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B100827/277 Version 1 MSG/STEG

## **Curtain fabric Twin Stripe by Kvadrat A/S**

**Determination of airflow resistance  
according to DIN EN ISO 9053-1**

**Test Report No. B100827/277**

Client:	Kvadrat A/S Lundbergsvej 10 8400 Ebeltoft DENMARK
Consultant:	M. Eng. Philipp Meistring
Report date:	2023-06-05
Delivery of the test object:	2023-05-08
Test date:	2023-05-09
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## 1 Task

On behalf of Kvadrat A/S, 8400 Ebeltoft, Denmark, the airflow resistance of the fabric type Twin Stripe was to be determined according to DIN EN ISO 9053-1 [1].

## 2 Basis

This test report is based on the following document:

- [1] DIN EN ISO 9053-1: Acoustics –Determination of airflow resistance – Part 1: Static airflow method (ISO 9053-1:2018); German version EN ISO 9053-1:2018. March 2019
- [2] DIN EN ISO 5084: Textiles - Determination of thickness of textiles and textile products (ISO 5084:1996); German version EN ISO 5084:1996. 1996-10

## 3 Test object

The fabric Twin Stripe consists of two different types of fabric that are woven together in stripes. The fabric type with the lower mass per unit area is described in Table 1 and the fabric type with the higher mass per unit area is described in Table 2.

The samples were taken by the testing laboratory from a fabric roll delivered by the client. Each sample had dimensions of 210 mm x 297 mm. The following characteristics were determined by the testing laboratory:

Table 1. Fabric with the lower mass per unit area.

Test object (information provided by the client / indication on samples)	Sample No.	Area specific mass $m'$ [g/m <sup>2</sup> ]	Thickness $t$ [mm]
Fabric type Twin Stripe, material: 61 % polyester FR, 39 % polyester	1	174	0.58
	2	173	0.59
	3	174	0.59
Mean		174	0.59

Table 2. Fabric with the higher mass per unit area.

Test object (information provided by the client / indication on samples)	Sample No.	Area specific mass $m'$ [g/m <sup>2</sup> ]	Thickness $t$ [mm]
Fabric type Twin Stripe, material: 61 % polyester FR, 39 % polyester	4	246	0.53
	5	247	0.54
	6	248	0.53
Mean		247	0.53

The thickness of the fabric was determined acc. DIN EN ISO 5084 [2] (per sample mean value of three positions, pressure 1.00 kPa, pressure-foot 2,000 mm<sup>2</sup>).

#### 4 Execution of measurements

The airflow resistance was determined according to DIN EN ISO 9053-1 [1].

The test method, the test facility and the test equipment used are described in Appendix B.

#### 5 Measurement results

The measurement results are shown in the diagram and table in the test certificates in Appendix A of this report.

For the tested fabric the following specific airflow resistance was determined:

Table 3. Specific airflow resistance of the fabric with the lower mass per unit area.

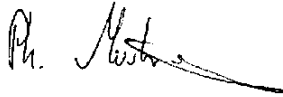
<b>Test object</b> Fabric type Twin Stripe	<b>Specific airflow resistance</b> $R_s / (\text{Pa s} / \text{m})$	<b>Appendix A,</b> <b>page</b>
Sample 1	11	1
Sample 2	11	2
Sample 3	11	3
Mean	11	--

Table 4. Specific airflow resistance of the fabric with the higher mass per unit area.

<b>Test object</b> Fabric type Twin Stripe	<b>Specific airflow resistance</b> $R_s / (\text{Pa s} / \text{m})$	<b>Appendix A,</b> <b>page</b>
Sample 4	1116	4
Sample 5	827	5
Sample 6	924	6
Mean	957	--

## 6 Remarks

The test results exclusively relate to the investigated subjects and conditions described.



M.Eng. Philipp Meistring  
(Project manager)

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**EN ISO 9053-1**  
Determination of airflow resistance

**Client:** Kvadrat A/S  
Lundbergsvej 10  
8400 Ebeltøft

**Project number:** B100827

**Sample number:** 15260-1

**Test object:** - fabric: Twin Stripe  
- material: 61 % polyester FR, 39 % polyester

sample 1  
stripes lightly woven

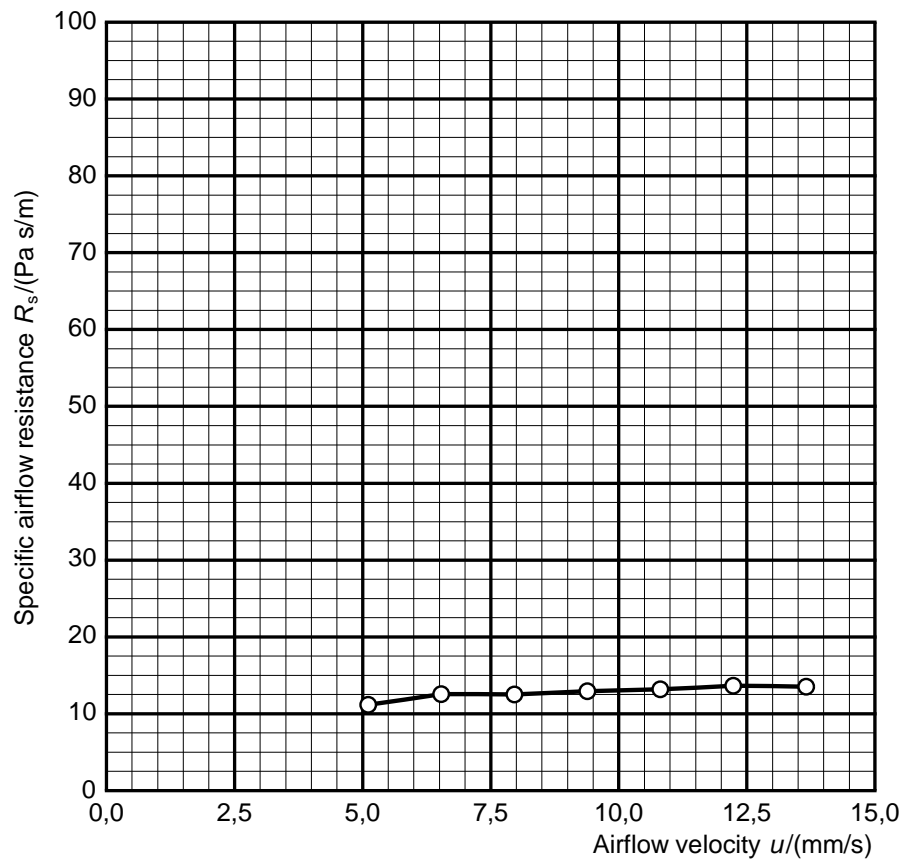
Diameter: 100 mm  
Thickness: 0.58 mm  
Area-specific mass: 174 g/m<sup>2</sup>

Barometric pressure:  
 $B = 94,9 \text{ kPa}$

Temperature:  
 $\theta = 24,4 \text{ °C}$

Relative humidity:  
 $r. h. = 14,0 \text{ %}$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
5.11	11
6.54	13
7.96	13
9.38	13
10.81	13
12.23	14
13.66	14



Specific airflow resistance  $R_s(0.5 \text{ mm/s}) = 11 \text{ Pa s/m}$

Laboratory: Planegg  
Responsible: Moll  
Date: 2023-05-09

**EN ISO 9053-1**  
Determination of airflow resistance

**Client:** Kvadrat A/S  
Lundbergsvej 10  
8400 Ebeltøft

**Project number:** B100827

**Sample number:** 15260-2

**Test object:** - fabric: Twin Stripe  
- material: 61 % polyester FR, 39 % polyester

sample 2  
stripes lightly woven

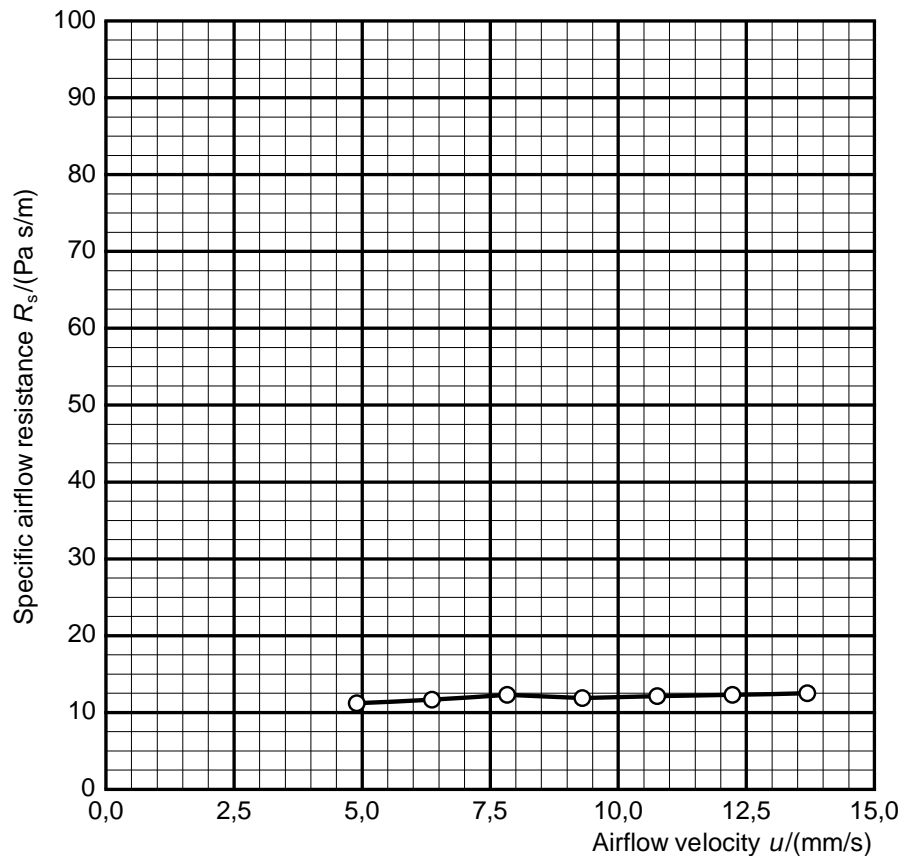
Diameter: 100 mm  
Thickness: 0.59 mm  
Area-specific mass: 173 g/m<sup>2</sup>

Barometric pressure:  
 $B = 94,8 \text{ kPa}$

Temperature:  
 $\theta = 24,9 \text{ °C}$

Relative humidity:  
 $r. h. = 16,1 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
4.90	11
6.36	12
7.83	12
9.30	12
10.76	12
12.23	12
13.69	12



Specific airflow resistance  $R_s(0.5 \text{ mm/s}) = 11 \text{ Pa s/m}$

Laboratory: Planegg  
Responsible: Moll  
Date: 2023-05-09

EN ISO 9053-1  
Determination of airflow resistance

**Client:** Kvadrat A/S  
Lundbergsvej 10  
8400 Ebeltøft

**Project number:** B100827

**Sample number:** 15260-3

**Test object:** - fabric: Twin Stripe  
- material: 61 % polyester FR, 39 % polyester

sample 3  
stripes lightly woven

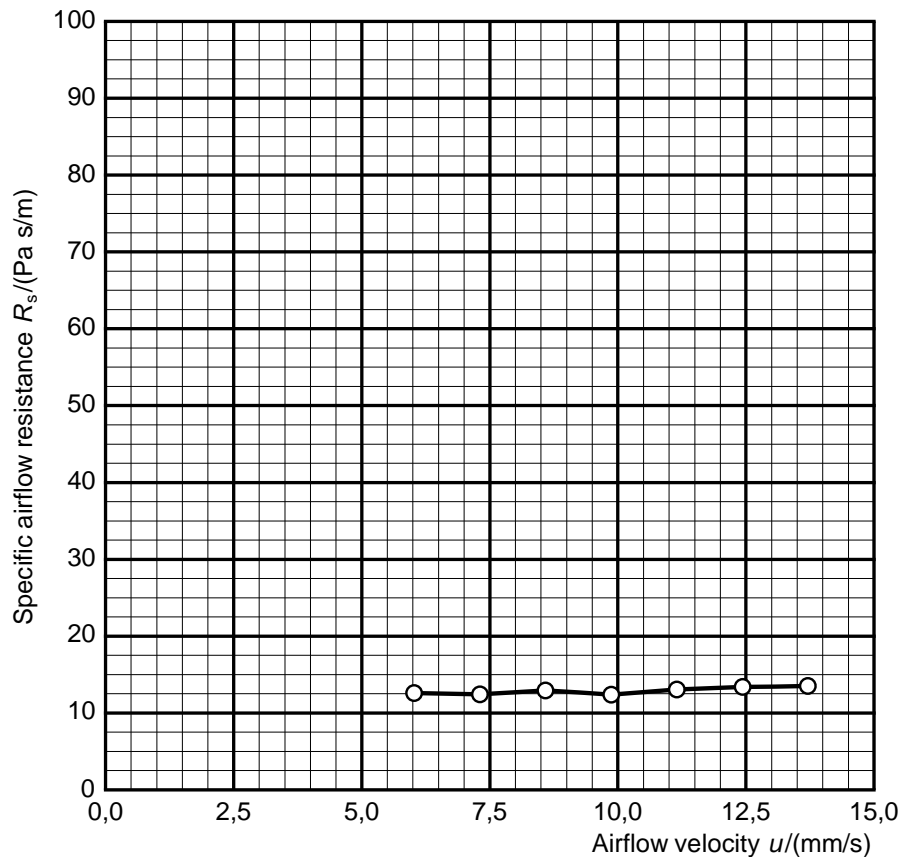
Diameter: 100 mm  
Thickness: 0.59 mm  
Area-specific mass: 172 g/m<sup>2</sup>

Barometric pressure:  
 $B = 94,7 \text{ kPa}$

Temperature:  
 $\theta = 25,0 \text{ °C}$

Relative humidity:  
 $r. h. = 11,7 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
6.03	13
7.31	12
8.59	13
9.87	12
11.15	13
12.43	13
13.71	14



Specific airflow resistance  $R_s(0.5 \text{ mm/s}) = 11 \text{ Pa s/m}$

Laboratory: Planegg  
Responsible: Moll  
Date: 2023-05-09



**EN ISO 9053-1**  
Determination of airflow resistance

**Client:** Kvadrat A/S  
Lundbergsvej 10  
8400 Ebeltoft

**Project number:** B100827

**Sample number:** 15260-4

**Test object:** - fabric: Twin Stripe  
- material: 61 % polyester FR, 39 % polyester

sample 4  
stripes more woven

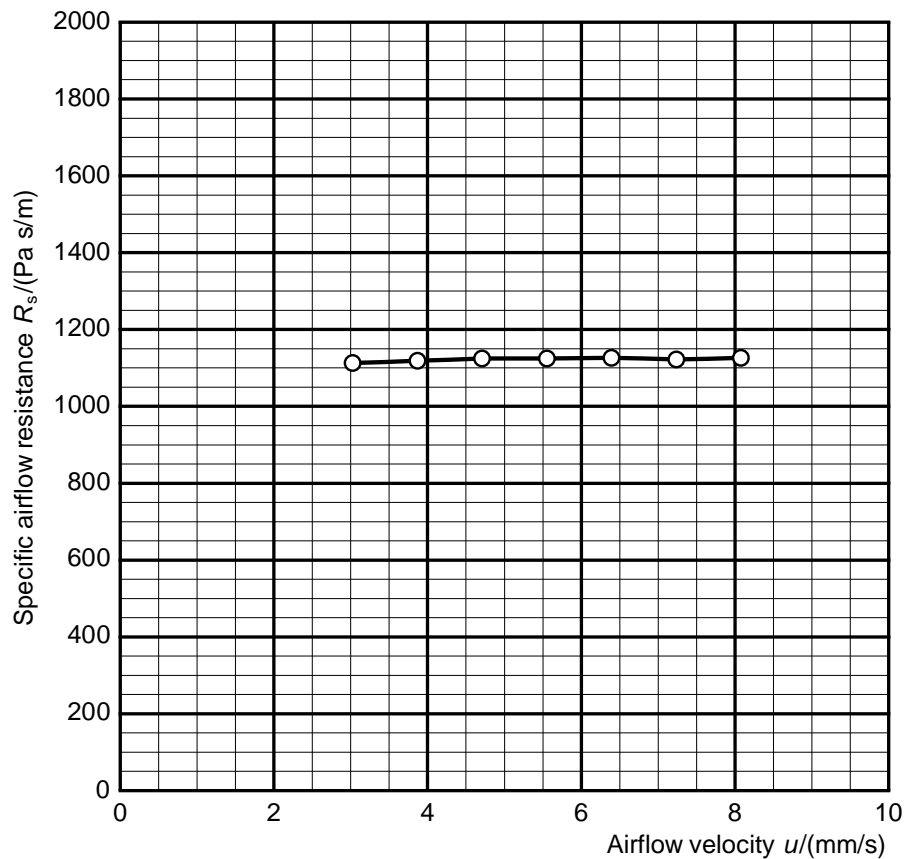
Diameter: 100 mm  
Thickness: 0.53 mm  
Area-specific mass: 246 g/m<sup>2</sup>

Barometric pressure:  
 $B = 94,9 \text{ kPa}$

Temperature:  
 $\theta = 24,5 \text{ °C}$

Relative humidity:  
 $r. h. = 14,4 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
3.03	1112
3.87	1119
4.71	1124
5.55	1124
6.39	1126
7.23	1122
8.08	1126



Specific airflow resistance  $R_s(0.5 \text{ mm/s}) = 1116 \text{ Pa s/m}$

Laboratory: Planegg  
Responsible: Moll  
Date: 2023-05-09

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m:\ars 1.25.8646.27231 - S:\B\Proj\100\B100827\MapData\20230509\Twin Stripe Probe 4 stark gewebt.mns (01.06.2023)

**EN ISO 9053-1**  
Determination of airflow resistance

**Client:** Kvadrat A/S  
Lundbergsvej 10  
8400 Ebeltoft

**Project number:** B100827

**Sample number:** 15260-5

**Test object:** - fabric: Twin Stripe  
- material: 61 % polyester FR, 39 % polyester

sample 5  
stripes more woven

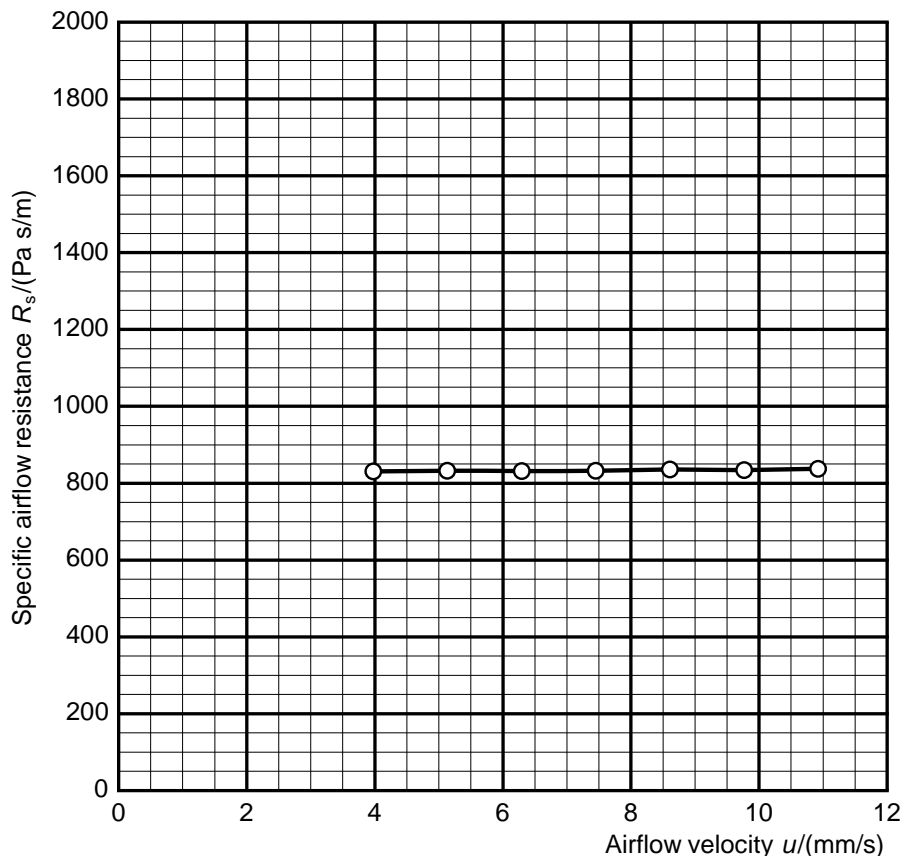
Diameter: 100 mm  
Thickness: 0.54 mm  
Area-specific mass: 247 g/m<sup>2</sup>

Barometric pressure:  
 $B = 94,8 \text{ kPa}$

Temperature:  
 $\theta = 24,9 \text{ °C}$

Relative humidity:  
 $r. h. = 15,4 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
3.98	830
5.13	832
6.29	832
7.45	832
8.61	836
9.77	834
10.92	837



Specific airflow resistance  $R_s(0.5 \text{ mm/s}) = 827 \text{ Pa s/m}$

Laboratory: Planegg  
Responsible: Moll  
Date: 2023-05-09

EN ISO 9053-1  
Determination of airflow resistance

**Client:** Kvadrat A/S  
Lundbergsvej 10  
8400 Ebeltøft

**Project number:** B100827

**Sample number:** 15260-6

**Test object:** - fabric: Twin Stripe  
- material: 61 % polyester FR, 39 % polyester

sample 6  
stripes more woven

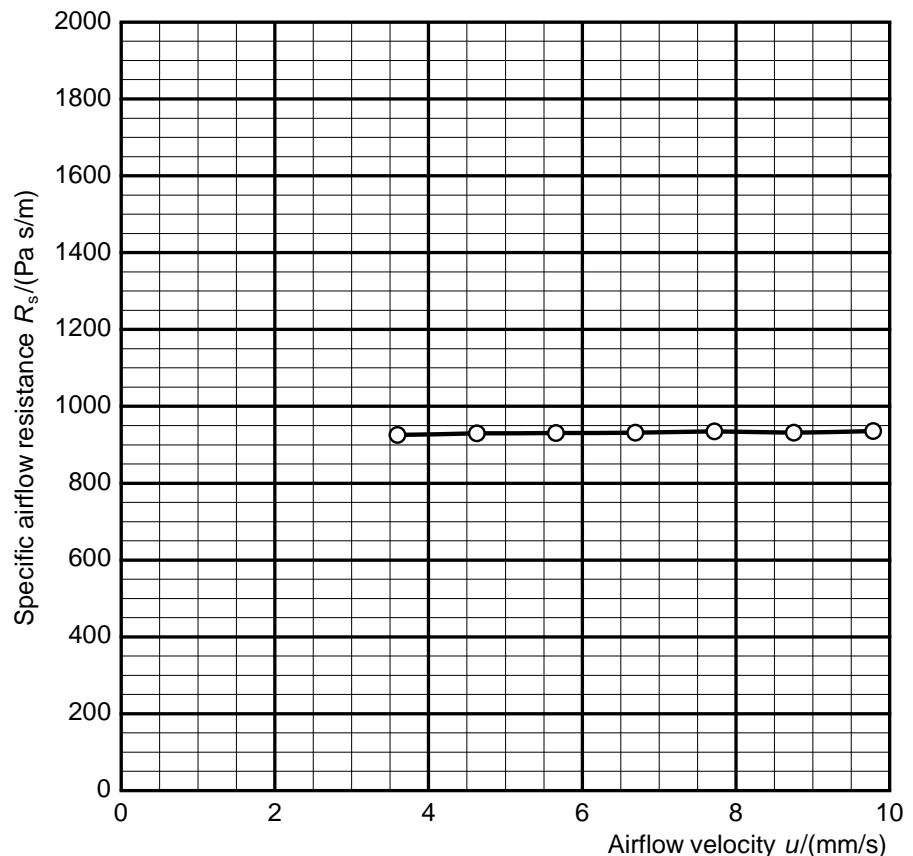
Diameter: 100 mm  
Thickness: 0.53 mm  
Area-specific mass: 248 g/m<sup>2</sup>

Barometric pressure:  
 $B = 94,7 \text{ kPa}$

Temperature:  
 $\theta = 25,0 \text{ °C}$

Relative humidity:  
 $r. h. = 12,6 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
3.59	925
4.63	930
5.66	931
6.69	931
7.72	934
8.75	931
9.78	936



Specific airflow resistance  $R_s(0.5 \text{ mm/s}) = 924 \text{ Pa s/m}$

Laboratory: Planegg  
Responsible: Moll  
Date: 2023-05-09

## Description of the test procedure for the determination of the airflow resistance

### 1 Measurand

The specific airflow resistance  $R_S$  of the test object was determined. For this purpose the air pressure difference in front of as well as behind the test object was measured at different volumetric airflow rates. The specific airflow resistance  $R_{S,i}$  for each volumetric airflow rate  $q_{v,i}$  determined was calculated using the following equation:

$$R_{S,i} = \frac{\Delta p_i \cdot A}{q_{v,i}}$$

With

$R_{S,i}$  specific airflow resistance in Pa s/m;

$\Delta p_i$  air pressure difference across the test object with respect to the atmosphere in Pa;

$A$  cross-sectional area of the test object perpendicular to the direction of flow in m<sup>2</sup>;

$q_{v,i}$  volumetric airflow rate passing through the test object in m<sup>3</sup>/s;

$u_i$  linear airflow velocity in m/s;

In addition the linear airflow velocity  $u_i$  was determined:

$$u_i = \frac{q_{v,i}}{A}$$

The indicated measurement result is the specific airflow resistance  $R_S$ , which is calculated for an airflow velocity of  $u = 0.0005$  m/s by extrapolation with help of the linear regression.

## 2 Test procedure

The direct airflow method (static airflow method according to DIN EN ISO 9053-1 [1]) was applied. A steady unidirectional airflow with different air flow rates is pressed through the test object in the specimen holder. The resulting pressure drop between the two free faces of the test object is measured.

The specimen holder had a diameter of  $D = 100$  mm.

## 3 List of test equipment

The test equipment used is listed in Table B.1.

Table B.1. Test equipment.

Name	Manufacturer	Type	Serial-No.
Measurement system airflow resistance	Müller-BBM	M89319-00	315003
Software for measurement and evaluation	Müller-BBM Acoustic Solutions	m ars	Version 1.23.8256. 29682
Thickness gauge	Hans Schmidt & Co GmbH	D-2000- C0913	2985
Electronic balance	Kern	KB1200-2N	W1402353