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## Overview

This standard is for those who carry out air tightness and/or air change rate testing of non-simple buildings, which are greater than a gross internal volume of 4000m<sup>3</sup> inside the thermal line as defined by EN 13829 2001, and includes buildings that could be tested in smaller volumetric sections. Buildings which are classed as large, and complex, may also be high rise, and/or phased hand over zonal buildings, are treated separately as part of ASTATT10.

You are required to develop a testing plan to ensure accurate testing can take place. You must carry out a risk assessment of the building and its components including specific fire safety requirements. You are required to identify the characteristics of the building which make it a non-simple building and develop a testing plan to ensure accurate testing can take place. You must select appropriate test fan types and sizes appropriate to the complexity and surface area of the building and locate them correctly.

You must calculate and achieve the total airflow required to achieve a pressure differentiation of 50 Pascals, and compare results with the target figure in the appropriate energy calculation software for the type of building being tested. To determine a pass, the result (in m<sup>3</sup>.hr-1.m-2@50pa) must be compared to the target for the air test as defined in the appropriate energy calculation software. You must complete and keep accurate records of all measurements and the location of equipment must be included in the air testing report.

Ideally, the whole building should be air tested; should this not be possible then the reasons must be stated and the proposed regime defined that will satisfy the requirements of the relevant approved document. You must ensure that all temporarily seals remain in place during the test and that all mechanical ventilation and air conditioning systems remain switched off and sealed where appropriate. You are required to note and record any variances from acceptable tolerances in key readings, such as static pressure and wind speeds' and record them for final reporting. You must also report on any acceptable deviations from accepted norms and standards in the manner described by the standard

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## Performance criteria

You must be able to:

### **Identify special requirements for air tightness testing of non-simple buildings**

- P1 determine an appropriate test strategy for testing non-simple buildings as defined in relevant test standards and regulations
- P2 identify health, safety and specific fire safety requirements when conducting air tightness tests on non-simple buildings
- P3 establish the ways in which a building is zoned and the implications on air tightness testing procedures including any stack effect or restrictions on free air flow
- P4 deploy the appropriate types and numbers of fans in separate components of the building to achieve required air pressure stabilisation
- P5 establish the area to be tested; entire, extension or other, and calculate the envelope area in accordance with the standards' requirements.
- P6 identify health and safety and specific fire safety requirements when conducting air tightness tests on large buildings

### **Carry out air tightness testing of non-simple buildings**

- P7 calculate the envelope area/volume of the conditioned space to be tested in accordance with the test standard and approved document
- P8 ensure that the calibration of all air testing equipment has not expired and that it is fully operational prior to arriving on site
- P9 establish the ventilation systems in use and requirements for temporary sealing
- P10 establish the number and location of internal openings and fans to create equalisation of air pressure throughout the test area
- P11 ensure that all relevant external windows and doors remain closed for the duration of the test
- P12 check and list temporary seals
- P13 ensure temporary seals are not excessive
- P14 check and record building details
- P15 check and record meteorological conditions including barometric pressure and temperatures
- P16 record pre-test information
- P17 conduct pre-test checks

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- P18 carry out the testing process following relevant test Standard for non-simple buildings
  - P19 ensure that all temporary seals remain in place and external doors and windows have remained closed for the duration of the test
  - P20 gather and record test data
  - P21 validate and assess test data against pre-test checks
  - P22 gather and record post-test information
  - P23 confirm that all building test preparation conditions have remained stable during the test
  - P24 ensure that test data are accurately recorded
  - P25 with reference to the test strategy compare the result of the test with the target air permeability as defined in the associated energy calculation at a test pressure of 50 Pascals to determine a pass or fail
  - P26 remove all temporary seals and return the building to its previous state
  - P27 remove or safely dispose of all waste
  - P28 take all equipment supplied for the test away from the site
  - P29 arrange re-tests where appropriate

## Knowledge and understanding

You need to know and understand:

### Identify special requirements for air tightness testing of non-simple buildings

- K1 the relevant and current test standards and regulations to be applied
- K2 identify how to test the building as a whole; if not practical how the building could be split up and tested in sections that mount up to the whole
- K3 the health, safety and specific fire safety requirements to be complied with when compartmentalising buildings for air tightness testing
- K4 how to minimise air pressure loss through restrictions in the building and their potential effect on the result
- K5 how to calculate envelope areas for extensions and sample test areas
- K6 the impact of differences in area footprint/cross-sectional area of different parts/floors of buildings and how they are measured and factored into the testing procedure
- K7 the appropriate types and numbers of fans to achieve required air pressure stabilisation from separate locations in the building
- K8 how to identify a representative sample of the building envelope area to conduct a pre air tightness testing
- K9 methods of constructing temporary screen to isolate test zones to ensure that they act as effective air barriers during testing
- K10 how to ensure that the calibration of all air testing equipment has not expired and that it is fully operational prior to arriving on site
- K11 how to use relevant instrumentation
- K12 how to measure and record all outside and inside temperatures
- K13 understand the effects of the various corrections required in the relevant test Standard
- K14 limiting factors to be taken into account when evaluating results
- K15 the required measurements and tolerances as defined in the relevant test Standard
- K16 ways of calculating Equivalent Leakage Areas
- K17 requirements for the calibration of equipment and calibration periods in accordance with traceable Standards, by UKAS accredited organisations and against recognised test procedures
- K18 how to identify all results outside accepted tolerances and their effect on test results and reporting
- K19 the relationship between air flow rate measurements and the required range of fan flows

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- K20 the technical requirements of the test Standard in relation to pressure measurement
  - K21 how to ensure stabilisation of induced pressures throughout the building envelope
  - K22 the importance of recording the average of positive and negative values over minimum periods of 30 seconds and the average of all values over 30 second periods
  - K23 positive, negative and average values tolerance which prevent a valid test from being undertaken and how to explain this to the client
  - K24 how to qualify results where static pressures before or after the test are in excess of plus or minus 5 Pascals
  - K25 how to complete all data sheets accurately with the required results to permit the production of a test report
  - K26 how to calculate the total airflow required to achieve a pressure differentiation of 50 Pascals with reference to the air tightness target incorporated into the energy calculation for the building
  - K27 how to establish the test result
  - K28 best and normal values for the type of building being tested
  - K29 procedures for the safe removal of all temporary seals and returning the building to its previous state
  - K30 procedures for the safe removal and disposal of waste materials
  - K31 equipment checks required to ensure that all supplied equipment has been collected from site
  - K32 the importance of following site sign out procedures and/or making appropriate people aware that you have completed the test and are leaving the site
  - K33 methods for identifying air leakage paths such as smoke pens
  - K34 how to handle re-tests

ASTATT4

Carry out air tightness testing for non-simple buildings



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