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M60 836/22 nm/jre
2006-06-14

Upholstery Fabric Kvadrat Type Pro

Determination of the
air flow resistance according to EN 29053

Test Report No. M60 836/22

Client:	Kvadrat A/S Lundbergsvej 10 8400 Ebeltoft Denmark
Consultant:	Dipl.-Ing. (FH) Andreas Niermann
Date of report:	14 June 2006
Date of test:	3 June 2006
Total number of pages:	In total 7 pages: 4 pages of text 2 pages of appendix A 1 page of appendix B

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1 Task

On behalf of Kvadrat A/S, DK-8400 Ebeltoft, the airflow resistance of the upholstery fabric Pro, make Kvadrat, is to be determined by measurements.

2 Test object and measurement conditions

For the specimen of the upholstery fabric Pro, make Kvadrat, the airflow resistance was to be determined. The data, e. g. name and type of the test object, were indicated by the client.

The fabric can be described as follows:

- Manufacturer: Kvadrat, DK-8400 Ebeltoft
- Designation: upholstery fabric type Pro
- Material: 100 % Trevira CS
- Thickness of fabric: approx. $d = 0.8$ mm
- mass per m^2 : approx. $m'' = 327$ g/ m^2

3 Execution of measurements

The measurements were carried out on 3 June 2006 in the Laboratory for airflow resistance measurements of the Müller-BBM company in Planegg.

The airflow resistance was determined according to EN 29053: 1993-03 "Acoustics – Materials for acoustical applications – Determination of airflow resistance".

The measurements for the determination of the airflow resistance were carried out at different air velocities. The continuous airflow method was applied. The measurement cell (specimen holder) has a diameter of 100 mm. The test specimen was fitted flat over the measurement cell, without stretching the material, sealed at the edges and fixed.

According to the standard the specific airflow resistance R_s and the airflow resistivity r are indicated as measurement results which were determined by extrapolation (linear regression) at an airflow velocity of $u = 0,0005$ m/s.

4 Measurement results

The determined airflow resistance values are indicated below. For further information regarding the measurements, see Appendix A.

The results of the measurements are:

R_S = specific airflow resistance
 r = airflow resistivity

- Upholstery fabric Pro, make Kvadrat
 - $R_S = 974 \text{ Pa} \cdot \text{s/m}$
 - $r = 1.23 \cdot 10^6 \text{ Pa} \cdot \text{s/m}^2$

5 Remark

The present report may only be copied, disclosed or published as a whole including all appendices. The publication of extract requires the prior written consent of Müller-BBM.



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DAP-PL-2465.10

Determination of airflow resistance acc. to EN 29053

Project:	Kvadrat		
Test report no.:	60836/22		
tested by:	nm		
Date of measurement:	2006-06-03		
Number of specimen:	5327		
Construction:	woven fabric, single layer		
Designation:	Pro		
Material:	100 % Trevira CS		
Purpose:	upholstery		
Thickness:	0,8 mm	Climatic conditions	
Surface:	0,389 m ²	Absolute air pressure:	101,3 kPa
Mass:	127,4 g	Barometrical air pressure:	96,2 kPa
Area specific mass:	327 g/m ²	Air temperature:	21,5 °C
Diameter:	100 mm	Relative air humidity:	49,0 %

Number of measurement	pressure difference Δp / mm H ₂ O	air flow q_v / (cm ³ /min)	air flow velocity u / (m/s)	specific air flow resistance R_s / (Pa s/m)	spec. air flow resistance rel. Length r / (Pa s/m ²)
1	10,000	34855	0,07024	1397,0	1,77E+06
2	9,500	34015	0,06855	1360,0	1,72E+06
3	9,000	32765	0,06603	1337,0	1,69E+06
4	8,500	31522	0,06352	1313,0	1,66E+06
5	8,000	30287	0,06104	1286,0	1,63E+06
6	7,500	28650	0,05774	1274,0	1,61E+06
7	7,000	27429	0,05528	1242,0	1,57E+06
8	6,500	25808	0,05201	1226,0	1,55E+06
9	6,000	24195	0,04876	1207,0	1,53E+06
10	5,500	22190	0,04472	1207,0	1,53E+06
11	5,000	20198	0,0407	1205,0	1,53E+06
12	4,500	18616	0,03752	1177,0	1,49E+06
13	4,000	16655	0,03356	1169,0	1,48E+06
14	3,500	15103	0,03044	1128,0	1,43E+06
15	3,000	12806	0,02581	1140,0	1,44E+06

Extrapolated acc. to EN 29 053:

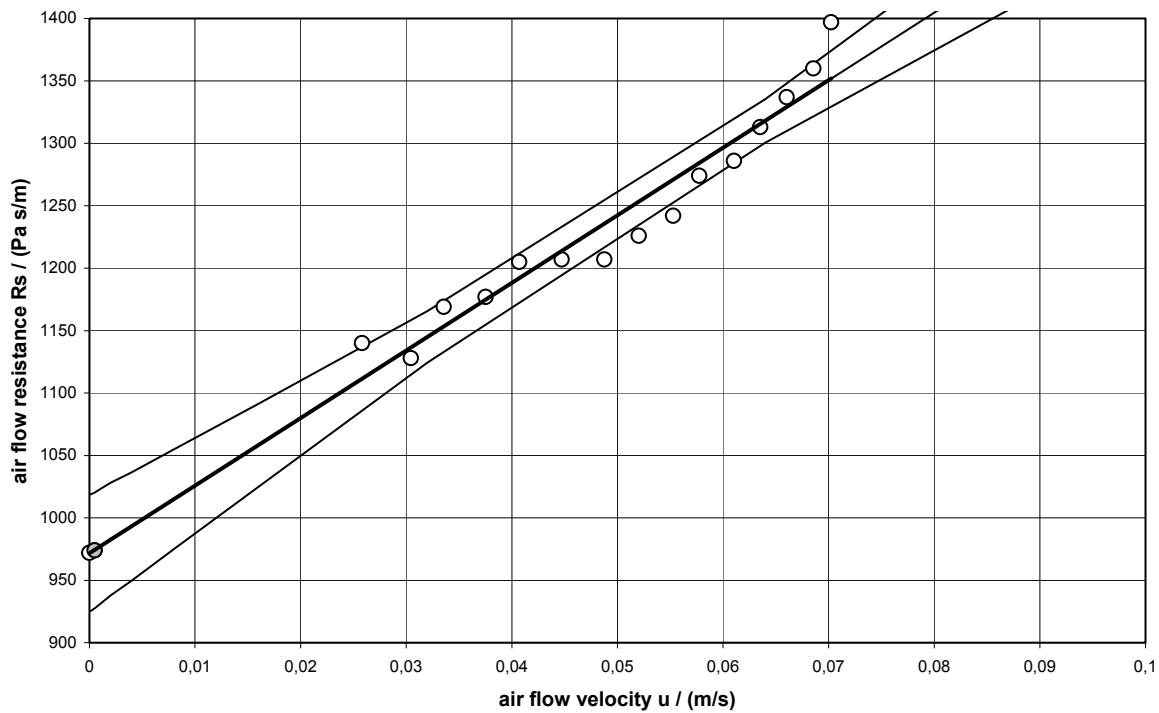
0,0005	974	1,23E+06
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Statistical confidence: 95 %

Confidence interval $u = 0,0005$ m/s: $\pm 4,8$ %

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air flow velocity u / (m/s)	specific air flow resistance R_s / (Pa s/m)	spec. air flow resistance rel. Length r / (Pa s/m ²)
0,0005	974	1,23E+06

Extrapolated acc. to EN 29 053:

Statistical confidence: 95 %

Confidence interval $u = 0,0005$ m/s: $\pm 4,8$ %

List of test equipment

For the measurements and evaluations, the following test equipment was applied:

Name	Manufacturer	Type	Serial-No.
Mikromanometer	Furness Controls	FC O14 - MOS 220	9002407
Flow meter	BROOKS	Tube R-6- 15-B	--
Flow meter	BROOKS	Tube R-2- 15-C	--
Flow meter	BROOKS	Tube R-2- 15-A	--
Flow meter (4 pieces)	Kirchner & Tochter	KD 77/2 (air)	--
Measuring construction for airflow resistance	Müller-BBM	--	--
Computer with programs for evaluation	Müller-BBM	--	--