

## Measurement of pH of Leachate in Zinc Hydrometallurgy and Air Jet Cleaning to Prevent Scaling

Industry: Metals and Mining

Product: pH/ORP Analyzer

### Introduction

Most zinc are produced at hydrometallurgically, where a high-grade zinc product can be obtained and valuable metals mixed in the raw material can be recovered. In the hydrometallurgy, the raw material of zinc concentrate is roasted and then dissolved in sulfuric acid to remove impurities. The process called leaching and pH control of the leachate is important. The leachate contains gypsum and impurities that may cause scaling on electrodes. As a result, it interfered with stable pH measurement and required frequent cleaning at least once a week.

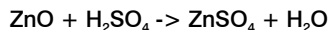
A pH analyzer with air jet cleaning system provides continuous cleaning and therefore can reduce maintenance frequency to once every one or two months.

### Expected Benefits

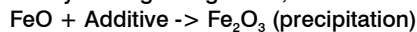
- Ensures stable and continuous pH measurement
- Reduces operating costs
- Eliminates manual cleaning work by hand

### Process Overview

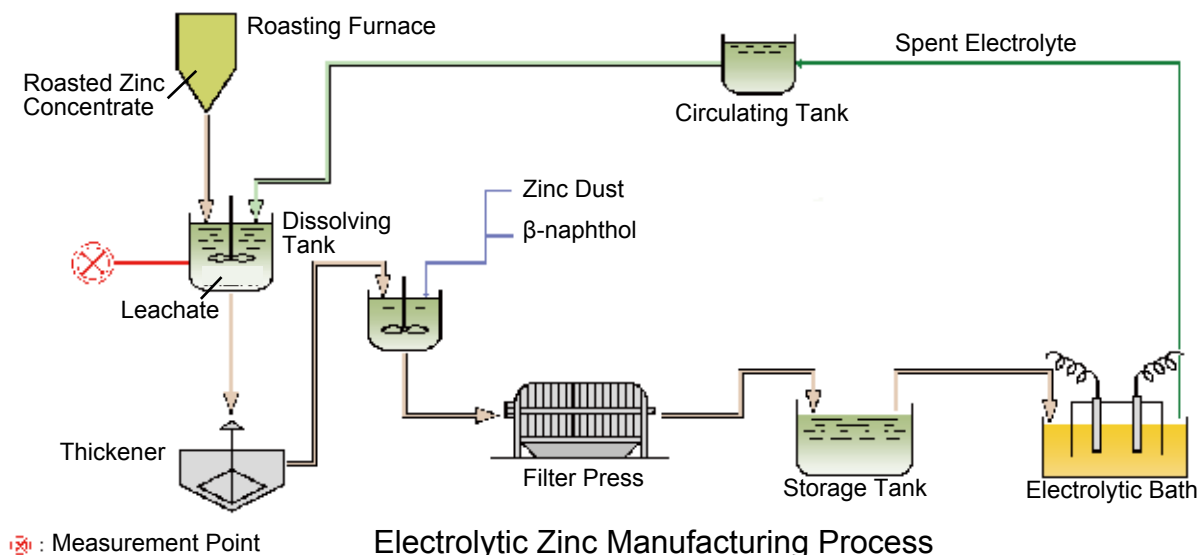
Roasted concentrate sent from a roasting furnace, is dissolved in diluted sulfuric acid (spent electrolyte) in a dissolving tank.



In addition, some iron and other material contained in the calcine are dissolved. Therefore, these impurities are removed by precipitation by adding manganese, lime or other additives.



pH control is important to allow zinc to dissolve fully and impurities to precipitate maximally. The leachate is filtered by a filter press to remove impurities and the filtrate is fed to an electrolytic bath where zinc is electrolytically produced.



## Solution Details

### Measurement system

#### 4-wire pH measurement system (with jet cleaning system)

##### Sensor

KCl refillable pH sensor (Teflon liquid junction)  
PH8EFP-□□-TN-TT1-N-G\*A/TF

##### Holder

Submersion type holder with jet cleaning system  
PH8HS-PP-□□-T-JT-JP\*A/MS3

##### Terminal box (when needed)

WTB10-PH3

##### 4-wire pH/ORP converter

PH450G-A-□/UM

## Utilities

#### PH450G 4-wire pH/ORP converter

Power supply: 90 to 264 V AC, 50/60 Hz

Power consumption: approx. 15 VA

#### Submersion holder

Air for jet cleaning

Air pressure: 200 to 400 kPa

Consumption: 100 to 300 NI/min

## Notes

- Continuous air jet cleaning

Since the leachate is a strongly acid solution, its pH value is not affected by air cleaning. This allows measurement and cleaning simultaneously.

- Other applications

This cleaning system can be used for other smelting processes of copper, manganese, cadmium, etc.

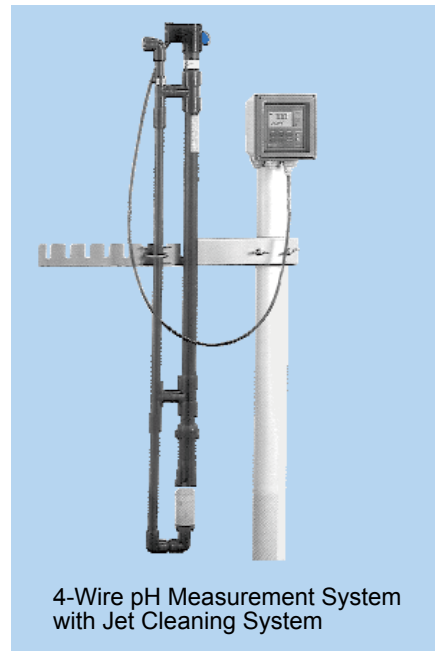
## Field Data

### Process condition

Measurement point:	Leachate in the dissolving tank
Temperature:	80 °C
pH value:	pH 1.5 ±0.2
Zinc:	Approx. 160 g/l
Sulfuric acid:	2 to 3 g/l
Lime:	Saturated

Before air jet cleaning system was introduced, the cleaning work by had had been required at least once a week. Continuous air jet cleaning using the submersion holder with jet cleaning system, has reduced the maintenance frequency to once a month or two months.

To ensure stable measurement, the pH sensor uses a Teflon liquid junction, where the KCl outflow is higher than that of ceramic junction.



4-Wire pH Measurement System with Jet Cleaning System