Extensions are a simple way to add space and value on your home, it is important to make sure that the work is done to a good standard that complies with minimum requirements set by government.

This guide seeks to provide information on how to achieve compliance with the Building Regulations.

The solutions shown are just some examples of how to comply, other solutions and manufacturers products may achieve the requirements.
Foundations

One of the most important parts of any building are the foundations. Although not seen foundations can be expensive, depending upon the ground conditions.

Foundations: Items to consider when digging

- Depth and type of existing house foundations. - The excavation should ideally expose the existing foundations as a starting point.
- Ground conditions. - It may be necessary to excavate deeper than the existing foundations if the ground is not suitable for the new foundations.
- Trees/shrubs near to foundations. - If a mature tree or shrub is near to the proposed extension and the ground is clay, it may be necessary to excavate deeper and provide protection from heave. This can be discussed with us.
- Gas, electricity and water mains running under proposed extension.
- Drains and main sewers near or under the proposed extension. - Foundations should be taken down to the invert (bottom) of any drains running under or within 1 metre of an extension. If a drain is discovered and it takes drainage from more than one house it is now classed as a main sewer. You are allowed to build over a sewer under the United Utilities protocol as agreed with building control. Some sewers may require a Build over agreement from United Utilities, this depends upon the depth, diameter and length of sewer to be built over, see table below. A sewer 300mm diameter or larger and deeper than 3 metres requires a build over agreement.

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<table>
<thead>
<tr>
<th>Sewer depth</th>
<th>Length of sewer built over or within 3m of centre line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 6.0m</td>
</tr>
<tr>
<td>0 - 1.2m</td>
<td></td>
</tr>
<tr>
<td>1.2 - 2.0m</td>
<td></td>
</tr>
<tr>
<td>2.0 - 3.0m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Work to be approved by Building Control under H4</td>
</tr>
<tr>
<td></td>
<td>Work to comply with H4 and length of sewer to be built over to be agreed with United Utilities</td>
</tr>
<tr>
<td></td>
<td>Formal Build over agreement required.</td>
</tr>
</tbody>
</table>

**Foundations: ground conditions**

It is possible to have 2 ground types on the same project in this instance mesh reinforcement is placed within the proposed foundations to take into account the differing conditions. It was common in the past for some sites to be backfilled with clay, a sign of this is often brick fragments within the clay.

The following are some examples of ground conditions experienced within the borough of Rochdale.
Foundation: types

Rochdale has a mixture of varying ground conditions and therefore one foundation solution will not be suitable for all. The most common type of foundation is a strip foundation, however this may not be possible if ground is poor which sometimes requires a structural engineer to design.

Foundations: strip

The most common foundation type normally suitable for clay, rock and sand ground conditions.

Foundations: mass concrete

Often used when excavations are deep to avoid workers having to build in trenches or when space is limited. Considered cheaper than strip foundations.
Foundations: engineer designed

If ground conditions are poor a Structural Engineer design foundation will have to be adopted, the most commonly used is a pile and ground beam foundation. Piles are driven down to firm ground and then reinforced concrete ground beams span between the piles. We will require structural calculations and pile logs when this type of foundation is used.

When a design foundation is used, the floor will also have to be designed as a suspended slab.

Foundations: concrete

In winter concrete should not fall below 5 degrees C at any time during mixing and transporting and not placed against frozen or ice covered surfaces as specified in BS 8000.

Floors: types

Floors are normally constructed from timber or concrete and both require a minimum U value of 0.22 w/m²K. The amount of insulation required is based upon the P/A ratio which is the perimeter length divided by the area of the floor. Manufacturer’s websites have information regarding insulation thickness based upon the P/A ratio.
Floors: timber

With timber floors it is important to provide ventilation under the floor to prevent moisture build up and timber decay. Air bricks should be placed on opposing walls to provide 1500mm²/m run of wall. Any existing air bricks will need to be maintained so that existing timber floor remains vented.

Ends of joist should be wrapped in dpc.

An example of suspended timber floor construction is below:
Floors: timber sizes

Floor joists should be free from mould and stress graded C16 or C24.

Floor joists (grade C16) are sized from Eurocode 5.

47 x 145mm joists installed at 400mm centres will span up to 2.89m
47 x 170mm joists installed at 400mm centres will span up to 3.38m
47 x 195mm joists installed at 400mm centres will span up to 3.87m
72 x 145mm joists installed at 400mm centres will span up to 3.33m
72 x 170mm joists installed at 400mm centres will span up to 3.89m
72 x 195mm joists installed at 400mm centres will span up to 4.44m

Floors: timber strutting

Joists spanning over 2.5 metres require strutting at mid span to prevent twisting when loaded. When joist span over 4.5 metres strutting is required at third spans.

Strutting should be at least 38mm wide and at least three quarters of the joist depth. Typical strutting arrangement is shown below.

Solid strutting shown 38mm wide for full depth of floor joist.

Note: Floor joists should be doubled up under partitions.
Floors: concrete slab

Solid concrete floors are the most common floor type. Where a new floor is being added to a house and the existing floor is timber with vents, these will need to be ducted under the new floor slab to maintain the existing air flow.

Concrete floors are ground bearing or suspended.

Concrete should be grade GEN2/ST2 for use for house floors without mesh reinforcement and grade GEN3/ST4 for garage floors. Slabs with mesh reinforcement should be grade RC28/35.

Floors: ground bearing concrete slab

Ground bearing slabs are used when fill material below the slab is not more than 600mm and there is no danger of heave from trees in clay subsoil. The detail below shows a typical ground bearing slab.

100mm minimum thickness GEN2 ground bearing concrete slab.

25mm perimeter insulation.

500g visqueen separation layer

75mm Kingspan or similar insulation

1200g visqueen dpm

sand blinding

150mm thick layers of well compacted hardcore (not more than 600mm)
Floors: suspended concrete slab

Suspended slabs are required if an engineered design foundation is used or fill below the slab is more than 600mm and is being replaced with 150mm thick layers of compacted hardcore. If clay subsoils exist and trees may cause risk of heave (ground movement).

Suspended slabs are supported on the internal leaf blockwork and on existing walls by pockets formed typically in a 450mm hit and miss pattern.

Reinforcement mesh requires a nominal 50mm cover from the bottom of the slab and 15mm from the edge of the cavity. Mesh should be supported by concrete or plastic supports and should be lapped 300mm minimum.

An example of suspended concrete floor construction is below:

150mm minimum thickness RC28/35 suspended concrete slab.
(designed by structural engineer)

Mesh reinforcement 50mm min cover
500g visqueen separation layer
75mm Kingspan or similar insulation
1200g visqueen dpm
sand blinding
150mm thick layers of well compacted hardcore.
(not more than 600mm)
The table below indicates mesh sizes for light domestic loads.

<table>
<thead>
<tr>
<th>Clear span (m)</th>
<th>Slab thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150</td>
</tr>
<tr>
<td>2.00</td>
<td>B196</td>
</tr>
<tr>
<td>2.25</td>
<td>B283</td>
</tr>
<tr>
<td>2.50</td>
<td>B283</td>
</tr>
<tr>
<td>2.75</td>
<td>B385</td>
</tr>
<tr>
<td>3.00</td>
<td>B503</td>
</tr>
<tr>
<td>3.25</td>
<td>B785</td>
</tr>
<tr>
<td>3.50</td>
<td>-</td>
</tr>
<tr>
<td>3.75</td>
<td>-</td>
</tr>
<tr>
<td>4.00</td>
<td>-</td>
</tr>
<tr>
<td>4.25</td>
<td>-</td>
</tr>
<tr>
<td>4.50</td>
<td>-</td>
</tr>
<tr>
<td>4.75</td>
<td>-</td>
</tr>
<tr>
<td>5.00</td>
<td>-</td>
</tr>
<tr>
<td>5.25</td>
<td>-</td>
</tr>
</tbody>
</table>

**Floors: damp proof membrane**

A damp proof membrane is normally inserted under a floor to protect from dampness in the ground. These should be formed from visqueen (polyethylene) 1200 gauge minimum laid on a material that will not damage the sheet such as sand blinding or insulation. PIR insulation such as Kingspan, Celotex and Xtratherm need an additional layer of 500g visqueen over the insulation to prevent damage to the insulation from concrete. **Damp proof course in walls should link with damp proof membrane in floors.**

**Floors: gas protection**

In certain instances a different type of membrane is required to protect from harmful gases in the ground rather than a standard damp proof membrane.
The use of a gas membrane will be advised either by a building control surveyor or as a condition under planning permission. Different systems are required dependant upon risk factors and generally determined by the Councils Environmental Health Department.

**It is important to note that insulation should be placed above gas membranes.**

A typical detail for junctions at walls and floors for gas protection is shown below.

![Diagram of gas protection detail](image)

**Floors: radon**

Radon is a natural radioactive gas originating from minute amounts of Uranium that occur naturally in all rocks and soil. In certain areas of Rochdale there is a risk of from radon gas, however only basic protection measures are required. Basic protection consists of 1200g visqueen installed in similar fashion to a gas membrane. (As seen in the diagram above). Building Control or Environmental Health are able to provide guidance in relation to which properties require protection from radon.
Floors: first floor

First floors have to prevent fire spread and sound transmission, the detail below shows how to achieve these requirements.

22mm floor boarding (minimum mass 15kg/m²)

floor joists sized from Eurocode 5.

100mm Knauf earthwool between joists (minimum mass 10kg/m³)

12.5mm plasterboard and scrim with skim finish (minimum mass 10kg/m²)

The floor should be strapped to the external walls to provide lateral support to walls, see detail under roof: strapping.
Drains: systems

New drainage connections must be connected to the existing system, some areas have separate foul (toilet) and surface (rainwater) drainage others have combined systems. It is important that new connections are made to the correct system. A good indicator of separate system is two maholes in the road close side by side.

Drains: falls

Drains should be laid to a fall depending on the diameter and type of system. Foul drains 1 in 40 minimum fall for 100mm pipes. Surface water drains laid at not less than 1 in 100 for 100mm pipes. 100mm diameter pvc pipes should be bedded and surrounded in pea gravel (granular material) of 5-10mm size.

Drains: foundations and slabs

Foundations should be taken down to the invert level of drains or sewers passing within 1m of foundations. Where drains or sewers pass though foundations protection is required to prevent loads from extension damaging drains. A detail to prevent damage is shown below.

- plywood shuttering either side of pipe.
- broken line shows proposed lintels inserted after foundation concrete set
- 50mm clearance all round pipe. Void to be filled with compressible sealant.
- opening masked with rigid material.
- drain concrete strip foundation.
Where a drain or sewer passes under proposed extension, 100mm minimum pea gravel should be provided around pipe. If the top (crown) of the pipe is within 300mm of bottom of floor slab then the slab should be reinforced with mesh and insulation provided as flexible filler and minimum 75mm pea gravel from top of pipe to underside of the filler.

**Drains: rainwater pipes**

The number and diameter of gutters and rainwater pipes depends on the pitch and area of roof to be drained see table below.

<table>
<thead>
<tr>
<th>Surface type</th>
<th>Effective design area</th>
</tr>
</thead>
<tbody>
<tr>
<td>flat roof</td>
<td>plan area</td>
</tr>
<tr>
<td>pitched roof 30 degrees</td>
<td>plan area x 1.29</td>
</tr>
<tr>
<td>pitched roof 45 degrees</td>
<td>plan area x 1.5</td>
</tr>
<tr>
<td>pitched roof 60 degrees</td>
<td>plan area x 1.87</td>
</tr>
<tr>
<td>pitched roof over 70 degrees or a wall</td>
<td>elevational area x 0.5</td>
</tr>
</tbody>
</table>

It is important that any existing rainwater which discharges onto new roof and into new drains is calculated.

<table>
<thead>
<tr>
<th>Effective design area</th>
<th>Gutter size diameter</th>
<th>Outlet size diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>18m²</td>
<td>75mm</td>
<td>50mm</td>
</tr>
<tr>
<td>37m²</td>
<td>100mm</td>
<td>63mm</td>
</tr>
<tr>
<td>53m²</td>
<td>115mm</td>
<td>63mm</td>
</tr>
<tr>
<td>65m²</td>
<td>125mm</td>
<td>75mm</td>
</tr>
<tr>
<td>103m²</td>
<td>150mm</td>
<td>89mm</td>
</tr>
</tbody>
</table>

Where a combined system is used rainwater pipes should discharge into trapped gulley’s.
Drains: connections and blockages

Access to clear blockages should be provided at head of each drain run, at bends change of gradients and change of pipe size and at junctions. A maximum 22 metres is recommended between access points.

Pre-formed inspection chambers can be used up to 1.2m deep. It is good practice to provide inspection chambers at change of direction as shown adjacent.

If unavoidable some manholes may have to be inside the building if this is the case mechanically fixed airtight cover is required. Small lightweight covers should have screw down covers.

The cover of a manhole or inspection chamber depends on loads it may take, see table below:

<table>
<thead>
<tr>
<th>Use</th>
<th>BS 476 grade</th>
<th>BS EN 124 Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrians only</td>
<td>C</td>
<td>A15</td>
</tr>
<tr>
<td>Driveways</td>
<td>B</td>
<td>B125</td>
</tr>
<tr>
<td>Roads</td>
<td>A</td>
<td>D400</td>
</tr>
</tbody>
</table>

Drains: above ground drainage

Waste pipes from wash basins, baths, showers, sinks, washing machines, dishwashers and toilets need water seal traps to prevent foul air from sewage system entering the building.

Any new soil & vent pipe (stack) should finish with a wire cage or perforated cover 900mm above windows or air intake into the building if they are within 3 metres of the pipe. Inside a building an air admittance valve is used (often called a durgo).
Walls: damp proof course

Damp proof courses are the modern way of preventing rising dampness, these came into wide use after 1875.

Damp proof courses are often referred to as dpc’s which should be positioned 150mm minimum above the outside ground level. Concrete cavity fill must be at least 225mm below the lowest dpc level.

Walls: construction

Many types of wall construction are available, new external walls must have maximum U value of 0.28 w/m²K.

The inner and outer leaf of cavity walls need to be tied together using austenitic stainless steel ties at 900mm horizontal and 450 vertical centres staggered each line which are embeded 50mm minimum into both leaves.

Walls: partial fill

Brickwork or stone outer leaf.

50mm clear cavity

50mm Kingspan K108 insulation

Cavity ties with retaining clip for insulation.

blockwork inner leaf (k 0.11)

12.5mm plasterboard on dabs.

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A 50mm clear cavity is required as Rochdale is rated severe for exposure to wind driven rain.

In partial fill cavity construction plastic retaining clips are attached to the wall ties to hold insulation in place.

It is important to make sure that the internal face of blockwork is clear of mortar snots so that the insulation is tight against the blockwork.

**Walls: full fill**

It is now common that full fill cavity insulation is used this is because a water repellent additive is added to the insulation. It is advisable in exposed areas where high levels of wind driven rain are possible that partial fill cavity insulation is used.

Brickwork or stone outer leaf.

100mm cavity fully filled with earthwool dritherm 32 insulation

100mm blockwork inner leaf (k 0.11)
12.5mm plasterboard on dabs.

Where walls are to be rendered both leaves are constructed in blockwork above the damp proof course (dpc) level with brickwork below so that moisture cannot pass above dpc level.
blockwork outer leaf with render finish.

100mm cavity filled with earthwool Dritherm 32.

100mm blockwork inner leaf (k 0.11)

Walls: stability and openings

The sizes of openings allowed in walls is calculated below.

\[
\begin{align*}
 w_1 + w_2 & \text{ should not be more than } 3m \\
 w_1 + w_2 & \text{ should not be more than } \frac{2xL}{3} \\
 p_1 & \text{ should be equal to or more than } \frac{w_1}{6} \\
 P_2 & \text{ should be equal to or more than } \frac{w_1 + w_2}{6} \\
 P_2 & \text{ should be equal to or more than } \frac{w_2}{6}
\end{align*}
\]

L is taken from the centre line (middle of the wall)

For windows near boundary see section on fire spread.
If the amount of openings exceeds the guidance above calculations from a competent Structural Engineer will be required.

The wall at the corner of buildings need to have a return to make sure it is structurally safe. The minimum return is 665mm (3 bricks) this may need to be larger if a large bi-fold door is installed. The detail adjacent shows return at corner.

Walls: fire spread and boundaries

Walls within 1 metre of a boundary are only allowed windows up to 1.0m² in size over the frame. This is the total unprotected area allowed. Walls between 1 and 2 metres from boundary can have from 5.6m² up to 12.0m² openings.

If more windows are required they would have to be non-openable fire resistant glass and frame to achieve 30 minutes fire resistance (integrity/insulation). Windows overlooking neighbouring properties may require opaque glass this may be a planning requirement.

Walls: window & door openings.

The amount of window and door openings allowed in extensions is based upon the 25% of the total internal floor area of the extension plus any windows or doors covered up by the extension.

If the amount of openings is more than the above then specialist SAP calculations proving that CO₂ emissions from the dwelling with its proposed extension are no greater than for a dwelling plus a notational extension will be required.
Walls: lintels

When installing a lintel it is important to install dpc over the lintel with weep holes. Photo adjacent shows lintel and weep hole.

Some lintels have built in dpc. Steel lintels to act as a dpc must be made from austenitic steel or powder coated galvanised steel and a minimum of 140mm deep.

A separate dpc is required in Rochdale as the weather exposure to wind driven rain is classed as severe.

Walls: cavity closers

Cavities should be closed at doors and windows with insulated cavity closers which also act as dpc as shown in detail adjacent.

Photograph adjacent shows a proprietary cavity closer in position. Closers should be installed before windows and doors are fitted.
Walls: connection to existing

New cavities should be linked to existing, as shown in the detail below.

- existing brickwork to be cut out to form continuous cavity.
- Ancon wall starter kit
- blockwork inner leaf
- clear cavity
- brickwork outer leaf.

Sometimes brickwork is bonded (known as toothed, shown below) into the existing walls. This can be problematic if the length of wall is greater than 12m as this is the recommended maximum length of brickwork, therefore a movement joint should be provided at junction.
Walls: internal stud partitions

Internal partitions need to achieve half hour fire resistance and sound resistance. Detail below shows how this can be achieved.

- 75 x 50mm sw studding at 400mm centres.
- Voids between the studding have minimum 25mm thick mineral wool (minimum density 10kg/m³).
- 12.5mm plasterboard both sides.
- 22mm floor boarding.
- 100mm Knauf earthwool between joists (minimum mass 10kg/m³).
- Floor joists doubled up and bolted together under partitions.
- 12.5mm plasterboard and scrim with skim finish (minimum mass 10kg/m²).
Roofs: pitched

The most common form of roof construction is traditional pitch which is formed with rafters and ceiling joists giving triangulation for stability as shown below.

50 x 25mm treated sw battens to BS 5534 on breathable roofing felt.

sw rafters (sized from Eurocode 5)

rafter ventilation tray

ceiling joists

soffit vent

100 x 75mm sw wallplate strapped down to walls at 2.0m maximum centres.

Pre-formed roof trusses can also be obtained from specialist manufacturers as shown below.
Roof: vaulted pitched

In many new extensions owners are opting for a sloping (vaulted) ceiling with roof lights to bring additional light into the building. The details below show typical sections through sloping ceiling.

1. Roof tiles (suitable for pitch)
2. 50 x 25mm treated sw battens to BS 5534 on breathable roofing felt.
3. Sw rafters (sized from Eurocode 5)
4. 50mm clear air space
5. 100mm Kingspan TP10 insulation.
6. 25mm Kingspan TP10 insulation.
7. 12.5mm foilbacked plasterboard.
8. Breathing roofing felt.
9. Roof tiles (suitable for pitch)
10. 50 x 25mm treated sw battens
11. Sw rafters (sized from Eurocode 5)
12. 50mm clear air space
13. 100mm Kingspan TP10 insulation.
14. 25mm Kingspan TP10 insulation.
15. 12.5mm foilbacked plasterboard.

For more information, visit www.rochdale.gov.uk/buildingcontrol
Where roof lights are installed rafters require doubling up and bolting together as shown in photo adjacent.

When a vaulted roof is used no triangulation is provided to prevent roof spread. In many single storey extensions the roof pitch (angle) is shallow to fit under existing windows to the first floor. As the roof pitch get shallower a greater force (thrust) is put on the top of the wall. To prevent spread the connection detail of the roof to wall should be as detail below.

rafters birds mouthed over wall plate (maximum 1/3rd depth of rafter)  
roof tiles (suitable for pitch) on sw battens on breathable felt

Tilting fillet shown on sketch above helps keep the bottom roof tile at the same pitch as the rest of the roof.
Roof: pitched roof joist sizing

Rafters for pitched roof (grade C16) are sized from Eurocode 5 for pitches from 15 – 22.5 degrees.

47 x 125mm joists installed at 400mm centres will span up to 2.4m
47 x 150mm joists installed at 400mm centres will span up to 3.0m
47 x 195mm joists installed at 400mm centres will span up to 4.08m

Ceiling joists for pitched roof (grade C16) are sized from Eurocode 5.

47 x 120mm joists installed at 400mm centres will span up to 2.48m
47 x 145mm joists installed at 400mm centres will span up to 3.16m
47 x 170mm joists installed at 400mm centres will span up to 3.86m
47 x 195mm joists installed at 400mm centres will span up to 4.55m

Roof: coverings

For pitched roofs the tiles used depend on the pitch which can be achieved, the list below shows some of the most common seen, for further details please refer to manufacturers details.

<table>
<thead>
<tr>
<th>Roof Pitch</th>
<th>Roofing material</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>FORTICRETE Centurion</td>
</tr>
<tr>
<td></td>
<td>REDLAND regent (15 degrees if roof includes valleys)</td>
</tr>
<tr>
<td>15</td>
<td>REDLAND Cambrian slate</td>
</tr>
<tr>
<td></td>
<td>MARLEY Malvern, Wessex, Marley Mendip</td>
</tr>
<tr>
<td></td>
<td>SANDTOFT 20/20 (plain clay appearance)</td>
</tr>
<tr>
<td>17.5</td>
<td>REDLAND landmark double roman,</td>
</tr>
<tr>
<td></td>
<td>MARLEY Modern, Edgemere (slate)</td>
</tr>
<tr>
<td></td>
<td>SANDTOFT Britlock (slate)</td>
</tr>
<tr>
<td>22.5</td>
<td>FORTICRETE Gemini (plain clay equivalent)</td>
</tr>
<tr>
<td></td>
<td>MARLEY Birkdale, Rivendale, Garsdale,</td>
</tr>
<tr>
<td>30</td>
<td>Natural Slate - refer to BS 5534:2003</td>
</tr>
<tr>
<td>35</td>
<td>Plain Clay Tiles (Rosemary’s)</td>
</tr>
</tbody>
</table>

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Roofs: flat

Flat roofs need to achieve a U value of 0.18 w/m²K. Typical flat roof construction is shown below.

- built up felt or single ply membrane
- 50mm clear air space
- 19mm external quality plywood.
- timber furring piece to give minimum fall 1 in 80
- flat roof joists sized from Eurocode 5
- 125mm Kingspan or similar between joists
- 32.5mm Kingspan K118 insulated plasterboard under joists.

If a lantern light is to be used or ventilation may be an issue it is better to provide a warm roof construction as shown below.

- built up felt or single ply membrane
- 120mm Kingspan Thermaroof TR 24 insulation.
- 19mm external plywood.
- timber furring piece to give minimum fall 1 in 80
- flat roof joists
- 12.5mm foilbacked plasterboard.
- 100x50mm sw studding
- With 100mm Kingspan between and 25mm to external face.
- Joists doubled up and bolted together
Roof: flat roof joist sizing

Flat roof joists (grade C16) are sized from Eurocode 5, these are only for maintenance access. If used as a balcony the span is reduced.

- 47 x 145mm joists installed at 400mm centres will span up to 2.84m
- 47 x 170mm joists installed at 400mm centres will span up to 3.43m
- 47 x 195mm joists installed at 400mm centres will span up to 4.02m
- 47 x 220 mm joists installed at 400mm centres will span up to 4.61m

Roofs: ventilation and condensation

To prevent the build-up of moisture within roof voids which can lead to mould growth and timber decay adequate ventilation is required.

Ceilings should be sealed by providing either a vapour control layer or foilbacked plasterboard to prevent moisture entering roof space. Loft access hatches should not be provided in kitchens or bathrooms. Any recessed lighting should also be sealed.

Roofs: eaves ventilation

25mm continuous air gap at eaves is required for pitches of 15 degrees or less. 10mm continuous air gap at eaves for pitches over 15 degrees. Ventilation at eaves can be provided by one of the vents shown in the photographs below.

![eaves strip](image1)
![circular vents](image2)
![over soffit vent](image3)

[www.rochdale.gov.uk/buildingcontrol](http://www.rochdale.gov.uk/buildingcontrol)
Roofs: high level ventilation

Ventilation is required at high level with a continuous gap of 5mm this is either by dry ridge vents or abutment vents for lean to roofs.

Abutment vent  Dry ridge vent

Roofs: breathable membranes

These should be installed to manufacturer instructions, this should always be with an effectively sealed ceiling. A UV resistant section of membrane is used where dropping into gutter.

Roofs: junctions with walls

Cavity trays should be provided at the junction of roofs and walls as shown adjacent, and over lintel openings.
Roofs: tile and slate fixings

Due to the amount of high winds the fixing of tiles and slates has changed to prevent tile and slate loss in high winds. Single lap tiles need to be mechanically fixed. Tiles at edges of roofs must have at least two fixings. Fixings for slates or tiles can be copper, aluminium, phosphor or silicon-bronze nails. Stainless steel nails can also be used for concrete tiles. **Zinc-coated (galvanised) steel nails should not be used.**

Roofs: ridge and hip fixings

From 2014 mortar cannot be the only method for securing ridge and hip tiles. All ridge and hip tiles must now be mechanically fixed, which also provide high level ventilation.

Roofs: strapping

When constructing floors and roofs it is important to bear in mind that they provide lateral support to walls. Where floor and ceiling joists run parallel to walls, straps should be installed as below.
Rafters also require strapping to walls in the same manner as in detail photograph and below.

30 x 5 straps to be fixed over 3 rafters at 2.0 metre maximum centres, fixed to noggins with a minimum of four fixings with at least one in the third rafter.

Packing piece between rafter and inner leaf.

Strap to be bedded on full block with cut block over.

Windows & doors: thermal performance

New windows are to achieve a minimum WER (window energy rating) band C, or a U value of 1.6 W/m²K. This normally includes a low e coating on the inside face of glass which reflect the heat back into the room. The gap between the panes of glass is filled in the factory with a gas called argon which helps reduce heat loss.

New doors are to achieve a minimum U value of 1.8 W/m²K or 1.6 W/m²K for a fully glazed door.
Windows & doors: safety

Glass in doors and windows below 800mm from floor level in windows and less than 1500mm above floor level in doors and within 300mm in side panels of doors is to be safety glass to conform to BS 6206 (BS EN 12600), this is normally marked in a corner of the glass as below.

The photograph below indicates critical locations where safety glass is required.

For security at ground floor level it is advisable to fit PAS 24 marked doors and windows. Laminated safety glass in doors and windows at ground floor level provides additional security by remaining intact when broken.
Windows: background ventilation

Trickle ventilators are required in windows to new rooms to provide 2,500mm² equivalent area in wet rooms (showers, bathrooms, wc, utility and kitchen) and 5,000mm² equivalent area in all other rooms. The size of vents is usually printed on the edge, see photograph below.

4000mm² equivalent area vent viewed from outside

Windows: roof lights

Roof lights should be installed to the manufacturer’s instructions and not less than 15 degree roof pitch. If roof lights are less than 15 degree pitch a special kerb is available to lift the light to the required angle. Roof lights have a built in trickle function.

Windows: purge (rapid) ventilation

All rooms need opening windows for ventilation, the size of opening needed is based upon 1/20th (20%) of the floor area of the room as long as the window opens more than 30 degrees. If the window opens less than 30 degrees then opening based on 1/10th is required.
Ventilation

Any new kitchens, toilets or bathrooms need mechanical extract fans to give the extract rate shown below.

<table>
<thead>
<tr>
<th>Room</th>
<th>Intermittent extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kitchen</td>
<td>30 l/s adjacent to hob or 60 l/s elsewhere</td>
</tr>
<tr>
<td>Utility</td>
<td>30 l/s</td>
</tr>
<tr>
<td>Bathroom</td>
<td>15 l/s</td>
</tr>
<tr>
<td>Toilet</td>
<td>6 l/s</td>
</tr>
</tbody>
</table>

When fans are ducted to outside, a common mistake is made when flexible ducts have long runs or bends so fan does not extract at the required rates. Long pipe runs with too many bends this results in an increase in static pressure which decreases ventilation rate. An example of poor installation can be seen adjacent.
Staircase

Staircases are made by specialist manufacturers. Any new staircases should have maximum risers of 220mm and minimum goings (treads) of 220mm. The maximum pitch of a stair is to be 42 degrees, so for example a 220mm riser would need to have 245mm going to be under 42 degree pitch.

If kite winders are to be used the minimum tread size at the newel post must be 50mm.

A continuous handrail is required set 900mm from the pitch line of the flight. Guarding should have no gaps exceeding 99mm.

Detail below shows stair components.

The headroom to a staircase is to be 2000mm minimum measured from the pitch line shown above.
Electrical work

Electrical work must be undertaken by a competent person who has sufficient knowledge to undertake the work. Electrical work must conform to the 17th edition of the IEE wiring regulations. The best way of achieving compliance is to employ a competent person registered with NICEIC, NAPIT, ECA or ELECSA.

The website Registered Competant Person - electrical lists local contractors who are registered, which can be found using the link below.
http://www.electricalcompetentperson.co.uk/

Lighting

75% (3 per 4) of new light fittings should be low energy light fittings with lamps having a luminous efficacy greater than 45 lamp lumens per circuit-watt and a total output greater than 400 lamp lumens.

Heating

New heating extended off the existing system should be provided with Thermostatic valves to control the temperature.

If a new boiler is to be installed it requires 92% minimum efficiency for gas fired and 88% for Oil fired boilers. New gas boilers now require one of the following:

- Flue gas heat recovery
- Weather compensation
- Load compensation.
- Smart thermostat with automation and optimisation.

Work on boilers must be undertaken by a Gas Safe registered engineer. Boiler flue terminals must be 600mm minimum from the boundary.
Planning Permission

This is a separate matter from Building Regulations. Some simple extensions are allowed without Planning Permission under permitted development rights.

A Lawful Development Certificate can be applied for to confirm if you need Planning Permission. For further information regarding Planning Permission check the interactive guide on the Planning Portal or call 01706 924305.

Inspections

We normally inspect work before it is covered up, ideally at the following stages on extensions:

- **Foundations** - existing foundations and drains are located and excavation is complete before concrete is poured.
- **Floor** - to view floor set up before concrete is poured or work covered up.
- **Pre-plaster** - to view all structural and insulation elements before plasterboard applied.
- **Drainage** - to view new external drain connections below ground.
- **Completion** - when the work is complete and electrical certification is available.

For inspections call our office on 01706 92437. Please note inspections take place in the morning between 8:30 and 13:00.
Bibliography/Further Guidance


