AHRI Air-to-Air Energy Recovery Ventilators Certification Program

Plenum Guidance
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AHRI ERV Plenum Guidance

Included are five drawings intended to assist manufacturers in providing plenums for their units submitted to Intertek-Cortland for qualification or annual testing. The four drawings illustrate:

2. Standard Hose-end Plates
3. Standard Plenum Design
4. Heatpipe Plenum Setup
5. Wheel Plenum Setup
6. Plate Plenum Setup

The following chart shows what size plenums you should expect to connect to your unit, based on airflow:

<table>
<thead>
<tr>
<th>Airflow Range (SCFM)</th>
<th>Diameter (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-550</td>
<td>8</td>
</tr>
<tr>
<td>550-3000</td>
<td>18</td>
</tr>
<tr>
<td>3000-4500</td>
<td>24</td>
</tr>
</tbody>
</table>

The following should be noted when building plenums:
- If your plenums are not connected to the unit, be sure there is a way for the lab to connect the plenums to the unit and seal the connection with silicon. Mark which airstream the plenum should connect to.
- Plenums should be insulated on the outside, not the inside.
- Do not make the plenums longer than suggested by each plenum design guide.

Should you have any further questions, please contact the Intertek-Cortland laboratory:
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HOSE-END PLATES
Insulated hoses connecting the test stations to the exchanger under test. These hoses terminate in flat plates as shown below.
Three sizes are used depending on tested flow rate (see table below).
Plenums for the exchanger under test must be constructed to connect to the hose-end plates.

<table>
<thead>
<tr>
<th>Airflow Range</th>
<th>Dimension A</th>
<th>Dimension B</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-550 SCFM</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>550-3000 SCFM</td>
<td>24</td>
<td>18</td>
</tr>
<tr>
<td>3000-4500 SCFM</td>
<td>32</td>
<td>24</td>
</tr>
</tbody>
</table>
Inlet Plenums:
Included angle should not exceed 40°. For included angle greater than 20°, add Splitter Plate at Hose End, extending half the Plenum Length L.

Hose end of Plenums:
Should match the OD and opening size of the appropriate standard Hose-end Plate. See separate drawing.

Exchanger end of Plenums:
Height (H) and Width (W) of exchanger outlet establish cross-section and length of final straight plenum section.

**View from Top**
- Piezometer Ring ties together (4) static taps.
- Offset may be needed to prevent interference between inlet/outlet plates.
- Splitter Plate (only if included angle >20°)

**View from Side**
- Included Angle

**NOTE:** Static tap location is dependent on flow direction.

**View of Exchanger End**
- (H/2)

**View of Hose End**
- W/2

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**Air Flow**
Outlet Plenums:
Included angle should not exceed 40°.

Exchanger end of Plenums:
Height (H) and Width (W) of exchanger outlet establish cross-section and length of initial straight plenum section.

Hose end of Plenums:
Should match the OD and opening size of the appropriate standard Hose-end Plate. See separate drawing.

Offset may be needed to avoid interference between inlet/outlet plates.

NOTE: Static tap location is dependent on flow direction.

Piezometer Ring ties together (4) static taps.
NOTE: location of static taps in plenum is dependent on flow direction.

Static Taps connected by piezometer ring

Preferred static tap arrangement provides (4) taps, one on top of plenum, one on the bottom, and one on each side.

If this is not possible, provide (1) tap on top of plenum and (1) tap on a side of the plenum.

See separate drawings for standard sizes of inlet/outlet plates and proportions of plenums.

Maximum Length of Final Assembly = 11'0"
Maximum dimension of any pre-assembled components = 79"

Gap allows for taping of duct-end plates.

Outlet (4)
Outlet (2)
Inlet (1)
Inlet (3)

Access panels (if necessary) to allow sealing of plenums to heat exchanger.

Attach exchanger to Pallet. Support Plenums.

Representative Setup of Heat Pipe Exchanger with Plenums for Testing
8/23/2013
See separate drawings for standard sizes of inlet/outlet plates and proportions of plenums.

NOTE: location of static taps in plenum is dependent on flow direction.

Representative Setup of Wheel Exchanger with Plenums for Testing
8/23/2013

Static taps connected by piezometer ring.
Preferred static tap arrangement provides (4) taps, one on top of plenum, one on the bottom, and one on each side.
If this is not possible, provide (1) tap on top of plenum and (1) tap on a side of the plenum.

Attach exchanger to Pallet. Support Plenums.
NOTE: location of static taps in plenum is dependent on flow direction.

See separate drawings for standard sizes of inlet/outlet plates, recommended proportions of plenums, and locations of static taps.

Maximum Length of Final Assembly = 11'0"
Maximum dimension of any pre-assembled components = 7'9"

Preferred static tap arrangement provides (4) taps, one on top of plenum, one on the bottom, and one on each side.
If this is not possible, provide (1) tap on top of plenum and (1) tap on a side of the plenum.

Attach exchanger and plenums to pallet. Support plenums. With large samples (as shown) it may be necessary to ship some of the plenums separately.

Access panels may be helpful for sealing plenums to exchanger.

Outlet (4)
Outlet (2)
Inlet (1)
Inlet (3)
Static taps connected by piezometer ring

Representative Setup of Plate Exchanger with Plenums for Testing
5/18/2017