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In This Issue:
Life Safety Dampers
Effective Smoke Control
In-line Fans
To find the leakage at other pressures, simply multiply the leakage at 1 inch times the square root of your actual pressure. For example, if a damper leaks 10 cfm/sq.ft. at 1.0-in. w.g. (0.25kPa) when tested in accordance with AMCA 500D,” But what do these requirements really mean?

Dampers generally leak in two main places: between the blade ends and the frame, an area typically known as the “jamb,” and between the blade edges. Therefore, low-leakage dampers are normally supplied with blade and jamb seals. However, the type of seal supplied can mean significant differences in leakage rates. There can be a 10-to-1 difference in a damper supplied with mechanically locked seals and flexible metal jamb seals versus a damper supplied with no seals at all.

AMCA Publication 502, Damper Application Manual for Heating, Ventilating and Air Conditioning, defines the “sealing performance” of a closed damper as “described by the airflow leakage rate through the damper for a given pressure differential across the damper.” So leakage is a function of pressure, not airflow. This sealing performance is usually expressed (or plotted) as cfm/sq.ft. (m³/s per m²) through the face area of a damper versus measured pressure differential across the damper and includes a statement of the specified seating torque. For example, a 24x24-in. opposed blade damper may have its sealing performance described as 32 cfm/sq.ft. @ 4-in. w.g., pressure with 5 inch-pounds/sq.ft. torque applied holding damper closed. This is a lot of information, but all necessary when a specifier or end-user is comparing information from one manufacturer to another.

Published leakage data of dampers are usually expressed as cfm/sq.ft. of damper at 1.0-in. w.g. static pressure. Once you know how much a damper will leak at 1 inch, it is easy to estimate the leakage at other pressures using the basic fan laws.
Damper manufacturers test their products to AMCA Standard 500-D, *Laboratory Methods of Testing Dampers for Rating*. This standard includes recognized and accepted standard test procedures for performance testing, including sealing performance. There are many test centers that can test dampers to the procedures in AMCA Standard 500; many manufacturers have the ability to test their own products. Should a specifier or owner want impartial data that a damper will perform, they should specify that the damper comply with AMCA Standard 511, *Certified Ratings Program – Product Rating Manual for Air Control Devices*.

AMCA 511 details procedures for participation in the AMCA Certified Ratings Program (CRP). Manufacturers having their products tested in an AMCA-accredited laboratory, with the test results verified by the AMCA staff and then obtaining the proper license from AMCA, can offer products bearing AMCA's Certified Ratings Seal for Air Leakage. The purpose of the seal is to offer assurance that a damper will perform in accordance with the manufacturer’s published data. Therefore, if a particular damper’s ratings comply with the performance criteria specified, it should produce an acceptable application, provided all other requirements are satisfied.

Bearing the seal doesn’t stop with the first round of testing. All of the manufacturer’s literature must be verified for accuracy before publication. The ratings are subject to review at all times by AMCA and the products are “check-tested” on a minimum three-year basis to make sure that the products perform as required. And all licensed products are open to challenge testing by competitors or any third party.

AMCA 511 also introduces us to damper “Leakage Classes.” Chart 1 illustrates each damper classification.
The new IECC (International Energy Conservation Code) and ASHRAE 90.1 Energy Standard require new lower leakage rates for outside air dampers in buildings. Ruskin is the first to offer AMCA certified low leak dampers that meet the new 1A leakage classification. Ruskin’s low leak control dampers can save building owners up to $30 per damper annually by providing tight sealing of outside air openings. So turn “on” to energy savings while your building is “off” and let Ruskin start saving you money today.

To learn more about Ruskin’s energy-saving solutions, or to locate a representative nearest you, visit our website at www.ruskin.com or call us at (816) 761-7476.

1 Based on Class 1A leakage rate of 3 CFM/sq. ft. versus a standard leakage of 40 CFM/sq. ft. and energy rate of $0.10/KWH.

<table>
<thead>
<tr>
<th>Pressure/Class</th>
<th>Leakage, cfm/ft² (L/S/m²)</th>
<th>Required Rating</th>
<th>Extended Ranges (Optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td></td>
<td>1” w.g. (0.25kPA)</td>
<td>11 (55.9) 14 (71.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4” w.g. (1.0kPA)</td>
<td>11 (55.9) 14 (71.1)</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>8 (40.6)</td>
<td>11 (55.9) 14 (71.1)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>10 (50.8)</td>
<td>28 (142) 35 (178)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>40 (203)</td>
<td>112 (569) 140 (711)</td>
</tr>
</tbody>
</table>

Chart 2: UL555S Classified Leakage Ratings

<table>
<thead>
<tr>
<th>Leakage Class</th>
<th>Leakage, cfm/ft² (L/S/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td></td>
</tr>
</tbody>
</table>

Earlier we covered the requirements of the IECC and ASHRAE Standard 90.1. Using the AMCA 511 table, we now see that both the IECC and ASHRAE require Class 1 dampers.

**UL Classified Leakage Ratings**

UL Standard 555S, Smoke Dampers, is the test standard to qualify dampers for use in smoke-control systems. UL 555S identifies leakage classes for both smoke and combination fire/smoke dampers (combination fire/smoke dampers must meet the requirements of both UL 555, Fire Dampers, and UL 555S). Chart 2 identifies the different leakage classes under UL 555S.

Note the similarities between the leakage classes in both AMCA 511 and UL 555S. They are the same except that UL 555S does not have a Leakage Class 1A nor does it allow leakage ratings at 1-in. w.g. (0.25kPA). Anyone specifying a leakage class can feel comfortable knowing that the class is essentially the same for all damper types and styles.

Moreover, AMCA 511 also includes procedures to qualify smoke and fire/smoke dampers to bear AMCA’s Certified Ratings Seal for Air Leakage.

Understanding damper leakage rates and leakage classes enables specifiers, contractors, and building owners to identify the correct damper products. Specifying and installing low-leakage dampers (Class 1 preferred, Class 2 at a minimum by code) helps ensure that the building HVAC system is operating at its most energy-efficient level. Specifying and installing dampers licensed to bear the AMCA Seal for Damper Leakage is a sensible way to provide specifiers, contractors, and owners peace-of-mind that the dampers in their systems will perform as intended and help take their buildings to the “green,” sustainable level.

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