

**Section Revision History**

No.	Purpose	Date
A	Issued to Q.S. for Billing	01/11/08

**Clauses amended in this revision**

No.	Clause and Description or Change	Date
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Sample

This is the first revision for this section. For all future revision stamps, details of all clauses amended at that revision will be included here.



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<u><a href="#">Air Tightness</a></u>	<u><a href="#">Energy – SAP, SBEM, EPC &amp; BREEAM</a></u>	<u><a href="#">Acoustic Consultancy &amp; Testing</a></u>	<u><a href="#">Air Sealing &amp; Fire Stopping</a></u>
<u><a href="#">Fall Protection – Safety Systems</a></u>	<u><a href="#">Rail &amp; Bridge Works</a></u>	<u><a href="#">Geotechnical</a></u>	<u><a href="#">Building Inspection &amp; Maintenance</a></u>

## AT10 Airtightness Consultancy, Air Test and L2 Continuity of Insulation

To be read with Preliminaries/General conditions.

*Please complete project specific details in red and after please delete this line*

*Please delete as applicable where it is \* (Starred) and/ or in red*

### GENERAL REQUIREMENTS

#### 110 INTRODUCTION

- All buildings are required to demonstrate they are built to a minimum level of air tightness by Building Regulations to reduce carbon emissions. All buildings are to be air tested with some exceptions. Buildings under 500m<sup>2</sup> gross envelope area may avoid an air tightness test, but must accept a default air permeability of 10 m<sup>3</sup>/(h.m<sup>2</sup>). This will impact on the building carbon dioxide emission calculation.

#### 120 STANDARDS AND PERFORMANCE

- Part L Conservation of Fuel and Power Building Regulations 2006 defines the minimum acceptable air permeability as 10 m<sup>3</sup>/(h.m<sup>2</sup>) at a pressure differential of 50 Pascals of envelope area.
- Air test to be carried out in accordance with ATTMA TS1. The standard level of 10 m<sup>3</sup>/(h.m<sup>2</sup>) to be used unless a specific client or SBEM requirement.

### DESIGN PERFORMANCE REQUIREMENTS

#### 130 PROJECT SPECIFIC DETAILS

- Information required to calculate Q<sub>50</sub> (fan flow) and effective leakage area (m<sup>2</sup>) allowable, as part of the air tightness strategy for this project.
  - Calculation type: **Air permeability (\*Air leakage more onerous, normally only required by retail clients)**
  - Air Permeability Rate: 10 m<sup>3</sup>/(h.m<sup>2</sup>)\* **(\*SBEM to be checked, client and BREEAM requirements to be checked)**

Envelope areas in m<sup>2</sup> – calculate and complete as follows

- Ground floor area: XXXXm<sup>2</sup>
- Exposed soffits: XXXXm<sup>2</sup>
- External walls (internal perimeter x height): XXXXm<sup>2</sup>
- Roof: XXXXm<sup>2</sup>
- Total Envelope Area for Air Test Calculation: XXXXm<sup>2</sup>**

Q<sub>50</sub> fan flow – measured in m<sup>2</sup>/sec (of air)

(Envelope area x air permeability rate/3600) 10x0000/3600 =XX.XX m<sup>2</sup>/sec

Effective leakage area (Q<sub>50</sub>/5.5 = sqm) 00.00/5.5 =X.XXXm<sup>2</sup>

#### 140 SCOPE OF RECOMMENDED SERVICES – To Test Pass

- The following services are required and are to be added to the pre-tender programme and the contractor's construction programme:
  - Pre-tender/desktop review and strategy report (RIBA Stage D/E)
  - Award/post tender design workshop and report (RIBA Stage E/F)
  - Design workshop with designer's and contractor's report (RIBA Stage F/G)
  - Interface schedule (output from design workshop) (RIBA Stage F/G)
  - Air tightness site audits at key stages and reports (start of roof, start of envelope, Start of finishes)
  - Thermographic survey (as soon as envelope complete, and post failure)
  - Pre-test inspection and report (1 month before test)
  - Pre-test contractor's co-ordination meeting (1 week before test)
  - Air test (preferably 1 month before completion) and investigations
  - Failure report – Detailed with referenced photos and remedies.
  - Re-test (if required upon failure after remedial)
  - Air test certificate for Building Control and SBEM ratification before completion – Please see guidance clauses AT 610 at end of section describing each phase.

- Start test, recording all data as necessary. ATTMA TS1 requires a minimum number of tests usually in excess of 10 sets at varying fan pressures with a Maximum test area differential pressure to be 100Pa
- At end of test, confirm test area envelope including temporary sealing conditions have been maintained throughout test
- Input test data into HRS software
- Where possible, ascertain test area air permeability result
- Inform client of informal / draft test result
- Where possible, confirm if air permeability specification has been achieved with client
- In the event of specification believed to having been achieved, the client shall be informed the test is over
- In the event of specification believed to having not been achieved use below:
  - Possible air leakage paths to outside of test area can be checked, both visually and with the aid of hand held smoke pencils/generators to detect air flows. NB: smoke should only be used in ventilated, unobstructed spaces to avoid inhalation in strong convection. NB: fans are not be left running unattended
  - Should a leakage path be identified, that can be immediately be resolved and that may significantly affect the test result, then allowing, the test may be re-run following the above procedure
- Prior to leaving site all HRS equipment shall be re-packed into HRS vehicle and sea litters found in rubbish disposed off in the contractors bins/skips etc.

## DESIGN CONSIDERATIONS

### 300 ESTABLISHING AIR SEAL LINE

- Complete the following requirements to assist the identification of the air seal line:
  - External rooms only accessed from outside? **YES/NO**  
**Insert List of rooms to be excluded:**  
**Consider insulating these rooms**
  - Plant rooms within envelope of building? **YES/NO**  
**If yes, list rooms:**  
Do any of these have open louvres to external air? **YES/NO**  
List these rooms and insulate and exclude from rest of building  
List:
  - Service risers open to excluded plant room/external room? **YES/NO**  
Exclude these risers and/or seal off by use of an air seal barrier (this may be a non-permeable fire seal) which may be in addition to fire compartmentation.  
**List rooms:**
  - Unheated stairwells or rooms? **YES/NO**  
**List rooms:**  
Review if these insulated or need insulating further
  - Airtightness consultant (HRS) would facilitate the above at desktop review or on-site design workshop.

- If the partition voids are not isolated from the perimeter void/external cavity, the air seal line becomes substantially more complex; with the potential need to ensure that all internal walling junctions are detailed as to how and where to limit the extent of the air seal as well ensure that all penetrations to all walls are air sealed.
  - This, inevitably, presents a greater risk to the building air tightness.
  - The head and base of all plasterboard should be sealed to the floor slab, along the full perimeter length.
  - Light switches, plug sockets, wall lights, heating services etc. through the plasterboard on the air seal line, all provide potential air leakage paths.
    - Electrical back boxes should be specified with minimal holes and be close fitting into lining – larger joints and holes being wet sealed.
    - Cabling and pipe penetrations should be sealed directly into plasterboard linings.
    - Where dado trunking or other boxing is attached to the wall to contain services, all 'holes' through plasterboard etc. should be sealed prior to them being obscured.
  - Windows and doors, etc.
    - At all openings through the plasterboard such as windows, reveals and eills need to be continuously sealed into the window/door framing and plasterboards, e.g. with decorators caulk – preventing air leakage into the perimeter wall/external cavity void.
    - Door and window seals should all be placed including threshold seals for doors.
  - Where the dry lining is continuous for example in service cupboards or above suspended ceilings, care must be taken to ensure all gaps and joints are filled.
- 532 RAISED ACCESS FLOORS
- Confirmation required from M&E designer/contractor if raised access floor is a plenum for air. If so, the specification should be for a sealed tile system.
  - Perimeter detailing/tile edges to have sealed joints, including columns, boxing ducts, etc.
  - Riser and duct junctions. Fire seals or upstands of raised access floor at risers must be sealed and access floor sealed to them.
  - Fire barriers – If any fire barriers are being used as part of the air seal they need to be non-permeable, i.e. faced Rockwool, either foil and sealed or intumescent faced and edges sealed/pasted as mineral wool is permeable.
- 533 SUNTUBES/ROOLIGHTS, ROOF HATCHES, AOVs, SMOKE EXTRACTS
- Roof lights, hatches, etc. that penetrate the roof air seal line need to be sealed to the air seal line.
  - Often the air seal line (regularly internal line) i.e. concrete structure or metal deck does not connect with frame of hatch/opening. Allowing an air leakage path to the underside of the roof covering and to eaves, verges or parapets.
  - Seal hatches etc back to the structure internally e.g. using a lining sealed behind to structure.
  - Roof lights themselves should be reasonably air sealed if the frame and light close and seal properly. The upstand and internal flashings to the roof light frame should be air sealed to the air seal element of the roof itself. Hollow sections supporting the roof light and flashings to the edges of roof lights should be fully sealed. Note: Roof lights are a common cause of excessive air leakage and efforts should be made to ensure detailing and workmanship is to a high standard.
  - Sun tubes and domes themselves are air sealed but often are installed through air sealed elements and the joint between the tube and air sealed roof element not air sealed or made good.
    - The sun tube liner should be air sealed to the air-sealed element of the roof itself.
  - Take particular care where vapour membranes are being used as the air seal line.
- 534 M10 SCREEDS AND PLASTER
- Careful detailing at floating screed/partition joint is required. Seal screed via skirting board or with a caulk joint before finishes or acoustic non-setting mastic to board.



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