BS 6229: 2018 - The Changes Explained

One of the key British Standards for roofing (BS 6229:2018) has been completely overhauled. Paul Franklin, Technical Secretary for the Liquid Roofing and Waterproofing Association (LRWA) explains the most significant changes and their impact.

The BS 6229:2018 - 'flat Roofs with continuously supported flexible waterproof coverings' – Code of Practice was published in November 2018. It provides an overall recommendation for the design, specification and, to a degree, the installation and later maintenance of a flat roof.

I was the secretary when the 2003 version was produced and contributed to the development of the new 2018 standard as a member of BS Committee B/546. Unlike many revisions of standards, this new Code has changed significantly from the 2003 version.

Key Differences

The 2018 standard is substantially shorter. This is partly because the sections relating to metal roofs, such as lead, copper and zinc, have been removed and the drafting of guidance for these passed to the metal roofing industry and BS Committee B/542.

Additionally, the committee started from a clean sheet and produced a more readable, understandable and user-friendly reference. All non-essential details such as tables have been removed, making it more cost effective.

The guidance reflects the fact the flat roof industry has evolved significantly over the last 15 years, with new challenges driven by Building Regulations and fire requirements, as well as new materials and systems. The liquid roofing sector for example, has been growing steadily, so now incorporates new formulations that offer greater usability and can be used at lower temperatures, increasing their value to the industry.

BS 6229 describes best current practice in the design, construction, care and maintenance of roofs with a flat or curved surface, at a pitch not greater than 10 degrees to the horizontal, with a continuously supported flexible waterproof covering.

The supporting structure can either be dense and heavy, for example a concrete slab, or a lightweight deck of metal or of a timber-based material mounted on framing members. Given similar design conditions, it could apply to greater degrees of pitch and to usable/ working roofs, such as green roofs.

New Terminology

New terms have been included, such as:

- AVCL - Air and vapour control layer (both are controlled with this layer)
- WFRL - Water flow reducing layer (for inverted and some green roofs). This is used to reduce the amount of water flowing down to the waterproofing, warming up and flowing into the drainage system. The thermal losses can be reduced and managed by a well installed WFRL.
- Blue Roof – this is designed to attenuate the rate at which rainwater is drained from the roof and is allowed to enter the drainage system. This is used in SUDS (Sustainable Drainage Systems) assisting the building to meet BREEAM and Building Regulations needs. It also helps to prevent damage to soakaways.
- Zero Fall Roof - now specifically defined as a "*Roof with a fall between flat and 1:80*".

Certain third-party certified waterproofing and insulating systems have gained approval for use with zero falls. Hot melt systems in particular are popular for this area of work. For these systems, zero falls are acceptable, but back falls are not, so should be corrected. It is no longer acceptable for a main contractor to provide roof decks with large depressions, back falls and non-draining areas.

To ensure a zero fall finished surface (i.e. totally flat), a design fall of 1:80 should be used and a detailed structural analysis to account for construction tolerances, settlement and deflection under load.

If sites have negative falls, so will hold water, then remedial action should be taken by the main contractor before the roofing is applied. This could be by laying a localized screed or fitting additional rainwater outlets at the lowest points.

As a result, the roofing contractor should expect a flat, properly drained surface on which to lay the specified system and the finished roof should not suffer from ponding or inadequate drainage.

Design Falls

The reference to design falls in the new Code is much clearer stating that "*all flat roof surfaces (including gutter beds) should be designed with a fall of 1:40 to ensure finished drainage falls of 1:80 are achieved.*

"*This should take account of construction tolerances, permitted deviations and deflection under load, and account for deflections/settlement.*"

In other words, design should allow for all factors that could reduce or hinder the drainage eliminating the risk of ponding on roofs.

Upstand Heights

This standard recommends a clear upstand of at least 150mm above the finished roof surface, including any paving, inverted insulation or green roofing. This has proved a useful guideline, and cover flashings to complete the detail have been very reliable over many decades. Also, in exposed retained or attenuated water systems (i.e. Blue Roofs), it should be measured above the maximum height of the retained water.

Based on NHBC experience and guidance, if level access is required from within the building, for example the access door to a balcony or terrace, the height of the upturn may be reduced to not less than 75 mm. BS 6229 includes three detailed drawings illustrating this for each roof type. The LRWA Guidance Note on Termination of Waterproofing at Cills and Thresholds should also be referred to, which is available on our website.

Flat Roof Types

In 2003, this standard tried to dissuade the use of cold-decked roofs, based on growing concern at early failures due to interstitial condensation. With the progress of Part L and the requirement for far more thermal insulation, the new BS goes further.

Warm and inverted roofs are highlighted and recommended, and the cold roof "*is not now recommended. This is because of the difficulty of forming and maintaining an effective AVCL below the insulation and of providing sufficient cross ventilation above the insulation.*" *Ref: BS 5250.*

If such a construction cannot be avoided due to height restraints, then very adequate cross ventilation is essential. The maximum dimension for this is now five metres, because the ventilation will be greatly restricted over longer distances.

Inverted Roofs – Thermal Performance

As Part L of the Building Regulations evolves, this is becoming more important and long-term results will be under close scrutiny. In the inverted roof, the inclusion of a WFRL immediately above the insulation layer is used to restrict the cooling effect of cold water reaching the waterproof layer, absorbing heat from the membrane and then flowing across into drains.

However, any shortcomings in this layer will degrade the roof performance, therefore: *"Until further research and test evidence is made available and included as part of a future standard it would be prudent to increase the design thickness of the thermal insulation by not less than 10%."*

This should ensure that the design performance is better maintained in service. Blue roofs will however, by their design, have a head of water at certain times. For this situation, no correction or reduction is permitted, even with a WFRL.

Condensation – Interstitial

BS 6229:2003 included a large section on this, but the BS 5250 Code of Practice for control of condensation in buildings is the senior document and is currently being revised. To allow for the cooling effect of clear sky radiation, designers should still use an external temperature of -5°C for 60 days during the heating season.

Condensation – Surface

To ensure there is no risk of surface condensation, legislative guidance requires the roof of a heated building to be insulated to a U-value of 0.35W/m²K or better; BS 6229:2018 concurs with this.

Care and Maintenance

The new Code has a complete section on the actions needed to maximise the reliable service life of a flat roof. Either the BIM database or a full building manual should be provided, including information on the design, specification and construction of the roof, as-built drawings, specification (as installed), testing certificates, parties involved, warranties, frequency of inspections and procedures for maintenance.

For more information or advice, please contact us at technical@lrwa.org.uk