Measuring point	Installation	Measuring task
1	pipeline	determination of the oleum concentration
2	pipeline	monitoring of the sulfuric acid / oleum concentration
3	pipeline	control and monitoring the blending to the desired concentration

H_2SO_4 in Copper Mining

Introduction

Copper is obtained by the extraction of copper sulfide ores, which have a copper content of ~ 2 wt%. The raw metal production includes a wide variety of process steps.

The processing of copper sulfide ores is carried out by flotation. Thereby, crushed copper sulfide ores are enriched with water and a foaming agent, to skim quartz or silicates. The obtained copper concentrate has a copper content of 20 - 40 wt%.

In the pyrometallurgical extraction, SO_2 is generated which is oxidized with atmospheric oxygen to form sulfur trioxide SO_3 (contact process). What remains is a copper content of approx. 96-99 wt%. In order to reach a purity of 99.99 wt%, a electrolytic refining takes place subsequently. Otherwise, the impurities strongly influence the thermal and electrical conductivity and quality of copper.

Application

In the pyrometallurgical extraction, the copper concentrate is slagged by adding SiO_2 in the furnace at 1200 to 1400 °C. The melt of copper and iron sulfide is removed as the so-called copper matte from the slag phase. The liquid copper matte is poured into a converter and the iron sulfide reacts with air to sulfur dioxide SO_2.

Resulting SO_2 is oxidized to sulfur trioxide SO_3 (contact process), which SO_3 is directed into sulfuric acid (96 wt%). In the absorber, sulfuric acid in high concentrations by adding water or oleum is generated. In the blending process, the H_2SO_4 is diluted on desired target concentration.

Each process step can be both monitored continuously by the inline LiquiSonic® measurement technology and optimally set. The high dependency on sonic velocity enables an accuracy of +/- 0,05 wt% for sulfuric acid.

Customer value

The LiquiSonic® analyzer provides a precise inline H_2SO_4 and oleum concentration measurement with real-time monitoring.

The robust sensor construction and the optional special materials, like Hastelloy C2000, 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

In comparison to conductivity and density measurement, LiquiSonic® generates a clear signal in the concentration range from 80 to 100 wt% and provides at every time reliable process information.

Investment: approx. 18.000 € (22,000 $)
Amortization: approx. 2 years

Installation

The LiquiSonic® immersion sensor is easily installed into pipelines after absorber or sulfuric acid production and blending.

By using the LiquiSonic® controller 30, up to four sensors can be connected, allowing the simultaneous monitoring of several measuring points.
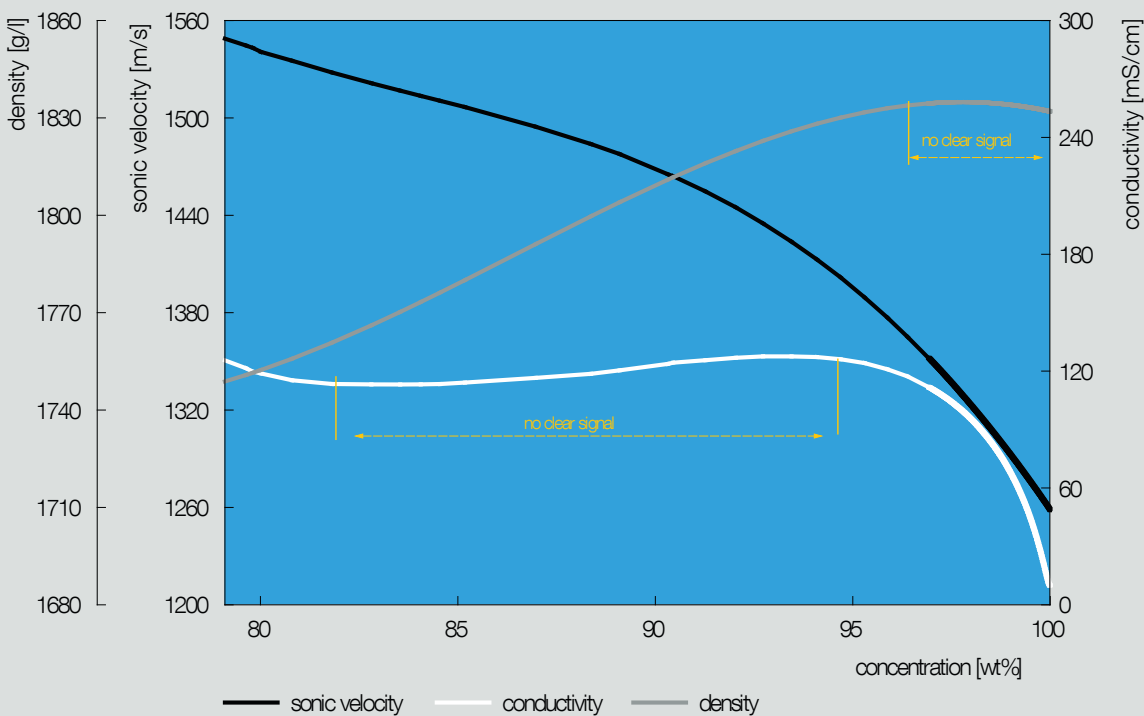
Typical measuring range:
concentration range from H_2SO_4: 80 to 100 wt%
temperature range: 20 to 90 °C

concentration range from oleum: 0 to 10 wt%
temperature range: 10 to 60 °C

LiquiSonic® sonic velocity measurement

LiquiSonic® 30
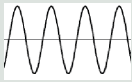

	21001311 LiquiSonic® Controller 30 V10
	21010109 Immersion sensor V10 40-14, ANSI 2", L092, HC2000
BUS	21004435 BUS connection: Profibus DP
	21004449 Network integration
	21004110 High power sensor electronic
	21004202 Bus cable indoor (100m)
	21007846 Factory acceptance test (FAT) certificate