

# Weather Louvre Test

449/225

Carried out for  
Renson Ventilation NV

Report 105079/2

Compiled by Thomas Costello

5 June 2023



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# Weather Louvre Test

449/225

Carried out for: Renson Ventilation NV  
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Maalbeekstraat 6  
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Belgium

Contract: Report 105079/2

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## QUALITY ASSURANCE

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# 1 INTRODUCTION

This report concerns tests conducted on a louvre to determine the Rainwater Penetration and the Pressure Drop versus Airflow Curves, with the associated Coefficient of Entry and Coefficient of Discharge, using the test methods contained within BS EN 13030:2001. It should be noted that BS EN 13030:2001 simply provides a method for testing and rating louvre samples, there are no minimum permitted values or recommendations for louvre performance.

The work was commissioned by Renson Ventilation NV and was carried out at BSRIA North from 3<sup>rd</sup> May to 18<sup>th</sup> May 2023, by Thomas Costello and Samuel Twibill of BSRIA Ltd.

## Items received for test

Test Item	BSRIA ID
449/225	105079A2

## 1.1 TEST ITEM INFORMATION

Contract	105079
Date	1/5/23
Manufacturer	Renson Ventilation NV
Louvre Model	449/225
Material	Aluminium
Painted	No
Core Area Height	900 mm
Core Area Width	991 mm
Blade Pack Depth	220 mm
Frame Depth	230 mm
No. of Blades	4
Blade Pitch	170 mm
Blade Angle	45° approx.
No. of Banks	1
Guard Type	Insect
Guard Spacing	10 mm
Side Channels	No
Water Drip Tray	No
Blade Orientation	Horizontal

**Note:** Weather louvre core area - product of the minimum height H and minimum width W of the front opening in the weather louvre assembly with the louvre blades removed.  
Blade Pack Depth refers to the distance from front of first bank to rear of last bank.

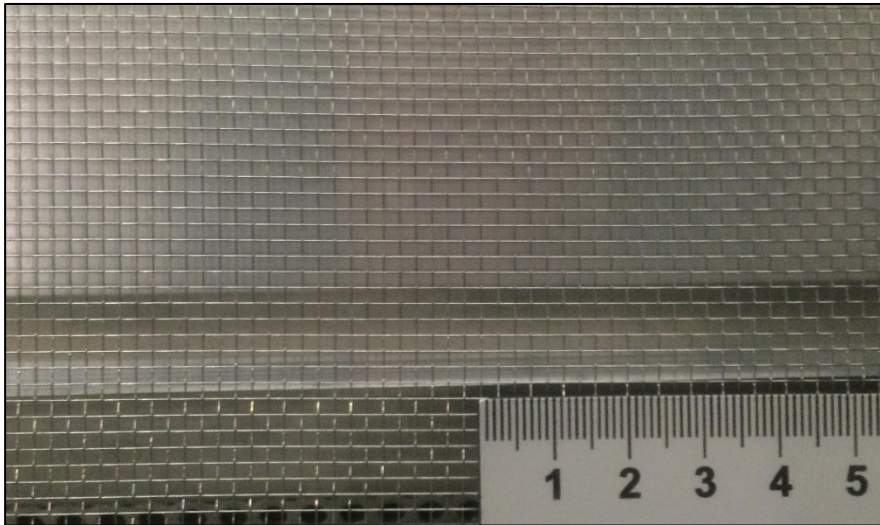
**Figure 1 Test item 105079A2 (front)**



**Figure 2 Test item 105079A2 (rear)**

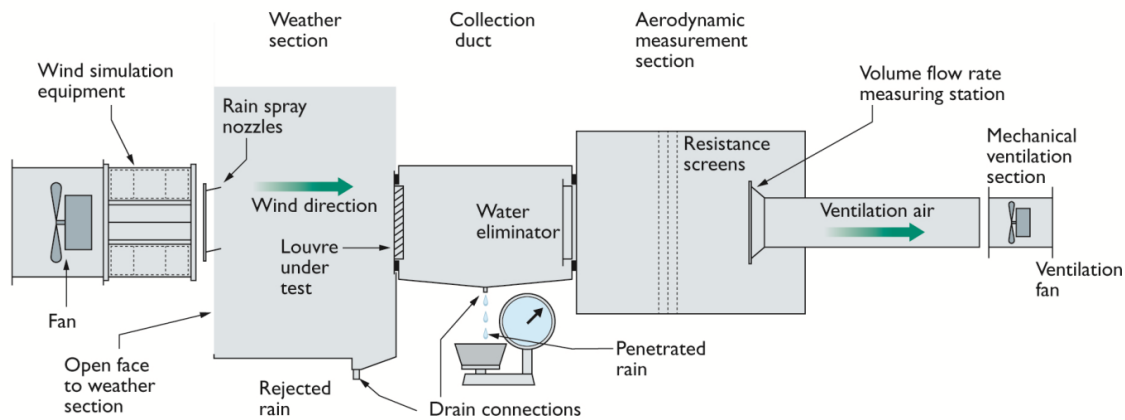


**Figure 3** Test item 105079A2 (close-up of guard)



## 2 TEST METHOD

A schematic representation of the rig used during testing



The test comprises of two parts:

### 2.1 WATER PENETRATION

The weather louvre is subjected to fan driven wind at a speed of 13 m/s and water sprayed as rainfall at a rate of 75 l/h (+10% / -0%). In addition to the simulated wind and rain, air is drawn through the louvre at various set velocities (0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0 and 3.5 m/s).

Each test is preceded by a suitable 'pre-test' soak which is typically around 30 minutes. Each test is run until the results become stable, and in any case, for a minimum of 30 minutes.

The penetrated water is collected in the collection duct and is measured and recorded against time elapsed. A range of measurements are taken to give the characteristic curve for the test louvre.

### 2.2 PRESSURE DROP

For this test, the Aerodynamic Measuring Section (AMS) is separated from the main rig. The louvre is then mounted in the upstream opening of the AMS.

Pressure tapings in the plenum walls of the AMS allow measurement of the static pressure within the plenum during testing. The airflow volume is calculated from the differential pressure at the measuring cones. The plenum has a set of settling screens within to produce even flow through the cones and therefore gives an accurate reading of the total volume.

By adjusting the fan speed, the total airflow through the system varies and therefore changes the pressure on the louvre under test. A range of measurements are taken to give the characteristic curve for the test louvre.

### 2.3 TEST EQUIPMENT USED

Test equipment	BSRIA ID	Calibration Expiry Date
Rain measuring system	353	19-12-23
Airflow cones	364	18-12-23
Fan	484	19-12-23
Scales (water)	1599	26-05-23
Micromanometer	1600	24-11-23
Micromanometer	1601	24-11-23
Temperature and Pressure Gauge	1605	10-10-23
Flow meter	1533	05-05-23
Water supply measurement	1749	20-12-23

### 3 RESULTS

#### 3.1 RAINWATER PENETRATION

Manufacturer Renson Ventilation NV

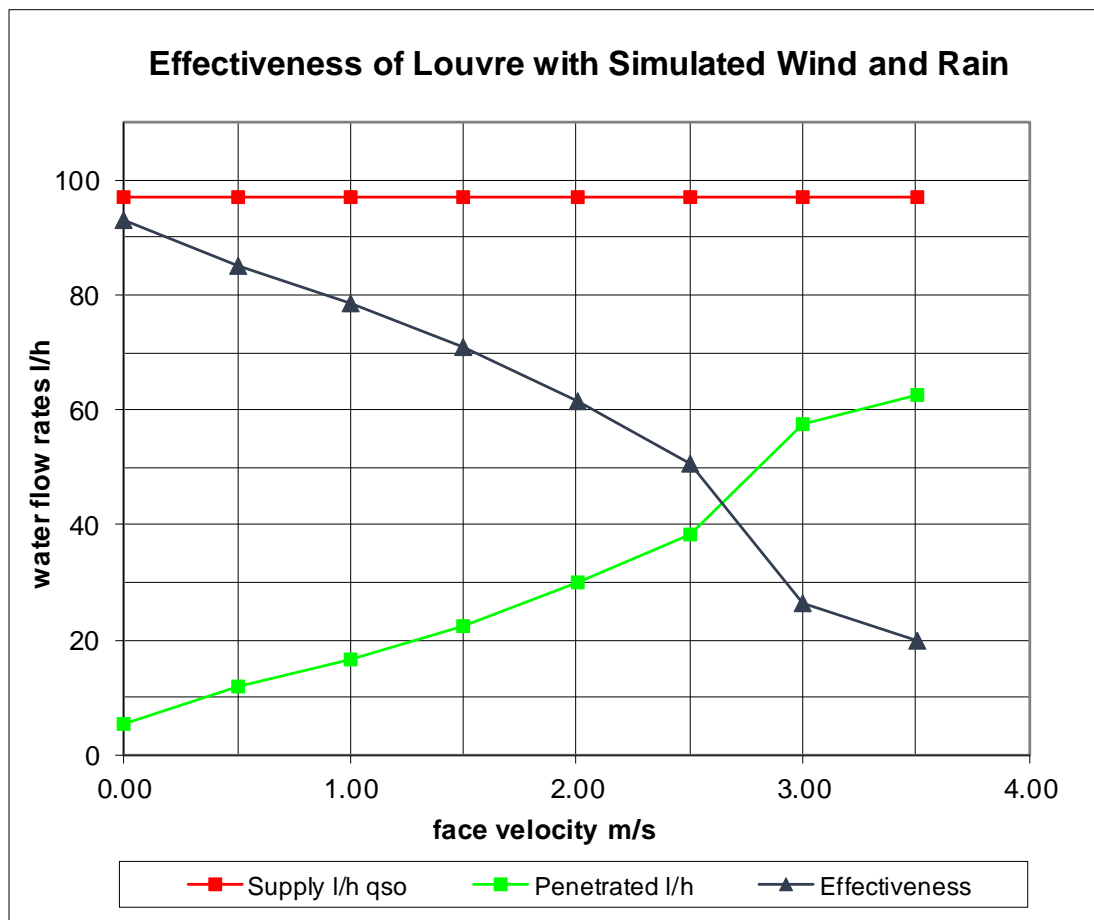
Date 03/05/2023

Model 449/225

Contract 105079

Simulated Rainfall	75 (+10% / -0%)	mm/hr	Core Area Height	900	mm
Wind Speed	13 (+/-10%)	m/s	Core Area Width	991	mm
			Core Area Area	0.892	m <sup>2</sup>

Ventilation Rate		Water Flow Rates		Effectiveness %	Class
Volume m <sup>3</sup> /s	Velocity m/s	Supply l/h	Penetrated l/h		
0.00	0.00	97.2	5.3	93.2	C
0.45	0.50	97.2	11.7	84.9	C
0.89	1.00	97.2	16.6	78.6	D
1.34	1.50	97.2	22.5	71.0	D
1.79	2.00	97.2	29.9	61.7	D
2.23	2.50	97.2	38.5	50.6	D
2.68	3.00	97.2	57.7	26.5	D
3.12	3.50	97.2	62.5	19.8	D



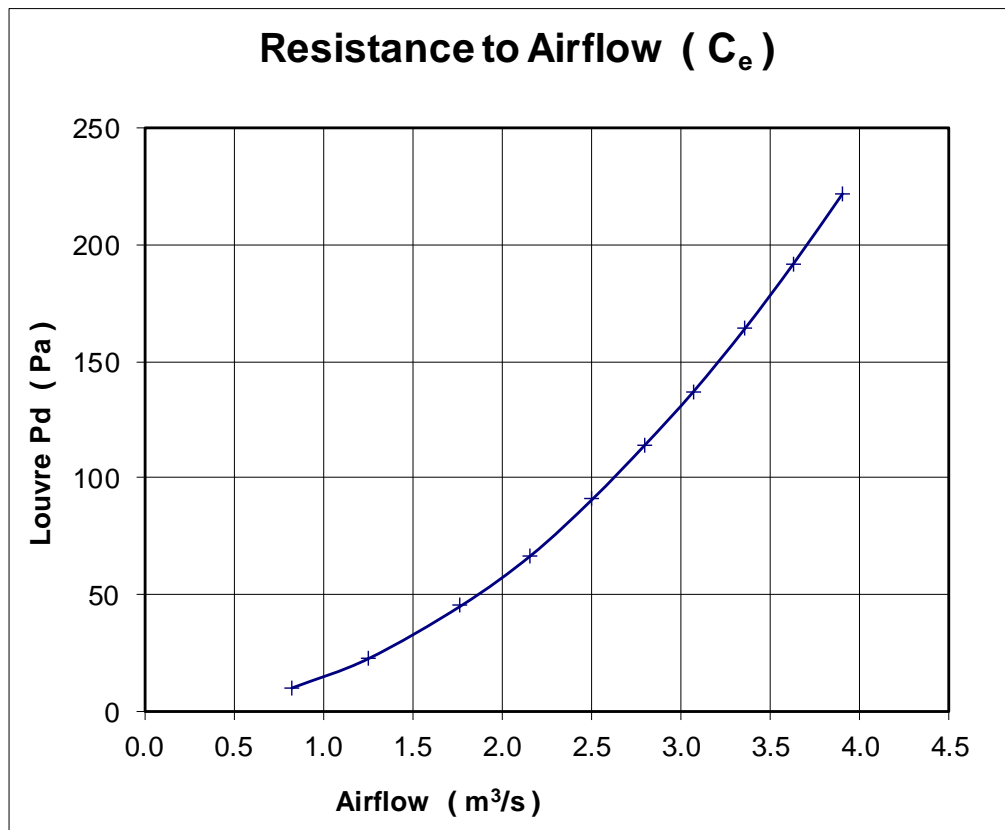
### 3.2 COEFFICIENT OF ENTRY

Manufacturer Renson Ventilation NV  
Model 449/225

Date 18/05/2023  
Contract 105079

Air Temperature	18.6 °C	Core Area Height	900 mm
Barometer	1022.8 mbar	Core Area Width	991 mm
Air Density	1.216 kg/m <sup>3</sup>	Core Area Area	0.892 m <sup>2</sup>

Louvre p.d. Pa	Louvre Face Velocity	Air Flow Rate		Coefficient C <sub>e</sub>
	m/s	Test m <sup>3</sup> /s	Theoretical m <sup>3</sup> /s	
10.0	0.92	0.819	3.617	0.226
22.6	1.40	1.249	5.437	0.230
45.3	1.98	1.769	7.697	0.230
66.9	2.42	2.161	9.354	0.231
91.0	2.81	2.505	10.910	0.230
114.0	3.14	2.797	12.211	0.229
137.0	3.44	3.071	13.386	0.229
164.0	3.77	3.359	14.646	0.229
192.0	4.07	3.633	15.847	0.229
222.0	4.38	3.908	17.040	0.229
Mean C <sub>e</sub>				0.229
Class				3



A 'trendline' for the above graph would follow  $y = 14.657x^{1.9904}$

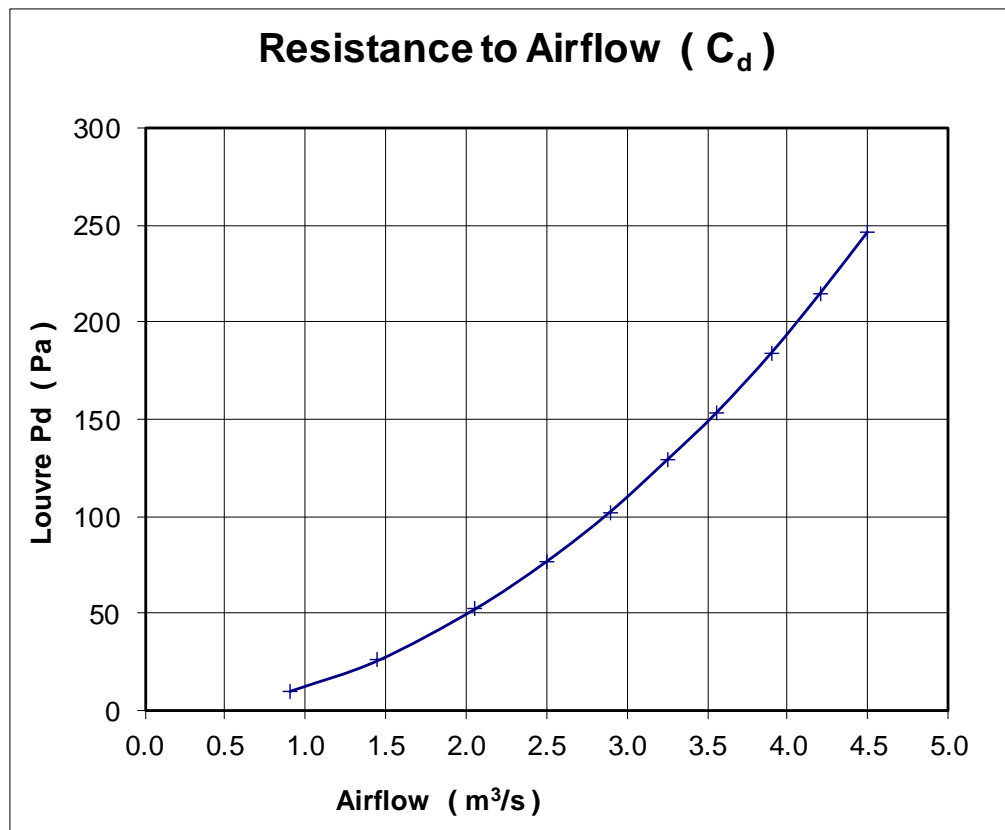
### 3.3 COEFFICIENT OF DISCHARGE

Manufacturer Renson Ventilation NV  
Model 449/225

Date 18/05/2023  
Contract 105079

Air Temperature	118.9 °C	Core Area Height	900 mm
Barometer	1022.6 mbar	Core Area Width	991 mm
Air Density	0.905 kg/m <sup>3</sup>	Core Area Area	0.892 m <sup>2</sup>

Louvre p.d. Pa	Louvre Face Velocity	Air Flow Rate		Coefficient C <sub>d</sub>
	m/s	Test m <sup>3</sup> /s	Theoretical m <sup>3</sup> /s	
10.0	1.02	0.907	4.193	0.216
25.6	1.62	1.448	6.709	0.216
51.9	2.30	2.051	9.552	0.215
76.8	2.81	2.506	11.620	0.216
102.0	3.25	2.897	13.391	0.216
129.0	3.65	3.256	15.060	0.216
153.0	3.99	3.560	16.401	0.217
184.0	4.38	3.905	17.986	0.217
215.0	4.72	4.213	19.442	0.217
246.0	5.05	4.503	20.797	0.217
Mean C <sub>d</sub>				0.216
Class				3



A 'trendline' for the above graph would follow  $y = 12.241x^{1.9936}$

APPENDIX A: MANUFACTURER’S DRAWING

