Weather Louvre Test

411/414/431 - L.033.01 no water gutter no mesh

Carried out for

Renson Ventilation NV

Report 101758/1

Compiled by Paul Ainscoe

14 May 2020

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411/414/431 - L.033.01 no water gutter no mesh

Carried out for: Renson Ventilation NV
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Contract: Report 101758/1

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QUALITY ASSURANCE

Issue	Date	Compiled by:	Approved by:	Signature
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		Technician	*Principal Test Engineer*	

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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 4 to 5 May 2020.

Items received for test

Test Item	BSRIA ID
411/414/431 - L.033.01 no water gutter no mesh	101758A1

1.1 TEST ITEM INFORMATION

Contract		101758
Date		21/Apr/2020
Manufacturer		Renson Ventilation NV
Louvre Model		411/414/431 - L.033.01 no water gutter no mesh
Material		Aluminium
Painted		Yes
Core Area Height		965 mm
Core Area Width		1000 mm
Blade Pack Depth		20 mm
Frame Depth		35 mm
No. of Blades		29
Blade Pitch		33 mm
Blade Angle		45° approx.
No. of Banks		1
Guard Type		None
Side Channels		No
Water Drip Tray		No
Blade Orientation		Horizontal

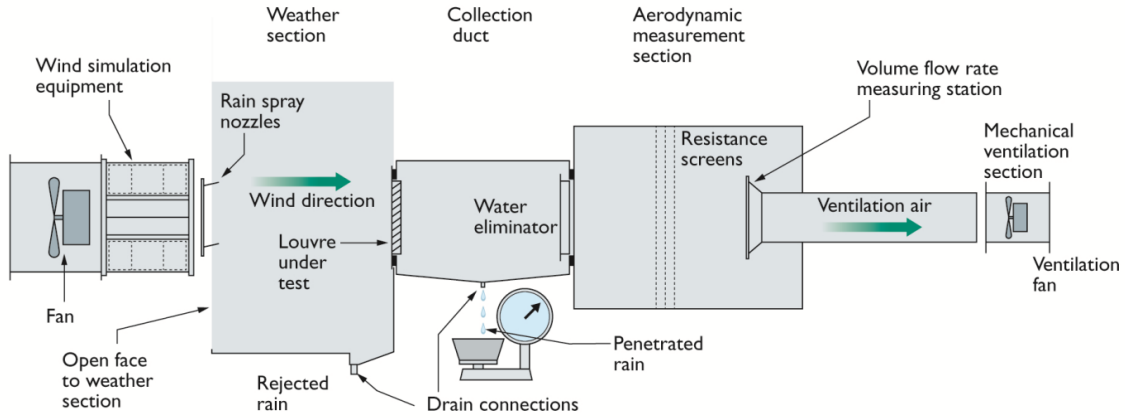
Note: Weather louvre core area - product of the minimum height H and minimum width W of the front opening in the weather louvre assembly with the louvre blades removed.
Blade Pack Depth refers to the distance from front of first bank to rear of last bank.

Figure 1 Test item 101758A1 (front)

Figure 2 Test item 101758A1 (rear)

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	19-12-20
Airflow cones	364	24-01-21
Fan	484	19-12-20
Flow meter	1688	17-06-20
Scales (water)	1599	15-05-20
Micromanometer	1600	19-12-20
Micromanometer	1601	19-12-20
Temperature and Pressure Gauge	1605	31-07-20
Water supply measurement	1749	20-12-20

3 RESULTS

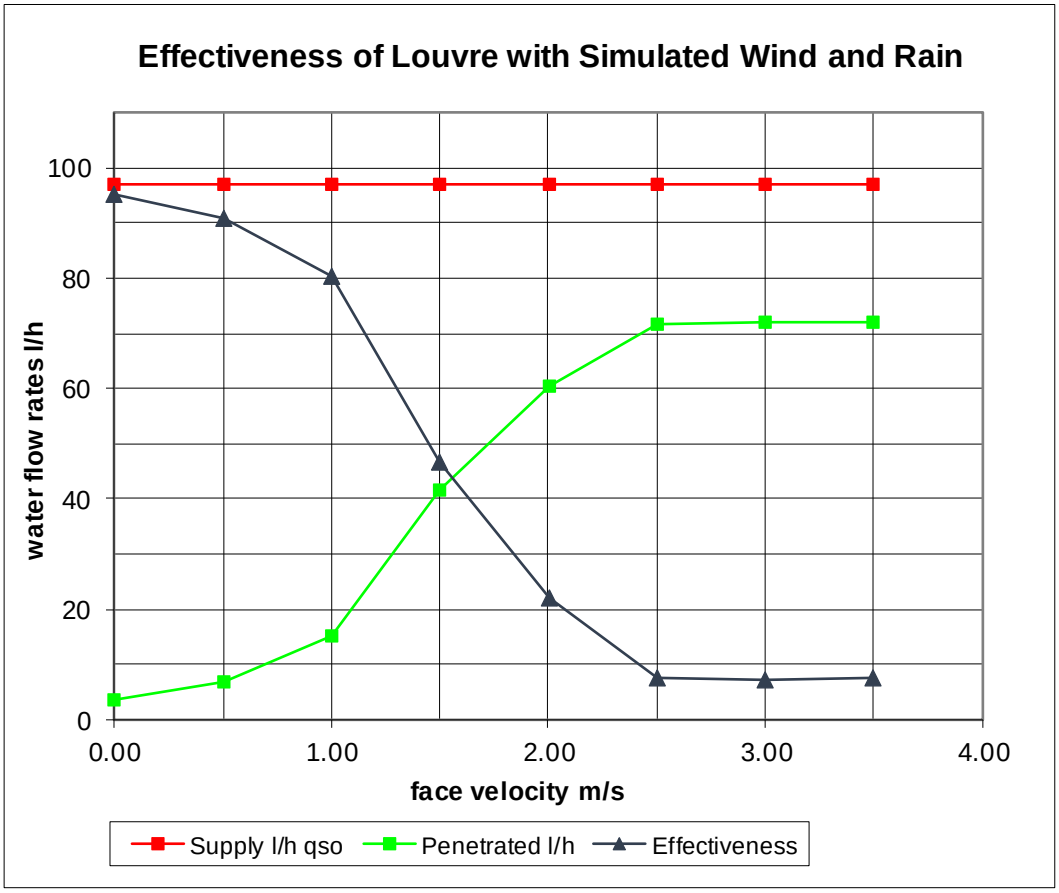
3.1 RAINWATER PENETRATION

Manufacturer Renson Ventilation NV Date 04/05/2020

Model 411/414/431 - L.033.01 no water gutter no mesh Contract 101758

			Core Area Height	965	mm
Simulated Rainfall	75 (+10% / -0%)	mm/hr	Core Area Width	1000	mm
Wind Speed	13	m/s	Core Area Area	0.965	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	3.6	95.3	B
0.48	0.50	97.2	7.0	91.0	C
0.96	1.00	97.2	15.2	80.5	C
1.45	1.50	97.2	41.5	46.6	D
1.93	2.00	97.2	60.5	22.0	D
2.41	2.50	97.2	71.8	7.4	D
2.89	3.00	97.2	72.1	7.3	D
3.38	3.50	97.2	72.1	7.5	D

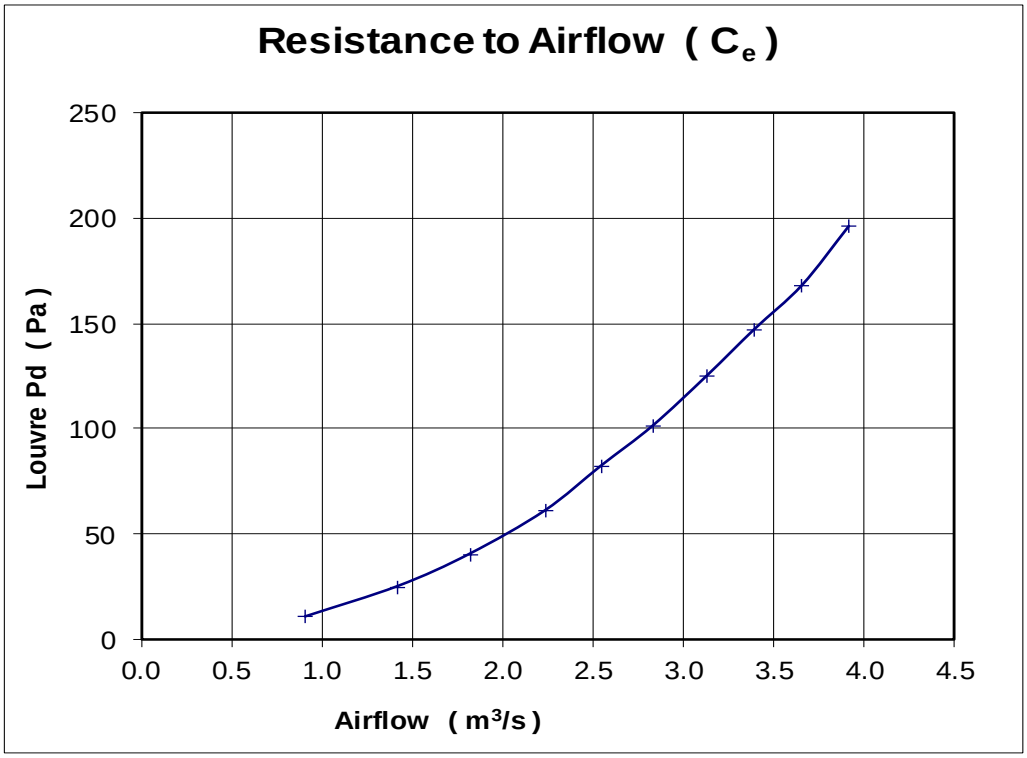


3.2 COEFFICIENT OF ENTRY

Manufacturer Renson Ventilation NV Date 05/05/2020
Model 411/414/431 - L.033.01 no water gutter no mesh Contract 101758

Air Temperature	14	°C	Core Area Height	965	mm
Barometer	1017.8	mbar	Core Area Width	1000	mm
Air Density	1.230	kg/m^3	Core Area Area	0.965	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
10.4	0.94	0.910	3.969	0.229
24.9	1.48	1.423	6.141	0.232
40.2	1.89	1.820	7.802	0.233
60.7	2.32	2.235	9.588	0.233
82.1	2.64	2.547	11.150	0.228
101.0	2.93	2.832	12.367	0.229
125.0	3.25	3.134	13.758	0.228
147.0	3.52	3.396	14.920	0.228
168.0	3.79	3.661	15.950	0.229
196.0	4.06	3.919	17.228	0.227
			Mean C_e	0.230
			Class	3



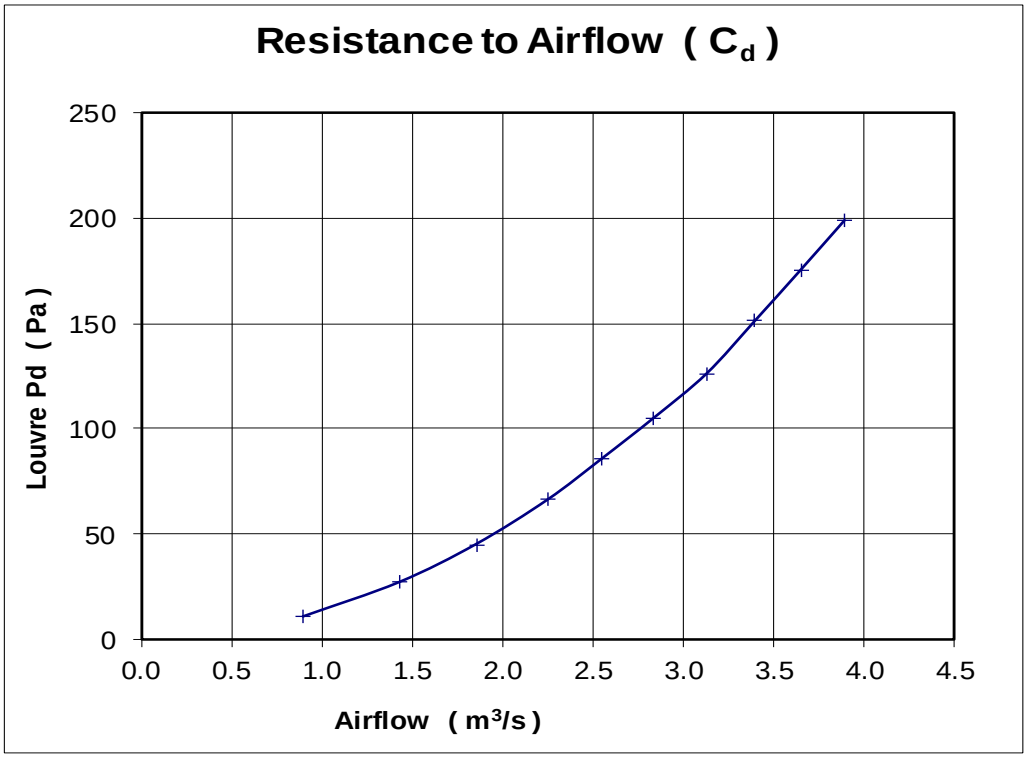
A 'trendline' for the above graph would follow $y = 12.301x^{2.0199}$

3.3 COEFFICIENT OF DISCHARGE

Manufacturer Renson Ventilation NV
Model 411/414/431 - L.033.01 no water gutter no mesh
Date 05/05/2020
Contract 101758

Air Temperature	14.4	°C	Core Area Height	965	mm
Barometer	1017.7	mbar	Core Area Width	1000	mm
Air Density	1.228	kg/m^3	Core Area Area	0.965	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
10.5	0.93	0.893	3.991	0.224
26.8	1.48	1.426	6.375	0.224
45.0	1.92	1.855	8.261	0.225
66.1	2.33	2.250	10.012	0.225
85.5	2.64	2.549	11.387	0.224
105.0	2.94	2.839	12.619	0.225
126.0	3.25	3.132	13.824	0.227
151.0	3.52	3.399	15.133	0.225
175.0	3.78	3.651	16.291	0.224
199.0	4.04	3.898	17.373	0.224
			Mean C_d	0.225
			Class	3



A 'trendline' for the above graph would follow $y = 13.159x^{1.9931}$

APPENDIX A: MANUFACTURER'S DRAWING