

Measuring point

Installation

Measuring task

1

Bypass

Monitoring of  $\text{SiO}_2$  and  $\text{Na}_2\text{O}$  or  $\text{K}_2\text{O}$  concentration in the autoclave

# Sodium silicate

## Introduction

Base materials to produce water glass are quartz sand and different alkali carbonates. Soda ( $\text{Na}_2\text{CO}_3$ ) is used for the production of sodium silicate, potash ( $\text{K}_2\text{CO}_3$ ) for potassium water glass.

Depending on the alkali silicate type, the raw materials are mixed in the desired proportion (ratio) and used for alkali silicate synthesis. The purity of the raw material is of enormous importance, because they effect the melting process and the product properties.

The LiquiSonic® analyzer guarantees accurate and rapid determination of process concentrations ( $\text{Na}_2\text{O}/\text{K}_2\text{O}$  and  $\text{SiO}_2$ ) and the process temperature. Through permanent data logging, process parameters can be controlled during quality inspection.

## Application

Water glass is produced by melting of highly purified silica sand ( $\text{SiO}_2$ ) with alkali carbonate ( $\text{Na}_2\text{CO}_3$  or  $\text{K}_2\text{CO}_3$ ). The raw material mix is continuously melted at a temperature of 1200 °C - 1500 °C in the melting tank.

The molten alkali silicate is water-cooled till transport on a chain conveyor. The cooled fragments are dissolved in an autoclave at 4 - 5 bar and 140 - 150 °C, until the desired density and viscosity is reached. Even the finest impurities are removed by filtration. The filtered solution is adjusted with water to the desired moisture content.

LiquiSonic® analyzers determine the process concentrations inline and continuously and allow precise process control, to avoid quality fluctuations.

## Customer value

The LiquiSonic® analyzer provides a precise inline concentration measurement with real-time monitoring and exact control of the required  $\text{Na}_2\text{O}$  /  $\text{SiO}_2$  molar ratio. Thus providing optimal product parameters, like stability and resilience.

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

LiquiSonic® provides an optimal dissolving speed of the water glass fragments and reduces steam costs:

- steam savings: 0.2 t per hour
- steam costs: 30 € per t (40 \$)
- operating hour: 6000 h per year
- total cost savings: 36.000 € per year (48,000 \$)

Investment: approx. 25.000 €

Amortization: approx. 6 month

## Installation

The LiquiSonic® 40 sensors are easily installed in the pipeline from the bypass line of the autoclave. The robust sensor construction and the optional special materials, like HC2000, promote long process life.

The LiquiSonic® controller 40 is connected to the LiquiSonic® immersion sensor and the device for the second physical value. The controller displays the  $\text{Na}_2\text{O}$  or  $\text{K}_2\text{O}$  concentration and  $\text{SiO}_2$  content. Further process parameters, like temperature or sonic velocity, are monitored via trend view.

Typical measuring ranges:

concentration range  $\text{Na}_2\text{O}$ : 6 to 9 wt%

concentration range  $\text{SiO}_2$ : 20 to 30 wt%

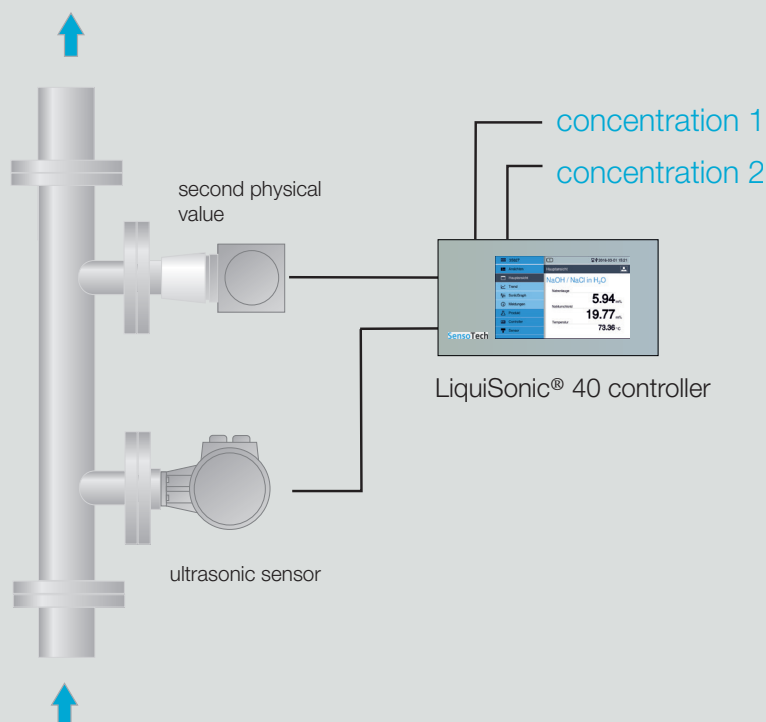
temperature range: 40 to 95 °C (105 - 205 °F)

concentration range  $\text{K}_2\text{O}$ : 19 to 24 wt%

concentration range  $\text{SiO}_2$ : 30 to 35 wt%

temperature range: 40 to 70 °C (105 - 165 °F)

## Sonic velocity measurement with LiquiSonic® 40



## LiquiSonic® 40



21001411  
LiquiSonic® Controller 40 V10



21010112  
Immersion sensor V10 40-14, DIN DN50, L092



21006123  
Inductive conductivity sensor CM42/CLS50 DN 50



21005215  
Maximum rated sensor temperature: 150 °C



21004449  
Network integration



21004435  
BUS connection: Profibus DP



21004202  
Bus cable indoor (100m)



21007846  
Factory acceptance test (FAT) certificate



SensoTech GmbH  
Germany  
T +49 39203 514 100  
info@sensotech.com  
www.sensotech.com

SensoTech Inc.  
USA  
T +1 973 832 4575  
sales-usa@sensotech.com  
www.sensotech.com

SensoTech (Shanghai) Co., Ltd.  
申铄科技(上海)有限公司  
电话 +86 21 6485 5861  
sales-china@sensotech.com  
www.sensotech.com