



Measuring point	Installation	Measuring task
1, 2	transport pipe or bypass	monitoring of pickling bath
3	transport pipe	monitoring of rinsing bath
4	transport pipe	concentration measurement and fresh acid redosing control

# Hydrochloric acid Pickling

## Introduction

Pickling baths are used downstream of the hot rolling process, but also in many other fields of the metal-working industry to remove, modify, passivate or clean surfaces in a defined manner.

To this end, pickling solutions are employed, mainly consisting of mineral acids, like hydrochloric acid. The concentration of these acids decreases during the pickling process, whereas the degree of disturbing components such as contaminations and carry-over increases.

The LiquiSonic® measuring technology provides a solution for online measurements of pickling bath concentrations facilitating redosing of the required quantity of fresh acid. This ensures a continuous, optimum pickling bath quality. Delays in time as a result of sampling and lab analyses are avoided.

## Application

Pickling removes impurities from the steel surface. However, the acid also attacks the iron oxide on the metal surface and ferrous salts are generated (e.g. iron (II)). It is therefore of great importance to precisely control all process-relevant parameters, such as dwell time, bath temperature and bath composition. Only in this way, pickling bathes can be operated in an economic and resource-saving manner.

The measuring system LiquiSonic® 40 allows the parallel detection of two physical quantities, such as sonic velocity and conductivity, and therefore the determination of the HCl concentration in the pickling bath as well as the iron content. This leads to the elimination of expensive laboratory analysis.

The inline LiquiSonic® sensors enable the user to monitor the process concentrations precise in real time and make pickling bath control automatable. Fluctuations can be seen and corrected immediately and very flexibly.

## Customer value

The LiquiSonic® analyzer provides a precise inline bath concentration measurement with real-time monitoring and permanent data logging. This allows the process to be automatically controlled in the optimal concentration range with stable, sufficient pickling results. LiquiSonic® is used to avoid a underdosage or overdosage of HCl.

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

LiquiSonic® saves costs by reduction of hydrochloric acid consumption (ROI for 30 m<sup>3</sup> plant: 7,5 m<sup>3</sup>/h acid consumption):

- 10 % HCl savings or 20.000 € (24,000 \$) per year

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

Amortization: approx. 12 month

## Installation

The LiquiSonic® 40 analyzer is installed into the transport pipelines (mostly DN80, 3") or the bypass of the pickling bath. Even for installation either in the transport line of the rinsing bath or in the fresh acid feed, SensoTech offers proven solutions for decades.

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

The installation of the LiquiSonic® flange type sensor DN80 and the corresponding conductivity sensor in a piping system DN80 is simplified through the use of the installation adapter DN80. The total length of the measuring distance can be shortened by the adapter, to 0.70 m.

Typical measuring range:

concentration of free HCl: 0 - 120 g/l; 180 - 250 g/l

concentration range of Fe: 20 - 140 g/l

temperature range: 60 - 95 °C (140 - 200 °F)

## LiquiSonic® 40 installation adapter for pickling bath



## LiquiSonic® 40



21001411  
LiquiSonic® Controller 40 V10



21010122  
Flange sensor V10 DN80 (3"), Halar coating



21006125  
Inductive conductivity sensor 226/1066

BUS

21004435  
BUS connection: Profibus DP



21004449  
Network integration



21004660  
Installation adapter for pickling bath DN80



21004202  
Bus cable indoor (100m)



21007846  
Factory acceptance test (FAT) certificate



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