

Project Daisy PPV

Subject Guidance on Air Leakage

Date 15 Feb 2016

1.0 DOCUMENT CONTROL

Issue	Date	Description	Author	Reviewed
a	15/02/16	Guidance note issue	GG	HB

2.0 INTRODUCTION

The following sections outline the capability of the Daisy PPV unit and issues to watch out for.

3.0 SYSTEM CAPABILITY

The Daisy PPV unit incorporate one small duty and standby supply low temperature fan housed within the enclosure. Each of the fans is capable of delivering 0.5m³/s at an operating pressure of 50pa. This will provide a pressure difference of 50 pa across a total leakage area of 0.08m² assuming an air tight fire compartment.

It is critical the Client is advised of the importance of an **air tight compartment** as the pressure difference will not be achieved from a leaky enclosure as the fan is developing a volume to overcome the leakage across a British Standard fitted door.

4.0 SYSTEM DESIGN

Table 1 below shows the typical leakage areas for British Standard tested and fitted fire and lift doors and is an extract from BS EN 12101: Part 6 (Table A.3).

Element	Leakage area (m ²)	Volume to achieve 50pa (m ³ /s)
PPV unit capability	0.08	0.500
Single leaf door in rebated frame opening into a pressurised space (2m high, 0.8m wide)	0.01	0.060
Single leaf door in rebated frame opening outwards from a pressurised space (2m high, 0.8m wide)	0.02	0.120
Double leaf door (2m high, 1.6m wide)	0.03	0.180
Lift landing doors (2m high, 1.6m wide)	0.06	0.350

Table 1 – Leakage Areas for BS Doors

When all the doors opening onto the pressurised lobby are added together, the leakage area cannot exceed 0.08m².

In addition to the above the swing of the door also needs to be considered. Where the fire door opens into the pressurised space, the door stops will prevent the door being pushed out as the pressure builds up.

On lobbies with the doors opening out of the space, door closures of a heavy duty may be required to keep the door closed against the pressures. These can be around 50N force.

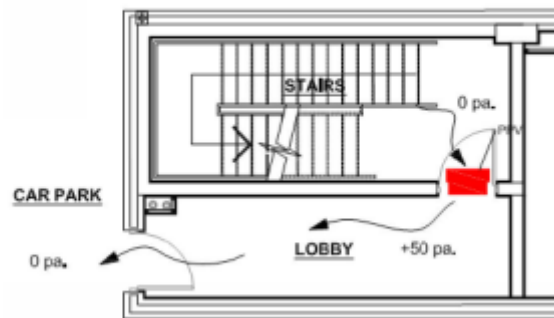
5.0 EXAMPLE LEAKAGE

Case 1

PPV unit fitted on stair wall side of stair/lobby door injecting air from the stair into the lobby to raise the lobby to 50pa above the surrounding spaces.

Two single fire doors ($0.01\text{m}^2 + 0.02\text{m}^2$) =
 0.03m^2 leakage area

Door to stair to be fitted with door closer to ensure door remains closed at 50pa across the door.



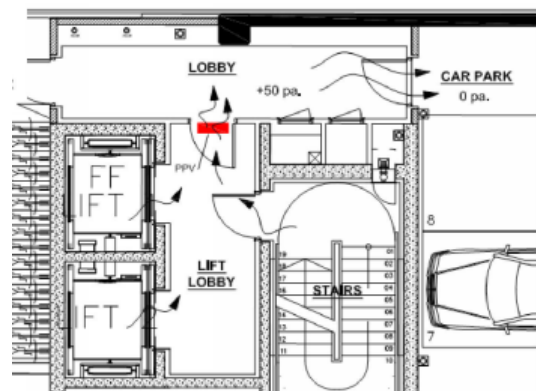
Case 2

PPV unit fitted on lift lobby side of lift lobby/lobby door injecting air from the lift lobby into the lobby to raise the lobby to 50pa above the surrounding spaces.

Three single fire doors ($0.02\text{m}^2 \times 2$) + (0.01m^2) =
 0.05m^2 leakage area

The two small cupboards to right of lift lobby/lobby door are horizontally fire stopped at ground level, thus no leakage.

The door between the lift lobby/lobby and door in the cycle store to the top left to be fitted with door closer to ensure door remains closed at 50pa across the door



6.0 IMPORTANT CONSIDERATIONS

Pressurised lobby enclosure needs to be of air tight construction.

Lift door positions should be considered as they create a large leakage area.

Fire doors should be fitted to the British Standard tested criteria.

Consideration should be made to all fire doors and cupboard doors within the pressurised lobby.

Vertical riser compartments should be made air tight at ceiling level.

The leakage area across doors should not exceed 0.08m^2 .

Double doors add an additional 50% leakage area.

Where any ventilation grills are provided, they will need to be of an air tight standard during fire mode.

Heavy door closers will need to be fitted to fire doors opening out of the pressurised space.