



**ARCADIA HUFF<sup>®</sup>**  
FIRE AND SMOKE VENTILATION





## HUFF® FIRE AND SMOKE SYSTEM

### ARCADIA®

Arcadia® is one of Australia's leading manufacturers and suppliers of natural ventilation, louvre and sun shading systems. Arcadia® products control the natural elements of the sun, wind and light to create energy effective and comfortable conditions in industrial and commercial buildings.

The successful integration of Arcadia® products by architects and designers is supported by the experienced management and engineering team at Arcadia.

If you would like to find out more about the range of products at Arcadia, please visit [www.grouparcadia.com.au](http://www.grouparcadia.com.au)

Arcadia® maintains an ongoing research and testing program in the quest for product improvement and in consequence the information provided in this brochure may be subject to change without notice.

# WALL & ROOF VENTILATION SYSTEM

## OVERVIEW

The Arcadia Huff® Fire and Smoke Ventilation System is an automatic ventilator purpose engineered for exhausting heat and smoke in the unfortunate event of a fire. Whilst providing an economical solution for automatic fire venting, the Arcadia Huff® Fire and Smoke Ventilation offers a low profile appearance and can be manually operated to give natural ventilation comfort and allow the entry of day light. When closed the Huff® ventilator prevents rain entry and minimizes heat loss in winter.

The Huff® ventilator has undergone exhaustive testing at the Experimental Building Station, a well-recognised testing authority internationally. The testing was carried out in strict conformity with the relevant Australian Standards and provides conclusive evidence of compliance.

## BENEFITS

- Facilitates fire fighting.
- Automated fire ventilator specifically engineered and tested to Australian Standards.
- Day to day natural ventilation and lighting.
- Cost effective.
- Minimal running & maintenance costs.
- Suitable for roof and wall mounting.



## FEATURES

- High performance aerodynamic free area.
- Full control: manual, pneumatic and electric options.
- Preassembled: simple economical installation.
- Low Profile: unobtrusive, neat, aesthetically pleasing.
- Fail-safe operation.
- Lightweight and durable.

We are available to answer your questions. Call our experts who will talk through your design requirements and will be more than happy to assist you.



# DESIGN SCIENCE

## HISTORY

The concept of fire venting embodied in the Huff® Smoke and Fire Ventilator was developed in England following exhaustive studies of a number of serious fires in industrial plants and warehouses. The tragedy of lost lives and destroyed property together with ever increasing costs of fire insurance were catalysts for both Government and Building Authorities to begin to investigate the lessons of history. Fire prevention and fire control began to be taken seriously and to be regarded as a science. One compelling fact to emerge from the studies conducted was the enormous advantage of properly engineered automatic smoke ventilation.

## TYPICAL SCENARIO WITHOUT SMOKE VENTILATORS

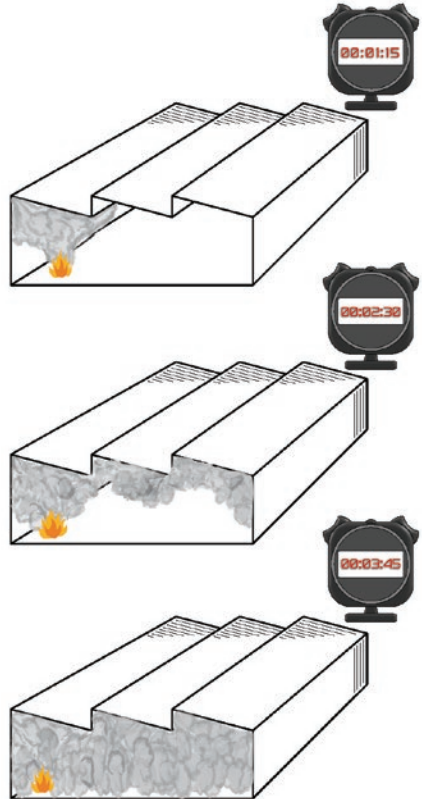
To a layperson, the idea of providing ventilation to a fire may seem strange. Common knowledge indicates that depriving a fire of oxygen (by closing up the building) will extinguish it. This supposition overlooks that fact that virtually any industrial or commercial building contains enough oxygen to burn it to destruction. Fire fighters talk firsthand of the huge problems they encounter when fire breaks out in buildings without automatic fire ventilators.

In such a situation the fire travels laterally, often at frightening speed, as it reaches for more oxygen. The resulting thick smoke, heat and toxic gases trapped under the roof roll through the building rapidly filling the entire complex and frustrating the efforts of fire fighters to enter the building, determine the source of the fire, and begin the fight to save lives and property. As the smoke layer builds and spreads, it heats the building membrane and contents which can cause combustible goods in the building to ignite, contributing to the spread of fire. Often the build-up of poisonous gas and dense black smoke is such as to even thwart the entry of firefighters equipped with sophisticated breathing apparatus. Serious explosions are a significant risk.

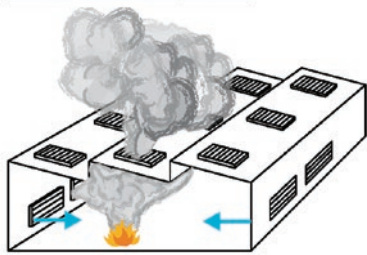
## THE SMOKE VENTILATION ADVANTAGE

In contrast, using the principles of ventilation and containment, a smoke ventilation system will keep smoke above head height and prevent it spreading around the building.

The incorporation of an engineered fire ventilation system will, in the event of a fire, automatically release heat, smoke and general products of combustion. Fire fighters are then able to pinpoint approach and have access to the source of the fire. Huff® ventilators reduce the lateral spread of the fire and smoke, prevent explosions by quickly exhausting partially burnt gases and reduce damage by enabling fire fighters to apply countermeasures directly onto the fire.



In less than five minutes this is what can happen in a building without adequate fire ventilation.



With Arcadia Huff® Smoke and Fire ventilators, smoke and toxic fumes are contained in a localised area, and the smoke plume is an immediately visible signal that a fire has started.



# UNDERSTANDING FIRE & SMOKE VENTILATION

## INLET VENTILATION

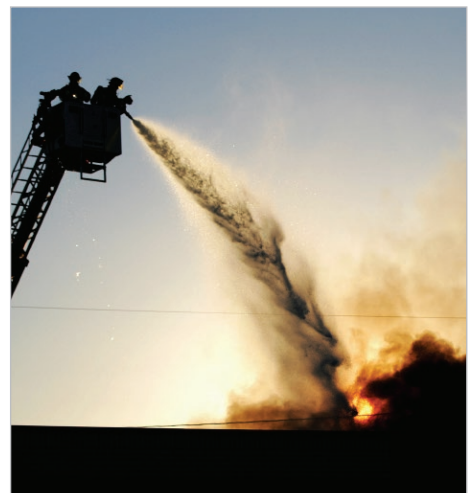
Inlet air should be supplied to ensure the efficient operation of the smoke ventilation system and to balance the smoke and gases being extracted by way of automatic low-level Huff® Smoke and Fire Ventilators mounted on the walls.

## INTEGRATION WITH SMOKE CURTAINS AND FIRE SPRINKLERS

The Huff® Smoke and Fire ventilator works extremely well in conjunction with both smoke curtains and fire sprinklers. The misconception that smoke ventilators impact the performance of sprinkler systems has been clarified in recent years. Fire sprinklers will essentially limit fire growth and spread, however they will not reduce smoke damage within the building. Ventilation will aid Fire-fighters to fight the fire, reduce fire intensity, and assist escape of personnel. Smoke draught curtains in large warehouses can be fixed where headroom is not an issue, alternatively drop down smoke draught curtains can be utilised where fixed curtains are not suitable.

## KEY ADVANTAGES

- Increased time for occupants to escape before a building becomes smoke clogged with toxic fumes that disorientate and kill within minutes.
- Firefighters can pinpoint the fire and access the building to put out the fire as quickly as possible, minimising lost times and clean-up operations.
- In industrial situations, it reduces the likelihood of loss of production and stock.
- If the smoke is kept at high level, fire-fighters will be able to see the fire and therefore extinguish more easily and effectively.
- It can permit fire engineers to safely design buildings with greater travel distances to exits.
- Smoke ventilators provide the ability to naturally ventilate buildings in an environmentally friendly manner in comparison to mechanical ventilation
- Heat & Smoke ventilators compliment fire sprinklers & smoke curtains providing a complete comprehensive fire solution.



# APPLICATION & MATERIALS

## APPLICATIONS

The Arcadia Huff® ventilator is designed to suit a wide range of applications and due to its high coefficient discharge, is ideal where both fire and natural draft ventilation is required.

### TYPICAL BUILDING TYPES INCLUDE:

- Industrial & Commercial Buildings
- Foundries
- Workshops
- Aircraft Hangers
- Superstores & Warehouses
- Institutional and Public Buildings
- Gallery, Theatres & Stages
- Gymnasium & Atrium
- Mining processing plants
- Transport and service centres

As a certified fire ventilator Huff® can be utilised on projects requiring compliance with the Building Code of Australia requirement for smoke and heat vents. Architects and Engineers are encouraged to contact Arcadia regarding design requirements for both BCA compliance and natural draft ventilation problems.

## MATERIALS

Arcadia Huff® units are manufactured from engineered components to meet specified requirements. Huff® vents can be manufactured in:

- Zinalume® \*
- Colorbond® \*
- Aluminium
- Anodised
- Powdercoat
- Other typical roofing and walling materials

*\*Colorbond® and Zinalume® are a registered trademark of Bluescope Steel. Arcadia reserves the right to use alternative similar products to Zinalume® and Colorbond® materials.*



# MAINTENANCE

## MAINTENANCE

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The Huff® Smoke and Fire Ventilators are low maintenance and trouble free but according to Australian Standards AS 1851-2005 all fire ventilation systems require annual inspection and biannual testing.

In accordance with good practice, all components including drainage channels should be inspected regularly and any debris or silica and salt encrustations immediately removed. The regularity of checks is dictated by environments, e.g. Heavy pollution, salty marine exposure, require more frequent checks etc.

The inclusion of the 'auto exercise function' in the control module is recommended and acts as a visual reminder that the ventilators are operable and must be kept free of deleterious matter.



# HUFF® FIRE VENTILATION REQUIREMENTS

## FIRE VENTILATION DETERMINATION

Many buildings require fire ventilators for smoke and heat exhaust as specified by a fire engineer or to satisfy AS2665 as required by the Building Code of Australia (Parts C2 & E2). The quantity and size of the ventilator can generally be determined as follows:

### EFFECTIVE AERODYNAMIC AREA (EAA) EXAMPLE

STEP	DESCRIPTION	EXAMPLE
1.	Obtain total effective aerodynamic area (EAA) in m <sup>2</sup> required for building or building zone.	Bldg EAA = 30m <sup>2</sup>
2.	Determine quantity of ventilators required.	Required ventilator quantity is 16
3.	Divide quantity required into total EAA to determine required EAA for each ventilator.	$\frac{EAA}{QTY} = \frac{30}{16} = 1.88$
4.	Using Table 1.1 or 1.2, select an appropriate ventilator which has required or greater performance.	Select model Huff® R1224 which has EAA of 2.056
5.	Specify ventilators as per 'Draft specification pg 16'	Specify model HUFF® R1224
6.	Ensure inlet ventilation is provided to meet requirements of Australian Standards.	

For assistance with meeting the full requirements of BCA and AS2665 for determining EAA for your building, please contact Arcadia.

## NATURAL DRAFT VENTILATION DETERMINATION

The Huff® ventilator has a very high discharge exhaust capacity when compared with conventional ventilators and, being an operable ventilator, it provides an ideal option for natural draft ventilation. It is especially appropriate for areas requiring discharge of heat and fumes.

The quantity and size of Huff® ventilators for natural draft ventilation can generally be determined as follows:

1. Obtain total volume of area to be ventilated (Width x Length x Height).
2. Multiply volume by required air changes per hour and convert to m<sup>3</sup>/second.
3. Divide m<sup>3</sup>/second value by numbers of ventilators desired (suggest 6-8m spacing).
4. Determine appropriate ventilator model from performance table 2.0 below.
5. Specify ventilators as per 'draft specification' – Page 14

For assistance with calculating your buildings natural draft ventilation requirements please contact Arcadia.

Table 2.0 provides Arcadia Huff® exhaust capacity in m<sup>3</sup>/second based on 8m effective building stack height, 6°C temperature difference and with effective inlet air equal to 150% of exhaust area.

HUFF® NATURAL DRAFT EXHAUST CAPACITIES   m <sup>3</sup> /sec <sup>2</sup>							TABLE 2.0
EXTERNAL WINDSPEED	HUFF® R1212	HUFF® R1224	HUFF® R1230	HUFF® R1512	HUFF® R1524	HUFF® R1530	
0km/hr	0.970	2.108	2.678	1.237	2.687	3.412	
4km/hr	1.086	2.361	3.026	1.385	3.009	3.821	
6km/hr	1.455	3.162	4.017	1.856	4.031	5.118	
12km/hr	1.940	4.216	5.356	2.474	5.374	6.824	

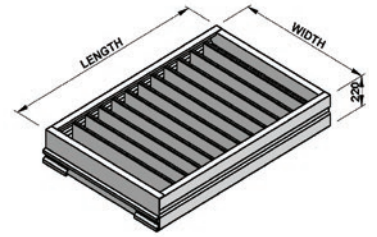




# HUFF® FIRE VENTILATION SIZES

## FIRE VENTILATION DETERMINATION

Many buildings require fire ventilators for smoke and heat exhaust as specified by a fire engineer or to satisfy AS2665 as required by the Building Code of Australia (Parts C2 & E2). The quantity and size of the ventilator can generally be determined as follows:



HUFF® ROOF MOUNTED UNITS

TABLE 1.1

Huff® Model	R1012	R1018	R1024	R1030	R1112	R1118	R1124	R1130	R1212	R1218	R1224	R1230	R1312	R1318	R1324	R1330	R1412	R1418	R1424	R1430	R1512	R1518	R1524	R1530
Vent Width mm	1000	1000	1000	1000	1100	1100	1100	1100	1100	1100	1200	1200	1200	1300	1300	1300	1400	1400	1400	1400	1500	1500	1500	1500
Vent Length mm	1180	1790	2400	3010	1180	1790	2400	3010	1180	1790	2400	3010	1180	1790	2400	3010	1180	1790	2400	3010	1180	1790	2400	3010
Weight Inc Base Kg	32	43	53	64	34	45	56	64	34	45	58	70	37	49	61	73	39	51	63	76	40	53	66	79
*EAA m <sup>2</sup>	0.780	1.243	1.705	2.167	0.863	1.375	1.886	2.397	0.946	1.507	2.067	2.628	1.029	1.639	2.249	2.858	1.112	1.771	2.430	3.089	1.195	1.903	2.611	3.319

\* Effective Aerodynamic Area (EAA)

HUFF® WALL MOUNTED UNITS

TABLE 1.2

Huff® Model	W1015	W1020	W1025	W1030	W1035	W1115	W1120	W1125	W1130	W1135	W1215	W1220	W1225	W1230	W1235	W1315	W1320	W1325	W1330	W1335	W1415	W1420	W1425	W1430	W1435	W1515	W1520	W1525	W1530	W1535
Vent Width mm	1000	1000	1000	1000	1000	1100	1100	1100	1100	110	1200	1200	1200	1200	1200	1300	1300	1300	1300	1300	1400	1400	1400	1400	1400	1500	1500	1500	1500	1500
Vent Length mm	1500	2000	2500	3000	3500	1500	2000	2500	3000	3500	1500	2000	2500	3000	3500	1500	2000	2500	3000	3500	1500	2000	2500	3000	3500	1500	2000	2500	3000	3500
Weight Inc Base Kg	34	42	51	60	68	36	45	54	63	71	38	47	57	66	75	40	49	60	69	78	41	51	62	72	82	43	53	65	75	85
EAA m <sup>2</sup>	1.120	1.456	1.850	2.243	2.636	1.232	1.602	2.035	2.467	2.900	1.344	1.748	2.220	2.692	3.164	1.456	1.893	2.405	2.916	3.427	1.568	2.039	2.590	3.140	3.691	1.681	2.185	2.775	3.365	3.955

\* Effective Aerodynamic Area (EAA)



# HUFF® WALL VENTILATION

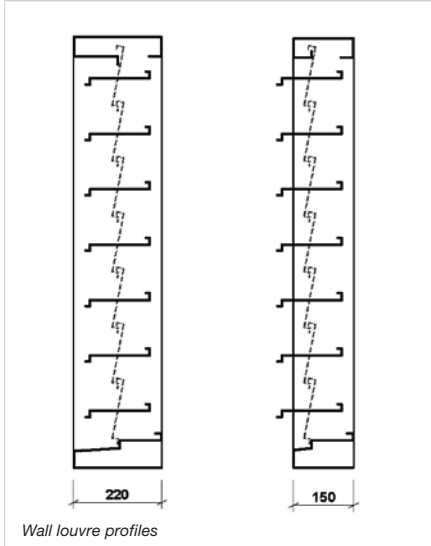


Huff® Smoke and Fire Wall Ventilator

## TYPICAL FIXING DETAILS

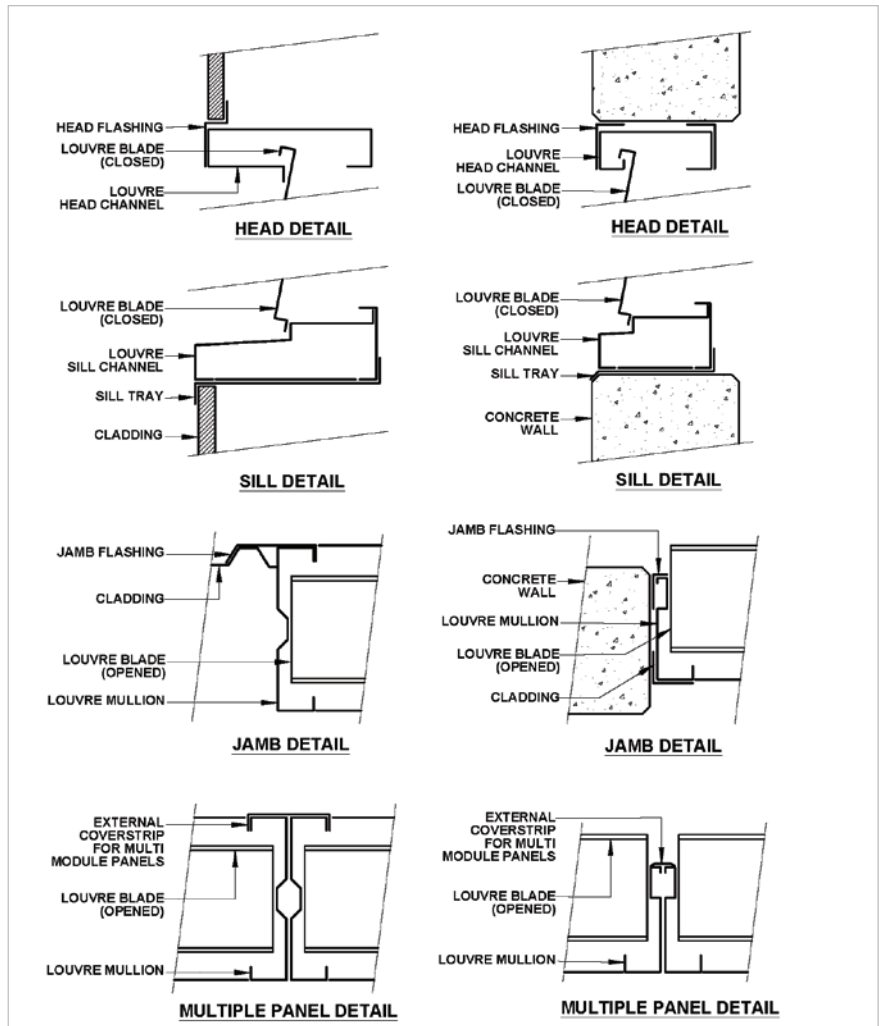
HUFF® W220 and HUFF® W150

TABLE 1.3



Arcadia Huff® Smoke and Fire Wall louvres offer designers two depths. The Huff® W220 is the standard model with a 220mm deep frame. This model suits most applications and enables the blades to be always within the louvre frame.

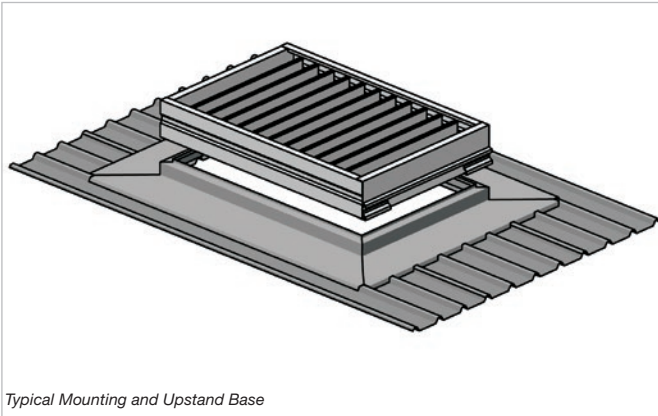
Where depth restrictions exist Arcadia offer a low profile 150mm louvre frame. It is particularly good for concrete wall applications and high level openings where blade protrusion is not a concern.



# HUFF® ROOF VENTILATION

## MOUNTING & UPSTAND BASES

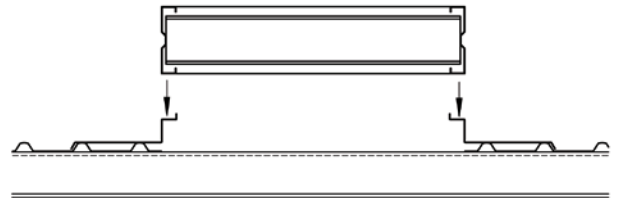
Huff® base selected to suit roof type and position. See typical details below:



Typical Mounting and Upstand Base



Tapered Base Option



Typical Base Details for Sheetting

The Huff® Fire Roof Ventilator base featured above is shown with the tapered base, which is utilised when the roof is pitched less than 7%.



# HUFF® OPTIONS

## CONTROL SYSTEMS

Huff® ventilators are available with a variety of controls to suit all applications. The weatherproof louvre blades can be opened and closed manually or automatically. When closed they exclude rain during inclement weather.

Most Huff® models incorporate a back-up fusible link.

## THREE MODES OF CONTROL

- Manual
- Pneumatic
- Electric

Arcadia Huff® units with electric or pneumatic operation are controlled by a Huff® control module, specifically designed to suit preferred type of operation required, including integration with the fire detection system. (See sub heading Huff® Control Module – see Page 11)



## MANUAL SYSTEMS

M/F: Manual roof-top test control, for operation or testing of ventilator at roof level only.

RC/F: Manual controls by means of remote control pull cord system or hand winder at ground level.

## PNEUMATIC SYSTEMS

P/F PTO: Pneumatic operation by means of a control panel and compressed air-line to open the ventilator with air pressure.

P/F PTC: Pneumatic operation by means of a control panel and compressed air-line to maintain ventilator closed under air pressure and auto-open on pressure release.

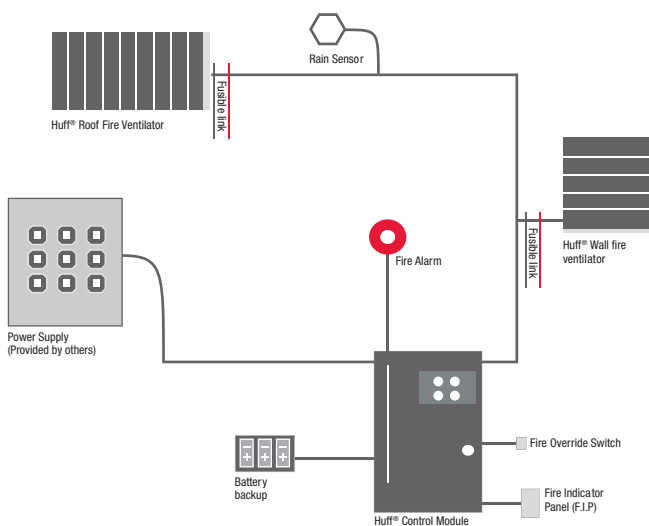
## ELECTRIC SYSTEMS

E/F: Electric operation by means of 24v or 240v motor to open and close the ventilators.

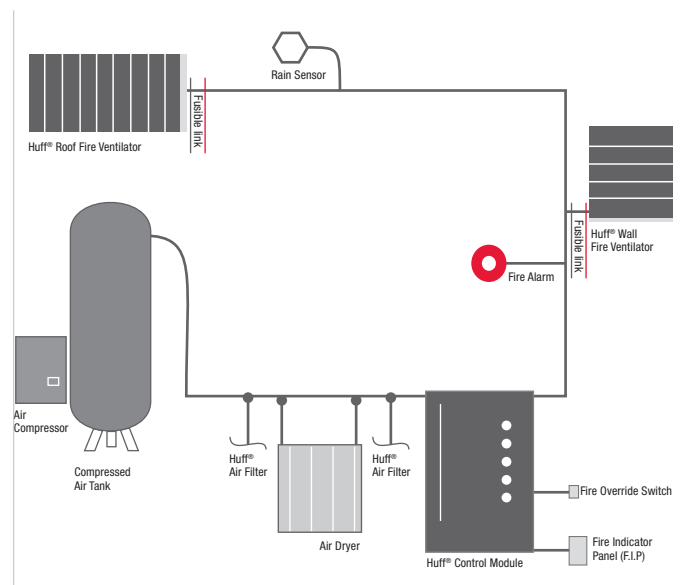
EF/SR: Electric operation by means of 24v or 240v motor, to open and close the ventilators, including built-in spring-to-open function in the event of a fire signal. (Spring to close option also available).



## ELECTRIC HUFF® FIRE AND SMOKE VENTILATION CONTROL



## PNEUMATIC HUFF® FIRE AND SMOKE VENTILATION CONTROL



# HUFF® ACCESSORIES

## HUFF® CONTROL MODULE

Huff® control module can be specially designed to control both the pneumatic and electric systems. In addition the control module can incorporate any or all of the following special features:

- RAINBRAIN rain sensor for auto closing (during inclement weather)
- UPS battery powered backup (overcoming power interruption)
- Zone coupling allowing control of separate area of a building
- Auto exercise function (see Maintenance)
- Auto timer operation (to accommodate demand ventilation requirements)
- Coupling to fire indication panel
- Manual over-ride for fire brigade use.



Control Module

## HUFF® ACCESSORIES

Huff® is available with various accessories to suit your particular project requirements:

- Bird Mesh
- Insect Mesh
- Security screens
- Hail Screens
- Electrothermal fusible links
- Nonstandard fusible link ratings.



# HUFF® | SMOKE & FIRE VENTILATION SPECIFICATION

## HUFF® SMOKE & FIRE VENTILATOR

Heat and smoke release ventilators shall be Arcadia Huff® ventilators located to suit the requirements of AS2665 or (as shown on the drawings).

Huff® units shall be manufactured with up-stand flashing and main frames from (select from **A** Below), be complete with (select from **A** Below) blades, and be constructed of materials and gauges standard with the manufacturer. The Huff® Ventilator shall be fitted with the following accessories (select from **B** Below)

## HUFF® VENTILATOR OPERATION

Each ventilator shall be operated by means of (select from **C** below) control using type (select from section **D** below) and be fitted with a fusible link to ensure fail safe operation in event of fire.

Ventilators shall have a tested and certified coefficient of discharge obtained under AS2428.5 which shall ensure an effective aerodynamic area (EAA) value for each ventilator of (see table 1.1 and 1.2 for EAA value for ventilator models). The ventilators shall have been tested and certified to the requirements of AS2428.

## HUFF® CONTROL MODULE SPECIFICATION

Arcadia Huff® ventilators shall be coupled with a Huff® Control Module to suit and include the following list: (select **C** below)

## HUFF® INSTALLATION STANDARDS

The Arcadia Huff® Heat and Smoke Ventilators shall be fitted to conform to The Building Code of Australia and AS 2427-1983, Smoke/Heat Release Vents and maintained in accordance with Australian Standard AS1851 Part 5 Maintenance of Automatic Smoke/Heat Venting system. Where the Arcadia Huff® Heat and Smoke Roof Ventilator is located on a low pitched roof below 7° it shall be installed on a tapered base.

### A. HUFF® COLOUR

- Zinalume®\*
- Colorbond®\*
- Aluminium
- Or alternative

### B. ACCESSORIES

- Bird Mesh
- Insect Mesh
- Security screens
- Hail Screens
- Electrothermal fusible links
- Nonstandard fusible link ratings

### OPERATION

- Manual
- M/F
- RC/F
- Pneumatic
- P/F PTO
- P/F PTC
- Electric
- E/F
- EF/SR (Fail-safe open)
- EF/SR (Fail-safe close)

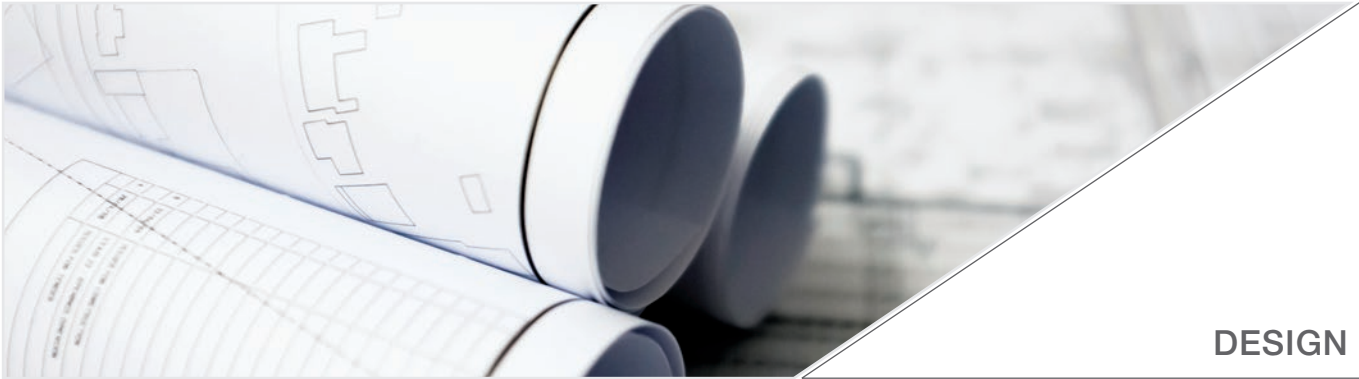
Note: due to the diversity of control options it is recommended that specifying authorities take advantage of the Engineering service offered by Arcadia.

### CONTROL MODULE

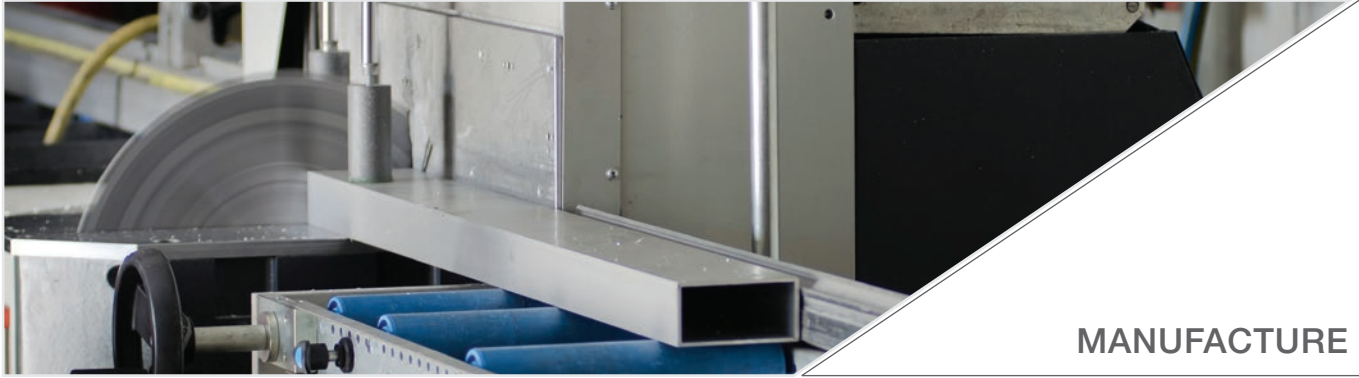
- Rainbrain rain sensors (specify N° off)
- Receipt of smoke detection signal from FIP (Fire Indicator Panel)
- Auto-timer operation
- Auto-exercise function
- All relevant indicator lights
- Manual override for testing and natural ventilation
- Lockable cabinet
- UPS battery powered backup
- Pneumatic tubing and fittings (copper or other)
- Compressor & reserve air tank
- Zoning
- Quick exhaust valves
- Dust boots for pneumatic cylinders

*\*Colorbond® and Zinalume® are a registered trademark of Bluescope Steel. Arcadia reserves the right to use alternative similar products to Zinalume® and Colorbond® materials.*

ARCADIA IS A COMPANY THAT OFFERS A PROFESSIONAL TEAM WITH DIVERSE EXPERTISE.



DESIGN



MANUFACTURE



PROJECT MANAGEMENT



SERVICING MAINTENANCE

PROVIDING A FULL SPECTRUM OF SERVICES FROM CONCEPT TO COMPLETION FOR EVERY ASPECT OF YOUR PROJECT.

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