Weather Louvre Test

448/300

Carried out for

Renson Ventilation NV

Report 105079/1

Compiled by Thomas Costello

5 June 2023

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Weather Louvre Test

448/300

Carried out for: Renson Ventilation NV
Industriezone 2, Vijerdam
Maalbeekstraat 6
Waregem
8790
Belgium

Contract: Report 105079/1

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QUALITY ASSURANCE

Issue	Date	Compiled by:	Approved by:	Signature
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		Senior Technician	*Technical Operations Manager*	

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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 2nd May to 18th May 2023, by Thomas Costello and Samuel Twibill of BSRIA Ltd.

Items received for test

Test Item	BSRIA ID
448/300	105079A1

1.1 TEST ITEM INFORMATION

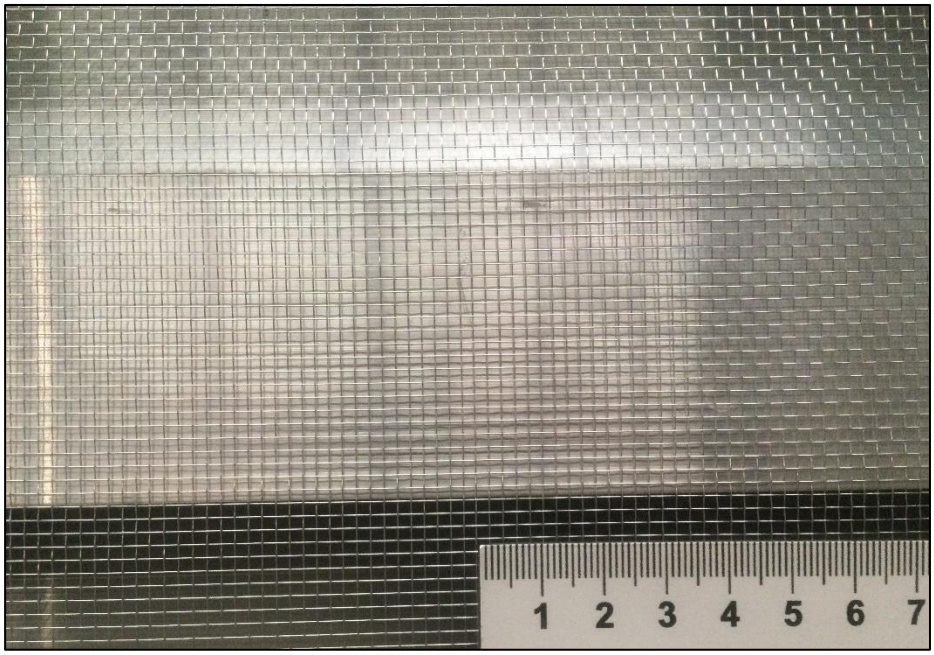
Contract		105079
Date		1/5/23
Manufacturer		Renson Ventilation NV
Louvre Model		448/300
Material		Aluminium
Painted		No
Core Area Height		974 mm
Core Area Width		974 mm
Blade Pack Depth		300 mm
Frame Depth		305 mm
No. of Blades		7
Blade Pitch		150 mm
Blade Angle		45° approx.
No. of Banks		2
Guard Type		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 105079A1 (front)

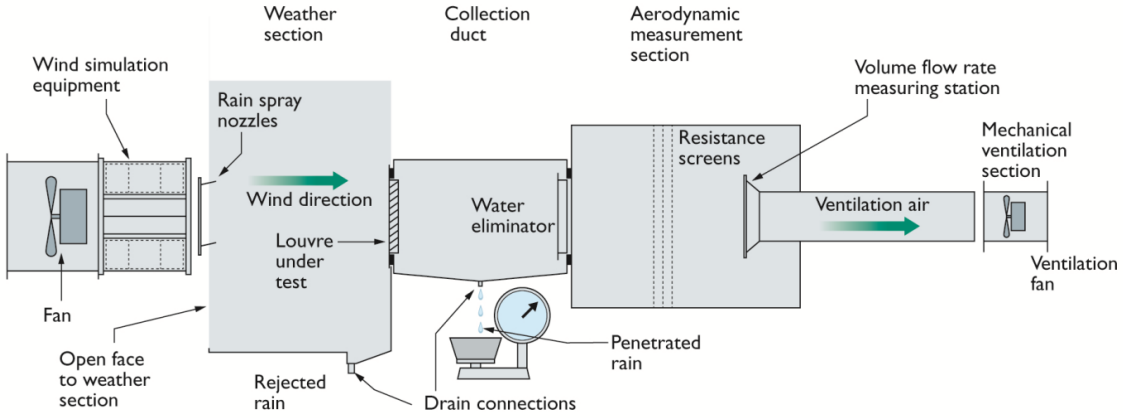
Figure 2 Test item 105079A1 (rear)

Figure 3 Test item 105079A1 (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 tappings 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

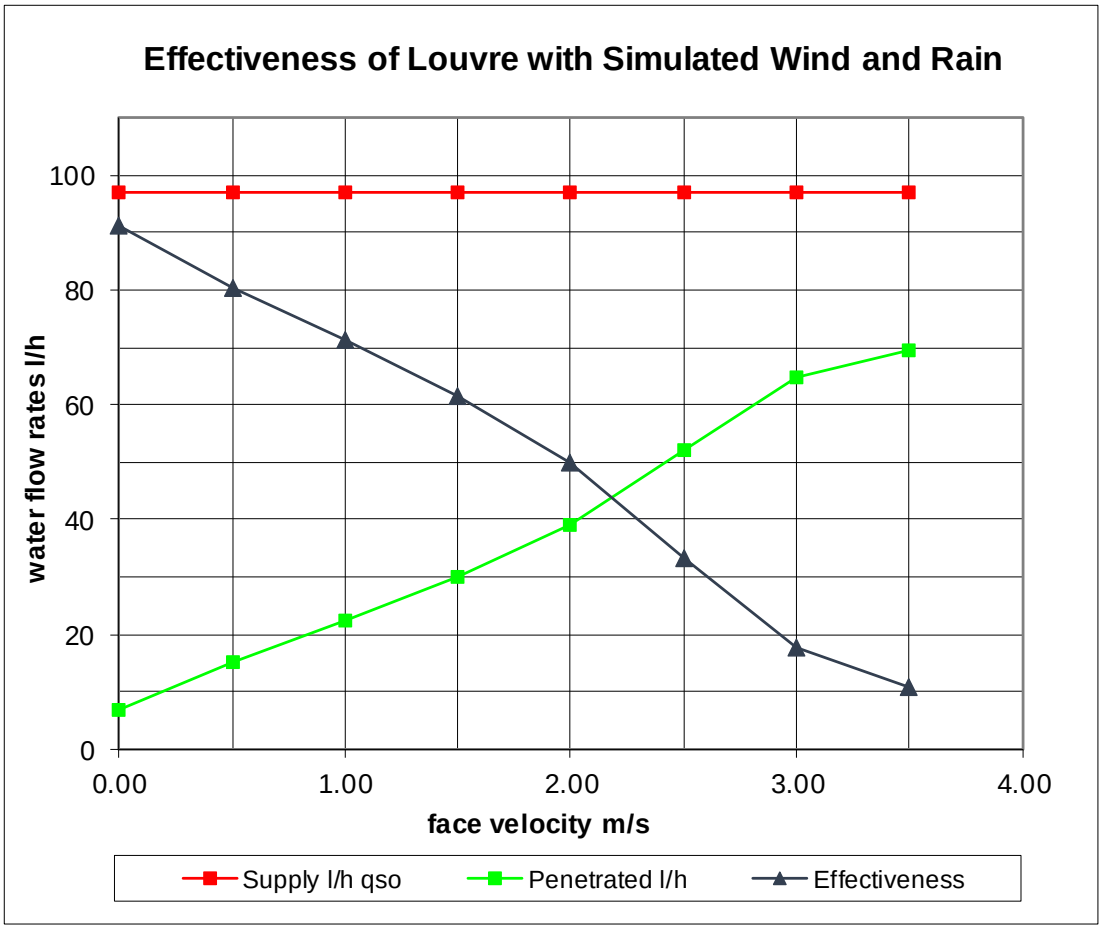
3.1 RAINWATER PENETRATION

Manufacturer Renson Ventilation NV
Model 448/300

Date 02/05/2023
Contract 105079

			Core Area Height	974	mm
Simulated Rainfall	75 (+10% / -0%)	mm/hr	Core Area Width	974	mm
Wind Speed	13 (+/-10%)	m/s	Core Area Area	0.949	m^2

Ventilation Rate		Water Flow Rates		Effectiveness	Class
Volume m^3/s	Velocity m/s	Supply l/h	Penetrated l/h	%	
0.00	0.00	97.2	6.9	91.2	C
0.47	0.50	97.2	15.3	80.4	C
0.95	1.00	97.2	22.4	71.3	D
1.42	1.50	97.2	29.9	61.6	D
1.90	2.00	97.2	39.0	50.0	D
2.37	2.50	97.2	52.0	33.3	D
2.84	3.00	97.2	64.8	17.5	D
3.32	3.50	97.2	69.6	10.8	D



3.2 COEFFICIENT OF ENTRY

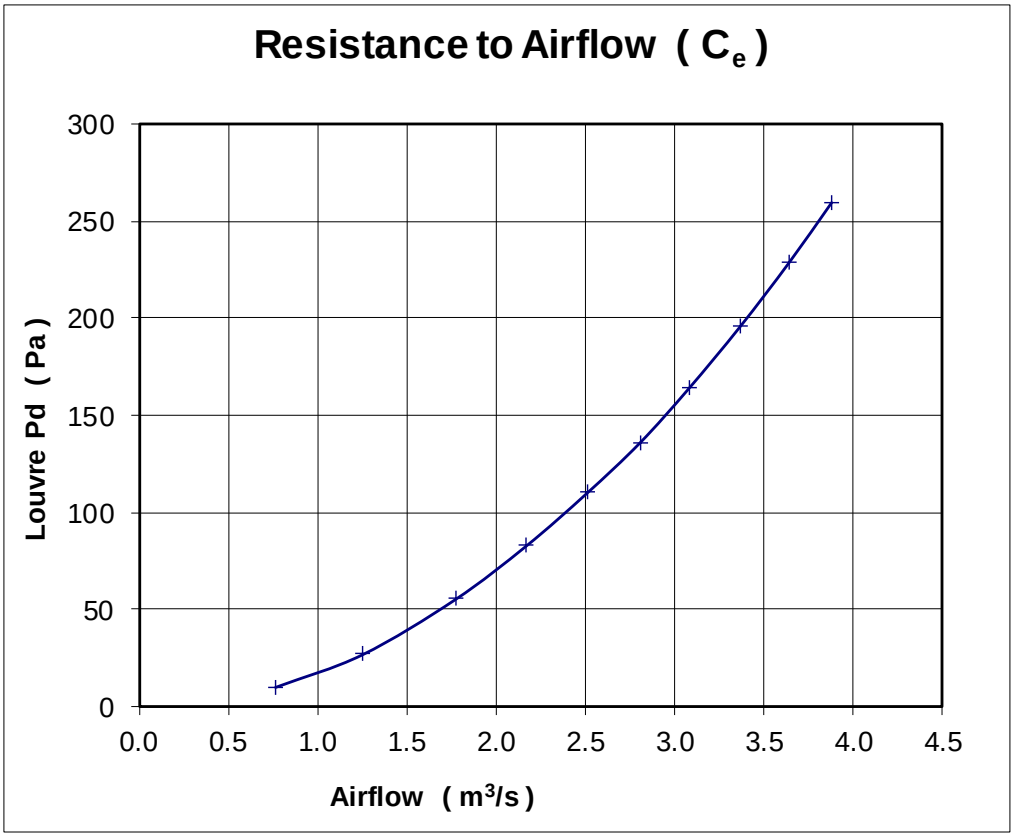
Manufacturer Renson Ventilation NV
Model 448/300

Date 18/05/2023
Contract 105079

Air Temperature	19.3	°C	Core Area Height	974	mm
Barometer	1022.5	mbar	Core Area Width	974	mm
Air Density	1.213	kg/m^3	Core Area Area	0.949	m^2

	Louvre Face Velocity	Air Flow Rate		
Louvre p.d. Pa	m/s	Test m^3/s	Theoretical m^3/s	Coefficient C_e
10.0	0.81	0.765	3.852	0.199
26.8	1.32	1.252	6.306	0.198
55.2	1.87	1.771	9.050	0.196
83.0	2.29	2.171	11.097	0.196
110.0	2.64	2.509	12.775	0.196
136.0	2.96	2.806	14.205	0.198
164.0	3.25	3.080	15.599	0.197
196.0	3.55	3.368	17.053	0.198
229.0	3.84	3.643	18.433	0.198
260.0	4.09	3.881	19.641	0.198

Mean C_e	0.197
Class	4



A 'trendline' for the above graph would follow $y = 17.248x^{2.0051}$

3.3 COEFFICIENT OF DISCHARGE

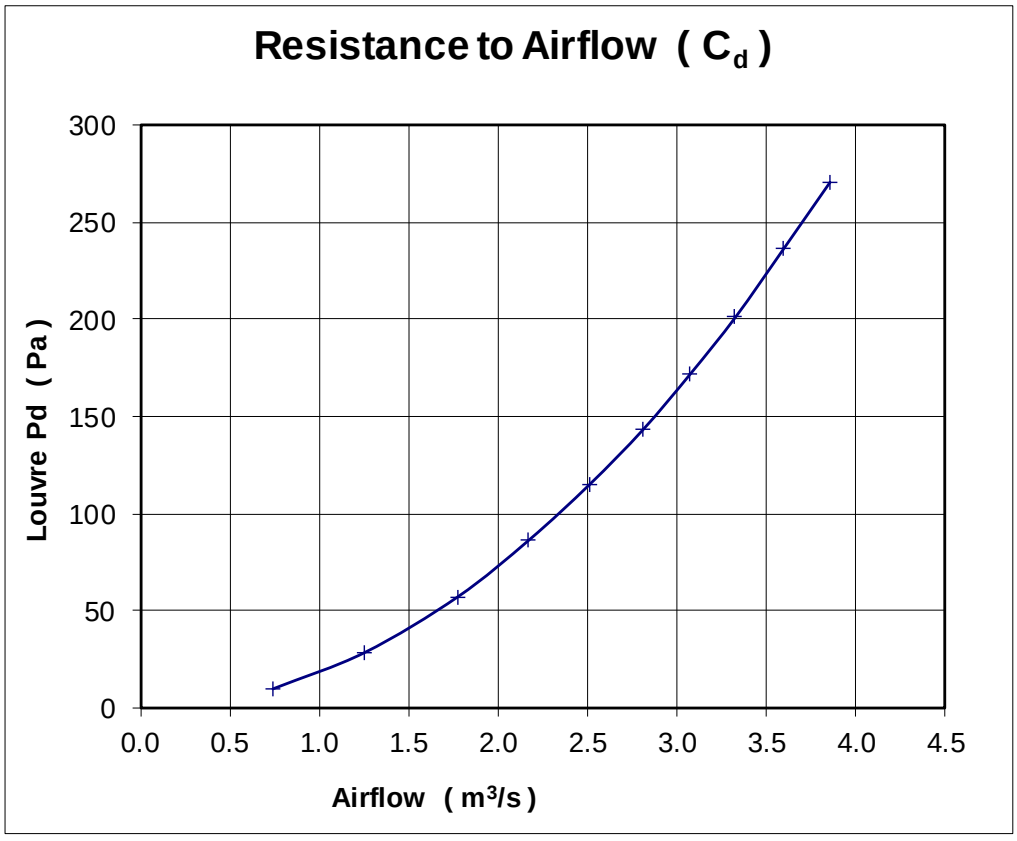
Manufacturer Renson Ventilation NV
Model 448/300

Date 18/05/2023
Contract 105079

Air Temperature	19.4	°C	Core Area Height	974	mm
Barometer	1022.5	mbar	Core Area Width	974	mm
Air Density	1.213	kg/m^3	Core Area Area	0.949	m^2

	Louvre Face Velocity	Air Flow Rate		
Louvre p.d. Pa	m/s	Test m^3/s	Theoretical m^3/s	Coefficient C_d
10.0	0.78	0.736	3.853	0.191
28.7	1.32	1.251	6.527	0.192
57.3	1.87	1.771	9.222	0.192
86.6	2.29	2.172	11.337	0.192
115.0	2.64	2.509	13.065	0.192
143.0	2.96	2.807	14.569	0.193
172.0	3.24	3.075	15.978	0.192
201.0	3.51	3.327	17.272	0.193
236.0	3.79	3.595	18.716	0.192
270.0	4.06	3.853	20.019	0.192

Mean C_d	0.192
Class	4



A 'trendline' for the above graph would follow $y = 18.401x^{1.9909}$

APPENDIX A: MANUFACTURER'S DRAWING