

TECHNICAL UPDATE

Panelled Roof Cassettes



What are roof cassette systems?

For the purposes of our Warranty, roof cassette systems are prefabricated pitched roof panels (open or closed) which may also be supplied with wall and floor panels, beams and other supporting elements of structure. The systems may be constructed from timber, metal or structural insulated panels (SIP) or a combination of these. They can provide a completely clear roof space free from struts ties or bracing.

What are the warranty concerns?

Design concerns

The roof structure is a critical part of the building design for structural stability, there will also need to be consideration for, prevention of fire spread, thermal insulation, durability, weatherproofing, vapour permeability and sometimes sound insulation.

The stability of traditional cut roofs and truss roof designs is dependent on the triangulation of all of the different elements that work together to take the horizontal thrust at eaves level away from the walls.

Roof cassette systems are however outside the scope of Approved Document A as they do not meet the basic requirements for stability and because they're a non-standard form of construction.

Many panel roof designs do not consider how the horizontal thrust is dealt with as they are not adequately tied to the structure, and/or gable walls.

Our internal review show that the system design packages are limited to the panel itself and are not considering the interaction with the wall, gable and floor structures or the need to meet the other requirements of a roof as described above.

Installation

On site Installations of these systems have been found to not follow the approved design, often due to the unfamiliarity of the system requirements by site operatives. The design and installation of the correct connections is being ignored and can lead to failure of the panel system.

What we require to mitigate the risk

Third party product approval

The roof cassette system must hold full third party product approval from an independent approval body which is accepted by us. This could either be a UKAS, European equivalent product conformity accredited organisation or other body accepted by us, which looks at the system as a whole and reports on its suitability and scope of accepted use.

Appendix C of our Technical Manual provides guidance on the suitability of products and systems and emphasises the following to be covered in third party product approval certificates:

- Structural integrity, including serviceability of product.

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- Safety in case of fire*.
- Hygiene, Health & Environment including:
 - a) Vapour permeability and moisture resistance.
 - b) Water tightness.
 - c) Release of dangerous substances.
- Safety in use (where appropriate).
- Sound Insulation.*
- Thermal performance*, air tightness and movement characteristics.
- Durability; including:
 - a) Compatibility of materials (interaction between components, structural or otherwise).
 - b) Longevity of materials (identifying it achieves a 60 year service life in accordance with CML requirements where used in the structure or lesser period where identified in the Service Life table contained within 'Appendix C' of the Manual).
 - c) Maintenance issues.

In addition, for roof cassette systems, the following should also be included in the third party product approval:

- Regulatory compliance
- Inspection and surveillance of factory production
- Installation guidance (with information on acceptable tolerances)
- Approval of installers
- Confirmation the manufacturer holds ISO 9001 certification

* Note: Evidence will be required that the Building control body is satisfied in respect of safety in case of fire, sound insulation and thermal performance

Transitional arrangements:

For roof cassette systems that do not yet hold a full third party product approval, manufacturers must have entered into a contract with a UKAS, European equivalent product conformity accredited organisation or other body accepted by us. A statement of intent from the UKAS approved product conformity body should be provided to the Warranty Provider by 31st December 2023. A satisfactory third party product approval must be in place from an appropriate independent UKAS approved product conformity body by 31st of December 2024.

Please note: All components used in manufacturing should satisfy Appendix C of our Technical Manual.

Design responsibility

We require an Engineer to take overall design responsibility of the roof cassette systems and to take account of interactions between the roof cassettes and the main house structure.

Installers

All installers of the roof cassette system should receive suitable training from the manufacturer, evidence of which should be provided to the Warranty Surveyor upon request – for example:

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- Installation by approved installers and issue of completion certificate.
- Installation by others will require completion sign-off certificate by manufacturer/designer.

Please note: Roofing cassette panels will require temporary protection (when being stored on-site and where it is left exposed when in-build) as per the manufacturer's recommendations. Where a breather membrane is proposed as a temporary weather protection details of maximum exposure of the membrane should be provided.

What design information is required?

The structural design of roof cassette systems consider either:

1. Roof cassettes that spans eaves to ridge.
2. Roof cassettes that spans gable to gable.

The documents required for each individual site specific review must include:

1. A full description and specification of the system and how this system complies with all current regulations and design codes, along with copies of calculations, drawings, reports, testing, etc.
2. Structural calculations and drawings should be carried out in accordance with the current European/British standards and refer to the worst case scenario where the system could be used (structure location: max altitude, closest distance to shore / critical span of each structural element / max positive and negative load).
3. Each project must have a Qualified Structural Engineers design/drawings and calculations that oversees all structural components of the building and elements that interact with the roof cassette to ensure they are compatible. The calculation package must fully reflect the construction type and build-ups of the final structure of the house and roof including roof covering and any additional attachments (such as PV panels).
4. Principle Connection details (drawing and calculations) must be provided for the floor and roof panel at the external wall, ridge connections, ceiling strut connections, and floor and roof connections. The calculations must cover all connection details and details of the roof load transfer.
5. There must also be a house type specific fixing schedule document available, to allow the Warranty surveyor to check that the fixing specification has been followed on site. Please Note: a 'generic fixing specification' is NOT acceptable. It should also not be left to a third party to provide a fixing specification, this should be part of the holistic structural package from the Engineer.
6. The structural calculation package will need to include wind uplift calculations to ensure that the roof will be connected by restraint straps to the wall plates and gable/hipped ends accordingly. A gable restraint system will need to part of the design calculation package to consider the continuous or raised gable wall plate depending on the gable panel. (i.e., masonry or timber frame or panels)

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7. The whole design package must consider how all other elements will interact with the roofing cassette, such as insertion of false prefabricated chimneys, roof light penetrations or dormers, roof covering, Solar photovoltaic installations and ventilation systems.
8. The design package will also need to consider the prevention of fire spread, thermal insulation requirements, durability, weatherproofing, vapour permeability and sound insulation requirements (where applicable). The designer must consider critical elements especially at party walls and gable ends for fire resistance where Building Regulation fire safety standards may have different requirements than a traditional roof due to the differing loadbearing elements.
9. As part of the design there must be details on how the roofing cassettes will be finished at eaves and verge. Due to the varying nature of the roofing cassettes this could be done in different ways. Such as site attached constructed gable ladder or pre-installed gable ladder to roofing cassettes. Some have extended rafters to be cut on site and some have additional add on sections to extend the eaves. This must be in the design and not left as an ad-hoc solution to be constructed on site.
10. Roof cassette manufacturers must have a system operating procedure manual covering repairability and installation and sign off processes. All installers of the roof cassette system should receive suitable training from the manufacturer evidence of which must be provided to the Warranty Surveyor upon request.

Please note, roof cassette systems may be determined by the Building Control Bodies as an element of structure and therefore the necessary fire resistance may be applicable. Please contact your Building Control Body to agree compliance.

Every care was taken to ensure information in this article was correct at the time of writing (June 2022). Guidance provided does not replace the reader's professional judgement and any construction project should comply with the relevant building regulations or applicable technical standards. For the most up to date LABC Warranty technical guidance please refer to your risk management surveyor and the latest version of the [LABC Warranty Technical Manual](#).