

Measuring point

Installation

Measuring task

1

pipeline

discharging of the semi-finished product

2

pipeline

quality assurance for the final product

Formaldehyde Synthesis

Introduction

Formaldehyde is an organic base material for numerous applications to synthesize diverse end products. In this way formaldehyde is frequently used in chemical and pharmaceutical industry. Typical synthesis products are resins, dyes, fertilizers, disinfectants, pesticides and medicines.

Formaldehyde is produced by oxidation of methanol. The two most important production methods offer different advantages and disadvantages. Because of the higher efficiency and the lower residual methanol content, the silver catalyzed process has now replaced the metal oxide catalyzed process. However, the silver catalyst plant requires a more frequent catalyst regeneration.

By a continuous measurement directly in the process, an optimum concentration management can be assured. With the robust LiquiSonic® system, the synthesis can be inline monitored and the methanol and formaldehyde content is precisely determined.

Application

Formaldehyde is industrially produced in the silver catalyzed process. Methanol gas is mixed with air and passed through silver electrodes, which act catalytically. The result is a formaldehyde gas, which precipitates and is collected as liquid in storage tanks. The excess methanol is recovered and fed back into the process, leaving a residual value of < 1 wt% methanol in the formaldehyde to stabilize it.

The LiquiSonic® 40 analyzer is used to circulate the semi-finished product and to ensure the quality of the final product. Extensive laboratory measurements, providing analytical results with time delay, are omitted. The process efficiency can be derived by the precise inline determined formaldehyde and methanol value.

Customer value

LiquiSonic® 40 provides a precise inline concentration measurement of 3-component mixtures with real-time monitoring. Using sonic velocity and density, methanol and formaldehyde can be monitored directly in the process.

The robust sensor construction promotes long process life. All measured data are saved in a long term data memory, so that they can be used in audits and for analysis of process disturbances.

Additional advantages are:

- optimum line control and reliable process data
- precise methanol value of the final product
- early recognition of process malfunctions in a matter of seconds
- reduced material and energy (steam) costs
- reduced sampling and lab analyze

Investment: approx. 20.000 € (28,000 \$)

Amortization: < 1 year

Installation

The LiquiSonic® 40 sensors are easily installed in the pipelines to determine the concentration level of the semi-finished and final product.

The LiquiSonic® controller 40 is connected to the LiquiSonic® immersion sensor and the device for the second physical value (density). The controller displays the concentration levels of methanol and formaldehyd.

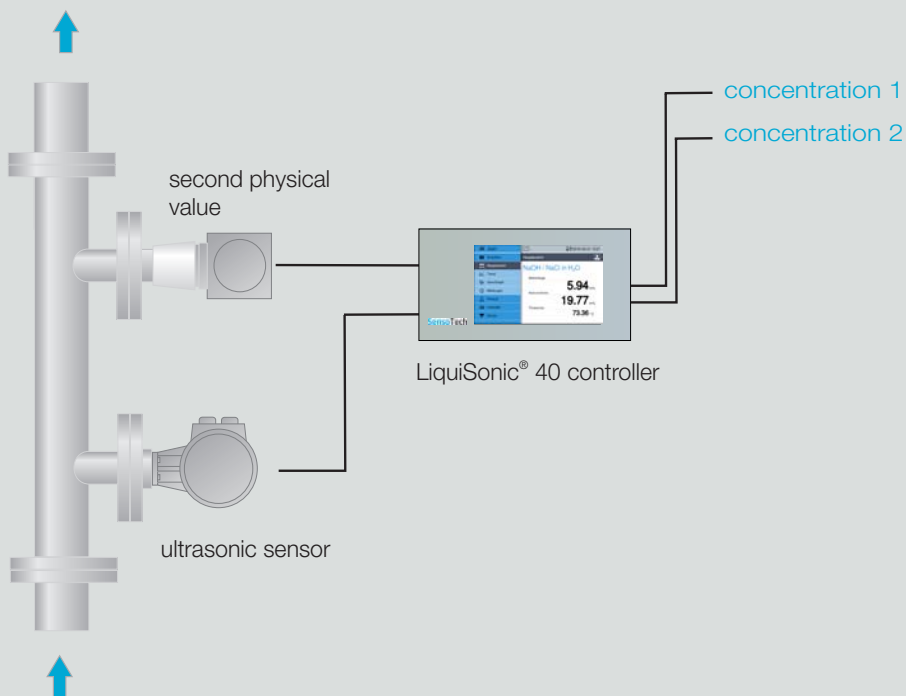
Typical measuring range:

concentration methanol: 0 - 5 wt%

concentration formaldehyde: 40 - 60 wt%

temperature: 60 - 80 °C (140 - 180 °F)

LiquiSonic® 40 process analysis by sonic velocity and density



LiquiSonic® 40



21001411
LiquiSonic® Controller 40 V10



21010102
Immersion sensor V10 40-40 Ex FM, ANSI 2", L150



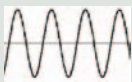
21006020
Density sensor BR, DN15, PN40, Ex i, 1.4571, $T_{max}=150^{\circ}\text{C}$

BUS

21004435
BUS connection: Profibus DP



21004449
Network integration



21004110
High power sensor electronic



21004202
Bus cable indoor (100m)



21007846
Factory acceptance test (FAT) certificate



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