

Version 1.0
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Passive House Volume Calculation Checklist

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The airtightness performance of a Passive House is assessed through its air changes per hour at a 50 Pascal pressure difference, known as the n50 value. This value is determined by dividing the volumetric flow of air (v50) required to maintain the pressure difference by the internal air volume (Vn50) of the heated space. The Vn50 volume includes conditioned spaces measured from visible wall, floor, and ceiling finishes, excluding voids between ceilings and floors, internal wall voids, and floor voids. Detailed plans of the final construction are necessary to ensure accurate calculations, as some volumes may not be enclosed during initial tests. External door reveals deeper than 13cm are included, while hidden risers, wall and floor voids, and enclosed air spaces behind partitions are excluded. The accuracy of the Vn50 volume calculation is crucial, as overestimation leads to underestimated airtightness results. Any revisions to the calculated volume must be done early to avoid jeopardising Passivhaus certification. A competent third party should verify the Vn50 calculation, documented within the Passivhaus certification folder. In cases of uncertainty, the lower figure should be used until clarification is provided by the certifying body. Room-by-room calculations are recommended, encompassing all conditioned air spaces within the thermal envelope, while excluding certain enclosed spaces and shallow window and door reveals.

This desk-based service, it's crucial that a competent person calculates the volume accurately. If you're seeking Passive House certification, it's best if the Passive House designer approves our calculations and they align. Any differences should be resolved before the test day.



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1. Scaled drawings

Please send us floor plans, sections, and elevations if you haven't already. This helps us accurately measure the surface area and volume.

2. Third-party volume verification

Details of the Passive House designer, to compare volumetric calculations, as these must align.

3. Window and door reveals

Do your window or door reveals measure 13cm or more in depth? If they do, please provide the depth measurement.

What's included/excluded from the volume calculation?

Stairs

Include the volume of air displaced by the stairs (unless the stairs are of monolithic stone or concrete construction without any air void or cupboard beneath them).

Stair void in floor plate

Include the air volume of the stair void in the floor plate.

Window reveals

Exclude (unless full height window with reveal depth $\geq 13\text{cm}$).

Door reveals

Exclude (unless door reveal depth $\geq 13\text{cm}$).



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Columns

Include the volume of air displaced by any columns (unless the cross-sectional area of an individual column is greater than 0.1m^2).

Beams

Include the volume of air displaced by any beams (unless the cross-sectional area of an individual beam is greater than 0.1m^2).

Attic/loft space

Include if warm roof construction with openable loft hatch.
Exclude if cold roof construction or not accessible via loft hatch/
internal opening.

Ductwork and flues

Include the volume of air displaced by ductwork and flues (unless the duct or flue is room sealed and the cross-sectional area is greater than 0.1m^2).

Cupboards

Include the air volume displaced by all wall mounted cupboards and shelving units. For walk in wardrobes and large services cupboards measure internal volumes as per a room.

Storage cylinders and appliances

Include the air volume displaced by all hot water storage cylinders, header tanks and building services (unless the total air volume displaced by an individual appliance is greater than 1% of the net internal air volume).