Building Leakage Test

Cambridge Building Science
26 St Barnabas Road
Cambridge, CB1 2BY
Phone : 07540 370493

Date of Test :	31/01/10	Performed By :	Alexander Rice
Customer :	Argyll St Co-Op 3 Fletcher's Terrace Cambridge CB1 1LU	Building Address :	1 Fletcher's Terrace Cambridge CB1 1LU

Test Results

Airflow @ 50Pa (m^3/h)	1290
Air changes per hour @ 50Pa (/h)	5.3
Envelope Permeability @ 50Pa (m3/h/m2 surface area)	4.28
Normalised Permeability @ 50Pa (m3/h/m2 floor area)	12.9
Equivalent Leakage Area @ 10 Pa (cm^2)	312
Normalised ELA @ 10 Pa (cm^2/m^2 of surface area)	1.03
Equivalent Leakage Area @ 4 Pa (cm^2)	272
Normalised ELA @ 4 Pa (cm^2/m^2 of surface area)	0.9

Testing

Inside Temperature (°C)	17	Test Mode	Depressurisation
Outside Temperature (°C)	5	Wind Class	1 – Light Air

Building Preparation

- Extractor fans sealed in bathrooms
- Windows closed
- Trickle vents closed
- Water traps filled
- Internal doors opened

Building Information

Rooms

Bedrooms	4
Bathrooms	2
Kitchens	1
Other	0

Significant Penetrations

Personnel Doors	2
Windows	15
Flues	1

Construction

Construction Date	1980s
Construction	Cavity Wall, Room in Roof, Slab on Grade

Dimensions

Exposed Floor Area (m^2)	100
Exposed Ceiling Area (m^2)	60
Height Between Storeys (m)	2.4
Storeys	2
Volume (m^3)	240
Perimeter (m)	29.4
Exposed Wall Area (m^2)	141
Exposed Surface Area (m^2)	301

Locations of Significant Infiltration

- In 2nd floor bedroom, intentional air grille near bed platform, 100x200mm
- In kitchen, air brick behind kitchen units, total area of 200x200mm
- In downstairs toilet around soil pipe
- In second floor bathroom around soil pipe
- Small cracks around most windows

Interpretation of Results

Indoor Air Quality & Ventilation

The minimum ventilation rate for this building under part F of the building regulations if this building were built today would be 25 l/s. The presence of second-hand tobacco smoke would raise the recommended ventilation rate to 10 ACH.

If the fire doors are operating as they are designed to, and preventing air leakage then the total ventilation rate for the building will be far below this recommended level. This tallys with occupant reports that even if they open a window and attempt to purge the room it takes a long time for it to have a noticeable effect. With the doors closed, each room is essentially isolated from the rest of the house meaning that each room needs it's own supply and extract to provide ventilation.

With all internal doors open the present the total ventilation rate is around 20 l/s. There's around 18 l/s of infiltration, some of which is contributing effectively to ventilating the building, particularly the ventilation of the kitchen.

The airtightness test suggests that on average there will be around 0.25 natural air changes an hour without mechanical ventilation, with all internal doors open. The addition of the continuously running bathroom fans brings this up to about 0.5 ACH. With internal doors closed average ventilation rate is likely to be a lot lower.

In some cases intentional provisions for ventilation do not seem to be well placed and provide high levels of ventilation to some rooms, where other areas of the building have far lower rates. In particular there is an air brick in one of the bedrooms that is placed very close to the sleeping platform and is likely to be a source of thermal discomfort.

Energy Cost of Infiltration

At present infiltration (excluding ventilation) is estimated to consume around 800 kWh of gas per year, compared to a total consumption of around 10500 kWh. This is about 8% of your total gas consumption.

Recommended Actions

I recommend that the Co-op further investigates whether the fire doors are providing such an effective air seal that the fans in the bathrooms do not contribute to the ventilation of the building. If this is the case the ventilation of the building requires further consideration. This may be a partial explanation for open windows during winter.

As 1 Fletchers is a self-appointed non-smoking house there is not the concern with tobacco smoke as in some other buildings, so although the overall ventilation rate may be quite low it poses a relatively low risk to health. There was no obvious sign that the humidity in the house was high enough to cause excessive mould growth so the bathroom fans seem to be doing an adequate job of ensuring that humid air is extracted from the building, however the average humidity may not be low enough to kill dust mites and this can aggravate asthma symptoms in some people.

There is a vent in one of the bedrooms that is located such that it is likely to cause thermal discomfort, as evidence by the presence of an electric heater in the room.

I recommend that there be some discussion of ventilation strategy for these buildings. The buildings were not designed with a ventilation strategy in mind and I think this is an important part of the explanation for windows being open in winter, which is not a very good ventilation strategy.