ODORANT FOR NATURAL GAS A073

APPLICATION NOTE

Odorant supply for natural gas

For a Dutch customer, Bronkhorst supplied a flow solution for adding odorant to natural gas in a **continuous** and **controlled way**.

Commercial natural gas in the Netherlands has to contain at least 18 mg of THT (tetrahydrothiophene) per cubic meter gas. As natural gas is odorless by itself, the liquid THT is added to act as a 'warning agent' in case of leakage. This THT has to be added very accurately to the natural gas. By using a flow solution consisting of **Coriolis mass flow controllers**, it was possible to develop a **continuous** and **accurate dosing system** to supply the odorant for natural gas.

Application requirements

Traditionally, THT is added pulse-wise to the gas on a regular basis, using a pump with a fixed stroke volume. Especially for small gas flows - for biogas installations in the range of 40-50 m^3/hour - such a batch-wise injection may lead to liquid THT remaining in the gas lines. In this way, THT may not be mixed well with the gas, it might have the wrong concentration and there is no control on supplying. By using the Coriolis flow solution the continuity and accuracy issues should be solved.

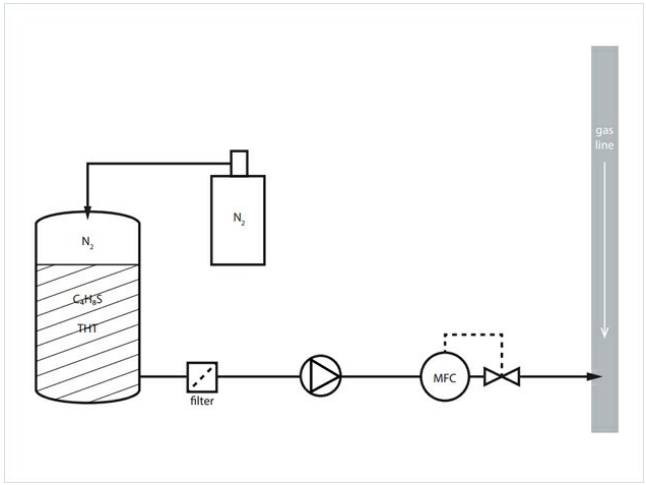
Important topics

- Continuous and accurate dosing of natural gas odorant
- Homogeneous distribution in the natural gas
- Solution gives operational reliability

Odorisation process solution

The key component of the new dosing solution for natural gas odorant is a Bronkhorst Coriolis mass flow controller (mini CORI-FLOW series) that injects a small but continuous liquid THT flow into the biogas flow. A master mass flow meter measures the biogas flow and sends a signal to the mass flow controller via a PLC. The flow controller has been set to a dosing value of 18 mg of THT per cubic meter gas and continuously injects the correct amount of THT.

In this configuration, a 40 liter THT storage tank is pressurized by means of nitrogen gas. A pulsation damper is incorporated to remove pressure surges and to guarantee a stable control. This results in a precharge pressure upstream of the flow controller of 10 to 13 bars. Downstream of the device the pressure is typically 8 bars. The flow controller is set to maximum dosing value of 40 mg/m^3 .



Flow scheme

Using this dosing solution, THT can be dosed very accurately, within a range of 1-2%. This is a major improvement compared with the traditional batch-wise method. Furthermore, the **continuous dosing** results in a homogeneous THT/biogas mixture, which is a more efficient way of dealing with the amount of odorant as overdosing is avoided.

Another important aspect is the operational reliability of this solution - the ability to supply the natural gas odorant to the natural gas mains. Prior to entering the mains, the biogas composition is analyzed by GC. If the biogas contains not enough THT, the grid operator will shut off the supplier from the natural gas mains. By default, the monitoring of the dosing occurs by PLC, but it can also be done by means of the flow controller itself. In this solution, it is exactly known how much THT has been dosed - and an alarm will be given when no odorant is detected. Moreover, a prediction can be made when an empty THT storage tank has to be replaced.

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Recommended Products

MINI CORI-FLOW™ M12V14I

- Flow range 0…200 g/h
- Pressure rating 100 bar
- Independent of fluid properties
- High accuracy, fast control

MINI CORI-FLOW EX D XM14

- Flow range 0…30 kg/h
- Pressure rating 107 bar
- IECEx and ATEX Zone 1 approved
- Independent of fluid properties

Bronkhorst®

BRONKHORST USA LLC

57 South Commerce Way

Suite 120

USA - Bethlehem, PA 18017

Tel. +1-610-866-6750

sales@bronkhorstusa.com