

Measuring point	Installation	Measuring task
1,2	pipeline	control and monitoring of the concentration of scrubbing liquid and salt
3	pipeline	control and monitoring of the concentration of fresh scrubbing liquid
4	pipeline	monitoring on breakthroughs in the treatment of salts

Phosgene Gas Scrubbing

Introduction

Two different monomers are linked for the production of polyurethanes: polyisocyanates and polyols. This process is also referred to as polyaddition. Thereby two most significant monomers are polyether polyol and the toluene-2,4-diisocyanate (TDI).

The production process is divided into 3 parts:

- preparation of polyether polyol
- production of toluene diisocyanate
- polyaddition.

The TDI is produced from toluylendiamin (TDA) by phosgenation. In emergency cases, the unreacted phosgene must be absorbed, because the gas is highly toxic. In the chemical industry, it is only used in hermetically closed circuits. The neutralization of the gas to sodium chloride (NaCl) and sodium carbonate (Na_2CO_3) takes place with sodium hydroxide (NaOH).

Application

In a gas scrubber, the scrubbing liquid absorbs certain gaseous, liquid or solid components from the gas stream. The circulating scrubbing liquid must be kept in the range of the maximum absorption. In order to ensure an effective absorption of the phosgene in the gas scrubber, the concentration of NaOH, NaCl and of Na_2CO_3 must be monitored.

If the NaOH content is under limit, it must be re-dosed. If the content of the salt is too high, salt is removed from the circulation, since it would otherwise crystallize in the system.

The LiquiSonic® 40 analyzer allows the concentration measurement in 3-components-liquids. Due to the parallel detection of two physical quantities such as sonic velocity and conductivity, two concentration values can be determined simultaneously: the scrubbing liquid and the salts NaCl and Na_2CO_3 . This allows a better response to concentration fluctuations in the scrubbing liquid.

Customer value

The LiquiSonic® analyzer provides a precise inline concentration measurement with real-time monitoring. Due to automatic control, a sufficient level of scrubbing liquid is maintained, thus keeping the scrubber at its optimal absorption efficiency.

The robust sensor construction and the optional special materials, like HC2000, promote long process life.

LiquiSonic® enables a reduction of labor cost through the elimination of manual process steps:

- time saving: 1 h per day
- cost per hour: 50 € (60 \$)
- total cost savings: 10.000 € (12,000 \$) per year

The prevention of an over- and underdosing leads to the reduction of material input for the scrubbing liquid:

- 1 % NaOH overdosing in the circulation flow corresponds to: approx. 27.000 € per year

Investment: approx. 25.000 € (30,000 \$)

Amortization: approx. 8 month

Installation

The LiquiSonic® immersion sensor can easily be installed directly into pipelines. A typical installation point, combined with a conductivity meter, are DN 80 pipelines from the scrubber to the regeneration tank

The LiquiSonic® controller 40 is connected to the LiquiSonic® immersion sensor and device for the second physical value. The controller displays NaOH concentration and salt content.

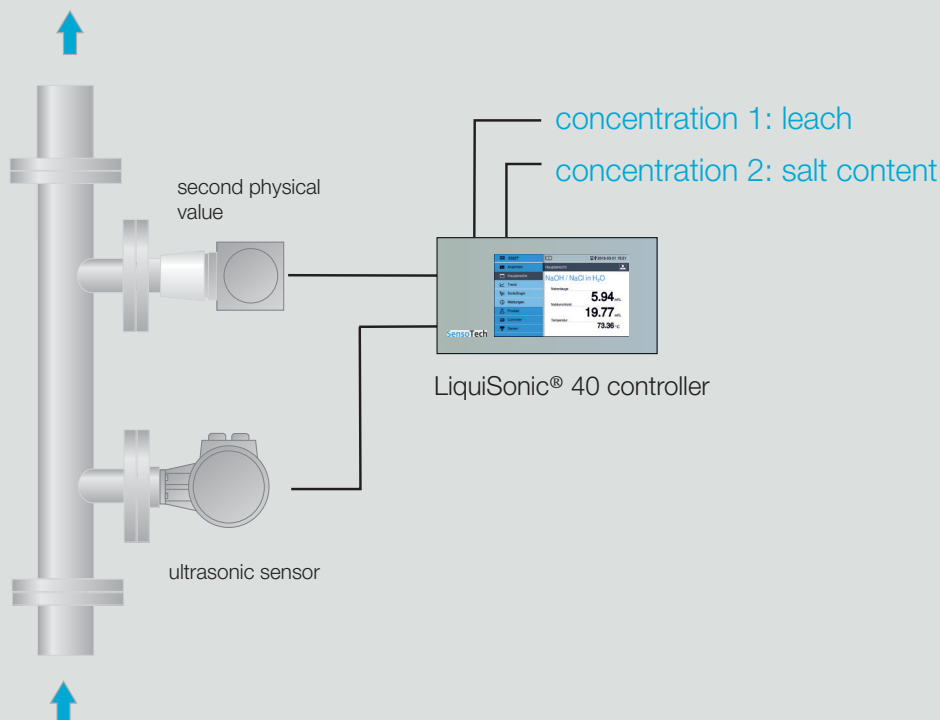
Typical measuring range:

NaOH concentration range: 5 to 20 wt%,

Na₂CO₃/NaCl concentration range: 5 to 30 wt%

temperature range: 30 to 60 °C

Sonic velocity measurement with LiquiSonic® 40



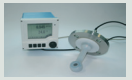
LiquiSonic® 40



21001411
LiquiSonic® Controller 40 V10



21010138
Immersion sensor V10 40-40 Ex FM, ANSI 2", L150, HC2000



21006123
Inductive conductivity sensor CM42/CLS50 DN 50

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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