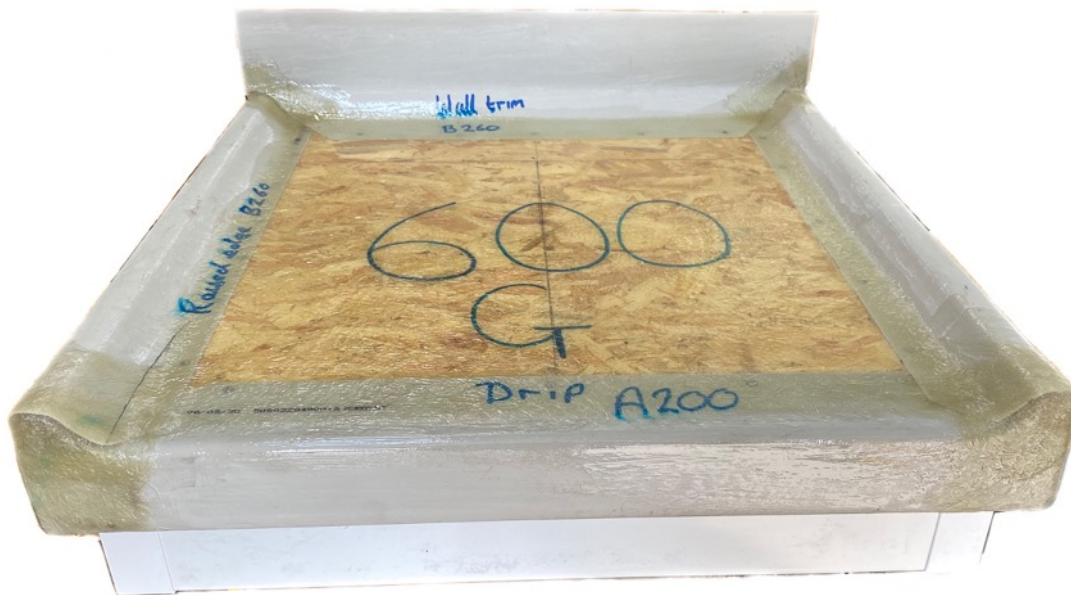


FIBREGLASS ROOF CONSTRUCTION

Part 4/5: How to Install Fibreglass Laminate



User Guide and Manual

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4.2. Background

This section details the steps involved in creating the laminate on a fibreglass roof.

Its part 4 of a 5-part series where we cover health and safety, as well as the installation of timber decking and insulation, positioning of edge trims, laminating and eventually topcoat application.



You can purchase Resin Library fibreglass roofing kits in a range of sizes, simply click the link in the description below.

WARNING! Read the Safety Data Sheets (SDSs) available for download on the product page. Wear appropriate protective eyewear, clothing, and gloves and other PPE. Safety Data Sheets (SDSs) are available from www.resinlibrary.com/product/600g-fibreglass-grp-flat-roofing-kit/. Perform a full risk assessment, method statement and COSHH form in advance.

Table 1. Fibreglass Roofing Kit

Product	Size (m ²)	Note	Ordering
Fibreglass (GRP) Roof Kits	1	Materials and tools included based on kit size	> Find out more <
	2		
	3		
	5		
	10		
	15		
	20		
	25		
	30		
	35		
	40		
	45		
	50		

4.3. Introduction

A high-quality laminate is a critical part of a fibreglass flat roof. It provides a seamless, mechanically strong and water-resistant barrier between the decking and the environment – but in order to do so it must be of sufficient quality. To obtain a quality laminate, please consider the following instructions.

Following on from Part 3, this section covers laminating of the timber decking and edge trims.

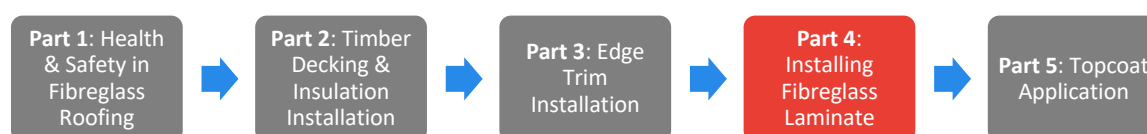


Table 2. Fibreglass Roof Construction Topics in Series

Part	Topic	Description	Video Link
1/5	Health & Safety in Fibreglass Roofing	Covers health and safety topics involved in fibreglass roofing	> Find out more <
2/5	Timber Decking & Insulation Installation	Process of installing timber decking and insulation	> Find out more <
3/5	Edge Trim Installation	Installation of GRP edge trims around the perimeter of the flat roof	> Find out more <
4/5	Installing Fibreglass Laminate	How to install fibreglass laminate onto timber decking	> Find out more <
5/5	Topcoat Application	Application of topcoat (flowcoat) to the fibreglass laminate	> Find out more <

Note: if you are laminating a large or awkwardly positioned area of flat roof, you should plan which areas to target first in advance. One of the best strategies is to focus on opposite ends of the roof first – and then move inwards. This gives you room to manoeuvre between both sides and avoids trapping you at one end or at the edge where you end up needing a ladder. Furthermore, you do not want to walk or place any weight on fresh laminate.

Note: it is advisable that beginners practice over small areas in advance – this will help validate the quality of the intended laminate.

Note: fibreglassing is an art as much as it is a science. We recommend that you practice in small areas using small quantities in advance if you are new or an inexperienced laminator. Resin Library is not liable for any outcome.

Note: Use of material in applications not specified or not described in this manual, may result in improper function, personal injury, or damage of the product or material.

4.4. Planning & Preparation

4.4.1. Health, Safety & Technical Advice

Please familiarise yourself with the Material Safety Data Sheets (MSDS) before starting.

Personal protective equipment (PPE) should be always worn. Recommended PPE includes safety goggles, gloves and overalls. A suitable mask is advised if work is being performed indoors.

For product or technical support, please email (www.resinlibrary.com/contact-us/) or telephone us on **029 21900 282**.

Use of the products in applications not specified or not described in this manual, may result in improper function, personal injury, or damage of the product or material.

Disclaimer: this guide is for general informational purposes only. It does not constitute fibreglass roofing advice. Resin Library is not liable for any outcomes. The use of information linked to this content is at the user's own risk. The content in this guide is not intended to be a substitute for professional advice. Users should not disregard in obtaining professional advice.

4.5. Materials & Tools for Laminating

The materials and tools recommended for laminating are detailed below.

Table 3. Materials & Tools

Tools	Materials
<i>Polyester roller</i>: used to soak resin into the glass fibre matting	<i>Polyester Resin (Llyod's Approved)</i>
<i>Paddle roller</i>: used to consolidate the laminate, ensuring air bubbles are removed and correct amounts of resin added	<i>MEKP catalyst</i>
<i>Stanley knife</i>: sharp blade used to cut matting	<i>600-gram glass fibre chopped strand matting</i>
<i>Mixing bucket</i>: to blend catalyst with resin	
<i>Catalyst dispenser</i>: to accurately measure quantity of MEKP catalyst to use	
<i>Mixing stick</i>: to ensure catalyst is thoroughly mixed into the resin	

4.6. Method

The procedures recommended for laminating are detailed below.

4.6.1. Glass Fibre Matting

Note: Once MEKP catalyst has been added to polyester resin, you only have around 15 minutes to use it before it begins to cure.

1. Plan and pre-cut sections of glass fibre matting using a stanley knife. These sections should centre on two main areas with a 5-10 cm overlap between each section of glass fibre:
 - Corner detailing
 - Main flat roof deck



Note: the fibreglass laminate should be seamless, so cut sections of matting that will overlap each other by 5-10 cm.

2. Once prepared, position these sections onto the roof or have close at hand.

4.6.2. Polyester Resin-MEKP Catalyst Preparation

Catalyst addition to polyester resin is also critical to ensure the quality of the laminate.

Resin Quantity per Unit Area of Glass Fibre

Resin used per square meter of laminate is dependent on the grade of glass fibre used. Different grades can be used to create desired levels of thickness in the laminate, adding durability as required. Industry standard for fibreglass roofing is 600-gram CSM. If foot traffic or equipment placement is required, use a dual layer of 450- or 600-gram CSM. More detail is displayed in the following image.

How Much Resin Per Square Meter of Glass Fibre Matting?

Adding the correct amount of resin per square meter of glass fibre is important in creating a high quality laminate. Minimum amounts centre on:

Single Layer Laminate

1 x 450 gram CSM = 1.1 kg/m²

1 x 600 gram CSM = 1.5 kg/m²

Dual Layer Laminate

450 gram CSM = 1.1 kg/m² per layer and 2.2 kg/m² total

600 gram CSM = 1.5 kg/m² per layer and 3.0 kg/m² total



Note: polyester resin must be catalysed before use. An extra 10-15% of catalysed resin may be used if required.

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Note: slightly higher quantities of resin – around 10% extra – may be used as needed.

Concentration of MEKP Catalyst

1. Prepare a 1 – 4 % volume of catalyst per weight of polyester resin.



MEKP catalyst being measured. Note that a pink dye has been added to show the level – MEKP exists as a clear liquid otherwise.

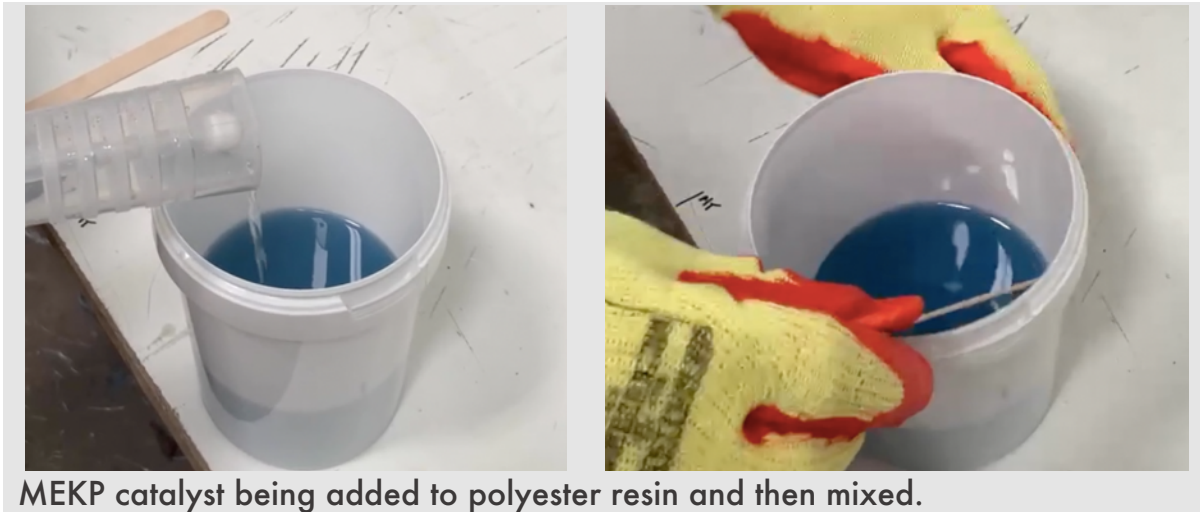
Note: usually, a lower amount of catalyst (1 %) is added during warmer periods (e.g., summer at 20 to 40 °C), whilst a higher amount (up to 4 %) is added during colder winter periods (e.g., 5 to 10 °C).

Note: it is advisable in most instance to use 2 % MEKP or less – this gives the user more time to use the resin before it begins to harden.

Note: for every 1 kg of polyester resin, add 10 – 40 mL of resin catalyst per 1 kg of resin (according to the desired concentration).

Note: a more informative guide is outlined in Table 4 below.

2. Once measured, carefully add the catalyst to the resin and mix thoroughly using a clean mixing stick.



MEKP catalyst being added to polyester resin and then mixed.

Note: when mixing, avoid excessive mixing as this will create air bubbles. Ensure a clean mixing tool is used.

Table 4. Recommended catalyst volumes (mL) per weight of resin (kg).

Curing	Slower curing (Suited to warmer weather)		Faster curing (Suited to colder weather)	
Catalyst (%)	1%	2%	3%	4%
Note: relative quantities of MEKP catalyst to be added in mL per weight of resin (kg)				
Resin Amount	Hardener Usage (mL)			
1 kg	10 mL	20 mL	30 mL	40 mL
2 kg	20 mL	40 mL	60 mL	80 mL
3 kg	30 mL	60 mL	90 mL	120 mL
4 kg	40 mL	80 mL	120 mL	160 mL
5 kg	50 mL	100 mL	150 mL	200 mL
6 kg	60 mL	120 mL	180 mL	240 mL
7 kg	70 mL	140 mL	210 mL	280 mL
8 kg	80 mL	160 mL	240 mL	320 mL
9 kg	90 mL	180 mL	270 mL	360 mL
10 kg	100 mL	200 mL	300 mL	400 mL
11 kg	110 mL	220 mL	330 mL	440 mL
12 kg	120 mL	240 mL	360 mL	480 mL
13 kg	130 mL	260 mL	390 mL	520 mL
14 kg	140 mL	280 mL	420 mL	560 mL
15 kg	150 mL	300 mL	450 mL	600 mL
16 kg	160 mL	320 mL	480 mL	640 mL
17 kg	170 mL	340 mL	510 mL	680 mL
18 kg	180 mL	360 mL	540 mL	720 mL
19 kg	190 mL	380 mL	570 mL	760 mL
20 kg	200 mL	400 mL	600 mL	800

Note: mL = millilitres; kg = kilogram

Note: too much or too little catalyst will lead to a sub-optimal finish.

Note: aim to apply to the matting within 15 minutes to avoid dealing with resin that has prematurely cured.

Note: care should be taken to ensure that the correct ratio of glass fibre mat to resin is used. Excessive amounts of resin will create a brittle laminate, too little resin will expose the glass fibres to moisture, leading to water ingress. Both will result in failure of the laminate and an eventual leak.

Note: the viscosity of the polyester resin is temperature dependent. In winter, when the temperature is colder (5 – 10 oC), it takes longer for it to saturate the glass

fibre mat. Avoid adding extra resin to compensate for this; the correct resin-glass fibre ratio must remain consistent. Do not work below 5 °C or above 30 °C for best results.

Note: do not add catalyst to the entire resin supply. Pour workable amounts of resin into a separate, clean bucket and then mix in the catalyst in carefully and thoroughly.

4.6.3. Laminating

The following section covers the steps involved in applying fibreglass laminate to the roofing structure.

Note: it is a good idea to practice and test with a small amount of laminate in advance.

Corners

1. Position pre-cut corner sections of matting onto the edge trims and apply resin. Wearing both chemically resistant nitrile gloves covered in gripper gloves, place the laminate onto the edges and gently position into place.



Pre-cut sections of resin-soaked matting being positioned onto corners

2. Hold the top part of the laminate and gently rip it. Re-apply and repeat as necessary for the remaining sections until the corner is covered and the desired thickness is created.



Pre-cut sections of resin-soaked matting being stretched across the corners

3. Use a brush to tidy up the corner, taking care to ensure that the matting sticks to the trim surface and that no exposed fibres remain. You should expect to see a change in transparency, as the matting turns from a white colour to a near transparent one.



Ensuring good laminate-surface coverage

Main Decking

1. Once the corners have been laminated, apply the catalysed polyester resin to the main section of matting using a roller.



Application of catalysed polyester resin to glass fibre matting on main deck

2. The matting itself should cover around half of the trim surface. Using a roller, apply the resin to the matting. Using manageable quantities, repeatedly apply the resin until the laminate turns transparent.



Repeated rolling to ensure sufficient saturation.

3. Ensure the laminated matting is made consistent, flat, smooth and clear; aim to remove air pockets. Matting should overlap by around 5 cm.

Note: work efficiently; catalysed resin will begin to cure after around 15 minutes.



Elimination of air pockets

Note: when using a roller to laminate, apply moderate pressure to disperse the resin into the matting. Avoid fast or heavy application as this will splash excess resin.

4. Consolidate the laminate using a paddle roller. Focus on areas that are dry or have trapped air pockets (indicated by white patches). Consolidate the wet laminate several times to drive out any excess air trapped inside. This will become apparent when the laminate becomes clear and transparent.

Note: when using the paddle roller, apply moderate pressure to the matting and do this until the matting is consistent.



Use a paddle roller to consolidate the resin via repeated rolling cycles to achieve a consistent finish

Note: a clear and transparent laminate is a good indicator that air has been removed and that the glass fibre is saturated with resin. Special attention should be paid to overlaps and joints, which are more prone to insufficient resin coverage.

5. Allow the laminate to cure. Curing rates are around 2 hours for a partial cure and 24 hours for a full cure. The curing rate depends on the temperature, since resin cures faster in warmer temperatures and slower in colder ones.



Picture of laminated flat roof post application and pre-curing

6. Once cured, the laminate should be hardened or mildly sticky. Inspect all areas for protruding glass fibre strands around the edges and on the surface.

Note: exposed fibres indicate insufficient coverage. They allow moisture to enter the laminate and ultimately roofing structure. If you do encounter protruding glass fibre sticking out of the laminate, sand it back and re-apply thin layer of resin to re-waterproof it.

Note: once you have finished with any resin, it should be disposed of appropriately. This means you should pour water on top of any remaining catalysed resin that you have in the mixing bucket and keep it away from other materials. However, once the resin has cured, it should be sent to waste.

Note: if too much catalyst is added to resin, the mixture might become exothermic, generating heat. In such instances the mixture could self-ignite, and should that occur, you should pour water into it and move away from the area, alerting nearby persons of the situation. Whilst this is rare, it can occur at higher temperatures – particularly during summer. Be advised that safety goggles must be worn.

Note: resin will stain surfaces easily and is very hard – if not impossible to remove. So, take care to move your car away from the roof and to protect adjacent surfaces like windows, brickwork and other surfaces.

4.7. Assessing Laminate Quality

The cured laminate should be seamless and free from defects prior to progressing to Step 5 (topcoat application). Should an assessment reveal defects in the laminate, they must be addressed prior to progressing.

Examples of incorrect laminating procedures are outlined accordingly. In most instances of a failed fibreglass roof, a poor-quality laminate is the main cause. The edges as you can see here often contain glass fibres that have not been covered in resin and remain exposed, allowing rainwater to enter the membrane, leading to a leak.

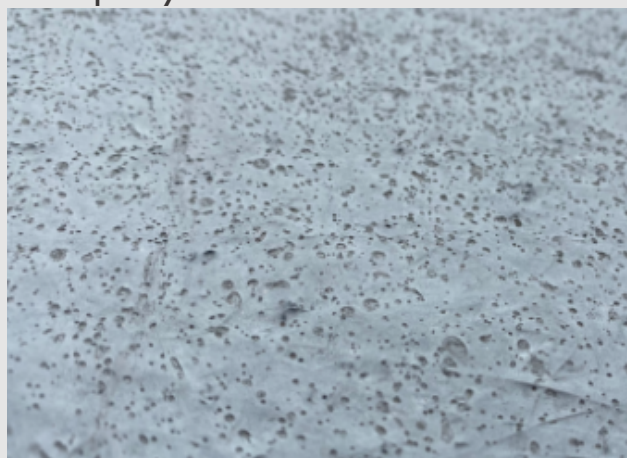
Note: these examples are post-topcoat application, hence the grey coverage.



Poor quality laminate



Exposed glass fibres



Insufficient resin during laminating impacting the topcoat coverage



Poor coverage around perimeter

Other reasons include insufficient resin quantities applied to the laminate, leading to air pockets forming, which allow entry of the resin into the membrane, or simply poor laminating techniques. More detail on how to build a fibreglass roof is available on our site.

In the next guide we'll focus on the application of topcoat to the fibreglass laminate.

4.8. Related Products

Resin Library also offers a range of fibreglass-related products.

Table 4. Fibreglass (GRP) Roof Repair Kits

Product	Size (m ²)	Note	Ordering
Fibreglass (GRP) Roof Repair Kits	0.5	Materials and tools included based on kit size. Includes topcoat (flowcoat)	> Find out more <
	1		
	2		
	3		
	5		
	10		

Table 5. Fibreglass (GRP) Repair Kits (Without Topcoat)

Product	Size (m ²)	Note	Ordering
Fibreglass (GRP) Repair Kits	0.5	Materials and tools included based on kit size. Does not include topcoat (flowcoat).	> Find out more <
	1		
	2		
	3		
	5		
	10		

Table 6. Polyester Resin

Product	Size (L)	Note	Ordering
Polyester Resin	1	- Used for fibreglass laminating - Includes MEKP - Lloyd's Approved - WRAS compliant	> Find out more <
	2.5		
	5		
	10		
	20		

Table 7. Topcoat Resin

Product	Size (L)	Note	Ordering
Topcoat Resin	1	• Colour: Dark Grey • Includes MEKP	> Find out more <
	2.5		
	5		
	10		
	20		

Table 8. Glass Fibre (CSM)

Product	Type	Size (m ²)	Note	Ordering
Glass Fibre Matting (CSM)	450-gram	2 - 80	Multi-directional glass fibre reinforcement for fibreglass laminating. Designed for use with polyester resin.	> Find out more <
	600-gram	2 - 55		> Find out more <