

High Performance Rainproof Ventilation Louvres



Rainproof Ventilation Louvres



Single and Double Bank Ventilation Louvres - Beijing MRT, Daxing Line

Mega Union maintains a world-leading position in the rainproof ventilation louvre market by satisfying a variety of architectural requirements such as decorative and rainproof ventilation uses. Each set of system is specially customised to cater for the special requirements of buildings.

Mega Union's rainproof ventilation louvres are being deployed in different projects around the world ranging from London to China, whereby each application component entails a unique combination of professional experience and advice from them.

The following types of rainproof ventilation louvre systems are available for your architectural needs.

1. Single bank ventilation louvre - a single layer louvre that provide good ventilation with some rain protection.
2. Double bank rainproof ventilation louvre - a double layer louvre that effectively integrates both rainproof and ventilation capabilities.
3. Triple bank stormproof ventilation louvre - a triple layer louvre with a strong performance of rain defence.



Double Bank Rainproof Ventilation Louvres - Ocean Financial Centre, Singapore



Double Bank Rainproof Ventilation Louvres - Expo Centre, Shanghai



Single Bank Ventilation Louvres - PL1 and PL1/DT



Double Bank Rainproof Ventilation Louvres - PL2 and PL2/DT



Triple Bank Stormproof Ventilation Louvres - PL3 and PL3/DT

Heating, Ventilation and Air Conditioning



Double Bank Rainproof Ventilation Louvres - Asia Square Tower 1, Singapore

OVERVIEW

Throughout the years, quantifying the performance of rainproof ventilation louvre systems has always been problematic. This is due to the escalating standards for practical applications as well as the non-existence of comprehensive application technology guidelines for designers. The HEVAC standard for "Laboratory Experiments and Grading Levels of Rainproof Ventilation Louvres under Simulated Environmental Conditions" has provided a useful classification method. However, the responsibilities for recommending classification methods of special applications remain with the designers and experts. Hence, the purpose of this guide is to contribute modestly to assisting designers and experts in selecting the most effective performance classification for rainproof ventilation louvres deployed in special applications.

Experimental Standard: British rainproof ventilation louvre system maker joined hands with HEVAC and BSRIA to invent an experimental standard aimed at assisting designers in adapting different classifications of rainproof ventilation louvres to different special needs. An experimental environment with an air flow rate of 13m/s (30 miles/hr) and rainfall intensity of 75mm/hr (3 inches) may be relatively harsh but it is still a highly effective environment that is close to the actual rainproof performance environment.

Classification of Mega Union's Rainproof Ventilation Louvre Systems

> 2 layers	A3	< 3.5m/s
Double-layer	A2	1.5 m/s
	B2	1.5 to 2.5 m/s
	C2	2.5 to 3.5 m/s
Single-layer	D1	1.5 to 3.5 m/s

Performance specifications should consider the design of the speed of airflow passing through the inlet.

Experimental Results for the Performance Classification of Mega Union's Rainproof ventilation Systems.

Airflow performance

Category	Effectiveness 1.0 to 100%	Effectiveness of Rainproofing (%)	Actual Rain Absorption Rate (Ltr/hour/m ² louvre)	Category	Coefficient
A	1.00	100%	0.00	1	0.40 & above
	0.99	99%	0.75		
B	0.98	98%	1.50	2	0.30 ~ 0.399
	0.95	95%	3.75		
C	0.94	90%	7.50	3	0.20 ~ 0.299
	0.80	80%	15.0		
D	0.80	70%	22.5	4	0.20 following
	Following	60%	30.0		
	Following	50%	37.5		

High coefficient represents low rainproof performance & high airflow.

As performance classification is dependent on air flow rate, it should be specified when designing the speed of air flow passing through louvre inlets. The above figure illustrates the actual rainproof performance under experimental conditions. This experiment represents the harsh weather condition in Britain.

The HEVAC standard is currently formally promulgated and is technically equivalent to the European Standard BS EN13030.

The precision levels of louvre performance tests have been continuously increasing alongside the continuous improvements and upgrades of the HEVAC experimental standard. Mega Union closely follows international standards for quantification tests and has passed the one and only globally recognised British BSRIA test, thus proving the excellent performance of Mega Union's rainproof ventilation louvres.

Application

Recommendations for the choice of rainproof ventilation louvres are based on the actual specified inlet air flow rate.

Class A	The best rainproof performance is required and the core air flow rate is 1-3.5m/s.	Louvres with 2 or more layers and no significant infiltration of rain water
Class A	The best rainproof performance is required and the core air flow rate < 1m/s.	Double layer with no significant infiltration of rain water
Class B	Good rainproof performance is required and the core air flow rate is 1-2.5m/s.	Double layer with rain water entering but the depth of infiltration is limited
Class C	Relatively better rainproof performance is required & the core air flow rate is 2.5-3.5m/s.	Double layer with large quantity of rain water entering but the depth of infiltration is limited
Class D	High air flow performance is required and rainproof performance is not important.	Single layer with limited resistance to rain water blown in by the wind

BSRIA Accredited Test Reports



Double Bank Rainproof Ventilation Louvres - Lot One Shoppers' Mall, Singapore

BSRIA
www.bsria.co.uk

Certificate

Certificate No: 53366/1 Issue No: 1 Date of issue: 13 August 2009

This is to certify that

BSRIA Limited

Has tested a sample of the product described below in accordance with the test methods contained within EN 13030 : 2001 and has determined the item met the detailed classification shown on pages 3 and 4 of this certificate. For further details of the test item see Page 2 of this certificate

Manufacturer/Agent Shanghai Mega Union Architectural Technology Co. Ltd
Gu Bei Road 686
Unit 118
Chang Ning District
Shanghai 200336
P. R. China

Product PL1

Test location BSRIA
Old Bracknell West
Bracknell
Berkshire RG12 7AH

Date of test 30 July 2009

Expiry date 13 August 2012

Test engineer A Coulson

Quality approved Phil Stoodart
Laboratory Manager
Testing & Certification

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BSRIA Limited
Old Bracknell Lane West, Bracknell, Berkshire RG12 7AH UK
T: +44 (0)1344 420511 F: +44 (0)1344 487578
E: bsria@bsria.co.uk W: www.bsria.co.uk
1 of 5

PL1 louvres - BS EN13030 : 2001 test report

BSRIA
www.bsria.co.uk

Certificate

Certificate No: 53366/2 Issue No: 1 Date of issue: 13 August 2009

This is to certify that

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Gu Bei Road 686
Unit 118
Chang Ning District
Shanghai 200336
P. R. China

Product PL2

Test location BSRIA
Old Bracknell West
Bracknell
Berkshire RG12 7AH

Date of test 31 July 2009

Expiry date 13 August 2012

Test engineer A Coulson

Quality approved Phil Stoodart
Laboratory Manager
Testing & Certification

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E: bsria@bsria.co.uk W: www.bsria.co.uk
1 of 5

PL2 louvres - BS EN13030 : 2001 test report

BSRIA
www.bsria.co.uk

Certificate

Certificate No: 5464/4 Issue No: 1 Date of issue: 19 November 2010

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BSRIA Limited

Has tested a sample of the product described below in accordance with the test methods contained within EN 13030 : 2002 and has determined the item met the detailed classification. For further details see Page 2 of this certificate

Manufacturer/Agent Shanghai Mega Union Architectural Technology Co., Ltd
No. 3129 Shen Zhuan Road
She Shan City Industrial Park
Building 26
SHANGHAI 201603
P. R. China

Product PL3

Test location BSRIA
Old Bracknell West
Bracknell
Berkshire RG12 7AH

Date of test 11 November to 19 November 2010

Expiry date 19 November 2013

Test engineer M Roper / A Freeth

Quality approved Phil Stoodart
Laboratory Manager
Test & MicroClimate

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Offices in Bracknell, Beijing, St Helens, Stuttgart, and Toulouse
Associates in Armagh and Cardiff

PL3 louvres - BS EN13030 : 2002 test report

BSRIA
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Certificate

Certificate No: 5464/1 Issue No: 1 Date of issue: 19 November 2010

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Manufacturer/Agent Shanghai Mega Union Architectural Technology Co., Ltd
No. 3129 Shen Zhuan Road
She Shan City Industrial Park
Building 26
SHANGHAI 201603
P. R. China

Product PL1/DT

Test location BSRIA
Old Bracknell Lane West
Bracknell
Berkshire RG12 7AH

Date of test 9 November to 19 November 2010

Expiry date 19 November 2013

Test engineer M Roper / A Freeth

Quality approved Phil Stoodart
Laboratory Manager
Test & MicroClimate

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PL1/DT louvres - BS EN13030 : 2002 test report

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No. 3129 Shen Zhuan Road
She Shan City Industrial Park
Building 26
SHANGHAI 201603
P. R. China

Product PL2/DT

Test location BSRIA
Old Bracknell West
Bracknell
Berkshire RG12 7AH

Date of test 11 November to 19 November 2010

Expiry date 19 November 2013

Test engineer M Roper / A Freeth

Quality approved Phil Stoodart
Laboratory Manager
Test & MicroClimate

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Old Bracknell Lane West, Bracknell, Berkshire RG12 7AH UK
T: +44 (0)1344 420511 F: +44 (0)1344 487578
E: bsria@bsria.co.uk W: www.bsria.co.uk
Offices in Bracknell, Beijing, St Helens, Stuttgart, and Toulouse
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PL2/DT louvres - BS EN13030 : 2002 test report

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Certificate

Certificate No: 5464/3 Issue No: 1 Date of issue: 19 November 2010

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Manufacturer/Agent Shanghai Mega Union Architectural Technology Co., Ltd
No. 3129 Shen Zhuan Road
She Shan City Industrial Park
Building 26
SHANGHAI 201603
P. R. China

Product PL3/DT

Test location BSRIA
Old Bracknell Lane West
Bracknell
Berkshire RG12 7AH

Date of test 11 November to 19 November 2010

Expiry date 19 November 2013

Test engineer M Roper / A Freeth

Quality approved Phil Stoodart
Laboratory Manager
Test & MicroClimate

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E: bsria@bsria.co.uk W: www.bsria.co.uk
Offices in Bracknell, Beijing, St Helens, Stuttgart, and Toulouse
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PL3/DT louvres - BS EN13030 : 2002 test report

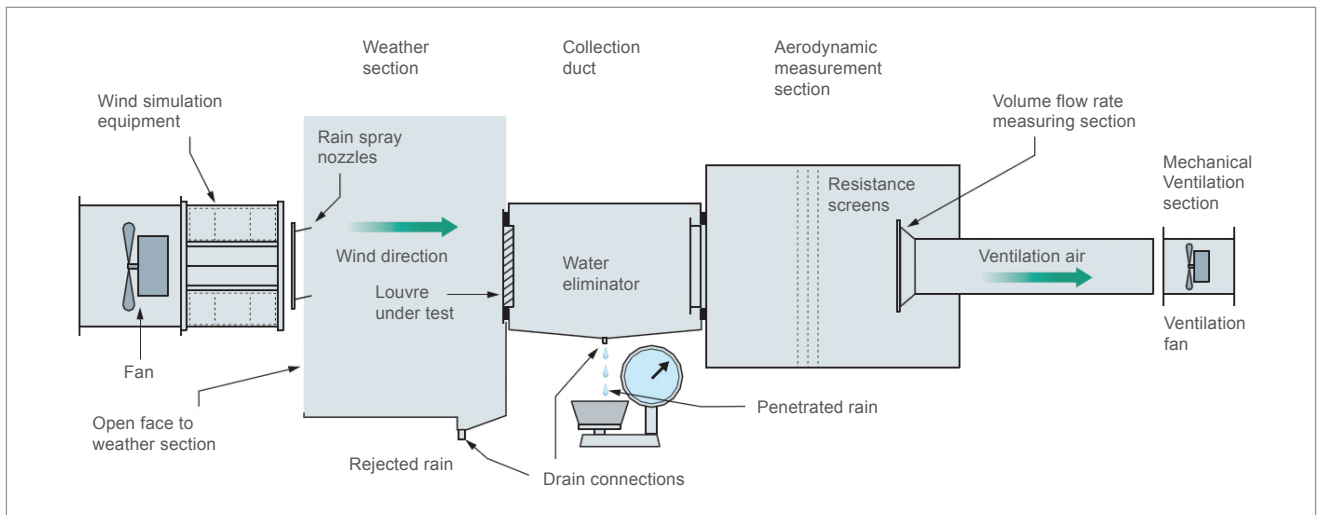
Relevance & Accuracy of Louvre Test Results



Double Bank Rainproof Ventilation Louvres - Intel Plant, Dalian

BSRIA Testing to BS EN 13030:2001 - Ventilation for Buildings - Terminals - Performance Testing of Louvres subjected to Simulated Rain

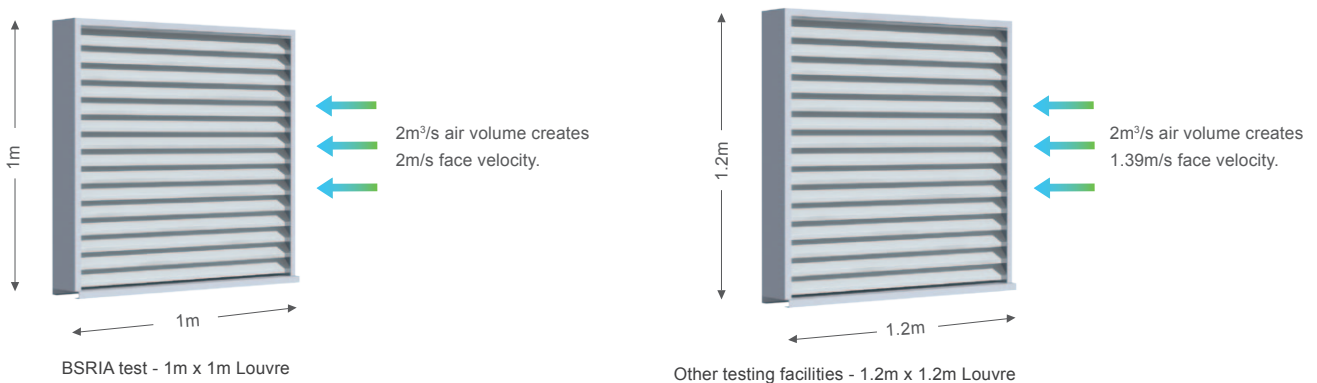
BSRIA being one of the only two laboratories in the world that is fully accredited and independent, ensures that the most stringent and credible test results are derived in accordance to the latest test standards.



Aerodynamic weather louvre test facility at BSRIA laboratory

BS EN13030 versus other testing facilities

A 1m x 1m louvre test sample and a 1.2m x 1.2m louvre test sample when subjected to a 2m³/s air volume have different air flow face velocities; 2m/s and 1.39m/s respectively. A difference of 30%!



BSRIA test - 1m x 1m Louvre

Other testing facilities - 1.2m x 1.2m Louvre

In summary, the BS EN13030 ensures more stringent testing conditions.

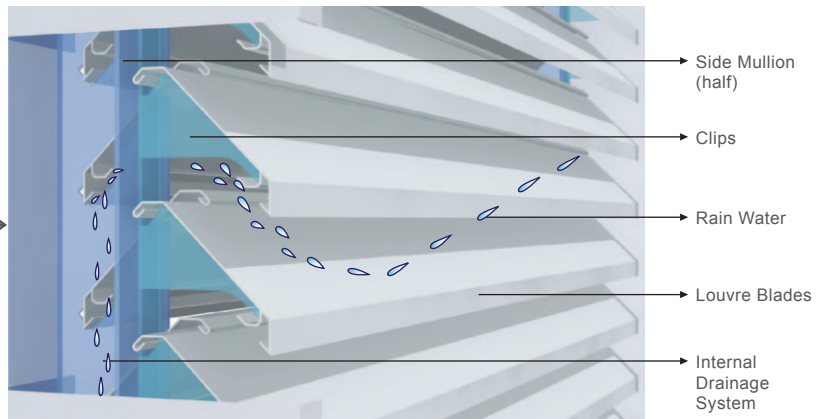
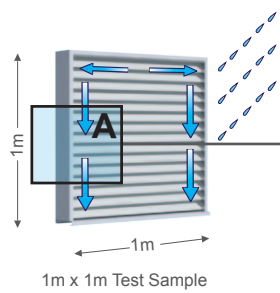
Performance of Internal Drainage System

Test Sample versus Site Sample



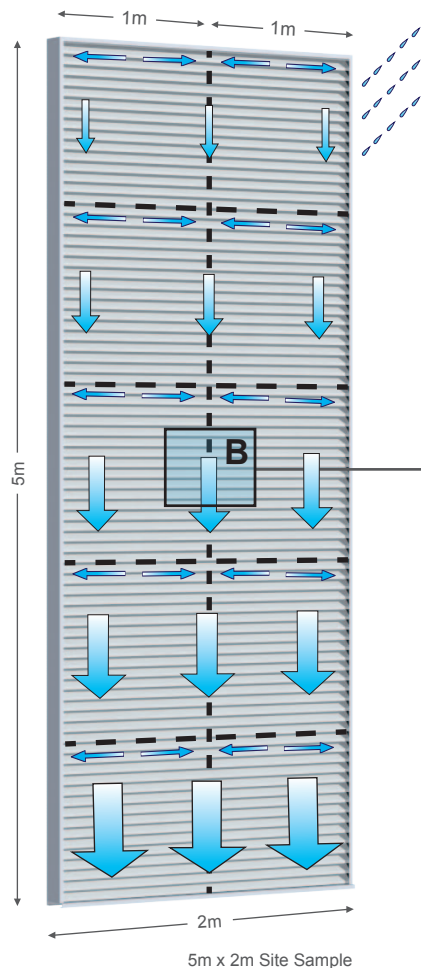
Double Bank Rainproof Ventilation Louvres - Ocean Financial Centre, Singapore

Test Sample

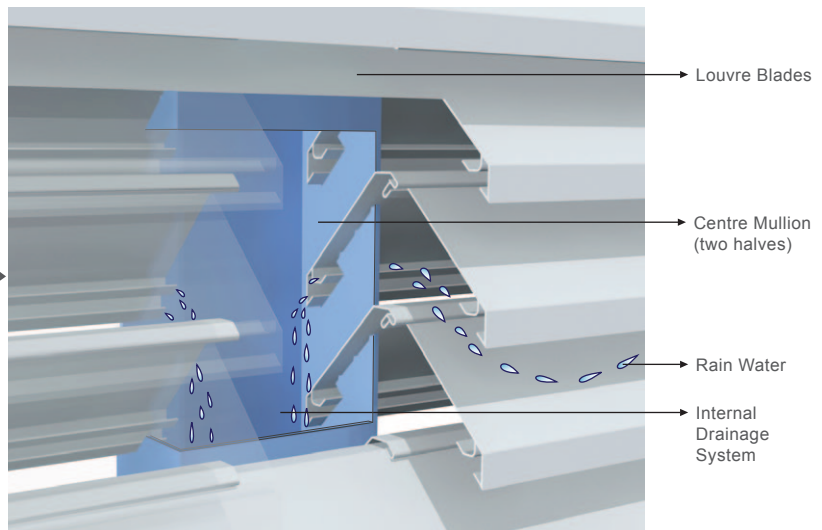


A - Details of internal drainage system (half mullion)

Site Sample



In order to ensure the consistent rain defence effectiveness as per the test result, it is only appropriate to incorporate drainages at every 1m length interval as per the test sample.



B - Details of internal drainage system (centre mullion)

Example:

A Typical louvre panel of 5m x 2m size installed at site will need drainages to filter out rain water. Mega Union louvres have in-built drainages to collect ingress rain water to prevent the formation of cascades.

Single Bank Ventilation Louvres PL1 and PL1/DT



Single Bank Ventilation Louvres - Dahui Plant, Shanghai

GENERAL

Mega Union's single bank ventilation louvre system is mainly used as a material for the outer wall panels of highly ventilated buildings for the purpose of satisfying decorative and shading requirements. The external appearance and installation flexibility of the single bank louvre makes it highly effective for decoration and shading purposes.

Installation	Horizontal, vertical, horizontally inverted
Standard Materials	Aluminium, stainless steel
Surface Treatment	Powder coating, fluorocarbon coating
Supplementary Materials	Mitred edge, silencer board (single-layered / insulated), acoustic components, anti insect net, anti bird net

Performance Summary

A multi-purpose ventilation louvre system that is able to achieve the lowest airflow resistance performance. The blades possess a streamline design without any sharp edges or protrusions in order to ensure the highest effectiveness of the air flow performance.

Water Penetration

Ventilation Rate (m/s)	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
PL1	C	C	D	D	D	D	D	D
PL1/DT	C	C	C	D	D	D	D	D

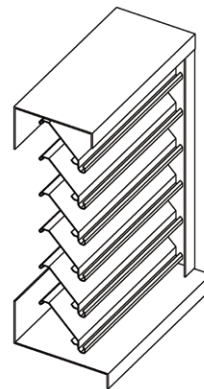
Coefficient of Entry / Discharge

Type of Louvre	Class	Ce
PL1	2	0.34
PL1/DT	3	0.3

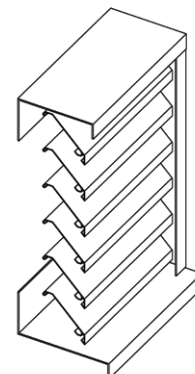
Product Specifications

The blade spacing of Mega Union's single bank ventilation louvre is 60mm. Its overall structure is made of high quality anti-corrosion aluminium 6063T5. The blades of the single bank ventilation louvre should not be installed by drilling or fastening with screws but wedged into the structural supporting mullion so as to allow expansion or contraction along the horizontal direction without being deformed or distorted. In addition, this will ensure a uniform appearance of the louvres.

The maximum distance from the centre of the mullion should not exceed 1250 mm. Support points along the vertical direction served to satisfy the actual air flow pressure requirement should be computed & specified by a structural engineer.

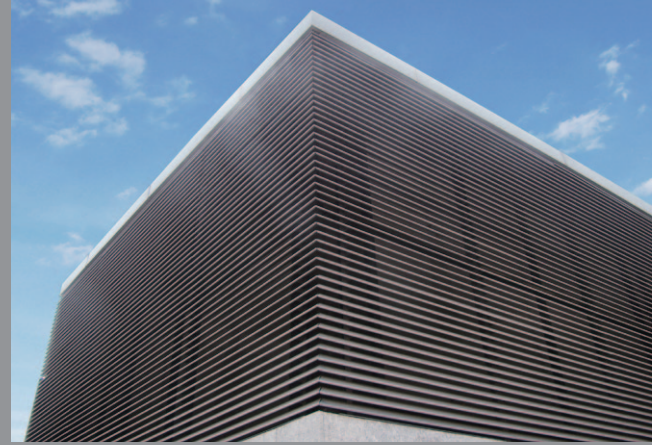


Isometric View of PL1 Louvre

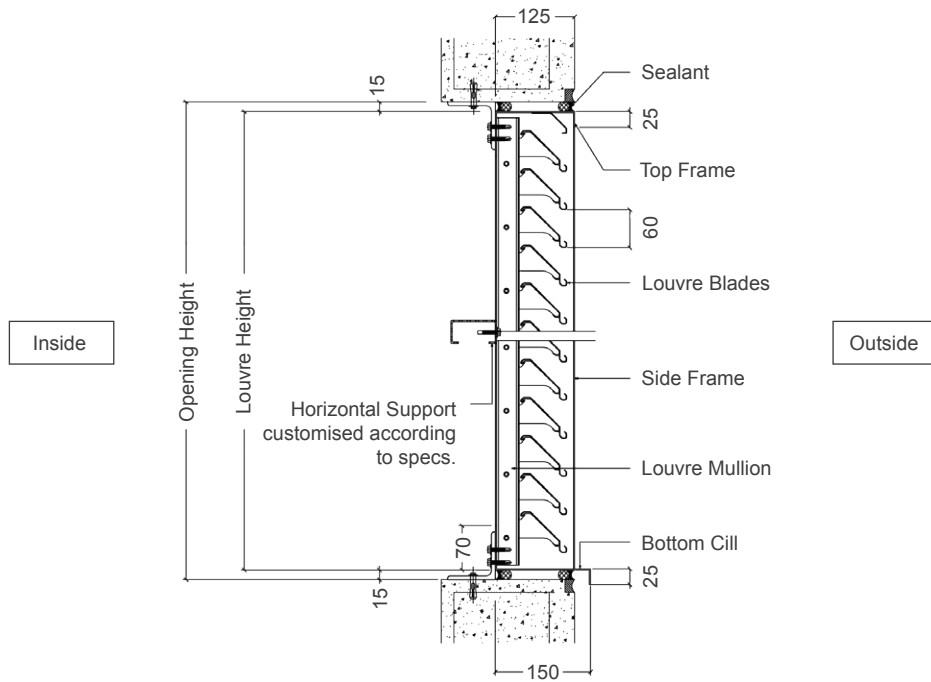


Isometric View of PL1/DT Louvre

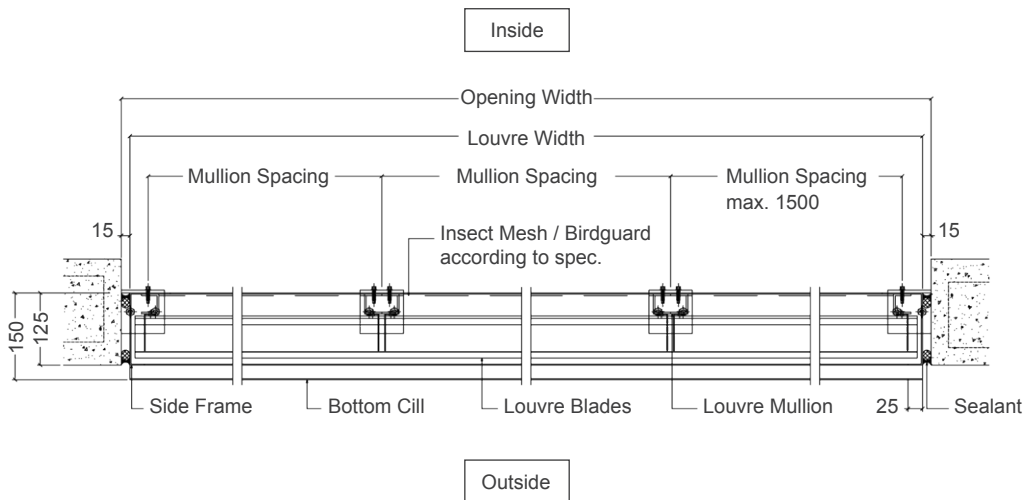
PL1 Installation Details



Single and Double Bank Ventilation Louvres - Beijing MRT, Daxing Line

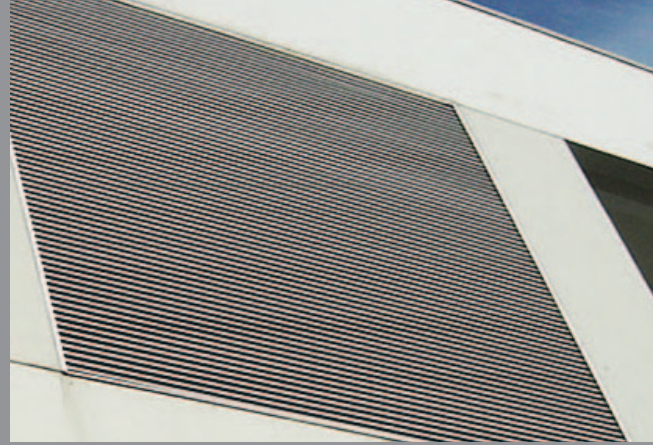


Vertical Cross-Section Diagram

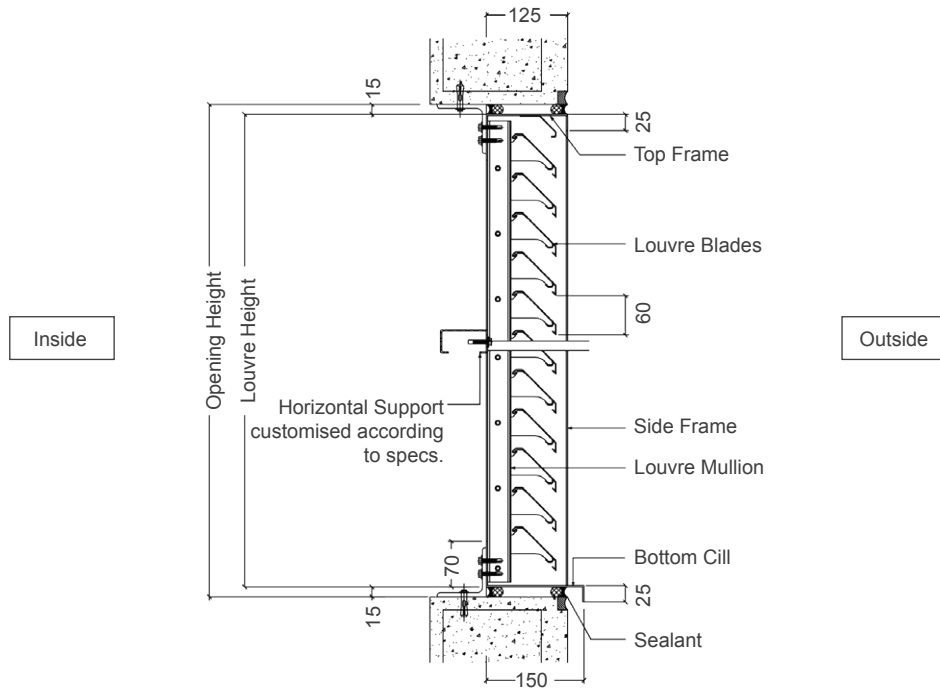


Horizontal Cross-Section Diagram

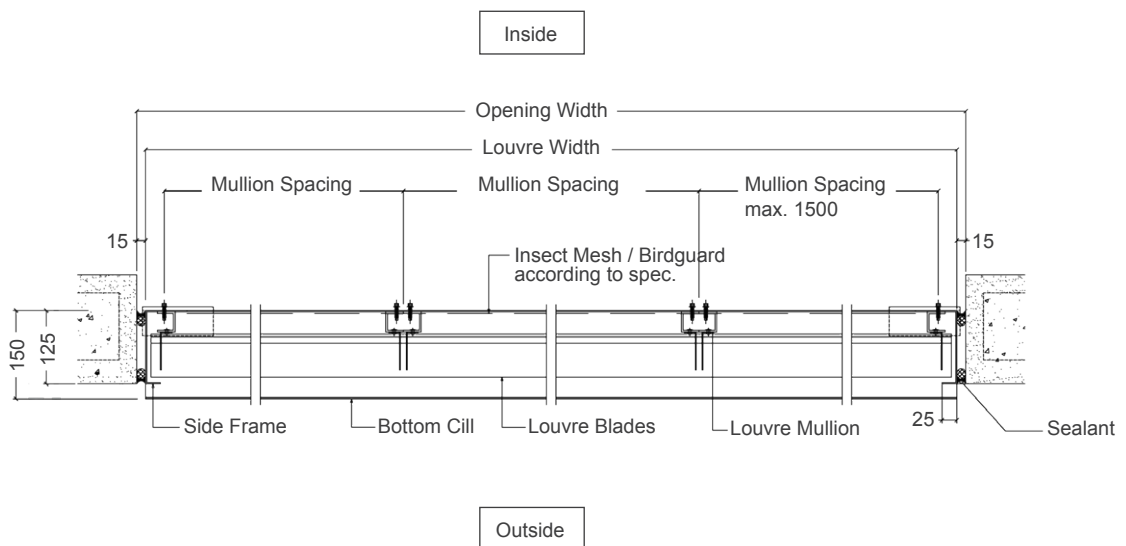
PL1/DT Installation Details



Single Bank Ventilation Louvres - Sino International School, Shanghai

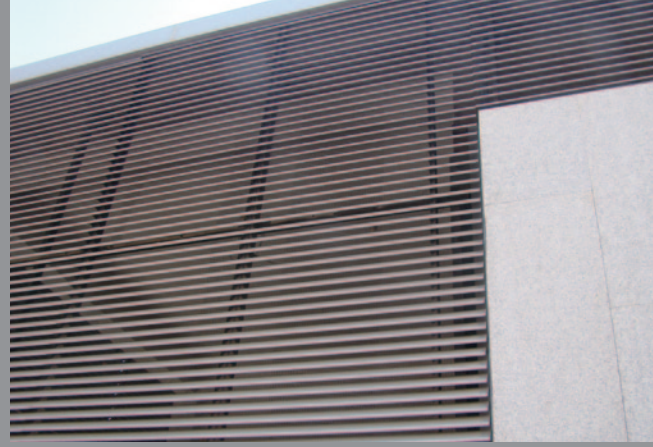


Vertical Cross-Section Diagram



Horizontal Cross-Section Diagram

Track Records



Single and Double Bank Ventilation Louvres - Beijing MRT, Daxing Line



Single Bank Ventilation Louvres - Hangzhou MRT, Line 1



Single Bank & Double Bank Ventilation Louvres - HengLung Plaza, Shenyang



Double Bank Rainproof Ventilation Louvres - Intel Plant, Chengdu



Double Bank Rainproof Ventilation Louvres - City Hall Henglung Plaza, Shenyang



Double Bank Rainproof Ventilation Louvres - Expro Centre, Shanghai

Double Bank Rainproof Ventilation Louvres PL2 and PL2/DT



Double Bank Rainproof Ventilation Louvres - Huamao Trade Centre, Beijing

GENERAL

Mega Union's double bank rainproof ventilation louvre system is not only able to satisfy high rainproof performance requirements but also relatively high ventilation requirements; thereby effectively resolving the conflicts between ventilation and rain protection.

Choices of louvre for high rainproof and ventilation performance: double bank rainproof ventilation louvre and rainproof ventilation louvres with more than 2 layers.

Installation	Horizontal or vertical
Standard Materials	Aluminium, soft steel, stainless steel
Surface Treatment	Mill finishing, sandalwood polyester powder coating, fluorocarbon coating
Supplementary Materials	Mitred edge, silencer board (single-layered / insulated), acoustic components, anti insect net, anti bird net

Performance Summary

A multi-purpose ventilation louvre system that is able to achieve the lowest airflow resistance performance. The blades possess a streamline design without any sharp edges or protrusions in order to ensure the highest effectiveness of the air flow performance.

Water Penetration

Ventilation Rate (m/s)	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
PL2	A	A	A	A	B	C	D	D
PL2/DT	A	A	B	B	C	D	D	D

Coefficient of Entry / Discharge

Type of Louvre	Class	Ce
PL2	3	0.23
PL2/DT	3	0.25

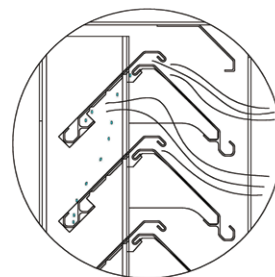
Product Specifications

The blade spacing of Mega Union's double bank rainproof ventilation louvre is 60 mm. Its overall structure is made of anti-corrosion aluminium 6063T5. The louvre blades should not be installed by drilling or fastening with screws but wedged into the structural supporting mullion so as to allow expansion or contraction along the horizontal direction without being deformed or distorted. In addition, this will ensure a uniform appearance of the louvres.

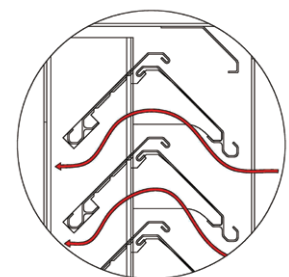
The maximum distance from the centre of the mullion should not exceed 1250 mm. Support points along the vertical direction served to satisfy the actual air flow pressure requirements should be computed & specified by a structural engineer.

How Does The Double Bank Rainproof Ventilation Louvre Work?

1. Air and rain water enters through the spaces between the blades.
2. Rain water flows into the second layer of the louvre and gets intercepted by the drainage channels.
3. Rain water flows along the blades into the hollow upright mullions and gets discharged onto the base plate.



Dispersion of Rain Water

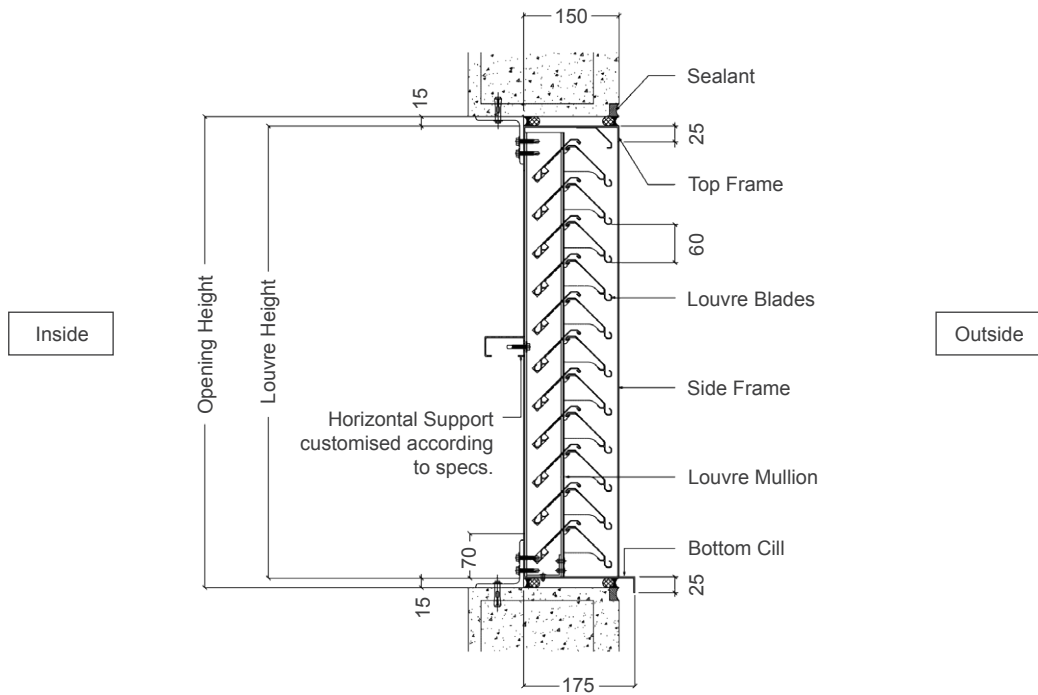


Air Flow

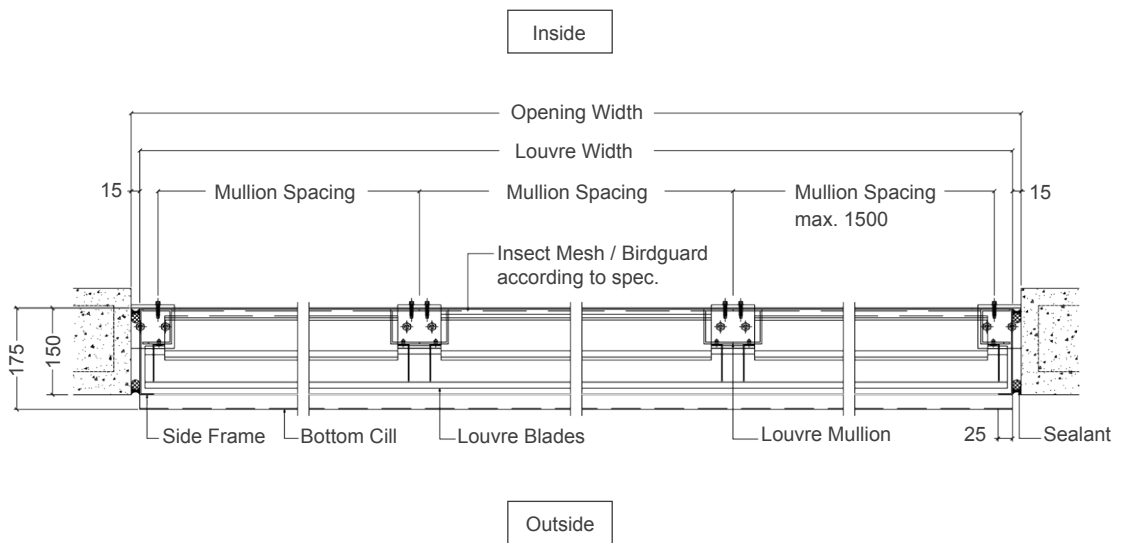
PL2 Installation Details



Double Bank Rainproof Ventilation Louvres - Asia Square Tower 1, Singapore



Vertical Cross-Section Diagram

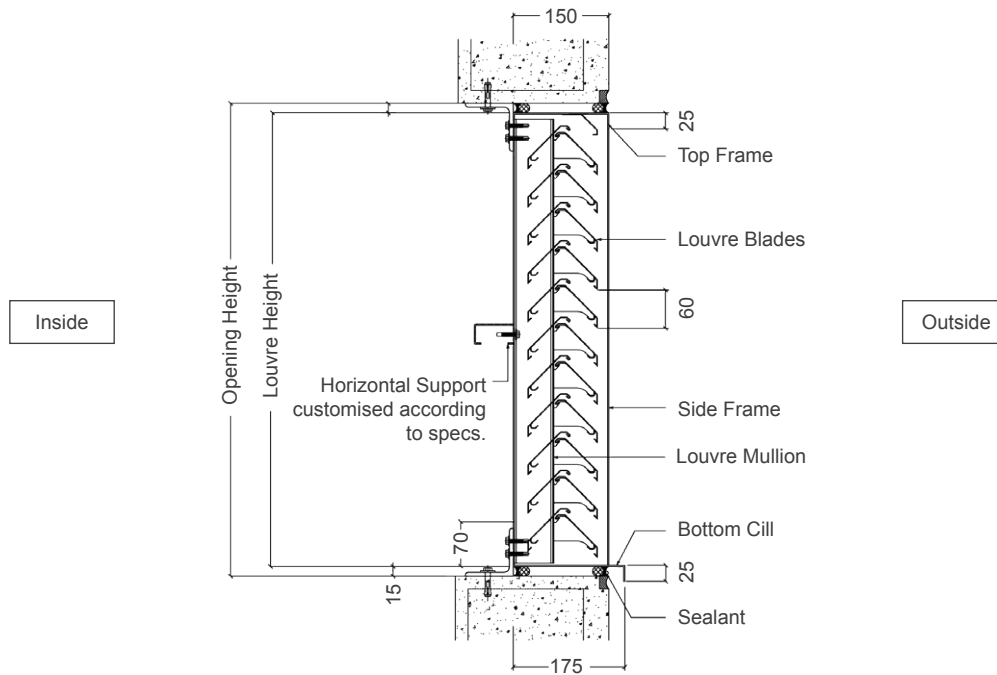


Horizontal Cross-Section Diagram

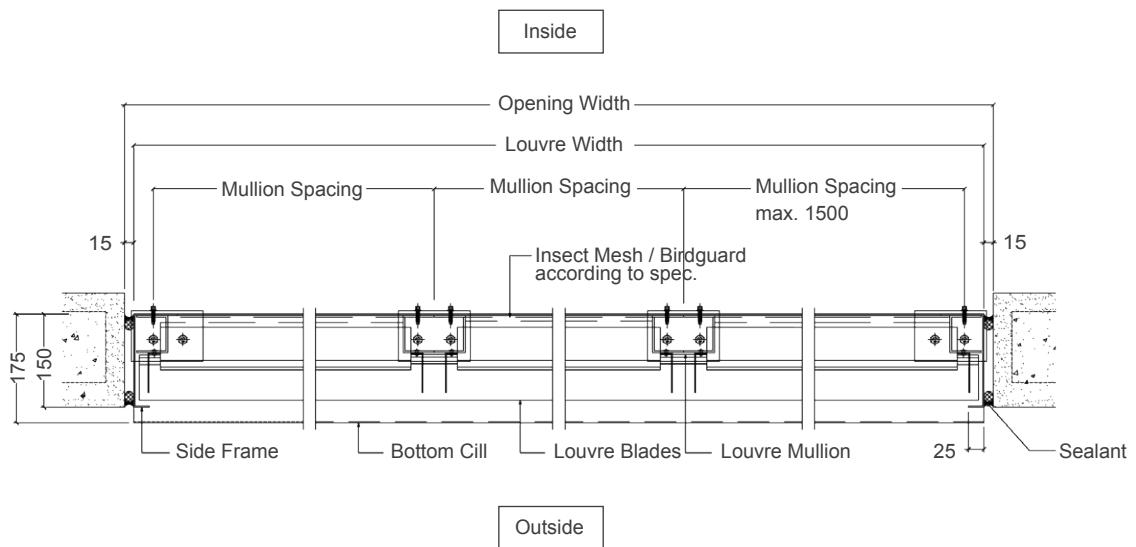
PL2/DT Installation Details



Double Bank Rainproof Ventilation Louvres - Ocean Financial Centre, Singapore



Vertical Cross-Section Diagram



Horizontal Cross-Section Diagram

Track Records



Double Bank and Horizontal Performance Louvres Yingtai Plaza, Beijing



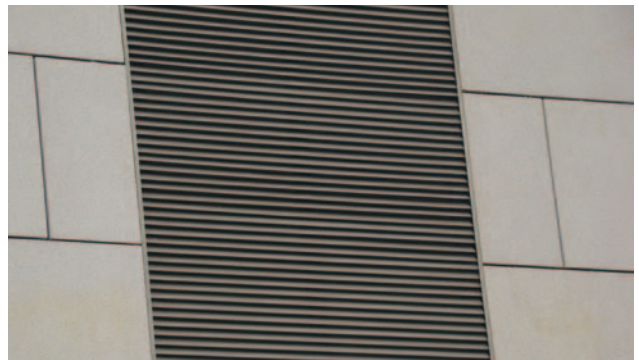
Double Bank Rainproof Ventilation Louvres - Maode Cell Plant, Chongqing



Double Bank Rainproof Ventilation Louvres - Zhong Jian Plaza, Shanghai



Double Bank Rainproof Ventilation Louvres - Yingtai Centre, Beijing



Double Bank Rainproof Ventilation Louvres - Shanghai University



Double Bank Rainproof Ventilation Louvres - Expo Centre, Shanghai

Triple Bank Stormproof Ventilation Louvres PL3 and PL3/DT



Double Bank Rainproof Ventilation Louvres - Beijing Hua Trade Centre

GENERAL

Mega Union's triple bank stormproof louvre system is not only able to satisfy relatively higher ventilation requirements but also relatively higher rainproof performance requirements.

Installation	Horizontal, vertical, horizontally inverted
Standard Materials	Aluminium, stainless steel
Surface Treatment	Powder coating, fluorocarbon coating
Supplementary Materials	Mitred edge, silencer board (single-layered / insulated), acoustic components, anti insect net, anti bird net

Performance Summary

A multi-purpose ventilation louvre system that is able to achieve the lowest airflow resistance performance. The blades possess a streamline design without any sharp edges or protrusions in order to ensure the highest effectiveness of the air flow performance.

Water Penetration

Ventilation Rate (m/s)	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
PL3	A	A	A	A	A	C	D	D
PL3/DT	A	A	A	A	A	B	D	D

Coefficient of Entry / Discharge

Type of Louvre	Class	Ce
PL3	3	0.2
PL3/DT	4	0.19

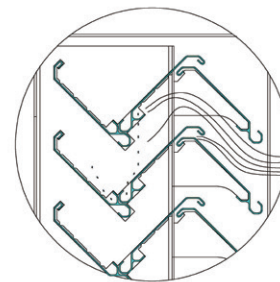
Product Specifications

The blade spacing of Mega Union's triple bank stormproof louvre is 60mm. Its overall structure is made of anti-corrosion aluminium 6063T5. The louvre blades should not be installed by drilling or fastening with screws but wedged into the structural supporting

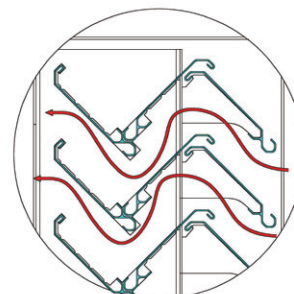
mullion so as to allow expansion or contraction along the horizontal direction without being deformed or distorted. In addition, this will ensure a uniform appearance of the louvres. The maximum distance from the centre of the mullion should not exceed 1250mm. Support points along the vertical direction served to satisfy the actual air flow pressure requirement should be computed & specified by a structural engineer.

How Does The Triple Bank Stormproof Ventilation Louvre Work?

1. Air and rain water enters through the spaces between the blades.
2. Rain water flows into the second, the third layer of the louvre and gets intercepted by drainage channels.
3. Rain water flows along the vanes into the hollow upright mullions and gets discharged onto the base plate.



Dispersion of Rain Water

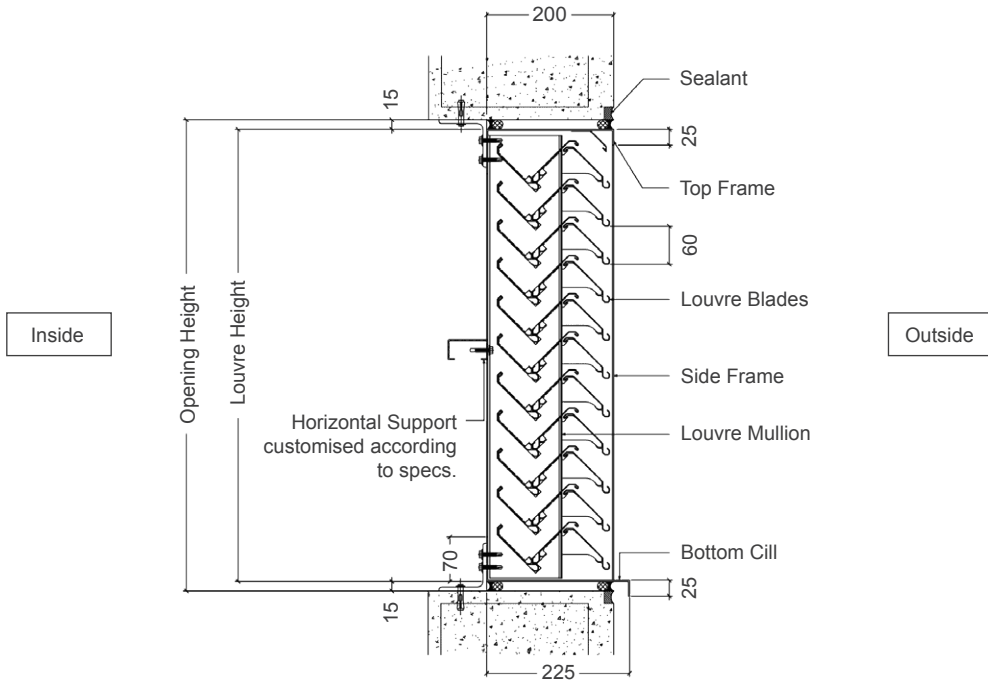


Air Flow

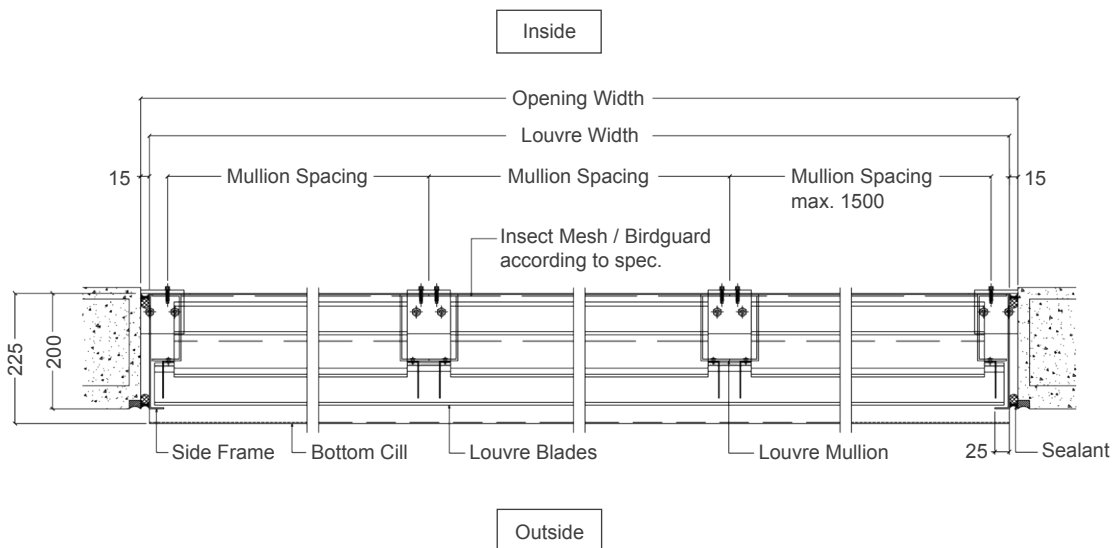
PL3 Installation Details



Double Bank Rainproof Ventilation Louvres - Beijing MRT, Daxing Line



Vertical Cross-Section Diagram

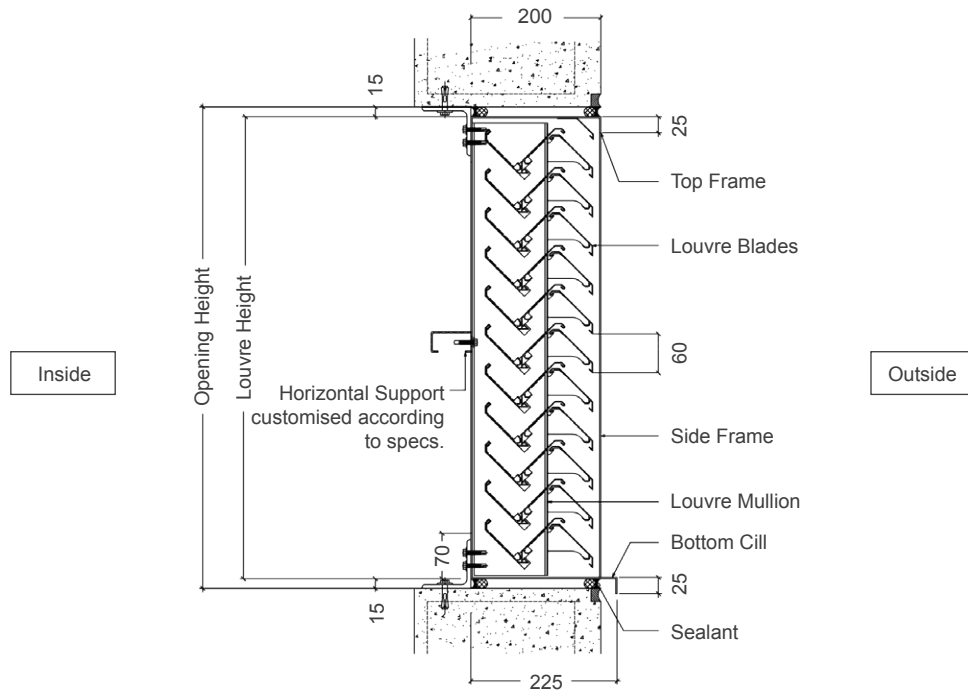


Horizontal Cross-Section Diagram

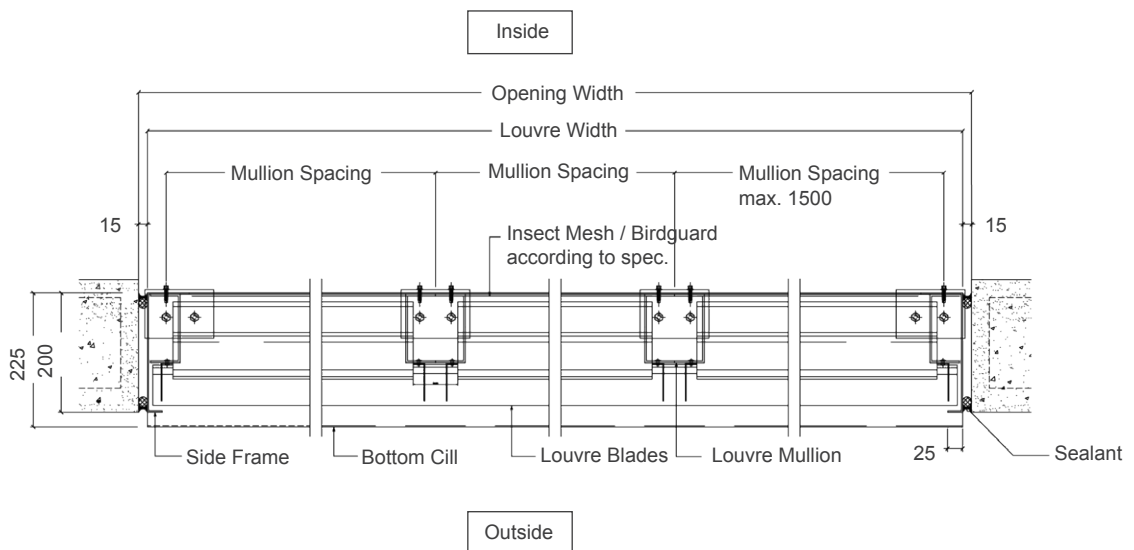
PL3/DT Installation Details



Double Bank Rainproof Ventilation Louvres - Lot One Shoppers' Mall, Singapore



Vertical Cross-Section Diagram

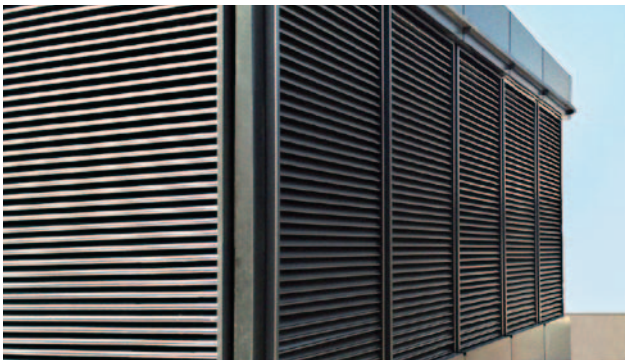


Horizontal Cross-Section Diagram

Track Records



Horizontal Performance Louvres - Hockey Stadium, Beijing



Double Bank Rainproof Ventilation Louvres - Expo Centre, Shanghai



Horizontal Performance Louvres - Beijing MRT, Line 4



Horizontal Performance Louvres - Beijing MRT, Line 4



Horizontal Performance Louvres - Beijing MRT, Line 4



Single Bank and Double Bank Ventilation Louvres - Zhongjie Heng Lung Plaza, Shenyang

Series of Performance Louvres



Horizontal Performance Louvres - Beijing MRT, Line 4

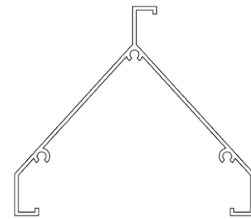
In addition to PL1, PL2 and PL3 rainproof ventilation louvres, Mega Union has also designed the following types of rainproof ventilation louvre systems for your architectural requirements.

PLR1

Chevron Rainproof Ventilation Louvre - This is a type of single-layer general purpose louvre possessing a relatively lower effective ventilation rate and excellent rainproof capability, and is not easily deformed.

Water Penetration

Ventilation Rate (m/s)	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
PLR1	A	A	A	B	B	C	D	D



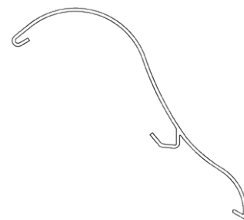
Chevron Rainproof Ventilation Louvres - PLR1

PLR2

Streamline Rainproof Ventilation Louvre - These louvres are able to bend to a certain extent without being easily deformed, and possesses the best airflow performance and excellent rainproof capability.

Water Penetration

Ventilation Rate (m/s)	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
PLR2	C	C	C	D	D	D	D	D



Streamline Rainproof Ventilation Louvres - PLR2

PHL

Horizontal Performance Louvre - This is a type of ventilation louvre that can be horizontally installed onto the roof and possesses high ventilation performance. It is suitable for use in locations require lots of ventilation.

Water Penetration

Ventilation Rate (m/s)	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
PHL	A	A	A	B	B	B	C	D



Horizontal Performance Louvres - PHL

Structural Glazing



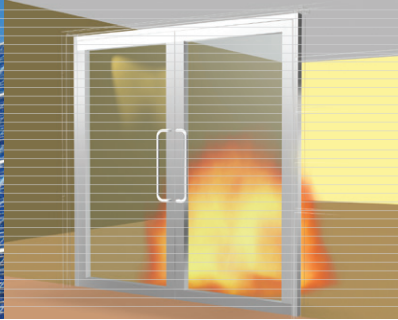
HPLED Streetlights



Photovoltaic Cells



Fire Rated Glass Door

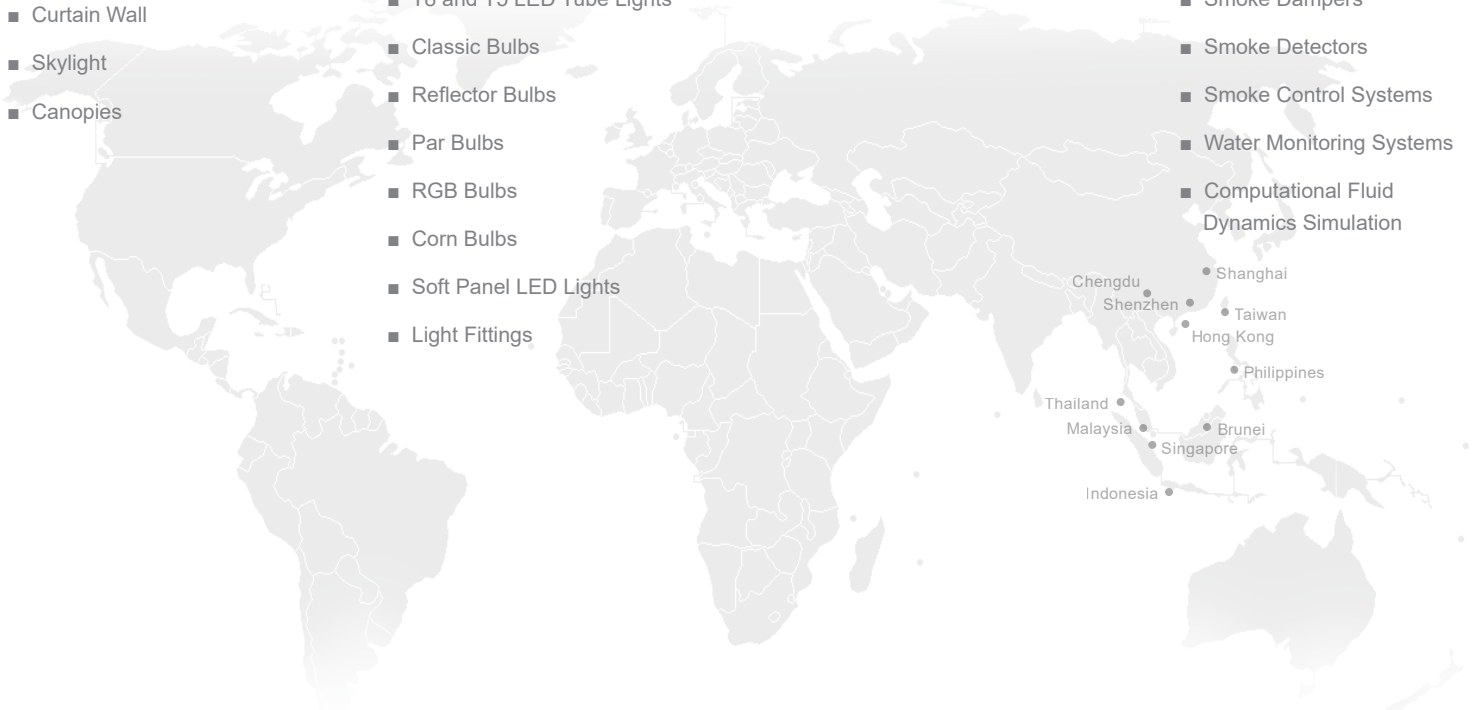


- Glass Solar Shading Systems
- Single Bank Ventilation Louvres
- Double Bank Rainproof Ventilation Louvres
- Triple Bank Stormproof Ventilation Louvres
- Structural Glazing
- Curtain Wall
- Skylight
- Canopies

- Streetlights
- Projection Lights
- Flood Lights
- Highbay Industrial Lights
- High Performance Industrial Lights
- Wallwasher Industrial Lights
- T8 and T5 LED Tube Lights
- Classic Bulbs
- Reflector Bulbs
- Par Bulbs
- RGB Bulbs
- Corn Bulbs
- Soft Panel LED Lights
- Light Fittings

- Fixed / Controllable Solar Shading System with Photovoltaic Cells
- Solar Powered LED Lighting Systems
- Solar Cell Roofing Systems

- Automatic Smoke Curtains
- Automatic Fire Curtains
- Fixed Smoke Barriers
- Fire Rated Glass Doors
- Natural / Powered Smoke Exhaust Ventilators
- Smoke Exhaust Fans
- Smoke Dampers
- Smoke Detectors
- Smoke Control Systems
- Water Monitoring Systems
- Computational Fluid Dynamics Simulation



iDAs^{tech}
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iDAS Technology Private Limited 11 Kallang Place #07-08 Singapore 339155
TEL +65 6745 3933 | FAX +65 6745 7737 | Email sales@idastech.com.sg | www.idastech.com.sg

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