PIOX® S – mass flow, density and concentration measurement without media contact

PIOX® S includes an extensive and continuously growing database for the non-invasive determination of mass flow and concentration of liquid media:

- Maximum 4, available are:
  - 0 to 40 % at 14 to 131 °F
  - 0 to 14 % at 14 to 104 °F
  - 0 to 100 % at 14 to 248 °F
  - 0 to 40 % at 14 to 140 °F
  - Formalin (CH₂O) -40 °F ... +392 °F

- Upper limit of ±0.1 % for density determination of acids, caustics and other dangerous media.

**Medium Concentration Measuring Range**
- Water [H₂O] 0 to 100 % at -50 to 180 °F
- Fuel oil [C₆H₁₂O₆] 0 to 100 % at 14 to 250 °F
- Hydrazine [N₂H₄] 0 to 55 % at 14 to 248 °F
- Methanol [CH₃OH] 0 to 100 % at 14 to 221 °F
- Alcohol [C₂H₆O] 0 to 55 % at 14 to 248 °F
- DMF (C₆H₅NO) 0 to 55 % at 14 to 230 °F
- Calcium chloride [CaCl₂•2H₂O] 0 to 55 % at 14 to 250 °F
- Ferric chloride [FeCl₃•6H₂O] 0 to 55 % at 14 to 250 °F
- Ethylene glycol [C₂H₆O•2H₂O] 0 to 55 % at 14 to 250 °F
- Lactic acid (C₃H₅O₂) 0 to 55 % at 14 to 250 °F
- Formic acid (H₂CO₂) 0 to 55 % at 14 to 250 °F
- Phosphoric acid (H₃PO₄) 0 to 55 % at 14 to 250 °F
- Acetic acid (CH₃CO₂H) 0 to 55 % at 14 to 250 °F
- Sulfuric acid (H₂SO₄) 0 to 55 % at 14 to 250 °F
- Hydrofluoric acid (HF) 0 to 55 % at 14 to 250 °F
- Hydrochloric acid (HCl) 0 to 55 % at 14 to 250 °F
- Nitric acid (HNO₃) 0 to 55 % at 14 to 250 °F
- Ammonium sulfate (NH₄)₂SO₄ 0 to 55 % at 14 to 250 °F
- Ammonium nitrate (NH₄NO₃) 0 to 55 % at 14 to 250 °F
- Ammonium chlorate (NH₄ClO₃) 0 to 55 % at 14 to 250 °F
- Acids
- Caustics
- Salts
- Solvents
- Inorganic media

**Concentration Measuring Range**
- Water [H₂O] 0 to 100 % at -50 to 180 °F
- Fuel oil [C₆H₁₂O₆] 0 to 100 % at 14 to 250 °F
- Hydrazine [N₂H₄] 0 to 100 % at 14 to 250 °F
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- Ammonium chlorate (NH₄ClO₃) 0 to 100 % at 14 to 250 °F
- Acids
- Caustics
- Salts
- Solvents
- Inorganic media

**Flow velocity**
- 0.15% of reading ±0.2 inch/s

**Operating temperature**
- Pipe temperature: 40 °F, +392 °F
- 60 °F, +232 °F

**Flow velocity**
- 0.25...80 ft/s

**FLEXIM® S**
- Clamp-on ultrasonic measurement system for the non-invasive mass flow measurement and concentration determination of acids, caustics and other dangerous media.

**Accuracy**
- Mass Flow: ± 1 % of reading ±0.2 inch/s
- Concentration: ±0.1 % of reading
- Density: ±0.1 % of reading

**Measuring principle**: The table above refers to density and mass flow measurements at dynamic concentration measurement in real-time. For constant customer request.

**Material**
- Stainless steel 321

**Protection degree**
- Measuring transmitter: NEMA (UL) Class I, Div. 2 certified
- Housing material: Aluminum or stainless steel 321

**Communication**
- Service Interfaces:
  - USB, Ethernet
  - HART, Modbus RTU/TCP, FF H1, Profinet RX, etc.

**Samples**
- Inorganic media
- Organic media
- Solvents
- Acids
- Caustics
- Salts
- Solvents
- Inorganic media

**ISO 5167**
- FLEXIM has offices located throughout North America. Please have a look for your local representative at:
  - www.flexim.com
  - or call us at:
  - 1-888-852-PIPE

**FLEXIM AMERICAS**
- Corporation
- Headquarters
- 2500 Executive Drive
- Edgewood, NY 11717
- Phone: (631) 492-2390

**FLEXIM** is the only manufacturer offering BACnet MS/TP or IP.

**FLEXIM® S**
- Mass flow measurement without media contact

**Flow rate – Concentration – Density**

**PIOX® S**
- Clamp-on ultrasonic measurement system for the non-invasive mass flow measurement and concentration determination of acids, caustics and other dangerous media.

**XML**
- FLEXIM® S – mass flow, density and concentration measurement without media contact
PIOX® S – Measurement from the safe side

PIOX® S721 determines mass flow rate, concentration, density and other parameters by means of clamp-on ultrasonic transducers mounted on the outside of the pipe. The non-invasive acoustic technology is the system of choice when substances and processes place highest demands on safety and reliability.

-- Precision and reliable:
- Permanently stable measurement without any drift
- Accurate measurement at the lowest and highest flow velocities
- Insensitivity of measured solids or gas
- Continuous monitoring of measurement quality

-- Durable and long term stability:
- No media contact, therefore no risk of corrosion
- No moving parts, no vibrations, no material fatigue
- No pressures limitations
- For hand-industrial environments

-- Safe and available:
- Mounting of the measurement system outside of the pipe, no need for pipe modifications
- Maintenance-free measurement system
- No leakage risk

-- Cost-effective and economical:
- No guesswork or commissioning
- No special materials or bypass solutions required
- No early failure of measuring systems
- Simultaneous determination of mass flow as well as concentration and density

-- Indestructible as a matter of principle:
PIOX® S721 measures the acoustic velocity, thereby determining the density and concentrations of the medium inside the pipe. By simultaneously recording the volume flow rate, PIOX® S721 automatically calculates the mass flow rate.

In a large number of binary media systems, the acoustic velocity is in a fixed proportion to concentration and density. PIOX® S721 includes an extensive database of substances, thereby allowing for accurate and reliable density, concentration and mass flow determination in real time for a variety of acids, caustics and other chemical media.

Advantages:
- No wear and corrosion on the measurement system
- Highly durable and long term stable measurement without any measurement drift as proven by regular control tests
- Furthermore, simultaneous measurement of volume flow and density allows for the output of mass flow and thus the complete monitoring of the filling process

Practical applications:
- Chlor-alkali electrolysis is one of the central processes of the chemical industry. It provides the basic substances chlorine, sodium hydroxide and hydrogen.
- At a major German chemical site, sodium hydroxide produced during chlor-alkali electrolysis is evaporated in a multi-stage distillation process. The Coriolis meter that was installed for concentration measurement was subject to excessive wear and tear due to the corrosive medium. Replacing the Coriolis meter significantly extended the maintenance intervals. Replacing the Coriolis meter not only extended the maintenance intervals, but also made it possible to carry out corrective maintenance on the outside of the pipe, thereby reducing plant downtime.
- PIOX® S remains stable over the long term and proved to be the better solution.
- PIOX® S simultaneously measures the mass flow and density allowing for the output of mass flow and thus the complete monitoring of the filling process

Advantages:
- No wear or corrosion on the measurement system
- Highly durable and long term stable measurement without any measurement drift and maintenance-free
- No need for expensive special materials or bypass solutions

PIOX® S stands its ground where others fail

Concentration and mass flow measurement of sodium hydroxide

Chlor-alkali electrolysis is one of the central processes of the chemical industry. It provides the basic substances chlorine, sodium hydroxide and hydrogen.

One of Europe’s largest fertilizer manufacturers uses PIOX® S in its nitric acid bottling plants. The nitric acid is traded in two different concentrations: 68% and 60%. If the lower concentration must be monitored by means of measurement technology, the ideal solution for this measuring task is PIOX® S. Since PIOX® S simultaneously measures the mass flow and density necessary for the calculation of concentration, it is the ideal solution for monitoring nitric acid. PIOX® S automatically calculates the mass flow rate.

Advantages:
- No risk of corrosion or leakage
- Simultaneous measurement of concentration and mass flow
- No pressure limitations, no process shut-downs necessary

Concentration and mass flow measurement of nitric acid

One of Europe’s largest fertilizer manufacturers uses PIOX® S in its nitric acid bottling plants. The nitric acid is traded in two different concentrations: 68% and 60%. If the lower concentration must be monitored by means of measurement technology, the ideal solution for this measuring task is PIOX® S. Since PIOX® S simultaneously measures the mass flow and density necessary for the calculation of concentration, it is the ideal solution for monitoring nitric acid. PIOX® S automatically calculates the mass flow rate.
PIOX® S – Measurement from the safe side

PIOX® S721 determines mass flow rate, concentration, density and other parameters by means of clamp-on ultrasonic transducers mounted on the outside of the pipe. The non-invasive acoustic technology is the system of choice when substances and processes place highest demands on safety and reliability.

Precise and reliable
- Permanently stable measurement without any drift
- Accurate measurements at the lowest and highest flow velocities
- Insensitivity of captured solids or gas
- Continuous monitoring of measurement quality

Durable and long term stability
- No media contact, therefore no risk of corrosion
- No moving parts, no vibrations, no material fatigue
- No pressure limitations
- For hand-held instruments

Safe and available
- Mounting of the measurement system outside of the pipe, no need for pipe modifications
- Maintenance-free measurement system
- No leakage risk

Cost-effective and economical
- No standardization for commissioning
- No special materials or bypass solutions required
- No early failure of measuring systems
- Simultaneous determination of mass flow as well as concentration and density

Unlimited applications
- For virtually all pipe sizes and materials – regardless of whether it’s steel, plastic, glass or special materials with coatings.
- For temperatures up to 750 °F.
- For almost all acids, caustics and a wide range of other toxic media.
- For hazardous areas – transducers and transmitters are available in FM-certified variants.
- For 100% plant availability – the measurement point can be set up during ongoing operation.
- For temperatures up to 800 °F – the measurement point can be set up during ongoing operation.
- For 100% plant availability – the measurement point can be set up during ongoing operation.

Advantages:
- No risk of corrosion or acid leakage
- Highly durable and long term stable measurement without any measurement drift and maintenance-free
- No need for expensive special materials or bypass solutions
- No early failure of the measurement system
- For virtually all pipe sizes and materials – regardless of whether it’s steel, plastic, glass or special materials with coatings.
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PIOX® S stands its ground where others fail

PiOX® S simultaneously measures the acoustic velocity, thereby determining the density and concentration of the medium inside the pipe. By simultaneously recording the volume flow rate, PiOX® S721 automatically calculates the mass flow rate.

In a large number of binary media systems, the acoustic velocity is in a fixed proportion to concentration and density. PiOX® S721 includes an extensive database of substances, thereby allowing for accurate and reliable density, concentration and mass flow determination in real-time for a variety of acids, caustics and other chemical media.

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Concentration and mass flow measurement of sodium hydroxide

Chlor-alkali electrolysis is one of the central processes of the chemical industry. It provides the basic substances chlorine, sodium hydroxide and hydrogen.

At a major German chemical site, sodium hydroxide produced for the fiber-based electronics industry was subjected to a small-scale distillation process. The Coriolis meter that was installed for concentration measurement was subject to enormous wear and tear and required frequent maintenance and replacement. Replacing the Coriolis meter with an ultrasonic device proved to be the better solution. The PIOX® S721 system was installed on the outside of the pipe, there is no direct contact with the aggressive medium. This means no risk of corrosion or acid leakage, as was the case in the previously installed Coriolis meters. Replacing an inline meter means expensive process shut-downs for emptying and cleaning of the pipe. Furthermore, simultaneous measurement of volume flow and density allows for the online mass flow and thus the complete monitoring of the distillation process.

Advantages:
- No risk of corrosion or acid leakage
- Simultaneous measurement of concentration and mass flow
- No risk of corrosion or acid leakage
- Simultaneous measurement of concentration and mass flow
PIOX® 5 – Measurement from the safe side

PIOX® S721 determines mass flow rate, concentration, density and other parameters by means of clamp-on ultrasonic transducers mounted on the outside of the pipe. The non-invasive acoustic technology is the system of choice when substances and processes place highest demands on safety and reliability.

- **Precise and reliable:**
  - Permanently stable measurement without any drift
  - Accurate measurements at the lowest and highest flow velocities
  - Exceedance of measured solids or gas
  - Continuous monitoring of measurement quality

- **Safe and available:**
  - Mounting of the measurement system outside of the pipe, no need for pipe modifications
  - Maintenance-free measurement system
  - No leakage risk

- **Durable and long term stability:**
  - No media contact, therefore free of corrosion
  - No moving parts, no friction, no material fatigue
  - No pressure limitations
  - For hard industrial environments

- **Cost-effective and economical:**
  - No special materials or bypass solutions required
  - No early failure of measuring systems
  - Simultaneous determination of mass flow as well as concentration and density

- **Unlimited applications:**
  - For virtually all pipe sizes and materials – regardless of whether it’s steel, plastic, glass or special materials with coatings.
  - For temperatures up to 750 °F.
  - For almost all acids, caustics and a wide range of other toxic media.
  - For hazardous areas – transducers and transmitters are available in FM-certified variants.
  - For 100% plant availability
  - For hazardous areas
  - For almost all acids, caustics and a wide range of other toxic media.
  - For 100% plant availability
  - For hazardous areas
  - For almost all acids, caustics and a wide range of other toxic media.

- **Advantages:**
  - No moving parts or diaphragms
  - Highly durable and long term stable measurement at all times and ensures compliance with the specified quality.
  - Concentration measurement allows the system to run optimally
  - Furthermore, simultaneous measurement of volume flow as well as mass flow and density allows for the output of mass flow and thus the complete monitoring of the filling process.
  - Replacing an inline meter often requires an expensive process shut-down for emptying and closing of the pipe. Furthermore, simultaneous measurement of volume flow and density allows for the output of mass flow and thus the complete monitoring of the filling process.
  - No need for expensive special materials or bypass solutions

- **Proven measurement:**
  - Nitric acid
  - Hydrochloric acid
  - Hydrofluoric acid
  - Ammonia
  - Ammonium nitrate
  - Salt solutions
  - Alcohols, Glycols
  - Sodium / Potassium

- **PIOX® S721** simultaneously measures the mass flow.

<table>
<thead>
<tr>
<th>Application</th>
<th>Concentration</th>
<th>Mass Flow</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cauvic Soda (NaOH)</td>
<td>60M%</td>
<td>6200</td>
<td>120°F</td>
</tr>
<tr>
<td>Nitric Acid (HNO₃)</td>
<td>20M%</td>
<td>4900</td>
<td>70°F</td>
</tr>
</tbody>
</table>

PIOX® S stands its ground where others fail

- **Concentration and mass flow measurement of sodium hydroxide**
- Chlor-alkali electrolysis is one of the central processes of the chemical industry. It provides the basic substances chlorine, sodium hydroxide and hydrogen.
- At a major German chemical site, sodium hydroxide produced during that electrolysis was required in a high-stable distillation process. The 68% nitric acid that was required for concentration measurement was subject to enormous wear and tear due to its high concentration of nitric acid and potential contamination with sodium chloride. Replacing the inline instrument is extremely time-consuming and requires a flawless-running control loop for the start-up and emptying of the pipeline. PIOX® S proved to be the better solution. PIOX® S remains stable over the long term and without any measurement drift as proven by regular control measurements in the laboratory. Continuous accurate concentration and mass flow measurement allows the system to run optimally without any wear and tear of the inline instrument. The PIOX® S simultaneously measures the mass flow.

- **Advantages:**
  - No moving parts or diaphragms
  - Highly durable and long term stable measurement without any measurement drift and maintenance-free
  - No need for expensive special materials or bypass solutions

- **Concentration and mass flow measurement of nitric acid**
- One of Europe’s largest fertiliser manufacturers uses PIOX® S to monitor the nitric acid bottling plants. The nitric acid is traded in two different concentrations: 68% and 40%. If the lower concentration is required, the 68% nitric acid must be diluted by adding water. Compliance with the required concentration must be monitored by means of measurement technology.
- The ideal solution for this measuring task is PIOX® S. Since nitric acid is in direct contact with the transducers and transmitters, the measurement must be easily removable on the outside of the pipe. There is no direct contact with the corrosive medium. There is no risk of corrosion or acid leakage, as it was in the case with previously installed Coriolis meters. Replacing an inline meter often requires an expensive process shut-down for emptying and closing of the pipe. Furthermore, simultaneous measurement of volume flow and density allows for the output of mass flow and thus the complete monitoring of the filling process.

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<td>20M%</td>
<td>4900</td>
<td>70°F</td>
</tr>
</tbody>
</table>
The media listed here are available as standard data sets for PIOS®. Alternative media sets can be analyzed for proposal upon customer request.

The table above refers to density and mass flow measurements at dynamic concentration measurement in real-time. For constant medium concentration (respectively density), mass flow measurement is possible over the entire temperature range.

PIOX® S

<table>
<thead>
<tr>
<th>Medium</th>
<th>Concentration Measuring Range</th>
<th>Medium</th>
<th>Concentration Measuring Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic acid</td>
<td>0 to 100 % at 14 to 248 °F</td>
<td>Acetic acid</td>
<td>0 to 100 % at 14 to 248 °F</td>
</tr>
<tr>
<td>Calcium chloride</td>
<td>0 to 40 % at 14 to 131 °F</td>
<td>Calcium chloride</td>
<td>0 to 40 % at 14 to 131 °F</td>
</tr>
<tr>
<td>Ferric chloride</td>
<td>0 to 50 % at 14 to 104 °F</td>
<td>Ferric chloride</td>
<td>0 to 50 % at 14 to 104 °F</td>
</tr>
<tr>
<td>Hydrogen peroxide</td>
<td>0 to 25 % at 14 to 122 °F</td>
<td>Hydrogen peroxide</td>
<td>0 to 25 % at 14 to 122 °F</td>
</tr>
<tr>
<td>Isopropyl alcohol</td>
<td>0 to 20 % at -50 to 104 °F</td>
<td>Isopropyl alcohol</td>
<td>0 to 20 % at -50 to 104 °F</td>
</tr>
<tr>
<td>Propylene glycol</td>
<td>0 to 37 % at 14 to 176 °F</td>
<td>Propylene glycol</td>
<td>0 to 37 % at 14 to 176 °F</td>
</tr>
<tr>
<td>Sodium carbonate</td>
<td>0 to 100 % at 14 to 356 °F</td>
<td>Sodium carbonate</td>
<td>0 to 100 % at 14 to 356 °F</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>0 to 55 % at 14 to 230 °F</td>
<td>Sodium hydroxide</td>
<td>0 to 55 % at 14 to 230 °F</td>
</tr>
<tr>
<td>Sodium sulfide</td>
<td>0 to 45 % at 14 to 122 °F</td>
<td>Sodium sulfide</td>
<td>0 to 45 % at 14 to 122 °F</td>
</tr>
<tr>
<td>Sodium sulfate</td>
<td>0 to 100 % at 14 to 248 °F</td>
<td>Sodium sulfate</td>
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</tr>
</tbody>
</table>

**PIOX® S**

 Clamp-on ultrasonic measurement system for the non-invasive mass flow, concentration and density determination of acids, caustics and other aggressive media.

**FLEXIM**

More than 25 years of experience in ultrasonic flow measurement and process analytical technologies.

**FLEXIM**

Mass flow measurement without media contact

**Flow rate – Concentration – Density**

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Mass Flow</th>
<th>±1 % of reading ±0.2 inch/s (factory calibrated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>up to ±1 % of reading</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concentration Range</th>
<th>Accuracy</th>
<th>Mass Flow</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 100 % at 14 to 248 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>50 to 100 % at 113 to 248 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>60 to 100 % at 122 to 248 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>60 to 100 % at 104 to 248 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>80 to 100 % at 14 to 482 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>0 to 100 % at 167 to 248 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>50 to 100 % at 68 to 248 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>30 to 100 % at 14 to 140 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>12 to 25 % at 14 to 176 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>8 to 16 % at 14 to 176 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
<td>±1 % of reading ±0.2 inch/s (process calibrated)</td>
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Mass flow measurement without media contact

**Flow rate – Concentration – Density**

<table>
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<tr>
<th>Concentration Measuring Range</th>
<th>Mass Flow</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 100 % at 14 to 248 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>0 to 15 % at -4 to 149 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>0.03 ... 80 ft/s</td>
<td>±0.5 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
</tr>
<tr>
<td>55 to 100 % at 176 to 248 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
<td>±0.4 % of reading ±0.2 inch/s (process calibrated)</td>
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<td>50 to 100 % at 113 to 248 °F</td>
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<tr>
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<tr>
<td>60 to 100 % at 104 to 248 °F</td>
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<tr>
<td>0.15% of reading ±0.2 inch/s (process calibrated)</td>
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</tbody>
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**PIOX® S**

<table>
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<tr>
<th>Concentration Measuring Range</th>
<th>Mass Flow</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10 % at -4 to 149 °F</td>
<td>±1 % of reading ±0.2 inch/s (factory calibrated)</td>
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</tr>
<tr>
<td>0.03 ... 80 ft/s</td>
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<td>55 to 100 % at 176 to 248 °F</td>
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**FLEXIM**

More than 25 years of experience in ultrasonic flow measurement and process analytical technologies.

**FLEXIM**

Mass flow measurement without media contact

**Flow rate – Concentration – Density**

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</table>
PIOX® S – mass flow, density and concentration measurement without media contact

PIOX® S includes an extensive and continuously growing database for the non-invasive determination of mass flow and concentration of liquid media:

<table>
<thead>
<tr>
<th>Medium</th>
<th>Concentration Measuring Range</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Internal standard</td>
<td>0.1% to 100% at 14 to 248 °F</td>
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<td>0.1% to 100% at 14 to 248 °F</td>
</tr>
<tr>
<td>Density Measuring Range</td>
<td>up to ±0.1% of reading</td>
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</tr>
</tbody>
</table>

More than 25 years of experience in ultrasonic flow measurement and process analytical technologies

PIOX® S Clamp-on ultrasonic measurement system for the non-invasive mass flow, concentration and density determination of acids, caustics and other chemical media

<table>
<thead>
<tr>
<th>Accuracy and Measurement Ranges</th>
<th>PIOX® S</th>
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</thead>
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<tr>
<td>Mass flow</td>
<td>±1 µ% of reading ±0.2 inch/s</td>
</tr>
<tr>
<td>Concentration</td>
<td>up to ±1% of reading</td>
</tr>
<tr>
<td>Density</td>
<td>up to ±1% of reading</td>
</tr>
</tbody>
</table>

Flow velocity: 0.33...330 m/s

Inputs:
- Maximum of 64 channels, each channel can be configured for temperature, density, viscosity or fieldbusses (up to +750 °F with WaveInjector®)

Outputs:
- Frequency, binary (switchable) current (0/4 mA ... 20 mA), voltage, frequency, binary

Communication:
- Device interface:
  - MODBUS RTU, ASCII, PROFIBUS PA, 4-20 mA, 0-10 V
  - Device interface:
    - USB, Ethernet

Protection Degree:
- Transducers: NEMA 4X (IP66), IECEx Ex ia IIC T6, FM Class I, Div. 1, 2 certified
- Housing material: Stainless steel 304 or 316

Headquarter: Edgewood, NY 11717

FLEXIM Americas
Corporation
1201 N Executive Drive
Edgewood, NY 11717
Phone: (631) 492-2300

FLEXIM has offices located throughout North America. Please have a look for your local representative at:

www.flexim.com

or call us at:

1-888-852-PIPE

The media listed here are available as standard data sets for PIOX® S. Alternative media sets can be analyzed for proposal upon customer request.

The table above refers to density and mass flow measurements at dynamic concentration measurement in minutes. For constant media concentration (respectively density), mass flow measurement is possible over the entire temperature range.