to international standards and helps us respond to the fast delivery times that are sometimes required by our customers.



Service from Endress+Hauser

Endress+Hauser's Service Department is dedicated to keeping your plant working efficiently seven days-a-week, 24 hours-a-day. Technicians are located throughout the country to provide various levels of support for you and your instruments.



Start-up service

Delays and production losses can far exceed the costs of planned start-up! A high percentage of instrument problems can be traced to start-up by unqualified personnel. These can be prevented by scheduling a trained Endress+Hauser service technician to be on-site during start-up.

Basic factory warranty is extended from 1 to 3 years when start-up is purchased on your instrumentation order. Ask for start-up to be quoted with your new instruments. www.us.endress.com/start-up

Preventative maintenance contracts

Planned maintenance lowers costs

To ensure optimum performance and help extend the life of your instruments, our skilled service engineers perform periodic checks (including any necessary adjustments), and issue a report confirming the instrument's performance. Additionally, we provide specific recommendations for maintenance of the equipment under the agreement.

www.us.endress.com/agreements



Long-term maintenance offers more savings

The Endress+Hauser Instrument Management Solutions (IMS) service provides a long-term plan to a more reliable operating plant, cost-effective maintenance, and gives a basis for complete life cycle management of your instrumentation.

www.us.endress.com/IMS

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