

IS ASTM E283 INTERCHANGEABLE WITH ASTM E2178?

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The short answer is **no**. The results you get from ASTM E283 will be different than from ASTM E2178. They are not the same test method. ASTM E283 is simply the procedure to determine air leakage rate across a specimen while ASTM E2178 is to determine the air leakage rate across a building material.

That may seem to be the same thing, but ASTM E283 was developed to determine the air leakage rate through exterior windows, curtain walls, and doors. In the standard, it defines the specimen as being full size, the height of full story building or the height of the unit, whichever is greater. It goes on to require the specimen to consist of the entire assembled unit, etc. The test method gets into how you calibrate the test apparatus, what the test conditions need to be and the procedure for testing. Finally, it provides requirements for calibration and outlines what is required for the report of the test.

The summary of ASTM E283 in clause 4, talks about taking one side of a specimen, sealing it against a chamber, then supplying and measuring the air flow rate to maintain a set pressure difference. ASTM E283 provides information on how to calibrate the test apparatus and how to calculate the results of the test. It works for windows, walls and doors as the specimens are all constructed units. There is no specimen preparation required so the test method can focus on how to conduct the actual testing of a single unit. There are no required pressure differential requirements in ASTM E283, the proponent decides on whatever they want.



ASTM E2178 air leakage rate of building materials test being conducted

If no other information is provided, ASTM E283 cannot be used for comparing one air barrier material to another. To be able to compare materials, the specimens need to be the same and the procedure for testing and reporting needs to be the same.

The air barrier industry developed ASTM E2178 specifically to test the air leakage rate of building materials to determine what materials may be considered an air barrier material. This standard requires that five (5) specimens are used to determine the air leakage rate and that these specimens are a minimum of one (1) meter by one (1) meter. This is an important requirement as we have learned that no material is truly homogeneous. The minimum of five

specimens helps to determine the true air leakage rate of the material. We are also measuring air leakage rates that are very low in a lot of materials and if the specimen size is small the results are not accurate.

Table 1 – Comparison of the two standards

Comparison of ASTM E2178 and ASTM E283		
	ASTM E2178	ASTM E283
Specimens required	five	one
Chamber requirements	detailed	simply airtight
Flow measuring device requirements	specific	none
Specimen preparation	very detailed	none
Specimen sealing to chamber	very detailed	none
Procedure for determining extraneous air leakage	detailed	none
Number of pressure differences for the test	six	one
Specific pressure differences	yes	chosen by entity
Requirement to test at reporting pressure after subjecting the specimen to all loads	yes	no
Error analysis required	yes	no
Regression line greater than $r^2 < 0.99$ required	yes	no

Summary

ASTM E283 cannot be a substitute for ASTM E2178. You cannot use results from a ASTM E283 test to compare the air leakage rate of one air barrier material against another air barrier material as the specimens may not be the same. If you wanted to use ASTM E283 tests for comparison, you would have to ensure that all of the requirements of ASTM E2178 have been met. If they have, then you have test results from a ASTM E2178 test. If they have not been met, then the results cannot be compared to test results from ASTM E2178.