

Installation of boiler flues and ventilation perforations in external timber framed walls and other such structures.**Purpose.**

BCA technical guidance notes are for the benefit of its members and the construction industry, to provide information, promote good practice and encourage consistency of interpretation for the benefit of our clients. They are advisory in nature, and in all cases the responsibility for determining compliance with the Building Regulations remains with the building control body concerned.

This guidance note is based upon information available at the time of issue and may be subject to change. The Approved Documents should be consulted for full details in any particular case.

Introduction.

Boiler flues have been a subject of discussion in the last few years, primarily due to issues raised within CORGI's technical bulletin 200 which addresses some aspects of the installation of room sealed flue systems within voids. Whilst this provides for the access and inspection of flues inspecting officers from public and private sectors have noted that there appears to be a lack of knowledge by site operatives etc. in the installation of boiler flues and other ducted ventilation perforations within timber frame buildings.

Any perforation within the external walls of a timber frame building need to take into account the relevant requirements of Parts B, C, J & L. It has been discovered that in the majority of cases, appropriate installation instructions are not provided or highlighted within installation or manufacturers manuals/guidance to address timber framed buildings. This has created a "custom and practice" approach by installers which generally does not comply with the goals required in the above mentioned Parts of the Building Regulations and in some cases miss the provisions altogether leaving dangerous conditions, latent defects or both.

Key Issues.

As indicated in the introduction perforations for boiler flues and ventilation discharge ducts within timber framed constructions need to be addressed and dealt with under various parts of the building regulations. These include, Part B ~ fire, Part C ~ interstitial condensation & moisture ingress, Part J ~ combustion appliances and fuel storage systems and Part L ~ thermal efficiency and air tightness etc.

To fulfill these and other stated goals within the building regulations the perforations need to be specifically identified and details clearly stated to ensure compliance is met. However, it has been found that installers, and more worryingly the suppliers, are not aware of the standards they are to achieve.

Perforating a timber frame construction involves, viewing the construction from the inside to outside, the breaking of the internal plaster board layer, generally the only fire barrier to the structural timber frame; the vapour barrier which obviates the moist air within the room percolating into the timber structure, the main thermal barrier (insulation), the ply wood/sterling board back sheeting, the breather membrane which allows the moisture within the timber structure to discharge into the cavity, the cavity itself and finally the outer weather proof layer, normally constructed of a single brick wall tied to the timber structure by fish tailed ties.

Each layer has a specific job to carry out, perforating these could, and do, reduce the effectiveness of the barrier which ultimately may lead to premature failure of the structure itself. Designers, surveyors etc. need to be aware as to how to obviate this happening and how to ensure the continuity of the structure and maintain the function of the construction as a whole.

Even though modern day twin walled flues utilize the external portion of the flue for carrying cool intake air and the internal portion for the discharge of hot combustion products, ensuring that, in normal circumstances, the flue would reach only quite "low temperatures". The constant heating and cooling effects will cause "heat stress" on any material in close proximity and in time may cause structural degradation or worse still spontaneous combustion.

The guidance to the building regulations generally addresses such effects and ensures that combustible materials are kept at an appropriate distance away from any source of heat. Unfortunately the guidance does not specifically address the gap distance between boiler flues within standard timber frame construction.

Evaluation of the appropriate “gap” distance revolves around the flue classification; this must be sought from the manufacturer and communicated to the installer.

It should be noted however, that although most board type insulation is fire retardant to one degree or another, the flue to combustible material distances provided by the manufacturers are generally evaluated using timber as the reference material.

As a consequence greater “gap” distances than that stated by the manufacturers may need to be considered when assessing the allowable distances between the insulation material perforated and the flue itself.

The cooling of the metal boiler flue, either in use or by a natural process, will cause condensation to readily form on its surface within the cavity and within the outer face wall construction and the flue.

Because boiler flues of condensing boilers need to be installed so that they fall back toward the boiler, that is, back towards the internal of the building, the condensate will flow towards the internal breather membrane and internal timber sheeting etc.

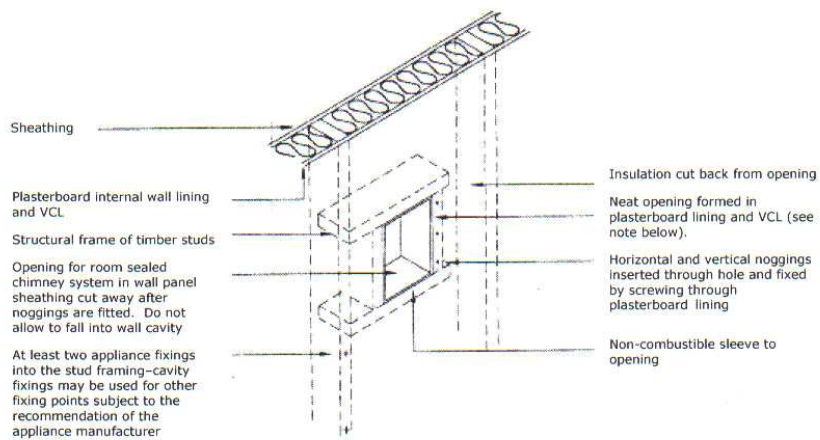
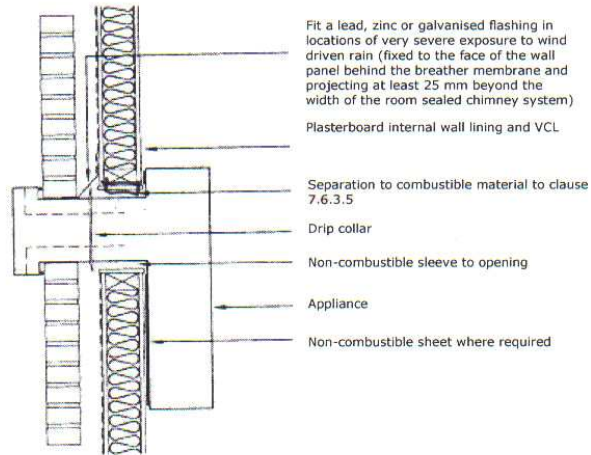
In short, the flue will act like a large cavity tie without a moisture drip and will allow the adjacent timber structure to be wetted. Any metal or plastic ventilation duct will act in a similar way, although it generally will not be angled or pitched toward the internal face. But again the duct would act like a large area cavity tie without the drip twist allowing the flow of water to gain access to the vulnerable inner leaf.

How to obviate the above

The institute of gas engineers has produced IGE/UP/7 to address the above mentioned issues and indicate acceptable measures, details and process of installation. Following some of these provisions may cause difficulty on site and it is recommended that each situation is reviewed to evaluate whether the or not the solution is appropriate for the specific application proposed.

Among the many solutions proposed within IGE/UP/7 one of the details has found favor with some housing associations and it may be that this is considered initially. A copy of the detail is given below which provides solutions to the issues identified above.

The detail, some times referred to as the “Biscuit Box” for obvious reasons should be constructed of non combustible materials i.e. fire resisting boarding cut to size with the vapour and breather membranes affixed to the lips of the box. The void between the boiler or ventilation flue should be packed with non combustible wool material and a cavity tray affixed above to ensure no water ingress. The packing etc. is not indicated on the detail. However this is to ensure that the minimum thermal requirements of part C 0.7 w/m² can be achieved.



Note: Fit circular sleeve for appliance with circular flues. For further details, see Figures 7-11.

FIGURE 6 - FITTING A WALL MOUNTED ROOM SEALED APPLIANCE ON AN EXISTING TIMBER FRAME EXTERNAL WALL



Note: ~ the picture has been taken before the drip plate, preformed membrane cover and the external insulated sheeting has been applied. This is to show the correct lapping of the breather membrane around the "Biscuit Box" construction comprised of fire resisting board material (in this case fire line). Due to the requirement of the flue distances to the timber noggins, to which the fire board is affixed, the void within the box is quite large and required insulating with Rockwool to achieve / exceed the minimum insulation values required in Part C. (Note at the time this picture were taken the incorrect insulation had been affixed)

It is interesting to note the insulation issue, as even when an experienced site installer tries to ensure that the constructional provisions are correct, the site laborers, who were requested to install the insulation within the boxes, used the wrong material due to an on site misunderstanding.