Specific Comments to Part F and Part L Consultation

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These comments are an attachment to the Response Document and cover the following items:

Notional Building Concept

Part L page 206 Item 6b

VEETECH has previously pointed out a serious anomaly in the existing Part L notional building approach. This enables specifiers and developers to achieve Part L CO_2 and energy compliance for the much higher notional building energy base set for air conditioned buildings than for equivalently sized naturally ventilated and passively cooled buildings. As a consequence the current version of Part L is promoting the use of high energy and CO_2 emitting air conditioning systems in preference to lower energy and CO_2 emitting passive solutions. While Section 6b alludes to this problem it is essential that this matter is properly resolved. Since this is such an obvious error that, in many cases, essentially defeats the purpose of Part L, VEETECH believes that a solution cannot be delayed and that therefore a clarification be issued now. In addition to the damaging excess CO_2 emissions resulting from this error, enormous damage has been caused to the UK passive cooling market. Elsewhere in Europe passive cooling is being advanced in an effort to stem the growth in peak summer electricity air conditioning demand.

Overheating

See Part F Page 17 Paragraph 4.8; Part L Criterion 3 Page 131

Overheating appears to receive little attention in the revised Regulations. Part F page 17 paragraph 4.8 states that "*Ventilation also provides a means to control thermal comfort but this is not controlled under the Building Regulations, although Part L addresses minimizing energy use due to summer overheating*". Meanwhile Part L guidelines on overheating are also very minimal and primarily refer to guidance in dealing with solar gain (criterion 3 page 131) combined with working with the design team to specify what constitutes an acceptable indoor environment.

In contrast, the Government established Committee for Architecture and the Built Environment (CABE) has expressed deep concern with regard to summer overheating [http://www.sustainablecities.org.uk/energy/reducing-demand/overheating/]. CABE states: "Rising summer temperatures and improved air tightness of buildings mean that heat gain is a challenge as well as heat loss. The CO_2 challenge for new buildings is

likely to become much more about controlling heat gain than heat loss in the relatively near future given the energy efficiency of new buildings". It goes on to say that: "There is a risk that highly insulated new housing without adequate thermal mass will overheat internally to dangerous levels, a problem that has already been experienced in some energy efficient developments". CABE also refers to 30,000 recent heat related deaths in Western Europe and then states: "Given that temperatures will be increasing as a result of climate change, there is a need to provide future temperature headroom in building design. This is particularly important when it comes to maximising the future natural ventilation potential of buildings, instead of locking them permanently into air conditioning or operation only at a specific range of external temperatures".

These CABE thoughts and the associated impact of current requirements, that result in the trapping of indoor heat, appears to be missing from the Regulations. In the light of the CABE report, VEETECH believes that the revised Building Regulations should specifically address the overheating issue since it has a direct impact on both health and cooling energy consumption.

Natural Ventilation

Consultation Document Volume 1 Item 1.49 Page 13

Natural ventilation is called into question in the Proposals for amending Part L and Part F of the Building Regulations – Consultation Volume 1. Item 1.49 (page 13) states: ***"****It is likely to become more challenging to provide adequate ventilation rates using natural ventilation systems …"*

The sentiment of this statement appears to be at variance with the views expressed by other government established organisations aimed at advising on energy efficiency. Examples are too numerous to reference in full but the Government established Carbon Trust tells us that: "Using natural 'free energy' to heat, cool and ventilate a space can help save substantial sums of money and give building occupants greater control of their environment". It also states "Making the most of natural ventilation is a simple and cost effective way of achieving big savings". Of night cooling the Carbon Trust states that "Night cooling is an established technique … this free cooling of the building reduces energy consumption otherwise used by mechanical cooling and ventilation".

In its 2009 Carbon Reduction Strategy, the UK National Health Service states: "Buildings designed with passive ventilation have improved resilience to energy supply failure and are more energy efficient than mechanically ventilated buildings. In an acute hospital up to 70% of net floor space could be entirely or partially naturally ventilated".

CABE also gives advice and examples. Reference [http://www.sustainablecities.org.uk/energy/reducing-demand/overheating/] covers natural ventilation and housing issues as outlined in the comments on overheating given above.

Reference http://www.sustainablecities.org.uk/energy/portfolio/future-proofing/ states that: “even if air conditioning in a building is initially perceived as necessary for current commercial expectations, buildings should be designed so that it can be stripped out and the building operated more naturally, using its thermal mass and potentially natural ventilation”.

A recent report prepared by VEETECH, on behalf of the CIBSE Natural Ventilation Group, “Reducing your footprint by using natural ventilation” presents many more examples and cites expert views highlighting concerns about Part L in relation to natural ventilation.

This apparent disagreement between those responsible for the Building Regulations and the bodies that have been established by the government to promote energy efficiency needs to be reconciled. Almost certainly the standard methods required by Part L to satisfy the EPBD, are not sufficiently developed to deal with natural ventilation and passive cooling.

Airtightness

Question 35 of the Response Form

Various levels of building airtightness are proposed although it is not clear as to whether the most leaky values will actually satisfy energy reduction targets within the constraints set by the approved calculation methods. Question 35 of the response form asks for any evidence that appropriately sized natural ventilation does not work adequately in airtight homes. It is unfortunate that this question was not extended to mechanically ventilated homes. In Sweden, a pioneering country for airtightness and mechanical systems, a study undertaken by the Swedish National Testing and Research Institute has been published covering a survey of 390 homes (C. G. Bornehag , J. Sundell , L. Hägerhed-Engman , T. Sigsgaard "Association between Ventilation Rates in 390 Swedish Homes and Allergic Symptoms in Children", INDOOR AIR:Volume 15(4) p 275-280 - 2005). This study found that 60% of the multi-family houses and 80% of the single-family houses did not fulfil the minimum requirement for ventilation rate required by the Swedish Building Code. It also went on to show that there was a ‘response relationship’ between allergic symptoms in children and low ventilation rates.

Various other failings and risks have been identified in VEETECH’s commissioned report on airtight homes (Is tight right for British homes? - http://comment.veetech.org.uk/index.htm). Failings identified included critical errors in the installation of associated mechanical systems, a significant number of system failures and poor maintenance (especially of filters). Unfortunately therefore, there is evidence to suggest that extremely airtight buildings are not fail safe. In Britains’s mild and warming climate VEETECH believes that energy efficient solutions can be developed that work in harmony with safe levels of building porosity. At present this is thought that this is prevented more by modelling constraints than by thermodynamics.

Minimum Ventilation Rates

Part F Table 6.1b (page 53); Table 5b (page 28); Section 6.18 and Table 6.3 (page 55)

There appears to be inconsistencies in minimum ventilation rates. Table 6.1b of Part F (page 53) gives a minimum ventilation rate for offices of 10 L/s.p. This seems to be an acceptable standard that approaches recognised norms.

In contrast the headline value for dwellings, given in Table 5b (page 28), amounts to 6.5 L/s.p for the first two occupants and 4 L/s.p for each additional occupant. There is an over-ride according to floor area that may or may not result in an increase in ventilation rate above the occupant value. These are whole house rates thus individual room rates could be even lower. By all accounts these rates for dwellings appear to be very low in comparison to current health norms. Again the reference of C. G. Bornehag , J. Sundell , L. Hägerhed-Engman , T. Sigsgaard "Association between Ventilation Rates in 390 Swedish Homes and Allergic Symptoms in Children", INDOOR AIR:Volume 15(4) p 275-280 – 2005 (see airtightness comments) should be taken into account.

For a range of buildings Part F Section 6.18 page 55 of the Approved document states: *"The requirement will be satisfied by following the appropriate design guidance for the other buildings given in Table 6.3"*. In Table 6.3 much reference is made to CIBSE Guide B2:2001 "Ventilation and Air Conditioning". Following this could lead to serious problems, especially if a designer or developer wishes to use natural ventilation. Take, for example, Table 6.3 item: Shops and Retail Premises. This makes reference to Section 3.20 of the CIBSE Guide. Looking through this Guide reveals that specific ventilation details are given in Section 3.20.2. This prescribes 5 L/s.p or 1 L/s.m^{-2}. However the design guidance in this Section then goes on to state: "Minimum fresh air for occupation is supplied to the space via a supply AHU or via an extract fan in conjunction with openings on an external wall". Section 3.20.3 goes on to state that " the building should be maintained under positive pressure by ensuring the rate of supply exceeds the rate of extract" In both cases these are entirely mechanical solutions. No guidance is given to meeting the requirements by natural ventilation. This thus implies that, to satisfy Part F, retail premises must be mechanically ventilated. Such an approach goes against much of the advice of the Carbon Trust in relation to the energy efficient ventilation and cooling of retail premises.

Keeping it Simple - the KISS approach to making affordable housing affordable.

Recent additions of the Part F and L Approved Documents have mushroomed in size and the associated explanations and calculation methods have become ever more complex. For large building developments it is understandable that demanding calculations are necessary. However, for standard homes and simple commercial buildings, VEETECH

would recommend the introduction of a keep it simple (i.e ‘KISS) approach. It should not be too difficult to produce optional, simple generic solutions that would be deemed to satisfy the EPBD. Such solutions could be in the form of a checklist covering U values, glazing properties, gasketing performance and heating system requirements etc. This would vastly reduce design and approval bureaucracy, and would, especially, help towards making affordable housing affordable.