

## Air Shower with Integrated Air Handling Unit



## Product overview.

The air shower is used for removing particulate from operatives before they enter a controlled environment. The PBSC air shower has an integrated air handling unit (AHU) on the top of the shower, provide an efficient removal of particulate from the operatives garment with 28m/sec flow at each of the 16 nozzles in the shower.

The shower operates as an air lock with interlocked doors and the operatives initiate the cycle via a start button when are entering the room. This enables the shower to be used as both the entry and exit to the room if required.

### Material of Construction

The shower is a modular construction which can be transported to position on site through single door way access. The largest pieces are 1000mm x 2100mm (side panel) and 1400 x 1400 x 600mm AHU plenum.

The construction is 1.6mm (16 gauge) steel panels. Shower body can be in either powder coated zintec, 304 stainless steel or 316 stainless steel.

Glass door leaves are 10mm (3/8") thick toughened glass, with polished edges. The glass is available with the options below.

- Clear doors – Standard
- Grey Tint – On request
- Opaque – On request
- Screen printed logo's – On request

### Airflow – Directional Nozzles

The high air flow through the nozzles is generated via 4 high quantity fan units. Each plenum with 4 nozzles is fitted with it own high performance fan unit.

- **Flow Clean Filter – Average of 28m/s from each nozzle**
- **Flow Dirty Filter – Average of 26m/s from each nozzle**



## **Air Shower Operation Overview**

### **One way operation**

The doors maglocks are permanently energized and the request to open door push button must be pressed.

The operative enters the shower the operative then starts the shower cycle from inside the shower via the "cycle start" button.

The shower cycle will run for a preset period of time with both doors locked and unavailable to open until the air shower cycle is finished. The cycle time is adjustable.

The operative can then leave via the designated exit door on the shower.

If there is an emergency there is an emergency override button to both sides of the shower to open the door on the shower. This would allow access in the wrong direction but would set of an audible alarm on the shower.

### **Two way operation**

The doors maglocks are either permanently energized and the request to open door push button must be pressed.

*or*

The door locks can be unlocked at rest and only energized if the other door is opened or the air shower cycle is operating.

The operative enters the shower the operative then starts the shower cycle from inside the shower via the "cycle start" button.

The shower cycle will run for a preset period of time with both doors locked and unavailable to open until the air shower cycle is finished. The cycle time is adjustable.

The operative can then exits the shower. Exit is available by any door on the shower.

If there is an emergency there is an emergency override button to both sides of the shower to open the door on the shower. This will release the door even during an air shower cycle.



## Air Shower Air Flow During Operation and Rest

### During Operation

When the shower cycle has been started the fans draw air through the high flow H14 HEPA filter in the roof panel of the shower. The filter is changeable from within shower cubicle via a clean change process if required. If safe change is require a different execution of the air shower is required with a separate Air Handling Unit (AHU).



The shower has a single fan unit per plenum fitted with 4 nozzles. The air drawn through the filter is blown into the shower cubicle through the nozzles to remove particles from the operative. The air is then drawn back via the H14 filter in a re-circulation process.

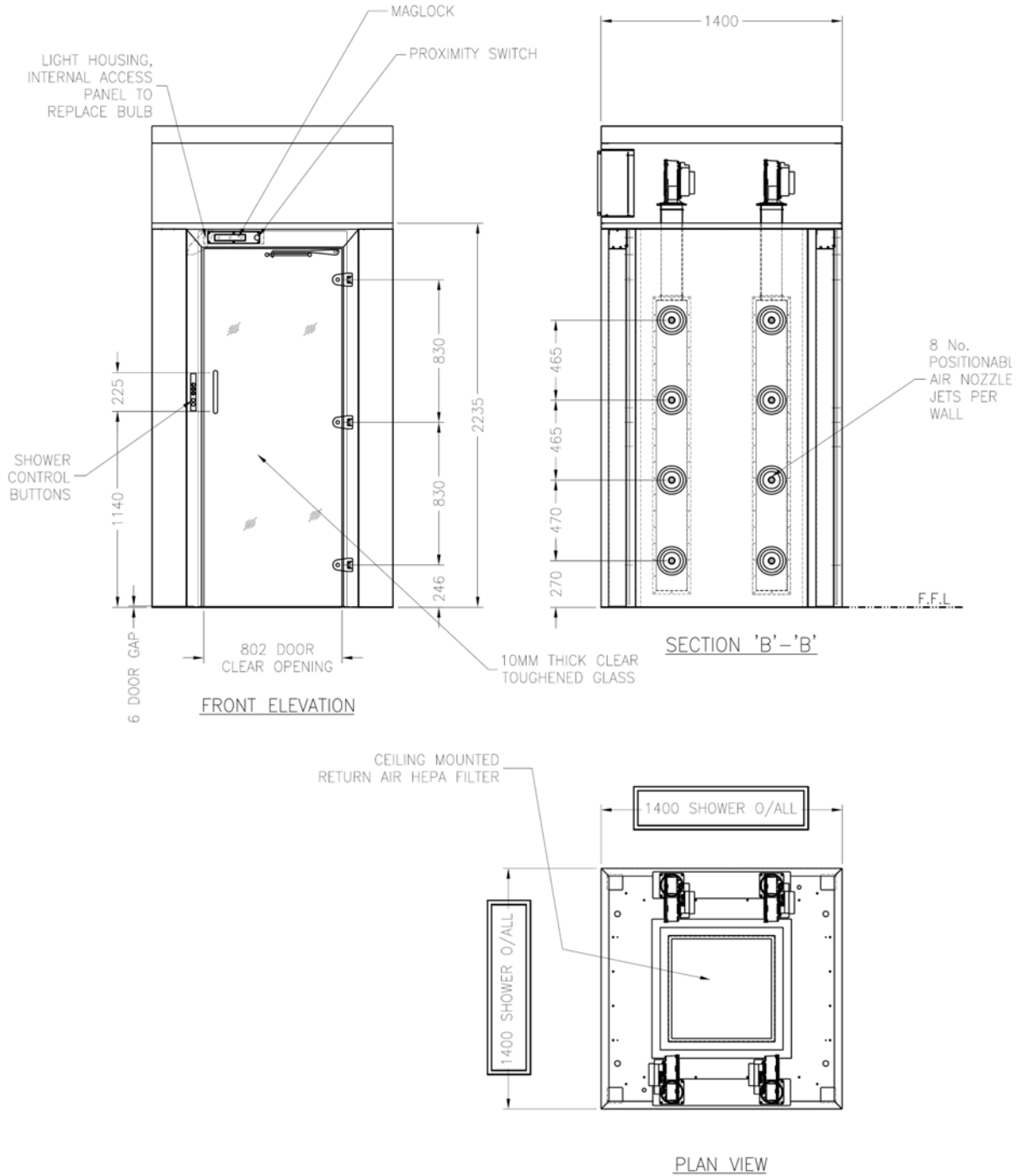
### During Rest

The fans on the shower only operate during the air cycle and if a controlled air flow through shower is required during rest predrilled holes in the shower doors to allow air to cascade through the shower can be supplied. The holes will be positioned at the top of one door leaf and the bleed holes in the other door will be at the bottom to provide a cascade from high to low inside the shower. It may be required wiper strips are added to the doors to reduce the leakage rate under the doors.

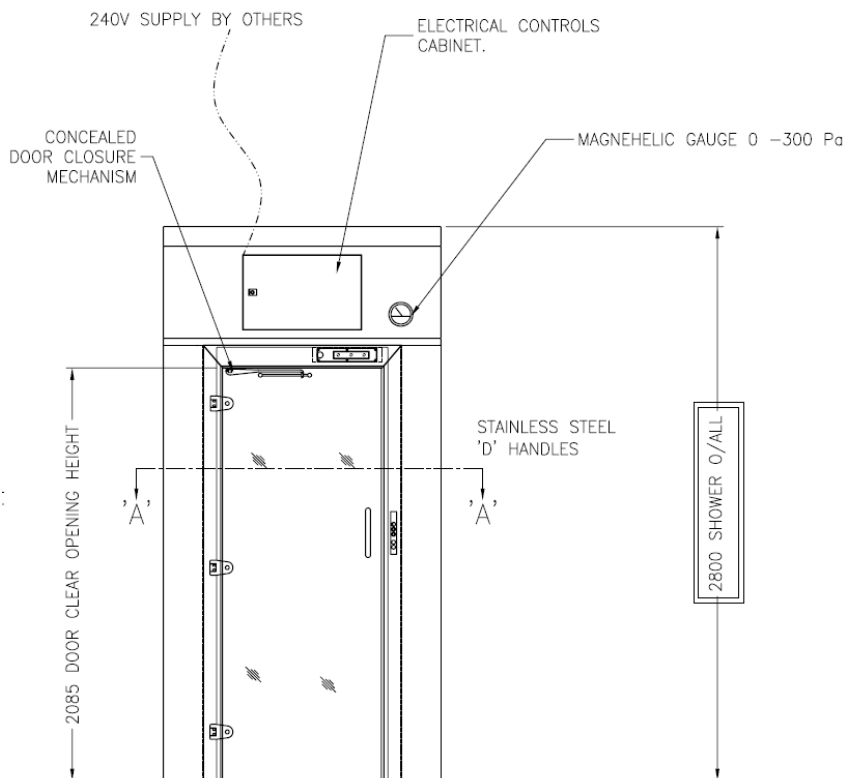
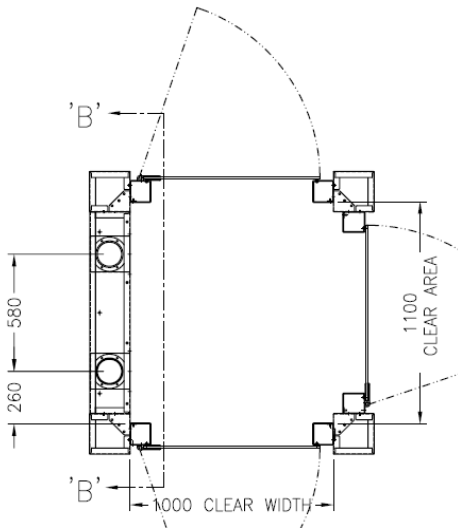
If there are no purge holes in the glass doors there will not be any air flow through the shower.



# Air Shower system schematic – 2 Door Unit (available as a right angle or straight through unit)



# Air Shower system schematic – 3 Door Unit



## **HEPA Filter: Type Megalam MGA - Model 6P6 610 x 610 x 110 - H14**

### **H14 Filter Monitoring**

There is a 0 – 500pa magnehelic gauge measuring the pressure drop across the filter. The pressure drop can be routinely checked by pressing the remote start button on the outside of the shower.

- Clean Filter – 150Pa pressure drop
- Dirty Filter – 450Pa pressure drop

### **Advantages of Megalam Filter**



- Low pressure drop
- Double faceguard
- Long operating life

**Application:** Final or return filtration for clean rooms with turbulent flow.

**Type:** High efficiency filter panel for mechanical clamping systems.

**Frame:** Extruded and anodised aluminium.

**Gasket:** Polyurethane endless at inlet.

**Media:** Glass fibre paper.

**Separator:** Hot-melt beads.

**Sealant:** Polyurethane.

**Faceguard:** Expanded metal on both side, powder coated RAL 9016.

**EN 1822 filter class:** H14

**MPPS efficiency:** H14:  $\geq 99.995\%$

**Recommended final pressure drop:** 450 Pa.

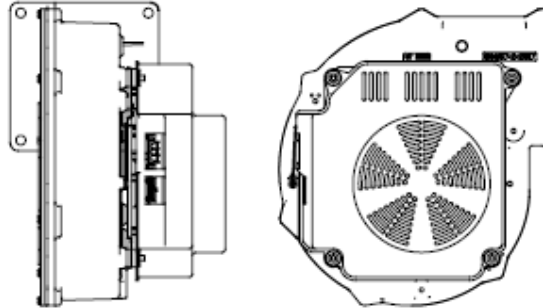
**Temperature:** 70°C maximum in continuous service.

**Test:** 100% individually tested according to EN 1822.

**Mounting system:** Mechanical clamping structure, Terminal housing.

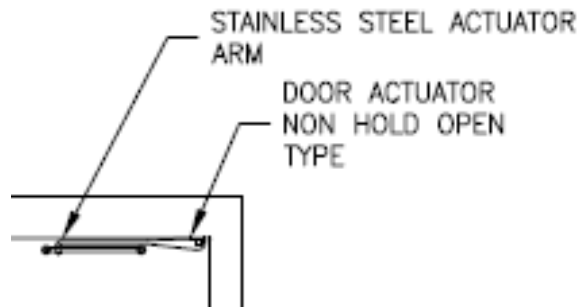
**Fans:** EBM - G1G170 EBM fans

High performance EBM fans supply each plenum. These can be maintained by removing the filter in the ceiling of the shower.



**Door Closer:** Concealed Closer System using a Dorma RTS85, PBSC arm and rail (in 316 grade stainless steel)

The door closer is mounted in head of the door frame and the spigot on the transom closer is fixed into the solid stainless steel arm. The closer arm then slides along the rail to pull the door to the closed position. Hold open closer available on request at no extra cost.



Below is an image of the closer system on shower door leaf.



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Page 8 of 12





**Control Panel:** PCB with timer and dip switches for cycle operation

The shower is wired into a PCB control panel with relay to the 4 fans. The control panel includes an adjustable timer to allow the cycle time to be adjusted. The control panel also includes dip switch to adjust the showers operating protocol. A full description of dips switch setting is supplied with the O&M and the correct configuration will be advised.

The control panel is mounted above the door to one side of the shower for easy access.

Alarm output to BMS system available from PCB.



**D-Handle:** Stainless steel back to back D-handles fitted to each door leaf. In 316 grade stainless steel. 225mm centres.



**Glass Door Hinge:** 3 Per Leaf in solid 316 grade stainless steel.

These are robust hinges made specifically by PBSC for clean room use.



### **Maglock and Proximity Switch**

The doors are fitted with a flush mounted mini-mag and the strike plate mounted to the glass door leaf.

The proximity switch is mounted to the back of the removable access panel to service the maglock and the magnet is located in the plastic housing which is fitted to the glass door leaf.



### **Door Seal**

The shower is fitted with a mechanically captured door seal, this is available in either Silicone or Black EPDM when there is no silicone allowed on the shower construction.

**Control buttons** (may vary depending on operation requirements)

Below is an image of our standard buttons for the operation of the shower. These are fitted with a flush semaphore for easy cleaning.

- The top two lights indicate if the door is available
- The green button is used to open the door when the maglocks are permanently energized.
- The blue button starts the cycle when automatic cycle start is not turned on.
- The red button is the emergency override button.



**Directional Air Nozzle**, Size of nozzle is 30mm Ø



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Page 11 of 12



## **Related Documentation**

### **Specifications.**

1. This document.

### **Factory testing documents**

1. In house testing of shower to check velocity at nozzles and operation
2. FAT optional

### **Site documents**

1. Installation Sign Off
2. SAT Optional

### **Manuals**

1. O&M manual

