AQSOA™ Desiccant Air-Conditioner
AQSOA™ Adsorption Heat Pump

Complete systems are also for sale.

Manufactured by MAYEKAWA MFG. CO., LTD

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AQSOA™ is a novel inorganic "AQua SOrb" zeolitic adsorbent originally developed by Mitsubishi Chemical Corporation.

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The Features of AQSOA™

1. Regenerated by Low Temperature Heat Source

Due to the low temperature of regeneration, AQSOA™ is environmentally friendly equipment which uses alternative heat sources such as solar heat and exhaust heat for regeneration.

2. Large Amount of Adsorption in a Narrow Range of Operations.

Depending on temperature, there is a large change in the adsorption amount with in a narrow range of operational temperature and humidity. It makes possible the construction of compact AQSOA™ heat pumps.

3. Humidity Control

Achieves a comfortable atmosphere with controlled humidity.

4. Durability

High durability, at least 200,000 cycles of vapor adsorption.

5. Type of Products

Three different types of AQSOA™ were created for application in different temperature and humidity conditions.

For humidity control we have available the honeycomb wheel and the AQSOA™ desiccant air conditioner, and for cold water we have available the AQSOA™ coated heat exchanger and the AQSOA™ adsorption heat pump.

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Structure and Electron Photomicrograph of AQSOA™

<table>
<thead>
<tr>
<th>AQSOA™-Z01</th>
<th>AQSOA™-Z05</th>
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</thead>
<tbody>
<tr>
<td>API Structure</td>
<td>CHA Structure</td>
</tr>
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</table>

Water molecule: 0.73 nm

0.3 nm

30 μm

International Classification by Zeolite Association.
**AQSOA** Honeycomb Wheel

- Recommended Regeneration Temperature

![Graph showing recommended regeneration temperature range](image)

- Example of regeneration temperature range

**Merits of AQSOA**-Dessicant Air-Conditioner are to

- Control Humidity and Temperature
- For low dew point
- Regenerates at Low Temperature (40°C~)
- Humidity Control
- Manufacturing Process Control
- Product Quality Productivity

**Mechanism of Desiccant Air-Conditioner**

In the AQSOA™ desiccant air-conditioning, moisture in wet air is adsorbed through AQSOA™ honeycomb wheel and dry air is supplied.

**Applied Locations of AQSOA™ Honeycomb Wheel Cassette**

- **Applications**
  - For Humidity Conditioning
    - AQSOA™ Desiccant Air-Conditioners
  - For low dew point
    - AQSOA™ Desiccant Air-Conditioners

- **Applied Locations**
  - Office Buildings
  - Humidity Controlled Plants
  - Cold Storage Rooms
  - Hospitals
  - Nursing Homes
  - Supermarkets
  - Household Humidity Conditioners

**Typical Dimensions (Cassette)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Supplied Air Flow Rate (m³/h)</th>
<th>Humidity Removal (g/kg)</th>
<th>Approximate Weight (kg)</th>
<th>Dimensions (mm)</th>
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</thead>
<tbody>
<tr>
<td>AQSOA™-01280</td>
<td>2,000-3,000</td>
<td>0.4</td>
<td>250</td>
<td>1,250</td>
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<tr>
<td>AQSOA™-10380</td>
<td>3,100-4,700</td>
<td>0.6</td>
<td>250</td>
<td>1,350</td>
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<tr>
<td>AQSOA™-13380</td>
<td>4,200-6,600</td>
<td>0.8</td>
<td>300</td>
<td>1,450</td>
</tr>
<tr>
<td>AQSOA™-15380</td>
<td>6,500-9,800</td>
<td>1.0</td>
<td>350</td>
<td>1,750</td>
</tr>
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<td>AQSOA™-19380</td>
<td>10,500-15,000</td>
<td>1.1</td>
<td>600</td>
<td>2,150</td>
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</tbody>
</table>

*Volume ratio: 1:1. 
*Feasible to customize a honeycomb wheel with different dimensions.

**Dimensions of Honeycomb Core**

- **Designation**
  - HC-320
  - HC-190

- **Pressure Loss**

- **Performance of Dehumidification (AQSOA™-201)**

  - Correlations of absolute humidity of inlet air and absolute humidity and temperature of outlet air

  - Condition: Temperature 50°C/Zone ratio 11 / Air flow ratio 1.1 / Air flow thickness 200mm / Wind speed (20°C) 2m/s
  - Absolute humidity of processing inlet air 90%RH / Absolute humidity of regeneration processing inlet air XIR 20g/kg(DA)

  - After the precooler, the latent heat is processed with the AQSOA™ Honeycomb Wheel. It is regenerated by heating the outlet air using the air conditioning machine of the forced system of ventilation.

- **Regeneration**

  - The performance is not a guaranteed value.
**AQSOA™ Coated Heat Exchanger**

**Recommended Regeneration Temperature Range**

![Graph showing recommended regeneration temperature range](image)

**Merits of AQSOA™ Adsorption Heat Pump**

1. Regenerates at Low Temperature (60°C)
2. Energy Saving
3. Compact Size
4. High COP (10.0)
5. The coolant is water
6. Adsorption: Adsorption phenomenon is used instead of compressor
7. Adsorption is used in high temperature adsorption
8. ECO: Energy Saving

**Mechanism of AQSOA™ Adsorption Heat Pump**

1. Evaporation: Water (refrigerant) evaporates in the evaporator. Cold water is generated by the evaporative latent heat.
2. Adsorption: AQSOA™ coated heat exchanger adsorbs vapor from the evaporator.
3. Desorption: We have desorption of vapor from AQSOA™ by passing hot water through the AQSOA™ coated heat exchanger. The released vapor flows to the condenser.
4. Condensation: The vapor becomes water in the condenser and it moves to the evaporator.

**Applications**

- For air-conditioning
- AQSOA™ Adsorption Heat Pump
- For various cooling processes
- AQSOA™ Adsorption Heat Pump

**Applied Locations**

- Steelmaking Plants
- Cast Incinerator Plants
- Chemical Plants
- Food Processing Facilities
- Hot Springs
- Cogeneration Plants

**Standard Unit Specifications**

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</thead>
<tbody>
<tr>
<td>HEX-400A</td>
<td>250 400 50</td>
<td>5</td>
<td>9.53 1.8 0.115 1</td>
<td>1 1 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEX-600A</td>
<td>290 800 100</td>
<td>15</td>
<td>9.53 1.8 0.115 1</td>
<td>1 1 4 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Nominal cold output is latent heat of evaporation in 5 minutes assuming that AQSOA™ Z01 absorbs 0.18kg/kg, AQSOA™ Z02 absorbs 0.25kg/kg, and all latent heat is effectively used for cooling.

**Typical Dimensions**

<table>
<thead>
<tr>
<th>Dimensions [mm]</th>
<th>Dimensions of Condenser [mm]</th>
<th>Adiabatic Fine</th>
<th>Fine Thickness</th>
<th>Height of AQSOA™ [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50~300</td>
<td>110~2000</td>
<td>2</td>
<td>0.115</td>
<td>0.2</td>
</tr>
</tbody>
</table>

- The weight of AQSOA™ by equipment volume (WxLxH).

**Performance of AQSOA™—Z01 adsorption heat pump compared with silica gel adsorption heat pump and absorption heat pump.**

- Expected Performance Ratio of The Heat Pumps with Decreasing Regeneration Temperature. 100% standard performance is defined that at 88°C for regeneration, 31°C for cooling water and 9°C for producing cold water.

**Performance of AQSOA™ adsorption heat pump**

- Can generate cold water from lower temperature exhaust heat as compared to absorption heat pumps and silica gel adsorption heat pumps.

*The dotted parts of the absorption heat pump curve is evaluated on the basis of Dufring diagram of lithium bromide. Performance of AQSOA™ adsorption heat pump is evaluated on the basis of AQSOA™'s isotherm.*