



Air Tightness for Smoke Shafts

Things to watch out for

Factor	What to look out for	Addressed
Know your airtightness target	Smoke shafts for Automatic Opening Ventilation tend to need to achieve less than 3.8 or 3.85 m ³ /h/m ² @50Pa which is tight for what is a relatively small envelope area	
Potential leakage paths	<p>The shafts tend to be made up of a combination of concrete casting, block work and/or stud wall/plasterboard.</p> <ul style="list-style-type: none"> • The concrete is likely to provide the tightest air barrier so the more concrete walls the better. • Block work is normally the next best as long as the blocks are high density and there are no gaps in mortar joints (you may need to consider painting/parge coating the blocks if there is a concern about their permeability) • The plasterboard will need to fully sealed (between boards and the junctions between plasterboard and concrete) <p>Any penetrations in the shaft wall will need sealing as well e.g.</p> <ul style="list-style-type: none"> • Services • Opening for the AOV fan • Openings for louvres/shutters/doors • Around floor grilles <p>These are typically sealed by a combination of tape/jointing, fire stopping and mastic/foam</p>	
Timing of the test	The test tends to take place when the shaft is fully complete and sealed but before the AOV fan and louvres/shutters have been installed	
The Test	The test is a positive pressurisation test using a 'blower door fan' installed into an aperture created in a board used to temporary seal one of the louvre/shutter openings. The test itself will only take a few minutes but the overall time on site is likely to be around 3 hours.	
What if the shaft fails to achieve the target	<p>Given the restricted access to the shaft, the preferred method for finding air leakage is to pressurise the shaft using our fan and push theatrical smoke into the shaft.</p> <p>The smoke is pushed out of any gaps/cracks in the shaft or temporary sealing so the problems can be identified. A number of people will be needed across multiple floors to spot/photograph the smoke while our test engineer operates the fan.</p> <p>The smoke escaping may be enough to set off smoke alarms, cause concern to those who spot it and aren't aware of what is going on (on site and outside the building) or reduce visibility.</p> <p>If a smoke leakage test is required, it will mean informing as many people as possible on the day (including the local fire brigade) and, potentially, limiting access to some areas until the smoke disperses.</p>	

Testing

Pre-test Preparation Checklist for Air Tightness Testing of Smoke Shafts

Site Name:			
Our reference:		Test Date:	

Item	Considerations	Date/Initial
1) Sealing of the shaft	Has it been agreed how best to ensure the shaft is sealed, especially if it is a combination of construction types? Has someone checked everything has been done correctly at a time when it can be seen and addressed?	
2) Test Preparation		
a. Book the test	Will the sealing be complete but the AOV is yet to be installed? We typically need 2 weeks' notice	
b. Provide drawings	To allow ALT to accurately calculate the total area of the internal surface area	
c. Confirm air test result required	Based on AOV manufacturer's requirements, typically less than '3.8' or '3.85'	
d. Access	<ul style="list-style-type: none"> Access to site to unload test equipment and to the shaft for set up. Our blower door fan is approximately 25cm diameter and is preferably installed directly to an opening of this size in one of the louvre/shutter openings that has been temporarily boarded up (see pre-test preparation). Our engineer will identify the best location to set up on arrival but may need assistance creating the aperture and holes to run tubes into the shaft. 	
e. Power	Mains 240V power within 10m of the fan(s) installation location (if only 110V power available, please inform test engineer in advance of arrival).	
f. Temporary Sealing	<p>Capping of the shaft i.e. sealing the opening at the top of the shaft where the AOV fan would be installed. Depending upon the surrounding construction, this could be done using a piece of board sealed around the perimeter using mastic or tape or using a piece of Corex or plastic sheet which is securely taped in place to make a continuous seal.</p> <p>If the AOV ducting and fan has already been installed, the openings from the ducting will need bagging off i.e. using a robust plastic bag over the end of the duct, secured and sealed using tape.</p> <p>Each louvre/shutter opening will need temporary sealing, if possible this is best done using plasterboard with a continuous bead of mastic around the inside perimeter to seal it to the outside wall of the shaft. If this would cause damage to the walls or the shutters/louvres have already been fitted, then Corex taped in place to secure and seal should be sufficient.</p> <p>At least one of the openings will need to be sealed using a rigid piece of board that can be used to hang our fan on. An aperture will need cutting in this board. Our engineer will define the location and size when on site but someone will need to be able to assist with a jigsaw and drill.</p>	

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