

SensyMaster FMT450

Thermal mass flowmeter

Nitrogen blanketing in tanks for hydrocarbon liquids



Direct mass flow measurement with high accuracy and integrated totalizer functionality for increasing efficiency and cost control.

Measurement made easy

SensyMaster FMT450

Introduction

Nitrogen blanketing in storage tanks is a common practice to improve safety and reduce the risk of an explosion or fire associated with storing flammable and explosive liquids. Filling Nitrogen into the vapor space of the tank prevents an explosive gas-air-mixture to develop in the unused tank space and cause a fire or explosion when ignited by a spark from e.g., built up static electricity. In addition to the improved safety nitrogen blanketing also helps to increase the profitability of the company.

Nitrogen prevents excessive evaporation of the valuable liquid and reduces damages through corrosion by reducing the amount of oxygen in the tank which can cause the corrosion when meeting with humidity.

One of the world's leading independent storage partners for oils and chemicals uses nitrogen gas for tank blanketing. In one storage terminal for oil and other refinery products 20 tons of nitrogen are used per day to keep the terminal safe. Since the costs of nitrogen are high the company wants to control the use of nitrogen tighter to increase the efficiency and also add the exact costs for the nitrogen to the bills for their customers.

Additional Information

Additional documentation on SensyMaster FMT450 available for download free of charge at www.abb.com/flow.

Alternatively, simply scan this code:



Task

01 Tank farm

02 Tank detailed



01

The measurement task at the storage partner is to measure nitrogen at the best possible accuracy with integrated totalizer functionality.



02

Little pressure loss also is important as well as wide measuring range and simple installation and commissioning.

Solution

Since the measurement of tank blanketing nitrogen was intended to be used for billing purposes for the storage company the accuracy of the SensyMaster FMT450 with a maximum allowed deviation of $\pm 0.6\%$ of reading, $\pm 0.05\%$ of full scale, was the most important argument to decide for the ABB SensyMaster FMT450 flowmeter for this application.

A number of SensyMaster FMT450 flowmeters with ATEX Zone 2 approval in combination with different designs of pipe components were installed after consultation by the ABB application specialists.

The pipe components integrate well into existing pipelines and ensure a stable and well developed flow profile and the best possible measurement performance of the flowmeter.

In case sufficient straight pipe runs were not available after elbows or valves ABB flow straighteners provided a solution.

All meters installed feature an easy setup menu to adjust the relevant parameters in easy steps and provide accurate measurements that are repeatable and reliable. The totalizer value in mass unit [kg/h] is read into the PLC of the storage company via the HART signal of the meter and represents the basis for the commercial invoicing of nitrogen used within storage duration.

Instrumentation

ABB's thermal mass flowmeter SensyMaster FMT450 measures directly the mass flow without any further temperature and pressure compensation like it would be necessary for a volumetric flow measurement. Its measuring principle allows a maintenance friendly sensor design with no moving parts and the pressure loss created by the sensor part reaching into the pipeline is negligible.

Market outperforming accuracy and the wide measuring range of 1:100 are a result of the powerful electronic and optimized signal processing capability.

Up to eight different sets of applications can be stored and enable the meter to work accurately in different applications or in different installation places. Applications can also be adjusted to different parameters like pipe size on site to make the use of the meter as flexible as possible. A differentiated Sensor design gives the meter superior long-term stability and a remarkably short response time. It is sensitive and measures virtually down to zero flow.

— 03 Nitrogen tank blanketing process on refinery tanks

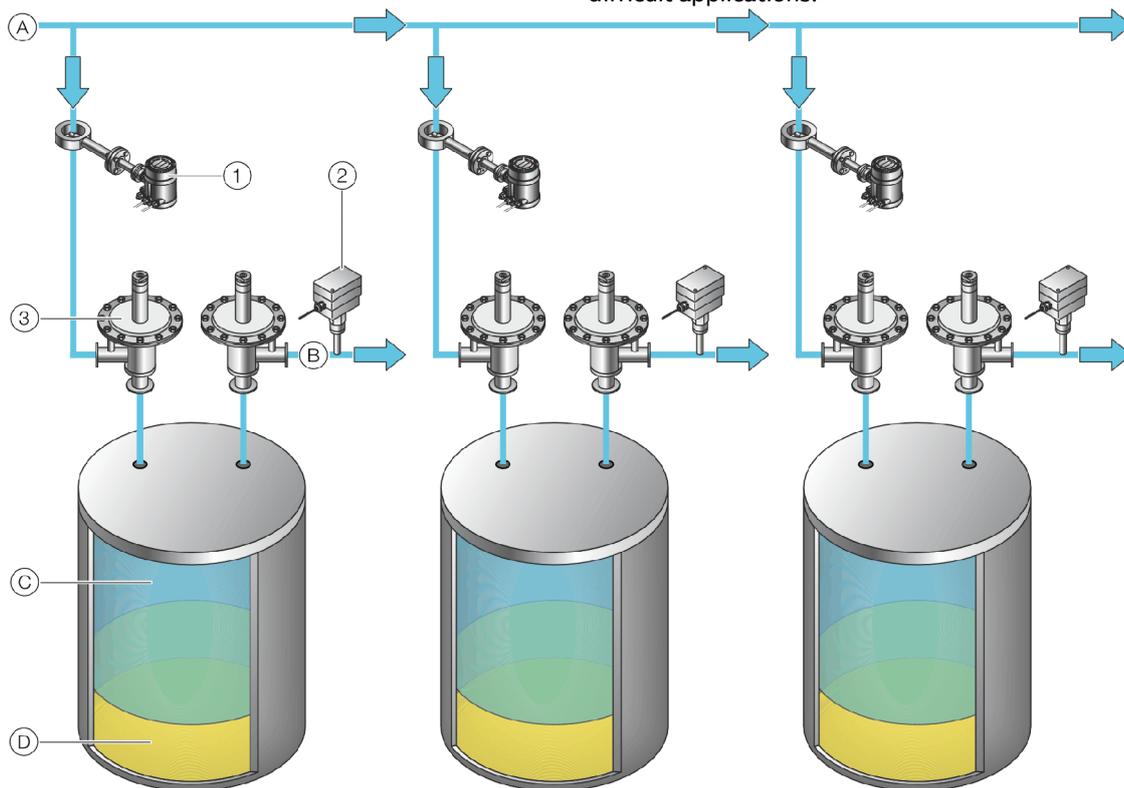
— 04 Thermal mass flowmeter FMT450 with integrated hot tap fitting

The meter is available as integral or remote design and features an inbuilt totalizer, temperature measurement, alarm functionality and various diagnostic functions.

Communication can be established via a current output with 4 to 20 mA including HART signals and digital outputs with frequency or pulse signal, or a PROFIBUS DP-interface.

In order to make the installation easy and accurate ABB offers different pipeline-matching pipe components that ensure a perfect and repeatable alignment of the meter in the pipe.

Weld-on-Adapters, wafer and flanged design pipe components all with centering pin and indication of flow direction are available. The different pipe components can be equipped with ball valves, hot tap fittings, or integrated flow straighteners for difficult applications.



(A) Nitrogen supply

(B) Vapour

(C) Nitrogen blanketing gas

(D) Hydrocarbons

(1) Thermal mass flowmeter SensyMaster FMT450

(2) Flow switch

(3) Tank blanketing valve

03

Products used



The SensyMaster FMT450: Compact and robust design for direct mass flow measurement.

- Extremely wide measuring range of typically 1:100
- Negligible pressure loss
- Maintenance-free design
- Easy and repeatable installation through pipe components
- In-built totalizer function and HART communication
- Hazardous Area Approvals

04

ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/flow

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