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2011-08-30
M77 692/13 mol

“Bühnenmolton B1” Manufacturer TÜCHLER

**Determination of the
airflow resistance acc. to EN 29053**

Test Report No. M77 692/13

Client:	TÜCHLER Bühnen- & Textiltechnik GmbH Rennbahnweg 78 1220 Vienna Austria
Consultant:	Jan-Lieven Moll
Date of report:	2011-08-30
Date of delivery of test objects:	2011-08-08
Date of measurements	2011-08-30
Total number of pages:	In total 9 pages: 3 pages text, 5 pages Appendix A and 1 page Appendix B.

1 Task

On behalf of the company TÜCHLER in 1220 Vienna, Austria, the airflow resistance of five specimens of the "Bühnenmolton B1" was to be determined by measurements according to EN 29053 [1].

2 Basis

This test report is based on the following documents:

- [1] EN 29053 "Acoustics – Materials for acoustical applications – Determination of airflow resistance". 1993

3 Test object

The tested material is described by the manufacturer as follows:

- Bühnenmolton B1, manufacturer Tüchler
- material: 100 % cotton

The test laboratory has determined the following parameters:

- area specific mass ca. $m'' = 300 \text{ g/m}^2$
- thickness ca. $t = 1.14 \text{ mm}$

4 Execution of measurements

The airflow resistance was determined according to EN 29053 [1].

The test equipment listed in Appendix B was used for the measurements.

5 Measurement results

The measured airflow resistance are listed in Table 1 below. For further information regarding the measurements, see Appendix A.

Table 1. Airflow resistance

Nr.	designation	airflow resistance $R_s /$ (Pa · s/m)	Appendix A Seite
1	„Bühnenmolton B1“, specimen 1	738	1
2	„Bühnenmolton B1“, specimen 2	778	2
3	„Bühnenmolton B1“, specimen 3	616	3
4	„Bühnenmolton B1“, specimen 4	623	4
5	„Bühnenmolton B1“, specimen 5	777	5
	mean samples 1 – 5	706	-

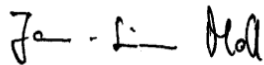
With:

R_s = the specific airflow resistance perpendicular to the sample area

6 Remark

The determined test results only refer to the prevailing conditions on the day of measurements.

This test report may only be published and copied as a whole including all of its appendixes. The publishing of extracts requires the prior written consent of Müller-BBM GmbH.



Jan-Lieven Moll

MÜLLER-BBM

Accredited Testing Laboratory
according to DIN EN ISO/IEC 17025



DGA-PL-2465.10

EN 29053

Determination of Airflow Resistance

Client: TÜCHLER Bühnen- & Textiltechnik GmbH
 Rennbahnweg 78
 1220 Vienna
 Austria

Order Number: M77692

Test Object: Bühnenmolton B1, manufacturer TÜCHLER, specimen 1

Specimen:
 Diameter: 100 mm
 Thickness: 1.14 mm
 Area-related Mass: 300 g/m²

Barometric Pressure:

$B = 95,1 \text{ kPa}$

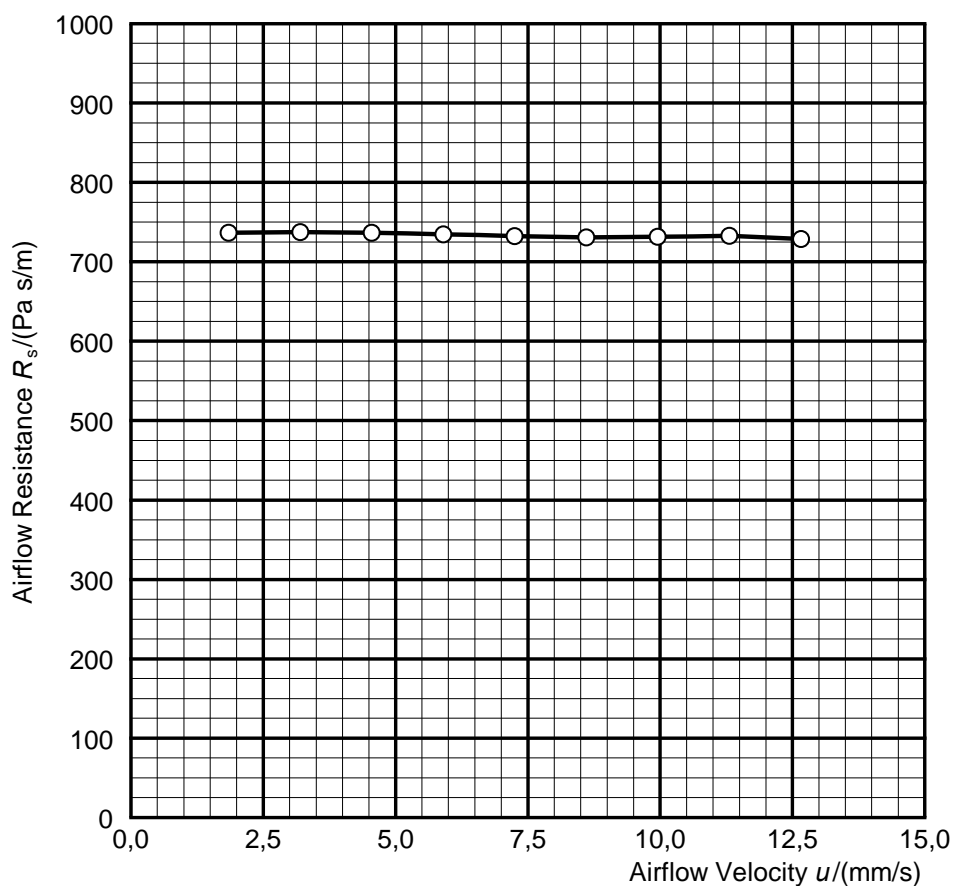
Temperature:

$\theta = 27,2 \text{ °C}$

Relative Humidity:

$r. h. = 39,0 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
1.85	736
3.20	737
4.55	736
5.90	734
7.25	732
8.61	731
9.96	731
11.31	733
12.66	728



Airflow Resistance $R_s = 738 \text{ Pa s/m}$

Laboratory: Planegg
 Personnel: Moll
 Date: 30.08.2011

EN 29053

Determination of Airflow Resistance

Client: TÜCHLER Bühnen- & Textiltechnik GmbH
 Rennbahnweg 78
 1220 Vienna
 Austria

Order Number: M77692

Test Object: Bühnenmolton B1, manufacturer TÜCHLER, specimen 2

Specimen:
 Diameter: 100 mm
 Thickness: 1.14 mm
 Area-related Mass: 300 g/m²

Barometric Pressure:

$B = 95,1 \text{ kPa}$

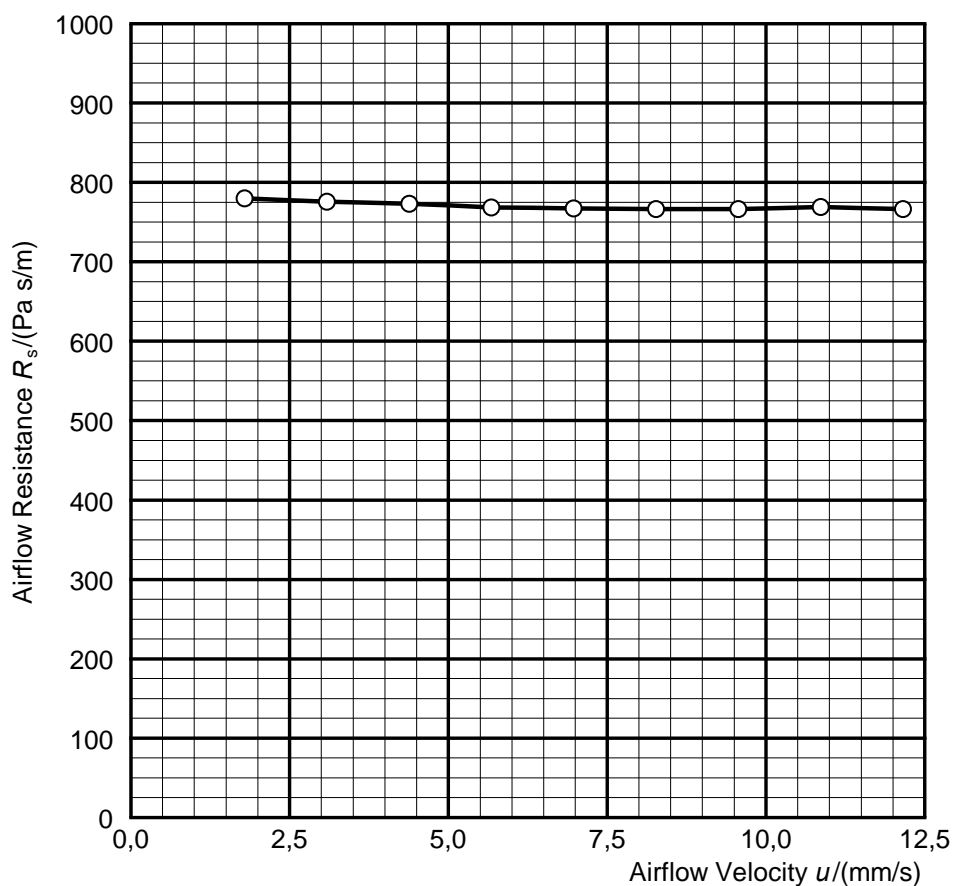
Temperature:

$\theta = 27,2 \text{ °C}$

Relative Humidity:

$r. h. = 39,0 \%$

$u /$ (mm/s)	$R_s /$ (Pa s/m)
1.79	780
3.09	776
4.38	773
5.68	768
6.97	767
8.27	766
9.57	766
10.86	769
12.16	766



Airflow Resistance $R_s = 778 \text{ Pa s/m}$

Laboratory: Planegg
 Personnel: Moll
 Date: 30.08.2011

EN 29053

Determination of Airflow Resistance

Client: TÜCHLER Bühnen- & Textiltechnik GmbH
 Rennbahnweg 78
 1220 Vienna
 Austria

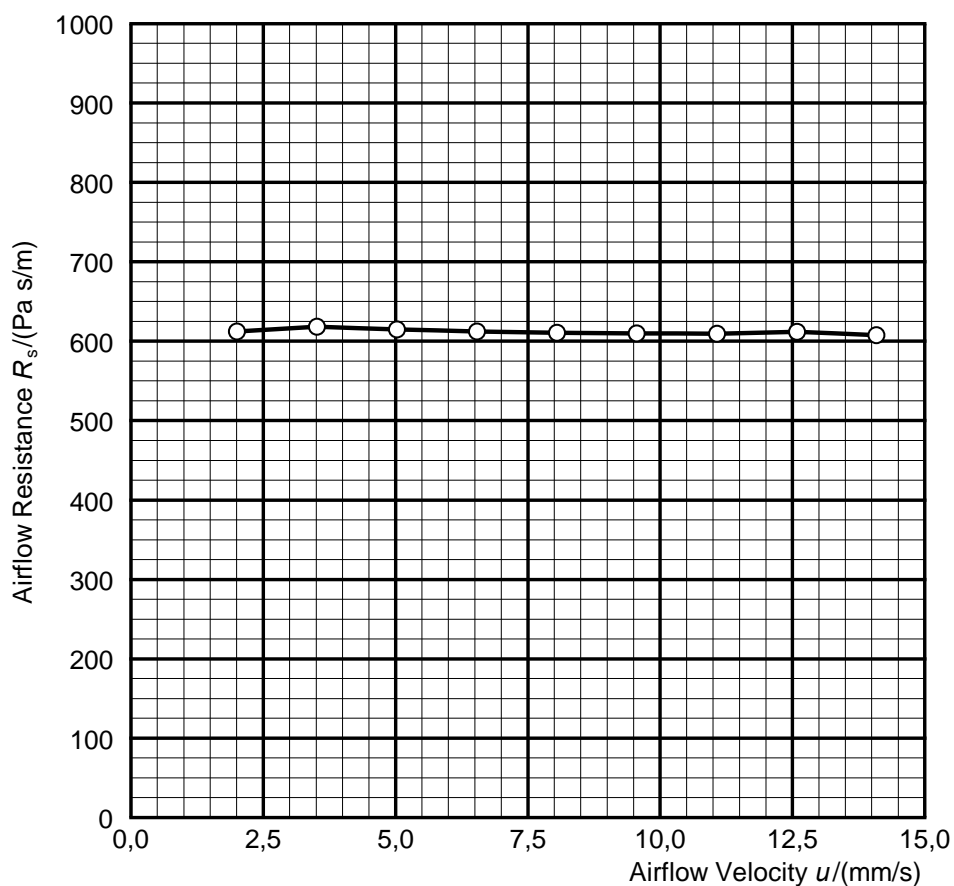
Order Number: M77692

Test Object: Bühnenmolton B1, manufacturer TÜCHLER, specimen 3

Specimen:
 Diameter: 100 mm
 Thickness: 1.14 mm
 Area-related Mass: 300 g/m²

Barometric Pressure:
 $B = 95,1 \text{ kPa}$
 Temperature:
 $\theta = 27,2 \text{ °C}$
 Relative Humidity:
 $r. h. = 39,0 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
2.01	612
3.52	618
5.03	615
6.54	612
8.05	610
9.56	609
11.07	609
12.58	612
14.09	607



Airflow Resistance $R_s = 616 \text{ Pa s/m}$

Laboratory: Planegg
 Personnel: Moll
 Date: 30.08.2011

EN 29053

Determination of Airflow Resistance

Client: TÜCHLER Bühnen- & Textiltechnik GmbH
Rennbahnweg 78
1220 Vienna
Austria

Order Number:

Test Object: Bühnenmolton B1, manufacturer TÜCHLER, specimen 4

Specimen:
Diameter: 100 mm
Thickness: 1.14 mm
Area-related Mass: 300 g/m²

Barometric Pressure:

$B = 95,1 \text{ kPa}$

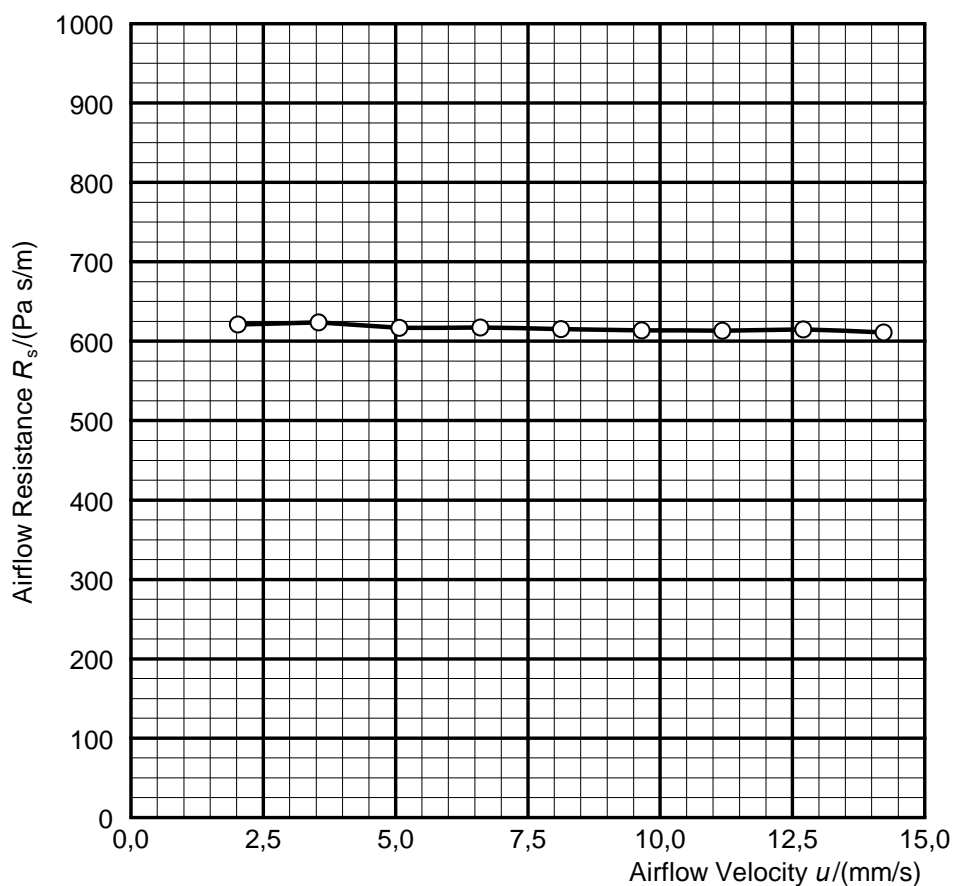
Temperature:

$\theta = 27,3 \text{ °C}$

Relative Humidity:

$r. h. = 39,0 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
2.02	621
3.55	624
5.07	617
6.60	617
8.13	615
9.65	613
11.18	613
12.71	615
14.23	611



Airflow Resistance $R_s = 623 \text{ Pa s/m}$

Laboratory: Planegg
Personnel: Moll
Date: 30.08.2011

EN 29053

Determination of Airflow Resistance

Client: TÜCHLER Bühnen- & Textiltechnik GmbH
 Rennbahnweg 78
 1220 Vienna
 Austria

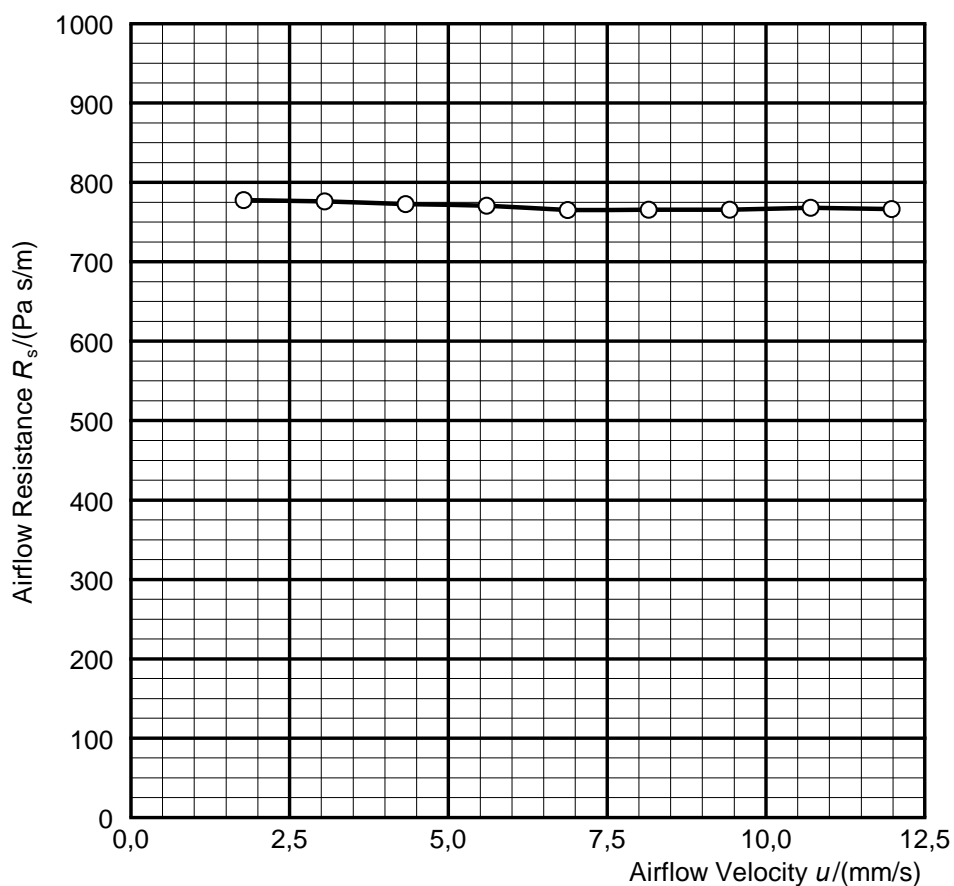
Order Number: M77692

Test Object: Bühnenmolton B1, manufacturer TÜCHLER, specimen 5

Specimen:
 Diameter: 100 mm
 Thickness: 1.14 mm
 Area-related Mass: 300 g/m²

Barometric Pressure:
 $B = 95,0 \text{ kPa}$
 Temperature:
 $\theta = 27,3 \text{ °C}$
 Relative Humidity:
 $r. h. = 39,0 \%$

$u/$ (mm/s)	$R_s/$ (Pa s/m)
1.77	778
3.05	776
4.32	773
5.60	770
6.88	765
8.15	766
9.43	766
10.71	768
11.98	766



Airflow Resistance $R_s = 777 \text{ Pa s/m}$

Laboratory: Planegg
 Personnel: Moll
 Date: 30.08.2011

1 Execution of measurements

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

According to the standard the specific airflow resistance R_s is indicated as measurement result which was determined by extrapolation (linear regression) at an airflow velocity of $u = 0.0005$ m/s.

2 List of test equipment

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

Name	Manufacturer	Type	Serial-No.
Digital Mass Flow Controller	Bronkhorst	E-201CV-5KO-RGD-33V	M8211608A
Digital Power Supply / Readout Systems	Bronkhorst	E-7100-13-01-01-RBB	M8211608B
Differential pressure transmitter with DSCM-A	Halstrup Walcher	P26	M8211704G
Software for data logging and evaluation	Müller-BBM	m ars	v1.0.0.2
Thermo-/Baro-/Hygrometer	Greisinger	GFTB 100	070806
Digital measuring slide	Mitutoyo	CD-15PPR	07019377
Electronic balance	Kern	440-49N	WC0633572