

THE GRENFELL TOWER INQUIRY

EXHIBIT DPB/12

This is the Exhibit marked “DPB/12”
referred to in the witness statement
of David Paul Bradbury



J S WRIGHT & CO LTD

1

TECHNICAL SUBMISSION

Contract	Grenfell Tower	Contract No.	9497
Submitted to	Matt Smith (Max Fordham)	Date of Submission	05.01.15
Submitted by	Dave Bradbury	Ref No.	011

Description of submission

Please find attached the technical submission for the AOV system at Grenfell Tower, also attached technical data sheets for the relevant equipment.

Please approve / comment by: 12.01.15

Status of Approval – (Please check box.)

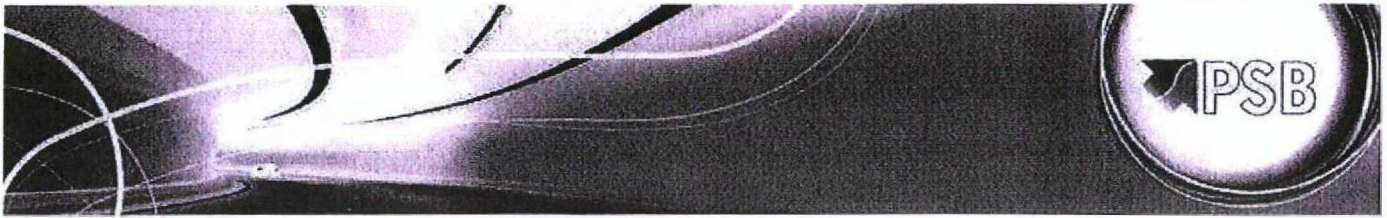
A	<input type="checkbox"/>	Approved with no comments.
B	<input type="checkbox"/>	Approved with the following comments;
C	<input type="checkbox"/>	Not approved. Resubmit in accordance with the following comments below

Comments

--

Signature _____ On behalf of _____

Title _____ Date _____



Smoke Ventilation Technical submission

For

Lobby Smoke Control Systems

at

Grenfell Tower Apartments, London

Revision History

Rev	Details	Author	Date	Appr
0	Issued for Approval	HMM	12/11/2014	HMM
1	Incorporation of Phase 2 details	HMM	1/12/2014	HMM

Technical Specification for PSB Lobby Smoke Control

Relation : J S Wright & Co Limited
Date : 1st December 2014
Reference : PSBUK1143-12 rev 1
Project : Grenfell Tower Appertments

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1.0 Lobby Smoke Control Systems

1.1 Base Documents

This Technical Submission is based in part upon the following documentation:

- Drawing Numbers
 1. 1279 (04) 101 Revision 05, 1279 (04) 102 Revision 05, 1279 (04) 103 Revision 05, 1279 (04) 105 Revision 01, 11279(08)100, Revision 01 279(08)101Revision 01
- Specification
 1. Max Fordham Employers Requirements for MEP Services Document J4350 dated 16th October 2013.
 2. Max Fordham Grenfell Tower Smoke Ventilation Analysis Rev A dated 6th May 2014

1.1.1 Description of the Project

The building is an existing tower block with 20 storeys of residential accommodation on top of a podium containing new residential accommodation, offices, a nursery and a boxing club.

The general scope of the project is:

- Recladding of the façade
- Reconfiguration of the podium levels to provide additional residential accommodation
- Relocation and refurbishment of the nursery
- Relocation and refurbishment of the boxing club
- Provision of new office space and meeting rooms
- Modifications to the MEP systems.

It is noted that a key factor for this for this project is that the tenants will remain in occupation throughout the installation and it is essential for all basic services to remain functional at all times apart from pre-agreed interruptions.

1.1.2 Smoke Control Proposals

The Final smoke control system has been designed to provide the existing stairwell with protection from the ingress of smoke, from a fire within a dwelling, by means of a mechanical extract system. The system has been designed to provide an average open door velocity, across an open lobby/stairwell door of 2.0m/s. This velocity is in accordance with the recommendation for a Class B pressure differential system as defined in Code of Practice BSEN12101 Part 6: Specification for pressure differential systems — Kits. (bsen12101-6)

I should be noted that as the system is designed to extract air from the lobby, via the open stairwell door, the system is not deigned to comply with all the requirements of the aforementioned Code of Practice.

The smoke control measures in the lobby areas will be implemented in two phases. Phase 1 will be to re-instate the natural smoke ventilation system consisting, of two natural smoke extract shafts and two natural air inlet shafts, with new motorised dampers in each lobby complete with a Programmable Logic Control System (PLC)

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The PLC control system will have links to the new fire alarm system to provide an initiating signal (one signal per floor). Once a signal is received all the dampers (extract and inlet air) in the smoke affected lobby will open and all dampers on other floors are to remain closed.

A human Mechanical Interface Panel (HMI) will be located within the entrance area to provide the fire and rescue service with a central override facility to close all dampers in a single operation.

Each ventilated lobby will be provided with a key override, switch located within the stairwell, at each storey level providing the Fire and Rescue service with a local override facility to open the dampers on any one floor.

Once one switch has been activated to open the dampers on a given floor then all other floor switches will be locked out. Once the activated switch is returned to its original position another floor can be activated.

Phase 2 will include ductwork alterations to connect all the existing supply air and smoke extract ducts into one extract section into which will be incorporate a pair of smoke extract fans mounted, in series, to provide a duty and standby mechanical smoke extract facility.

The control system will also have pressure sensors added into each ventilated lobby to control the speed of the fans to ensure that when the doors on the escape route are closed that the opening force on the door does not exceed 100N as detailed IN BSEN12101-6

- **Phase 1 Natural Smoke**

The existing fresh air and extract shafts are to be retained and converted to provide a natural low level air inlet and high level natural smoke extract.

Both the inlet air and smoke extract shafts will utilise the existing dual openings at each storey level. i.e. there will be two high level smoke extract ventilator openings and two low level fresh air ventilators, opening into the respective shafts.

Each of the four openings will be provided with a motorised damper grille assembly utilising a new damper unit and re-using the existing steel grille.

Each lobby will have a smoke detector linked back to the control system to provide an automatic initiating signal.

When smoke is detected within a lobby area only the ventilators within the lobby area are to operate and the ventilators on the other storey levels are all to remain closed.

Each lobby will have a local key operated two position fire override switch (auto/open) this will be mounted within the stairwell at each storey landing.

The system will have a PLC driven central control system with an individual control outstation module located at each storey level. All control and power cabling will be taken to and from the outstation to the smoke control system components on the individual floor.

A data and power cable will be daisy chain linked throughout the height of the building to link all the control modules to form an integrated system.

An HMI override panel will be installed in a position agreed with the approving authority which will enable the Fire and Rescue service to turn the system off. Once the system has been turned off the individual floor override switches can be used to open the dampers on any one floor. Once the key switch has been activated on one floor it will not be possible to open the dampers on another floor until the first activated

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switch is returned to the auto position i.e. once one floor is activated all other floors are locked out and all other dampers will remain closed.

All cables are to be run in fire rated cables.

A battery backup module will provide 72 hours secondary power supply to the system.

The existing smoke extract fans are to be removed and a new section of ductwork installed.

The existing fresh air shaft is to be extended through the plant room to an external wall and an automatic opening smoke ventilator will be fitted as a weathered discharge.

On completion of all works the system will be fully tested, commissioned and left in standby auto-position, ready for operation.

2. Phase 2 Mechanical Smoke Extract

At a pre-determined date phase two will be implemented to convert the system into a fully mechanical extract system with a new smoke extract run and standby fan set and fan starter panel with inverter drives to vary the speed of the extract fans. Pressure sensors will be fitted on each storey level to measure the pressure differential across the stair/lobby door. The system will be designed to provide low speed trickle ventilation when the lobby doors are closed and to provide high speed ventilation when the door is open.

The speed of the fans will be varied in accordance with the pressure readings so that the opening force on the closed lobby door does not exceed 100N and when the door is open air will be drawn through the open door at an average rate of 2.0m/s to provide smoke control protection of the stairwell.

A by-pass damper arrangement to allow a separate environmental fan system to be linked to the smoke shafts to provided day to day ventilation of the lobbies.

The method for testing the open door velocity and the opening forces on the door will be as detailed in BSEN12101-6 code of practice for pressure differential systems.

The new mechanical system will incorporate the phase 1 dampers and controls and the PLC control will be re-programmed to work as an integrated part of the mechanical system.

All of the works associated with the mechanical system will be completed, tested and proven prior to the final link being made to the natural smoke shaft so that the building is left unprotected for the minimum time period.

Once the final link has been made the fully integrated system will be commissioned, including re-testing of the original damper assemblies.

It should be noted that the mechanical systems will operate as follows:

- Smoke Extract mode: the by-pass damper assembly will shut off the connection to the environmental fan system and all four dampers in the lobby open, to extract air from the lobby through all four openings. Make up air will be provided via the open lobby door.
- Environmental Mode: the by-pass damper assembly will open and shut off the smoke extract fan set and isolate the two shafts. One shaft will act as an environmental extract shaft and the other will act as a fresh air make up shaft.

The newly installed vertical fresh air make up inlet ventilator within the plant room wall will be removed and the ductwork opening blanked off. The existing fresh air riser and smoke extract builderswork risers will be connected together using galvanised smoke ductwork and fed to a single extract fan set as described above. i.e. all four existing builderswork shafts will all be used as part of the smoke control extraction system.

A separate technical submission will be provided for phase 2 environmental systems which are linked to the smoke control system.

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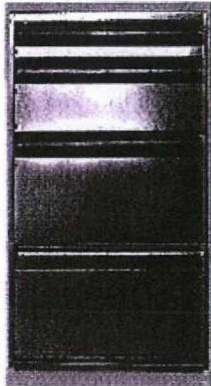
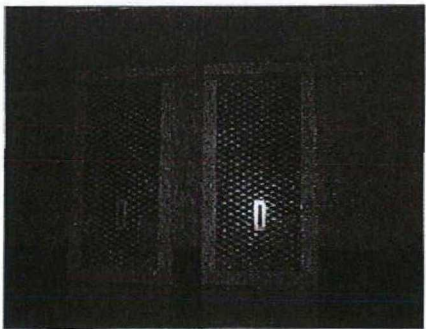
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2.0 Phase 1 Equipment and Controls

2.1 Automatic Lobby Ventilators

Product: Gilberts Series 54 Damper

Location: Existing Lobbies

QTY	CODE	CONSTRUCTION	FLANGE LENGTH	FLANGE WIDTH	OPENING LENGTH	OPENING WIDTH	FLANGE TYPE	CONTROLS	
80	SSE	GALVANISED STEEL	637	337	600MM (L)	300MM (W)	SELF	24V	
Damper Type: SSE 300 X 600 Number of Blades: N/A Construction of Blades: Galvanisd steel Opening Height: 600 Opening width: 300 Flange length: 637 Flange width: 337 Flange Type: Self Base Type: N/A Controls: MS Control 24v									
Grille Type: Existing Construction: Punched Steel									
Colour: Existing Certification: Damper section tested to EN1366 Pt2 Fire resistance test for service installtions Part 2 Fire Dampers									

Note: the damper motor is accessed for maintenance by removing the grille.

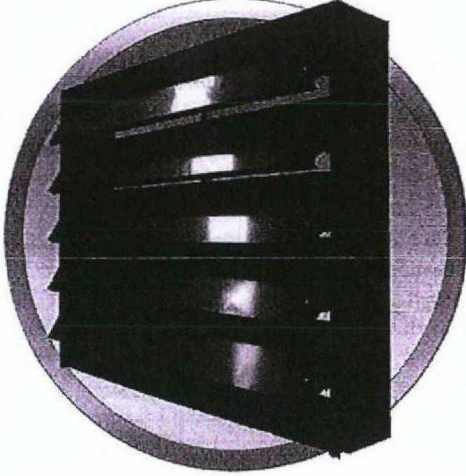
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2.2 Natural Air Inlet Ventilator

Product: Powrmatic OSR aluminium roof Ventilator with a measured free area of 1.0m².

Location: Roof Plant Room, External Wall

QTY	CODE	CONSTRUCTION	FLANGE HEIGHT	FLANGE WIDTH	THROAT OPENING HEIGHT	THROAT OPENING WIDTH	FLANGE TYPE	CONTROLS	WINDSHIELD
1	OSRW 12-06	ALUMINIUM	1065	1200	945	1080	CURB	24V	NO
Type: OSR Number of Blades: 7 Construction of Blades: Alu-1 Construction of Frame: Alu-1 Opening height: 945 Opening width: 1080 Flange height: 1060 Flange width: 1200 Mounting Flange Type: Wall Base Type: Wall Actuators: Motor Control 24v Certification: BSEN12101-2 specification For powered heat and Smoke exhaust ventilators									

The opening dimensions are the opening sizes taken for the purposes of calculating the measured free area and are not builderswork opening dimensions.

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2.3 Control System

2.3.1 Control System Philosophy Statement

The control system will be an intelligent PLC based modular control system using a network for operation of filed hardware and Ethernet communications network for the HMI user interfaces.

The control system will consist of the following components:

- Master smoke control panel with PLC
- HMI override panel
- Outstation module panels (one per ventilated lobby)
- Smoke detector (one per ventilated lobby)
- Override switch, configured auto/open (one per ventilated lobby, located within the stairwell)

The control philosophy is as follows:-

Upon smoke being detected in any of a firefighting lobby the following events shall occur:-

- The AOV's into the natural extract shafts serving the lobby in which the smoke was detected shall open.
- The AOV's into the natural air supply shafts serving the lobby in which the smoke was detected shall open.
- The wall mounted fresh air damper in the external wall opens.
- All other floors will be electrically isolated to prevent them from being opened to maintain separation and smoke contamination of the other floors.
- In the event of failure of the primary supply the battery backup panel will provide a power secondary supply.
- Indication on the mimic repeater panel and main control panels shall indicate the core & floor on which the alarm has been triggered.
- If the HMI override is activated i.e. shut system down all open dampers will close. The dampers on any given floor can be then opened using the local key override switch. Once a single switch has been turned to open all other switches, on the other floors, will be locked out.
- The above sequence shall also be executed if the manual overrides are operated on any level or by the master control panel.

Upon reset of the fire alarm or by override selection:-

- The AOV's into the builders work extract shaft serving the lobby shall close automatically.
- The AOV's into the builders work inlet air shaft serving the lobby shall close automatically
- The status on the indication panels shall return to normal.

2.3.2 Activation Mechanism

The system is triggered by smoke detectors supplied and installed by PSB. Detection within the lobby shall be provided by ceiling mounted smoke detectors. Signals from the smoke detectors will be relayed direct to the relevant smoke control systems via the local floor outstation.

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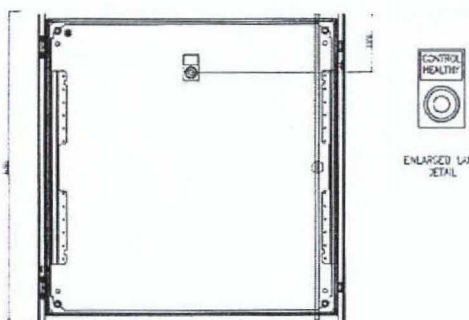
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2.3.3 Control Panels

2.3.3.1 Master Smoke Control Panel

Product: PSB Right Choice Control panel size 600mm wide x 600mm high x 400mm deep

Location: Service Riser Level 1 Existing Lobby

QTY	CODE	CONSTRUCTION	HEIGHT	WIDTH	DEPTH			CONTROLS	
1	MCP	STEEL BOX	600	600	400			240VAC IN 24VDC OUT	
Type:		SMCP Master smoke control panel incorporating PLC Control system							
Construction:		Steel cabinet							
Height:		600							
width:		600							
Mounting Type:		Surface wall mounted							

The master smoke control panel will be a steel wall mounted unit. The dimension of the panel will be 600mm High x 600mm Wide x 400 Deep with full PLC driven control system. The panel will be wall mounted in the electrical riser on the first floor.

The panel will have control interface wiring to the:

- Mimic HMI panel on the ground floor
- Outstation panels in electrical riser located in the lobby on each level served by the smoke control system.
- Battery backup panel one on every fifth floor

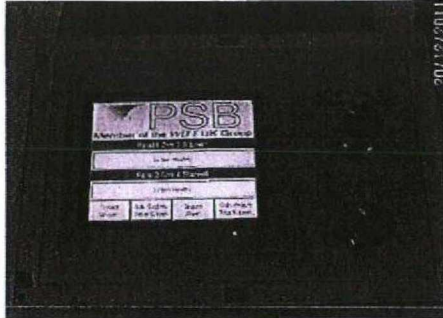
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2.3.3.2 HMI Mimic Override Control Panel

Product: PSB Right Choice mimic HMI panels

Location: Local To Fire Alarm Panel (Final Location to be Agreed)

QTY	CODE	CONSTRUCTION	LENGTH	HEIGHT				CONTROLS	
1	MIMIC	PLASTIC BOX	400	300				24V	
Type: HMI Mimic / Override panel Construction: Plastic cabinet with HMI Screen width: 400 Height: 300 Mounting Type: SURFACE									

The smoke mimic control panel will be a HMI Touch screen and shall comprise of an operator dialogue terminal housed in a plastic wall mounted enclosure. The dimension of the repeater panel will be 400mm Wide x 300mm High x 150 Deep. User facilities will allow the operator to access system configuration, maintenance and testing functions and provide Fireman's override facilities through the menu driven touch screen control interface. The master mimic will communicate with each core master control panel over an Ethernet TCP/IP protocol displaying in full graphical representation status of each core with event recording accessed through the menu system.

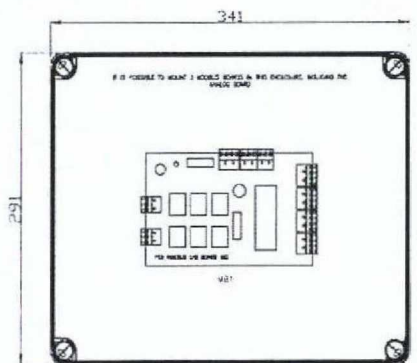
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2.3.3.3 Outstation Modular Control Panel

Product: PSB Right Choice Outstation Panel

Location: Service Riser Existing Lobbies

QTY	CODE	CONSTRUCTION	LENGTH	HEIGHT				CONTROLS	
20	OUTSTATION	METAL BOX	400	300				24V	
Type: Otstation Control Module Construction: Plastic cabinet with HMI Screen width: 400 Height: 300 Mounting Type: SURFACE									

The outstation modular smoke control panel will be a steel wall mounted unit. The dimension of the panel will be 300mm High x 400mm Wide x 200 Deep. The panel will be wall mounted in the electrical riser in each of the ventilated lobbies.

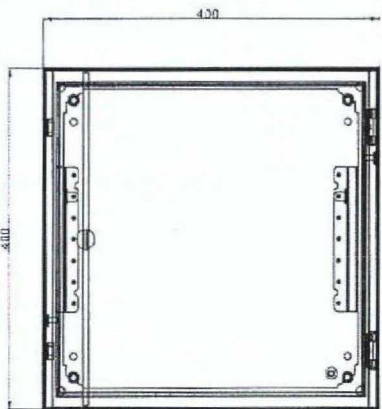
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2.3.3.4 Modular Battery Backup Panel

Product: PSB Right Choice Battery Backup Panel

Location: Service Riser Existing Lobbies every 5th Floor

QTY	CODE	CONSTRUCTION	LENGTH	HEIGHT				CONTROLS	
5	BATTERY BACKUP MODULE	STEEL BOX	400	400				240VAC IN 24V DC OUT	
Type: Otstation Control Module Construction: steel cabinet with H width: 400 Height: 400 Mounting Type: SURFACE									

The battery backup smoke control panel will be a plastic wall mounted unit. The dimension of the panel will be 400mm High x 400mm Wide x 300 Deep. The panel will be wall mounted in the electrical riser on every fifth floor level within the ventilated lobbies.


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2.3.3.5 Floor Override Switches

Product: KAC Ltd Right Choice Control Override Switches

Location: Stairwell at each storey level served by the ventilation system

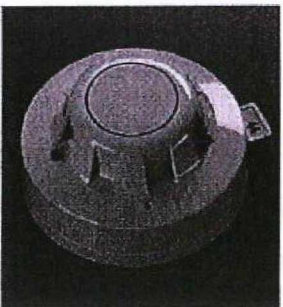
QTY	CODE	CONSTRUCTION						CONTROLS	
80	FOC FIRE OVERRIDE SWITCH	PLASTIC						VIA INTERFACE MODULE	
Type: FOC Construction : Plastic Mounting Flange Type: Base fixing Base Type: Plastic Colour: Yellow									

A Key operated fire override switch will be located within the stairwell for each ventilated lobby, local to the automatic lobby ventilator, these switches will be in a normal auto position allowing the ventilator to be opened when the system operates. Once the fire override switch on the mimic override panel has been activated the floor override switch will allow the fire and rescue service the facility to open the dampers.

2.3.3.6 Smoke Detector Heads

Product: Apollo Right Choice smoke detector heads

Location: Existing Lobbies

QTY	CODE	CONSTRUCTION						CONTROLS	
20	XP95	PLASTIC						VIA INTERFACE MODULE	
Type: Apollo Optical with relay base Construction : Plastic Mounting Flange Type: Base fixing Base Type: Plastic Colour: white									

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2.4 Power Supplies Electrical & Control Wiring

2.4.1: Power and Control

The master control panel incorporates a facility to connect the incoming 230v Ac incoming mains supply to power the smoke control systems. (Supplied and installed as part of the electrical contractors contract).
Should the mains power fail there is provision for 72 hour power supply via battery a battery backup system.

2.4.2: Power and Control cables

The electrical wiring for the system shall be provided in fireproof cable with a CWZ classification.

Power/Controls wiring – FP200 Enhanced or equivalent.

ASI Network – FP200 Enhanced or Equivalent.

Fan Cables - FP400 Enhanced or equivalent.

COMMS - Firetuf or Equivalent.

And installed in accordance with the Electrical Wiring Regulations and BS8519.

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3.0 Phase 2 Equipment and Controls

3.1. Run & Standby Extract Fan Arrangement

Product: Elta Fan Type LCS063K2-A5/19

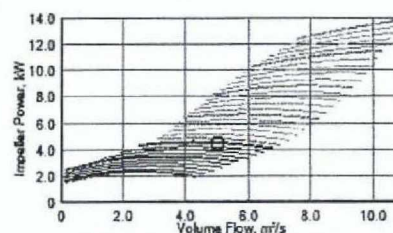
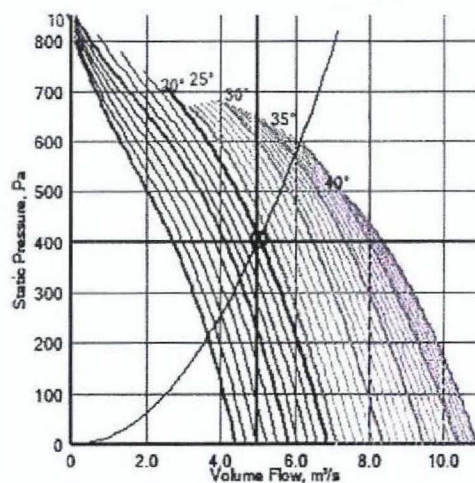
Location: Roof Top Plant Room

Fans will be mounted in series in the roof top plantroom and connect via ductwork to the builders work shafts. Motorised shut off dampers will be installed in the ductwork to provide a positive shut off of the system. All dampers will be fitted 24v DC motors.

All fans are tested to the latest internationally recognised standard ISO5801 Part 1, installation category D for aerodynamic performance and BS848 Part 2 (1985) for acoustic performance. The adjustable pitch Aerofoil impeller gives the exact performance required, with a non overloading fan characteristic.

The impellers are all high pressure die cast to offer thin aerofoil sections for low generation of noise. The maximum pitch angles allow for speed control by frequency inverter. The motors are suitable for inverter speed control down to 20% of full speed. Fans are tested in compliance with high temperature test standard directive 89/106/EEC to EN 12101-3 and are rated to one off emergency operation at 300°C for 2 hour.

Fan Performance Data: Elta Fan Type LCS063K2-A5/19



Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB):	99	96	96	94	95	92	87	82	104	78
Outlet (dB):	94	96	99	96	96	95	87	81	104	80

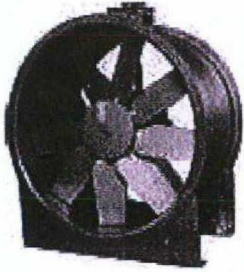
Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

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3.1. Run & Standby Extract Fan Arrangement (cont.)

Fan Performance Data: Elta Fan Type LCS063K2-A5/19

QTY	CODE	CONSTRUCTION	FLANGE LENGTH	FLANGE WIDTH	OPENING LENGTH	OPENING WIDTH	FLANGE TYPE	CONTROLS	WINDSHIELD
2	AS BELOW	STEEL/ALUMINIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Description of product / remarks: Fan Type: LCS630K2-A5/19 Fan diameter: 630mm Electrical Supply: 380-420volts 50Hz 3 phase Rated Motor Power: 4.0kW Full Load Current: 10.21 A Starting Current: Invertor soft start Start type: Invertor Absorbed Power: 4.47kW Peak Power: 4.52 kW Certification: BSEN12101-3 specification For powered heat and Smoke exhaust ventilators									

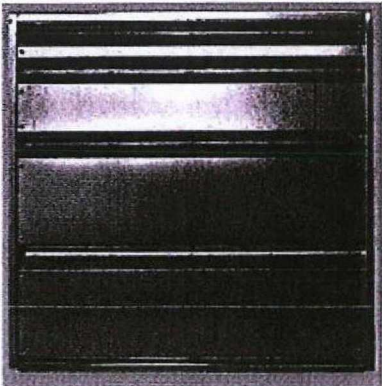
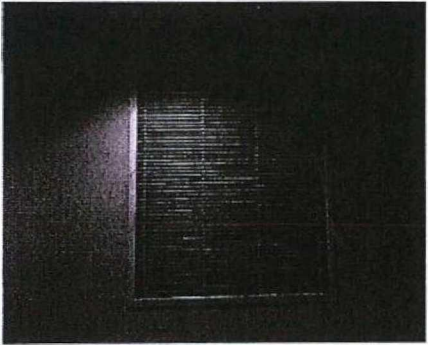
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3.2 Automatic Lobby Ventilators

Product: Gilberts Series 54

Location: Lobbies to Ground Floor, Walkway & Walkway Mezzanine

QTY	CODE	CONSTRUCTION	FLANGE LENGTH	FLANGE WIDTH	OPENING LENGTH	OPENING WIDTH	FLANGE TYPE	CONTROLS	
6		GALVANISED STEEL	837	637	800MM (L)	600MM (W)	SELF	24V	
<div> <p>Damper</p> <p>Type: SSE 600 X 800</p> <p>Number of Blades: N/A</p> <p>Construction of Blades: Galvanisd steel(black)</p> <p>Opening Height: 800</p> <p>Opening width: 600</p> <p>Flange length: 837</p> <p>Flange width: 637</p> <p>Flange Type: Self</p> <p>Base Type: N/A</p> <p>Controls: MS Control 24v</p> </div> <div>  </div>									
<div> <p>Grille</p> <p>Type: Gilberts K15</p> <p>Construction: Extruded Aluminium</p> </div> <div>  </div>									
<div> <p>Colour: RAL9010</p> <p>Certification: Damper section tested to EN1366 Pt2 Fire resistance test for service installtions Part 2 Fire Dampers</p> </div>									

Technical Specification for PSB Lobby Smoke Control

Relation : J S Wright & Co Limited
Date : 1st December 2014
Reference : PSBUK1143-12 rev 1
Project : Grenfell Tower Appertments

3.3 Mechanical Control System

The mechanical fan set will be provided with a fan starter panel incorporating inverter speed drives to control the speed of the fans between low speed (all doors closed) and high speed (door on fire floor open). The open/closed door condition will be monitored by a pressure sensor (see details below) which will measure the pressure differential between the lobby and the stairwell. The system is designed to maintain -25Pa in the lobby with all doors closed and will maintain the fans at low speed setting. Once a door to the smoke affected lobby, and only the smoke affected lobby, the pressure differential will be lost and the fans will automatically ramp up to full speed to extract air from the lobby at a rate which will provide an average face velocity of 2m/s across the open lobby / stairwell door.

The master control panel will be provided with a primary and secondary power supply in accordance with BS8519 and the power supplies are to include an auto changeover panel and a bypass switch arrangement with a single mains feed connection to the fan control panel.

The panel will be linked to the master PLC control panel via a data cable taken from the top floor outstation module in the service riser within the lobby area and will therefore seamlessly link into the existing natural smoke ventilation system installed in phase 1.

The pressure sensors will be fitted at each storey level and will monitor the pressure differential between the stairwell and lobby.

The pressure sensor will have a link to the control outstations fitted at each storey level and will link back to the master control panel via the data link between each outstation.

Once the system has been initiated by the smoke detection system only the smoke affected floor will operate and all floors will be linked out. Only the pressure sensor within the smoke affected lobby can operate the system.

As the smoke shafts are to be used to provide a route for fresh air and extract air for the environmental system a set of by-pass dampers will be incorporated into the ductwork system.

During normal environmental activities the system damper to the smoke ventilation fan set will be closed and the dampers to the environmental fan sets will be open.

On receipt of a fire alarm signal the environmental system dampers will close and the damper to the smoke ventilation system will open.

On receipt of a signal from the fire alarm system all environmental controls will be overridden by the smoke control system.

The mechanical system will operate as described above for the natural system as follows:

- On alarm signal all dampers in the smoke affected lobby open (four dampers per lobby on the existing twenty floors and two dampers on the ground floor, walkway and walkway mezzanine areas)
- All other floor are locked out
- Environmental controls are locked out
- By pass dampers to environmental systems close

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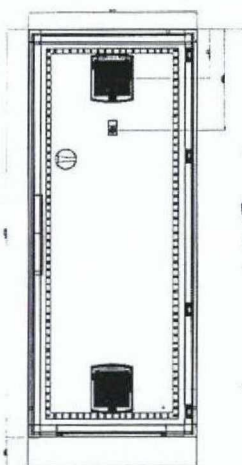
3.3 Mechanical Control System (cont.)

- By pass damper to the smoke extract fan set opens
- Smoke Ventilator in the stairwell opens to provide make up air path
- Smoke Extract Fans are initiated.
- Pressure sensor in smoke affected lobby active to regulate fan speed
- HMI override available
- If HMI override activated the Fan system shuts down and all dampers and stairwell ventilator will close
- If floor Override switch, in the stairwell, is turned to the on position, (when the HMI override has been activated) then the dampers on that floor will open, the stairwell ventilator will open and the fans will be initiated. Note: the override switch can be used on any one floor once the HMI override is initiated. However only one floor at a time can be activated via the override switches located in the stairwell.

3.3.1 Fan Starter Control Panel

Product: PSB Right Choice Smart Control panel size 600mm wide x 1400mm high x 600mm deep

Location: Roof top plant room local to fan set

QTY	CODE	CONSTRUCTION	HEIGHT	WIDTH	DEPTH				
1	FSP	STEEL BOX	1400	600	600				
Type:			FSP Fan starter control panel incorporating inverter fan drives						
Construction:			Steel cabinet						
Height:			1400						
width:			600						
Mounting Type:			Surface wall mounted						

The fan starter control panel will be a steel wall mounted. The dimension of the panel will be 600mm High x 1400mm Wide x 600 Deep with Macon MR5 inverter drives.

The panel will be provided with a 3 phase power supply (supplied and installed by others).


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3.3.2 Pressure Sensor

Product: Control Pressure Transmitter

Location: Stairwell at every floor level piped into lobby

QTY	CODE	CONSTRUCTION					CONTROLS	
83	PA-DPS-8X	PLASTIC					VIA INTERFACE MODULE	
Type: PA-DPS-8x Sontay Pressure sensor Construction : Plastic Mounting Flange Type: Base fixing Base Type: Plastic								

A Pressure transmitter will be fitted within the stairwell, at high level on each storey level, and will measure the pressure differential between the stair and the smoke affected lobby. If the pre-set pressure differential is maintain the fan will run at low speed (doors closed) Should a lobby door open then pre-set pressure differential will not be able to be maintained and the fan will ramp up to full speed via inverter drive in the master control panel (open door condition) to extract a higher volumetric rate from the lobby.

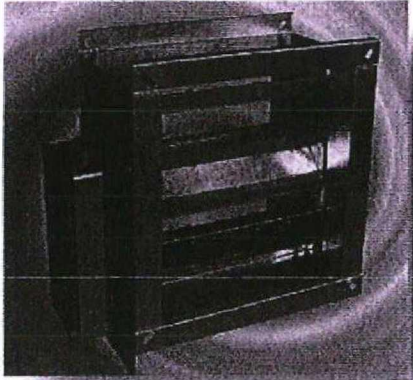
Technical Specification for PSB Lobby Smoke Control

Relation : J S Wright & Co Limited
 Date : 1st December 2014
 Reference : PSBUK1143-12 rev 1
 Project : Grenfell Tower Appertments

3.4 By-pass Dampers

Product: BSB SC Series

Location: Walkway Environmental Fan Set and Plant Room Smoke Extract Fan Set

QTY	CODE	CONSTRUCTION	FLANGE LENGTH	FLANGE WIDTH	OPENING LENGTH	OPENING WIDTH	FLANGE TYPE	CONTROLS	
3		GALVANISED STEEL	TBA	TBA	TBA	TBA	TBA	24V	
<div> <p>Damper</p> <p>Type: SC TBA</p> <p>Number of Blades: TBA</p> <p>Construction of Blades: Galvanisd</p> <p>Opening Height: TBA</p> <p>Opening width: TBA</p> <p>Flange length: TBA</p> <p>Flange width: TBA</p> <p>Flange Type: Self</p> <p>Base Type: N/A</p> <p>Controls: MS Control 24v</p> </div> <div>  </div>									

The environmental fan sets and the smoke extract fan sets will each have a shut off/ bypass damper fitted to isolate the fan sets. The damper sizes will be provided once the final ductwork sizing and arrangement has been agreed.

Technical Specification for PSB Lobby Smoke Control

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4.0 Testing and Maintenance Schedule

4.1 Maintenance Statement

It is a requirement under the Regulatory Reform Order of 2005 that a person shall be responsible for the maintenance of the smoke control system and this has to be tested and maintained in accordance with the schedules contained in BS9999 as detailed below in the extracts for the mechanical smoke control system and associated smoke detection. It is also necessary to carry out maintenance in accordance with manufacturers recommendations for each component.

4.2 Testing and Maintenance Schedule From BS9999

BRITISH STANDARD BS 9999:2008

Annex V (normative) Routine inspection and maintenance of fire safety installations

V.1 General

NOTE Fire safety installations comprise the items and elements of which examples are listed in Annex J.

It is essential for the safety of the occupants of a building that fire safety equipment (including passive fire protection provisions) is inspected frequently. Although much of the inspection can be undertaken by suitably trained personnel, a formal agreement should be made with the installer or the installer's representative to provide the regular inspection and testing described in the relevant British Standards for individual fire safety installations. Unless temporary alternative fire safety systems can be put in place, it might be appropriate for certain of the inspections carried out at three-monthly or longer intervals to be done outside normal working hours.

V.2 Daily inspections

V.2.1 General

The checks described in V.2.2 to V.2.6 should be undertaken daily. For premises with defined opening times such as shops, theatres and cinemas, these checks should be undertaken prior to members of the public entering the building.

V.2.2 Fire detection and alarm systems

All fire detection and alarm systems should be inspected daily. In particular, it should be ensured that:

- a) the control panel indicates normal operation or, if any fault is indicated, that it has been logged and the appropriate action(s) taken;
- b) any fault recorded the previous day has received attention.

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V.3 Weekly

V.3.1 General

In addition to the checks recommended in V.2, the checks described in V.3.3 to V.3.7 should be undertaken once a week.

V.3.2 Fire detection and alarm systems

All fire detection and alarm systems should be inspected weekly. In particular, it should be ensured that:

- a) the control equipment is able to receive a fire signal and to initiate the evacuation procedure, recording which trigger device has been used, in accordance with BS 5839-1;
- b) any standby batteries are in good condition and the fuel, oil and coolant levels of any standby generators are correct, topping up as necessary;
- c) the reserves of paper and ink or ribbon for any printer are adequate for two weeks' normal usage.
- f) *the mode monitoring system for stop valves in life safety installations is operating correctly;*
- g) *there is continuity of connection between the alarm switch and the control unit and between the control unit and the fire and rescue service (usually via a remote manned centre) for automatically monitored connections;*
- h) *trace heating systems provided to prevent freezing in the sprinkler system are functioning correctly.*

V.3.5 Smoke control systems for means of escape

Actuation of the system should be simulated once a week. It should be ensured that any fans and powered exhaust ventilators operate correctly, smoke dampers close (or open in some systems), natural exhaust ventilators open, automatic smoke curtains move into position, etc.

V.4 Monthly

V.4.1 General

In addition to the checks recommended in V.2 and V.3, the checks described in V.4.2 to V.4.9 should be undertaken once a month.

V.4.2 Fire detection and alarm systems

Any standby generator should be started up once a month by simulating failure of the normal power supply, and allowed to energize the system for at least 1 h, while the system is monitored for any malfunctioning caused by the use of the generator. After restoring the normal supply, the charging arrangements for the generator starting battery should be tested, and the appropriate action should be taken if they are found not to be functioning correctly. In addition, the oil and coolant levels should be topped up and the fuel tanks filled.

V.5 Three-monthly

In addition to the checks recommended in V.2, V.3 and V.4, the actuation of all smoke control systems should be simulated once every three months. All zones should be

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separately tested and it should be ensured that any fans and powered exhaust ventilators operate correctly, smoke dampers close (or open in some systems), etc.

V.6 Six-monthly

V.6.1 General

In addition to the checks recommended in V.2, V.3, V.4 and V.5, the checks described in V.6.2 and V.6.3 should be undertaken once every six months. Arrangements should be made for six-monthly inspections and tests to be carried out by competent persons on the fire detection and alarm systems, the sprinkler systems, any extinguishing systems, the emergency and escape lighting systems and the fire-fighting lift, for any defects found to be logged and the necessary action taken, and for certificates of testing to be obtained.

V.7 Yearly

NOTE Attention is drawn to the testing and inspection requirements of BS 7671.

In addition to the checks recommended in V.2, V.3, V.4, V.5 and V.6, arrangements should be made for annual inspections and tests of the following to be carried out by competent persons, for any defects to be logged and the necessary action taken, and for certificates of testing to be obtained:

- a) fire detection and alarm systems;
- b) self-contained luminaires with sealed batteries, if more than 3 years old;
- c) sprinkler and drencher systems;
- d) smoke ventilators and smoke control systems;
- e) evacuation lifts;
- f) fire-fighting lift installations;
- g) fire hydrants;
- h) fire mains;
- i) portable fire extinguishers;
- j) hose reels.

Stocks of foam concentrate or solution should be checked annually and replenished as necessary.

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5.0 Appendices

5.1 Product data sheets

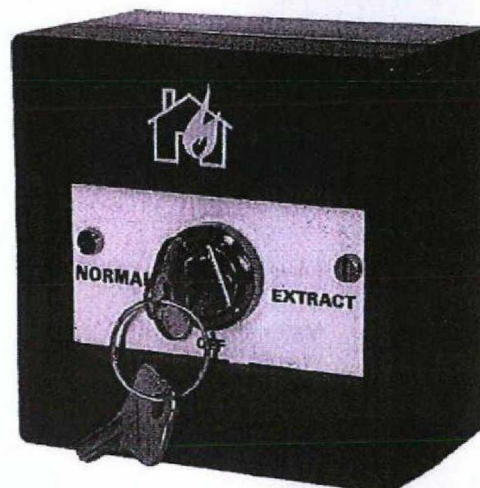
- Gilberts Series 54 Data Sheet
- Powrmatic OSR Data Sheet
- KAC Override Switch Data Sheet
- Apollo Smoke Detectors
- Pressure sensors
- Elta Smoke Extract Fans
- BSB Bypass dampers

Indoor Specialist Activation Devices Keyswitch model



> Product Benefits

- Variety of keyswitch devices available
- Suitable for Fire, Security & Other Specialist Applications
- Variety of colours and markings



Product Overview

The KAC Class 9000 range of devices provides you with the most comprehensive range of switching product solutions for fire, security and other specialist applications.

All products comprise a main housing and escutcheon plate. The switching device is fitted to the plate, which simply snaps into the main housing and is permanently located in place by fixing screws.

As with our market leading range of call points, all switching devices can be supplied in our core colours of red, green, white, yellow and blue. There are also numerous function marking options available to meet your specific requirements.

The keyswitch family forms part of the Class 9000 range and can be supplied in three principle versions: -

- Two position keyswitch (marked '1' and '0', with the key trapped in either position 1 or position 0 (customer choice at point of order, see figure 1 for contact arrangement)
- Two position keyswitch (marked '1' and '0', with the key removable in one position and trapped in the other position (see figure 1 for contact arrangement).
- Three position keyswitch (Fireman's Keyswitch) removable in all positions. This type has two pairs of electrically separated contacts; both open in the central position, one closes in each of the other positions (see figure 2 for contact arrangement).

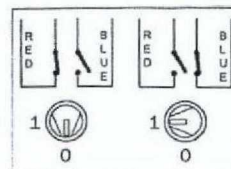
KAC

KEY-1
Rev. No. 2

Electrical Specification

Connection Details:	See figures 1 & 2
Cable Terminals:	See figure 3
Maximum Voltage:	240VAC or 24VDC
Current Rating:	2 Amps @ 240VAC, 6 Amps @ 24VDC

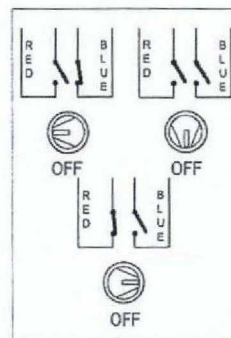
Fig. 1



ABOVE: Contact arrangement on Types 101 and 102.

BELOW: Contact arrangement on Type 103.

Fig. 2



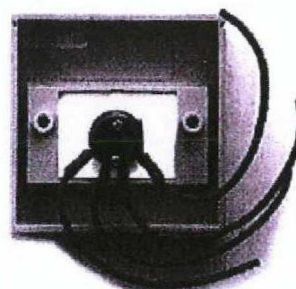
Environmental Specification

Humidity:	0-95% non-condensing
Operating Temperature:	-30°C to +70°C
Storage Temperature:	-30°C to +70°C
Ingress Protection (IP) Rating:	IP24D

Mechanical Specification

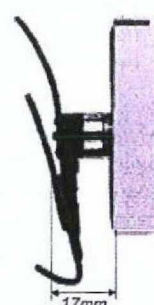
Material:	ABS
Weight:	110g Flush, 160g Surface
Colour:	Red, Green, White, Yellow, Blue

Fig. 3



Rear view of a Keyswitch Model showing how the connections are brought out on 32/0.2mm² flying leads.

The installer is required to make the required connections and remove the unwanted conductors.



Dimensioned side view of a keyswitch model

Ordering Information

Model	Description	Mounting
W*9101	Two position keyswitch, removeable in both positions	Flush
W*9101/S*	Two position keyswitch, removeable in both positions	Surface
W*9102	Two position keyswitch, removeable in 1 position	Flush
W*9102/S*	Two position keyswitch, removeable in 1 position	Surface
W*9103	Three position keyswitch, removeable in both positions	Flush
W*9103/S*	Three position keyswitch, removeable in both positions	Surface

* - defines colour, R=red, G=green, W=white, Y=yellow, B=blue

To identify the function label please attach word to the end of the above part codes.
For example WR9103/SR-F222 = Three position keyswitch, red, "house Flame" label
For available function labels please refer to our data sheets "FM-RED" and "FM-COL".

Accessories	Description
Code PS200	Plain Hinged Cover

> KAC Alarm Company Limited
15 - 19 Trescott Road,
Smallwood, Redditch,
Worcestershire B98 7AH.
England.

Telephone: +
Fax:
e-mail: marketing@kac.co.uk

KAC

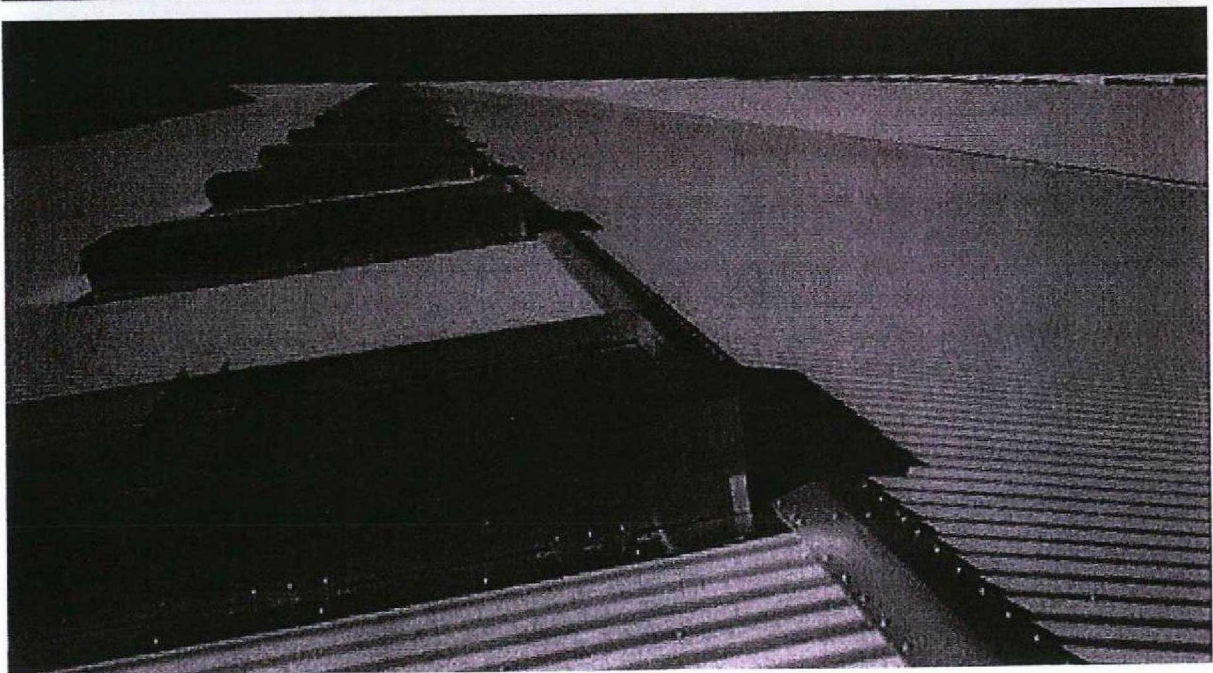
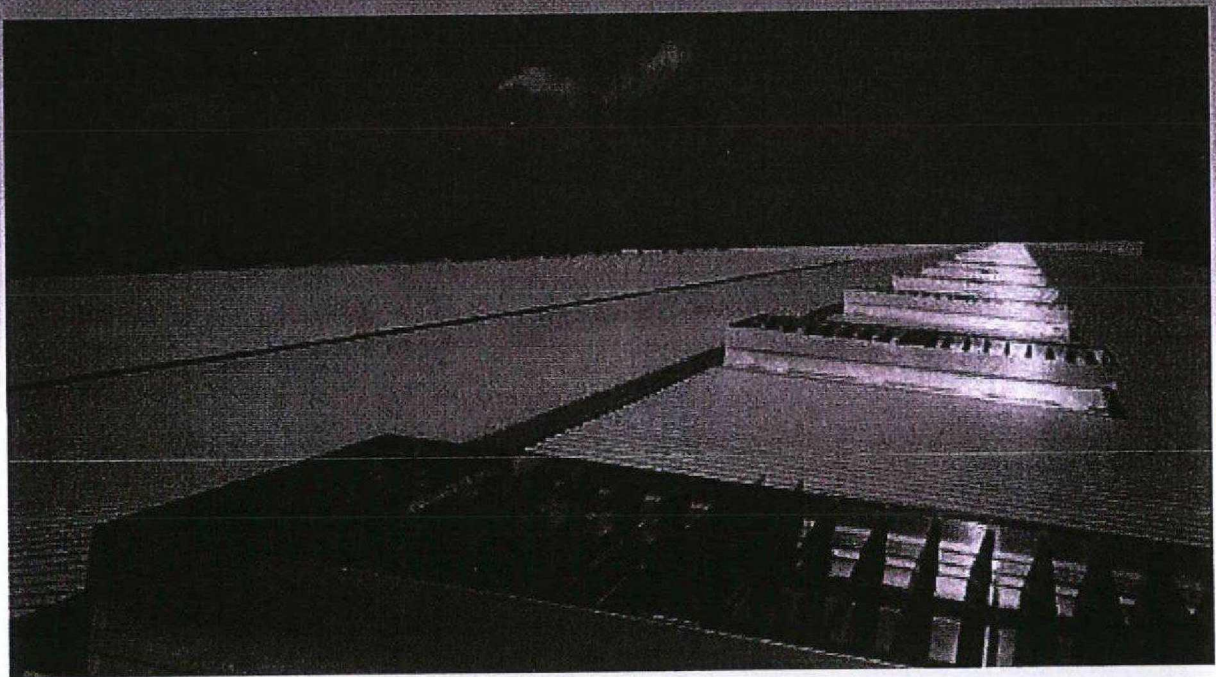
osr

louvred smoke ventilators



powrmatic

expect**more**



The osw range has been fully tested to BS EN 12101 Part 2: 2003 Specification for natural smoke and heat exhaust ventilators. This standard involves a series of tests determining aerodynamic free area, reliability of operation, performance under load, low temperature operation and exposure to heat.

The results of the tests on the osw range are as follows:

Test	Classification	Mode of operation
Reliability class	RE 1000	All
Snow load class	SL 500	Pneumatic
	SL 125	Electric
Low ambient temperature	T (00)	All
Wind load class	WL 1500	All
Heat exposure temperature class	B 300	All



Construction

Base assembly

- Press formed and welded 1.5mm mill finish aluminium
- Option: cladding with 0.7mm HP200 Plastisol

Sides and ends

- 1.5mm mill finish aluminium
- Option: cladding with HP200 Plastisol

Louvre blade options

- 1.5mm mill finish aluminium
- 2mm translucent double-skin polycarbonate
- Double-skin 1.5mm aluminium with 25mm polyurethane insulation
- Option: cladding with HP200 Plastisol

Louvre blade pivots

- 6mm diameter solid aluminium bearing in shouldered nylon66 bushes for maintenance-free operation

Louvre blade seals

- Polypropylene brush & pile seals

Finish options

- Mill finish aluminium
- Polyester powder paint to any British Standard or RAL colour
- Plastisol available to any standard colour

Optional accessories

- Birdguards: 1.2mm diameter galvanized wire mesh
- Security Guards: 16mm diameter mild steel bars PPC finished
- Insect Mesh: Woven aluminium
- Fusible Link Shields
- Internal Closure Pieces

osw wall mounted version



Control options

- Electric: 24V DC or 230V AC
- Pneumatic
- Manual
- Thermal Release Devices: bi-metal and manual reset bimetallic switch

Note

Plastisol cladded units should not be used in smoke control applications.

Energy Saving Features

Insulation

The osw range can be supplied with both insulated louvres and insulated bodies. The comparative U-Values for the available louvre specifications are shown below:

U-Values

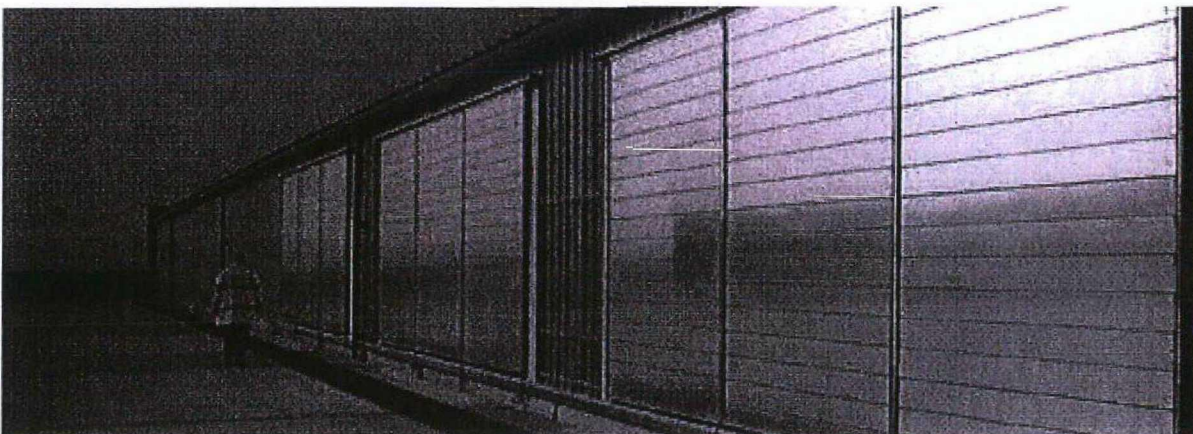
Louvre Specification	U-Value (W/m ² /°K)
1.5mm mill finish aluminium or 0.7mm Plastisol	6.00
Double-skin aluminium with 25mm polyurethane insulation	0.56
2mm double-skin translucent polycarbonate	1.75

In addition, louvre blade edges and sides are fitted with pile weather seals to reduce heat loss.

Natural Lighting

The polycarbonate louvre option provides excellent daylighting using a durable UV stabilised material.

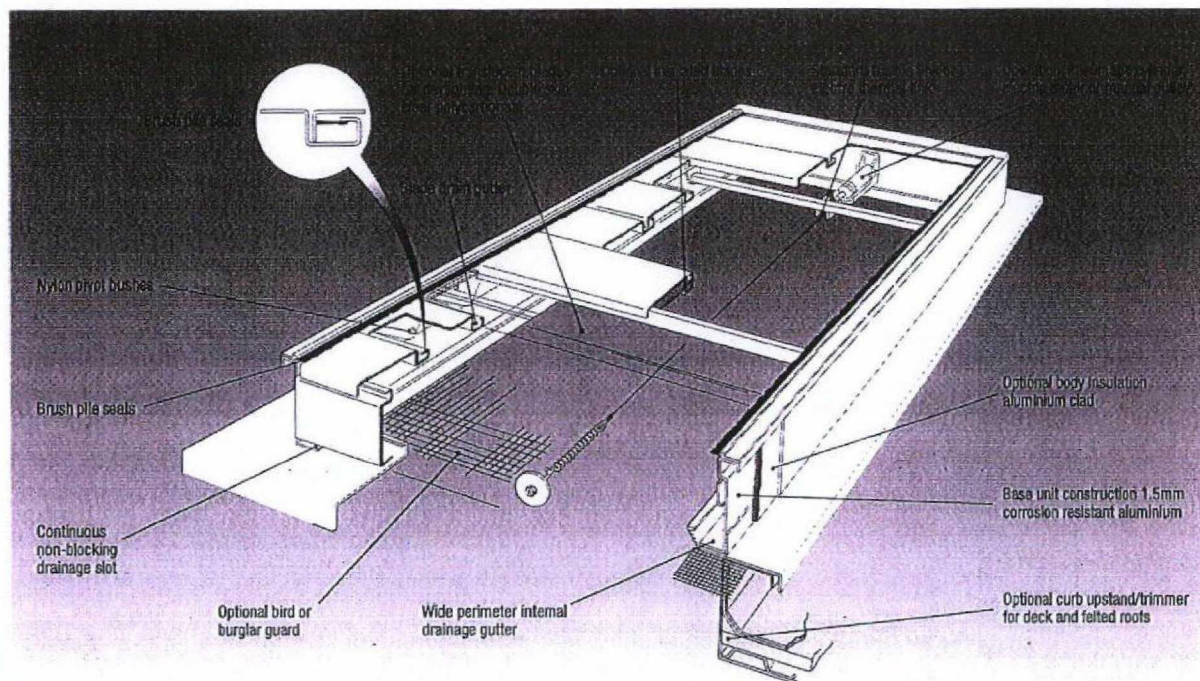
When closed, the osw provides an average diffused light transmission in excess of 80%, enabling savings on artificial lighting.



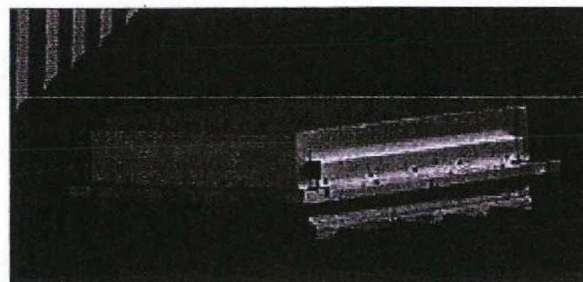
osw ventilators at Airbus, Broughton, Chester

Image courtesy of Gradwood Ltd

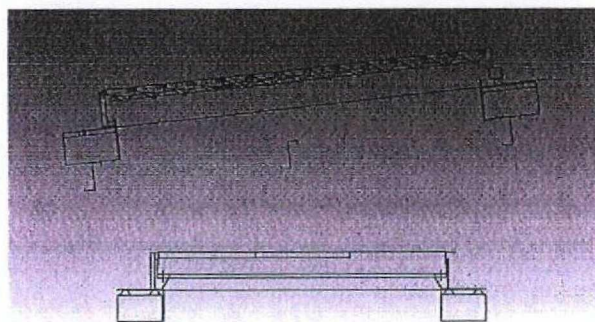
OSr features and applications



Roof sheet



Roof upstand



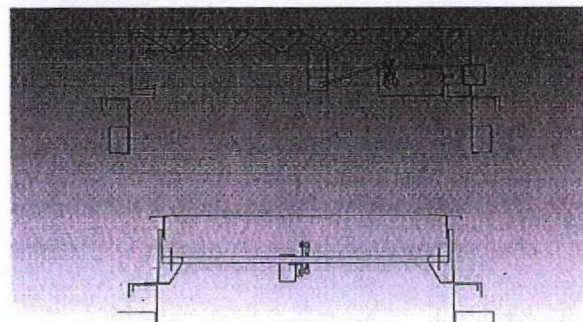
Installation

The OSr is suitable for fixing into a variety of applications. The unit is supplied in two parts to facilitate the installation procedure; the base flange and the louvre box assembly.

The ventilator can be installed:

- onto weathered roof upstands
- direct onto roof sheeting
- into roof glazing

The OSr, the wall-mounted version, can be supplied without a base flange for fitting in a recessed arrangement to enable installation flush with the building line. Fixing flanges and glazing adaptors can be supplied if required.



Fixing Details

Typical fixing details are shown above for:

- Sheeted roof construction with 1800mm purlin spacing
- Roof upstand fixing

Fixing details can be provided for a variety of applications, including wall openings.

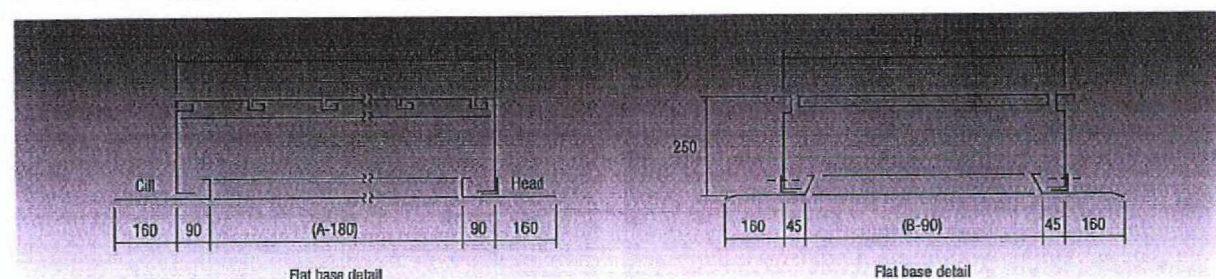
OSr dimensions and weights

Free area dimensions in m²

Width Code		05		06		07		08		09		10		11		12	
Vent Width B (mm)		500		600		700		800		900		1000		1100		1200	
Length Code	Vent Length A (mm)	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv
04	870	0.28	0.23	0.35	0.28	0.42	0.33	0.49	0.33	0.55	0.42	0.63	0.47	0.70	0.52	0.77	0.57
05	1070	0.36	0.29	0.45	0.35	0.54	0.41	0.63	0.47	0.72	0.53	0.81	0.59	0.90	0.65	0.99	0.72
06	1270	0.45	0.35	0.56	0.42	0.66	0.49	0.77	0.56	0.88	0.65	0.99	0.70	1.10	0.77	1.21	0.85
07	1470	0.53	0.40	0.66	0.49	0.79	0.58	0.92	0.66	1.04	0.74	1.17	0.82	1.30	0.91	1.43	1.01
08	1670	0.61	0.46	0.76	0.57	0.91	0.67	1.06	0.78	1.21	0.88	1.38	0.95	1.50	1.05	1.65	1.14
09	1870	0.69	0.53	0.86	0.64	1.03	0.76	1.20	0.87	1.37	0.98	1.54	1.07	1.71	1.19	1.88	1.30
10	2070	0.77	0.60	0.95	0.72	1.15	0.84	1.34	0.99	1.53	1.08	1.72	1.20	1.91	1.32	2.01	1.47
11	2270	0.86	0.67	1.07	0.80	1.27	0.94	1.48	1.07	1.69	1.21	1.90	1.34	2.11	1.47	2.32	1.63
12	2470	0.94	0.73	1.17	0.87	1.40	1.04	1.63	1.19	1.85	1.33	2.08	1.48	2.31	1.63	2.54	1.81
13	2670	1.02	0.80	1.27	0.96	1.52	1.14	1.77	1.30	2.02	1.47	2.27	1.63	2.51	1.79	2.76	1.99
14	2870	1.10	0.88	1.37	1.05	1.64	1.23	1.91	1.40	2.18	1.58	2.45	1.78	2.72	1.96	2.99	2.14
15	3070	1.19	0.94	1.47	1.12	1.76	1.31	2.05	1.50	2.34	1.71	2.63	1.90	2.92	2.09	3.21	2.28
16	3270	1.27	1.00	1.58	1.20	1.83	1.40	2.19	1.62	2.50	1.82	2.81	2.03	3.12	2.23	3.43	2.43
17	3470	1.35	1.06	1.68	1.27	2.01	1.51	2.34	1.72	2.66	1.94	2.99	2.15	3.32	2.37	3.65	2.58

Width Code		13		14		15		16		17		18		19		20	
Vent Width B (mm)		1300		1400		1500		1600		1700		1800		1900		2000	
Length Code	Vent Length A (mm)	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv
04	870	0.83	0.62	0.90	0.67	0.97	0.73	1.04	0.78	1.11	0.84	1.18	0.89	1.25	0.94	1.32	0.99
05	1070	1.08	0.78	1.17	0.84	1.25	0.91	1.34	0.98	1.43	1.04	1.52	1.12	1.61	1.18	1.70	1.24
06	1270	1.32	0.92	1.43	1.00	1.54	1.09	1.65	1.16	1.76	1.23	1.86	1.33	1.97	1.40	2.08	1.47
07	1470	1.56	1.09	1.69	1.17	1.82	1.26	1.95	1.36	2.08	1.45	2.21	1.53	2.33	1.65	2.46	1.73
08	1670	1.80	1.26	1.95	1.36	2.10	1.45	2.25	1.55	2.40	1.68	2.55	1.77	2.70	1.87	2.85	2.00
09	1870	2.04	1.41	2.21	1.54	2.38	1.65	2.55	1.77	2.72	1.91	2.89	2.02	3.06	2.13	3.23	2.24
10	2070	2.29	1.59	2.48	1.71	2.68	1.86	2.85	1.99	3.04	2.11	3.23	2.27	3.42	2.40	3.61	2.53
11	2270	2.53	1.77	2.74	1.91	2.95	2.04	3.16	2.22	3.37	2.35	3.57	2.49	3.78	2.63	3.99	2.77
12	2470	2.77	1.98	3.00	2.11	3.23	2.26	3.46	2.45	3.69	2.60	3.92	2.76	4.14	2.91	4.37	3.06
13	2670	3.01	2.15	3.26	2.32	3.51	2.48	3.76	2.65	4.01	2.81	4.26	2.98	4.51	3.15	4.76	3.31
14	2870	3.26	2.31	3.52	2.49	3.79	2.67	4.06	2.85	4.33	3.02	4.60	3.20	4.87	3.38	5.14	3.56
15	3070	3.50	2.47	3.79	2.66	4.07	2.86	4.36	3.05	4.65	3.24	4.94	3.43	5.23	3.62	5.52	3.81
16	3270	3.74	2.64	4.05	2.84	4.36	3.04	4.67	3.24	4.97	3.45	5.28	3.65	5.59	3.85	5.90	4.05
17	3470	3.98	2.80	4.31	3.01	4.64	3.23	4.97	3.44	5.30	3.66	5.63	3.87	5.95	4.09	6.28	4.30

Av = Measured Free Area (m²), AvCv = Aerodynamic Free Area (m²)



Throat dimensions = (A - 180) x (B - 90)

Weights in kg

Width Code	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
Length Code	17.50	18.50	19.50	20.50	21.50	22.50	23.50	24.50	26.75	27.00	28.00	29.25	30.25	31.25	32.50	34.00
04	17.50	18.50	19.50	20.50	21.50	22.50	23.50	24.50	26.75	27.00	28.00	29.25	30.25	31.25	32.50	34.00
05	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.50	30.00	31.00	32.75	33.50	35.00	36.50	38.00
06	22.50	23.50	24.50	25.50	26.50	27.50	29.25	30.00	31.50	33.00	34.50	36.50	38.50	40.00	41.75	43.00
07	25.00	26.00	27.00	28.00	29.00	30.00	31.50	33.00	35.00	36.50	38.00	39.25	40.50	42.25	44.25	45.50
08	27.50	28.50	29.50	30.50	31.50	32.50	34.25	36.00	38.00	39.50	41.00	42.75	44.50	46.50	48.00	49.50
09	30.00	31.00	32.00	33.00	34.00	35.00	37.00	39.00	41.25	43.00	44.50	46.25	48.00	50.00	51.75	53.50
10	32.50	33.50	34.50	35.50	37.00	38.00	40.00	42.00	44.00	46.00	48.00	49.75	51.50	53.75	55.50	57.50
11	35.00	36.00	37.25	38.50	39.25	40.50	42.75	45.00	47.50	49.25	51.00	53.00	55.00	56.75	58.25	59.50
12	38.00	39.00	40.00	41.00	42.00	43.00	45.25	47.50	50.00	52.50	54.50	56.75	59.00	62.00	63.75	65.50
13	40.50	41.50	42.25	43.25	44.50	46.00	48.25	50.50	53.50	56.00	57.50	60.00	62.50	64.50	66.00	67.50
14	43.00	44.25	45.50	46.25	47.25	48.50	51.00	53.50	57.00	59.50	61.00	63.50	66.00	69.00	71.25	73.50
15	46.00	47.00	48.00	49.00	50.00	51.00	53.75	56.50	59.50	62.00	64.50	67.00	69.50	72.50	74.50	76.50
16	48.50	50.00	51.00	52.00	53.00	54.00	56.75	59.50	63.00	66.00	68.00	70.50	73.00	76.00	77.75	79.50
17	51.00	52.25	54.00	55.50	56.75	58.50	60.25	62.00	64.25	67.00	71.00	74.00	77.00	79.50	81.00	82.50

Weights are approximate and subject to type of control, louvre and vent body specification.

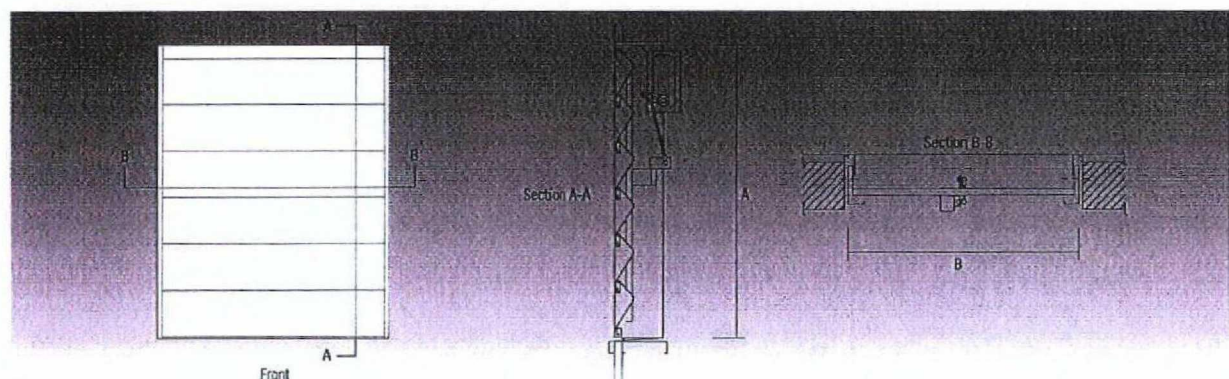
OSW dimensions and weights

Free area dimensions in m²

Width Code		06		07		08		09		10		11		12	
Vent Width B (mm)		600		700		800		900		1000		1100		1200	
Length Code	Vent Depth A (mm)	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv
04	885	0.36	0.22	0.48	0.26	0.51	0.31	0.59	0.36	0.66	0.41	0.73	0.45	0.80	0.51
05	1065	0.45	0.28	0.55	0.33	0.64	0.40	0.74	0.46	0.83	0.52	0.93	0.58	1.02	0.64
06	1265	0.55	0.34	0.66	0.41	0.78	0.48	0.89	0.55	1.01	0.63	1.12	0.75	1.24	0.79
07	1465	0.65	0.40	0.78	0.48	0.91	0.57	1.05	0.66	1.18	0.75	1.32	0.84	1.45	0.93
08	1665	0.74	0.46	0.90	0.58	1.05	0.66	1.21	0.76	1.36	0.87	1.51	0.97	1.67	1.08
09	1865	0.84	0.52	1.01	0.63	1.19	0.75	1.36	0.86	1.54	0.98	1.71	1.11	1.88	1.22
10	2065	0.93	0.58	1.13	0.71	1.32	0.83	1.52	0.97	1.71	1.01	1.91	1.24	2.10	1.37
11	2265	1.03	0.65	1.24	0.78	1.46	0.93	1.67	1.07	1.89	1.23	2.10	1.37	2.32	1.51
12	2465	1.13	0.71	1.36	0.86	1.59	1.02	1.83	1.17	2.08	1.34	2.30	1.49	2.53	1.67
13	2665	1.22	0.77	1.48	0.94	1.73	1.11	1.99	1.29	2.24	1.46	2.49	1.65	2.75	1.81
14	2865	1.32	0.84	1.59	1.02	1.87	1.21	2.14	1.39	2.42	1.59	2.69	1.78	2.96	1.98
15	3065	1.41	0.90	1.71	1.09	2.00	1.30	2.30	1.52	2.59	1.71	2.89	1.90	3.18	2.10
16	3265	1.51	0.97	1.82	1.19	2.14	1.41	2.46	1.62	2.77	1.83	3.08	2.03	3.40	2.24
17	3465	1.61	1.03	1.94	1.26	2.27	1.50	2.61	1.72	2.94	1.94	3.28	2.16	3.61	2.38

Width Code		13		14		15		16		17		18		19		20	
Vent Width B (mm)		1300		1400		1500		1600		1700		1800		1900		2000	
Length Code	Vent Depth A (mm)	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv	Av	AvCv
04	885	0.88	0.55	0.95	0.61	1.03	0.66	1.10	0.72	1.18	0.77	1.25	0.81	1.33	0.86	1.40	0.91
05	1065	1.12	0.71	1.21	0.77	1.30	0.85	1.40	0.91	1.49	0.97	1.59	1.05	1.68	1.11	1.78	1.17
06	1265	1.35	0.86	1.47	0.95	1.58	1.03	1.69	1.10	1.81	1.19	1.92	1.27	2.04	1.35	2.15	1.44
07	1465	1.59	1.02	1.72	1.12	1.86	1.21	1.99	1.31	2.13	1.40	2.26	1.49	2.39	1.60	2.53	1.69
08	1665	1.82	1.19	1.98	1.29	2.13	1.41	2.29	1.51	2.44	1.64	2.60	1.74	2.75	1.84	2.90	1.95
09	1865	2.06	1.34	2.23	1.47	2.41	1.59	2.58	1.73	2.78	1.85	2.93	1.96	3.11	2.08	3.28	2.23
10	2065	2.30	1.49	2.48	1.64	2.68	1.80	2.88	1.93	3.07	2.06	3.27	2.19	3.46	2.35	3.66	2.49
11	2265	2.53	1.67	2.75	1.84	2.96	1.98	3.17	2.13	3.39	2.30	3.60	2.45	3.82	2.60	4.03	2.74
12	2465	2.77	1.83	3.00	2.01	3.24	2.17	3.47	2.38	3.71	2.52	3.94	2.68	4.17	2.84	4.41	3.04
13	2665	3.00	1.98	3.26	2.18	3.51	2.39	3.77	2.56	4.02	2.73	4.28	2.91	4.53	3.13	4.78	3.30
14	2865	3.24	2.14	3.51	2.39	3.79	2.58	4.06	2.76	4.34	2.99	4.61	3.16	4.89	3.37	5.16	3.56
15	3065	3.48	2.33	3.77	2.56	4.06	2.76	4.36	3.01	4.65	3.21	4.95	3.41	5.24	3.62	5.54	3.88
16	3265	3.71	2.49	4.03	2.74	4.34	2.95	4.65	3.21	4.97	3.43	5.28	3.65	5.60	3.92	5.81	4.14
17	3465	3.95	2.64	4.28	2.91	4.62	3.14	4.95	3.42	5.29	3.65	5.62	3.93	5.95	4.17	6.29	4.40

Av = Measured Free Area (m²), AvCv = Aerodynamic Free Area (m²)



Weights in kg

Throat dimensions = (A - 120) x (B - 120)

Width Code	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
Length Code																
04	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00
05	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.50	23.25	24.25	25.50	26.50	27.50	29.00	30.25	31.00
06	17.60	18.50	19.60	20.60	21.60	22.50	23.75	25.00	26.25	27.25	28.60	30.25	32.00	33.50	34.50	35.50
07	18.75	19.50	21.25	22.50	23.75	25.00	26.25	27.00	28.25	29.50	31.00	32.25	33.50	35.00	36.25	37.50
08	20.25	21.50	23.25	24.50	25.75	27.00	28.50	30.00	31.25	32.50	34.00	35.25	36.50	38.00	39.50	41.00
09	21.75	23.00	24.50	26.00	27.75	29.00	30.50	32.00	33.50	35.00	36.50	38.00	39.50	41.00	42.50	44.00
10	23.60	25.00	27.00	28.50	30.00	31.50	33.00	34.50	36.00	37.50	39.00	41.00	42.50	44.00	45.75	47.60
11	25.25	27.50	29.50	30.75	32.00	33.50	35.25	37.00	38.50	40.00	42.00	43.75	45.50	47.00	48.00	49.00
12	27.00	29.25	30.60	32.00	33.75	35.50	37.25	39.25	41.00	43.00	45.00	46.75	48.50	51.00	52.75	54.00
13	28.50	30.00	32.00	34.00	36.00	38.00	40.00	42.00	43.50	45.00	47.50	49.50	51.50	53.00	54.00	56.00
14	31.60	33.50	35.50	37.50	39.00	40.50	42.25	44.00	45.50	47.25	49.50	51.00	53.00	55.00	56.00	59.00
15	34.50	36.25	37.75	39.25	40.75	42.25	43.50	45.00	47.50	49.50	51.50	53.25	55.00	56.50	58.00	61.50
16	37.25	39.50	41.25	42.75	44.25	45.75	47.00	48.25	49.75	51.50	53.50	55.50	57.00	58.00	60.50	63.75
17	40.50	42.00	43.25	44.75	46.25	47.75	49.00	50.25	51.75	53.50	55.50	57.00	58.50	60.50	62.25	67.00

Weights are approximate and subject to type of control, louvre and vent body specification.

Whatever your heating and ventilation requirements, powrmatic can provide a total solution from a single source.

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powrmatic offers customers the most comprehensive range of heating and ventilation solutions available in Europe. Whatever your requirements, powrmatic has the capability to provide a total solution from a single source with products proven in some of the world's most prestigious and demanding applications.

pgv
Glass louvred ventilator. Both functional and attractive. Specifically designed for modern building requirements.



tfv
Twin flap natural ventilator. Suitable for smoke venting & featuring very low air leakage when closed.



pri
Direct heat and warmth for localised heating in a range of applications.



Cabinet heaters
Indirect gas or oil fired floor standing air heaters for multiple use.



pv
Powered roof extract. Heavy duty high performance unit.



bsl
Fixed solar shading system, providing attractive yet low cost solutions to reducing heat gains.



Gas unit heaters
A quality range of suspended gas fired unit heaters.



Flue & chimney
Flue systems for domestic, commercial and industrial applications.



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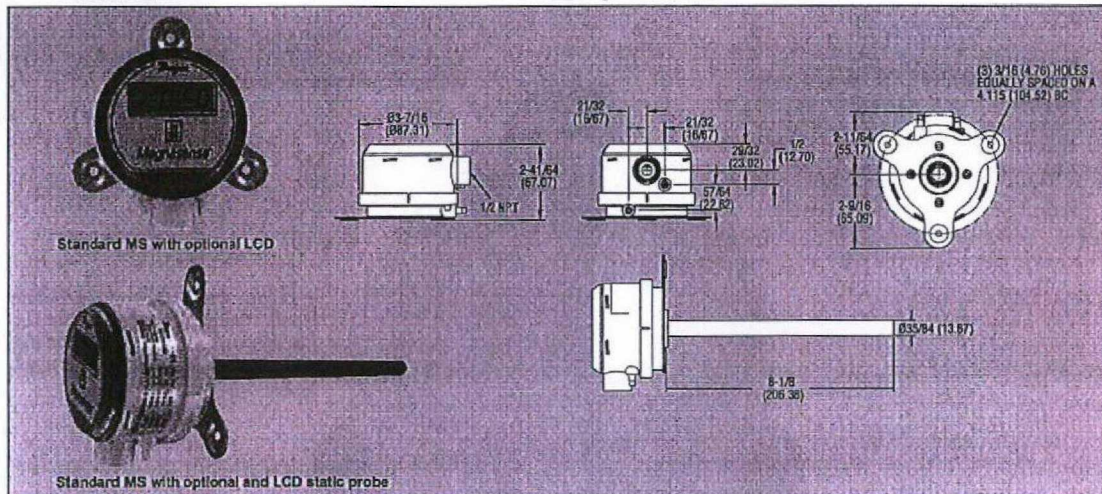
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Series
MS

Magnesense® Differential Pressure Transmitter

Monitors Pressure & Air Velocity

CE



The Series MS Magnesense® Differential Pressure Transmitter is an extremely versatile transmitter for monitoring pressure and air velocity. This compact package is loaded with features such as:

- Field Selectable English or Metric Ranges
- Field Upgradeable LCD Display
- Adjustable Dampening of Output Signal (with Optional Display)
- Ability to Select a Square Root Output for Use with Pitot Tubes and Other Similar Flow Sensors

Along with these features, the patented magnetic sensing technology provides exceptional long term performance and enables the Magnesense® Differential Pressure Transmitter to be the single solution for your pressure and flow applications.

Model	Output	Selectable Ranges
MS-121*	4-20 mA	0.1", 0.25", 0.5" w.c. (25, 50, 100 Pa)
MS-321*	0-10 V	0.1", 0.25", 0.5" w.c. (25, 50, 100 Pa)
MS-111*	4-20 mA	1", 2", 5" w.c. (250, 500, 1250 Pa)
MS-311*	0-10 V	1", 2", 5" w.c. (250, 500, 1250 Pa)
MS-131	4-20 mA	10" w.c. (2 KPa)
MS-141	4-20 mA	15" w.c. (3 KPa)
MS-151	4-20 mA	25" w.c. (5 KPa)
MS-331	0-10 V	10" w.c. (2 KPa)
MS-341	0-10 V	15" w.c. (3 KPa)
MS-351	0-10 V	25" w.c. (5 KPa)
MS-021	4-20 mA	±0.1", 0.25", 0.5" w.c. (±25, 50, 100 Pa)
MS-221	0-10 V	±0.1", 0.25", 0.5" w.c. (±25, 50, 100 Pa)

Note: Add -LCD to end of model for units with display.

*Models available with duct mount static pressure probe. Change last digit from 1 to 2. Ex. MS-122

SPECIFICATIONS

Service: Air and non-combustible, compatible gases.

Wetted Materials: Consult factory.

Accuracy: ±1% for 0.25" (50 Pa), 0.5" (100 Pa), 2" (500 Pa), 5" (1250 Pa), 10" (2 kPa), 15" (3 kPa), 25" (5 kPa) ±2% for 0.1" (25 Pa), 1" (250 Pa) and all bi-directional ranges.

Stability: ±1% / year F.S.O.

Temperature Limits: 0 to 150°F (-18 to 66°C).

Pressure Limits: 1 psi maximum, operation; 10 psi, burst.

Power Requirements: 10 to 35 VDC (2-wire); 17 to 36 VDC or isolated 21.6 to 33 VAC (3-wire).

Output Signals: 4 to 20 mA (2-wire); 0 to 5 V, 0 to 10 V (3-wire).

Response Time: Adjustable 0.5 to 15 sec. time constant. Provides a 95% response time of 1.5 to 45 seconds.

Zero & Span Adjustments: Digital push button.

Loop Resistance: Current Output: 0-1250 Ω max; Voltage Output: min. load resistance 1 kΩ.

Current Consumption: 40 mA max.

Display (optional): 4 digit LCD.

Electrical Connections:

4-20 mA, 2-Wire: European Style Terminal Block for 16 to 26 AWG.

0-10 V, 3-Wire: European Style Terminal Block for 16 to 22 AWG.

Electrical Entry: 1/2" NPS Thread

Accessory (A-151): Cable Gland for 5 to 10 mm diameter cable.

Process Connections: 3/16" ID tubing (5 mm ID). Maximum OD 9 mm.

Enclosure Rating: NEMA 4X (IP65).

Mounting Orientation: Diaphragm in vertical position.

Weight: 8.0 oz (230 g).

Agency Approvals: CE.

ACCESSORIES

A-435, Field Upgradeable LCD

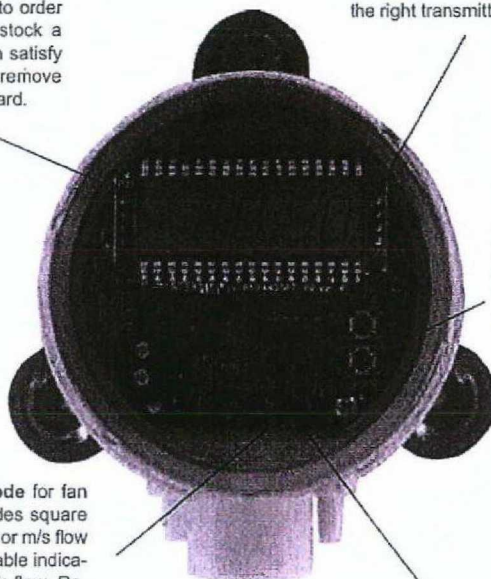
A-480, Plastic Static Pressure Tip

One Unit for all your Building Pressure Applications

The Industry Standard for Building Automation

• **Field Upgradable LCD.** No need to order two separate transmitters. Simply stock a transmitter and display and you can satisfy any customer's requests. Simply remove cover and snap the LCD onto the board.

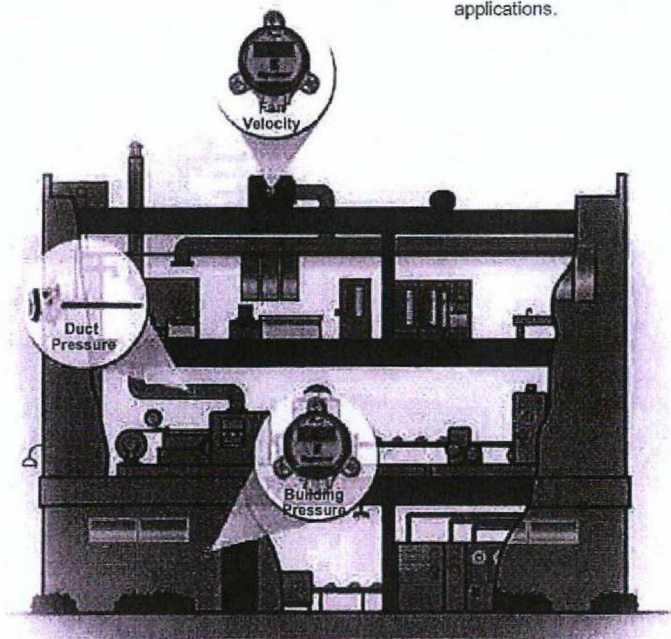
• **Field Selectable Ranges** in metric or English. Lowers stock and inventory requirements. You'll always have the right transmitter for every job.



• **Digital Push Button Zero and Span.** Reduces calibration time significantly over other transmitters that utilize potentiometers. Lowers maintenance time and costs.

• **Field Selectable Air Velocity Mode** for fan and blower applications. Unit provides square root output that accurately tracks fpm or m/s flow rate. No need for a smart programmable indicator or PLC to convert pressure to air flow. Reduces components and installation time lowering overall costs.

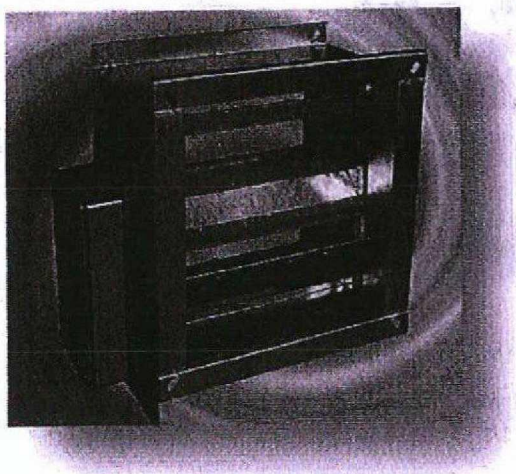
• **Adjustable Digital Dampening** smooths out unstable pressure fluctuations common in air flow applications.



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Smoke Control Damper

SC Series
Elevated Temperature
Smoke Control Damper

SC Series

elevated temperature smoke control

Introduction

The SC Series Smoke/Control Damper has been designed for installation primarily into Fire-Rated Ventilation Ducts to control low-medium air velocities.

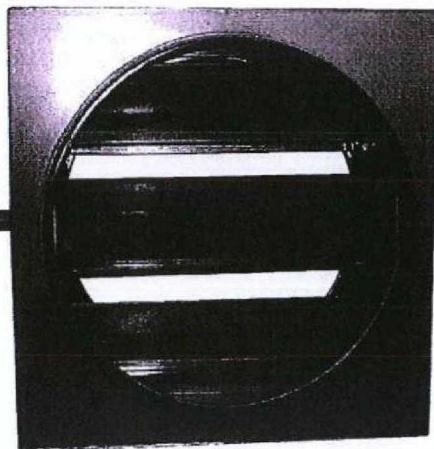
Its all steel construction is robust, with detail to its application, performance and size as required by specifiers and contractors.

Its design, construction and material selection have been specific so as to ensure a high quality, low-maintenance product is manufactured, supplied and installed.

Single section units are available from 100mm² to 1200mm².

Specifications and Testing

- Unless stated otherwise, flange models are suitable for classes A & B of DW144, with spigot models suitable for classes A, B & C of DW144
- Conformance to DW144 and Eurovent 2/2 classes A - C, as relevant
- Blade construction has been fire tested to BS476 part 20, 1987 for integrity and leakage
- Elevated temperature tests, reports 231297, 234486 and 27438 refer
- Resistance tested by BSRIA, report 15633/1 refers
- Leakage tested by BSRIA, report 15633/1 refers
- 28 day salt corrosion tested. Chatfield report RLR3 refers



Features

- Standard blade and case construction is galvanised mild steel, with grade 302S stainless steel side seals
- Unique one-piece double-skin interlocking airfoil blades
- Four casing options
- Linkage out of airflow
- Optional blades and case in grades 316 or 430 stainless steel
- Grade 316 stainless steel side seals available to order
- Infinite sizing capability from 100mm square to 1200mm square
- Variable flange dimensions and casing widths

Blades

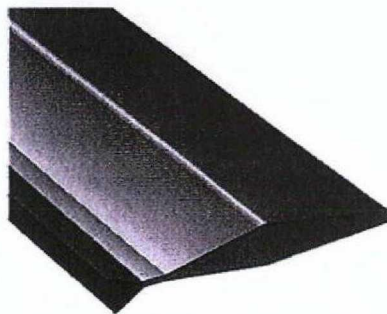
The 100mm wide steel airfoil inter-locking blades are fitted to 19mm diameter spindles for robust, low-friction rotation.

Galvanised blades are offered as standard, with Stainless Steel Grade 430 and 316 options available to order. Where stainless steel blade option is requested, Grade 430 will be supplied unless otherwise stated.

Fitted as standard, is grade 302S stainless steel blade end-seals.

Opposed blade operation only.

Special Note: For applications which necessitate the blades to be installed vertically, BSB's Sales Office must be informed so that thrust bearings are fitted to eliminate blade friction.



www.bsb-dampers.co.uk

SC Series

dimensions

Model SC Flangefit

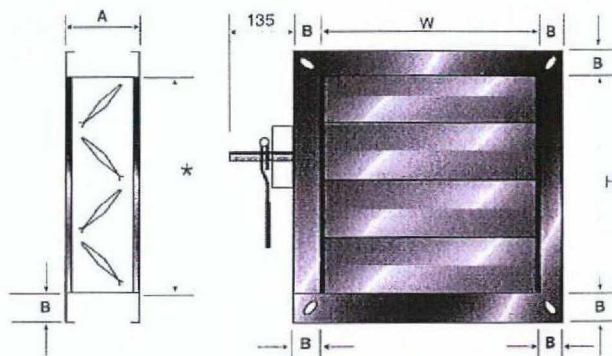
Width x Height = 100mm to 1200mm

Standard Dimensions

A = 160mm as standard. 140mm and 200mm available to order.

B = 40mm as standard. 30mm, 35mm and 50mm available as detailed below:

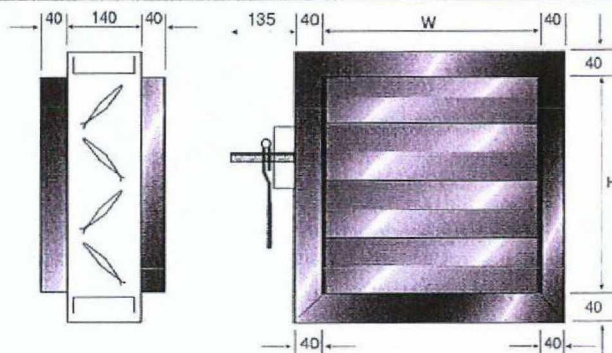
Flange Size	Case Width
30mm	160mm or 200mm
35mm	160mm or 200mm
40mm	all width variants
50mm	all width variants



* Where damper heights are requested in 100mm increments, the damper air way size will be 12mm greater with top and bottom flanges amended to accommodate the blade profile, with the overall flange size being unaffected.

Model SC Spigotfit

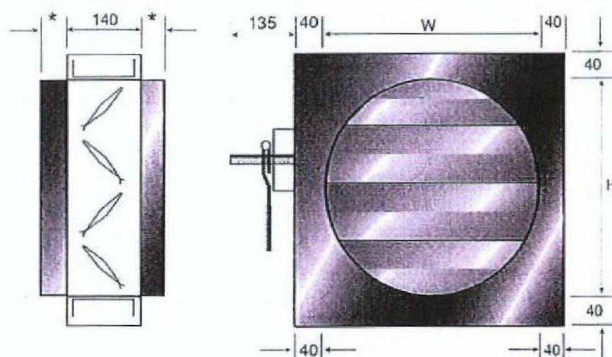
Width x Height = 100mm to 1200mm



Model SC Circular

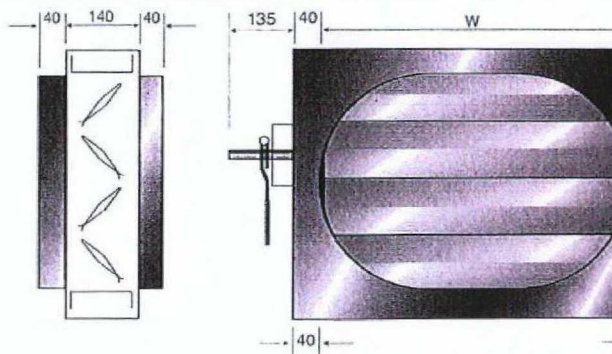
Width x Height = 100mm to 1200mm

* = 40mm (100 - 354mm diameter)
55mm (355 - 1200mm diameter)



Model SC Flat Oval

Width x Height = 100mm to 1200mm



SC Series

temperature testing and weight chart

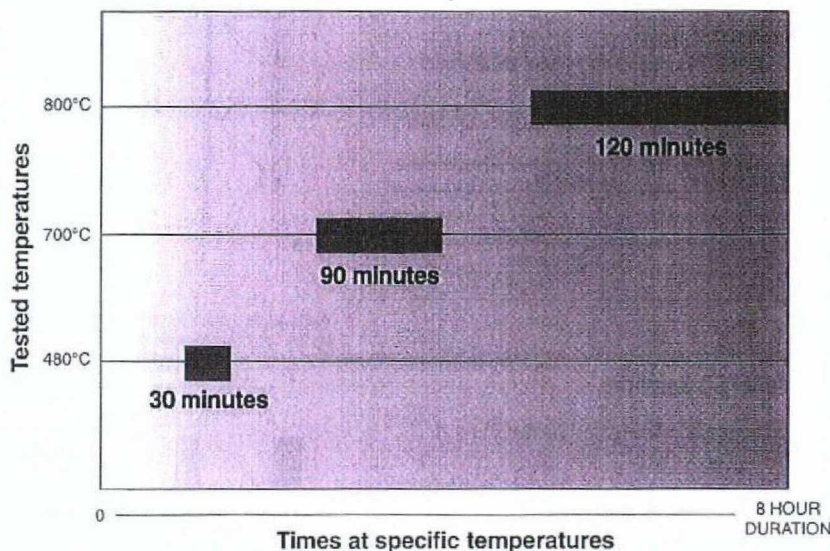
Elevated Temperature Test applied to a manually operated damper

A damper was placed into a furnace at ambient temperature (22°C), the furnace was ignited with the temperature being raised uniformly to 480°C and held for 30 minutes. The temperature was then raised to 700°C and held for a further 90 minutes. The temperature was then finally raised to 800°C for a further 120 minutes.

The damper was then removed and whilst still "cherry red" was inspected and operated. The blades and linkage rotated freely with all rivets, welds and components remaining intact.

The scope of the test was to test the damper's operation at an elevated temperature, in addition to establishing its integrity and distortion.

The conclusion of this test is that the design, construction and engineering tolerances permitted this product to be tested and operated at an "elevated temperature" successfully.



Special Note: When motors and/or other ancillaries are used in elevated temperatures, please consult with the manufacturers for suitability to the application.

BSB have concluded other tests at specific temperatures in addition to this test, all with satisfactory results.

Weight Chart (Kg) Flanged Model

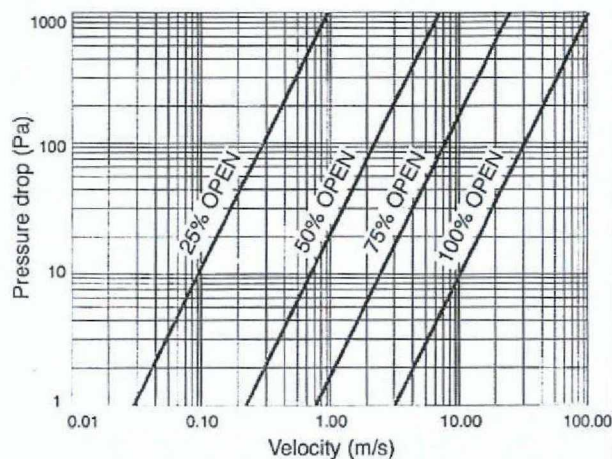
Damper Height (mm)	Damper Width (mm)											
	100	200	300	400	500	600	700	800	900	1000	1100	1200
100	4	4	5	6	6	8	8	9	10	10	12	13
200	5	6	7	8	9	10	11	12	13	14	15	16
300	6	8	9	10	11	13	14	15	16	17	18	19
400	8	9	10	11	13	14	15	16	18	19	20	21
500	10	11	13	14	15	16	18	19	21	23	24	25
600	12	13	14	16	18	19	21	23	25	27	28	29
700	14	15	16	18	19	21	23	25	27	29	31	32
800	15	16	18	19	21	23	25	27	29	31	33	35
900	16	18	19	21	24	26	28	30	32	34	36	38
1000	17	19	21	23	26	28	30	32	34	36	39	41
1100	18	21	23	25	28	30	33	35	37	40	43	45
1200	20	22	25	28	30	33	35	38	40	43	45	48

Please note that these values have been rounded up or down to whole values and are therefore illustrated for estimation purposes only.

SC Series

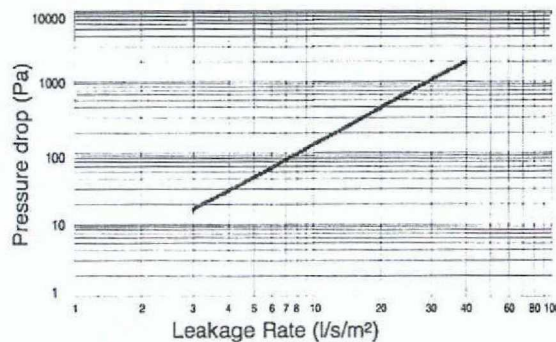
performance characteristics and torque chart

Pressure Drop BSRIA Report 15633/1



Calculated performance at various damper settings.
Individual data sheets are available for each blade setting.

Leakage BSRIA Report 15633/1

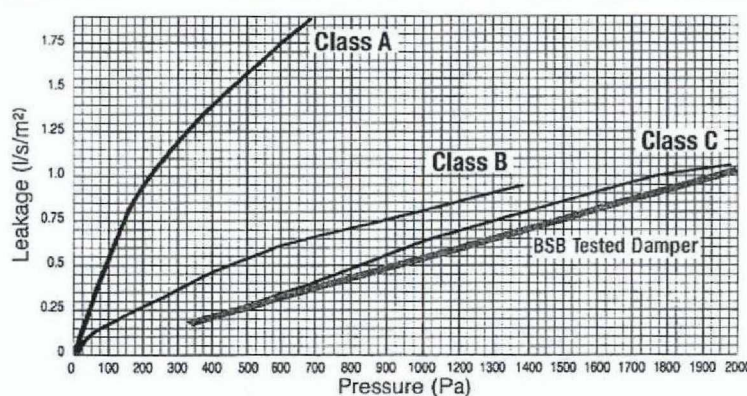


Static Pressure Pascals	Leakage per m ² l/s/m ²	Leakage l/s
15.6	2.970	0.891
29.4	4.239	1.272
74.8	7.035	2.111
162.2	10.636	3.191
225.4	12.604	3.781
380.0	16.230	4.869
660.0	21.583	6.475
955.0	25.511	7.653
2020.0	40.428	12.128

Permitted Case Leakage at Various Pressures

The Graph from HVCA's Publication DW144 illustrates the Flange Models Casing Leakage to Classes A & B.

For conformance to Class C Leakage, the fully welded Spigot Model should be supplied.



Torque Chart (Nm)

Duct Pressure (Pa)	Damper Size (Width x Height in mm)		
	200 x 200	600 x 600	1200 x 1200
250	3	7	12
500	4	8	13
750	5	9	14
1000	6	10	15

Please note that these values have been rounded up or down at blade inter-action, with actual blade rotation being at reduced torque levels.

SC Series

product specification and multiple assemblies

Product Specification

Case

Material is 1.2mm galvanised coated mild steel to BS EN 10142 1991, coating class FE P02b Z275 Na.

Spindle covers are of "Top Hat" design to allow the use of clamps onto the flanges.

Blades

Nominal 100mm wide one-piece double skin airfoil interlocking blades.

Material is 0.7mm galvanised coated mild steel to BS EN 10142 1991, coating class FE P02b Z275 Na.

Stainless steel blades (0.7mm) to grades 430 or 316 to BS 1449 Part2 1983 S172B are available.

Blade Spindles

Manufactured from 19mm steel tube, extending the full length of blade into and through the "blow through" bushes.

Material is 1.2mm galvanised coated mild steel to BS EN 10142 1991, coating class FE P02b Z275 Na.

Optional is grade 316-S11 to BS 1449 Part 2 1983 S172B.

Blade End-Seals

Manufactured from grade 302S stainless steel to BS 5770 Part 4 1981. Radius profile 170mm.

Linkage

Operation via drive bars 3.2mm x 20mm in size, manufactured from bright mild steel to BS EN 10142 1991. drive bars are positioned out of airflow, connected to blade spindles via crank arms.

Opposed blade operation is standard.

Installed on both sides of the flange case are cover plates to protect the linkage from dust or damage, in addition to minimising casing leakage to requirements of DW144 as standard.

Bushes

Standard are "blow-through" bushes pre-formed into the galvanised steel flange casing, allowing the spindles to rotate freely.

Size Range

100mm x 100mm to 1200mm x 1200mm as a single section.

Damper Operating Temperature Range

BSB has tested the SC Series Smoke Control Damper at elevated temperatures for 8 hours. Our test reports 231297,234486 and 27438 refer.

Test Specification

Conformance to DW144 as relevant. Salt corrosion tested for 28 days.

Resistance Test

Tested by BSRIA, report 15633/1 refers.

Leakage Test

Tested by BSRIA, report 15633/1 refers. (See Page 5 for illustrations)

Multiple Assemblies

Illustrated opposite are several variants to multiple section units. Where sizes exceed 1200mm x 1200mm square, multi-section units will be supplied.

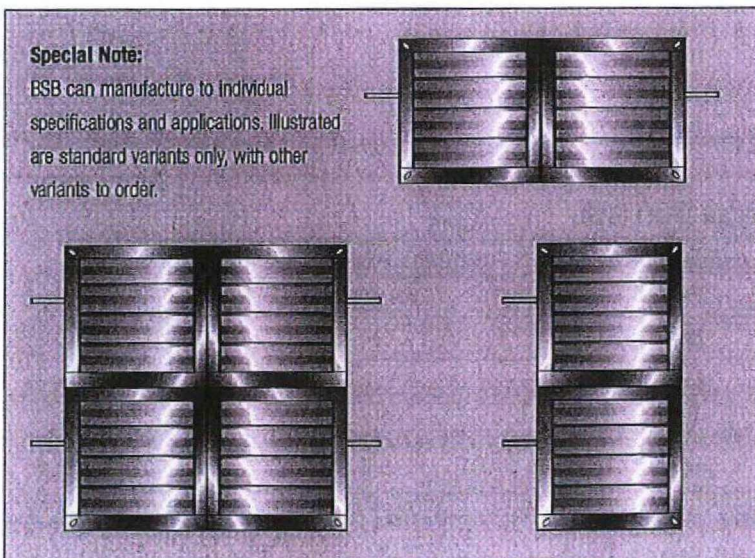
When there are transportation restrictions, large multiple units will be broken down and shipped as individual sections for site assembly. Unless requested, joining strips would not normally be supplied drilled.

Note:

For applications which necessitate the blades to be installed vertically, BSB's Sales Office must be informed so that thrust bearings are fitted to eliminate blade friction.

Special Note:

BSB can manufacture to individual specifications and applications. Illustrated are standard variants only, with other variants to order.



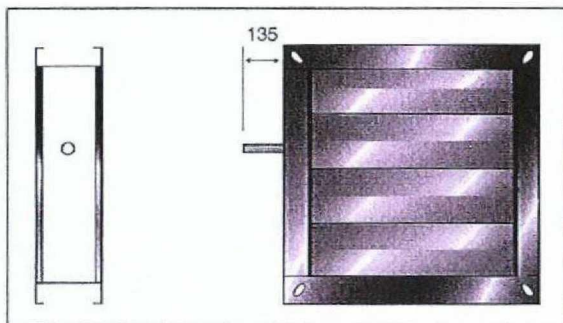
SC Series

control options

Option E Extended Spindle

For motorisation by others.

Supplied with 19mm spindle, 135mm in length.
12mm square spindle available to order.

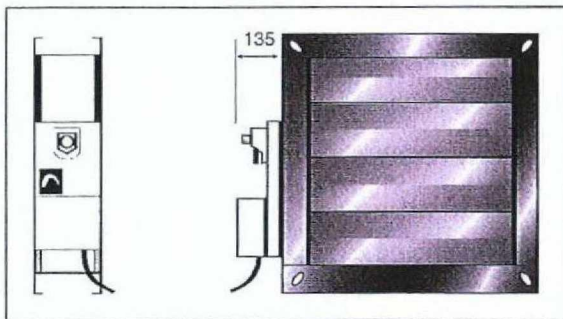


Option M Electric Motor

Can be supplied with the following control motors fitted:

- Open/Close Operation
- Spring Return Operation
- Or as specified

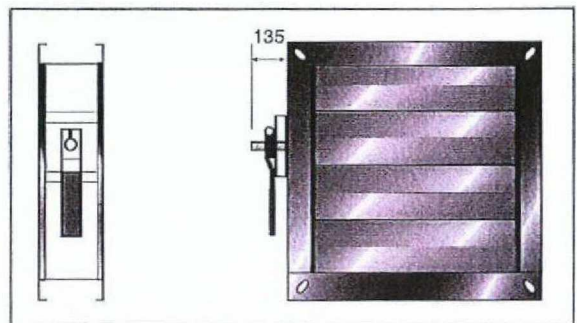
12mm square spindle available to order



Option H Hand Control

BSB's unique hand lockable quadrant is supplied complete from the factory.

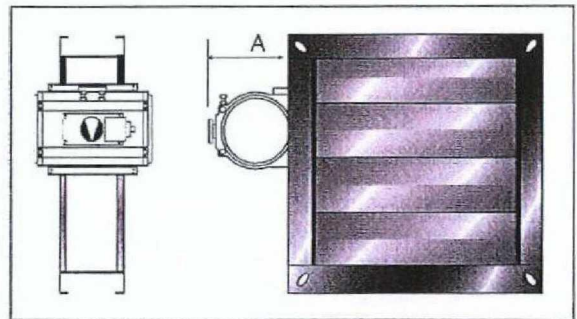
Option H Manual Quadrant Control is easily converted to Option E for motorisation by others without the need for specialist tools on site.



Option P Pneumatic Actuator

Operates between 20psi/1.4bar and 100psi/7bar. Supplied fitted to the damper complete with integral threaded airports to pressurise and vent the actuator. Accessories available.

A = 100mm or 150mm dependant on actuator model supplied.



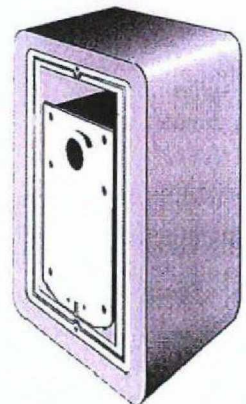
Thermal Housing

The thermal motor enclosure consists of an advanced phenolic composite resin. The enclosure uses a mould which has been specifically designed to encase Damper Actuators.

The thermal housing has been independently fire tested at 300°C by the Warrington Fire Research Establishment and results show that the surface temperature of the actuator inside the enclosure did not exceed 78°C during the 60-minute test.

The use of a thermal enclosure provides a tested and proven method to ensure operation of sensitive equipment when subjected to the extremities of fire.

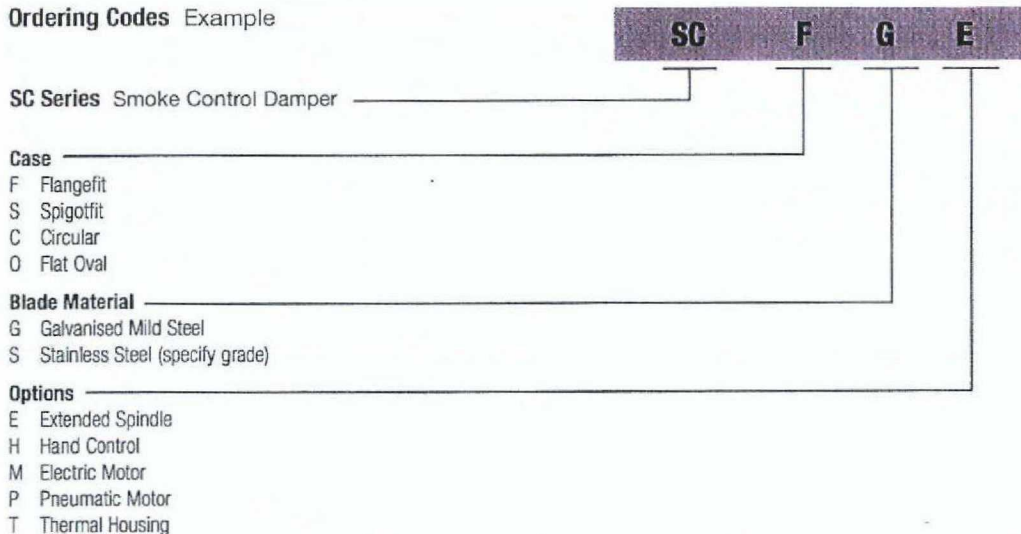
Enclosure size: 438mm length - 215mm width and 142mm depth.



SC Series

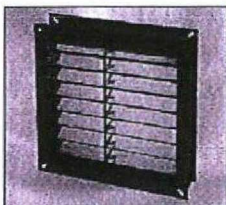
ordering codes

Ordering Codes Example

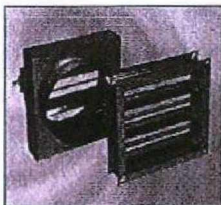


Air, Fire and Smoke Control

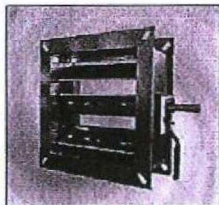
Air Balance Control



BD Series
Backdraught
Regulating Dampers



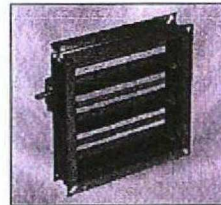
DD Series
Duct Regulating
Dampers



HD Series
Heavy Duty Regulating
Dampers

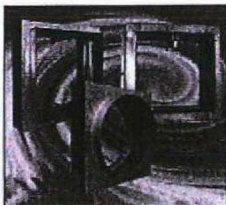


SB Series
Single Blade
Regulating Dampers

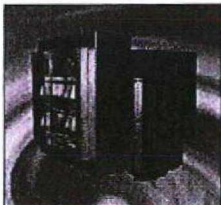


SF Series
Slimfit Regulating
Dampers

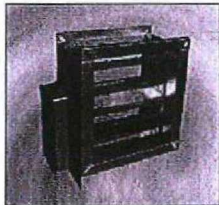
Fire and Smoke Control



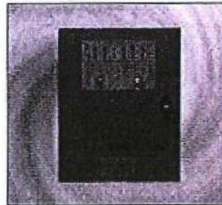
FD Series
Fire Control



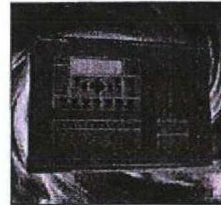
FSD Series
Fire and Smoke
Control



SC Series
Smoke Control



Control Systems
Electro Mechanical



Control Systems
Fully Addressable



BSB Engineering Limited

Unit E, Tribune Drive, Trinity Trading Estate, Sittingbourne, Kent ME10 2PD

Tel: [REDACTED] • Fax: [REDACTED]

E-mail: sales@bsb-dampers.co.uk Website: www.bsb-dampers.co.uk



A Member of The Maico Group

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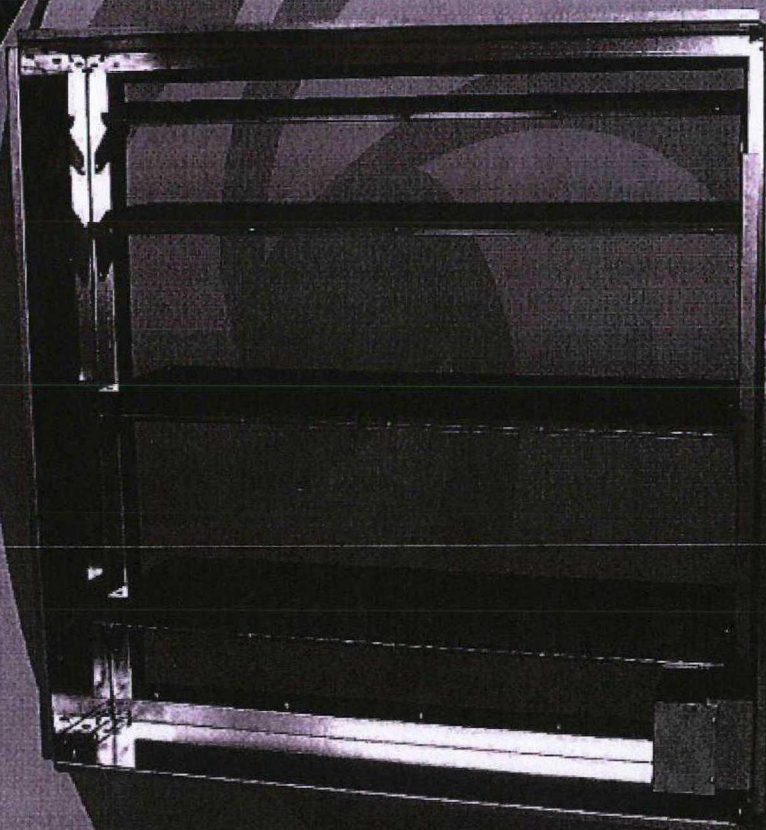
SERIES 54

Smoke Evacuation Damper

PUBLICATION

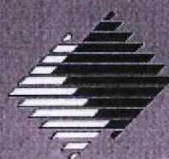
DAMPERS 10

OCTOBER 2011



Features

- 1.5 mm Galvanised steel construction
- Motor open or motor closed operation
- Fire tested to EN1366 Pt 2
- Low leakage rate
- High Free area design
- Optional Decorative Fascia grilles



GILBERTS



Introduction

SERIES 54

The Series 54 smoke damper range has been designed for safety smoke ventilation applications and is particularly suited for smoke evacuation shafts and risers in multi-storey buildings.

A multi-parallel linked blade smoke damper the Series 54 is manufactured from robust 1.6 mm galvanised steel and is fully tested to the requirements of EN1366 Pt 2 for 1 hour. Usefully the damper combines both a low leakage rate when closed with a high free area when open to support high smoke evacuation rates.

All Series 54 dampers are fitted with a Belimo actuator to offer either a powered motor open/close or failsafe spring return open/closed actuation according to requirements.

Series 54 has been designed to provide both a practical and

aesthetic solution. It is available in a wide range of sizes ranging from 400 x 400 to 1000 x 2000 with sizes based on the structural opening (aperture) dimensions. Effectively this means the largest size damper can provide

up to 10m² of free area.

For aesthetic finishing, where required, the damper face can simply be powder coated to a stock RAL colour with an optional cover plate also fitted to disguise the motor. Alternatively dampers can be masked with fixed blade type cover grille (Gibbera Series K40 or K15) with blades angled at 40° for virtual full damper masking, or 16° for a partial masking effect. These cover grilles can be face screw fixed or concealed fixed according to preference.

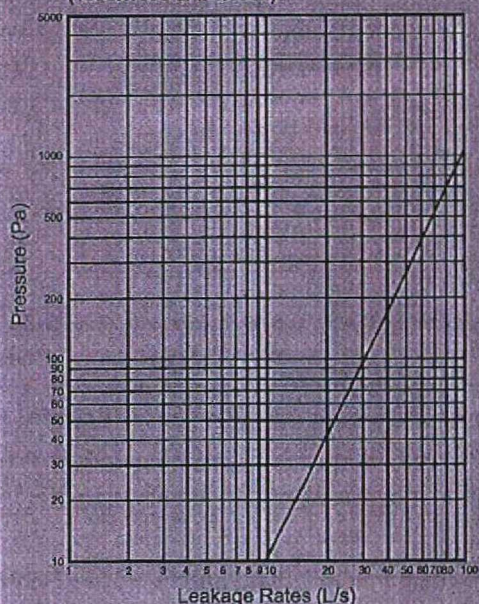
Features

- 1.6 mm Galvanised steel construction
- Motor open or motor closed operation
- Fire tested to EN1366 Pt 2
- Low leakage rate
- High Free area design
- Optional Decorative Fascia grilles

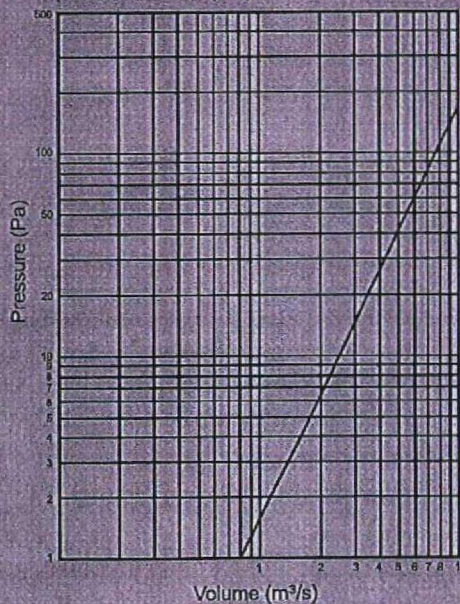


Pressure Graphs

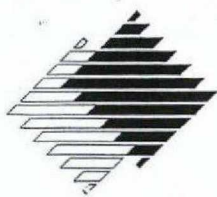
Pressure Drop / Leakage Graph
(1000x1000 unit closed)



Pressure Drop / Volume Graph
(1000x1000 unit open)



During non-operational conditions the damper blades would normally be in the closed position.

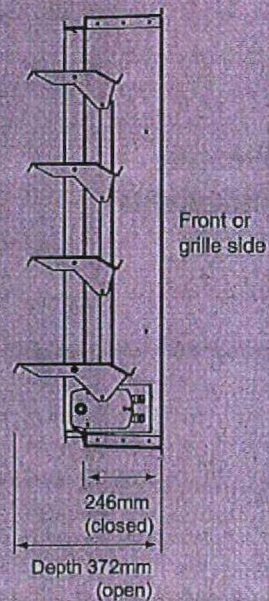
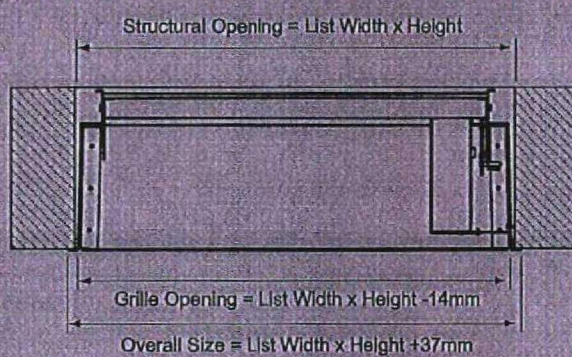


Dimensional Data

SERIES 54

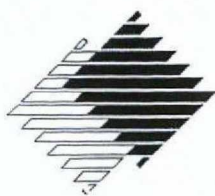
Fix with mudguard washers
at 600mm ctrs using
suitable screws for structure

Motor cover obscures
actuator from grille side
(if specified)



Smoke Evacuation Damper

3



Ordering Specification

SERIES 54

SERIES	SERIE 54
SIZE mm (width x height) Structural opening	700 x 1050
CONTROL OPTION: Open/close.....OC Spring return open.....SRO Spring return close.....SRC	SRO
OPERATING VOLTAGE: 24volts/230volts	230
MOTOR COVER.....MC	MC
CONCEALED GRILL FIX...CF	CF
FINISH (Optional) Matt Black Face.....BB	BB

Free Area

Approximate free area with damper in the open position:

Size	Damper Only	With K40 Fascia Grille
1000 x 2000 -	1.51m ²	1.4m ²
1000 x 1500 -	1.1m ²	1.0m ²
800 x 1000 -	0.55m ²	0.56m ²

Weight

Damper weight approx 39Kg per SQ/M

Fascia Cover Grilles

For Fascia Grille options please refer to Gilberts Air Distribution Catalogue "Grilles" section

Engineering Specification

Damper & Mounting Frame

Damper with horizontal blades for air passage and 15mm returned edge all round for fixing to structure. Damper body formed in flanged Z sections 62 x 35 x 196. All manufactured from 1.5mm cold reduced galvanised steel to BS.EN.10142: 1991. The frame corners are joined using 6 No 4.8mm dia. sealed steel rivets on slotted holes to allow for expansion.

Blades

Parallel blade assembly constructed from 1.0mm thick x 100mm to 300mm wide cold reduced galvanised steel to BS.EN.10142: 1991 set at a 100mm to 300mm pitch selected to suit structure opening height. Each blade is connected to the link bar (1.5mm thick galv m/s) with 4.8 dia steel rivets.

Motor Drive

Belimo BLE drive motor (open/closed) fitted as standard; spring return options available.

Contact

GILBERTS

Head Office and Works
GILBERTS (BLACKPOOL) LTD

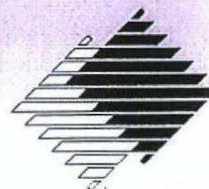
Gilair Works, Clifton Road,
Blackpool,
Lancashire FY4 4QT.

Telephone: [REDACTED]

Fax: [REDACTED]

e-mail: sales@gilbertsblackpool.com

Web: www.gilbertsblackpool.com



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SMOKE VENT



Emergency Ventilation

SMOKEVENT

Introduction

Elta Fans are a major supplier of axial flow fans for smoke ventilation, with the SmokeVent range specifically developed for emergency smoke spill extract systems that may operate as part of the main extract system as dedicated fans for emergency clearance only, to overcome hazardous fire, smoke and fume conditions.

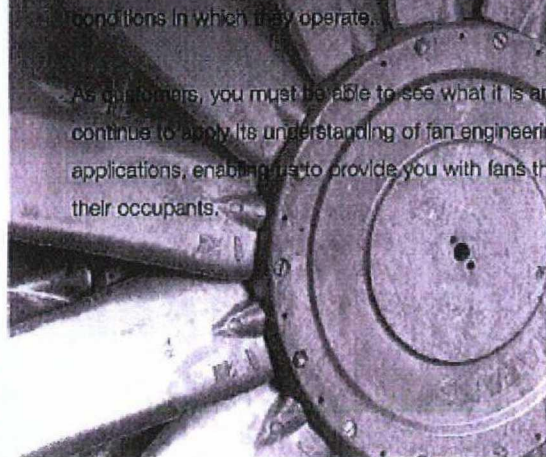
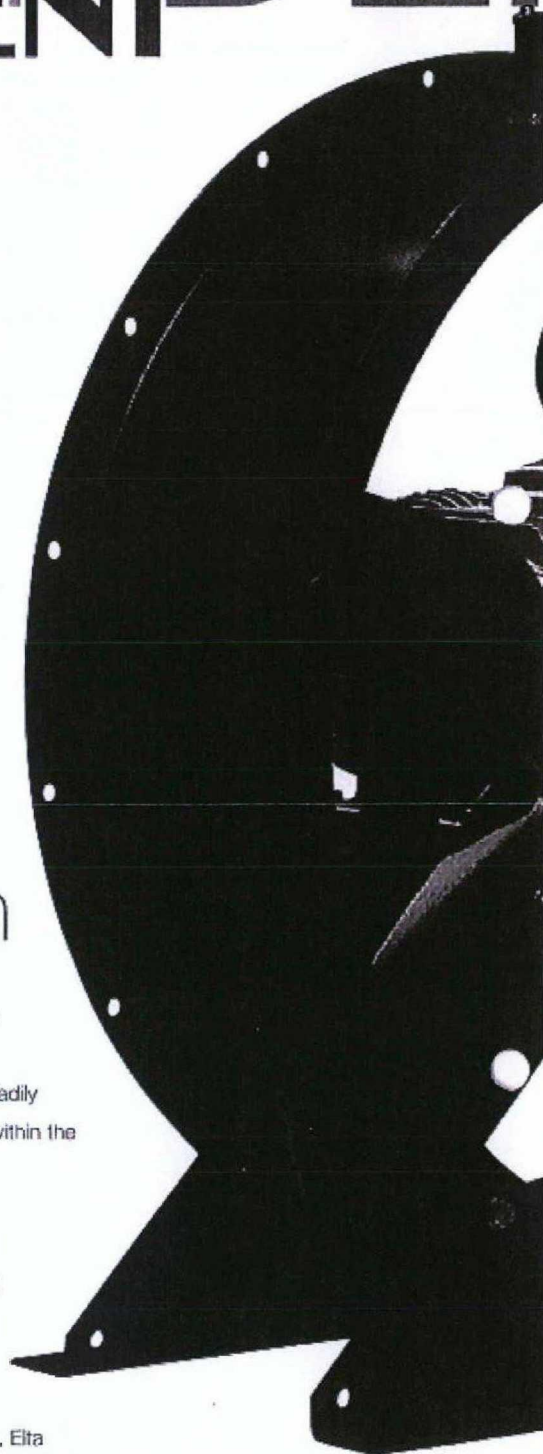
Technology will set its own limits, and at Elta we take special pride in exceeding them. Sometimes the solution is straight forward, sometimes it can be a tiresome, testing process. Nevertheless, Elta's development in Smoke Ventilation, by working to exacting standards, continues to set us apart through excellence in fan engineering and design.

emergency ventilation

In today's environment, if allowed to spread, Fire, Smoke and other noxious fumes can endanger safe means of escape, whilst causing widespread damage to buildings. By removing these and other harmful fumes, SmokeVent assists fire fighters in more readily identifying the fire source, enabling location of potential casualties and occupants still within the building for prompt escape, whilst also minimising smoke and fume accumulation.

With extensive experience in the design and application of Smoke Ventilation fans, SmokeVent products must immediately create understanding of their performance and characteristics, but above all, the benefits they provide for the demanding conditions in which they operate.

As customers, you must be able to see what it is and what SmokeVent can do for you. Elta continue to apply its understanding of fan engineering principles for smoke ventilation applications, enabling us to provide you with fans that assist in the protection of buildings and their occupants.



design & performance

Elta Fans has a wealth of experience and knowledge in the design and manufacture of axial flow fans for fresh air supply and extract as well as for emergency smoke ventilation systems.

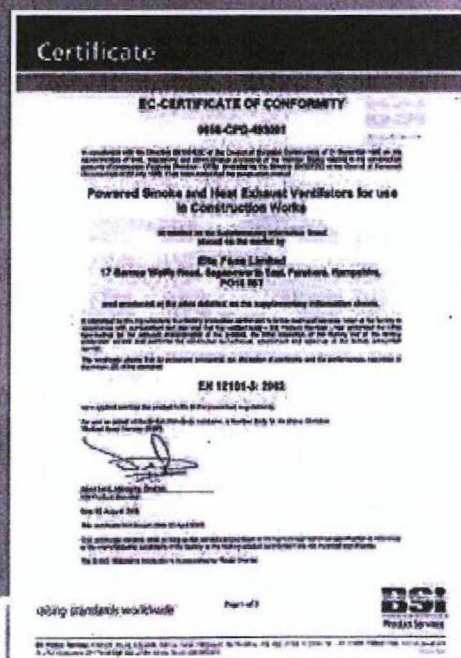
The SmokeVent range is specifically developed for general ventilation plus emergency smoke extract at 200°C or 300°C for 2 hours up to 2000mm in diameter, and 400°C for 2 hours up to 1250mm in diameter.

It is a mandatory requirement in the European Union that all smoke extract fans are independently tested to EN12101-3:2002 Smoke and Heat Control Systems - Specification for powered smoke and heat exhaust ventilators. This standard covers the testing, design and production controls that are required before the manufacturer can obtain product certification from the appropriate notified body.

Elta Fans has extended its EC Certification for smoke related fan units with BSI, with both its UK production facilities manufacturing the SmokeVent range, making it one of the largest certified standard product ranges available within Europe.

All Elta emergency smoke extract fans are included on EC Certificate of Conformity 0086-CPD-493001.

In addition, SmokeVent units are tested to ISO 5801:1997 (Airside performance) and BS 848 Part 2:1985 (Sound Performance).



features & benefits

SmokeVent fans are available from 250mm up to 2000mm diameter, supplied for free standing operation in ducted systems, although they are also suitable for installation in roof extract units.

Fans can be supplied as Single or Two Stage, Single or Two-speed operation, and with such a comprehensive range of standard sizes, SmokeVent provides the flexibility to supply models for new or refurbished projects.

cost effective

The highly efficient impellers make this a very economical method of moving high volumes of air at low to medium pressures.

The SmokeVent range offers additional cost savings as it satisfies the requirements for both emergency smoke extraction and general daily ventilation in a single unit.

design appeal

The integral spun flanges allow for smoother airflow and added efficiency.

safety and control

A mechanical smoke extract system that is independent from external conditions allows emergency control of the situation by the fire services. The removal of smoke assists the safety of the occupants in the event of a fire.

accessories

Full accessory range including: mounting feet, anti-vibration mounts, matching flanges, flexible connectors, silencers, bell mouth inlets, non-return dampers and wire guards - All selected in advance to match the fan, which means this avoids any on site installation and fitting problems.

rapid delivery

SmokeVent long cased axial fans within the Elta SELECT range, shall either be available from stock or on short delivery.



warranty

Each SmokeVent comes complete with a 12 month warranty (excluding emergency smoke operation).

SMOKE VENT

SMOKE VENT

specification

impellers

Adjustable pitch aerofoil impellers are provided with blades made from high quality pressure die cast aluminium (LM6) natural finish. Impellers are factory set at an angle to provide maximum performance. The hubs are manufactured from die cast aluminium alloy (LM24).

Assembled impellers will have their blades positively locked by pinning, for added security, for operation in the smoke regime.

Assembled impellers are to be dynamically balanced to Grade G6.3.

motors

Motors are to be foot or pad mounted totally enclosed metric type to IP55, with sealed for life bearings, standard industrial paint finish and Class F insulation to EN 60034-5, suitable for use at normal continuous duty and a once only use under smoke operation at 200 °C or 300 °C for 2 hours up to 2000mm in diameter and 400 °C for 2 hours up to 1250mm in diameter. Flying leads are brought out via a temperature resistant conduit system, to an external IP55 terminal box for customer cabling interface.

casings

The all metal fan casing provides a long lasting and robust construction.

The units have been constructed from a single sheet of steel, with both motors and axial impellers mounted within the length of the unit casing.

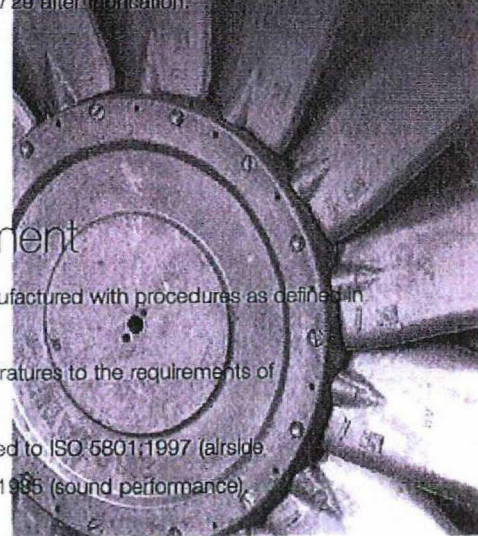
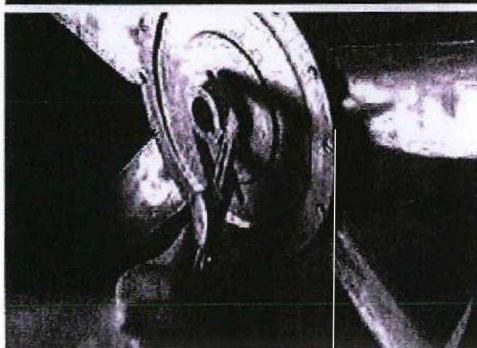
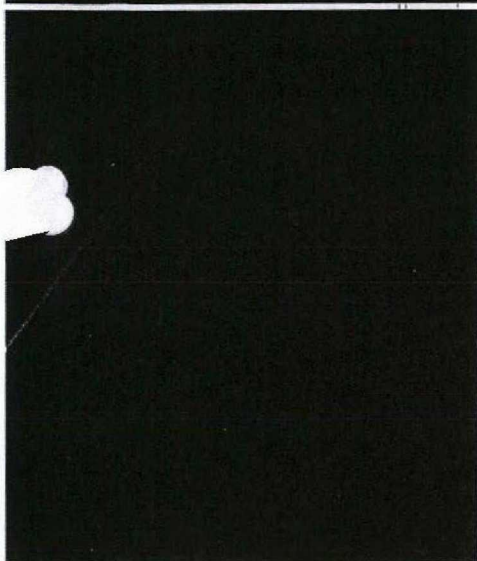
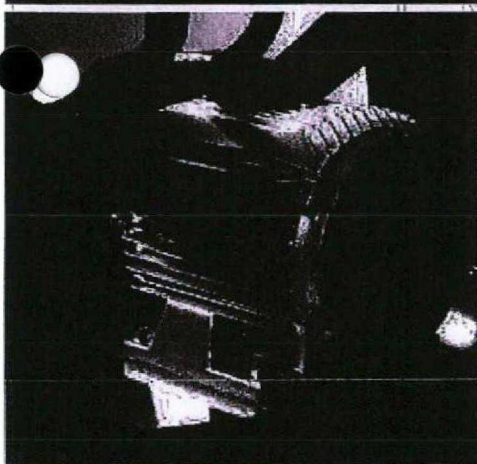
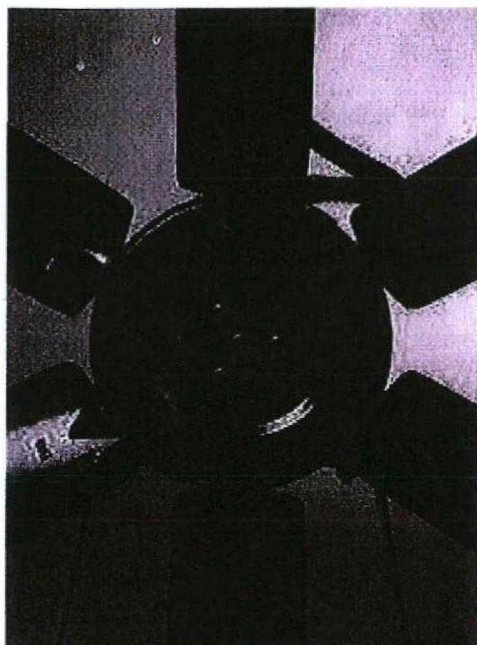
All casing parts are heavy gauge mild steel sheet, roll formed and welded, then hot dipped galvanised to BS 729 after fabrication.

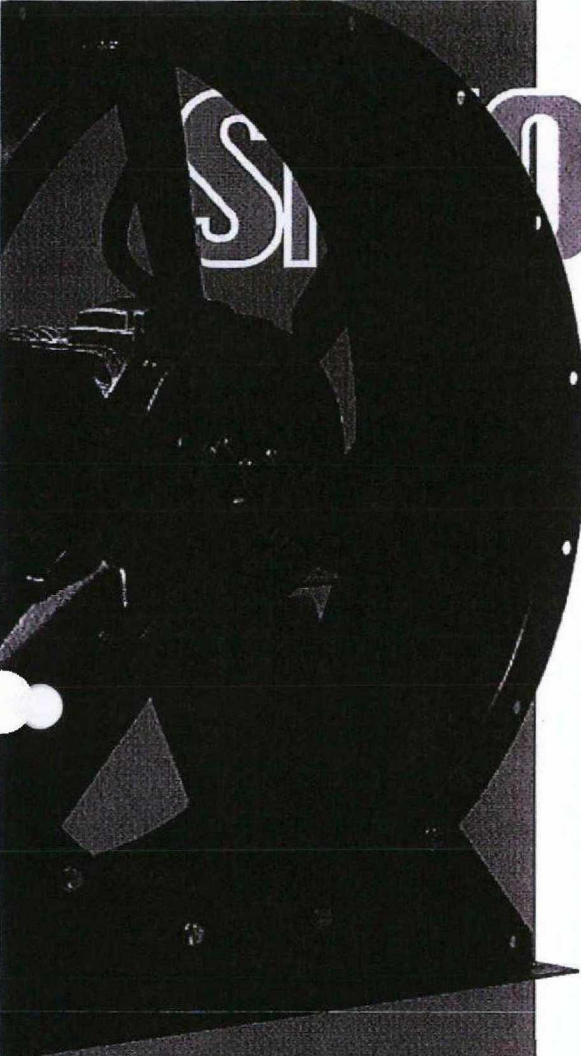
quality management

Units are to be designed and manufactured with procedures as defined in BS EN ISO 9001: 2000.

Units are tested at elevated temperatures to the requirements of EN 12101 - 3: 2002.

All SmokeVent units are to be tested to ISO 6801:1997 (airside performance) and BS 848 Part 2: 1995 (sound performance).





SMOKE VENT

applications

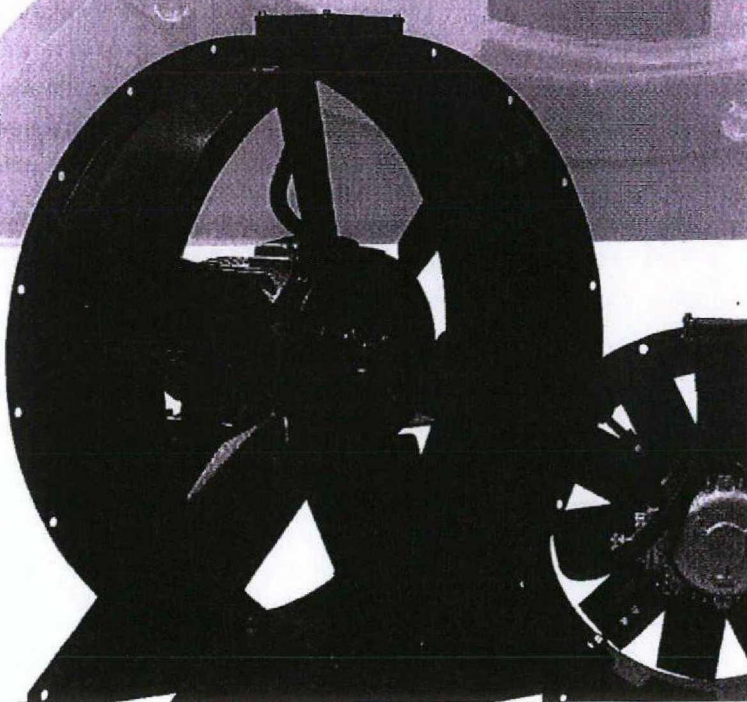
The major cause of death in the event of a fire is due to smoke inhalation. A smoke extract system is required to enable occupants to escape before being overcome by smoke and to facilitate access for fire fighters in order to extinguish the fire.

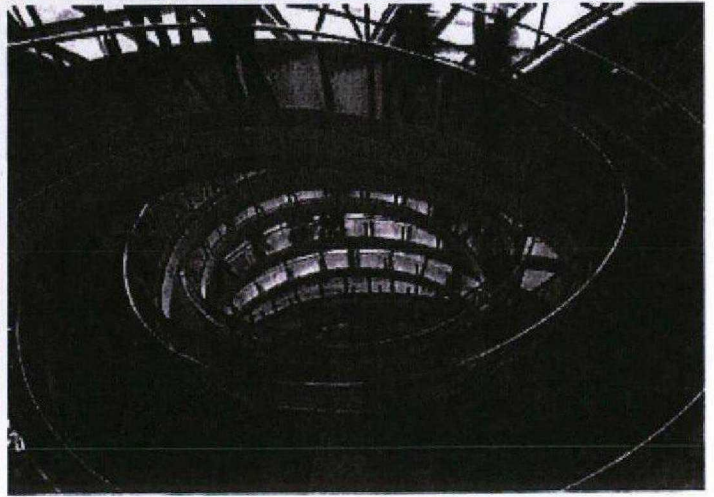
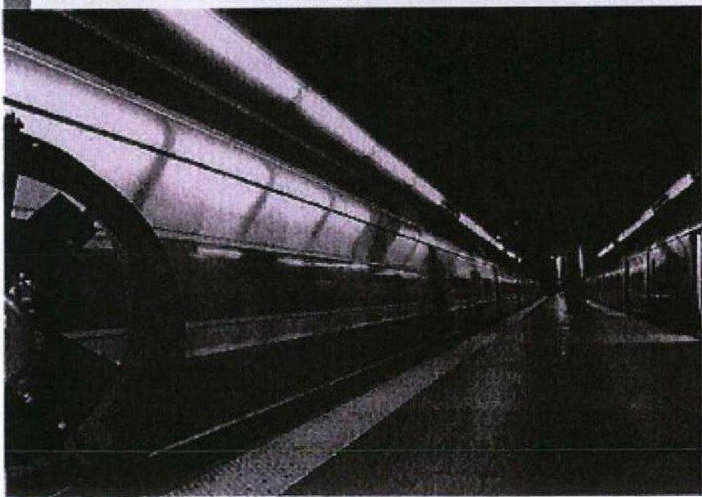
The same ventilation system is normally used to satisfy both the general ventilation and smoke control requirements. Smoke and heat exhaust ventilation systems are designed to:

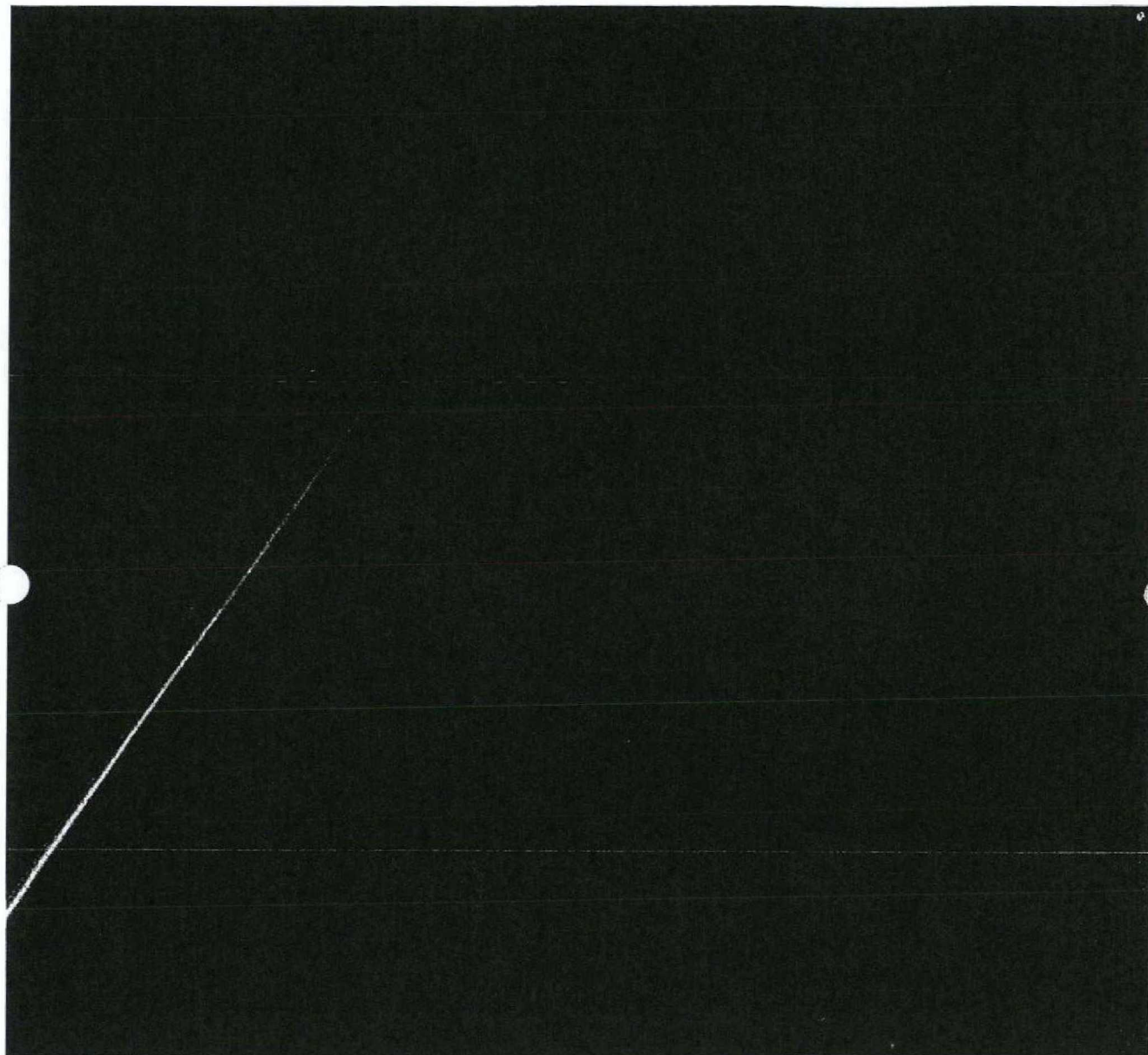
- Keep access and escape routes clear of smoke.
- Aid fire fighting operations.
- Delay or prevent flashover or full fire development.
- Reduce the subsequent damage to the building structure and its contents.

Elfa Fans provide a wide range of smoke ventilation fans that are specifically developed to satisfy the demands of 'emergency' ventilation, particularly during fires. There are a wide variety of applications for our products, which include:

- Atrium Smoke Extract
- Sports Hall Smoke Extract
- Emergency Stairwell Pressurisation
- Shopping Precinct Smoke Exhaust Systems
- Emergency Tunnel Ventilation
- Roof Smoke Extract Exhaust Cows
- Office Ventilation and Emergency Smoke Extract systems
- Car Park Ventilation and Smoke Extract Systems
- Marine and Offshore Living Quarters Emergency Smoke Extract







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XP95[®]

INTELLIGENT SMOKE & HEAT DETECTORS

- Open, Digital Protocol
- Alarm Flag for fast alarm reporting
- Alarm Address for fast location of alarm
- Automatic addressing with the patented XPERT card
- Electronics free base
- Slide-easy base
- Ease of installation
- Elegant design



0832


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WORLD CLASS FIRE SOLUTIONS

XP95

INTELLIGENT SMOKE & HEAT DETECTORS

XP95 Optical Detector

The XP95 optical smoke detector uses an internal pulsing LED and a photo-diode at an obtuse angle. In clear air conditions the photo-diode in the XP95 detector receives no light from the LED and produces a corresponding analogue signal. The signal increases when smoke enters the chamber and light is scattered onto the photo-diode. The optical smoke detector is externally identical to the ionisation detector but is distinguished by having a clear indicator LED which emits red light when the detector is in alarm.

Part No. 55000-600 XP95 Optical Smoke Detector

XP95 Heat Detector

The XP95 heat detector is distinguishable from the smoke detectors by its low air-flow resistance case which allows good contact between the sensing thermistor and the surrounding air.

The device monitors temperature by using a single thermistor which provides a voltage output proportional to the external air temperature.

Part Nos. 55000-400 XP95 Heat Detector A2S
55000-401 XP95 Heat Detector CS

XP95 Multisensor Detector

The XP95 Multisensor detector combines inputs from optical and heat sensors and processes them using a sophisticated algorithm. It is designed to be sensitive to a wide range of fires and may be used in place of an ionisation detector in many instances. The detector's construction is similar to that of the optical detector but uses a different lid and optical mouldings to accommodate the thermistor temperature sensor.

Part No. 55000-885 XP95 Multisensor Detector

XP95 Ionisation Smoke Detector

The air in the dual chambers of the XP95 ionisation smoke detector is irradiated to produce ions that travel to the positive and negative electrodes and hence create a current flow in the chambers. Smoke entering the

outer chamber causes a drop in the current flow and an increase in the voltage measured at the junction between the outer and inner chambers. The analogue voltage signal produced in the sensing chamber is converted to a digital signal by the electronic circuitry and transmitted to the control equipment on interrogation. The micro-processor in the control equipment then compares the signal with the stored data and initiates a pre-alarm or fire alarm as smoke density increases. When the equipment determines that a fire condition exists, it instructs the detector to switch on its indicator LED and the pre-planned alarm routine is initiated.

Part No. 55000-500 XP95 Ionisation Smoke Detector

XP95 Flame and Beam Detector

A range of flame and beam detectors are also available. For more information refer to the website www.apollo-fire.co.uk

Intrinsically Safe Detector

XP95 Intrinsically Safe (IS) detectors include all the benefits of the standard XP95 range, but are developed specifically for use in hazardous areas. This range includes ionisation and optical smoke detectors, heat detectors and manual call points, BASEEFA approved to E EX ia IIC T5. XP95 IS detectors and manual call points are approved by a number of marine classification societies. These include Marine Equipment Directive (MED), Lloyds Register of shipping (LR) and many more which can be viewed on our web site. For more information, please refer to Apollo publications PP1094 and PP1095.

Part No. 55000-640 IS Optical Smoke Detector
55000-540 XP95 IS Ionisation Smoke Detector
55000-440 XP95 IS Heat Detector

Sounders, Beacons & Sounder Beacons

There is a wide choice of devices for audible and visual alarm signalling. Sounders and beacons are available separately and as a combined sounder beacon unit. For more information, please refer to Apollo's website.

XP95 Manual Call Point

When activated, the XP95 manual call point not only interrupts the polling cycle to indicate to the control panel that it has been operated, but also reports its address. Thus an alarm and its position can be reported in less than 0.2 seconds.

Part Nos. 55100-905 XP95 Manual Call Point (surface)
55100-908 XP95 Manual Call Point with isolator (surface)
58100-950 Waterproof Manual Call Point
58100-951 Waterproof Manual Call Point with Isolator

Bases

A wide range of bases is available. For more information, please refer to the Apollo publication PP1089.



For more information visit www.apollo-fire.co.uk

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Fax: [REDACTED]

Email: sales@apollo-fire.com
Web: www.apollo-fire.com

Alan Whyte

From: M.Smith@maxfordham.com
Sent: 12 January 2015 14:59
To: David Bradbury
Cc: Alan Whyte; d.campbell@maxfordham.com; Simon Lawrence; Simon O'Connor; Terence McLaughlin
Subject: Re: Grenfell Tower - AOV Tech Sub
Attachments: 011 AOV - MF Response 20150112.docx

Afternoon Dave

I've looked through the information you included with the tech sub. It would be beneficial to include a schematic (or two) showing the operation of the system under general ventilation and fire conditions.

011 AOV - marked 'B'

Kind regards,

Matt

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From: David Bradbury <DavidBradbury@jswright.co.uk>
To: "M.Smith@maxfordham.com" <M.Smith@maxfordham.com>, "d.campbell@maxfordham.com" <d.campbell@maxfordham.com>,
Cc: Simon Lawrence <slawrence@rydon.co.uk>, Simon O'Connor <SOConnor@rydon.co.uk>, Terence McLaughlin <terencemclaughlin@jswright.co.uk>, Alan Whyte <AlanWhyte@jswright.co.uk>
Date: 05/01/2015 15:41
Subject: Grenfell Tower - AOV Tech Sub

Matt,

Please find attached technical submission for the AOV system at Grenfell Tower.

Although we have had verbal acceptance from building control on the proposed design, we'll need to submit this for formal approval so any comments you have, let me know and I'll incorporate them before final submission.

Kind regards,

Dave Bradbury
Design Manager
Head Office

Tel: [REDACTED] | Fax: [REDACTED] | Mob: [REDACTED] | Email: davidbradbury@jswright.co.uk | Web: www.jswright.co.uk

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[attachment "Apollo Smoke Heads.pdf" deleted by Matt Smith/MaxFordham] [attachment "Grenfell Tower Tech Sub Lobby Smoke Control Systems Rev 1.pdf" deleted by Matt Smith/MaxFordham] [attachment "KEY-1.pdf" deleted by Matt Smith/MaxFordham] [attachment "osr_brochure.pdf" deleted by Matt Smith/MaxFordham] [attachment "Pressure Transmitter 1240_415_REV_F.pdf" deleted by Matt Smith/MaxFordham] [attachment "sc_series[1].pdf" deleted by Matt Smith/MaxFordham] [attachment "SERIES_54.pdf" deleted by Matt Smith/MaxFordham] [attachment "smokevent_slcs.pdf" deleted by Matt Smith/MaxFordham] [attachment "011 AOV.docx" deleted by Matt Smith/MaxFordham]

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TECHNICAL SUBMISSION

Contract	Grenfell Tower	Contract No.	9497
Submitted to	Matt Smith (Max Fordham)	Date of Submission	05.01.15
Submitted by	Dave Bradbury	Ref No.	011

Description of submission

Please find attached the technical submission for the AOV system at Grenfell Tower, also attached technical data sheets for the relevant equipment.

Please approve / comment by: 12.01.15

Status of Approval – (Please check box.)

A	<input type="checkbox"/>	Approved with no comments.
B	<input checked="" type="checkbox"/>	Approved with the following comments;
C	<input type="checkbox"/>	Not approved. Resubmit in accordance with the following comments below

Comments

Approved subject to formal approval by RBKC Building Control/Fire Officer. A schematic showing the system's operation in both general ventilation and fire mode should also be provided for review.

Signature Matt Smith On behalf of Max Fordham LLP

Title Engineer Date 12/01/15