Weather Louvre Test

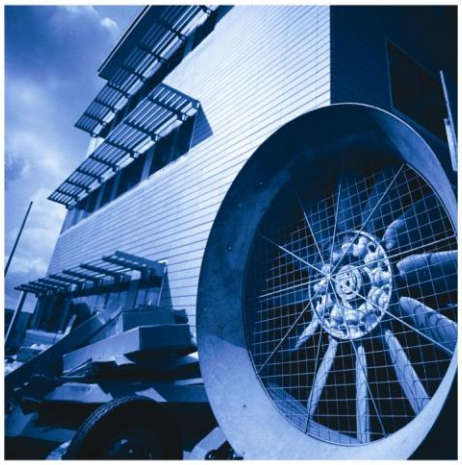
481/L.050HF

Final Report 60554/3

Carried out for
nv RENSON Sunprotection-Projects sa

By Andrew Freeth

27 November 2018



Weather Louvre Test 481/L.050HF

Carried out for:

nv RENSON Sunprotection-Projects sa
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Belgium

Contract: **Final Report 60554/3**

Date: **27 November 2018**

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APPENDICES

FIGURES

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 Coefficients of Discharge and Entry, using the test methods contained within 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 nv RENSON Sunprotection-Projects sa and was carried out at BSRIA North, Preston on 9 – 13 October 2017.

Items received for test

Test Item	BSRIA ID
481/L.050HF	60554A3

1.1 TEST ITEM INFORMATION

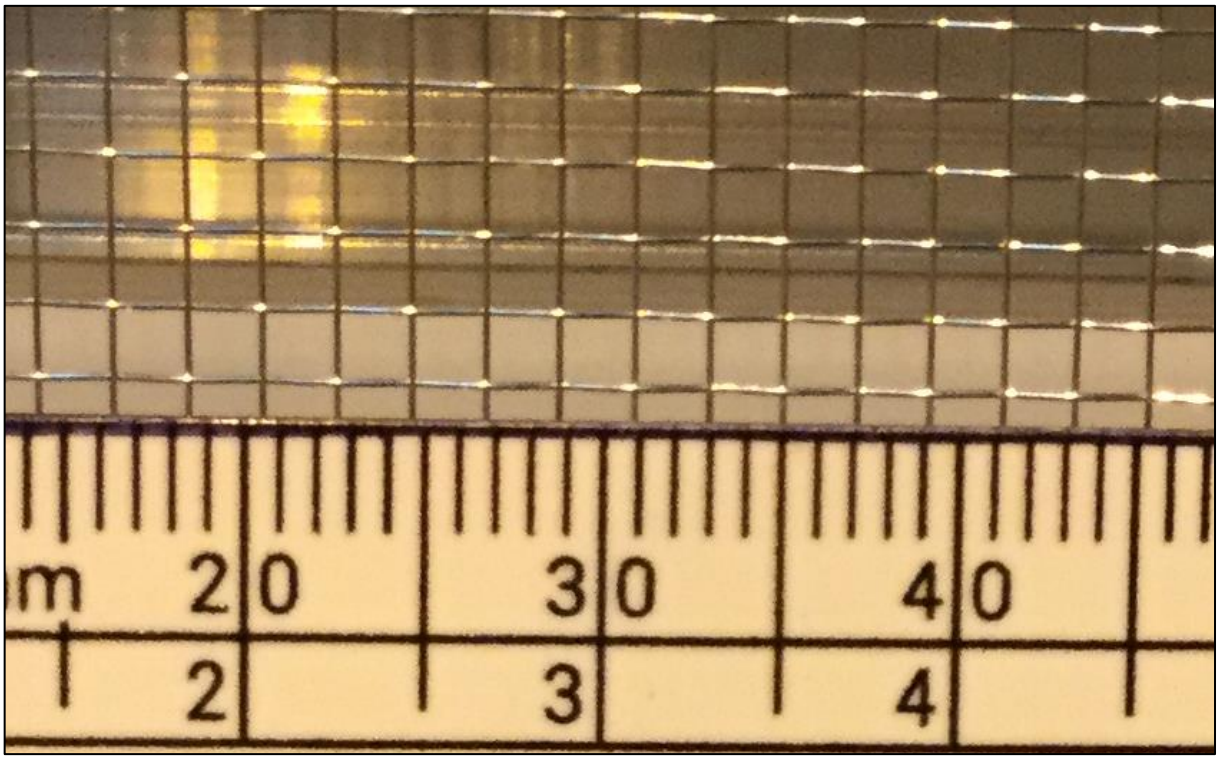
Contract		60554
Date		9-10-17
Manufacturer		nv RENSON Sunprotection-Projects sa
Louvre Model		481/L.050HF
Material		Aluminium
Painted		No
Core Area Height		960 mm
Core Area Width		980 mm
Blade Pack Depth		40 mm
Frame Depth		55 mm
No. of Blades		19
Blade Pitch		50 mm
Blade Angle		45º approx.
No. of Banks		1
Guard Type		Insect
Guard Spacing		10 mm
Side Channels		No
Water Drip Tray		Yes
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 60554A3 (front)

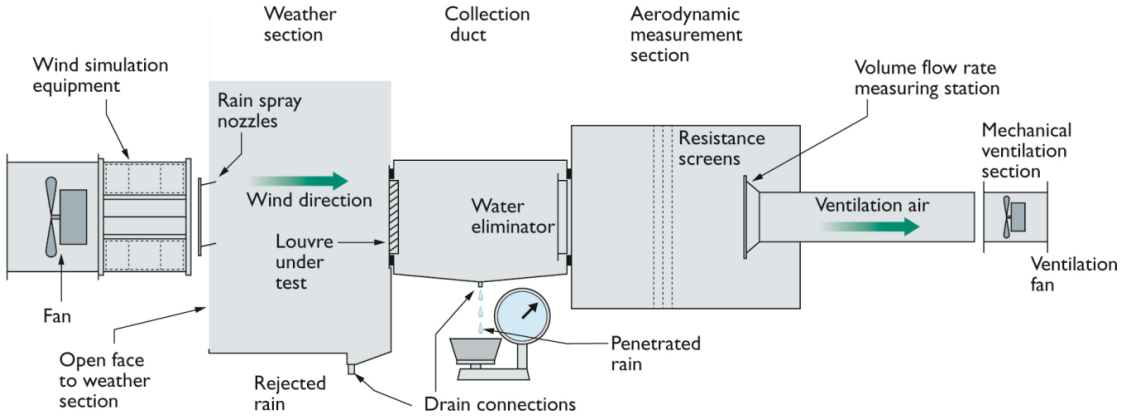
Figure 2 Test item 60554A3 (rear)

Figure 3 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. 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
Water supply measurement	352	24-4-18
Rain measuring system	353	24-4-18
Airflow cones	364	7-1-19
Micromanometer	1600	24-6-18
Micromanometer	1601	24-6-18
Scales (water)	1599	20-6-18
Flow meter	1533	9-6-18

3 RESULTS

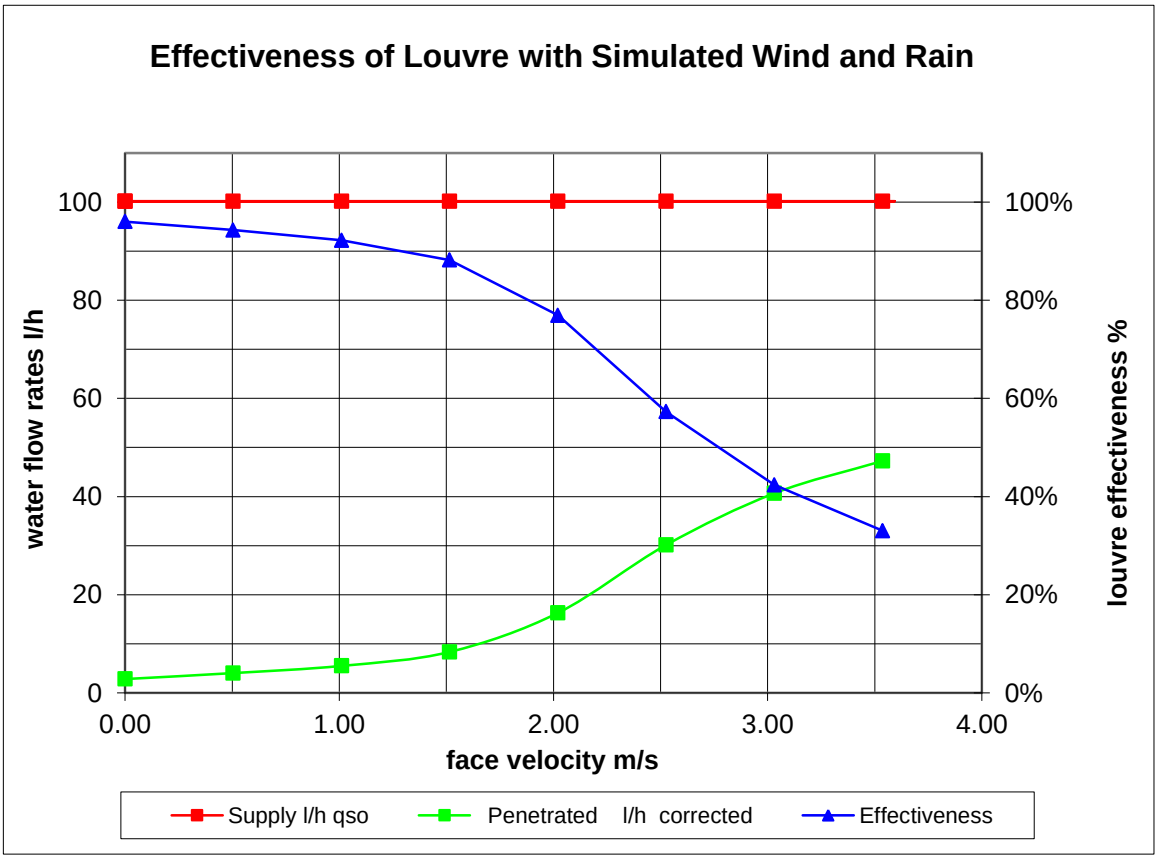
3.1 RAINWATER PENETRATION

MANUFACTURER nv RENSON Sunprotection-Projects sa Date 09/10/2017
MODEL 481/L.050HF Contract 60554

Simulated rainfall 75 mm/hr
Wind speed 13.0 m/s

louvre height 960 mm
louvre width 980 mm
louvre area 0.941 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	100.2	2.8	96.0%	B
0.47	0.50	100.2	4.0	94.3%	C
0.95	1.01	100.2	5.5	92.2%	C
1.43	1.52	100.2	8.3	88.2%	C
1.90	2.02	100.2	16.3	76.9%	D
2.38	2.53	100.2	30.1	57.3%	D
2.85	3.03	100.2	40.7	42.4%	D
3.33	3.54	100.2	47.3	33.0%	D

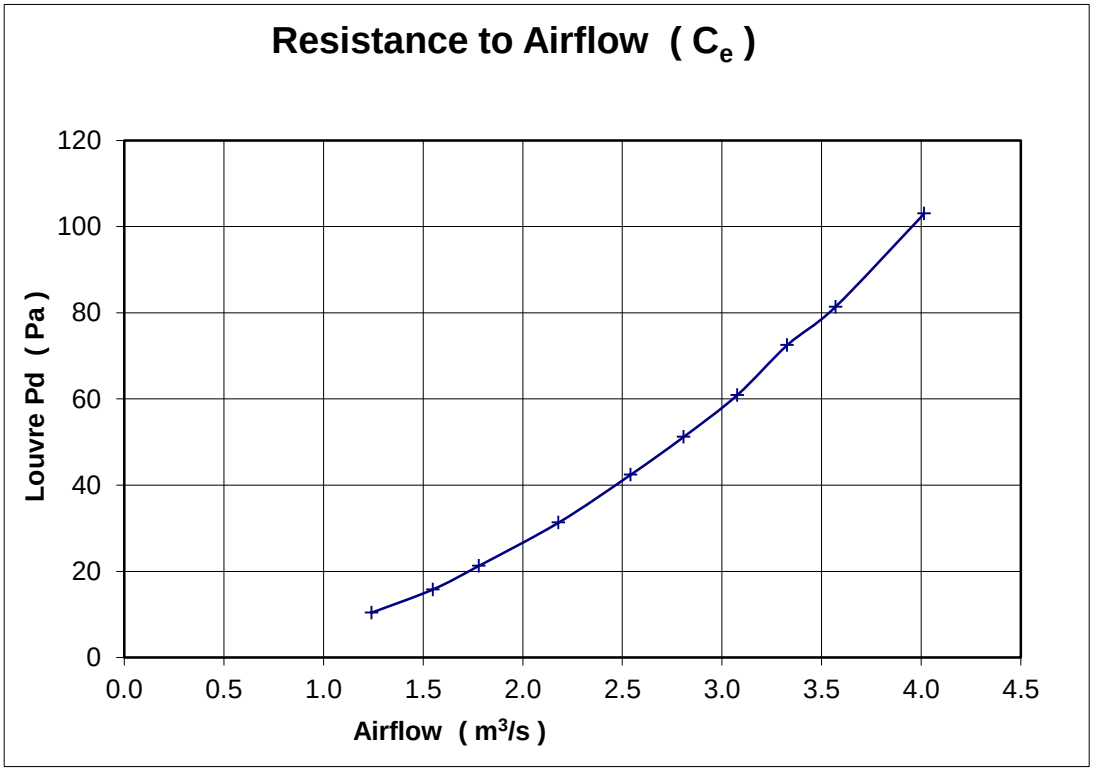


3.2 COEFFICIENT OF ENTRY

MANUFACTURER nv RENSON Sunprotection-Projects sa Date 13/10/2017
MODEL 481/L.050HF Contract 60554

air temperature	16.5	°C	louvre height	960	mm
barometer	1009	mbar	louvre width	980	mm
air density	1.208	kg/m^3	louvre area	0.941	m^2

	louvre face velocity	air flow rate		
louvre pd Pascals	m/s	test m^3/s	theoretical m^3/s	coefficient C_e
10.4	1.32	1.241	3.904	0.318
15.8	1.65	1.549	4.811	0.322
21.3	1.89	1.781	5.586	0.319
31.3	2.32	2.180	6.772	0.322
42.4	2.70	2.542	7.882	0.322
51.2	2.98	2.808	8.661	0.324
60.9	3.27	3.077	9.446	0.326
72.5	3.54	3.328	10.306	0.323
81.4	3.80	3.570	10.921	0.327
103.0	4.27	4.016	12.284	0.327
			mean C_e	0.323
			Class	2



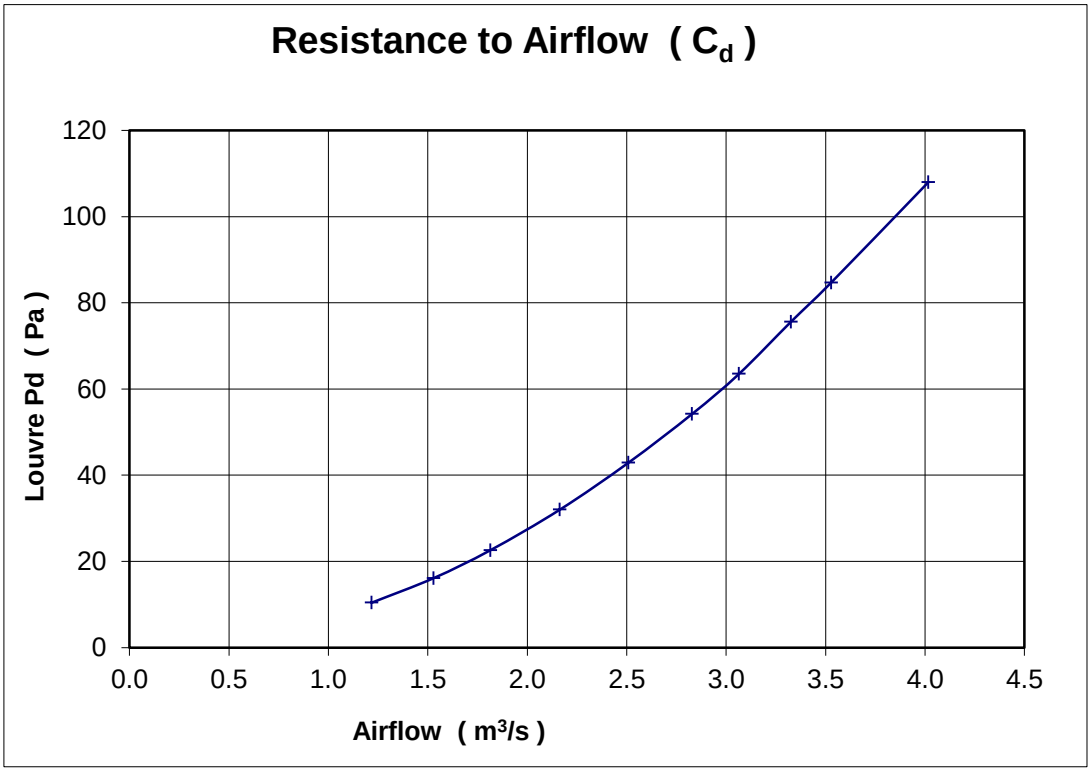
A 'trendline' for the above graph would follow $y = 6.8074x^{1.9559}$

3.3 COEFFICIENT OF DISCHARGE

MANUFACTURER nv RENSON Sunprotection-Projects sa Date 13/10/2017
MODEL 481/L.050HF Contract 60554

air temperature	16.2	°C	louvre height	960	mm
barometer	1009	mbar	louvre width	980	mm
air density	1.209	kg/m^3	louvre area	0.941	m^2

	louvre face velocity	air flow rate		
louvre pd Pascals	m/s	test m^3/s	theoretical m^3/s	coefficient C_d
10.4	1.29	1.217	3.901	0.312
16.1	1.63	1.529	4.854	0.315
22.6	1.93	1.815	5.751	0.316
32.0	2.30	2.164	6.844	0.316
42.9	2.67	2.509	7.924	0.317
54.2	3.01	2.829	8.907	0.318
63.5	3.26	3.065	9.640	0.318
75.6	3.54	3.326	10.519	0.316
84.7	3.75	3.529	11.134	0.317
108.0	4.27	4.017	12.573	0.320
			mean C_d	0.316
			Class	2



A 'trendline' for the above graph would follow $y = 7.0049x^{1.9711}$

APPENDIX: A MANUFACTURER'S DRAWING