

**Northern Ireland Fire & Rescue Service**  
**Fire Safety Legislation Advice Note 003**

**Automatically Opening Vents (AOV) Configuration**

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During fire safety inspections of tower blocks across the United Kingdom, it has been found that AOVs have been incorrectly configured. The following case study of a true event describes what happens when AOVs are incorrectly configured.

A significant fire occurred at a 7-storey block of flats. The block was built circa 2002 and consisted of 44 flats with a single staircase mid-way along the block. Smoke clearance from the corridors was provided by an Automatic Opening Vent (AOV) smoke shaft system, operated by local detection on each floor, with a permanent open inlet at the base of the shaft.

A fire in a second-floor flat spread to the common corridor due to no self-closer being fitted. This resulted in the actuation of the AOV door to the smoke shaft. Subsequently fire and smoke entered the smoke shaft, which due to the intensity of the fire, caused detectors on the third, fourth and sixth floors to actuate, this caused the AOV doors on these floors to open. As a result, the fire spread throughout the building severely impacting the evacuation and firefighting of attending crews.

The correct configuration is detailed in BS9991:2015 section 14.2 which states the following:

“Only the AOV leading from the protected corridor or protected lobby where the smoke has been detected should be configured to open. This should open either to external air or into a smoke shaft; all other protected lobby vents should be configured to remain closed. Fire and rescue service override controls should not permit multiple lobby vents to be open simultaneously.

NOTE 1: This applies whether the vent opens to outside air or into a natural or mechanical shaft.”

This is mirrored in the English, Welsh and Scottish Building Regulations.

English and Welsh - Approved Document B 2013, Page 29, Paragraph 2.26 iv  
Scottish - Technical Handbook - Domestic 2017, Page 64, Section 2.14.6

“On detection of smoke in the common corridor/lobby, the vents on the fire floor, the vent at the top of the smoke shaft and to the stairway should all open simultaneously. The vents from the corridor/lobbies on all other storeys should remain closed.”

Northern Ireland Building Regulations Technical Bulletin E 2012 at Page 149, Paragraph 6.6, require firefighting shafts to be constructed in accordance with the relevant recommendations of BS 5588-5:2004 Access and facilities for fire-fighting, which has since been superseded by BS 9991 as detailed above.

Additionally, guidance is also provided in the Smoke Control Association Guide on Smoke Control to Common Escape Routes in Apartment Buildings (Flats and Maisonettes) Revision 2, which quotes Approved Document B as above but also gives further guidance for mechanical system in Section 6.4.2 and Figure 6.4.2-a and 6.4.2-b.

The design of ventilation systems should have ‘locked out’ or been programmed in such a way that only the vent on the fire floor opened and all other vent doors should have remained closed, even after the smoke was subsequently detected on other floors. On further investigation to adjacent and similar premises in their authority area, approximately 80% of other buildings which had similar engineered solutions also failed to operate correctly.

**The correct configuration is summarised as:**

- 1. Fire occurs.**
- 2. Smoke detected in protected lobby or protected corridor.**
- 3. AOV in protected lobby or protected corridor and the AOV at head of protected stair opens simultaneously. The AOV will open to fresh air or to a smoke shaft. If opening to a smoke shaft the AOV at the head of smoke shaft should also open simultaneously.**
- 4. All other AOVs should remain closed even if smoke is detected on other floors.**
- 5. Fire and rescue service override controls should not permit multiple lobby vents to be open simultaneously.**

NIFRS Fire Safety Inspectors when carrying out an inspection will seek assurances that the AOVs are correctly configured.

For any queries please contact:

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