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The Association of Building Engineers

Further information can be obtained from The Building Regulations 2010 or from the Council's Building Control Service on request. The views expressed in this document are those of Charnwood Borough Council and do not necessarily represent a guaranteed methodology for compliance with the requirements of the Building Regulations 2010. Charnwood Borough Council accepts no liability for any claim that may arise in relation to reliance on the information contained in this document.

Introduction

1.0 Where a garage is converted in habitable accommodation, a change of use of part of a building has taken place, this is classed as building work and the following are some **common solutions** to meet these legal requirements.

A Building Regulation application will be required in all instances and also some will require planning permission and other consents please check!

Not all houses are the same and many have engineered design solutions, so if in doubt please ask!

2.0 Structure,

Firstly, is the building adequately built to allow the conversion to take place?

- a) Are the walls sound and free from defect?
- b) Are any piers tied well to the walls?
- c) Is the floor sound and free from defects?
- d) Is the foundation adequately carrying the building?
- e) Is the roof free of defects and structurally sound?

Attached garages are generally constructed to a better standard than detached ones, as these have been controlled and inspected by Building Control in most instances.

If the answer is NO to any of the above questions then we would suggest you employ a structural engineer to assess the building.

3.0 Infilling the Garage door (foundation details)

- a) Dig a trial hole and call Building Control to view the foundation, some garages have a continuous foundation across and this could be adequate to build off.
- b) If there is no foundation, then excavate a foundation down to match the house and then call us to inspect and if adequate then these can be concreted.
- c) Dig a trench across the opening and then use a concrete lintel suitable for the span and load to go above, this can be cut into the brickwork or sat onto the concrete foundation projections, generally 150mm bearing is required both sides, for a single door; 2 number 150mm deep concrete lintels are adequate. (for larger opening a lintel design will be required) Remember to concrete fill the cavity below these to prevent vermin entering the dwelling.

- d) Some garages have floor slabs that are steel reinforced and thickened at the edge, this may be adequate to built off, so call us when you have exposed this area for a decision.

4.0 Infilling the Garage door (wall details)

- a) Construct a cavity wall, usually done with a new panel of cavity walling incorporating a damp proof course that is lapped to the damp proof membrane in the floor and to the existing Damp Proof Course (DPC) at junctions. The cavity should ideally extend to at least 225mm below the DPC. The DPC should also lap and link to the damp proof membrane (DPM) in the floor. The masonry must be tied to the existing by tooth bonding or proprietary stainless steel fixing profiles and contain stainless steel wall ties adequately spaced. Insulation to this wall need to achieve a U Value of $0.28 \text{ W/m}^2\text{K}$ (100mm Dritherm 32 insulation with any block type achieves this)
- b) Alternatively a timber framed panel can be used instead of the inner blockwork skin or both skins of masonry. All infill panels must be durable, weather-proof and adequately thermally insulating, please speak to us for advice.

The choice of how this panel looks can be a planning requirement, please check!

5.0 Upgrading the existing walls (Weather resistance and insulation)

The walls need to resist rain, prevent rising damp, be structurally sound, be adequately insulated, and prevent condensation forming within the make up

- a) Cavity walls, these can be pumped full with insulation quite easily and this meets the minimum requirement, not all walls are suitable and some may already be done. If insulated already or suitable for pumping full then once done these meet the thermal requirement and assuming structurally sound then should be weather resistant also.
- b) 225mm solid walls, these can if very well sheltered meet the weather resistance but with driving rain, these can fail so we require a breathable wall membrane be added to prevent failure, then addition then of 50mm Celotex GA4000 or similar to achieve $0.30 \text{ W/m}^2\text{K}$, these sheet should be tight jointed and taped, then fixed in place with a 25mmx47mm timber treated batten, this creates a service void for cables and pipes and finally add a 12.5mm plaster board and skim.

- c) 103mm wall with brick piers, as b) above but carry the detail around the piers, if the walls need to be flat then the 25mm batten can be replaced with a timber stud 75mm deep this then bring the insulation and stud to 125mm off the existing wall which allows 25mm Celotex across the piers.
- d) 103mm walls with brick piers, these can be made into cavity walls as per the front door detail but often the floor slab around the edge is not adequate for the extra weight so this need to be removed and a foundation added.

Note: Where a solid 225mm or 103mm wall exists, an injected DPC may be required if one is not already present and working

Note: Some people prefer to use a bitumen type paint to create the weather resistance but correct detailing is required to this option, to prevent condensation being trapped within the wall (interstitial condensation) The breather membrane will allow the wall to breathe.

6.0 New Floor

Assuming the existing floor is in an adequate condition?

- a) Floor level with the house; if the floor is level with the house any insulation will create a step, so unless you are happy to step the floor this would be considered reasonable not to insulate but a DPM will be required if not already present, this can be a liquid paint bitumen type, generally 3 coats are required (BBA certified products only or equivalent)
- b) Floor lower than the house and level; easiest option is a floating floor, firstly add a 1200g DPM linked to the walls DPC, then add insulation 125mm polystyrene (EPS) or 80mm Celotex, then minimum 18mm Moisture resistant chipboard floor deck, depending on the level of the house the amount of insulation may need increasing or reducing, if reduce then Celotex or similar is a must. Chipboard come in various thicknesses as does the insulation board so a level floor with that in the house will easily be achieved.
- c) Floor lower than the house and sloping or uneven, as above in b) but use sand to level the floor first.
- d) Floor level a lot lower, insulation and DPM as above but then add 75mm screed or 100mm of concrete.

Note: If a timber floor finish is required this could easily be fixed above the chipboard, or if a suspended option is required then please speak to us, as ventilation voids below are harder to achieve unless a step in excess of 300mm is available. Inadequately ventilated floors lead to timber decay!

7.0 Sound Proofing

Where the garage being converted is next to a neighbouring habitable space addition sound detailing may be required, please ask for detail where this happens.

8.0 Roof

Assuming the existing roof is in an adequate condition?

- a) Existing Flat roof in good condition, these will need insulating, if choosing to insulate between the joists a 50mm ventilated air gap is required above the insulation, this requires Celotex 100mm GA4000 between the joist tight down to the bottom edge and a further 50mm Celotex GA4000 below prior to plaster boarding, this would require a joist depth of 150mm plus.
- b) Existing Flat roof in poor condition, these will need insulating and re-felting, the best option here is to insulate above as a warm deck flat roof, this type of roof does not need ventilating and requires less insulation, 126mm Celotex TD4000.
- c) Existing pitch roof in good condition with a level ceiling; then add 100mm fibreglass between the joists and a further 170mm cross laid at right angles, this type of roof will require ventilating at opposite sides and also the roof and wall insulation should meet or lap there often is a need to add ventilation trays at the eaves area to allow this detail. Continuous insulation prevents heat loss and mould, whilst an adequate airflow prevents timber decay by removing excess condensation.

Note: Some pitched roofs have breathable roofing felt on and do not need ventilating if installed in strict accordance with their test certificate. The addition of spotlights alone can invalidate this certificate. See http://www.charnwood.gov.uk/pages/building_control_guidance_sheets for a guide on Breathable felts and common questions and issues.

See our website for links to several well known insulation manufacturers, all supply similar or equivalent products
http://www.charnwood.gov.uk/pages/useful_links

9.0 Electrical work

Electrical wiring is controlled under the Building Regulations. Where the work involves a new circuit or forms a new kitchen, bath or shower room, it is classed as 'notifiable' under Part P of the regulations. The most straightforward route to compliance is by using an electrician who is registered under a government authorised Competent Person Scheme. Otherwise additional fees will be applied as per our charges scheme.

Note: Often earthing and bonding need upgrading and also RCD protection adding to older systems, your electricians will advise on this.

10.0 Smoke Alarms

These are required to be mains interlinked with battery backup and where the rooms formed do not have a door out to fresh air then there is a legal requirement to add these in the circulation spaces at all levels, many new houses already have these. See our smoke detector guide for more information.

http://www.charnwood.gov.uk/pages/building_control_guidance_sheets

11.0 Door opening linked into the house

A lintel suitable for the loads above will be required; a single door will generally require a 150mm deep concrete lintel with 100mm bearings onto masonry, please check the existing doors as many houses have fire doors throughout and if so the new door will need to be fire rated.

12.0 Windows/Doors (ventilation)

- a) Purge Ventilation; Minimum opening size of 1/20th of the floor area where opens more than 30° increase to 1/10 if more than 15° but less than 30°.
- b) Background ventilation; habitable rooms 5000mm² and kitchen, utility rooms and bathrooms 2500mm²
- c) Mechanical Ventilation, Kitchens requires 30l/s next to the hob or 60 l/s elsewhere, Utility 30l/s, bathroom 15 l/s and toilets 6 l/s (where no opening window exists)

13.0 Windows (means of escape)

Where a habitable room does not lead directly into an entrance hall with a door to outside air, or has its own door to outside then a means of escape window is required. The window needs to have a clear opening area of 0.33m² and be at least 450mm in any direction, for example if 450mm clear width the height would need to be 750mm.

The height to the opening of this window needs to be a maximum of 1100mm above floor level; it should be noted that if the glass is below 800mm above floor then the glass would also need to be safety glass. We recommend a means of escape sized window in all cases.

14.0 Heating

Any heating need to be adequately controlled, radiators for example need time and temperature controls. If adding a separate appliance this may need an application in its own right, please ask.

15.0 Wall where partly converting a section of a double garage

The wall that separates a garage/store from the new room/s will need to be fire rated to 30minutes and thermally insulated to achieve a U Value of 0.28 W/m²K

- a) This can be achieved with a block cavity wall as detail **4.0 Infilling the Garage door wall details a)**. This results in a loss of 300mm floor area.
- b) If a block wall is required then another option is to build a 100mm thick wall then add 60mm Celotex GA4000 or similar to achieve 0.28 W/m²K, these sheets should be tight jointed and taped, then fixed in place with a 25mmx47mm timber treated batten, this creates a service void for cables and pipes and finally add a 12.5mm plaster board and skim. The loss of floor area is about 200mm
- c) An alternative is a timber or metal stud wall, with 75mm Celotex in a 100mm stud, a further 12mm Celotex TB4000 internally across the face with plasterboard both sides, the garage side will need to be pink fire line board, in order to strengthen this wall we advise adding 9mm plywood to the wall before the fire board, the loss of floor now is about 150mm.

Note: These walls need to go full height and be fire stopped against the roof or floor above.

Note: If a door remains into the garage this needs to be a full FD30S door with auto closer and smoke seals fitted as per a valid fire test certificate, additionally a 100mm step is required at the door, or the garage floor needs to slope to the front this is to allow petrol fumes or similar to escape and not enter the dwelling.

If in doubt ask!

Not all construction types are the same and this guide is aimed at the common type of buildings we encounter within Charnwood Borough.