Duct water cooling units

**KWK**

for rectangular air ducts

### Use
- Supply air cooling for ventilation systems in various premises.
- Suitable for installation into supply ventilation or into air handling units to provide air cooling.

### Design
- Galvanized steel casing.
- The cooling elements are made of copper tubes and aluminum plates.
- Available in three-coil modifications and rated for maximum operating pressure 1.5 MPa (15 bar).
- Polypropylene droplet separator and drain pan for condensate drainage and removal included.
- Droplet separator is efficient at an air flow not exceeding 4 m/s.

### Mounting
- Only horizontal mounting by means of flanged connection. Air evacuation and condensate drainage must be provided.
- Air filter installation upstream of the cooling unit to prevent the unit soiling.
- Installation position must ensure uniform air flow distribution in the section.
- Installation upstream or downstream of the supply fan. The minimum air duct length downstream of the fan must be 1-1.5 m to ensure air flow stabilization.
- The maximum cooling capacity is attained if the cooling unit is connected on counter-flow basis. The attached charts are valid for counter-flow connection.
- If water is used as a cooling agent, the cooling unit is suitable for indoor use only with the ambient temperature not below 0 °C.
- If antifreezing solution, for example, ethylene glycol solution, is used as a cooling agent, the cooling unit is suitable for outdoor use as well.
- While mounting the cooling unit provide condensate drainage through the U-trap. The U-trap height must be selected with respect to the total fan pressure, refer to the table and diagram below.

### Overall dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions [mm]</th>
<th>H [mm]</th>
<th>K [mm]</th>
<th>P [Pa]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>B1</td>
<td>B2</td>
<td>B3</td>
</tr>
<tr>
<td>KWK 40х20-3</td>
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<td>420</td>
<td>440</td>
<td>470</td>
</tr>
<tr>
<td>KWK 50х25-3</td>
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<td>570</td>
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<td>670</td>
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<td>940</td>
<td>970</td>
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<tr>
<td>KWK 100х50-3</td>
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<td>1020</td>
<td>1040</td>
<td>1070</td>
</tr>
</tbody>
</table>

H – U-trap height
K – drain height
P – total fan pressure

For a proper and safe operation of the cooling unit it should be connected to a control system for integral control and automatic cooling capacity regulation.

Counter air flow connection

Air flow streamwise connection
DX cooling unit calculation diagram

How to use water cooling coil diagrams:
Sample parameters: Air flow = 900 m³/h, air flow speed through the cooling coil = 3.2 m/s.

- Supply air temperature: Prolong the line of air flow (e.g. 900 m³/h) up to the point where it crosses the outside air temperature (e.g. +32 °C); then draw a horizontal line from this point to the left until it crosses the outdoor air humidity curve (e.g. 50 %). From this point draw a vertical line to the supply air temperature axis on top of the graphic (20.1 °C).

- Cooling coil capacity: Prolong the line up to the point where it crosses the outside air temperature (e.g. +32 °C) and draw a horizontal line from this point to the right until it crosses the outdoor air humidity curve (e.g. 50 %). From here draw a vertical line up to the scale representing the cooling coil capacity (6.5 kW).

- Water flow through the coil: Prolong the line down to the water flow axis at the bottom of the graphic (0.25 l/s).

- Water pressure drop: Draw the line from the point where the line crosses the black curve to the pressure drop axis (15.0 kPa).
### How to use water cooling coil diagrams:

**Sample parameters:** Air flow = 1400 m³/h, air flow speed through the cooling coil = 3.1 m/s.

- **Supply air temperature:** Prolong the line of air flow (e.g. 1400 m³/h) up to the point where it crosses the outside air temperature (e.g. +32 °C); then draw a horizontal line from this point to the left until it crosses the outdoor air humidity curve (e.g. 50 %). From this point draw a vertical line to the supply air temperature axis on top of the graphic (20 °C).
- **Cooling coil capacity:** Prolong the line up to the point where it crosses the outside air temperature (e.g. +32 °C) and draw a horizontal line from this point to the right until it crosses the outdoor air humidity curve (e.g. 50 %). From here draw a vertical line up to the scale representing the cooling coil capacity (10.0 kW).
- **Water flow through the coil:** Prolong the line down to the water flow axis at the bottom of the graphic (0.4 l/s).
- **Water pressure drop:** Draw the line from the point where the line crosses the black curve to the pressure drop axis (17.0 kPa).

### How to use water cooling coil diagrams:

**Sample parameters:** Air flow = 2000 m³/h, air flow speed through the cooling coil = 3.75 m/s.

- **Supply air temperature:** Prolong the line of air flow (e.g. 2000 m³/h) up to the point where it crosses the outside air temperature (e.g. +32 °C); then draw a horizontal line from this point to the left until it crosses the outdoor air humidity curve (e.g. 50 %). From this point draw a vertical line to the supply air temperature axis on top of the graphic (20.6 °C).
- **Cooling coil capacity:** Prolong the line up to the point where it crosses the outside air temperature (e.g. +32 °C) and draw a horizontal line from this point to the right until it crosses the outdoor air humidity curve (e.g. 50 %). From here draw a vertical line up to the scale representing the cooling coil capacity (13.6 kW).
- **Water flow through the coil:** Prolong the line down to the water flow axis at the bottom of the graphic (0.54 l/s).
- **Water pressure drop:** Draw the line from the point where the line crosses the black curve to the pressure drop axis (27 kPa).
### Water Cooling Unit Calculation Diagram

#### How to Use Water Cooling Coil Diagrams:

**Sample Parameters:** Air flow = 2500 m³/h, air flow speed through the cooling coil = 3.75 m/s.

- **Supply Air Temperature:** Prolong the line of air flow (e.g., 2500 m³/h) up to the point where it crosses the outside air temperature (e.g., +32 °C); then draw a horizontal line from this point to the left until it crosses the outdoor air humidity curve (e.g., 50%). From this point draw a vertical line to the supply air temperature axis on top of the graphic (20.7 °C).
- **Cooling Coil Capacity:** Prolonging the line to the point where it crosses the outside air temperature (e.g., +32 °C) and draw a horizontal line from this point to the right until it crosses the outdoor air humidity curve (e.g., 50%). From here draw a vertical line up to the scale representing the cooling coil capacity (17.0 kW).
- **Water Flow Through the Coil:** Draw the line down to the water flow axis at the bottom of the graphic (0.68 l/s).
- **Water Pressure Drop:** Draw the line from the point where the line crosses the black curve to the pressure drop axis (27 kPa).

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#### How to Use Water Cooling Coil Diagrams:

**Sample Parameters:** Air flow = 2850 m³/h, air flow speed through the cooling coil = 3.85 m/s.

- **Supply Air Temperature:** Prolong the line of air flow (e.g., 2850 m³/h) up to the point where it crosses the outside air temperature (e.g., +32 °C); then draw a horizontal line from this point to the left until it crosses the outdoor air humidity curve (e.g., 50%). From this point draw a vertical line to the supply air temperature axis on top of the graphic (20.7 °C).
- **Cooling Coil Capacity:** Prolonging the line to the point where it crosses the outside air temperature (e.g., +32 °C) and draw a horizontal line from this point to the right until it crosses the outdoor air humidity curve (e.g., 50%). From here draw a vertical line up to the scale representing the cooling coil capacity (19.8 kW).
- **Water Flow Through the Coil:** Draw the line down to the water flow axis at the bottom of the graphic (0.75 l/s).
- **Water Pressure Drop:** Draw the line from the point where the line crosses the black curve to the pressure drop axis (30 kPa).
How to use water cooling coil diagrams:

Sample parameters: Air flow = 4000 m³/h, air flow speed through the cooling coil = 4.15 m/s.

- **Supply air temperature**: Prolong the line of air flow (e.g. 4000 m³/h) up to the point where it crosses the outside air temperature (e.g. +32 °C), then draw a horizontal line from this point to the left until it crosses the outdoor air humidity curve (e.g. 50 %). From this point draw a vertical line to the supply air temperature axis on top of the graphic (19.8 °C).
- **Cooling coil capacity**: Prolong the line up to the point where it crosses the outside air temperature (e.g. +32 °C) and draw a horizontal line from this point to the right until it crosses the outdoor air humidity curve (e.g. 50 %). From here draw a vertical line up to the scale representing the cooling coil capacity (28.5 kW).
- **Water flow through the coil**: Prolong the line down to the water flow axis at the bottom of the graphic (1.14 l/s).
- **Water pressure drop**: Draw the line from the point where the line crosses the black curve to the pressure drop axis (28 kPa).

Sample parameters: Air flow = 6000 m³/h, air flow speed through the cooling coil = 4.35 m/s.

- **Supply air temperature**: Prolong the line of air flow (e.g. 6000 m³/h) up to the point where it crosses the outside air temperature (e.g. +32 °C); then draw a horizontal line from this point to the left until it crosses the outdoor air humidity curve (e.g. 50 %). From this point draw a vertical line to the supply air temperature axis on top of the graphic (19.9 °C).
- **Cooling coil capacity**: Prolong the line up to the point where it crosses the outside air temperature (e.g. +32 °C) and draw a horizontal line from this point to the right until it crosses the outdoor air humidity curve (e.g. 50 %). From here draw a vertical line up to the scale representing the cooling coil capacity (43 kW).
- **Water flow through the coil**: Prolong the line down to the water flow axis at the bottom of the graphic (1.7 l/s).
- **Water pressure drop**: Draw the line from the point where the line crosses the black curve to the pressure drop axis (36 kPa).
How to use water cooling coil diagrams:

Sample parameters: Air flow = 7000 m³/h, air flow speed through the cooling coil = 4.4 m/s.

- **Supply air temperature:** Prolong the line of air flow (e.g., 7000 m³/h) up to the point where it crosses the outside air temperature (e.g., +32 °C); then draw a horizontal line from this point to the left until it crosses the outdoor air humidity curve (e.g., 50%). From this point draw a vertical line to the supply air temperature axis on top of the graphic (19.7 °C).

- **Cooling coil capacity:** Prolonging the line up to the point where it crosses the outside air temperature (e.g., +32 °C) and draw a horizontal line from this point to the right until it crosses the outdoor air humidity curve (e.g., 50%). From here draw a vertical line up to the scale representing the cooling coil capacity (57 kW).

- **Water flow through the coil:** Prolong the line down to the water flow axis at the bottom of the graphic (1.9 l/s).

- **Water pressure drop:** Draw the line from the point where the line crosses the black curve to the pressure drop axis (34 kPa).