

Measuring point

1, 2, 3

Installation

transport pipe

Measuring task

monitoring of rolling oil-water emulsion

Cold rolling

Introduction

During the cold rolling process, the thickness of the rolling product is being reduced. There are basically two types of systems: reversing and tandem mills. The tandem mill is used in larger production plants, in which the metal strip is running continuously through multiple rolling mills in order to ensure a higher throughput.

In reversing mills, the rolling oil is run for several times through the mill (passes). This is beneficial for production plants with a low occupancy rate and for maintaining a better microstructure for special products.

The LiquiSonic® measuring system enables a precise continuous monitoring of the rolling oil emulsion at reversing and tandem mills. This prevents variations in the quality of the rolled material caused by over and under lubrication. The LiquiSonic® analyzers are successfully installed for rolling mills and treatment plants for stainless steels, but also for carbon steels and non-ferrous metals.

Application

During the cold rolling process, the rolling oil-water emulsion is sprayed onto the rolled material in order to cool the rolls and the rolled stock, remove impurities and minimize the friction. The emulsion is circulated in a closed circuit (filter, buffer tank, pump, spray nozzles) and regenerated continuously.

Reversing mills have only one rolling stand with one tank. Tandem mills consist of multiple rolling stands with several tanks that have different emulsion concentrations.

The emulsion composition is constantly changing due to the continuous evaporation of water, the oil discharge through the rolling, the penetration of foreign oils (hydraulic oil, lubricant) or iron particles and dirt.

For decades SensoTech offers proven solutions to ensure continuous quality control of rolling liquids for numerous typical suppliers, such as Quaker, Henkel or Houghton.

Customer value

Through the continuous monitoring of the emulsion composition, variations in the quality of the rolled product, caused by under or over-lubrication, are prevented. Through precise limit monitoring, sudden entries of foreign oil (e.g. leakage in the hydraulic system or roller bearing), can be detected rapidly due to transient value peaks.

LiquiSonic® reduces extensive lab measurements and replaces the time-consuming sampling process:

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

If the analyzer signal is used to directly control the re-dosing, it results in significant oil savings:

- 5 % reduction per day are equivalent to 80.000 € (96.000 \$) per year

Investment: approx. 15.000 € (18,000 \$)

Amortization: approx. 2 month

Installation

The LiquiSonic® sensor is installed after the pump and in the main line to the spray nozzles on the rolling stand. Depending on the system, the pipeline diameter ranges typically from DN 80 to DN 200. By using the LiquiSonic® controller 30, up to four sensors can be connected, allowing the simultaneous monitoring of several measuring points of the tandem mill.

In addition, one controller can also administrate several sensors in different reversing mills as the maximum distance between the sensor and controller is 1000m. Pressure fluctuations in the pipeline, for example 5 to 12 bar (which may occur by switching between the roller and the circulation operation) are taken into account by the internal pressure compensation, so that the concentration values are stably issued.

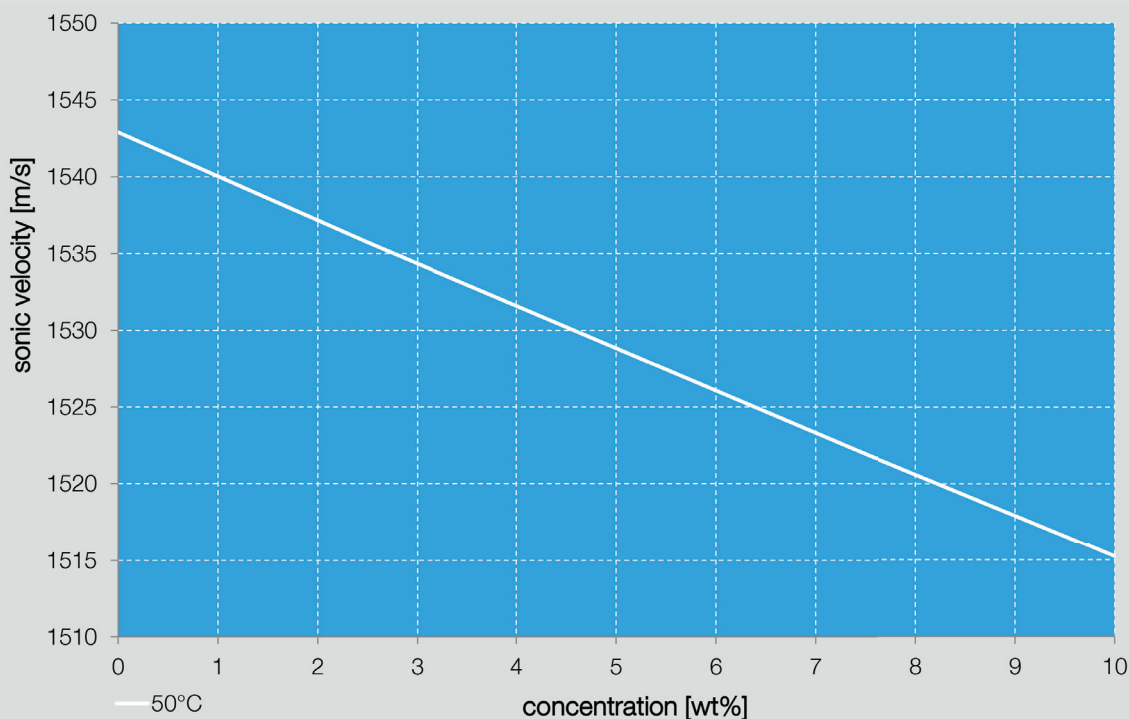
Typical measuring range:

concentration range: 0 to 10 wt%

temperature range: 40 to 70 °C (100 to 160°F)

pressure range: 0 to 15 bar

LiquiSonic® sonic velocity measurement in rolling oil Quakerol



LiquiSonic® 30



21001311
LiquiSonic® Controller 30 V10



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



21004725
Pressure transmitter 0 - 25 bar abs.

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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