REPORT
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1002
ISO/IEC 17025

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Air leakage test of a circular duct system
(2 appendices)

Assignment

Air leakage test of a circular duct system made of moulded glass wool.

Test object

Circular duct system consisting of:
5 pcs. 2.35 meters duct, Ø 200 mm.
2 pc. 1.17 meters duct Ø 200 mm.
1 pc. 2.35 meters duct Ø 125 mm.
2 pc. T-connection Ø 200 – 125 mm.
1 pc. Bend 90° Ø 200 mm.
1 pc. Bend 45° Ø 200 mm.
1 pc. Bend 90° Ø 125 mm.
2 pc. Endplate Ø 200 mm.

The system consisted of ducts made of moulded glass wool. Duct Ø 125 mm has an outside diameter of Ø 195 mm and duct Ø 200 mm has an outside diameter of Ø 275 mm.

For photos of the duct system, see appendix 1.

Place and date of test

The test was carried out by SP Energy Technology on February 4th 2015 on an assembled duct system in the laboratory at SP Energy Technology in Borås, Sweden. During the test Göran Bernhardsson from Climate Recovery AB was present.

Test procedure

The test was carried out according to standard EN 1507:2006 "Ventilation for buildings – Sheet metal air ducts with a rectangular section – Requirements for strength and leakage".

The duct system was connected to a variable speed fan to provide the correct static pressure and an air flow meter to measure the air leakage.

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Results

The reported values have been corrected to an air density of 1.2 kg/m³. The measurements were made at an atmospheric pressure of 993 hPa and the ambient temperature was about 20°C.

The tested circular system had a total surface area (A) of 10.65 m² and a total joint length (L) of 10.60 m. This resulted in a ratio L/A=1.00 1/m.

Air leakage test

The measured and calculated values for pressure and air leakage factors are presented in tables 1-2 and in the diagram in appendix 2.

Table 1. Results for circular duct system at static positive pressure.

Static positive pressure Pa	Measured leakage factor l/s/m²	Demand acc. to class B l/s/m²	Demand acc. to class C l/s/m²	Demand acc. to class D l/s/m²
102	0.012	0.181	0.060	0.020
210	0.021	0.291	0.097	0.032
398	0.036	0.441	0.147	0.049
606	0.052	0.579	0.193	0.064
752	0.062	0.667	0.222	0.074
1003	0.078	0.804	0.268	0.089

Table 2. Results for circular duct system at static negative pressure.

Static negative pressure Pa	Measured leakage factor l/s/m²	Demand acc. to class B l/s/m²	Demand acc. to class C l/s/m²	Demand acc. to class D l/s/m²
99	0.012	0.179	0.060	0.020
208	0.022	0.289	0.096	0.032
297	0.029	0.365	0.122	0.041
403	0.038	0.444	0.148	0.049
603	0.052	0.577	0.192	0.064
751	0.062	0.666	0.222	0.074

The determination of deflection of ducts as its presented in EN 1507:2006 is not relevant in this test. No deflection of ducts and joints was noticed and the duct system did not bulge or cave during the test.

At the actual test the system achieved air tightness class D at pressure class 2 according to EN 1507:2006.

The results only applies for the tested system.

Estimated measurement uncertainty

Temperature ± 1°C   Atmospheric pressure ± 1 hPa
Air flow ± 5 % of actual flow   Area ± 5 %
Static pressure ± 1 % of actual pressure   Leakage factor ± 6 %

The uncertainty has been calculated according to EA-4/16 with a coverage factor k=2.

Measuring equipment

Temperature meter, Comark C9001   SP Inventory number 201 312
Manometer, Swema 2000 Man   SP Inventory number 201 562
Manometer, Swema 80 Man   SP Inventory number 202 719
Air flow meter, nozzles 5 to 25 mm   SP Inventory number 201 602

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Appendices

1. Figure 1 and 2. Photo of the tested system.
2. Diagram: Leakage factor [l/s/m²] as a function of static pressure [Pa].

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Appendix 1

Figure 1. Photo of the tested system.

Figure 2. Photo of the tested system.

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Appendix 2

Circular duct system

Air tightness cass B

Air tightness class C

Air tightness class D

Static pressure (Pa)

Leakage factor (l/s/m²)

Positive pressure
Negative pressure