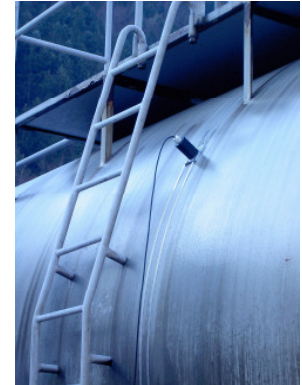


SONOGAS – System for Non-Intrusive Level- and Limit Measurement of Liquefied Gases



Application

Level control with ultrasound from the outside through the wall is used for a number of liquefied gases. Successful applications can be found in various areas, such as the measurement of propane/butane (LPG), propylene and other hydrocarbons, ammoniac (NH₃), refrigerants (e.g. R134a) and other technical gases such as sulfur dioxide (SO₂) and acetaldehyde (CH₃CHO).

The device can be used for limit measurement (signaling via an isolated relay output) as well as for continuous level measurement (current output: 4 ... 20 mA). For level measurement the temperature compensation is carried out in the preamplifier. The measurement system consists of a probe, which is fixed to the tank by means of fastening material, a preamplifier as well as a corresponding transducer (placed in the central control room). Both systems can also be applied in combination.

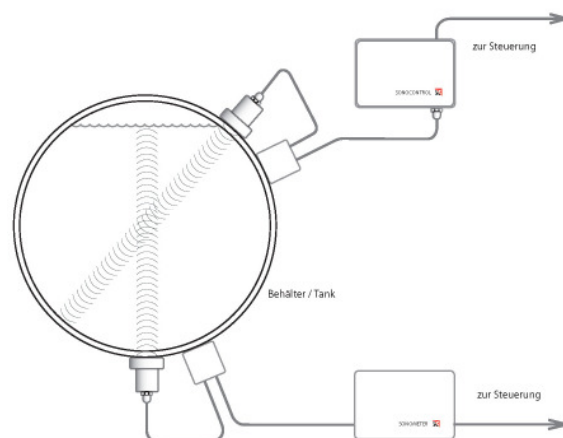
Advantages

Since the SONOGAS Systems measures through the wall, even through lacquer coats, enamellings and coatings, the installation can be carried out as a retrofitting without interrupting ongoing operations and without emptying the tank. There is no contact between probe and medium which leads to hardly any wear at the probe.

Principle

Our devices work according to the impulse-reflection method. The ultrasonic impulse passes the pipe wall and spreads through the liquid which is to be measured.

For limit measurement (probe is fixed sideways at the pipe wall) the transducer measures the echo, which is reflected by the opposite pipe wall. For level measurement (probe is mounted at the bottom of the tank) the ultrasonic echo, which is reflected at the surface of the liquid and returning back to the probe, are measured. If the acoustic velocity (specific value for different liquefied gases) is known, measuring in between sending and receiving the signals allows to determine the current level.



Functional Prerequisites

- Liquefied gases in a temperature range of -40 ... +80 °C
- Thermal insulation and loose layers of paint and rust in the area where the sensor is to be mounted must be removed; varnishing and coatings may stay if suitable
- Container diameter of ca. 1 ... 25 m, wall thickness > 50 mm
- Single-shell containers, no fixtures within the measuring section

Application Example

AB Kontrol installed for a Turkish gas supplier the SONOGAS 30 system at LPG tanks (mixture of 30% propane and 70% butane). After a longer period of testing the user was convinced of the reliability and the high measuring accuracy at different temperatures and operating conditions. Based on an automated content measurement the user is able to organize his stock optimally.



References

- AB Kontrol (Turkey) – propane/butane
- Infraser Logistics GmbH (Frankfurt Höchst) - acetaldehyde
- Total Petrochemicals France – propane/butane

Configuration for limit measurement: SONOGAS 20

- Probe and preamplifier are certified after ATEX and approved for Ex-Zone 1.
- Limit measurement: The analysis device SONOCONTROL 20 is mounted outside the hazardous area.

Configuration for level measurement: SONOGAS 30

- Probe and preamplifier (incl. temperature sensor) are certified after ATEX and approved for Ex-Zone 1.
- Level measurement: The analysis device SONOMETER 30 is mounted outside the hazardous area.



SONOTEC Ultraschallsensorik Halle GmbH
Nauendorfer Straße 2, 06112 Halle (Saale)
www.sonotec.de

e-mail: SONOTEC@sonotec.de
Tel. +49 (0)345/1 33 17- 0
Fax +49 (0)345/1 33 17-99