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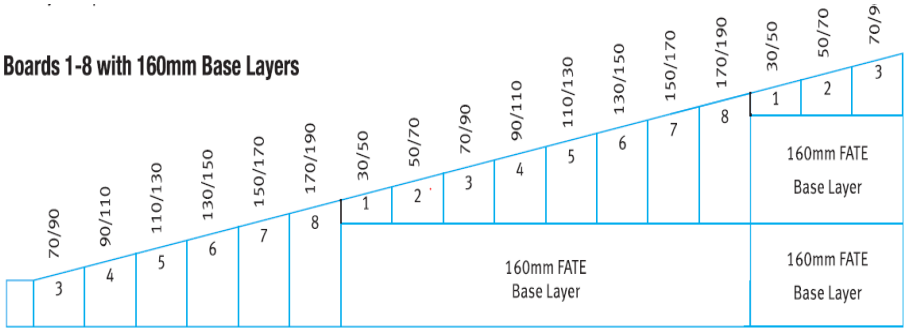
ALERT

MORGAN SINDALL
CONSTRUCTION

Flat Roofs

The information contained within this part of the quality alert is to raise our understanding of covered flat roofs and the requirements. Bauder have produced a document reviewing flat roofs and what that means in real terms.



Roof failures is a cost to the business year on year

The design of falls is covered by BS 6229:2003 Flat roofs with continuously supported coverings. Code of practice, BS 8217:2005 Reinforced bitumen membranes for roofing. Code of practice and NHBC Standards. New flat exposed roofs should be designed to have adequate finished falls and to drain efficiently. Typically this can be achieved either in the deck or by using tapered insulation. BS 6229 defines a flat roof as “having a pitch not greater than 10° to the horizontal” and then in Table 6 States that the minimum finished falls at any point on a liquid waterproofing system should be 1:80. It is usual to design roofs with a fall greater than 1:80 to allow for deflection of the structure or for site inaccuracies. Falls of 1:60 or 1:40 are commonly designed with the expectation of achieving a finished fall of 1:80 on the completed roof and reducing the potential impact of future deflection.
For standard flat roof applications, ponding water should ideally be avoided because:

- There is a greater potential for water penetration and subsequent damage if the roof should be punctured by mechanical damage in a ponded area
- It may cause progressive deflection of the deck due to increased loading. As this happens the depth of ponding water will increase thus increasing the load on the structure, causing further deflection. A 1m² area of ponding water, 1mm deep on a roof has a mass of 1kg/m². Hence a depth of 25mm of ponding water over an area of 20m² would add a dead load of 500kg, which the roof structure may not be able to accommodate.
- Water on exposed roofs will increase the risk of slip hazard where no provision for safe walkways has been provided. In cold weather this will be compounded by an increased risk of ice, which substantially increase the health and safety issue.
- It can lead to the build up of dirt, leaves and algae. This can be unsightly, unhygienic become a slip hazard and may obstruct outlets increasing the potential for further ponding and plant growth.
- Design and site managers need to ensure correct specifications and design detail are in place and installed to that design, standard, bespoke details etc, any items that may require further detailing should be soused as early as possible,
- The O&Ms for the roofs require a full encompassing information of the roof along with a clear maintenance strategy that the client can achieve.

In the main the above data for flat and inverted roofs runs prior to 2000, therefore the data should not be new to us or our supply chain contractors, in respect of standards, specifications, codes of practice and requirements etc. Early understanding of the roof structure, the intended covering, to assess the implications of the substrate if the covering fails, starts from pre-construction, design managers, managers throughout the project. Dialog with the client/client agent to discuss out the critical factors is essential to ensure the roof is fully compliant.

In line with the Quality Awareness Presentations, development of robust SIMS ITPs and check sheets is essential to ensure that compliance to design, specification, best practices, testing, hold points, inspection from the substrate to the completed item are formulated and adhered to.

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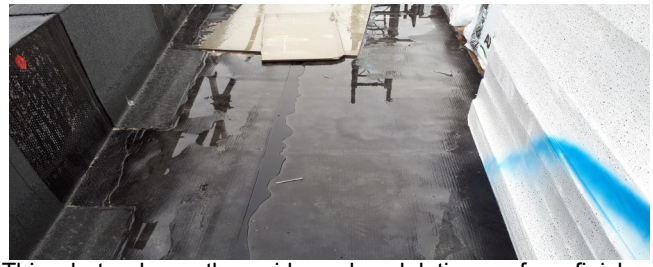
MORGAN SINDALL CONSTRUCTION

Inverted Roofs



This photo shows the voids and undulation surface finishes which become damaged and allows water ingress.

This photo depicts a lack of respect for the hotmelt covering.

- Insulation to inverted type roofs is to restrict the heat flow from the roof and protects the membrane from damage, degradation, UV and thermal cycling and have low water consumption reducing the freeze/thaw cycles.
- Other constructional variations in the plane of the surface will allow water which will not drain away, intern has a detriment to the freeze/ thaw cycles. Therefore a greater fall is required to allow for construction tolerances.
- Where horizons are evident such as steels or structural elements protrude above the plane of the roof, further consideration to prevent ponding or damming up of water, the roof may require a suitable topping, be it screed or concrete etc locally applied to maintain roof plane falls and or reset roof fall if possible.
- Ponding water will have a detrimental effect on the achieved thermal performance of inverted roofs. However, as the quantity of ponding water on a roof is usually unknown it cannot be taken into consideration when calculating the U-value. Therefore, every effort should be made within the design of the roof build up to prevent ponding water. Inverted roof decks should, therefore, be constructed to the designed falls without back-falls and hollows and be free draining.
- Inverted roofs are usually constructed with a slight fall of 1:80 to allow water to fully drain away. Where the 1:80 fall cannot achieve a fully draining roof, the fall needs increasing until the objective is acquired.
- Where a water control layer is part of the design, for that to operate correctly the inverted roof should be designed with a positive fall and 300 mm / appropriate overlaps to the control layer.
- Inverted roofs drain at two levels , travelling water over the water control layer and at deck level.
- Design and site managers need to ensure correct specifications and design detail are in place and installed to that design, standard, bespoke details etc, any items that may require further detailing should be soused as early as possible,
- The O&Ms for the roofs require a full encompassing information of the roof along with a clear maintenance strategy that the client can achieve.

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Key Learning. This advice should be used, where the above is applicable, and the information discussed with your team highlighting the following points:

- **Do NOT assume that work has been carried out in accordance with the design or standard details.**
- **Ensure that all information and design encompasses the physical site elements .**
- **Development of robust ITPs and check sheets that covers all associated works.**
- **Ensuring the installation is fit for purpose and it meets full compliance to NBS, British Standards & Code of practice.**

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