



Sand Louvre Test

Report 56458/1

Carried out for
HVC Supplies Ltd

By Andrew Freeth

26 September 2012



Weather Louvre Test

Carried out for:

HVC Supplies Ltd

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Contract: **Report 56458/1**

Date: **26 September 2012**

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1 INTRODUCTION

This report concerns tests conducted on a sand louvre to determine the Sand Penetration and the Pressure Drop versus Airflow Curve, with the associated Coefficient of Entry using the test methods contained within EN 13181 : 2001. The work was commissioned by HVC Supplies Ltd and was carried out at BSRIA on 6 – 12 September.

Items received for test

Test Item	BSRIA ID
STL	56458A1

1.1 TEST ITEM INFORMATION

Contract	56458
Date	6-9-12
Manufacturer	HVC Supplies Ltd
Louvre Model	STL
Material	Aluminium
Painted	No
Blade Height	975 mm
Blade Width	975 mm
Blade Depth	83
Frame Depth	100
No. of Blades	9
Blade Pitch	113 mm
Blade Angle	90° (to the airflow)
No. of Banks	2
Guard Type	None
Guard Spacing	N/A
Side Channels	No
Blade Orientation	Vertical

Photograph 1 Test item 56458A1 (front)

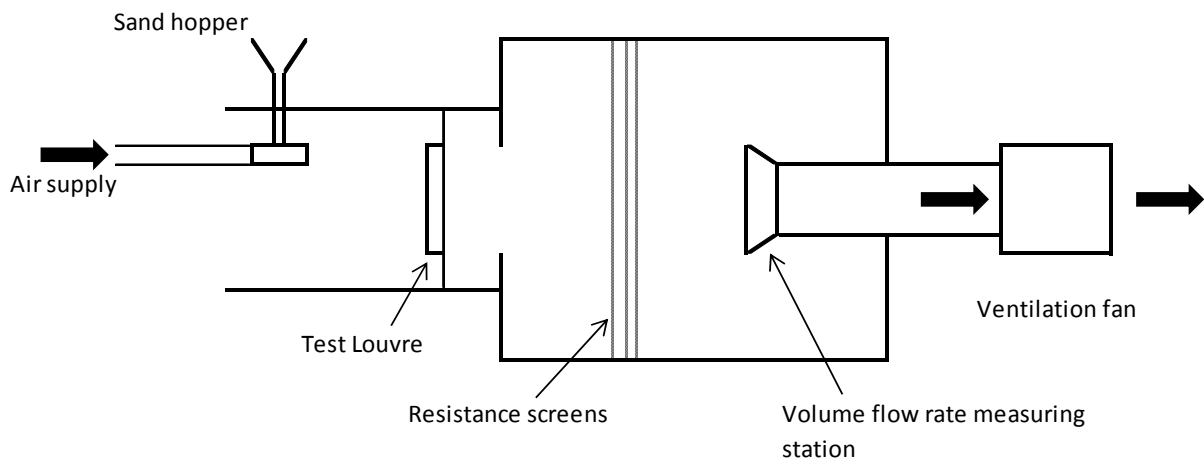


Photograph 2 Test item 56458A1 (rear)



2 TEST METHOD

A schematic representation of the rig used during testing



The test comprises of two parts:

2.1 SAND REJECTION

The sand louvre is subjected to wind driven sand at an airflow speed of 20 - 25 m/s measured in the injection tube with various sand masses and delivery rates as shown in Table 1 below. In addition to the simulated wind and sand, air is drawn through the louvre at a range of velocities (0, 0.5, 1.3, 2.0, 2.8, and 3.5 m/s, or the maximum achievable). Table 2 shows the graded sand requirements for 1 Kg of standard test sand.

After each sand delivery, the fans are kept running for a further 5 minutes.

The rejected sand in the louvre and in the area in front of it, is collected, weighed and recorded. A range of measurements are taken to give the characteristic curve for the test louvre.

Table 1 Core air velocities, weights or sand and sand discharge durations

Airspeed (m/s)	Sand mass (Kg)	Discharge duration (s)
0	1	Not timed*
0.5	1	200
1.3	1	75
2.0	2	100
2.8	2	70
3.5	2	60

* Note: Although 0m/s is not required as a test velocity, it has been included for information purposes. For 0m/s the ventilation fan is turned off

Table 2 Standard sand requirements

Grade size µm	Mass %	Mass required for 1kg sample (kg)
> 699	0.5	0.005
423 to 699	3.0	0.03
353 to 422	12.0	0.12
251 to 352	30.0	0.3
211 to 250	20.0	0.2
152 to 210	27.0	0.27
104 to 151	6.0	0.06
76 to 103	1.0	0.01
< 76	0.5	0.005

2.2 PRESSURE DROP

This is measured by attaching the test louvre to the front of the Aerodynamic Measuring Section after it is separated from the main rig.

Pressure tappings are used to record 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.

2.3 TEST EQUIPMENT USED

Test equipment	BSRIA ID
Airflow cones	364
Micromanometer	708
Scales	149
Sand injection nozzles	1235 - 1239

3 RESULTS

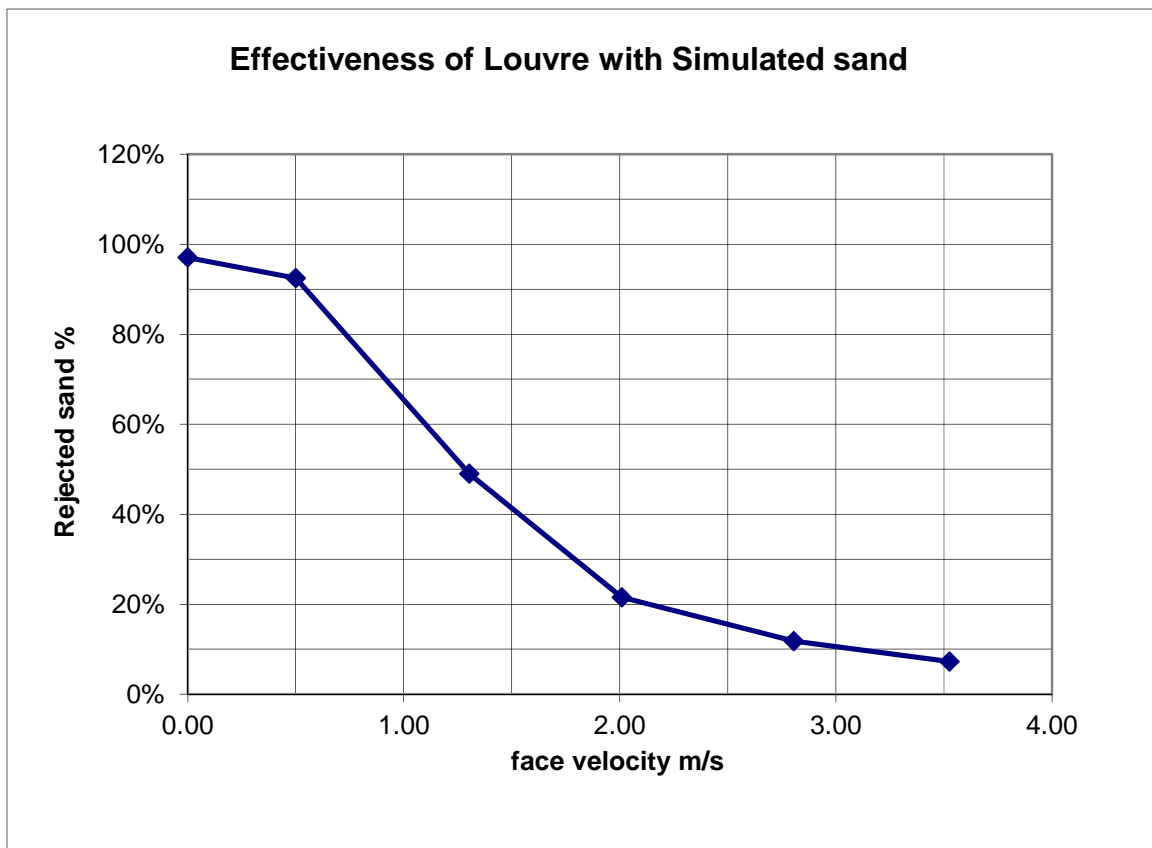
3.1 SAND PENETRATION

MANUFACTURER HVC Supplies Ltd
 MODEL STL

Date 12/09/2012
 Contract 56458

louvre height 975 mm
 louvre width 975 mm
 louvre area 0.951 m²

VENTILATION RATE		SAND MASS		Effectiveness
Volume m ³ /s	Velocity m/s	Injected kg	Rejected kg	
0.00	0.00	1.00	0.97	97.0%
0.48	0.50	1.00	0.92	92.5%
1.24	1.30	1.00	0.49	49.0%
1.91	2.01	2.00	0.43	21.5%
2.67	2.81	2.00	0.24	11.8%
3.35	3.53	2.00	0.14	7.2%



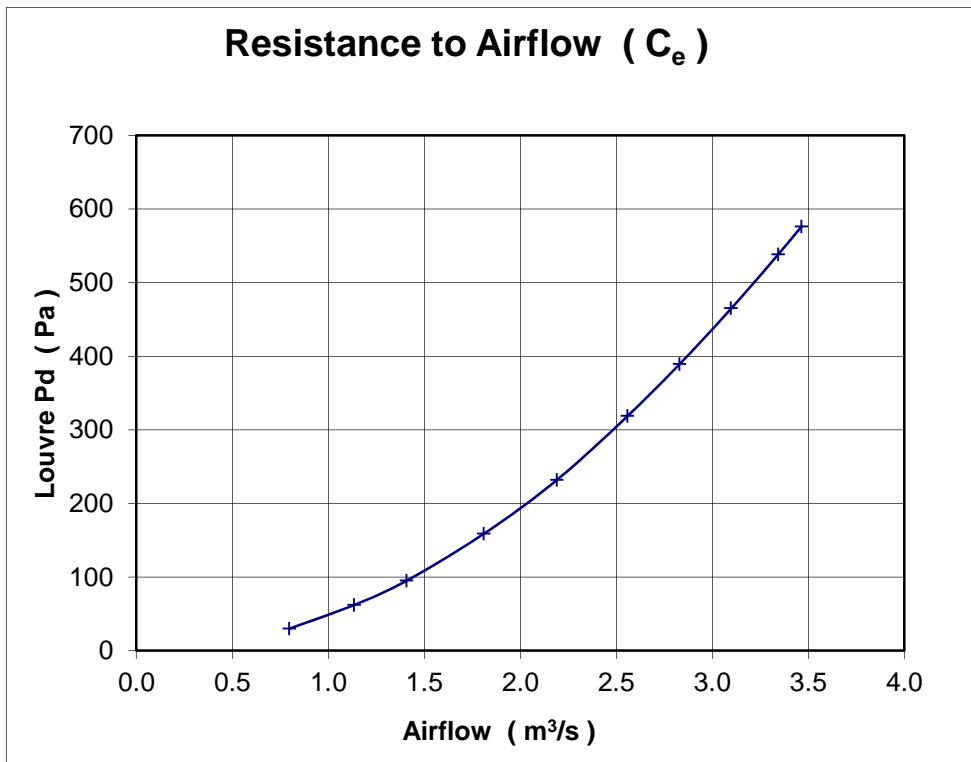
3.2 COEFFICIENT OF ENTRY

MANUFACTURER HVC Supplies Ltd
 MODEL STL

Date 12/09/2012
 Contract 56458

air temperature 20.5 °C louvre height 975 mm
 barometer 1019 mbar louvre width 975 mm
 air density 1.204 kg/m³ louvre area 0.951 m²

louvre pd Pascals	louvre face velocity		air flow rate		coefficient C _e
	m/s		test m ³ /s	theoretical m ³ /s	
576.0	3.64		3.464	29.402	0.118
538.0	3.52		3.343	28.415	0.118
465.0	3.26		3.097	26.417	0.117
389.0	2.98		2.830	24.162	0.117
319.0	2.69		2.558	21.880	0.117
232.0	2.30		2.191	18.660	0.117
159.0	1.90		1.810	15.447	0.117
95.2	1.48		1.407	11.953	0.118
62.2	1.19		1.134	9.662	0.117
30.0	0.84		0.797	6.710	0.119
mean C _e					0.118
Class					4



APPENDIX: A MANUFACTURER'S DRAWING

