MAK SAMPLE GAS CONDITIONING
Outstanding performance, reliability, and sustainability for extractive analytics
With over 35,000 units installed worldwide AGT Thermotechnik is for more than 40 years a leader in gas conditioning equipment that is based on refrigeration technique.

Sample Gas Conditioners for stack-gas analysis and Compressed Air Dryers for pneumatic applications are cost-effective solutions with proven performance, reliability and sustainability.

Previously AGT was the producer of gas conditioners for ViA, H&B and Alfa Laval. The former models MAK 6/8, CGEK 4/5 and SCC are still available.

MAK
SAMPLE GAS CONDITIONING

Outstanding performance, reliability and sustainability for extractive analytics.

- Continuously dehumidify gas sample streams and rapidly separate condensable liquids with a very low dissolution rate.
- Provide clean dry sample gases to extractive analysers in continuous emission monitoring, process control and engine testing applications.
- Optimise industrial burning processes and protect the environment.

APPLICATIONS

- Power Plants
- Waste Incinerators
- Cement Manufacturing
- Chemical Production Plants*
- Gas Production Plants*
- Glass manufacturing
- Timber Processing
- Food Processing

* not for highly combustible areas
What makes the new MAK 10 Sample Gas Conditioners so reliable?

Innovative solutions
The new MAK 10 offers precision, safety and long-term stability for extractive analytics. The unique cooling and separating technology of the newly designed coolers attains low, constant dew points of +3°C and compensates for operating data fluctuations as well as high thermal loads.

The very low gas dissolution rate is attained thanks to the new cooler technology (Patents applied). Both the permanent separation of the condensate from the gas phase, as well as the shorter contact time of the gas in the system, plays important roles.

The new coolers incorporate an advanced structural design. The new housings are available in wall-mount, 19"- rack, and mobile design. The coolers can be integrated in the analysis cabinet without having to leave space at the side for a cooling air outlet.

Preventative monitoring
An electronic system not only monitors the dew point, but also the ambient temperature. The fan motor speed is cooling air temperature dependent controlled. The operation of the condensate pumps can be adjusted demand-oriented. A service interval alarm and a precautionary alarm are both issued before an emergency stop takes place.

Which additional gas conditioning tasks can be performed by the MAK 10??

Sample gas cleaning
Reliable filtration of particles down to 0.1 micron takes place in the Teflon-depth filter. A view port allows you to see when the filter needs changing.

Moisture break-through monitoring
An externally installed moisture sensor controlled by an integrated electronic control monitors the function of the cooling system and the condensate pump. Analysers are protected from condensate breakthrough.

Measurement and adjustment of sample gas flow
With the flow meter and needle valve the sample gas flow can be adjusted and precisely measured.

Pre-cooling of sample gas with inlet dew point > 65°C
The integrated air-cooled pre-cooler preseparates free condensate and solid particles which are discharged through the additional condensate pump.

Elimination of SO3-Aerosols, HCL-, NO2-Concentrations
Samples containing additional water and acid injection can be accommodated.
Model: MAK 10-2

- Two gas paths
- Two heat-exchangers
- Two condensate pumps
- One 3-pole alarm contact MAK

Order No.: MAK 10-2202-4-00-F

Model: MAK 10-1-TF1-EC1-FM1 mobile

- One gas path
- One heat-exchanger
- One condensate pump
- One Teflon-depth filter
- One 3-pole alarm contact MAK
- One electronic control with one 3-pole alarm contact for ext. moisture sensor
- One flow meter with needle valve
- Two handles for mobile operations

Order No.: MAK 10-1101-8-1F-F
Further options and configurations available.

**Model: MAK 10-2-PS2-TF2-EC2**
- Two gas paths
- Two pre-separators for Dp in > 65°C
- Two heat-exchangers
- Four condensate pumps
- Two Teflon-depth filters
- One 3-pole alarm contact MAK
- Two electronic controls with two 3-pole alarm contacts for external moisture sensors

**Order No.: MAK10-2224-5-22-F**

**Model: MAK 10-2-PS2-TF1-EC1-FM1**
- Two gas paths
- Two pre-separators for Dp in > 65°C
- Two heat-exchangers
- Four condensate pumps
- Two Teflon-depth filters
- One 3-pole alarm contact MAK
- One electronic control with one 3-pole alarm contact for ext. moisture sensor
- One flow meter with needle valve

**Order No.: MAK 10-2224-7-1F-F MAK 10**
1. More efficient and no energy loss even in high ambient temperatures
- Coldness transfer through copper and aluminium
- Thermal conductance values 300 and 204 Wm⁻¹K
- Coldness transferred from the inside outwards

2. High and constant dryness rate even at extreme load changes
- Hydrophobic surface through PTFE Coating
- Large condensate drops are formed immediately
- Spiral performing stream goes downwards
- Discharge of condensate at the lowest point

3. Low dissolution rate a contribution to more environmental protection
- Very small dead space, 26 ml
- Extremely short response time of gas to liquid
- Large drops have a smaller surface to content ratio
- PTFE-Coating with low electrostatic current
  Condensate spiral stream separated
  from 3 sides

4. Key's to reliability
- Chemical resistance thanks to the PTFE Coating
- No clogging due to the self-cleaning feature

5. Comprehensive testing procedures guarantee equipment reliability.
- Providing of true inlet dew-points
- Automatic control of gas mixture at inlet
- Trace gas measuring by infra-red analyser
- Data processing and storing
- Availability of test certificates
<table>
<thead>
<tr>
<th>Technical Data xs</th>
<th>MAK 10-1</th>
<th>MAK 10-2</th>
<th>MAK 10-4</th>
<th>MAK 10-1-PS1</th>
<th>MAK 10-2-PS2</th>
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<tr>
<td>Number of gas paths</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>2</td>
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<td>Pre-separator (PS)</td>
<td>–</td>
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<td>–</td>
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<td>2</td>
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<td><strong>Operation data</strong></td>
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<td>Operating pressure (abs.)</td>
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<td>0,5 – 2,2 bar</td>
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<td>3°C +/- 0,3</td>
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<td>5 mbar (V = 125 Nl/h)</td>
<td>5 mbar (V = 125 Nl/h)</td>
<td>5 mbar (V = 125 Nl/h)</td>
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<td>26 ml</td>
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<td>Ready for start-up</td>
<td>&lt; 5 min.</td>
<td>&lt; 10 min.</td>
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<td>&lt; 10 min.</td>
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<td>300 W</td>
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<tr>
<td>3-pole alarm contact</td>
<td>25 V AC , 2A</td>
<td>25 V AC , 2A</td>
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<td>25 V AC , 2A</td>
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<tr>
<td>Alarm set points</td>
<td>&lt; + 2°C / &gt; + 10°C</td>
<td>&lt; + 2°C / &gt; + 10°C</td>
<td>&lt; + 2°C / &gt; + 10°C</td>
<td>&lt; + 2°C / &gt; + 10°C</td>
<td>&lt; + 2°C / &gt; + 10°C</td>
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<td>Housing protection class</td>
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<td>IP 20 EN 60529 / EN 61010</td>
<td>IP 20 EN 60529 / EN 61010</td>
<td>IP 20 EN 60529 / EN 61010</td>
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<td>Power supply</td>
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<td>230 V, 50 / 60 Hz; -15% / +15%</td>
<td>230 V, 50 / 60 Hz; -15% / +15%</td>
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<td>Power consumption max.</td>
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<td>170/185 W</td>
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<td>Power supply</td>
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<td>115 V, 50/60 Hz; -10% / + 10%</td>
<td>115 V, 50/60 Hz; -10% / + 10%</td>
<td>115 V, 50/60 Hz; -10% / + 10%</td>
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