



# MEASUREMENTS

<p><b>Static-synthetic / Total Pressure Technique</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: -20 to 250 °C</li> <li>• Pressure: 0.1 mbar to 1 bar</li> <li>• Material of construction: Glass</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Pure component and mixture boiling point measurements</li> <li>• Bubble point measurements</li> </ul>	<p><b>Dynamic-analytic / Ebulliometry</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: up to 250 °C</li> <li>• Pressure: 5 mbar to 1 bar</li> <li>• Material of construction: Glass</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Pure component boiling point measurements</li> <li>• Vapor-liquid equilibrium measurements</li> <li>• Vapor-liquid-liquid equilibrium measurements</li> <li>• Degradation kinetics</li> </ul>
<p><b>Static-analytic Technique</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: up to 280 °C</li> <li>• Pressure: 0.1 to 100 bar</li> <li>• Material of construction: Sapphire</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Pure component boiling point measurements</li> <li>• Vapor-liquid equilibrium and vapor-liquid-liquid equilibrium measurements with phase analysis, for sizing and separation units</li> <li>• Can be used with a total pressure technique</li> <li>• Reaction kinetic rates for reactor sizing</li> </ul>	<p><b>Dilutor</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: 25 to 90 °C</li> <li>• Pressure: 1 bar</li> <li>• Material of construction: Glass</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Solvent selection for absorption and stripping processes</li> <li>• Measures the activity coefficient at infinite dilution – key variable for sizing separation units designed for high purity operations</li> </ul>
<p><b>DSC and Calorimetry</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: up to 300 °C for calorimetry, -80 to 700 °C for DSC</li> <li>• Pressure: 1 to 500 bar</li> <li>• Material of construction: Stainless steel, Incoloy, Aluminium</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Thermal stability (Tonset, TMRad)</li> <li>• Heat of reaction (batch, fed batch or continuous mode)</li> <li>• Kinetic conversion curve for Homogeneous and Heterogeneous Reaction (liquid-gas, liquid-solid, catalyzed)</li> <li>• Heat Capacity</li> <li>• Boiling point</li> <li>• Melting point</li> <li>• Glass transition</li> </ul>	<p><b>Reactor with on-line Analysis</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: up to 280 °C</li> <li>• Pressure: 1 to 100 bar</li> <li>• Material of construction: Sapphire</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Homogeneous reaction kinetic measurements for reactor sizing</li> <li>• Thermal stability or reaction monitoring to identify degradation kinetics and product</li> </ul>



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<p><b>Liquid and liquid-solid Solubility Cells</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: 0 to 100 °C</li> <li>• Pressure: 1 bar</li> <li>• Material of construction: Glass</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Determination of extractive solvent selectivity</li> <li>• Liquid-liquid equilibrium measurements</li> <li>• Solid-liquid equilibrium measurements</li> <li>• Decantation kinetics rates</li> </ul>	<p><b>Reactor</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: up to 250 °C</li> <li>• Pressure: 1 to 200 bar</li> <li>• Material of construction: Hastelloy</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Homogeneous reaction kinetics</li> <li>• Heterogeneous reaction kinetics (liquid-gas, liquid-solid, catalyzed)</li> </ul>
<p><b>Densimeter - Paar – DMA 4100M</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: 0 to 100°C</li> <li>• Flow: up to 3000g/L</li> <li>• Minimum volume: 1 mL</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Density measurement</li> </ul>	<p><b>Autoclave – Paar reactor</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Temperature: up to 350 °C</li> <li>• Pressure: 1 to 200 bar</li> <li>• Material of construction: Stainless Steel</li> <li>• Capacity: 450 mL</li> </ul> <p><b>Applications:</b></p> <ul style="list-style-type: none"> <li>• Kinetics measurement</li> <li>• Could also be used for reactions</li> <li>• Ageing study</li> </ul>



# ANALYSIS

<b>High Pressure Liquid Chromatography</b>  <b>Characteristics:</b> <ul style="list-style-type: none"><li>• Agilent 1260 with UV &amp; DEDL detectors</li><li>• Agilent 1260 with DAD &amp; RID detector</li><li>• Agilent 1200 with DAD detector</li></ul>	<b>Gas Chromatography</b>  <b>Characteristics:</b> <ul style="list-style-type: none"><li>• Agilent 6890 and 7890 (5)</li><li>• FID &amp; TCD detectors</li></ul>
<b>GC-MS gas Chromatography</b>  <b>Characteristics:</b> <ul style="list-style-type: none"><li>• EI 70 eV</li><li>• Simple quad</li></ul>	<b>Water Analysis</b>  <b>Characteristics:</b> <ul style="list-style-type: none"><li>• Karl Fisher</li></ul>
<b>Spectrophotometer UV-Vis</b>  <b>Characteristics:</b> <ul style="list-style-type: none"><li>• GENESYS™ 10S UV-Vis</li></ul>	<b>Particle size analyzer</b>  <b>Characteristics:</b> <ul style="list-style-type: none"><li>• Malvern Mastersizer 3000</li><li>• Laser diffraction particule size analyser</li></ul>

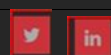
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# REACTION

<p><b>Batch Reactor</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• 800 mL to 6 L</li> <li>• Up to 1 bar</li> <li>• Liquid</li> <li>• Liquid/Liquid</li> <li>• Liquid/Solid</li> </ul>	<p><b>Batch or continuous reactor</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• 1 L</li> <li>• Up to 20 bar</li> <li>• Liquid</li> <li>• Liquid/Liquid</li> <li>• Liquid/Solid</li> <li>• Gas/Liquid/Solid</li> </ul>
<p><b>Pressure Batch Reactor</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• 400 mL</li> <li>• Up to 250 °C</li> <li>• Up to 200 bar</li> <li>• Liquid</li> <li>• Liquid/Liquid</li> <li>• Liquid/Solid</li> <li>• Gas/Liquid/Solid</li> </ul>	<p><b>High Pressure Microwave Reactor 2,45 GHz</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• 200 mL to 1 L</li> <li>• Up to 20 bar</li> <li>• Continuous or Batch with double jacket</li> <li>• Stainless steel or quartz stirred tank</li> <li>• Liquid</li> <li>• Liquid/Liquid</li> <li>• Liquid/Solid</li> </ul>
<p><b>Lab Scale Glass Microwave Reactor 2,45 GHz</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Continuous or Batch</li> <li>• Frequency 2,45 GHz</li> <li>• 200W-kit</li> <li>• U waveguide</li> </ul>	<p><b>Pilot Scale Glass Microwave Reactor 915 MHz</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Continuous or Batch</li> <li>• Frequency 915 MHz</li> <li>• 600W monomode line</li> <li>• MW solid state generator</li> </ul>
<p><b>2 G/L Oxygen and Hydrogen flow reactors</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 200° C</li> <li>• Up to 50 bar</li> </ul>	<p><b>Kobelco FlowReactor</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 200 °C</li> <li>• Up to 50 bar</li> </ul>
<p><b>G/L FlowReactor for chlorination</b></p>	



# SEPARATION AND PURIFICATION

<p><b>Liquid-Liquid Extraction Column</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 90 °C</li> <li>• 1 bar</li> <li>• 8 to 25 L/h</li> <li>• 4 to 8 theoretical stages</li> </ul>	<p><b>Batch Distillation</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• 20 to 300 °C</li> <li>• 1 to 1000 mbar</li> <li>• 100 mL to 6 L</li> <li>• Up to 40 theoretical stages</li> </ul>
<p><b>Pressure Distillation</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 250 °C</li> <li>• 1 to 20 bar</li> <li>• Batch mode</li> <li>• 300 mL</li> <li>• Up to 15 theoretical stages</li> </ul>	<p><b>Short Path Distillation</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 250 °C</li> <li>• Down to 0,001 mbar</li> <li>• Up to 2 L/h continuous</li> </ul>
<p><b>Wiped Film Evaporator</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 250 °C</li> <li>• Down to 1 mbar</li> <li>• Up to 2 L/h continuous</li> <li>• With rectification column if required</li> </ul>	<p><b>Microfiltration / Ultrafiltration / Nanofiltration / Reverse Osmosis</b></p> <p><b>Ceramic &amp; organic mambranes</b></p>
<p><b>Cooling / Evaporative Batch Crystallization</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• 0 to 150 °C</li> <li>• 50 to 1000 mbar</li> <li>• Batch mode</li> <li>• 800 mL to 7 L</li> </ul>	<p><b>Pilot Scale Glass Microwave Reactor 915 MHz</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Continuous or Batch</li> <li>• Frequency 915 MHz</li> <li>• 600W mono-mode line</li> <li>• MW solid state generator</li> </ul>
<p><b>Adsorption Column</b></p> <p><b>Operating range</b></p> <ul style="list-style-type: none"> <li>• Continuous</li> <li>• 0 to 150°C</li> <li>• 1 to 5 bar</li> </ul>	<p><b>Melt Crystallization</b></p> <p><b>Operating range</b></p> <ul style="list-style-type: none"> <li>• Batch mode-30 to 80°C</li> <li>• 300 mL</li> </ul>
<p><b>Stripping Column</b></p> <p><b>Operating range</b></p> <ul style="list-style-type: none"> <li>• Gas/vapor between 25 and 150°C</li> <li>• 1 bar</li> </ul>	<p><b>Micro-distillation</b></p> <p><b>Operating range</b></p> <ul style="list-style-type: none"> <li>• Batch mode</li> <li>• 20 to 250 mL</li> <li>• 20 to 250°C</li> <li>• 1 to 1000mbar</li> <li>• Up to 80 theoretical stages</li> </ul>



# SEPARATION AND PURIFICATION

<p><b>Batch Centrifuge</b></p> <p><b>Operating range</b></p> <ul style="list-style-type: none"> <li>• Up 16500 g</li> <li>• Between -20 / 40°C</li> <li>• 50mL to 1 L</li> </ul>	<p><b>Vacuum dead-end filtration</b></p> <p><b>Operating range</b></p> <ul style="list-style-type: none"> <li>• Batch mode</li> <li>• 50 mL to 3L</li> </ul>
<p><b>Pressure dead-end filtration</b></p> <p><b>Operating range</b></p> <ul style="list-style-type: none"> <li>• Batch mode</li> <li>• Up to 6 bar</li> <li>• Up to 150°C</li> <li>• Up to 2.5 L</li> </ul>	<p><b>Drying</b></p> <p><b>Operating range</b></p> <ul style="list-style-type: none"> <li>• Batch mode</li> <li>• Up to 250°C</li> <li>• 1 bar to 1 mbar</li> <li>• 1 L</li> </ul>

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# PILOTS

<p><b>Continuous Vacuum Distillation</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 5 L/h continuous</li> <li>• Up to 180 °C</li> <li>• 10 to 1000 mbar</li> <li>• Up to 45 theoretical stages</li> </ul>	<p><b>Reactive Continuous Distillation</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 5 L/h continuous</li> <li>• 20 to 220 °C</li> <li>• 1 to 20 bar</li> <li>• Up to 20 theoretical stages</li> </ul>
<p><b>Continuous Pressure Distillation</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Up to 5 L/h continuous</li> <li>• 20 to 220 °C</li> <li>• 1 to 20 bar</li> <li>• Up to 20 theoretical stages</li> </ul>	<p><b>Pilot Scale glass Microwave Reactor 915MHz</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• Continuous or Batch</li> <li>• Frequency 915 MHz</li> <li>• 600W monomode line</li> <li>• MW solid state generator</li> </ul>
<p><b>Batch Distillation</b></p> <p><b>Operating range:</b></p> <ul style="list-style-type: none"> <li>• 5 L to 8 L</li> <li>• 20 to 300 °C</li> <li>• 1 to 1000 mbar</li> <li>• Up to 40 theoretical stages</li> </ul>	

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