

# Definition of geometric free area for Smoke Vents

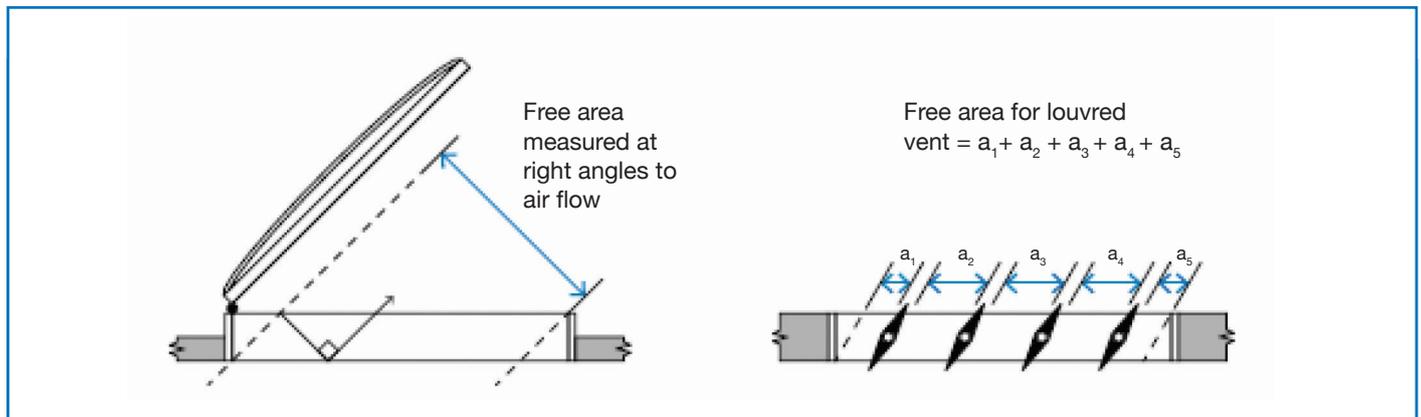


The definition for the geometric free area for the purposes of demonstrating building regulation compliance is clearly defined in Appendix D of Approved Document B2 of the Building Regulations, see the relevant extract below.

### Free area of smoke ventilators (as published in Appendix D of Approved Document B2)

**D5** The free area of a smoke ventilator should be measured by either of the following:

- The declared aerodynamic free area in accordance with **BS EN 12101-2**
- The total unobstructed cross-sectional area (geometric free area), measured in the plane where the area is at a minimum and at right angles to the direction of air flow (Diagram D7).



**Diagram D7** Free area of smoke ventilators

As can be seen from the above diagrams, the geometric free area is based on the clear internal cross sectional area in the throat of the vent measured at right angles to the direction of airflow. When there are other components mounted within the throat such as louvre blades, as shown in the right hand example above, or in the case of actuators and drive systems mounted within the opening, then these should be deducted from the total area used in the calculation.

It should also be noted that where the ventilator is mounted on a builders kerb the internal geometric free area of the kerb may be smaller than the geometric free area of the ventilator mounted on top of it, in which case that would become the determining free area for the smoke ventilator.

With regard to CE marking and Declaration of Performance (DoP) to BS EN 12101-2 the geometric

area has a different definition. In this product standard the Geometric Area is defined as 'area of the opening through a ventilator, measured in the plane defined by the surface of the construction works, where it contacts the structure of the ventilator. No reduction will be made for controls, louvers or other obstructions'. The purpose for the geometric area defined in BS EN 12101-2 is for calculation of the Aerodynamic free area in conjunction with the discharge co-efficient  $C_v$ . Therefore the geometric area ( $A_v$ ) quoted in a DoP should not be used to demonstrate Building Regulation compliance.

### Further information

Further information can be obtained from NARM, (National Association of Rooflight Manufacturers) at [www.narm.org.uk](http://www.narm.org.uk)