RECTANGULAR DUCT ATTENUATORS

DESCRIPTION

Fantech Rectangular Attenuators are available in different models to suit a variety of applications and duct dimensions. They can be made in different widths and heights, and each model number denotes a different percentage open area and length combination.

The rectangular attenuators are available in the following models:

RT Series - Rectangular Attenuators
The RT series is ideal for general HVAC purposes and suitable for industrial applications. These attenuators deliver good acoustic attenuation properties across a broad spectrum of sound frequencies while maintaining low air flow pressure drops through the attenuator. This range is suitable for dry applications. Refer to the RT..QS series for applications where moisture may be present in the air stream.

RT..QS Series - Rectangular Q-Seal Attenuators
The Rectangular Q-Seal attenuator includes the qualities of the RT series attenuator and incorporates an infill system fully wrapped in an impermeable plastic membrane/film. The RT..QS Series is suitable in medical and clean room applications and any sensitive ventilation systems requiring a wrapped infill material to prevent the possibility of insulation fibre ingress into the airstream. They are also suitable where the insulation medium is directly exposed to weather, grease, liquid or dusts. Attenuators of this model type may also be cleaned periodically by low-pressure steam or pressure washer equipment.

HOW TO ORDER

RT - Tapered splitter
R3T - Wide tapered splitter

Airway width code
- 07 - 75mm 15 - 150mm 22 - 225mm
- 10 - 100mm 17 - 175mm 25 - 250mm
- 12 - 125mm 20 - 200mm 30 - 300mm

Length code
- A - 600mm
- B - 900mm
- C - 1200mm
- D - 1500mm
- E - 1800mm
- F - 2100mm
- G - 2400mm

QS - with Q-seal
(Default is standard construction)

Casing width in cm.
Casing height in cm.

R3T Series - Rectangular Thick Wall Attenuators
The R3T series of attenuators is suitable for HVAC purposes and ideal for industrial applications. They have wider splitters providing better low-frequency attenuation than the standard RT series. This makes them more suitable for the control of low-frequency noise emissions such as those from generator sets and pump systems.

Sectional Representation

RT Series
Standard splitters

RT..QS Series
Splitters with infill wrapped in impermeable film

R3T Series
Thicker splitters

DIMENSIONS

Air Flow

H

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CONSTRUCTION

• Casing and splitters made from Z275 coated galvanized steel.
• Infill from bio-soluble acoustic grade glasswool or mineral wool, encased behind finely perforated galvanized steel. Infill is hygroscopic and incombustible.
• RT and R3T Series have a fiberglass membrane between infill and perforated steel layer to minimize fibre egress from the infill into the air stream.
• Q-Seal (QS) variants have infill material fully wrapped in liquid impermeable Melinex® PET Plastic Film.
• Standard construction rated to duct pressures between -500Pa and +1kPa relative to atmosphere.

SECTIONAL SIZING AND JOINING FLANGE INFORMATION

• Flanges 35mm TDF or compatible up to a maximum height or width of 1200mm. Above these sizes 40mm or 50mm steel angle section frames used, supplied undrilled.
• Matching flanges for attaching to accompanying ductwork can also be supplied.
• Rectangular attenuators will typically be made in a single piece up to a maximum of 2250mm in width, length or height. Above this dimension attenuators will be split into multiple sections in the dimension(s) exceeding the 2250mm limit noted.
• As a special request, attenuators may be divided into smaller sized sections than standard to fit through small spaces, before they are reassembled as a single unit on site.

CUSTOMISED ATTENUATOR OPTIONS

The following are available as special options when ordering Fantech rectangular attenuations:

• Different materials of construction such as Stainless Steel Grades 304 and 316.
• Paints / protective coatings such as epoxy paint, Chlorinated Rubber etc.
• Flange material/dimensions profile can be specified e.g. Ductmate, TDF, Plain Steel Angle.
• Access doors for easy cleaning (e.g. in Kitchen Exhaust Applications).

SUGGESTED SPECIFICATION

Rectangular attenuators shall be of the RT, R3T or RT. QS Series as designed and manufactured by Fantech Pty. Ltd. and shall have the dimensions, acoustic attenuator insertion losses and pressure losses as scheduled. Acoustic Attenuator Insertion Loss data for the attenuators to be derived from tests in accordance to BS4718:1971.

The casing shall be manufactured from forming grade zinc-coated mild steel sheet with Pittsburgh corner seams. The infill material shall be either rockwool or fibreglass as specified by the manufacturer. The infill material shall be covered with a membrane to prevent erosion of the fibres, then encased in galvanised perforated sheet metal. Where attenuators are exposed to the weather they shall be of the RT. QS Series where all infill materials shall be lined with an impervious film to prevent the ingress of moisture.

The infill material when tested in accordance with AS1530.3:1989 shall have the following indices:-

  Ignitability 0
  Spread of flame 0
  Heat evolved 0
  Smoke developed 0
Example: How to select a rectangular attenuator

For this scenario, noise from a car park exhaust fan results in a noise level of 83dB(A) in the car park it ventilates.

The exhaust air volume passing through the fan is 7m³/s. The user would like to have a targeted noise level in the carpark of 60dB(A). Also, the attenuator can be no longer than 2200mm long, is not exposed to the weather, and can have no more than 20Pa of airflow resistance through it to avoid affecting the fan selection.

1. Select the attenuator series required. Both the RT and R3T models would be appropriate as the internals of the attenuator are not exposed to the weather.

2. The noise reduction required is found by subtracting the target noise level from the current noise level.

3. The noise reduction required is found by subtracting the target noise level from the current noise level.

4. To achieve a 23 dB(A) noise reduction using the RT series, the following length and % open area combinations can be used; 2100mm/37%, 1800mm/33% and 1500mm/26%. For our example going forward, we will use the 2100mm long, 37% open area option. The selection closest to the top is normally the best from a price perspective. To evaluate other options, repeat the steps from 1 onwards.

### ACOUSTIC PERFORMANCE DATA

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>% Open Area</th>
<th>R3T Series</th>
<th>RT Series</th>
<th>RT.QS Series</th>
<th>R3T Series</th>
<th>RT Series</th>
<th>RT.QS Series</th>
<th>R3T Series</th>
<th>RT Series</th>
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</table>

Acoustic performance tests to ISO7235-2003 that have been simplified to single digit noise reduction levels are shown in table above. Detailed attenuator insertion loss (SIL) spectrums based on testing to the BS4718-1971 Standard can be obtained using the Fans by Fantech Product Selection Program.

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Select the product code which is aligned with the 2100mm long, 37% open, 23 dB(A). In this case the product code is RT12F. Refer to the correct pressure loss (20Pa) graph and attenuator series (RT Series for the RT12F model).

Draw a vertical line on the graph that corresponds to the length of the attenuator model chosen at step 4 (i.e. 2100mm long or "F" length code). The face velocity on the RT12../QS curve that corresponds to the model is 3.3 m/s.

Face Velocity at 20Pa Pressure Drop

<table>
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<tr>
<th>Length of Attenuator</th>
<th>RT.. Series &amp; RT.. QS Series</th>
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<tbody>
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<tr>
<td>1800mm</td>
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<td>2100mm</td>
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<td>2400mm</td>
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</table>

Face Velocity at 50Pa Pressure Drop

<table>
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<tr>
<th>Length of Attenuator</th>
<th>RT.. Series &amp; RT.. QS Series</th>
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</thead>
<tbody>
<tr>
<td>1500mm</td>
<td></td>
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<tr>
<td>1800mm</td>
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<td>2100mm</td>
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<tr>
<td>2400mm</td>
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</table>

Calculate the minimum face area for your attenuator selection; Face Area = Air flow / Face Velocity = 7.0 m³/s / 3.3 m/s = 2.12 m²

To calculate the width of a rectangular attenuator of unknown dimensions, use the formula;

Width = \( \sqrt{\text{Face Area} \times \text{Aspect Ratio}} = \sqrt{2.12 \text{m}^2 \times 1.5} = 1.78 \text{m} \)

*Common aspect ratios vary between 0.5 and 3.0. When a silencer width is larger than its height aspect ratio >1.0. An aspect ratio of 1.5 is a good default.

In the width table below, pick the closest width available for a RT12.. series attenuator. In this case, 1.95m (1950mm) is the selected width.

To calculate the height of the attenuator, use the formula; Height = Face Area / Width = 2.12 m² / 1.95 m = 1.09 m

The final model code of the attenuator selected is RT12F-195-1109 Width 1.95m

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