



# Weather Louvre Test

## RIA-1

Final Report 58839/1

Carried out for  
TROX Auranor Norge AS

By Andrew Freeth

20 May 2015





# Weather Louvre Test RIA-1

**Carried out for:**

**TROX Auranor Norge AS**  
Grimsdal 10  
2760 Brandbu  
Norway

Contract: **Final Report 58839/1**

Date: **20 May 2015**

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](mailto:bsria@bsria.co.uk) W: [www.bsria.co.uk](http://www.bsria.co.uk)

Compiled by: <b>Name:</b> Andrew Freeth <b>Title:</b> Senior Test Engineer BSRIA Test	Approved by: <b>Name:</b> Mark Roper <b>Title:</b> Principal Test Engineer BSRIA Test
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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 Curve, with the associated Coefficient of Entry using the test methods contained within EN 13030 : 2001. The work was commissioned by TROX Auranor Norge AS and was carried out at BSRIA on 22<sup>nd</sup> – 27<sup>th</sup> April 2015.

## Items received for test

Test Item	BSRIA ID
RIA-1	58839A1

## 1.1 TEST ITEM INFORMATION

<b>Contract</b>	58839
<b>Date</b>	22 April 2015
<b>Manufacturer</b>	TROX Auranor Norge AS
<b>Louvre Model</b>	RIA-1
<b>Material</b>	Aluminium
<b>Painted</b>	No
<b>Blade Height</b>	980 mm
<b>Blade Width</b>	983 mm
<b>Blade Depth</b>	60 mm
<b>Frame Depth</b>	80 mm
<b>No. of Blades</b>	19
<b>Blade Pitch</b>	50 mm
<b>Blade Angle</b>	60° (approx) to the airflow
<b>No. of Banks</b>	1
<b>Guard Type</b>	Bird/Vermin
<b>Guard Spacing</b>	0 mm
<b>Side Channels</b>	No
<b>Water Drip Tray</b>	Yes
<b>Blade Orientation</b>	Horizontal

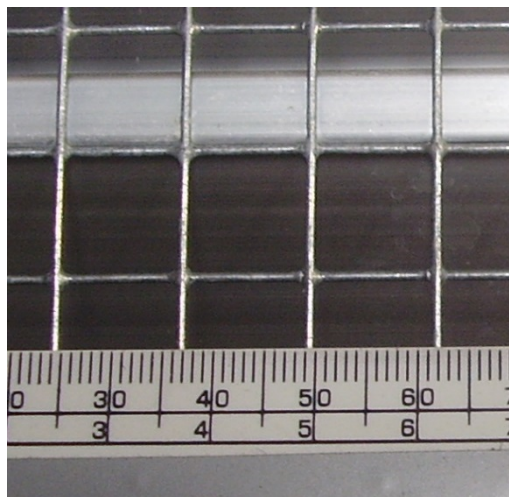
**Figure 1 Test item 58839A1 (front)**



**Figure 2 Test item 58839A1 (rear)**

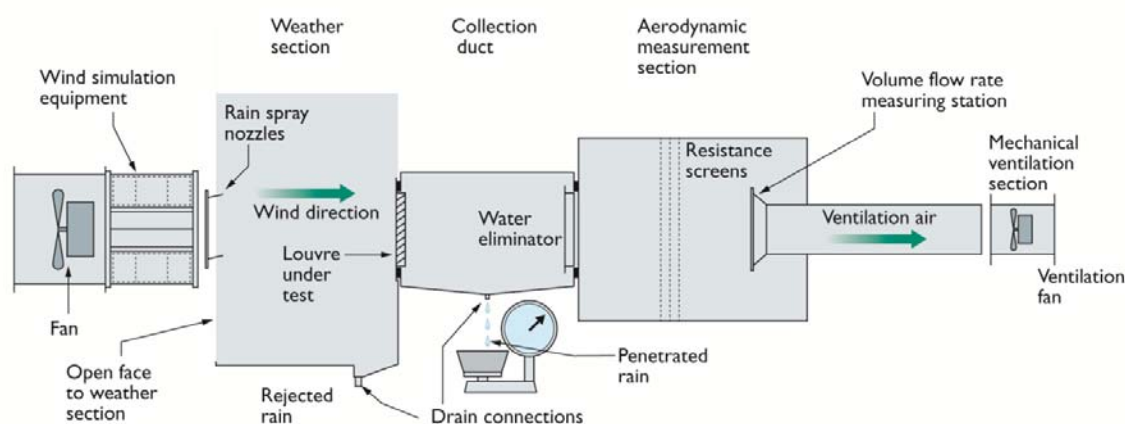


**Figure 3 Close-up of guard**



## 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	9-1-16
Rain measuring system	353	9-1-16
Airflow cones	364	9-1-16
Micromanometer	502	1-10-15
Micromanometer	682	7-1-16
Scales (water)	1364	9-2-16



### 3 RESULTS

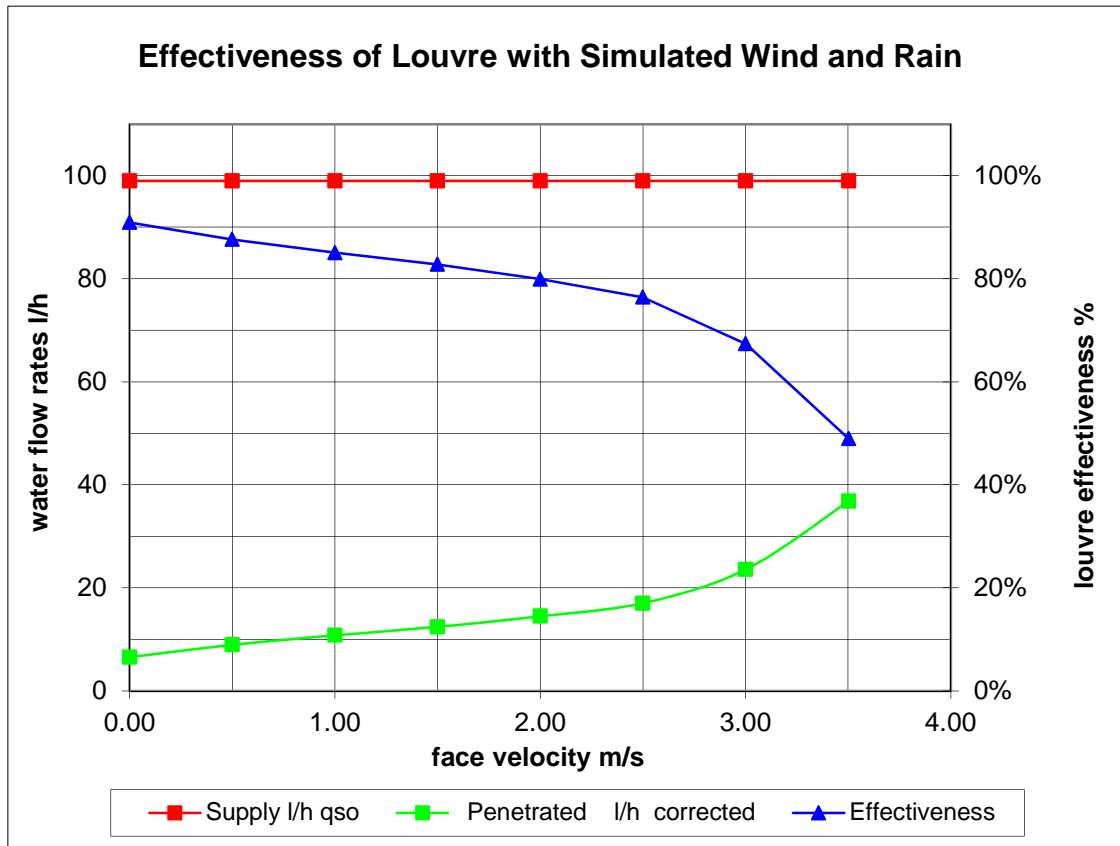
#### 3.1 RAINWATER PENETRATION

MANUFACTURER TROX Auranor Norge AS  
 MODEL RIA-1

Date 22/04/2015  
 Contract 58839

Simulated rainfall 75 mm/hr  
 Wind speed 13.0 m/s  
 louvre height 980 mm  
 louvre width 983 mm  
 louvre area 0.963 m<sup>2</sup>

VENTILATION RATE		WATER FLOW RATES		Effectiveness	Class
Volume m <sup>3</sup> /s	Velocity m/s	Supply l/h	Penetrated l/h		
0.00	0.00	99.0	6.6	90.9%	C
0.48	0.50	99.0	8.9	87.6%	C
0.96	1.00	99.0	10.8	85.1%	C
1.44	1.50	99.0	12.4	82.8%	C
1.93	2.00	99.0	14.5	79.9%	D
2.41	2.50	99.0	17.0	76.4%	D
2.89	3.00	99.0	23.6	67.4%	D
3.37	3.50	99.0	36.9	49.0%	D



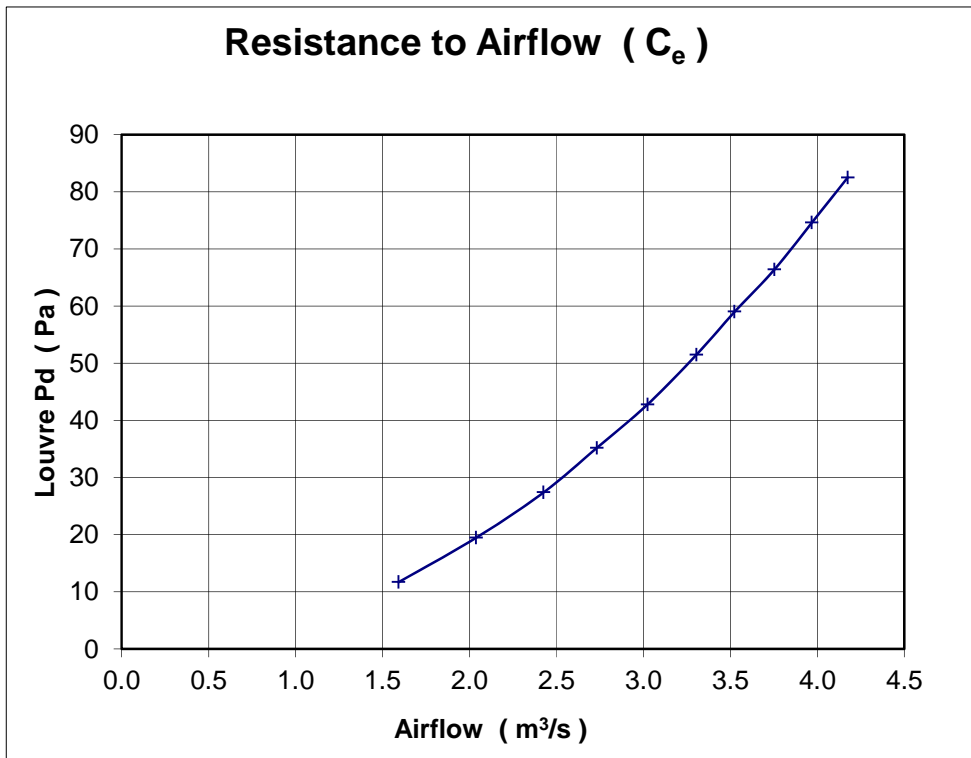
**3.2 COEFFICIENT OF ENTRY**

MANUFACTURER TROX Auranor Norge AS  
 MODEL RIA-1

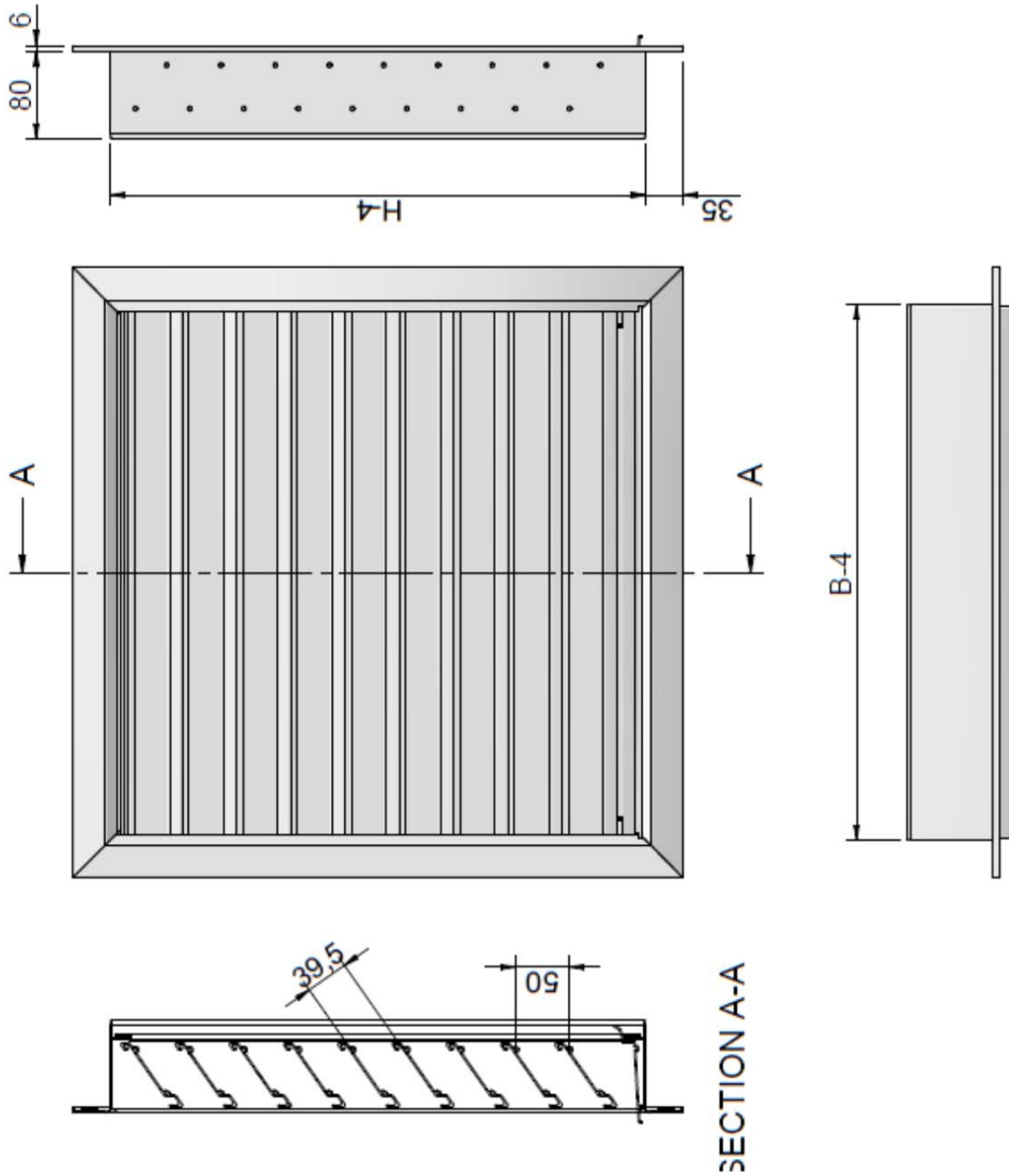
Date 22/04/2015  
 Contract 58839

air temperature 15.8 °C                      louvre height 980 mm  
 barometer 1004 mbar                      louvre width 983 mm  
 air density 1.206 kg/m<sup>3</sup>                      louvre area 0.963 m<sup>2</sup>

louvre pd Pascals	louvre face velocity	air flow rate		coefficient C <sub>e</sub>
	m/s	test m <sup>3</sup> /s	theoretical m <sup>3</sup> /s	
11.7	1.65	1.592	4.244	0.375
19.5	2.12	2.039	5.479	0.372
27.4	2.52	2.425	6.495	0.373
35.2	2.84	2.732	7.362	0.371
42.8	3.14	3.024	8.118	0.372
51.5	3.43	3.305	8.905	0.371
59.0	3.66	3.524	9.531	0.370
66.4	3.90	3.753	10.111	0.371
74.6	4.12	3.968	10.717	0.370
82.5	4.33	4.174	11.270	0.370
mean C <sub>e</sub>				0.372
Class				2



### APPENDIX: A MANUFACTURER'S DRAWING



**NOTE:** The test sample had 19 blades, the drawing shows 9.