



Better Energy scheme

**Contractors Code of Practice
and
Standards and Specifications Guidelines**

Version 7.1

Guide to Changes

Implemented May 2015



Ireland's EU Structural Funds
Programmes 2007 - 2013
Co-funded by the Irish Government
and the European Union



The Sustainable Energy Authority of Ireland is financed by Ireland's EU Structural Funds Programme co-funded by the Irish Government and the European Union

VENTILATION

Proper ventilation of a home is necessary in order to ensure:

- Adequacy of fresh air for a healthy and comfortable environment for the occupants
- Adequacy of the air supply for safe operation of particular types of fuel burning appliances
- Minimisation of condensation risk
- Avoidance of radon accumulation in affected areas

Ventilation Types

Uncontrolled (and unintended) air infiltration – through the porosity of the building structure or through looseness in detailing or workmanship of openings such as doors and windows - which 'provides' ventilation on an arbitrary basis but is not an appropriate basis on which to rely for ensuring occupant safety, health or comfort.

Purposeful ventilation provision – which may be to varying degrees controlled e.g. MVHR, humidistat actuated extract fans, closable wall vents, trickle vents or uncontrolled e.g. permanent wall vents, in accordance with TGD F to the Building Regulations. Key is avoidance of disturbance to any such proper existing provisions, and making all reasonable effort by way of works execution.

Ventilation should be considered at the same time as when improvements to the thermal envelope and/or windows are being made as improvements will reduce heat loss and lead to higher internal temperatures within a building. With a higher internal temperature, the internal air can hold a significant amount of additional water vapour. Air leakage paths should be minimised to help reduce interstitial condensation.

Each house should be upgraded such that the ventilation complies with Part F of the building regulations.

In undertaking the works, and on the basis of the findings of an initial assessment of the home, the contractor must:

1. Ensure that the works to be undertaken will not compromise the existing necessary ventilation provisions in the home to the detriment of the air quality and / or living environment therein.
2. Inform the homeowner where it is noted that the existing necessary ventilation provisions have already been adversely affected by actions of the homeowner or other parties.
3. Inform the homeowner of any aspects of ventilation considered to be inadequate or potentially unsafe (particularly with rooms containing a fuel burning appliances). Guidance on background ventilation is provided in TGD F 2002 (6,500mm² ventilation opening per habitable room) and permanent ventilation (minimum. 6,500mm²) for heat producing appliances in TGD J 1997 for pre 2006 housing.
4. Make appropriate recommendations to the homeowner in respect of 2 and 3 above. It is then the responsibility of the homeowner to rectify these issues, with or without the involvement of the contractor, before work pertaining to the Better Energy Homes scheme can commence. (Additional wall ventilators or other ventilation provisions may be supplied by contractor as part of the refurbishment works. Where this is agreed as part of the refurbishment contract works may proceed.)

These points are aimed at ensuring that the contractor takes all reasonable action to ensure that proper ventilation provisions are installed in the home and that the homeowner is made aware of the proper operation and maintenance of such provisions.

External Wall Insulation

In addition to points 1 to 4 above Contractors should be alert to the fact that the installation of wall insulation will increase the air tightness of the building thereby reducing unintended ventilation in the form of uncontrolled air leakage or draughts in the home. This effect is likely to be most pronounced in the case of external wall insulation systems. However, the primary focus should remain on following points 1 to 4 above which relate to installed ventilation provisions.

Therefore in accordance with the training given by the Agrément ETICS Certificate Holder, and where necessary in consultation with them, the contractor should consider the likely effect of the installation on the home's ventilation and to recommend appropriate options / solutions for the homeowner.

Assessment of Ventilation Provision

Provision should be made for existing wall ventilators to be maintained and/or suitable new ventilation provided as needed. If you note that there are no wall vents or sub-floor ventilation or other obvious ventilation provisions, then you should document that the homeowner has been informed of same.

Reference NSAI S.R. 54:2014: Code of practice for the energy efficient retrofit of dwellings, Section 10.2.1.1 for choice of appropriate ventilation systems.

Ventilation System Design Considerations:

- Background ventilation – allow for the provision of sleeved wall ventilator or trickle window / door ventilators. (Ref: NSAI S.R. 54:2014 clause 10.2.2.1.1 Table 30).
- Intermittent extract ventilation – all wet rooms should be fitted with mechanical extract ventilation (Ref: NSAI S.R. 54:2014 clause 10.2.2.1.1 Table 31).
Please note: Recirculating cooker-hoods are not recognised under BEH spec.
- Intermittent fan control – use of timers, manual switches, occupancy & humidity sensors where applicable.
- Fans and ductwork – ducting should be insulated to prevent condensation to a minimum of 25mm of mineral wool.
- Purge ventilation is the removal of pollutants and water vapour through opening such as doors / windows and mechanical extract ventilation in wet rooms.

For all of the above reference NSAI S.R. 54:2014: Sections 10.2.2.1.1 – 10.2.2.1.3.

Table 30 from S.R. 54:2014 - Guidance for the provision of ventilation for retrofit works with air permeability levels greater than $5 \text{ m}^3/\text{hr}/\text{m}^2$

Retrofit Works		Existing Dwelling Condition		
		A. No existing background ventilation in some or all habitable rooms and no extract ventilation in wet rooms	B. Existing purpose provided background ventilation in each habitable room. No extract ventilation provided in wet rooms	C. Existing purpose provided background ventilation in each habitable room. Extract ventilation provided in wet rooms
1	Internal/External/Cavity Insulation for Walls	Background ventilation should be provided to rooms without background ventilation in accordance with Column 2, Table 31	No requirement to upgrade background ventilation	No requirement to provide further ventilation
2.	Replacement of Windows	It is advised to provide extract ventilation in wet rooms in accordance with Column 3, Table 31	It is advised to provide extract ventilation in wet rooms in accordance with Column 3, Table 31	
3.	Sealing/insulating of timber suspended floors	Where evidence of inadequate ventilation exists (e.g. mould, condensation) - extract ventilation should be provided to all wet rooms in accordance with Column 3, Table 31	Where evidence of inadequate ventilation exists (e.g. mould, condensation) - extract ventilation should be provided to all wet rooms in accordance with Column 3, Table 31	
4	Two or more of the above measures done in combination or separately	Background and extract ventilation should be provided in accordance with Table 31	No requirement to upgrade background ventilation Extract ventilation should be provided to all wet rooms in accordance with Table 31	No requirement to provide further ventilation
NOTE Covered/Damaged covers on ventilators should be replaced with equivalent or better. Deficiencies or faults in ventilator grills or fans should be rectified and returned to intended working condition.				
NOTE Where ventilation exists and severe conditions of condensation or mould growth have developed, specialist advise should be sought.				

Background ventilators should be located to avoid draughts and at a height of approximately 2.1m to 2.2m above floor level. All background ventilators should be tested to EN 13141-1 and installed to manufacturer's instructions, it is recommended that baffles are fitted to reduce drafts.

Table 31 from S.R. 54:2014 - Minimum levels of background and extract ventilation as specified by Table 30

Room usage	Minimum background ventilation (mm ²) ^a	Intermittent extract fan rating (l/s)
Habitable room	6 500	Not required
Kitchen ^a	6 500	60 (reduced to 30 for suitably sited extracting cooker hood)
Utility room ^a	6 500	30
Bath or shower room ^b	Not required	15
WC (only) ^c	Not required	6
a) Where the room has no external wall, a floor area of less than 6,5 m ² and background ventilation cannot be provided then extraction fan to operate with a 15 minute overrun etc. b) Where the room has no external wall and background and purge ventilation cannot be provided then the extraction fan should operate with a 15 minute overrun etc. c) Where a window opening for purge ventilation exists then the window alone may be relied upon to provide extract ventilation. d) Ventilation area as stated above is free area. Equivalent area is measured in accordance with the method specified in I.S. EN 13141-1: 2004. The above values should be multiplied by 0,8 to obtain equivalent areas.		

Utility room: A room used for laundry purposes which contains a sink, washing machine, tumble drier or similar equipment and which is not entered solely from outside the building.

Ventilation of air tight dwelling (achieve an air permeability below 5m³/hr/m²)

Reference NSAI S.R. 54:2014: Clause 10.2.1.2 for checklist to achieve air permeability below 5m³/hr/m². The ventilation requirements are detailed in Table 32 for air tight dwellings

Table 32 from S.R. 54:2014 - Minimum levels of background and intermittent extract ventilation when the air permeability is expected to be below 5 m³/hr/m²

Room usage	Minimum background ventilation (mm ²) ^{c,d}	Intermittent extract fan rating (l/s)
Habitable room	7 000	Not required
Kitchen ^a	3 500	60 (reduced to 30 for suitably sited extracting cooker hood)
Utility room ^a	3 500	30
Bath or shower room ^a	3 500	15
WC (only) ^b	3 500	6

a) Where the room has no external wall, then extraction fan to operate with a 15 minute overrun etc.
 b) Where a window opening for purge ventilation exists, then the window alone can be relied upon to provide extract ventilation.
 c) Ventilation area as stated above is free area. Equivalent area is measured in accordance with the method specified in I.S. EN 13141-1: 2004. The above values should be multiplied by 0,8 to obtain equivalent areas.
 d) The minimum total equivalent area of background ventilators providing general ventilation should be 42 000 mm² with an additional 7 000 mm² for each additional 10 m² floor area above the first 70 m² of floor area measured. For single storey dwellings situated at ground level or on any storey up to four storeys, an additional 7 000 mm² per dwelling should be provided. The minimum level of background ventilation recommended for each room is unlikely to provide the total background ventilation required for the dwelling as a whole.

Permanent Ventilation is any means of permanent or controllable vents which open directly to the external air. Vents for heat producing appliances such as gas appliances are considered permanent as they are in a fixed position and not closable. Ref: NSAI S.R. 54:2014 table 35: Guidance for the provision of adequate supply of air for combustion products.

Retrofit Works		A. No existing supply of air in room containing a fixed open flued appliance.	B. Adequate supply of air provided in each room containing a fixed open flued appliance.
1	Wall insulation, window replacement or sealing/ Insulation of suspended floors carried out BUT NO new open flued appliance fitted.	Permanent ventilation should be provided in the room containing the appliance, (see note).	No requirement to upgrade permanent ventilation. Recommended to ensure ventilation is unblocked, in good condition and permanently open.
2.	New open flued or flueless appliance fitted.	This work falls within the Building Regulations Part J- Heat Producing Appliances. See TGD J for further guidance.	This work falls within the Building Regulations Part J - Heat Producing Appliances. See TGD J for further guidance.
3	Provision of new balanced flue appliance.	This work falls within the Building Regulations Part J- Heat Producing Appliances. See TGD J for further guidance.	This work falls within the Building Regulations Part J - Heat Producing Appliances. See TGD J for further guidance.

NOTE This permanent ventilation will also suffice for Background ventilation, see clause 10.

Introducing mechanical extraction may cause spillage of combustion products where either an open-flued (non-room sealed) heat producing appliance exists. Spillage occurs when the extraction rate of the fan causes a depressurisation in the room containing the heat producing appliance, which in turn may reverse the flow of air containing the combustion gases through the appliance's flue. The ventilation system should be designed to ensure the likelihood of spillage occurring is reduced to an absolute minimum. This may be achieved by:

- Ensuring that sufficient fresh air is continuously and permanently available in the room where the heat producing appliance is located.

- The relevant installation Standards for the fuel/product type should be followed.

ASBESTOS

Paragraph reworded to read as follows:

Where the presence of asbestos is suspected during a building survey or during the course of retrofit measures appropriate, the Contractor must bring to the attention of the customer that it may be necessary to undertake an asbestos management survey of the property to determine the presence of Asbestos Containing Materials (ACMs) in the building where proposed works may disturb the ACMs. All ACMs identified must be removed by a competent contractor prior to the commencement of proposed works in accordance with the *Safety, Health and Welfare at Work (Construction) Regulations 2006* (S.I. No. 504 of 2006). For further information on this refer to http://www.hsa.ie/eng/Your_Industry/Chemicals/Asbestos/

SECTION 7.1 CAVITY WALL INSULATION

The contractor **must** familiarise themselves with the Code of Practice for the Energy Efficient Retrofit of Dwellings (S.R. 54: 2014)

Installation Standards & Specifications

- Paragraph b added : 'The insulation material must be suitable as per clause 7.3.4.2.5 and 7.3.4.2.6 of S.R. 54:2014'
- Paragraph c added: 'The suitability of insulation depends mainly on the local exposure to driving rain and the condition of the existing construction. Cavity wall insulation is certified for use in masonry walls up to 12m in height subject to the conditions in the product certificate. The exposure of the walls to wind-driven rain should be assessed and related to any restriction on the particular type of cavity fill being considered. The map in S.R. 54:2014 ('Code of practice for the energy efficient retrofit of dwellings') Annex D illustrates the levels of wind driven rain. Any area higher than 5m²/sec/year should not have the cavities filled where the external face is open jointed. In these cases internal insulation, or full fill cavity with external insulation which provides protection, should be used.

NOTE System certificates provide maps which identify exposure zones and specify conditions where full fill cavity insulation can be used.

- Reference to 7.3.4.3 of S.R. 54 added to paragraph d : 'Additional guidance on installation considerations is detailed in clause 7.3.4.3 of S.R. 54:2014'

SECTION 7.2 EXTERNAL WALL INSULATION

The contractor **must** familiarise themselves with the Code of Practice for the Energy Efficient Retrofit of Dwellings (S.R. 54: 2014)

Installation Standards & Specifications

- Paragraph a added: 'All external wall insulation installation and associated works should be carried out in accordance with the manufacturer's specifications and the National Standards Authority of Ireland Standard Recommendation S.R. 54:2014 - Code of practice for the energy efficient retrofit of dwellings'
- Paragraph g added: 'External wall insulation may be restricted where the dwelling faces onto public footpaths. Relevant Local Authorities should be consulted where the installation affects the width of the public footpath. Owners of neighbouring properties should be consulted where the installation of external wall insulation encroaches on their property.'
- Paragraph j added: 'Modifications of down pipes, soil and vent pipes, pipe extensions, meter locations and other services should be as detailed in design specification. All pipe work should be relocated as required to accommodate the insulation.'
- Paragraph k added: 'Fixings to the external fabric will need reinforcement to resist movement that may affect joints on soil, rainwater, gas and water pipes. Satellite dishes are subject to wind load that may cause indenting into the insulation with the potential for failure of the waterproof render. A treated timber ground to the depth specified by the system certificate should be installed.'
- Paragraph l added: 'Any causes of dampness such as leaking gutters or down pipes should be repaired. Where there is evidence of rising damp, remediation measures should be carried out.'
- Paragraph m added: 'The condition of the exterior of the wall should be assessed. Surfaces should be sound, clean and free from any loose material. Render finishes should be in good condition. Pebble dash (wet and dry dash) does not provide an even surface for the adhesive to bond to and should be adequately prepared or removed. All necessary repairs to the property's structure must be completed and dry before the installation of the insulation.'
- Paragraph r moved up from the end of the section.
- Paragraph u added: 'The key thermal bridge junctions for external wall insulation may be addressed as follows:
 - where ground floor thermal bridges are being eliminated this may require placement of suitable external insulation to footpath level. Further thermal improvements may be achieved by bringing insulation below ground level and may require removal of footpaths;
 - sills may require specific detailing to avoid thermal bridging;
 - external insulation should abut the roof insulation to form a continuous layer, otherwise a thermal bridge may occur. To eliminate the cold bridge at the wall roof junction removal of the soffit may be required.
- The following three additions were made to paragraph v:
 - The insulation should be returned into reveals, sills and jambs in accordance with the approval documentation.
 - All junctions between external wall insulation and existing window frames should be adequately sealed to prevent the ingress of moisture. The insulation should overlap at the corners, and fit without gaps. Where clearance is limited, strips of approved insulation should be installed to suit available margins
 - For additional guidance, see Acceptable Construction Details on the Department of Environment, Community and Local Government website.
- Paragraph w added: 'Prior to application of base and finish coats, all necessary protective measures such as taping off of existing window frames and covering of glass should be in place.'

- Paragraph x added: 'In sunny weather, work should commence on the shady side of the building and be continued following the sun to prevent the rendering drying out too rapidly.'
- Paragraph ee added: Where windows and doors are being replaced they may be relocated towards the external face of the existing structure to reduce thermal bridging but at all times should be supported by the structure. Details should be in accordance with approved certification.

SECTION 7.3 INTERNAL WALL INSULATION

The contractor **must** familiarise themselves with the Code of Practice for the Energy Efficient Retrofit of Dwellings (S.R. 54: 2014)

Installation Standards & Specifications

- Paragraph a added: All internal wall insulation installation and associated works should be carried out in accordance with the manufacturer's specifications and the National Standards Authority of Ireland Standard Recommendation S.R. 54:2014 - Code of practice for the energy efficient retrofit of dwellings.
- Paragraph c added: 'Internal wall insulation solutions typically include:
 - Applying composite insulated dry-lining boards directly to the wall using mechanical fixings or plaster dabs.
 - Applying battens to the wall, insulating between the battens with composite insulated dry-lining boards'
- Paragraph e added: 'The internal wall insulation fixing method depends on the existing internal wall construction:
 - Where the masonry wall is plastered directly, any of the internal wall insulation solutions described may be used. Any wallpaper, skirting, picture rails, gloss paint and projecting window boards should be removed. The wall surface should be clean and dust free. Where the existing wall is painted the manufacturers do not recommend the use of plaster dabs
 - For existing plasterboard on dabs, it is not possible to assess whether the dabs are able to support the additional weight of the composite insulated dry-lining boards, therefore the plasterboard and dabs should be removed to provide a smooth substrate. Where the block wall finish is unplastered and therefore potentially porous resulting in poor airtightness, a parging coat of plaster should be applied, to improve the airtightness of the final works.
 - For existing plasterboard on battens, the condition of battens should be investigated and where they are found to be in a serviceable condition the battens may be retained and the new internal wall insulation fixed directly to them through the existing plasterboard. Where the battens are not in a serviceable condition, the plasterboard and battens should be removed entirely. Where insulation exists, it should be removed and replaced with insulation to an appropriate U-value.'
- Paragraph f added: 'Where existing plaster is being removed, the exposed surface of the wall should be pointed/cement washed to seal any holes/cracks;'
- Paragraph g added: 'Where existing plaster is to remain, all cracks should be filled, and any loose sections should be removed and made good. Where plaster is to be removed, the exposed surface of wall should be pointed/cement washed to seal any holes/cracks. Where the existing wall surface is level and smooth, the thermal laminate board may also be fixed directly to the wall surface'
- Paragraph h added: 'The interior wall surface should be structurally sound and free from dampness. Any repairs should be carried out ahead of the installation, and walls should be allowed to dry out prior to the works commencing. Any existing structural or dampness problems should be resolved before applying any insulation.'
- Paragraph i added: 'Provision should be made for the fixing of heavy items such as kitchen cupboards, or items that will have a level of force applied, such as banisters and grab rails.'
- Paragraph j added: 'The width of the staircase or corridor should not be reduced to less than the minimum requirements of the Building Regulations by the application of internal wall insulation. It may be necessary to install a reduced depth of insulation in these areas and increase the level elsewhere to compensate for this reduced performance.'
- Paragraph k added: 'Composite insulated dry-lining boards should be installed in accordance with good dry-lining practice and the manufacturer's instructions'.
- Paragraph l added: 'A vapour control barrier must be included in the insulation system. This can be achieved by using, for example, a polythene sheet applied to the warm side of the insulation. Where

the vapour control barrier is an integral part of the insulated dry-lining board, careful attention must be given to the sealing of joints.'

- Paragraph m added: 'Where any services such as pipes or cables are present in the wall, or mounted on the wall, these should be extended or replaced. They should extend through the full depth of the proposed insulation layer and finish with sufficient excess for fixing or working. Where radiators cannot be re-positioned to an internal wall or be floor mounted, a ply or OSB timber plate should be fixed to the wall surface and secured through the thermal laminate into the existing masonry or timber battens.'
- Paragraph n added: 'The location of potential service penetrations in the insulation should be determined by offering up the composite insulated dry-lining board. Slots should not be formed in insulated dry-lining board to accommodate service penetrations. A hole should be drilled through the insulated dry-lining board, slightly larger than the diameter of the service pipe or cable and the service should be slotted through the hole.'
- Paragraph o added: 'Where insulated dry-lining boards are being mechanically fixed to the wall using battens, the metal fixings through the battens should penetrate at least 35mm into the masonry. Fixings through boards must penetrate at least 25mm into the batten.'
- Paragraph p added: 'The procedure for fitting internal wall insulation to the internal face of the wall, mechanically or using plaster dabs, should be followed from clause 7.3.3 in SR 54:2014.'
- Paragraph q added: 'Window and door reveals can be sources of condensation and mould if not insulated correctly, but where the amount of visible window frame is too small the full thickness of the insulated dry-lining cannot be applied. Where this is the case an insulated window lining board (e.g. expanded PVC) can be used. The lining should not restrict ventilators or opening mechanisms. It may be necessary to remove the existing plaster to accommodate an adequate thickness of insulation within the limited space available.'
- Paragraph r moved from original paragraph g: 'Where there is no other option but to run electrical cables within the insulation component of the insulation board, the cables must be enclosed in an appropriate conduit, e.g. rigid PVC, as per the National Rules of the Electro-Technical Council of Ireland (ET101: 2008).'
- Paragraph s moved from original paragraph h: 'Avoid contact between PVC-insulated wiring and polystyrene insulation, e.g. run wires through flexible cable protection tubes.'
- Paragraph t – the following text was moved from the original paragraph c and added to the end of the existing text: 'Any penetrations of the insulated dry-lining board must also be sealed e.g. light switches, sockets etc. Where the manufacturer supplies or advises the use of a plasterboard primer this must be applied.'
- Paragraph v moved from original paragraph i: 'A system supplier or contractor guarantee must be issued to the customer where applicable'

SECTION 7.4: CEILING LEVEL ATTIC INSULATION:

The contractor **must** familiarise themselves with the Code of Practice for the Energy Efficient Retrofit of Dwellings (S.R. 54: 2014)

Installation Standards & Specifications

Paragraph g added as new:

Long term exposure to interstitial condensation within a roof space can lead to structural roof timbers rotting. It is essential that a cold roof space is adequately ventilated and the transfer of moisture from below is limited by:

- Installing an airtight membrane at ceiling level to reduce moisture transfer is recommended where reasonably possible.
- Prevent moisture from entering the roof space by ensuring that loft hatches are properly draught proofed and sealed.
- Fitting wet rooms with a suitable ventilation system to extract moisture at source. This is in addition to window/wall vents were applicable.
- Provide roof ventilation through side eaves or through ventilation tiles located in the slope of the roof.

Paragraph h added.

Insulation at ceiling level should be installed in such a way to avoid gaps. This can be done by;

- The insulation laid between the ceilings joists should be no more than 25mm either above or below the ceiling joists.
- The next layer of insulation should be placed across the joists and tucked into the eaves ensuring access to eaves ventilation

Paragraph l (formally h) has sentence added

High performance insulation should be placed between or above the timber joists where a storage platform or access walkway is proposed.

SECTION 7.5 RAFTER LEVEL ATTIC INSULATION (WARM ROOF)

Installation Standards & Specifications

- Paragraph a added: 'All attic insulation installation and associated works should be carried out in accordance with the manufacturer's specifications and the National Standards Authority of Ireland Standard Recommendation S.R. 54:2014 - Code of practice for the energy efficient retrofit of dwellings.'
- Paragraph g added: 'When installing rigid insulation between the rafters, the sheets should be cut accurately so as to leave no gaps around the edges. Where gaps occur these should be filled with either insulation or insulation foam. Similarly, any service penetrations, such as a soil stack, should be sealed adequately.'
- The following text was added to the end of paragraph j: 'Where foiled backed insulation is used, foil taping all joints between the insulation slabs in each layer will fulfil the requirement for a vapour control layer.'
- Paragraph l added: 'Downlighters should be provided with sufficient space to dissipate heat so as to prevent the lights themselves from overheating. Where the light fitting itself is airtight (to the roof) but the hood of the fitting is open to the room, then the hole for the recessed fitting should be cut into the ceiling accurately to prevent air movement from the room into the roof space. A void should be formed around the light fitting in the lowest insulation layer. Where the light fitting itself is not airtight (to the roof), or where it is not possible to make the ceiling airtight where the fitting is provided, then an airtight enclosure should be formed or a service void provided on the warm side of the vapour control layer. Forming these spaces at regular intervals in the insulation layer reduces the overall effectiveness of the roof insulation. Where they are fitted, a layer of high performance insulation should be installed above the recessed lights to compensate for the voids formed in the lowest layer to accommodate the recessed fittings. For sloped roofs where voids cannot be provided then recessed light fittings should not be installed in the sloping roof section unless a suitably deep service void is provided.'
- Paragraph o added: 'Careful detailing is required to avoid thermal loss due to thermal bridging and to maintain roof ventilation at the roof-wall junction particularly where the dwelling is also provided with wall insulation.'
- Paragraph p added: 'Services, such as cables/pipework, can be accommodated within a battened airspace, on the inside of the finished insulation, with the depth determined by what services are provided.'

SECTION 7.6 FLOOR INSULATION

Installation Standards & Specifications – Suspended Timber Floor Insulation

- Paragraph a added: 'Retrofit Floor insulation must be carried out in accordance with the guidelines as described in S.R. 54 – 2014 (Code of Practice for the energy efficient retrofit of dwellings) Clause 9 – Floor Insulation'

Installation Standards & Specifications –Concrete Floor Insulation

Paragraph added to incorporate suspended precast concrete floor in this specification:

'This specification is applicable to both ground supported concrete floors and suspended precast concrete floors. Where sufficient space is available for safe access, or a basement exists, fitting insulation to the underside of the slabs is an option. NOTE Caution should be taken to ensure that the area beneath a suspended ground floor is ventilated to prevent the build-up of condensation and hazardous soil gases, such as radon'.

- Paragraph a added: 'Retrofit Floor insulation must be carried out in accordance with the guidelines as described in S.R. 54 – 2014 (Code of Practice for the energy efficient retrofit of dwellings) Clause 9 – Floor Insulation'

Paragraph on Radon below added:

Radon

Where planned retrofit measures comprise of floor replacement consideration should be given to provision of radon preventative measures as detailed in Building Regulations Technical Guidance Document C

Post retrofit radon testing is recommended where extensive energy retrofit measures have been completed
NOTE: For further guidance see

http://www.epa.ie/radiation/publications/rad/RPII_Radon_Homes_Brochure_2008.pdf and the Department of the Environment, Community and Local Government publication Radon in Existing Buildings - Corrective options.

SECTION 7.7 FULLY INTEGRATED HEATING CONTROLS

Installation Standard & Specification

- The underlined text was included to ensure S.R. 54 was included for: 'All Heating Controls installation should be carried out in accordance with the manufacturer's specifications and Industry Best Practice. All works should be installed in accordance with the National Standards Authority of Ireland Standard Recommendation S.R. 54:2014 - Code of practice for the energy efficient retrofit of dwellings, the Dept. of Environment, Heritage and Local Government and SEAI Document Heating and Domestic Hot Water Systems for Dwellings – Achieving Compliance with Part L, the TACMA Guide to Heating Controls, and Energy Savings Trust Guidelines.'

Two Zones (Space Heating & Domestic Hot Water)

Installation Standard & Specification

- The following text was added to the end of the paragraph on Zoning: 'Motorised valves should not be positioned in the line of the open safety vent pipe or the feed and expansion pipe. Solid fuel systems should use normally-open motorised valves (i.e. they close only when power is applied) to ensure safe operation in the event of power failure or malfunction.'

Thermostatic Radiator Valves (TRVs)

Installation Standard & Specification

- The underlined text was included to ensure S.R. 54 was included for: 'TRVs should be installed in accordance with the manufacturers guideline, industry best practice, the National Standards Authority of Ireland Standard Recommendation S.R. 54:2014 - Code of practice for the energy efficient retrofit of dwellings, and the latest version of BS 7478 'Selection and use of thermostatic radiator valves'. This British Standard gives guidance on the selection, application and use of thermostatic radiator valves (TRVs) manufactured in accordance with BS EN 215-1 for use in domestic and commercial wet central heating systems up to a water temperature of 120oC. TRVs must not be fitted in rooms which already have temperature control through a thermostat.'
- The following text was added at the end of the section on TRVs: 'Where TRVs are being fitted to a one-pipe system, i.e. only the boiler is being replaced, units designed for minimum flow resistance should be used.'

SECTION 7.19 FULLY INTEGRATED HEATING CONTROLS WITH REMOTE ACCESS

General Standards & Specifications

Installation Standard & Specification

The underlined text was included to ensure S.R. 54 was included for: 'All Heating Controls installation should be carried out in accordance with the manufacturer's specifications and Industry Best Practice. All works should be installed in accordance with the National Standards Authority of Ireland Standard Recommendation S.R. 54:2014 - *Code of practice for the energy efficient retrofit of dwellings*, the Dept. of Environment, Heritage and Local Government and SEAI Document Heating and Domestic Hot Water Systems for Dwellings – Achieving Compliance with Part L, the TACMA Guide to Heating Controls, and Energy Savings Trust Guidelines:

- GPG 302 Controls for Domestic Central Heating and Hot Water – Guidance for Specifiers and Installers (Energy Savings Trust and BRE)
- CE29 Domestic Heating by Oil: Boiler Systems – Guidance for Installers and Specifiers
- CE30 Domestic Heating by Gas: Boiler Systems – Guidance for Installers and Specifiers
- All works should be carried out in accordance with the ETCI National Wiring Rules for Electrical Installations, Fourth Edition ET101:2008 and the latest draft of BS 5449 Specification of Forced Air Circulation Hot Water Central Heating Systems for Domestic Purposes (or equivalent Irish Standard) where applicable.'

Two Zones (Space Heating & Domestic Hot Water)

Installation Standard & Specification

- The following text was added to the end of the paragraph on Zoning: 'Zones should be divided according to Industry Best Practice as outlined in Good Practice Guide 302. This guide recommends using motorised control valves to subdivide the home into separate heating zones. A zoning manifold can also be used to achieve separate heating zones. Motorised control valves can be plumbed at an angle but must not be mounted so that the power-head is below the horizontal level of the pipework. If fitted in a confined space, adequate ventilation must be available in order to ensure that the valve will be kept within its recommended temperature range. There must also be adequate access so that the power head can be removed if necessary. Motorised valves should not be positioned in the line of the open safety vent pipe or the feed and expansion pipe. Solid fuel systems should use normally-open motorised valves (i.e. they close only when power is applied) to ensure safe operation in the event of power failure or malfunction.'

An Additional Zone

Installation Standard & Specification

- The underlined text was included to ensure S.R. 54 was included for: 'A Third Zone can be established using an additional motorised control valve or a zoning manifold arrangement and room thermostat. Installation should be carried out in accordance with the manufactures instruction, the National Standards Authority of Ireland Standard Recommendation S.R. 54:2014 - Code of practice for the energy efficient retrofit of dwellings, and Industry Best Practice. The Installation Standards & Specifications outlined in Section 7.16.1 will also apply to the installation of an additional heating zone.'

Thermostatic Radiator Valves (TRVs)

Installation Standard & Specification

- The underlined text was included to ensure S.R. 54 was included for: 'TRVs should be installed in accordance with the manufacturers guideline, the National Standards Authority of Ireland Standard Recommendation S.R. 54:2014 - Code of practice for the energy efficient retrofit of dwellings, industry best practice and the latest version of BS 7478 'Selection and use of thermostatic radiator valves'. This British Standard gives guidance on the selection, application and use of thermostatic radiator valves (TRVs) manufactured in accordance with BS EN 215-1 for use in domestic and commercial wet central heating systems up to a water temperature of 120oC. TRVs must not be fitted in rooms which already have temperature control through a thermostat.'
- The following text was added at the end of the section on TRVs: 'Where TRVs are being fitted to a one-pipe system, i.e. only the boiler is being replaced, units designed for minimum flow resistance should be used.'