

Measuring point

Installation

Measuring task

1

pipeline

monitoring of the urea concentration for quality control

Urea production

Introduction

Urea is an important raw material for many different industries. Due to its high nitrogen content, urea is used as a fertilizer and as a feed additive in agriculture. Urea plays also an important role in the chemical and pharmaceutical industry. Applications include for example the production of resins and melamine as well as the production of personal care products.

The production of urea is performed directly in conjunction with the ammonia synthesis because the base materials are liquid ammonia and carbon dioxide. The combination of both methods allows a resource-saving production.

The inline measuring method LiquiSonic® allows the urea concentration measurement at any time and guarantees an optimal efficiency of the urea production.

Application

Urea is prepared by numerous methods. A technical possibility to synthesise urea is the thermal conversion of ammonium carbamate, which is obtained from ammonia (NH_3) and carbon dioxide (CO_2) at a temperature of 200 °C and a pressure of 130 to 200 bar.

The reaction mixture (ammonium carbamate and urea) is expanded to atmospheric pressure and separated from ammonium carbamate in distillation columns at 70 °C. The reaction does not proceed completely. Therefore the residual ammonium carbamate is decomposed by stripping CO_2 in the base materials of NH_3 and CO_2 which are then returned to the reactor. The urea solution is evaporated and the urea is crystallized under vacuum. For further processing, the crystallized urea is centrifuged and dried.

Customer value

The quality control of the urea is of enormous importance for further processing. LiquiSonic® allows the determination of urea concentration at any time for complete documentation and consistent product quality. This enables immediate intervention, in case of malfunctions and deviations.

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® ensures an optimal and resource-saving production and increase the productivity:

- productivity increase: at least 0.1 %
- urea production: 1000 t per day (220 € / 240 \$ per ton, 200 production days per year)
- benefit: 44.000 € / 48,000 \$

Investment: approx. 13.000 € (16,000 \$)

Amortization: < 6 month

Installation

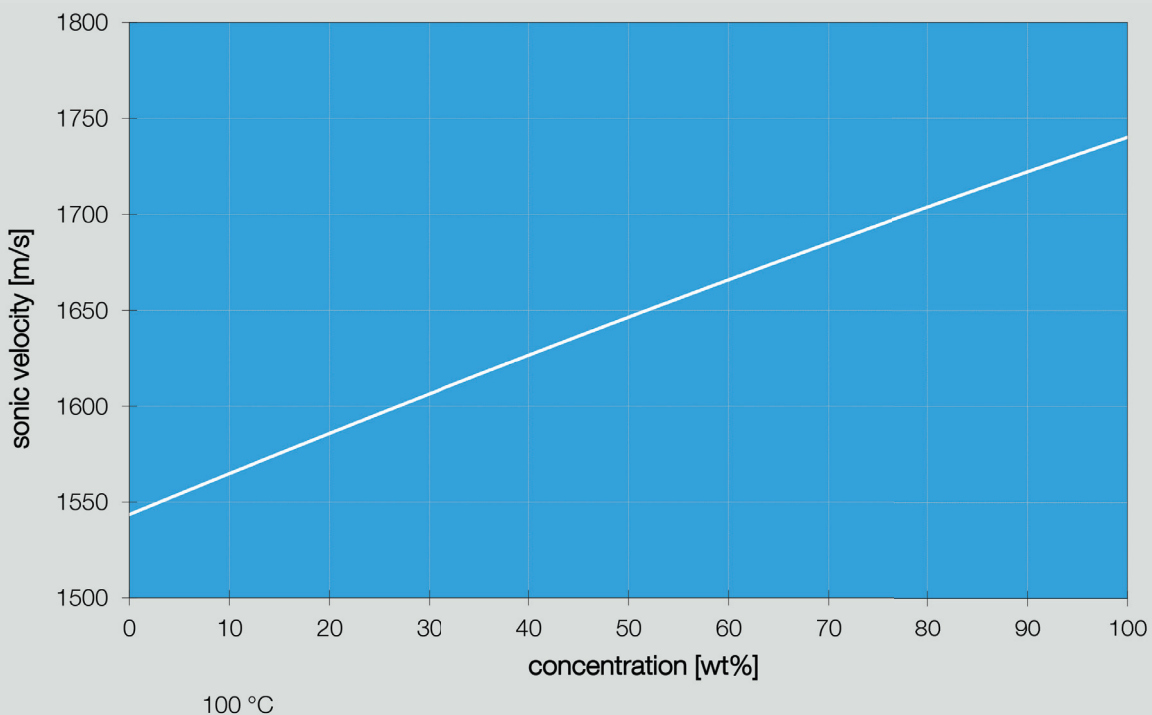
The LiquiSonic® immersion sensor is easily installed into the transport pipeline (typically DN80) after the decomposer.

The robust sensor construction and the optional special materials, like HC 2000, promote long process life.

By using the LiquiSonic® controller 30, up to four sensors can be connected, allowing the simultaneous monitoring of several measuring points.

Typical measuring range:
concentration range: 0 to 100 wt%
temperature range: -10 to 140 °C

LiquiSonic® sonic velocity measurement in Urea



LiquiSonic® 30



21001311
LiquiSonic® Controller 30 V10



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



21004352
T-adaptor for immersion sensor DN80-50-80 PN16

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



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