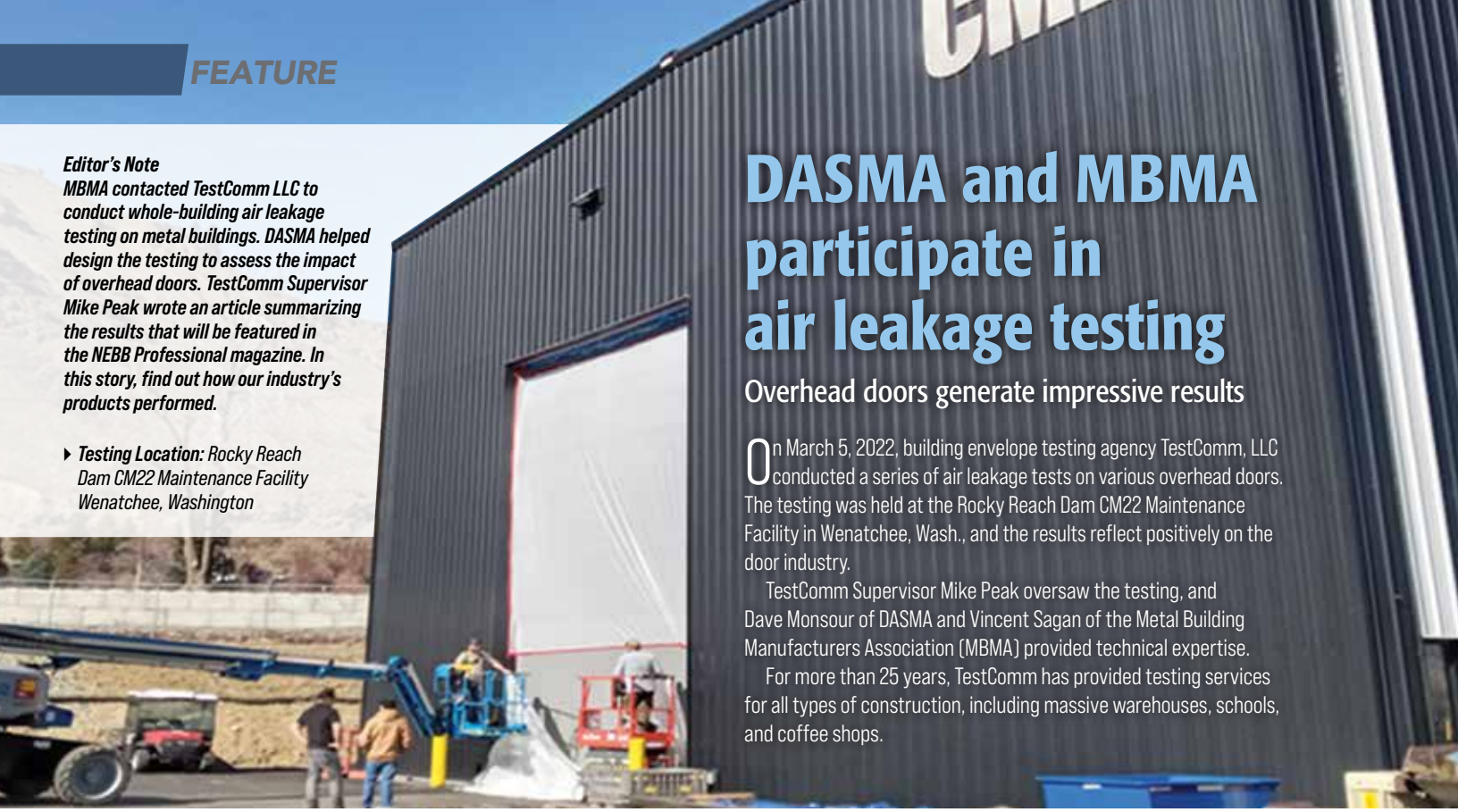


DASMA and MBMA participate in air leakage testing

Overhead doors generate impressive results

Editor's Note
MBMA contacted TestComm LLC to conduct whole-building air leakage testing on metal buildings. DASMA helped design the testing to assess the impact of overhead doors. TestComm Supervisor Mike Peak wrote an article summarizing the results that will be featured in the NEBB Professional magazine. In this story, find out how our industry's products performed.

- ***Testing Location:*** *Rocky Reach Dam CM22 Maintenance Facility Wenatchee, Washington*

On March 5, 2022, building envelope testing agency TestComm, LLC conducted a series of air leakage tests on various overhead doors. The testing was held at the Rocky Reach Dam CM22 Maintenance Facility in Wenatchee, Wash., and the results reflect positively on the door industry.

TestComm Supervisor Mike Peak oversaw the testing, and Dave Monsour of DASMA and Vincent Sagan of the Metal Building Manufacturers Association (MBMA) provided technical expertise.

For more than 25 years, TestComm has provided testing services for all types of construction, including massive warehouses, schools, and coffee shops.

What prompted the air leakage testing?

Washington state's energy code requires all buildings to pass a building envelope test at a given leakage rate to receive a certificate of occupancy. The 2018 code lowered the acceptable leakage rate from 0.40 cfm/ft^2 to 0.25 cfm/ft^2.

Peak said that nearly every warehouse with rolling doors that he has tested in the past has failed. "The reason these projects do so poorly is because non-insulated coil doors are specified, which have no air leakage rating," he said.

Rolling door concerns

Peak said that on non-insulated, nonrated rolling doors, the gap between the curtain and the header is generally unsealed or sealed with nothing more than a brush. As a result, the large opening allows air to easily pass through during a building envelope test.

With this previous experience and the new Washington state energy code requirements in place, Peak and his team anticipated that rolling doors would continue to fail at even higher rates. Members of DASMA and MBMA had similar concerns, so they approached TestComm to conduct some exploratory air leakage testing on rolling and sectional overhead doors.

"The experimental testing was initiated by MBMA. When DASMA members heard about it, they were immediately interested," said Monsour. "This was a great opportunity for first-hand involvement in evaluating our products. We were especially curious about how the immense 22' x 30' rolling door in this facility would do."

About the tests

TestComm performed a total of four tests in addition to the pass/fail baseline test conducted to satisfy the Washington state energy code requirements. The additional tests were used to determine the air leakage performance of the doors.

The first test, the pass/fail baseline, was conducted on the as-built structure. The second test was performed with all the doors sealed and plastic sheeting taped around the entire perimeter of each opening. They then tested with the large rolling door unsealed.

Lastly, both rolling doors were unsealed, leaving only the sectional doors sealed. The procedure provided the net leakage of the sectional doors and the individual leakage of the rolling doors, explained Peak.

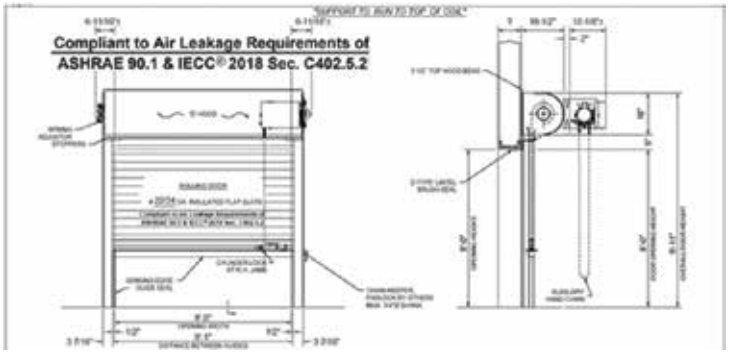
Peak thought it was a great idea to quantify the leakage between the sectional and the rolling doors adding, "Why didn't I think of this?"

Low expectations

While Peak saw the value of this experimental-type testing, he also had low expectations going in. The project consisted of a 22' x 30' coil door, an 8' x 8' rolling door, and four 14' x 14' sectional doors. Additional specs included insulated flat rolling doors with a lintel brush seal, an astragal at the floor, and seals on the guides.

The doors were advertised as being compliant with the air leakage requirements of ASHRAE 90.1 & IECC 2018 Sec. C402.5.2. "After inspecting the doors with Dave, I set up fans and fired them off fully expecting the building to fail," said Peak. "Much to my surprise, the building passed, and passed easily."

"These projects never go this well," he said. When Peak checked the numbers again, he asked DASMA's technical director, "What kind of doors are these?"



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> I HAD A LOT OF CONCERNS ABOUT USING COIL DOORS ON ANY BUILDING, UNTIL THIS PROJECT," SAID PEAK.

Building specifications

The building has a surface area of 79,810 square feet with an allowable leakage of 31,924 CFM based on the acceptance criteria of 0.40 cfm/ft^2 (the permit for the building was pulled under the 2015 Washington State energy code) at a test pressure of 0.30 inches of water gauge (2.0 L/s at 75 Pa). It was tested using the NEBB version of the ASTM E779 linear regression test, in both directions — positive and negative (i.e., pressurization and depressurization).

Impressive numbers

The initial baseline test showed an average leakage of 12,057 CFM at a test pressure of 75 Pa. That equated to a leakage rate of 0.15 cfm/ft^2 — good enough to pass even the more stringent upper limit of 0.25 cfm/ft^2 required under the 2018 Washington energy code.

With the baseline test completed, the group sealed up all the overhead doors and retested the building. The building leakage fell to 8,259 CFM with a leakage rate of 0.10 cfm/ft^2, indicating that the overhead doors contributed 3,798 CFM (31%) to the overall leakage of the building.

Next, the team unsealed the large rolling door and retested. The building leakage came was 10,490 CFM. Thus, the large rolling door contributed 2,231 CFM (18.5%) to the overall leakage during the baseline test.

Following this test, we unsealed the smaller rolling door and retested the building.

Rolling door effect on air leakage

With both rolling doors unsealed, the results revealed that both rolling doors contributed 22% of the overall leakage. The smaller rolling door contributed 430 CFM (3.5%) to the overall leakage of the building.

The group determined that the net leakage for the sectional doors was 1,135 CFM, representing 9% of the overall leakage of the building.

According to Peak, even with all the additional potential for leakage, the rolling doors performed "very well."

Manufacturers for the win

The aforementioned air leakage testing was the first MBMA test to include rolling doors. "Rolling doors comprised 48% of the door area on this building. Yet, the percent contribution of the doors was still in line with previous all sectional test results," said Monsour.

Overall, the testing agency was very impressed with the leakage resistance of the doors, he added.

"I had a lot of concerns about using coil doors on any building, until this project," said Peak. "I have learned that not all doors are the same. I'm delighted to see that manufacturers are taking energy conservation seriously in the design of the exterior components of our buildings and striving to meet higher energy efficiency standards."

Is your state or local jurisdiction considering adopting a building envelope testing requirement? Carefully considering what type of doors you select in your design can make the difference in passing or failing. ■