

Weather Louvre Test

411/414/431 - L.033.01 + water gutter + mesh 2.3 x 2.3

Carried out for
Renson Ventilation NV

Report 101477/1

Compiled by Paul Ainscoe

6 April 2020



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411/414/431 - L.033.01 + water gutter + mesh 2.3 x 2.3

Carried out for: Renson Ventilation NV
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QUALITY ASSURANCE

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CONTENTS

1 INTRODUCTION.....5
 1.1 Test Item Information5
2 TEST METHOD8
 2.1 Water Penetration.....8
 2.2 Pressure Drop.....8
 2.3 Test equipment used.....8
3 RESULTS9
 3.1 Rainwater Penetration9
 3.2 Coefficient of Entry.....10
 3.3 Coefficient of Discharge11

FIGURES

Figure 1 Test item 101477A6 (front)..... 5
Figure 2 Test item 101477A6 (rear) 6
Figure 3 Test item 101477A6 (close-up of guard) 7

APPENDICES

APPENDIX A: Manufacturer’s Drawing 12

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 9 to 23 March 2020.

Items received for test

| Test Item | BSRIA ID |
|--|----------|
| 411/414/431 - L.033.01 + water gutter + mesh 2.3 x 2.3 | 101477A6 |

1.1 TEST ITEM INFORMATION

| | |
|--------------------------|--|
| Contract | 101477 |
| Date | 04/Mar/2020 |
| Manufacturer | Renson Ventilation NV |
| Louvre Model | 411/414/431 - L.033.01 + water gutter + mesh 2.3 x 2.3 |
| Material | Aluminium |
| Painted | Yes |
| Core Area Height | 980 mm |
| Core Area Width | 1000 mm |
| Blade Pack Depth | 20 mm |
| Frame Depth | 35 mm |
| No. of Blades | 29 |
| Blade Pitch | 35 mm |
| Blade Angle | 45° approx. |
| No. of Banks | 1 |
| Guard Type | Insect |
| Guard Spacing | 10 mm |
| Side Channels | No |
| Water Drip Tray | Yes – 15 mm |
| 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.

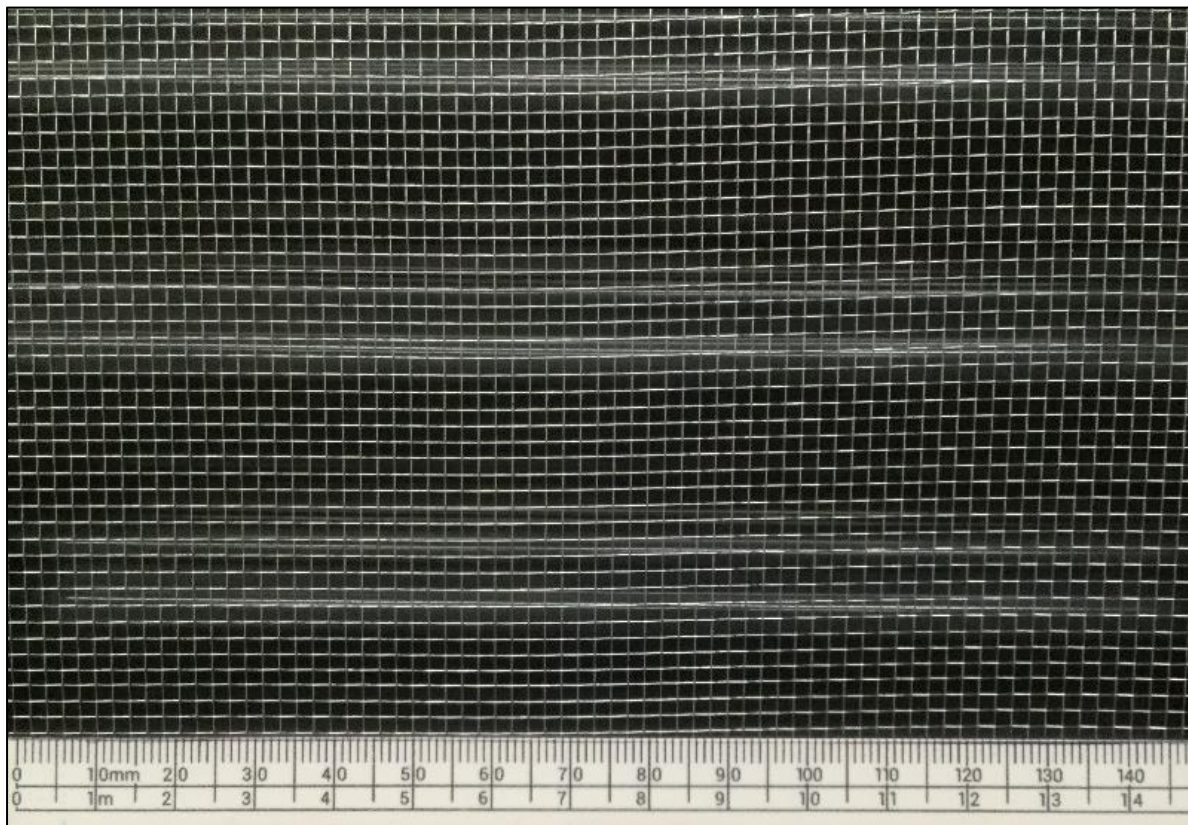
Figure 1 Test item 101477A6 (front)



Figure 2 Test item 101477A6 (rear)

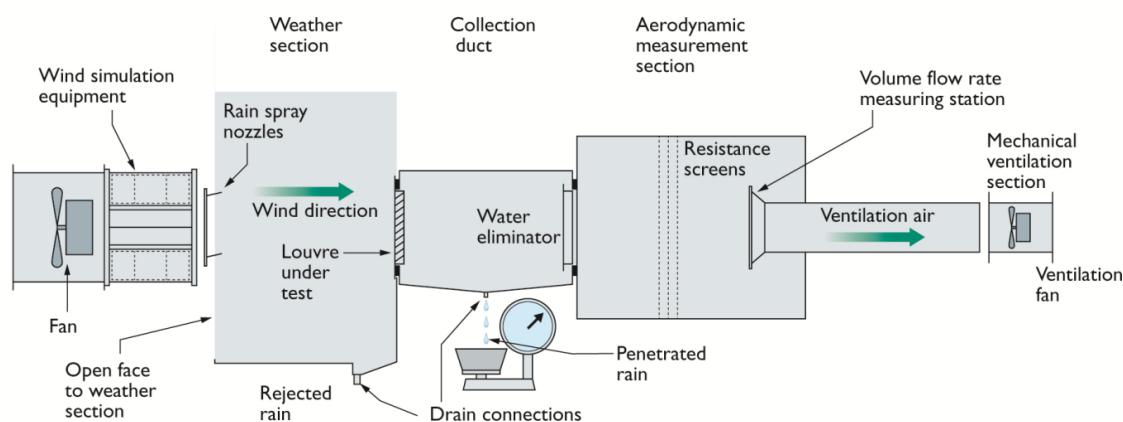


Figure 3 Test item 101477A6 (close-up of guard)



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 | 19-12-20 |
| 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

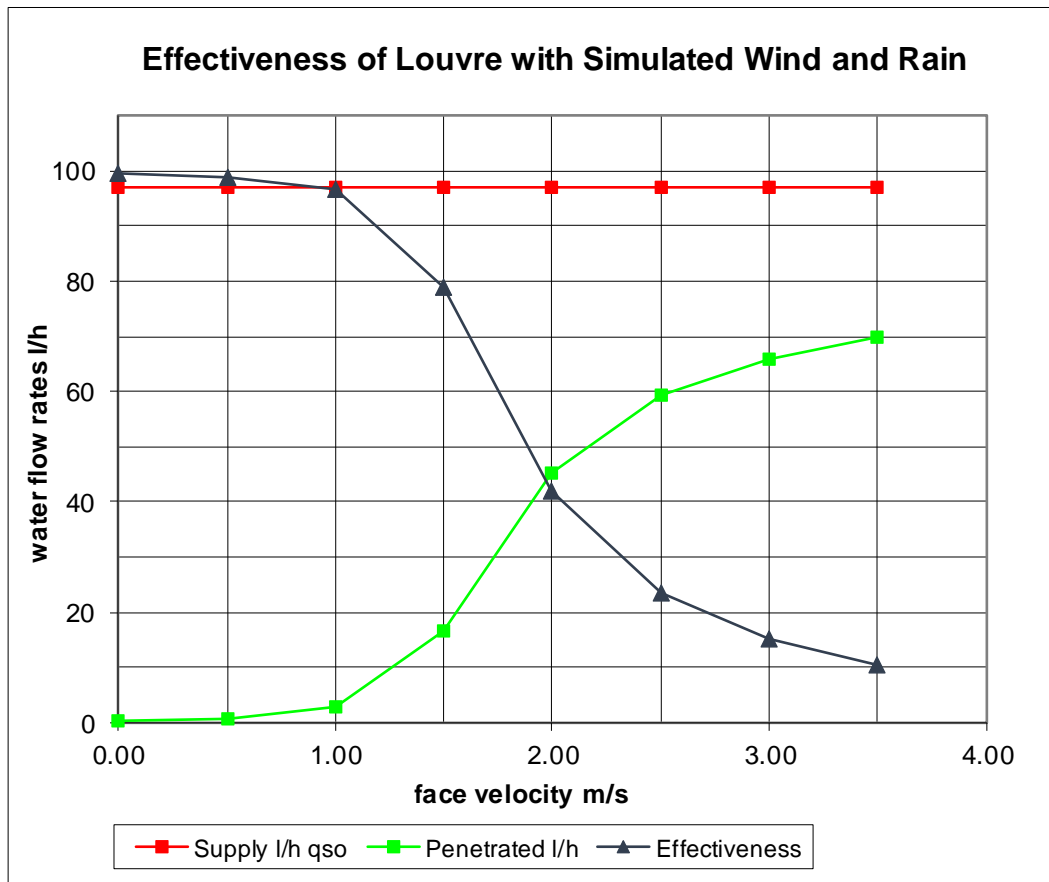
Date 23/03/2020

Model 411/414/431 - L.033.01 + water gutter + mesh 2.3 x 2

Contract 101477

| | | | | | |
|--------------------|-----------------|-------|------------------|-------|----------------|
| Simulated Rainfall | 75 (+10% / -0%) | mm/hr | Core Area Height | 980 | mm |
| Wind Speed | 13 | m/s | Core Area Width | 1000 | mm |
| | | | Core Area Area | 0.980 | 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 | 0.4 | 99.5 | A |
| 0.49 | 0.50 | 97.2 | 0.8 | 99.0 | A |
| 0.98 | 1.00 | 97.2 | 2.7 | 96.5 | B |
| 1.47 | 1.50 | 97.2 | 16.4 | 78.9 | D |
| 1.96 | 2.00 | 97.2 | 45.1 | 41.9 | D |
| 2.45 | 2.50 | 97.2 | 59.3 | 23.6 | D |
| 2.94 | 3.00 | 97.2 | 65.9 | 15.2 | D |
| 3.43 | 3.50 | 97.2 | 69.9 | 10.4 | D |



3.2 COEFFICIENT OF ENTRY

Manufacturer Renson Ventilation NV

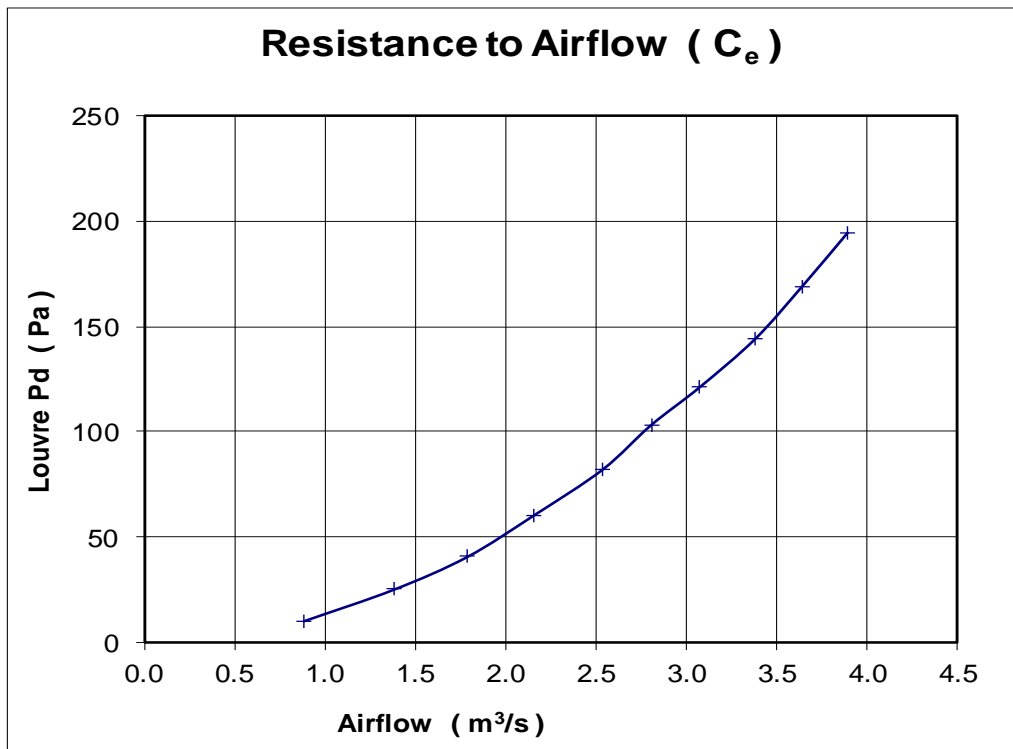
Date 09/03/2020

Model 411/414/431 - L.033.01 + water gutter + mesh
2.3 x 2.3

Contract 101477

| | | | |
|-----------------|-------------------------|------------------|----------------------|
| Air Temperature | 16.1 °C | Core Area Height | 980 mm |
| Barometer | 1004.2 mbar | Core Area Width | 1000 mm |
| Air Density | 1.205 kg/m ³ | Core Area Area | 0.980 m ² |

| Louvre p.d. Pa | Louvre Face Velocity | Air Flow Rate | | Coefficient C _e |
|---------------------|----------------------|---------------------------|----------------------------------|-------------------------------|
| | m/s | Test m ³ /s | Theoretical m ³ /s | |
| 10.3 | 0.90 | 0.881 | 4.053 | 0.217 |
| 25.2 | 1.41 | 1.379 | 6.339 | 0.217 |
| 40.7 | 1.82 | 1.786 | 8.056 | 0.222 |
| 60.4 | 2.20 | 2.157 | 9.814 | 0.220 |
| 82.0 | 2.59 | 2.537 | 11.435 | 0.222 |
| 103.0 | 2.86 | 2.805 | 12.815 | 0.219 |
| 121.0 | 3.14 | 3.076 | 13.890 | 0.221 |
| 144.0 | 3.45 | 3.385 | 15.153 | 0.223 |
| 169.0 | 3.72 | 3.647 | 16.416 | 0.222 |
| 194.0 | 3.97 | 3.895 | 17.588 | 0.221 |
| Mean C _e | | | | 0.221 |
| Class | | | | 3 |



A 'trendline' for the above graph would follow $y = 13.236x^{1.9692}$

3.3 COEFFICIENT OF DISCHARGE

Manufacturer Renson Ventilation NV

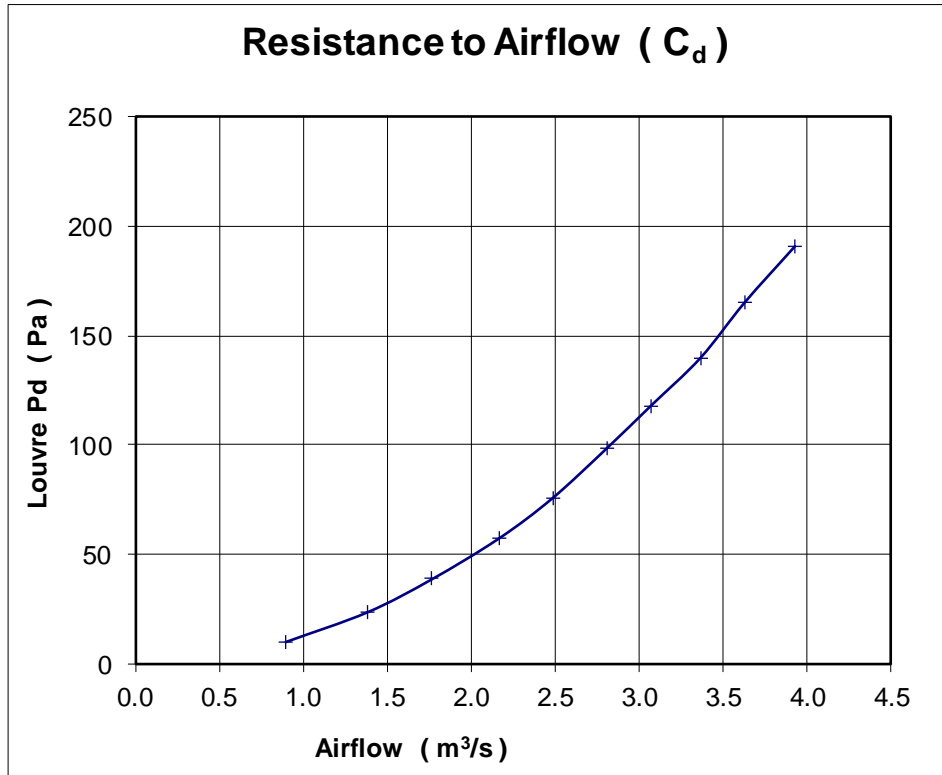
Date 16/03/2020

Model 411/414/431 - L.033.01 + water gutter + mesh
2.3 x 2.3

Contract 101477

| | | | |
|-----------------|-------------------------|------------------|----------------------|
| Air Temperature | 15.6 °C | Core Area Height | 980 mm |
| Barometer | 1014.4 mbar | Core Area Width | 1000 mm |
| Air Density | 1.219 kg/m ³ | Core Area Area | 0.980 m ² |

| Louvre p.d. Pa | Louvre Face Velocity m/s | Air Flow Rate | | Coefficient C _d |
|---------------------|-----------------------------|---------------------------|----------------------------------|-------------------------------|
| | | Test m ³ /s | Theoretical m ³ /s | |
| 10.1 | 0.92 | 0.898 | 3.989 | 0.225 |
| 23.7 | 1.41 | 1.385 | 6.111 | 0.227 |
| 38.7 | 1.80 | 1.767 | 7.809 | 0.226 |
| 57.3 | 2.21 | 2.166 | 9.502 | 0.228 |
| 75.6 | 2.53 | 2.484 | 10.915 | 0.228 |
| 98.2 | 2.86 | 2.805 | 12.439 | 0.226 |
| 118.0 | 3.14 | 3.073 | 13.636 | 0.225 |
| 140.0 | 3.44 | 3.370 | 14.853 | 0.227 |
| 165.0 | 3.70 | 3.630 | 16.125 | 0.225 |
| 191.0 | 4.01 | 3.932 | 17.348 | 0.227 |
| Mean C _d | | | | 0.226 |
| Class | | | | 3 |



A 'trendline' for the above graph would follow $y = 12.407x^{1.9985}$

APPENDIX A: MANUFACTURER'S DRAWING

