# BEST PRACTICE GUIDES

# SECTION 4 ROOFS





# BEST PRACTICE GUIDES

Our series of Best Practice Guides will take you through what the Pride in the Job judges look for at each stage of construction and when considering the site manager's overall organisation and management skills.

The Pride in the Job marking sheet used by our judges has 44 marking lines split across 9 sections. The judges will give a score for each line - where there is no work to mark, that line will be left blank and no mark given. A mark of 4 indicates compliance with NHBC Standards and with Building Regulations. A mark of 5 indicates extra attention to detail over and above compliance standards. A mark of 6 would indicate that much of what the judges have seen cannot be improved upon. A mark less than 4 would indicate varying issues relating to workmanship and non-compliance with NHBC's Standards - the greater the issue or number of the same issue. the lower the mark. The final score will be all the marks awarded expressed as a percentage.

These Guides set out what the judges are looking for with clear hints and tips on the sort of practice that will lead to higher marks.

Clearly it is impossible in these short guides to cover every single point of construction - we try here to cover the main issues that are taken into account when considering a mark for each score line.

When looking at the photographs, consider each one in the context of the score line heading – don't be distracted by something else that isn't as good – that will be marked accordingly elsewhere.

# SECTION 4 ROOFS

FRAMING (INCLUDING DUMMY CHIMNEYS) PITCHED ROOF COVERINGS FLAT ROOF COVERING VENTILATION, UNDERFELT AND INSULATION FLASHING, GUTTERS AND DOWNPIPES FIRE STOPPING (ROOFS)

In this section we look at the structural build of the roof and its ability to keep out the weather. In terraced properties, we also need to see evidence of appropriate measures taken to prevent the transmission of fire between dwellings.















**Images 1, 2, 3, 4, 5 and 6:** In timber pitched roofs, connections at the sole plate position have to be considered. The diagonal bracing should extend from the wall plate to the highest longitudinal brace. The longitudinal bracing should be tightly butted against gable walls. Chevron bracing is usually required to truss rafters when the span is greater than 8m. All hangers supporting rafters at girder truss positions must be fully nailed and each ply of the girder truss is to be fully fixed together. Appropriate thought should be given to connections in steel and concrete framed roofs.

**Image 1:** Where trussed rafters support traditional cut roof members, the roof should be designed by an engineer in accordance with Technical Requirement R5. In this photo the cut members have been accurately cut to fit tightly and there are no signs of damage or splitting, all members have been well fixed together. The three jack trusses have been supported and fixed to the bottom of the girder truss with a truss shoe and nailed to the hip rafter. This would score at least a 5 and if represented on all roofs, then a 6 for consistent high standards of workmanship.

Similar basic principles for bracing applies to all types of roof construction, for example, the bracing should transfer the wind load to other elements designed to resist these forces - specially designed wall panels, the frame itself or, most likely, the stair and lift shaft walls.

**Image 4:** Where roofs have hips or projections requiring the use of diminishing trusses, proper support should be in place to prevent them slipping down the main roof. We also need to see good support to the ends of the diminishing trusses. The strong solution shown

here would score a good 5, possibly a 6 if consistency is demonstrated throughout the site.

**Images 5 and 6:** Gable end restraint straps need to be correctly positioned at ceiling level and up the slope of the verge. They need to pull on a full block wherever possible, but certainly not against a mortar joint. Horizontal straps need to be well supported by noggins. Image 6 shows intelligent use of a gauge lath to ensure the straps are exactly at the right height to sit on a block bed joint. Image 5 shows a good example of gable restraint straps installed correctly at unsupported node points and overlapped on a minimum of two trusses.

Valley support boards (as shown in image 2) have been perfectly cut and fixed in between rafters, note also the saddle support to the head of the valley. It is important to get the roof construction correct at the valley. Setting the valley boards flush requires extra work as the boarding must be cut to fit between the rafters and supported on extra timbers fixed to the sides of the rafter.

Real care needs to be taken with both construction of the frame and bracing it for stability. The accuracy of cutting, where applicable, and fixing of cut members, general fixing of components and their connection to the structure will all be assessed by the judges. Neatness of valley support construction; attention given to the stability of hip members with good connection detailing and an enhanced understanding by the site manager of the fixing of components and their connections to the structure will all contribute to a higher score.



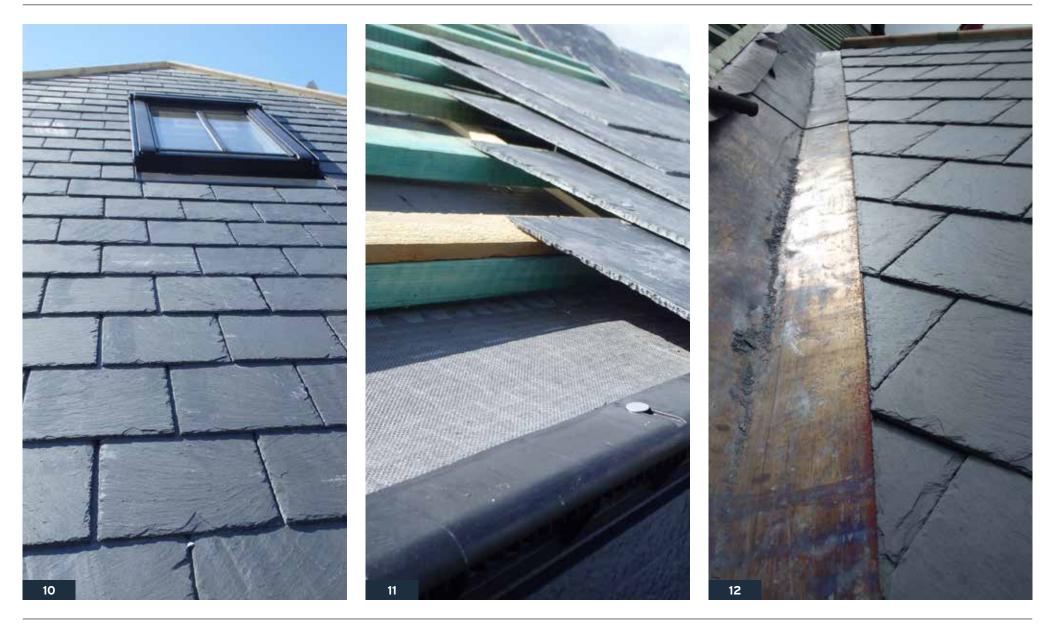
# **PITCHED ROOF COVERINGS**



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# PITCHED ROOF COVERINGS



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#### **PITCHED ROOF COVERINGS**

**Images 7, 8, 9, 10, 11 and 12:** Attention to detail at hips, verges, ridges and valleys should be considered. The correct mix should be used in the mortar for bedding slate and tiles, and be of a uniform colour, where specified. The bedding and pointing of tiles should be undertaken as one action.

Image 7 shows the preparation work for a curved roof to be covered in Rosemary tiles - quite a challenge managed very well here.

**Image 8:** The photo clearly demonstrates the skilled workmanship and attention to detail used to ensure these hip tiles have been neatly bedded and mechanically fixed. Careful setting out will improve the finished appearance of the roof, help avoid problems such as unequal overhangs. Wet bedded hip tiles should be supported at the base by a galvanized hip iron. A suitable score for what's shown here would be a good 5 and perhaps a 6.

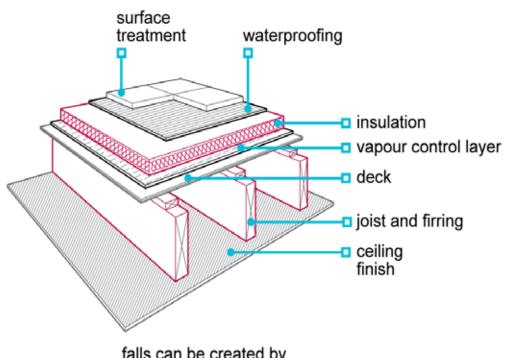
Valley tiles should be cut correctly, and not whilst in situ, to reduce risk of damage to the underlying weatherproofing construction and straight-as-a-ruler valley and verge lines. With image 9, note the true line of cut tiles to the valley, all tiles fully pointed and fixed as work proceeds. For lead-lined valleys, the tiles should be cut and bedded as for valley tiles, except that the mortar should be bedded on an undercloak (to prevent direct contact between the lead and the mortar). Mortar should not bridge the welt detail.

The quality of the detailing and fixing, the use of the correct components, neatly installed especially if solar panels or photovoltaics are present, along with the quality of the setting out to ensure good alignment of felt and tiles will ensure higher marks. Tight, neat-looking interfaces of materials and elements will assist too.

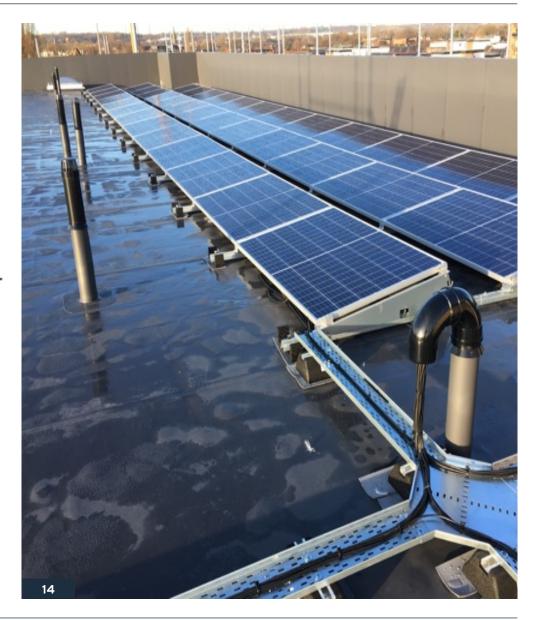
**Images 10, 11 and 12:** Slate roofs are popular in certain parts of the country but they do need more effort in making sure that an even thickness of slate is used on each row. This is so as to prevent an uneven line and 'chattering' in high wind - which can lead to premature failure. A good slater will spend a significant amount of time on the ground sorting slate by thickness and not using them straight out of the crate.

All double lap slates need proper support at the head of the slate - which is why correct gauging of the slate lathes is critically important. The workmanship show here is superb and worthy of a mark of 6.





falls can be created by firrings or tapered insulation



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#### FLAT ROOF COVERINGS

**Images 13 and 14:** A flat roof is one with a maximum slope of 10 degrees from the horizontal. Flat roof coverings are often proprietary systems. However, the fixing of any covering is very important.

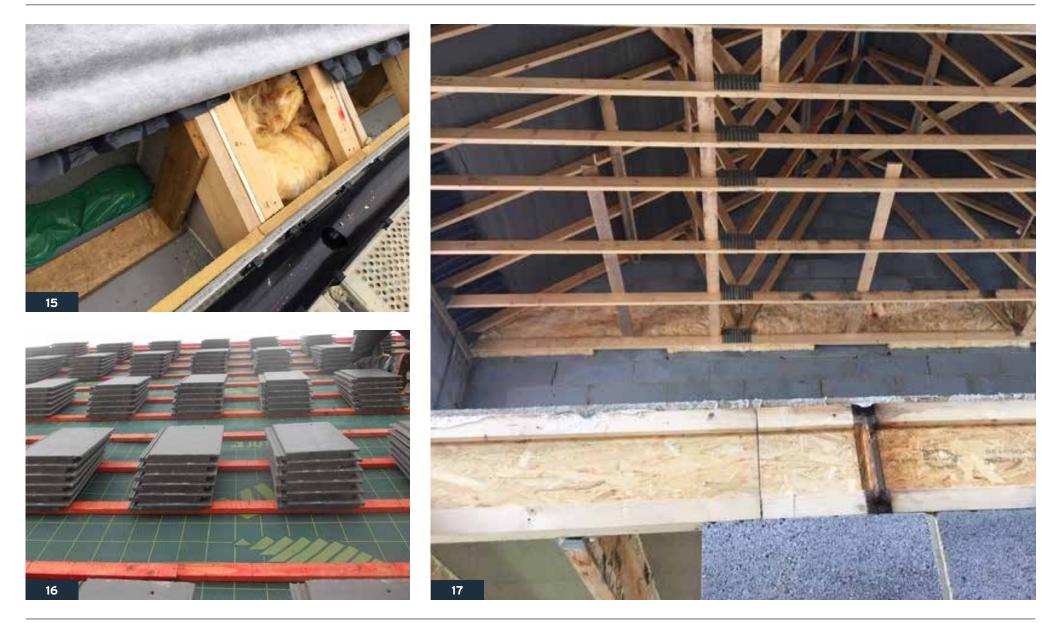
The manufacturers' details and guidance must be strictly followed to prevent leaks or wind damage. Laps to parapets and service penetration points must be properly formed and sealed in accordance with the manufacturer's instructions.

Going the extra mile and making it right first time could be demonstrated by carrying out ELD - Electronic Leak Detection.

The site manager needs to understand and have a good grasp of the quality of the detailing and fixing of the membrane of any specialist weatherproofing system being used. Tight, neat-looking interfaces of materials and elements. Our NHBC 3D Viewer App is also helpful here.

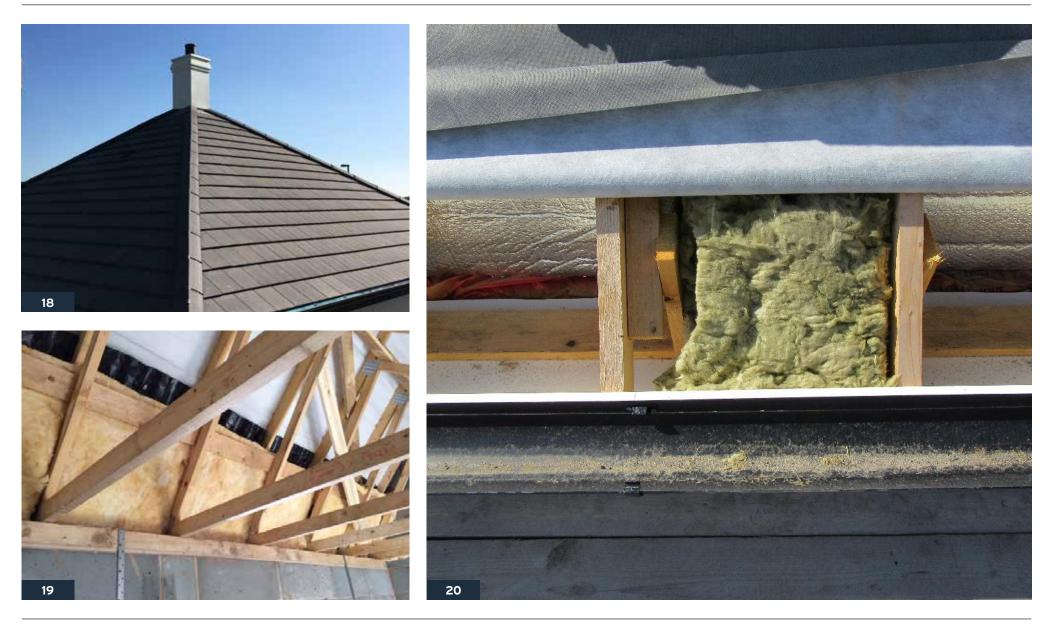


# VENTILATION, UNDERFELT AND INSULATION





# VENTILATION, UNDERFELT AND INSULATION



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#### VENTILATION, UNDERFELT AND INSULATION

**Images 15, 16, 17, 18, 19 and 20:** All felts should have the correct laps and batten sizes, cut and fixed to comply with NHBC Standards. Image 16 shows a well managed roof in the course of being tiled. Sarking felt just tight enough, staggered joints in battens, which if it yields as smart a roof as shown in image 18 would elicit a very high mark from the judges.

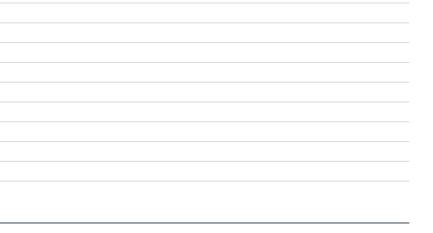
Adequate and appropriate insulation is to be laid over the whole of the ceiling area without the ventilation being impaired – check at this point that the height of the eaves vent spacers are appropriate for the depth of the insulation.

Rigid insulation laid to roof slopes must still maintain the ventilation air gap between the insulation and the roof if non breathable membrane is being used. No gaps in the roof insulation can be allowed. The bit that often gets missed is that narrow gap between the last truss and the gable wall. Image 17 shows an innovative way of ensuring this is complete at first fix; it is inspection friendly in that it can all be seen from the loft hatch without scrambling through the roof space.

All separate plots, at or under roof level, must be correctly compartmentalised with fire stopping and sound insulation. Fire stopping to eaves boxing and, in particular, for separating walls should be continuous and fully effective. Image 15 shows a possible solution using cement particle board and wire reinforced rockwool insulation (to prevent it from falling out in case of a fire).

The focus on overall quality and the installation of components such as tile vents to correctly perform their function is of paramount importance. Rigid insulation very neatly cut to aid accurate and gap-free installation. Maintenance of the quality of the insulation during construction and prior to application of the covering will ensure no defects are apparent and construction can continue.

Noticeable care taken when installing fire barriers is a must; ensuring a fully compliant dwelling will also reap higher marks.







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**Images 21, 22 and 23:** The fixings and supports for gutters and downpipes need to be functional and installed to manufacturers' requirements. They also need to be aesthetically acceptable.

Image 21 shows an innovative way of preventing that last bit of the gutter dipping down and causing ponding. Image 22 show the correct dome-head screw fixings for gutter brackets - very important for not splitting the plastic fittings. Image 23 shows a site manager who is concerned over the degradation of the screw fixing by fitting plastic caps to the RWP clips. The alignment of downpipes and swan necks, the fixing of guttering and downpipes. Workmanship such as this combined with good levels of guttering and vertical RWPs will merit a score of 5 or 6.

**Images 24, 25, 26 and 27:** Flashings must be properly dressed and lapped with DPCs and cavity wall trays. As well as being vital elements in the waterproofing of a structure, flashings can have also have a major impact on the visual appearance of the building. The dressing, jointing and detailing of leadwork along with correct clipping and securing of the lead to prevent upturning during any strong winds will be noted by the judges Cleanliness and dressing are important considerations.

In these images, there is demonstrated exceptional workmanship and attention to detail - from that difficult corner where a low roof juts out from the main wall through to the more complex sheet leadwork roof to a dormer window. All this work if repeated site-wide will merit a score of 6.









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#### FIRE STOPPING (ROOFS)

The correct installation of fire resisting materials at the junctions between a separating or compartment wall and a roof, at the junctions between cavities, above separating wall and within the boxed eaves at separating walls, are important to achieve their required performance standards. Care should be taken to ensure that products are installed accurately and precisely to meet their performance capabilities.

When providing fire stopping – gaps between compartments should be sealed. Separating walls should stop approximately 25mm below the top of adjacent roof trusses, and a soft fire-resistant packing, such as mineral wool, should be used to allow for movement in roof timbers and prevent 'hogging' of the tiles. Ordinary mineral wool quilt is acceptable as fire stopping above separating walls.

A cavity barrier of fire-resisting board or a wire reinforced mineral wool blanket (50mm minimum) nailed to the rafter and carefully cut to fully seal the boxed eaves should be installed.

The judges will be looking to ensure that careful consideration, planning and construction has been applied to these life-saving elements of the structure. It is of utmost importance and where consistent high quality fire stopping installation is evident across the entire site extra marks will be awarded. On the other hand, a lack of understanding, poor supervision and poor installation of this element of construction will result in considerable marks being lost. Be sure to sign off every plot, so we get it right every time! **Image 28:** In this image the material used to 'box in' the mineral wool is plasterboard. Plasterboard should not be used as it can potentially decompose over time. This scores a 3 if a one off occurrence, though if consistent across the site will score 2. On the other hand, if fire board is used as the boxing material, then this will score a 5 or even 6.

**Image 29:** In this photo a proprietary 'Rookwool' product has been installed. Judges will check to ensure this product has been installed in accordance with the manufacturer's installation guidelines. The product has been neatly cut to the rake of the truss, 20/30mm above the truss, so it will compress and completely close the gap when felt, battens and tiles are laid. This would score 4 or 5.

**Image 30:** In this photo there is no fire stopping, depending on how widespread this is, the score is 1 or 2. Judges would query lack of quality control, supervision and if the site manager is worthy of consideration in the Pride in the Job awards for that year.



# **GOOD LUCK!**

We hope you have found this best practice guide useful in gaining a better understanding of what the judges are looking for at each stage of construction.

Remember, the six characteristics the judges are looking for in a site manager are:

- consistency
- attention to detail
- technical expertise

- leadership
- interpretation
- health and safety.

We wish you all the very best in the Pride in the Job competition as you strive for your very first win or to repeat or even improve on your performance in previous years.

