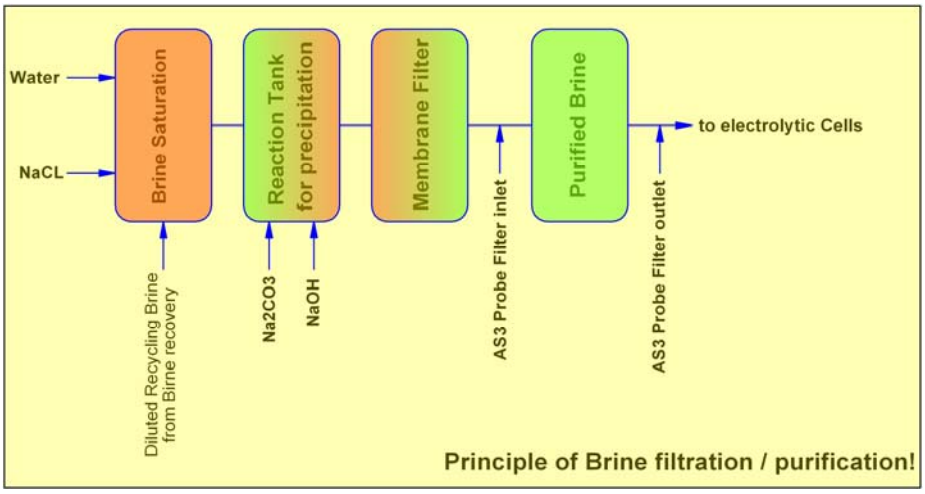
# Monitoring of Brine purification / filtration

**Using the ultra sonic particle monitor model AS3/AT3**




**Typical Ranges*:**

**Filter Inlet: 0-50ppm**
**Filter Outlet: 0-5ppm**

*** Range may vary depending by application.**

**APPLICATION:**

Chlorine is an important raw material for the chemical and pharmaceutical industry. It is typically produced by the electrolysis of water solved sodium chloride (NaCl / brine). This process usually takes place in a diaphragm, membrane or mercury cell. The brine for this process is mostly made from natural sources such as concentrated sea water. Dissolved minerals and metals like Calcium or manganese in the brine will have a negative effect on the electrolysis cells. They lead to the reduction of the cell voltage and damage the membrane or diaphragm material. The brine which flows to the electrolysis cells must be free of these contaminants. The precipitation of these substances will be initiated by pH adjustment and the addition of chemicals (caustic soda and sodium carbonate). After the reaction the brine is filtered together with the precipitated particles.
Continuous monitoring of the filter inlet and filter outlet increases the life of the filter, protects the electrolysis membrane from damage and allows the early detection of a filter breakdown. Traditionally optical turbidity meters are used for this application. The disadvantage of these systems is the high maintenance requirement. The substances in the brine cause stubborn coatings on the sight glasses of these instruments. Time intensive and expensive cleaning of the sensors is required to guarantee the proper function.

**SOLUTION:**

The ultrasonic measurement model AS3/AT3 is insensitive to coatings. In addition, the probe is self-cleaning due to the ultrasonic pulses used for measurement. The virtually maintenance-free sensor technology allows for cost-effective installation. Since the ultrasonic measurement has no wearing parts, a year-long continuous operation is the rule. The wetted parts of the wetted parts of the probe are either made from stainless steel, Hastelloy, Titanium or Peek depending by application. The installation in hazardous area (ATEX Ex Zone I and Zone II) requires the optional available Ex- approvals.

## Optical or Acoustic

### Optical: forward scatter turbidity (model MoniTurb-F / Messenger)

The optical measurement allows very high process temperatures. The sapphire windows of the sensor typically can become opaque after some weeks of operation, due to mineral or metal coatings. This requires a consistent manual cleaning of the sight glasses.

### Acoustic: Ultrasonic reflection (model AS3 / AT3)

The ultrasonic pulses of the measurement probe are not affected by any coatings. The accruing of any coatings is prevented by the ultrasonic cleaning effect additionally. The probe does not have any wearing parts, shows extreme high long term stability and is usually free of maintenance. The design of the probe allows an easy and cost-effective installation. These advantages make the ultrasonic reflection to a perfect technology for this application.

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# Turbidity by Ultrasound or by using the traditional optical Methods

## Ultrasonic reflection as an alternative for the optical turbidimetry

### Per definition is Turbidity an optical Impression.

Turbidity describes the characteristic of a transparent product, to scatter or absorb light. A focused light beam will be attenuated and scattered in hazy products, so that this product can become practically opaque in bigger layers. Turbidity is caused by particles in transparent products. A particle is defined as something with a different refractive index as the carrier liquid. Some examples of particles are minerals, yeast cells, metals, oil drops in water, milk in water, gas bubbles and aerosol's.

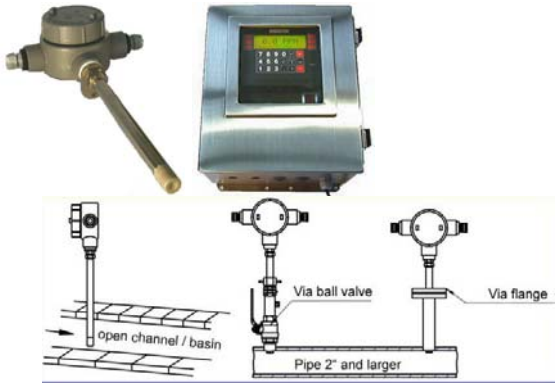
### Ultrasonic Reflection

The ultrasonic particle measurement is used to detect non-dissolved (suspended) particles in a liquid, similar to a turbidimeter. Turbidity is an optical effect. Therefore the acoustical method is typically named as particle or concentration measurement. The acoustic probe transfers ultrasonic pulses into the measurement sample, equal to a sonar system. When the acoustic pulses hit particles inside the sample, a part of this ultrasonic energy will be reflected as an echo. The quantity and intensity of these echoes will be detected, evaluated and shown as measurement values.
Possible measuring ranges are 0 - 1ppm up to 0 - 20000ppm.

### Scattered light turbidimetry the classics

An intense collimated beam of light is projected through a sample contained within the sensor. The intensity of this light beam is measured by the direct beam detector, located opposite to the light source. The light, scattered by particles inside the sample is measured by a scatter light detector. The more the scattering the higher the turbidity. Measuring ranges of 0 - 1ppm up to 0 - 4000ppm are possible (absorption sensors up to 50000ppm) depending by sensor.

## Model AS3/AT3




### Advantages Ultrasonic Reflection

- **Extreme low maintenance**
- **No wearing parts**
- **Calibration interval: typical 24 month**
- **Wide span of measurement ranges**
- **Pressure rating: ANSI class 400 / PN40**
- **Line size not limited**
- **Easy installation due to probe technology**
- **Self cleaning due to the ultrasonic pulses**
- **Not affected by product colour**
- **Insensitive against coatings**
- **Programmable measuring range**
- **Programmable units (ppm, mg/l, etc.)**

### Typical Applications

- **Product concentration**
- **Filtration control**
- **Quality control**
- **Iron in Water**
- **Oil in Condensate**
- **Oil in cooling water**

## Model Series MoniTurb / Messenger

### Advantages optical Turbidimetry

- **12° scattered light and / or 90° scattered light**
- **Low maintenance**
- **Calibration interval: typical 12 month**
- **Material measuring windows: Sapphire**
- **Pressure rating: ANSI class 150 / PN16**
- **Line size: ¼" up to 5" (DN10 to DN125)**
- **Installation flanges: DIN, ANSI, NPT, APV, TH, ...**
- **Optional cleaning jets**
- **Programmable measuring range**
- **Programmable units (ppm, mg/l, etc.)**

### Typical Applications:

- **Product concentration**
- **Filtration control**
- **Quality control**
- **Wells water**
- **Water in Oil**
- **etc.**

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