

TESTRAPPORT
60554/3
ENGLISH TRANSLATION

According to EN 13030: 2001: "Ventilation of buildings - Grilles - Performance testing of air grilles subjected to simulated rain"

**Weather Louvre Test
481/L.050HF**

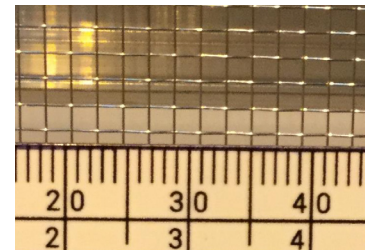
carried out by : BSRIA Ltd
 Old Bracknell West, Bracknell
 Berkshire RG12 7AH [Engeland]

commissioned by : nv RENSON Sunprotection-Projects sa
 Maalbeekstraat 10
 8790 Waregem [België]

Date of issue : 27 November 2018

TEST INFORMATION

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



Close-up of guard



60554A3 (front)



59126A7 (back)

INTRODUCTION

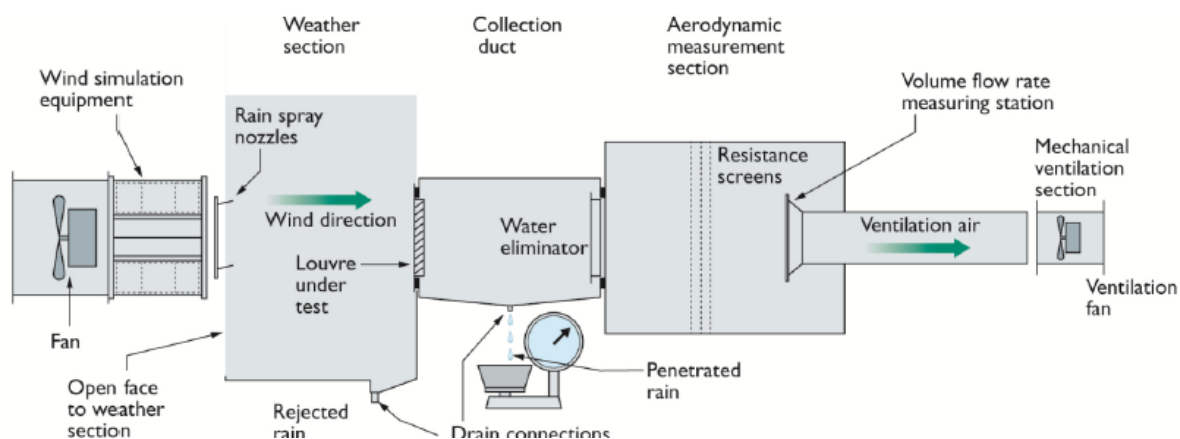
This report concerns tests conducted on a louvre to determine the Rainwater Penetration and the Pressure Drop versus Airflow Curve, with the associated Coefficient of Entry using the test methods contained within EN 13030 : 2001. The work was commissioned by nv RENSON Ventilation sa and was carried out at BSRIA on 14 – 31 May 2013.

Items received for test

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

TEST METHOD

A schematic representation of the rig used during testing



The test comprises of two parts:

- **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.

- **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 give 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.

- **TEST EQUIPMENT USED**

Test equipment	BSRIA ID	Calibration Expiry Date
Water supply measurement	352	9-1-16
Rain measuring system	353	9-1-16
Airflow cones	364	9-1-16
Micromanometer	5	17-2-16
Micromanometer	682	7-1-16
Scales [water]	332	9-2-16

WEATHER LOUVRE TEST

Uitgevoerd in opdracht van nv RENSON Sunprotection-Projects sa
Industriezone 2
Vijverdam
Maalbeekstraat 10
8790 Waregem
België

Contract : **Report 60554/3**

Datum : **27 November 2018**

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Berkshire RG12 7AH UK

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Compiled by: Naam : Andrew Freeth Titel : Senior Testingenieur	Approved by: Naam : Mark Roper Titel : Hoofd Testingenieur
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This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

RAINWATER PENETRATION

MANUFACTURER nv RENSON Sunprotection-Projects sa
 MODEL 481/L.050HF

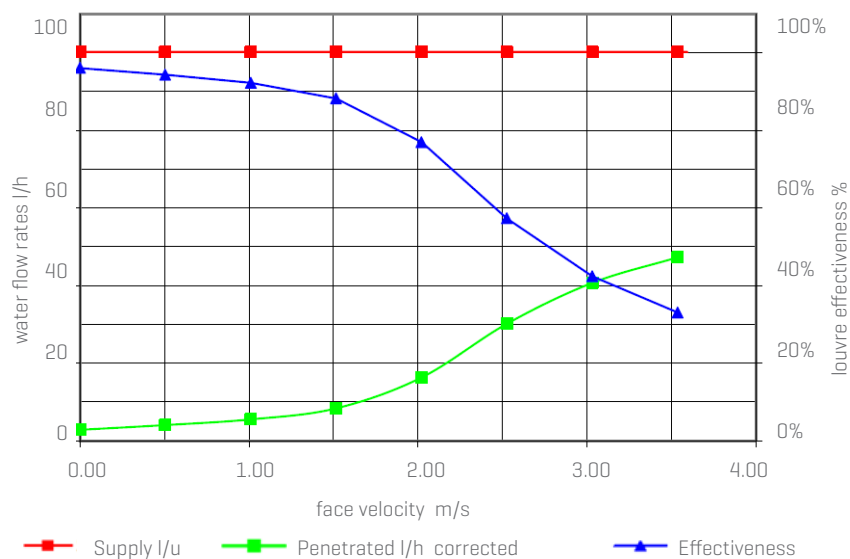
Date 09/10/2017
 Contract 60554

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

louvre height 960 mm
 louvre width 980 mm
 louvre area 0,941 m²

VENTILATION RATE		WATER FLOW RATES		Effectiveness	Class
Volume m ³ /s	Velocity m/s	Supply l/u	Penetrated l/u		
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

Effectiveness of Louvre with Simulated Wind and Rain



COEFFICIENT OF ENTRY

MANUFACTURER nv RENSON Sunprotection-Projects sa
 MODEL 481/L.050HF

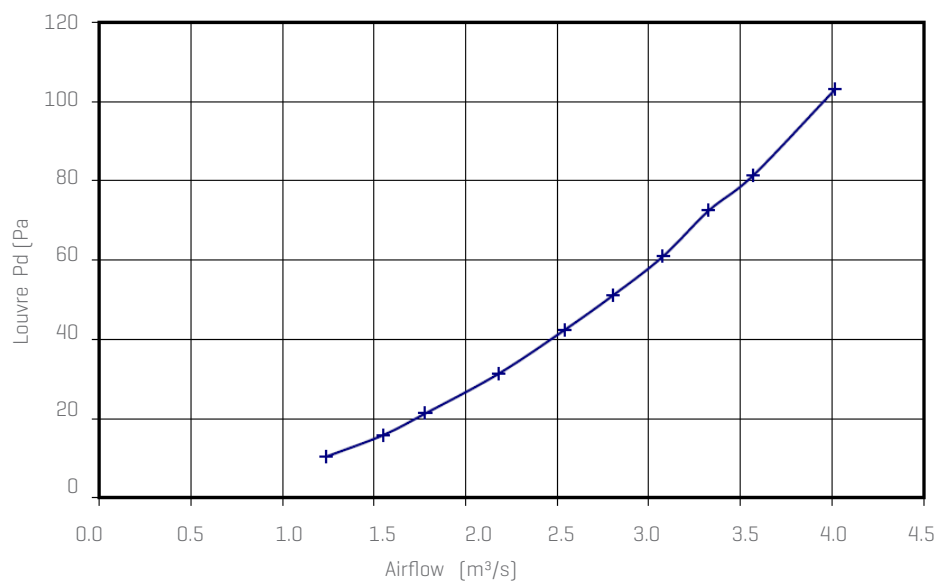
Date 13/10/2017
 Contract 60554

air temperature 16,5 °C
 barometer 1009 mbar
 air density 1,208 kg/m³

louvre height 960 mm
 louvre width 980 mm
 louvre area 0,941 m²

	louvre face velocity	air flow rate		
louvre pd Pascal	m/s	Test m ³ /s	theoretical m ³ /s	Coëfficient Ce
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
			Ce moyen	0,323
			Classe	2

Resistance to Airflow [C_e]



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

COEFFICIENT OF ENTRY

MANUFACTURER nv RENSON Sunprotection-Projects sa
 MODEL 481/L.050HF

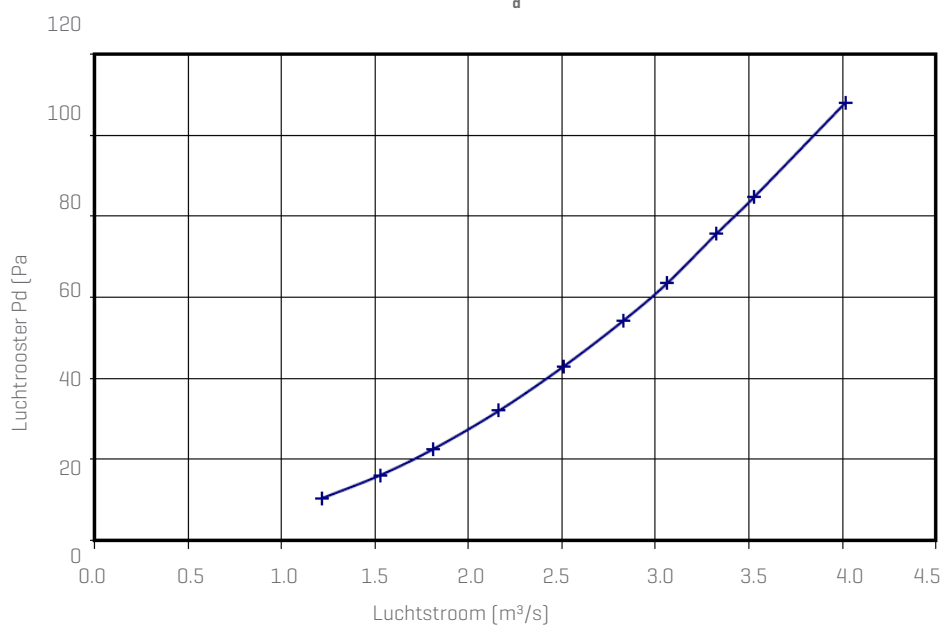
Date 13/10/2017
 Contract 60554

air temperature 16,5 °C
 barometer 1009 mbar
 air density 1,208 kg/m³

louvre height 960 mm
 louvre width 980 mm
 louvre area 0,941 m²

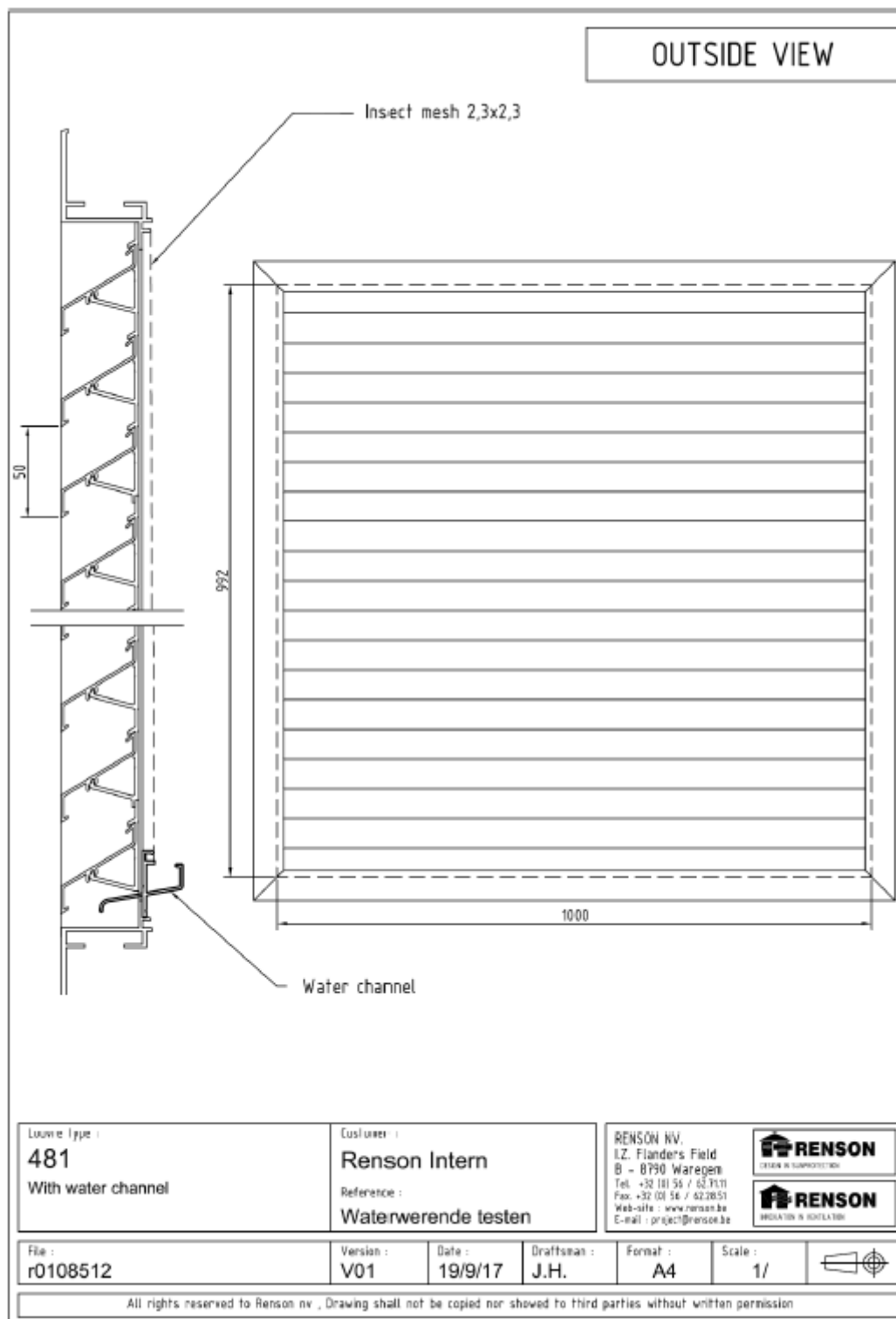
	louvre face velocity	air flow rate		
louvre pd Pascal	m/s	Test m ³ /s	theoretical m ³ /s	Coëfficiënt Ce
10,4	1,29	1,217	3,901	0,312
16,1	1,63	1,529	4,854	0,315
22,6	1,93	1,815	5,751	0,316
32,0	2,30	2,164	6,844	0,316
42,9	2,67	2,509	7,924	0,317
54,2	3,01	2,829	8,907	0,318
63,5	3,26	3,065	9,640	0,318
75,6	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
			Cd moyen	0,316
			Classe	2

Coëfficiënt C_d



A 'trendline' for the above graph would follow $y = 7.0049x1.9711$

APPENDIX: A MANUFACTURER'S DRAWING



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
Maalbeekstraat 10
8790 Waregem
Belgium

Contract: **Final Report 60554/3**

Date: **27 November 2018**

Issued by: **BSRIA Limited**
Old Bracknell Lane West,
Bracknell,
Berkshire RG12 7AH UK

Telephone: +44 (0)1344 465600

Fax: +44 (0)1344 465626

E: bsria@bsria.co.uk W: www.bsria.co.uk

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Approved by:

Name: Mark Roper

Title: 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 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.

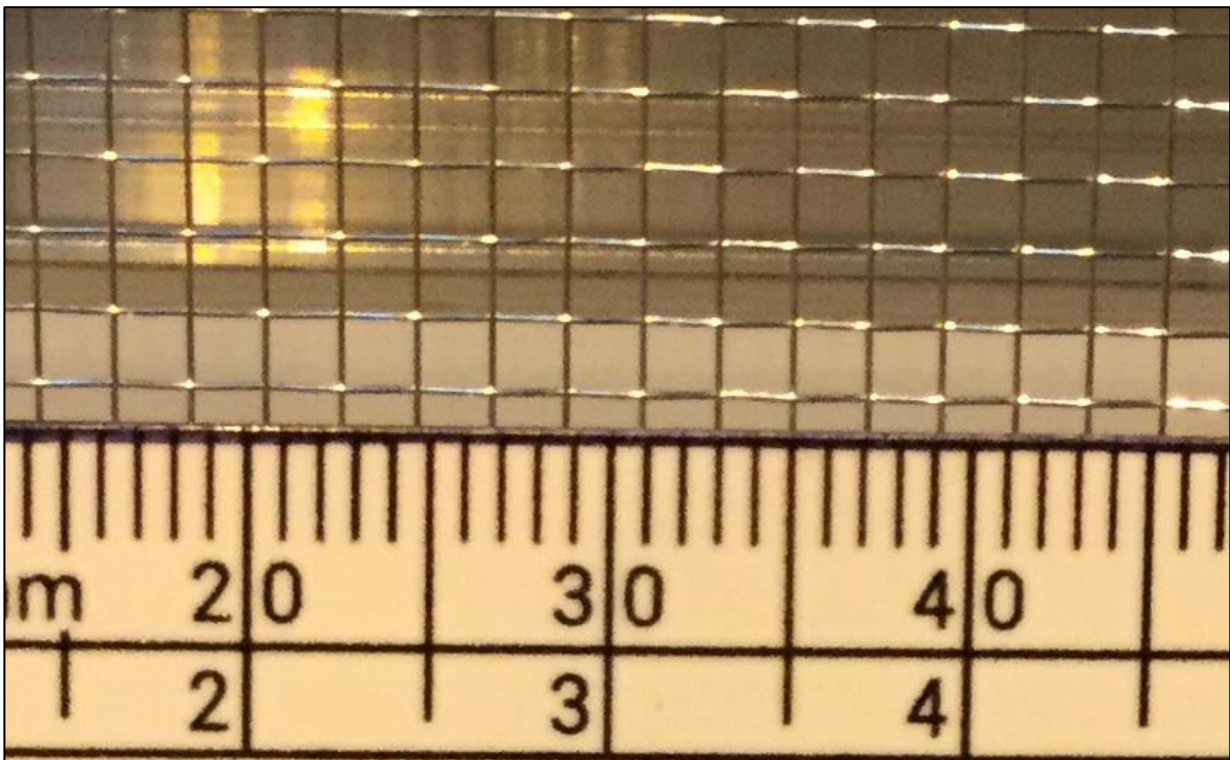
Items received for test

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

1.1 TEST ITEM INFORMATION

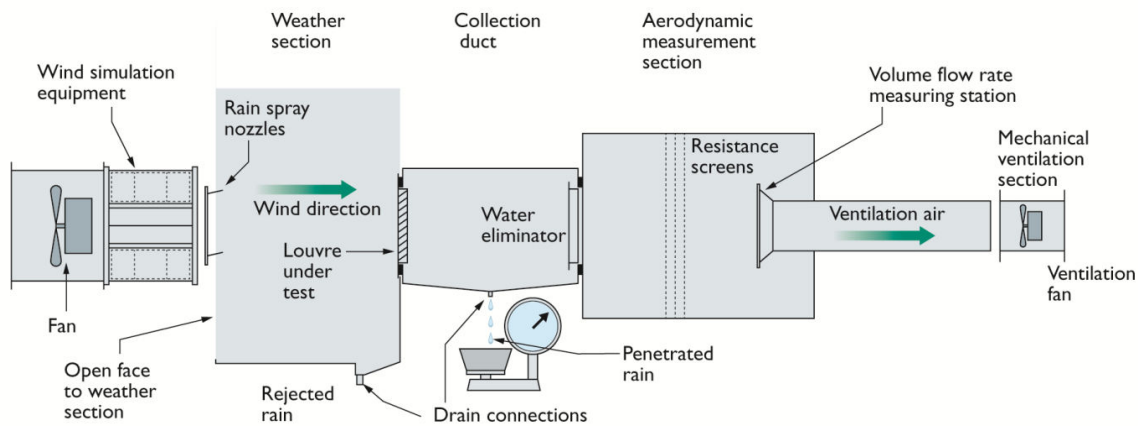
Contract	60554
Date	9-10-17
Manufacturer	nv RENSON Sunprotection-Projects sa
Louvre Model	481/L.050HF
Material	Aluminium
Painted	No
Core Area Height	960 mm
Core Area Width	980 mm
Blade Pack Depth	40 mm
Frame Depth	55 mm
No. of Blades	19
Blade Pitch	50 mm
Blade Angle	45° approx.
No. of Banks	1
Guard Type	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

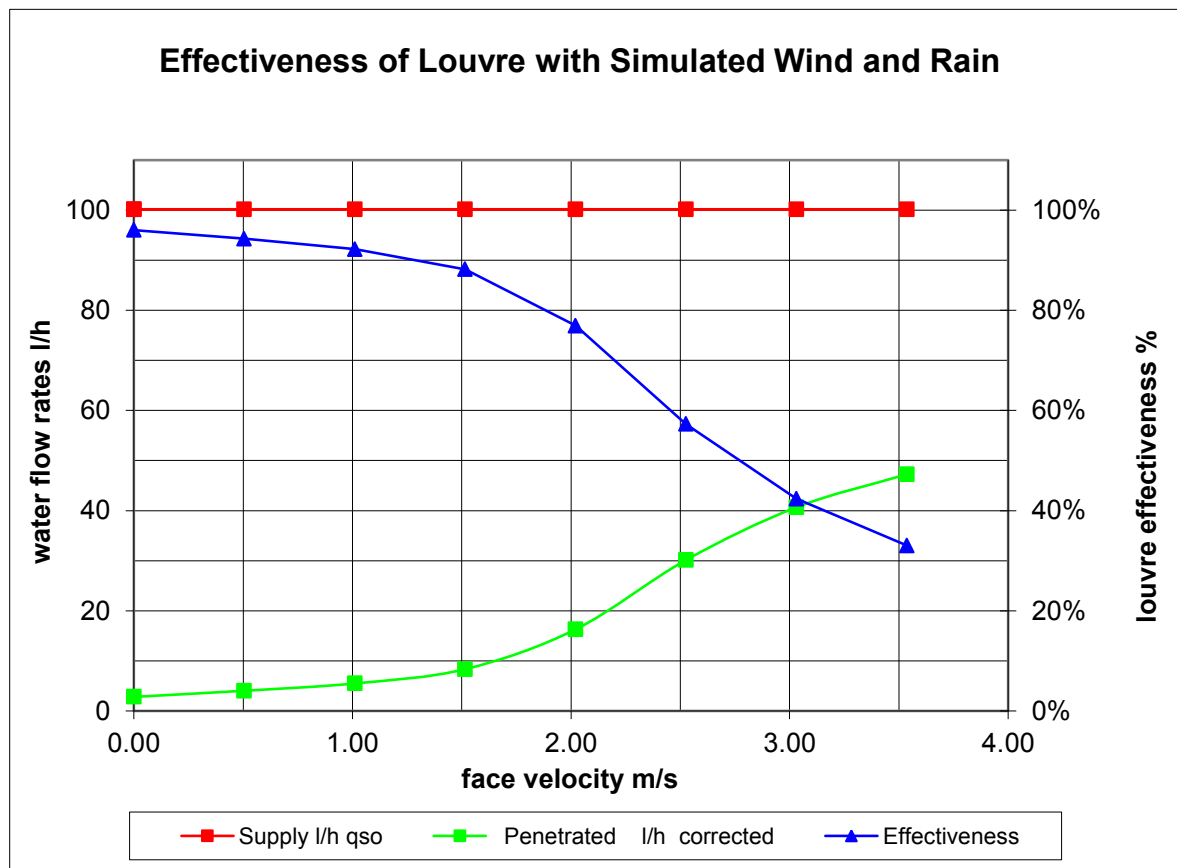
3 RESULTS

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 louvre height 960 mm
 Wind speed 13.0 m/s louvre width 980 mm
 louvre area 0.941 m²

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

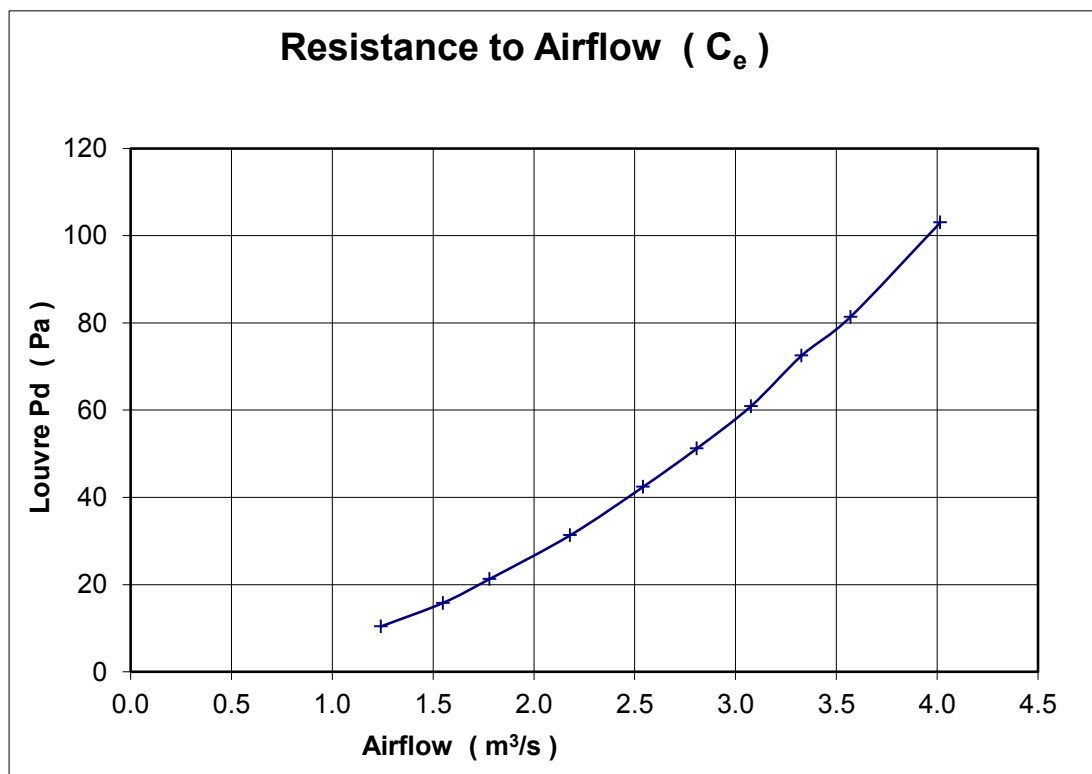
MANUFACTURER nv RENSON Sunprotection-Projects sa
MODEL 481/L.050HF

Date 13/10/2017
Contract 60554

air temperature 16.5 °C
barometer 1009 mbar
air density 1.208 kg/m³

louvre height 960 mm
louvre width 980 mm
louvre area 0.941 m²

louvre pd Pascals	louvre face velocity	air flow rate		coefficient C _e
	m/s	test m ³ /s	theoretical m ³ /s	
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 $y = 6.8074x^{1.9559}$

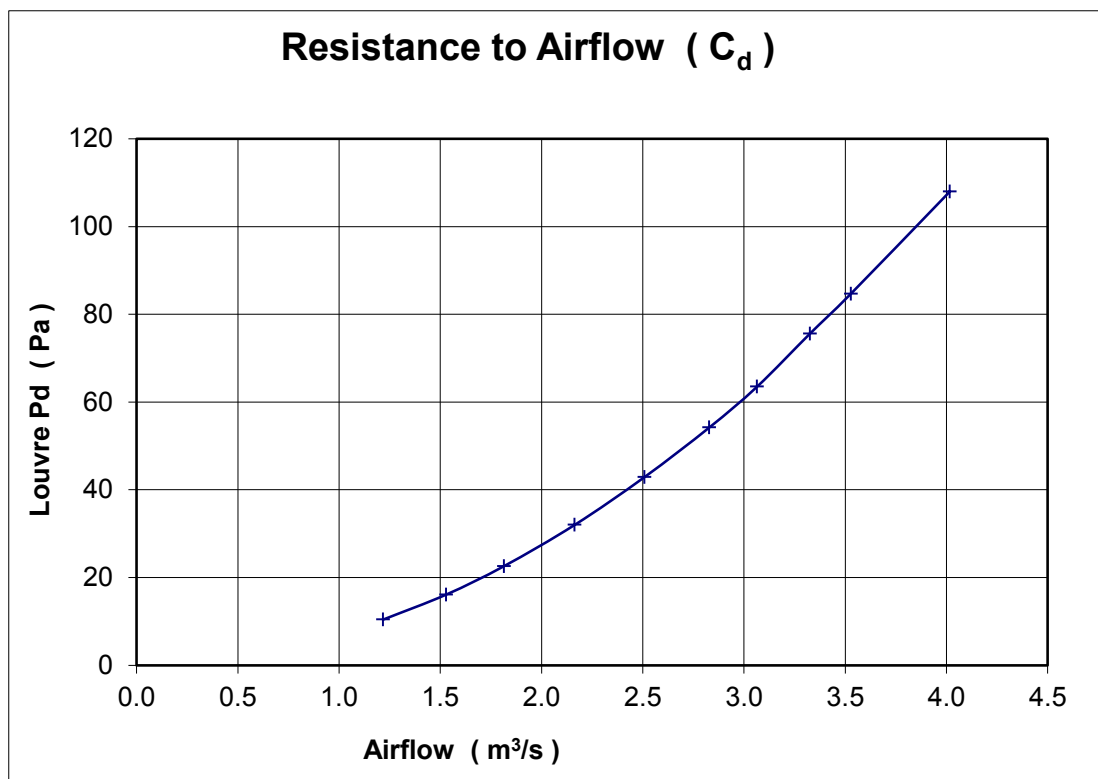
3.3 COEFFICIENT OF DISCHARGE

MANUFACTURER nv RENSON Sunprotection-Projects sa
MODEL 481/L.050HF

Date 13/10/2017
Contract 60554

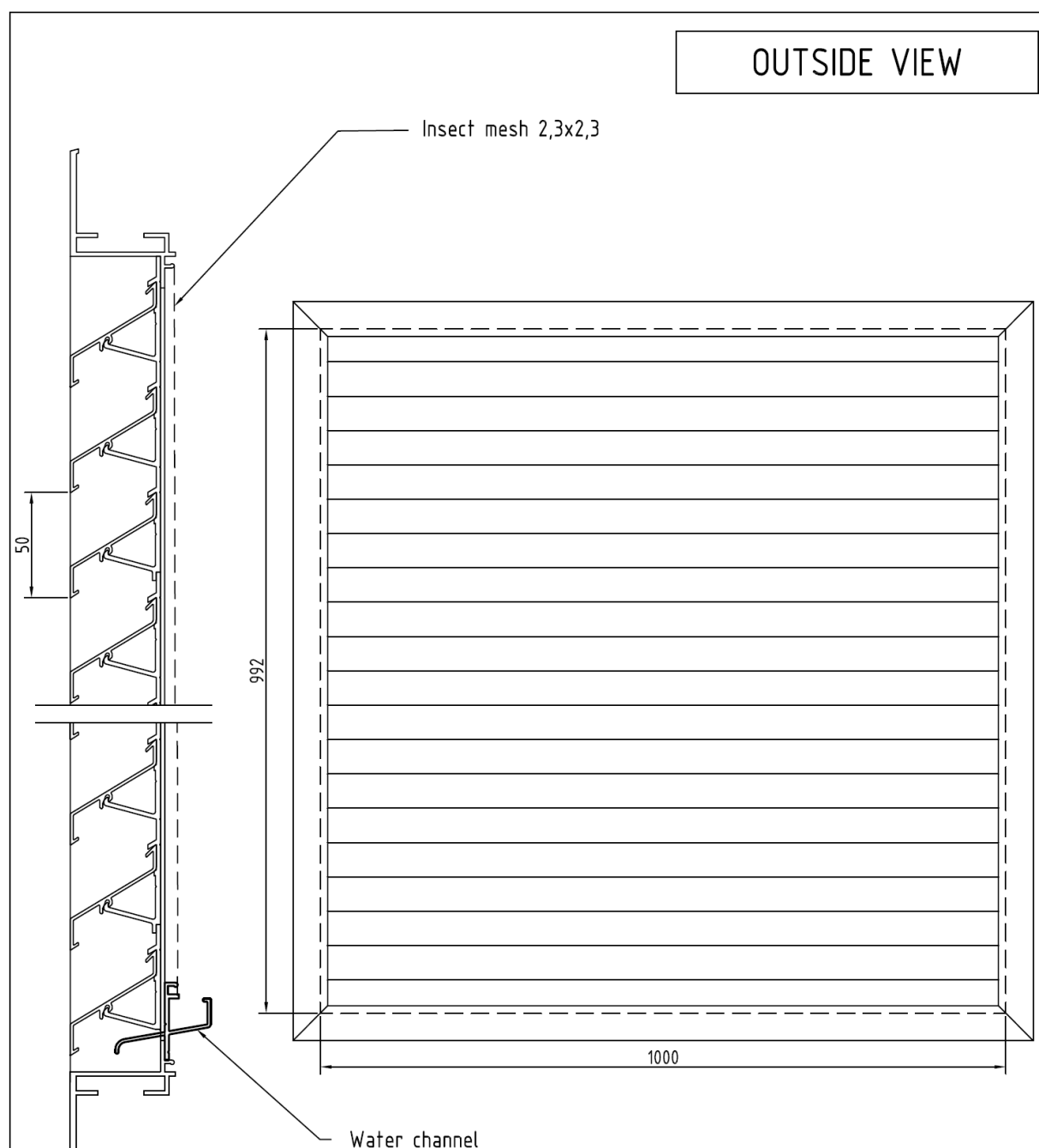
air temperature	16.2 °C	louvre height	960 mm
barometer	1009 mbar	louvre width	980 mm
air density	1.209 kg/m ³	louvre area	0.941 m ²

louvre pd Pascals	louvre face velocity	air flow rate		coefficient C _d
	m/s	test m ³ /s	theoretical m ³ /s	
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



Louvre type :

481

With water channel

Customer :

Renson Intern

Reference :

Waterwerende testen

RENSON NV.
I.Z. Flanders Field
B - 8790 Waregem
Tel. +32 (0) 56 / 62.71.11
Fax. +32 (0) 56 / 62.28.51
Web-site : www.renson.be
E-mail : project@renson.be



File :

r0108512

Version :

V01

Date :

19/9/17

Draftsman :

J.H.

Format :

A4

Scale :

1/

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