air3

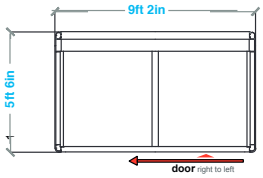
Tech Document

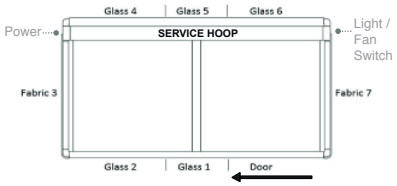
AHJ fire requirements

orangebox

Dimensions

AIR-23





Dimensions

9 ft 2 1/4 inches wide

5ft 6 5/16 inches deep

7ft 9 5/16 inches tall - excluding air circulation fan & opening roof

8ft 3 13/16 inches tall - including air circulation fan

Weight

962.5 lbs 436.6 kg

Power Usage

Occupied - 100w / Unoccupied - 1w or Less
(Not including any plugged in external equipment)

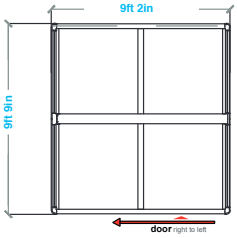
Max Voltage

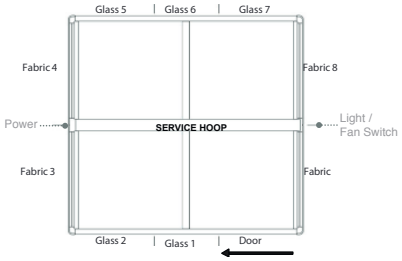
120V VAC Max

Current

12 AMPS

AIR-25





Dimensions

9 ft 2 1/4 inches wide

9ft 8 17/32 inches deep

7ft 9 5/16 inches tall - excluding air circulation fan & opening roof

8ft 3 13/16 inches tall - including air circulation fan

Weight

1296 lbs 587.8 kg

Power Usage

Occupied - 100w / Unoccupied - 1w or Less
(Not including any plugged in external equipment)

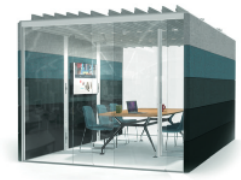
Max Voltage

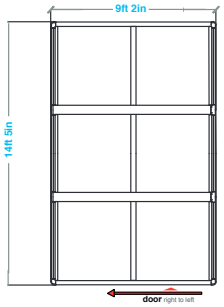
120V VAC Max

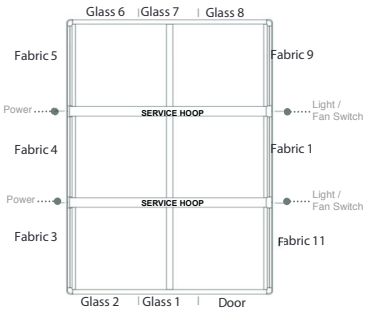
Current

12 AMPS

AIR-27







Dimensions

9 ft 2 1/4 inches wide

14ft 6 13/16 inches deep

7ft 9 5/16 inches tall - excluding air circulation fan & opening roof

8ft 3 13/16 inches tall - including air circulation fan

Weight

1698 lbs / 770.2 kg

Power Usage

Occupied - 100w / Unoccupied - 2w or less per hoop
(Not including any plugged in external equipment)

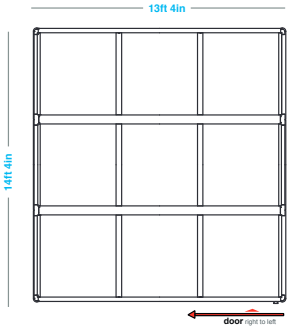
Max Voltage

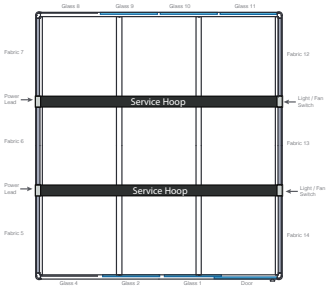
120V VAC Max

Current

12 AMPS

AIR-29





Dimensions

4.1m Wide

4.44m Deep

2.25m Tall - Excluding Air Circulation Fan & Opening roof

2.535m Tall - Including Air Circulation Fan & opening roof

Weight

2084 lbs / 945.6 kg

Power Usage

Occupied - 200W

Not Including any plugged in external equipment

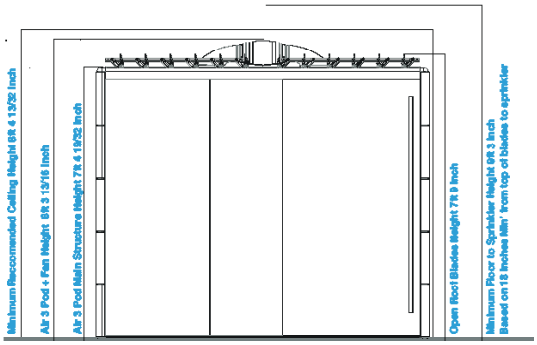
Unoccupied - 2W or Less

Not Including any plugged in external equipment120V VAC Max

Measurements

Air 23 / 25 / 27 / 29 clearance heights in buildings:

Minimum floor to ceiling height - 8 ft 4 13/32 inches
(non spinkler covered space)
Minimum floor to sprinkler height - 9 ft 3 inches
(sprinkler covered space)
Required opening blade clearance to sprinkler head - 18 inches



Please note: This is a reccomended distance between the ceiling and an open grid ceiling system however the pods utilize a louvre roof in one direction only, allowing greater water coverage.

These are guidelines from the closest related standard to the pods only and can be clarified / approved on a project by project basis by local AHJ's.

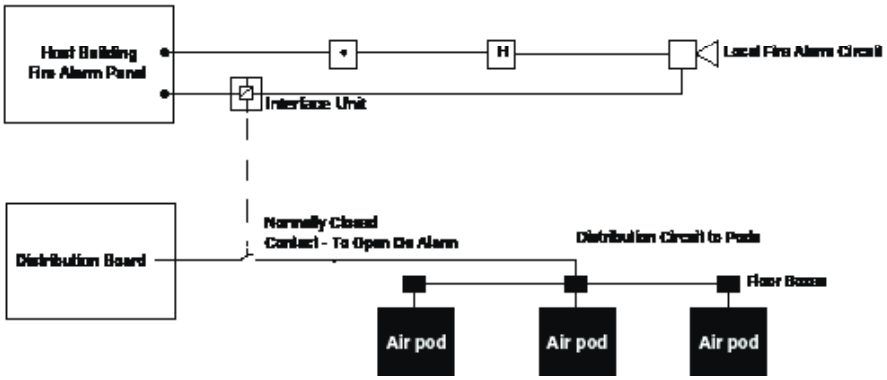
GUIDELINES FOR DISTANCES FROM SPRINKLER DEFLECTORS TO OPEN GRID CEILING SYSTEMS:

Hazard Occupancy	Sprinkler type	Sprinkler spacing	Minimum distance between sprinkler deflectors and the upper surface of the open-grid ceiling
Light	Spray or Old-Style Sprinklers	<10.0 by 10.0 ft. (3.0 by 3.0 m)	18.0 inches (45.7 cm)
	Spray Sprinklers	≥10.0 by 10.0 ft. (3.0 by 3.0 m) & < 10.0 by 12.0 ft. (3.0 × 3.7 m)	24.0 inches (61.0 cm)
	Old-Style Sprinklers	≥10.0 by 10.0 ft. (3.0 by 3.0 m) & < 10.0 by 12.0 ft. (3.0 × 3.7 m)	36.0 inches (91.4 cm)
	Spray or Old-Style Sprinklers	≥10.0 by 12.0 ft. (3.0 × 3.7 m)	48.0 inches (121.9 cm)
Ordinary	Spray Sprinklers Only	<10.0 by 10.0 ft. (3.0 by 3.0 m)	24.0 inches (61.0 cm)
	Spray Sprinklers Only	≥10.0 by 10.0 ft. (3.0 by 3.0 m)	36.0 inches (91.4 cm)

Connection

If however you prefer the fire board to open the roofs in the event of an alarm, simply connect all pods on one power circuit and create a cut-off link from the fireboard to the pod circuit "outside of the pod".

Using host building fire alarm panel to cut power in the event of a fire
NB. Cutting power will shut down the pod and open the roof.



What about strobes?

No problem, the pods have plenty of visibility through the glass sides.

What about audible alarms?

No problem, the pods have an acoustic performance but are not sound proofed and therefore the fire alarm set to 75 / 80dB is audible inside the pod (NFPA 72 - 15dB higher than the average ambient sound e.g 60dB). On site project specific testing is reccomended.

when there is a requirement to connect to the fire board, the roof will open in 8 seconds and the alarm audibility will be louder.

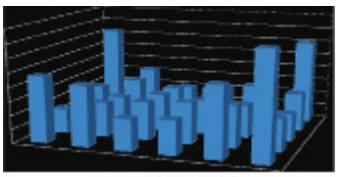
Testing & Performance

Improved water ingress through the use of the louvred roof

We have carried out extensive In-house testing during development to obtain the best possible performance and enable fine tuning of the design. This was critical in order to commission the pre-production prototyping in the exact materials for the independent testing.

Third party test house BRE GLOBAL.

Following the development testing, we commissioned an external independent test house, BRE Global to confirm compliance primarily with BS EN 12845 Fixed fire-fighting systems / Automatic sprinkler systems, NFPA 101 Life Safety Code & NFPA 13 Sprinkler Code by demonstrating a louvred roof is not an obstruction when placed under sprinklers.



The tests confirm through official documentation and video evidence, the low to zero risk status of Air pods within sprinklered workplace environments through sufficient even water ingress.

The results also highlighted that the spread of water inside the pods was better with the louvres than with no roof at all. The improvement to the water spread in the corners was vastly improved.

The tests were carried out with the two types of sprinklers:

- Tyco TY1236 flat spray K57 (flat spray pattern) – Common in the US
- Reliable F1FR pendant K80 (tapered spray pattern) – Common in the UK

At two heights from sprinkler head to top of louvre blades:

- 800mm – max for US
- 300mm – min for UK

These two distances from obstructions cover the min / max parameters for the US and the UK.

In the event of a fire

Stage 1

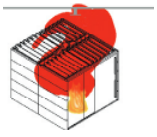
If a fire starts in the pod it will be detected by the heat detector.

Stage 2

The detectors immediately cut the power to the pod releasing the spring in the actuators which drives the louvres open in just **8 seconds**.

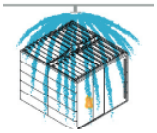
Stage 3

The open roof then allows the heat of the fire to release and set off the closest sprinkler heads.



Stage 4

The 74% open area allows enough even water ingress from the sprinklers (NO OBSTRUCTION), to control the size and spread of the fire within the pod. The roof blades have been proved (through sprinkler testing at BRE Global Fire Tesitng Facility) to greatly increase the even spread of water ingress against having no roof blades at all.



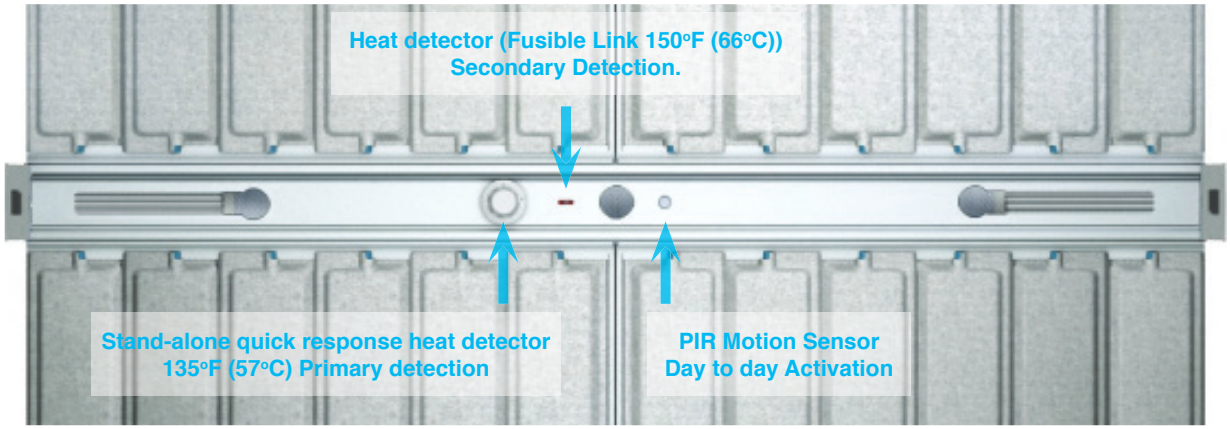
A failsafe system

Explaining the mechanics of the roof solution

The opening roof solution has been specifically developed as a “6 step” fail-safe system to conform to all relevant standards and the default position of the roof is “Always open”. This default is critical during night time when the building is unoccupied and at it’s most vulnerable time for asset safety. (No personnel present to identify a fire and raise alarm early).

6 Step Fail-Safe Modes:

- Roof opens when the PIR sensor stops sensing movement of people, i.e. when everyone has vacated the pod or when the pod is empty at night.
- Roof opens if heat is detected by the integrated heat detector, at 135°F (57°C). This is the primary “quick response” detector.
- Roof opens if heat is detected by the integrated fusible link at 150.8°F (66°C). This is the secondary stand-alone fail-safe detector.
- Roof Opens when a fire in the building is detected. Please note: This only applies when the pod is connected to a building fireboard. This Requires special electrical on site assistance and connection.
- Roof opens if the power is cut - turning off the pod power / in the event of a power cut in the building / in the event of an electrical failure within the pod.
- Roof opens if the heat detector is removed or fails.



The default open and fail-safe modes work by cutting the power to the actuators, allowing them to open by means of an integrated spring return. This effectively means that the roofs will “always open” whatever the scenario.

The roof opens without the need of electrical power in 8 seconds when any of the failsafes and detectors cut the power to the pod.

The roofs are by default “self testing” through their daily operation. In the event of a fault, flashing indicator lights on the membrane switch panel are indicated and the roof opens.

Building fire standards

- The opening roof is specifically designed to enable the Air pods to conform to fire standards through creating “by default” sprinkler coverage to the inside of the rooms...
- The Air pods have been designed so that internal wall and ceiling surfaces achieve the appropriate level of performance to UK / EU & IBC standards. This provides a robust platform by which Fire Engineers and Enforcing Authorities can satisfy themselves of compliance with functional Building Regulations requirements.
- Where the Air pods are being installed in buildings that are provided with automatic fire sprinklers, the automatic pod roof system has been designed to achieve the performance parameters of NFPA 13 sprinkler codes whereby the building’s existing sprinkler system will be able to control a fire in the pod without it being necessary to extend the building’s existing sprinkler to the pod itself.

Risk engineered out

All off the shelf component have been chosen to conform to the relevant standards in the UK & EU and for the US from the UL Yellow carded pre approved list and tested as an assembly against UL962 & UL 1286 electrical / fire standards. Equally, every specially designed component or assembly has been rigorously checked and engineered by ourselves and or suppliers for the UK & EU standards and for the US, by UL and also tested against UL962 & UL 1286.

Heat Detector 135°F (57°C) “Quick response” rated.

UL approved and specifically chosen for US market and by default, usable globally.

Non-Addressable Initiating Peripherals

*UL, ULC, CSFM Listed; FM Approved; MEA (NYC) Acceptance**

Electronic Heat Detectors for Two-Wire and Four-Wire Bases

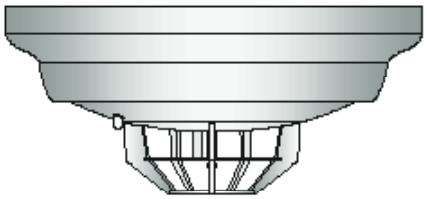
Features

Accurate and reliable heat detection for protection of property

UL listed to Standard 521 as a rate compensated heat detector

Fixed temperature operation is suitable for most applications:

- **Thermistor based design is inherently rate compensated due to minimal thermal lag**
- **135° F (57° C)**

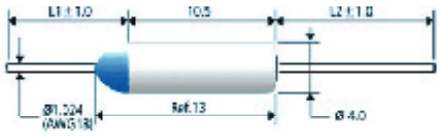


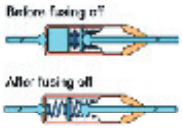
Electronic Heat Detector Mounted in Base

Model	Fixed Temperature Operation at	Rate-of-Rise Operation	FM Ratings		UL & ULC Maximum Spacing
			Maximum Spacing	RTI (Response Time Index)	
4088-9813	135° F (57° C)	Between 15° & 25° F/min (8.33° & 13.88° C/min)	20 ft x 20 ft (6.1 m x 6.1 m)	Quick	70 ft x 70 ft (21.3 m x 21.3 m)

Fusible Link (heat detector). - 66°C rated

A simple tried and tested mechanical device.
UL approved and specifically chosen for US market and by default, usable globally.





Part No.	UL/cUL	VDE	CCC	PSE	T_F (°C)	T_H (°C)
DF66S	O	O	O	O	66	42

Approvals: UL & cUL: E117626 VDE: 115369, 116219
CCC: 2003010205079617 PSE: JET2926-32001-1001-1009
EK: HH05009-2004A-2019A

Actuators - Failsafe opening in 8 seconds from detection

The actuators chosen are specifically designed for fire / smoke ventilation units and are tried and tested to UL approval, IP54 rating and have an ‘emergency spring’ minimum opening life of 60,000 cycles and a ‘day to day’ minimum motorized operation life of 150,000 cycles (based on 25 open / close cycles per day at 90°)... that’s 16 years life. They have a fail-safe “power off” spring release integrated as standard and are specified as a globally recognized quality product for smoke / ventilation louvre systems.

Spring return actuator with emergency function for adjusting air dampers in ventilation and air conditioning systems in buildings

Materials

Great attention has been paid to the material selection throughout the pod. Plastics have been specially selected as low flame / low smoke and for the US are UL 94 - V0 or HB either chosen from yellow carded pre approved and tested UL materials selector or have been tested and fingerprint audited on a quarterly basis by UL. All wall & roof linings are Class C minimum to Class A where possible for individual materials and fabrics.

ADA Compliance

All Orangebox Pods have features to Provide Compliance with ADA - Standards for Accessible Design / ICC A117.1 Accessible and usable buildings & facilities.
ICC A117.1 Accessible and usable buildings & facilities.

Compliant Door Opening

32 1/16 inches Min

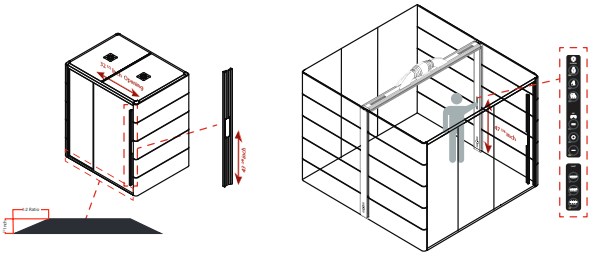
Full Length Door Handle With Central Grab Feature

Max opening / closing Force 5 Pounds / 22.5N

Door Access Bottom Track Profile

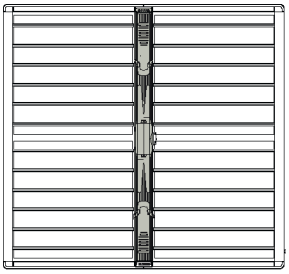
User Control Panel

Switches and socket outlets for lighting & other equipment in habitable rooms at appropriate heights. Between 15 inch min / 48 inch max



Sprinkler Positioning & Obstructions

The opening roof has been designed to create a minimum 70% open roof area regardless of the size of pod to conform to standards for sprinklers mounted above an open grid ceiling system as specified in **NFPA 13 - Installation of sprinkler systems**. Whist this is technically a different and more onerous scenario to our opening roof due to being an obstruction in both directions, it is important to meet as a minimum these requirements for open surface area to allow maximum water ingress.



The hoop is exempt from the NFPA 13 (max. 31 1/2 inches) as it is a light fitting - it is only 6 7/8 inches wide and does not reduce the foot-print open area to less than 60%.

Walls are exempt from the required open surface area as they are “sprinkler covered” from the outside + top.

We have actually surpassed this minimum requirement with 74% open area.

Standards

Assembled pod system

- UL 1286 Intertek Listed - 5007613

Intertek

US Fire Code - Where possible the following standards have been considered through our site coding consultants.

NFPA -13 Installation of Sprinklers.
NFPA 101 Life Safety Code.
IBC International Buildings Code.
NFPA 72 National Fire Alarm Code.
NFPA 1 Uniform Fire Code.

Roof panels:

ANSI/UL 723 / ASTM E84 - Tunnel test Class C

Textiles:

Camira - Synergy
California Technical Bulletin 117
NFPA 260 + UFAC

Gabriel - Europost
ASTM E84
CAL 117
NFPA 286

Guildford Of Maine - Anchorage
ASTM E84
CA Technical Bulletin 117-2013 Section 1
NFPA 260/UFAC Fabric Classification

Kvadrat Maharam Mode
California Technical Bulletin 117-2013
NFPA 260

Kvadrat Divina 3
California Technical Bulletin 117-2013
NFPA 260

Composite panel:

Fabric / plastic / acoustic infill / inner board / Aluminium frame
ASTM E84 / UL 723 / Class C
- Camira - Synergy
- Gabriel - Europost
- Guildford of Maine - Anchorage
- Kvadrat Maharam Mode
- Kvadrat Divina 3

Plastic drive arm / electrical housings / upholstery moldings:
UL 94 V0 rated

Plastic decorative covers:
UL 94 HB rated

Plastic extrusions:
UL 94 HB rated

Glass panels - Toughened glass:
Glass is 8mm thick / 0.31 inch or 5/16 inch Toughened glass to ANSI Z97.1-2009

Electrical:
UL 1286 - Approved / Interek Listed / References National Electric Code ANSI / NFPA 70

Seismic

Fire Detection & Roof Opening System

Suitable for use with standard and quick response sprinkler systems.

Minimum distance between open roof blades and sprinkler deflector system 18 to 48 inches.