

Site applied GRP roof covering systems

Introduction

This technical document provides additional guidance relating to how the Functional Requirements in the Technical Manual may be satisfied where a site applied GRP flat roof covering system is specified (often referred to as liquid applied waterproofing kits).

The term GRP stands for Glass Reinforced Polyester (often referred to as fibreglass) and is a composite material formed by a resin and fine fibres of glass. A catalyst is used to turn the liquid resin into a solid over a short period of time.

Provision of information

In all cases, where a GRP roof system is proposed:

- It must be covered by a full third party product conformity approval certificate
- The warranty surveyor will require a full specification for the proposed works prior to works starting on site – this must be accompanied by a full set of drawings covering aspects of detailing
- The specification and installation must be aligned with the content of the approval certificate and the manufacturer's guidance
- The installing contractor must provide evidence of inclusion into an Approved Installer scheme, which is controlled and verified by the system manufacturer

Common issues

GRP as a roof covering has been around for decades but we often see issues with its specification and installation, which can lead to their early failure. This article will provide some guidance on how to avoid common issues with GRP roofing, such as:

- Incorrect deck specification
- Poor installation of timber decks
- Incorrect expansion gaps
- Incorrect fixings for the timber deck
- Incorrect build-ups and lack of preparation layers
- Poor detailing
- Compatibility with other materials

The following sections provide guidance on how to avoid the above issues.

Correct deck specification

Installing the correct timber deck is critical to a GRP roof (or any flat roof for that matter). Plywood and Oriented Strand Board (OSB/3 or 4) are the two most common deck types for GRP roofs.

For OSB, the board must be manufactured to BS EN 300 and it must have UKCA marking. Alternatively, if plywood is used, it should conform to BS EN 1995 1-1 Euro code 5 and to BS EN 636 to a minimum service class 2 for humid conditions.

In all instances the deck should be a minimum thickness of 18mm.

Expansion gaps (For all board types):

Expansion gaps must be incorporated in the timber deck as indicated below, to allow for thermal movement.

A minimum gap of 10 mm, or 2 mm per metre run of panel, whichever is the greater, should be provided around the perimeter of roofs to rigid upstands or abutting construction.

Intermediate expansion gaps should also be provided for larger flat roofs (in excess of 10m in width or length) at 2mm per metre run. This needs to be specified by a Structural engineer with details on the size and location of the intermediate expansion gap.

Square edged boards:

For square edged boards (plywood and OSB), a minimum 3-5mm expansion gap needs to be maintained around all board edges.

Fixings for timber decks

Timber decks must be adequately fixed down to the supporting structure. Fixing nails should be at centres not exceeding 100mm mm the perimeter or along any intermediate support.

All fixings (for plywood and OSB) should be at least 8mm from the board edge. Nail heads should be punched 2-3 mm below the surface of the board and screws should be pre-drilled and countersunk. Fixings should be made from corrosion resistant materials such as galvanized or sherardized steel, austenitic stainless steel, phosphor bronze and silicon bronze.

Additional requirements for OSB decks

All boards should be fastened firmly to the supporting timber. Flat headed annular-ringed shank nails and screws have superior holding power and should be used in preference to plain shank nails.

Fixings should be a minimum of 50 mm or 2 times the thickness of the board, whichever is the greater, and the diameter of the fixing should be a minimum of 0.16 times the thickness of the board.

Additional requirements for plywood decks

Plywood should be laid with the exposed face grain perpendicular to the supports. All end joints should occur over supporting joists of at least 38 mm basic thickness or be supported by noggings.

Fixing nails should be either:

- Plain wire nails at least 3.35 mm in diameter and at least 65 mm long, which penetrate at least 40 mm into the support; or
- Annular-ringed shank nails at least 3.35 mm in diameter and at least 50 mm long, which penetrate at least 32 mm into the support.

Insulation

The type of insulation used for GRP systems is typically a foil faced rigid board which then receives an adhered carrier membrane (often referred to as the preparation membrane). Where these insulation boards are specified, their facings must be confirmed by the manufacturer as compatible with any roofing system primers or adhesives used for the attachment of the carrier material.

The insulation core must also be capable of giving support to the completed GRP system in order to ensure that applied loads do not give rise to cracking or indentation of the finished waterproofing system. In both instances, the manufacturers of the insulation board should provide any performance data for inclusion into the specification which has been produced for the roofing system.

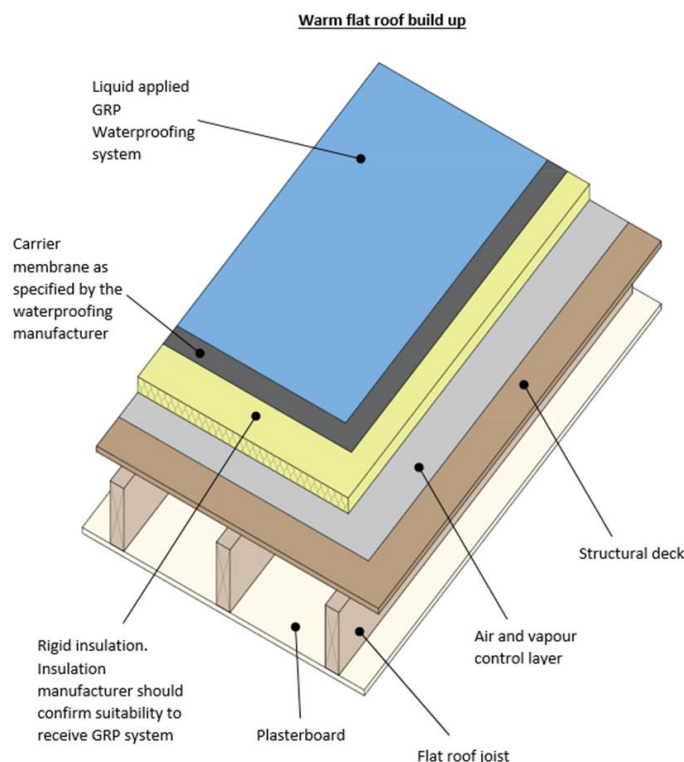
Any proposal that requires on site installation of an OSB or plywood sheet 'over' a proprietary rigid insulation board should not be accepted. Using this approach creates a risk of interstitial condensation occurring because the sheet material is outside the insulation zone, and therefore is subject to the effect of external temperatures.

The only exception to the above is where a proprietary insulation board, manufactured specifically for the application of GRP systems, has been used e.g. an insulation board which provides an AVCL, thermal insulation and a board facing for the application of GRP in one component.

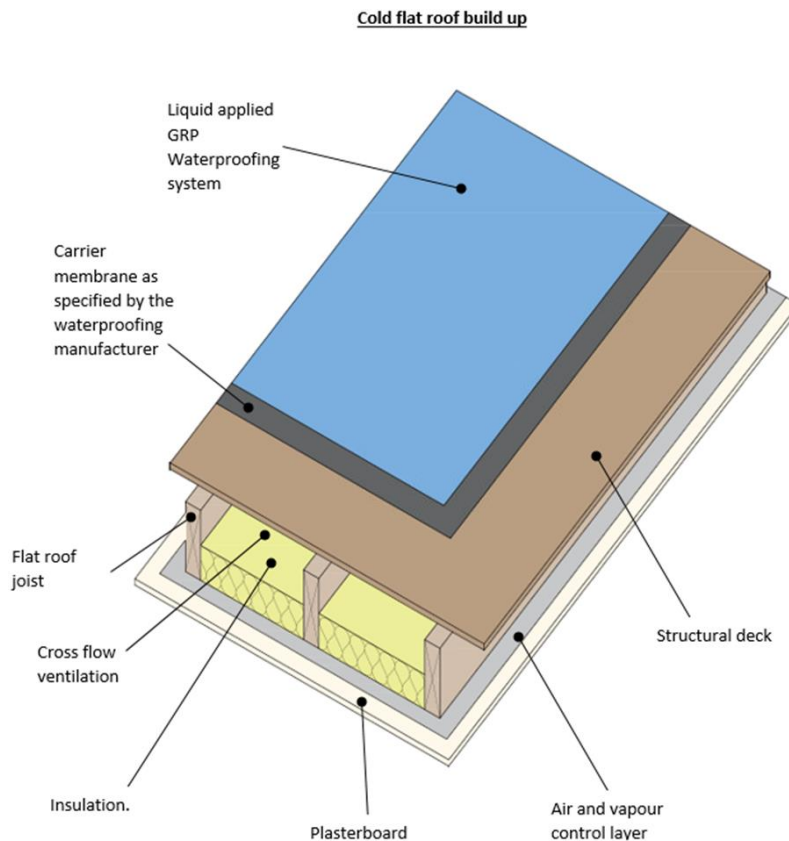
Such products must be manufactured in an offsite factory conditions, with manufacturing facilities holding evidence of appropriate Factory Control Certification from a UKAS accredited 3rd Party which confirms they are manufactured to the relevant industry standard. The product itself must be covered by a full third party product conformity approval certificate.

Acceptable build-ups

For the purposes of warranty, a warm flat roof build up is recommended for site applied GRP roof coverings. A carrier membrane (often referred to as the preparation membrane) should be present between the GRP waterproofing system and the specified rigid insulation boards. The insulation should be compatible with the GRP roofing system and method of application.



Cold flat roof build ups are only acceptable with a roof area up to 3m² with cross flow ventilation maintained. A preparation membrane should be present between the GRP waterproofing system and the structural timber deck.

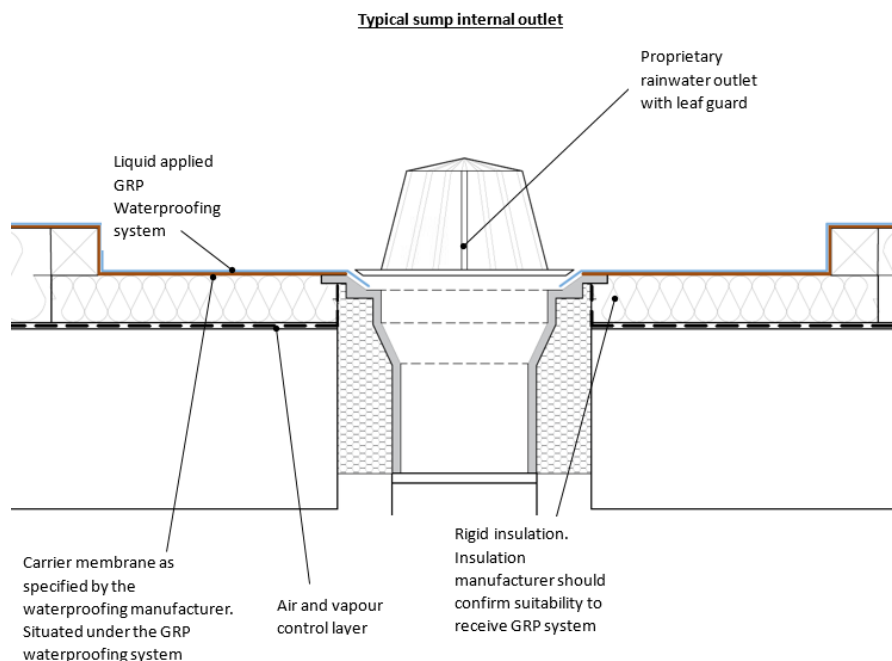
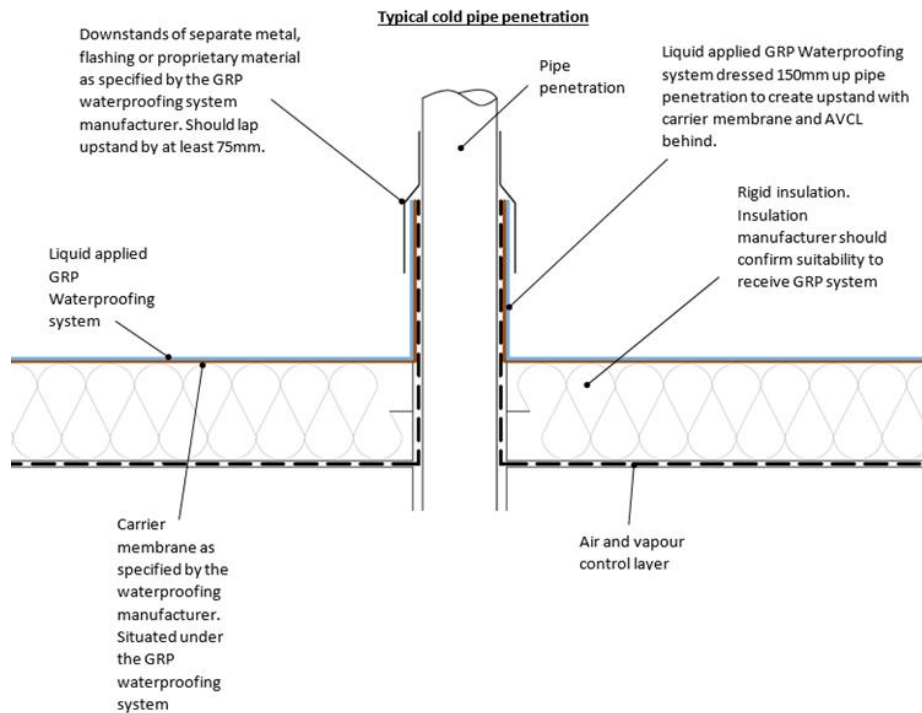


The carrier membrane in both build ups is especially important for GRP roof coverings which are by their nature very rigid. This rigidity can lead to cracking if there is no allowance for movement in between the GRP waterproofing and the receiving substrate. In all instances the preparation and fixing should be as per the manufacturer's recommendations.

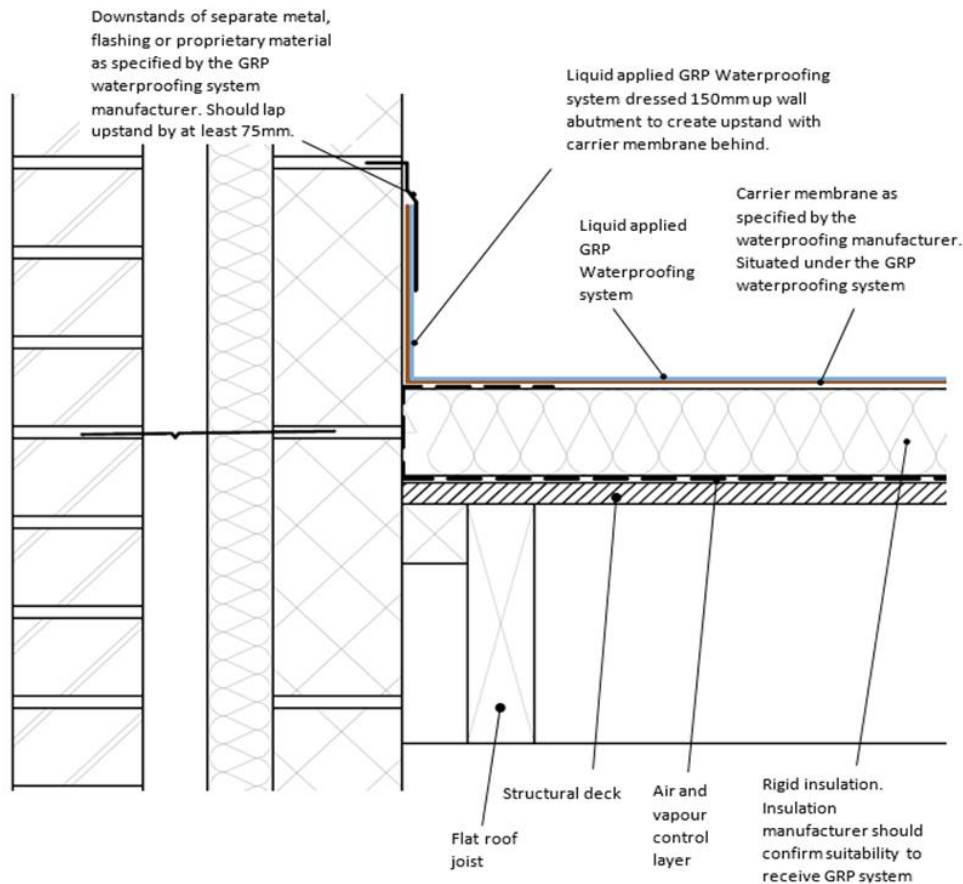
Detailing

The warranty surveyor must receive a full set of sectional drawings, which should be accompanied by the specification. These sectional details should be produced by the system manufacturer for all aspects of detailing specific to the project.

The illustrations below are representative of typical detailing that may be included within such drawing packages.



Typical wall abutment detail



Compatibility with other materials

GRP doesn't always adhere well to materials such as lead or concrete. As such, the GRP manufacturer's guidance should always be sought prior to works taking place. Incompatible material will often need special preparation and need to be primed with a system specific primer to facilitate a good adhesion of the GRP to the material in question.

Approved installers and testing requirements

A manufacturer's approved installer must be used for all GRP roof coverings. Evidence of the manufacturer's approval of the contractor to install their products should be provided to the warranty surveyor.

In addition to the above, where a roof falls into the criteria below, the GRP roof covering will also require testing at completion to demonstrate waterproofing integrity.

- On large developments: apartments etc. over 3 stories in height (including the ground storey), where the total combined roof/balcony areas exceeds 50m². In this case, a minimum of 20% of the roof areas must be tested
- On low rise housing: detached/semi-detached/terraced housing 3 stories or less in height (including the ground storey) when:
 - The roof/balcony areas exceed 50m²
 - Where the project consists of 10 or more properties: one test per ten houses (with a minimum of two tests per site) are required

- Where the roof includes features beyond a typical wall abutment e.g. (but not limited to) variations of upstand constructions/penetrations/fixings /external permanent machinery/balustrade fittings etc.
- Where, after the completion of the initial site risk assessment, the warranty surveyor has identified areas of complexity in relation to the roof and its ancillary components that present a higher risk. It will be necessary to identify this at the initial site assessment carried out between the developer and the warranty surveyor
- Where the waterproof membrane is to be covered over by pedestrian finishes, balustrades/fall protection devices or solar panels

Resisting fire spread over roof coverings

All roof coverings will be required to satisfy regional Building Regulations in respect to performance of the resistance of roofs to external fire exposure. Evidence of performance should be included within the specification documentation.

This should meet the minimum provision related to boundary distance given in statutory guidance; achieving European classification from BROOF (t4) to FROOF (t4) in accordance with BS EN 13501-5 from test 4 (t4) evidence. In Wales, Scotland and for some products on older projects in England, national class AA to DD tested in accordance with BS 476-3 can still be used as an alternative.

Warranty position

For the purposes of warranty, GRP roof coverings must incorporate the use of a preparation membrane. Where a manufacturer's specification states the membrane is not required, they must prove and demonstrate how the system accommodates thermal movement. A manufacturer's approved installer must be used for all GRP roof coverings.

In all cases, where a GRP roof is specified, the roof product must be covered by a third party product conformity approval certificate

Every care was taken to ensure the information in this article was correct at the time of publication (August 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 Premier Guarantee technical guidance please refer to your Risk Management Surveyor and the latest version of the [Premier Guarantee Technical Manual](#).

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