

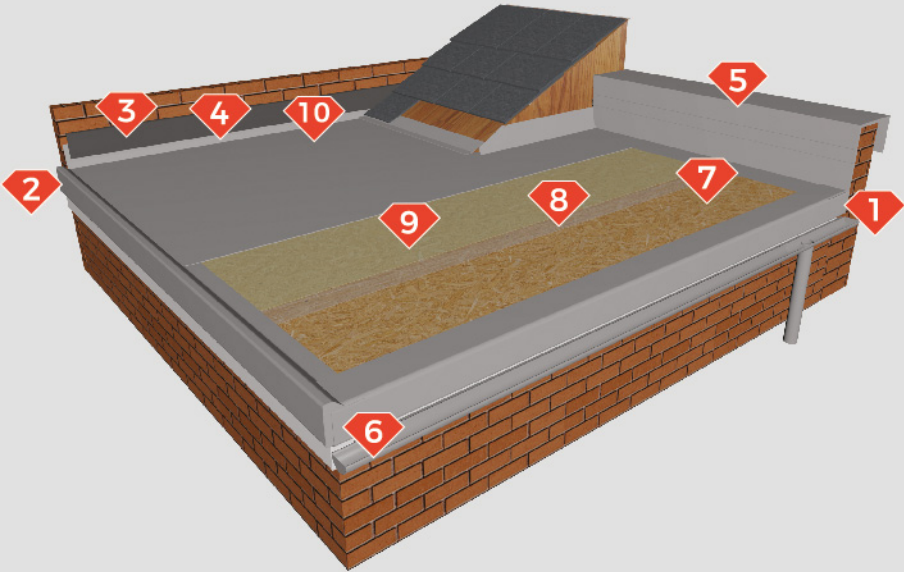


DIAMOND

GRP ROOFING SYSTEM

INSTALLATION GUIDE

The Diamond GRP roofing system comprises a single-ply GRP laminate of our base resin reinforced with Chopped Strand Mat (CSM) glass fibres, applied over 18mm OSB3 deck. The roof is profiled with GRP edge trims and finished with a coat of Diamond GRP topcoat.



1. A200/250 Drip Trim – for gutters/drip edge/fascia

2. B230/260 Raised Edge Trim – forms upstands

3. C100 Flashing Trim – simulated lead flashing

4. D260 Fillet Trim – use against an abutting wall

5. AT195 - Internal/External corner angles
6. C1 Universal external corner

7. OSB3 18mm decking boards (2400mm x 600mm T&G)

8. Chopped Strand Mat (CSM)

9. Diamond GRP Resin Laminate (with catalyst)

10. Diamond GRP Topcoat (with catalyst)

Tools & Materials

Ensure you have suitable PPE, materials and tools before starting the roof.

Diamond Materials	Tools	Other Materials & PPE
Roofing Resin - 10kg - 20kg Topcoat - 10kg - 20kg GRP Trims - Assortment Chopped Strand Mat (CSM) - 450g/m² - 600g/m² Catalyst (Summer or Winter grade) - 0.5L - 1L - 5L Acetone - 5L Bandages Mixing bucket	Strong shovel Wrecking bar Claw hammer Circular saw/jig saw Mastick gun 4" grinder + stone blade for cutting trims Diamond blade for cutting chase into wall Sweeping brush Sanding pads 40 grit paper Soft and stiff sweeping brushes Ground sheet (<i>visqueen/DPM</i>) Compressed air or gas powered nail gun Catalyst dispenser Hand saw Tape Measure Brushes 2.5" and 7" polyester rollers Paddle rollers	OSB3 18mm decking board (2400mm x 600mm T&G) 63mm paslode nails (galvanised ring shank nails or screws atleast 60mm) 13mm glav felt nails (for fixing trims) 25mm x 50mm batten Trim Adhesive Clear silicone (when flashing into walls) Bottles of eyewash Disposable latex gloves Safety gloves Protective goggles Dust mask

STAGE 1 – DECKING THE ROOF

We recommend the Diamond GRP Roofing System is installed by an experienced flat roofing professional.

Preparation:

Always ensure that conditions are dry during all stages of laying a Diamond GRP roof.

Decking boards absorb moisture and any moisture trapped within the roof will cause board movement and possibly joint failure.

After removing the old decking, check that all roofing joists are sound and free from rot (replace these as required).

If possible, build a fall on the roof to improve drainage and prevent standing water. Fit to a minimum of 1:80 gradient.

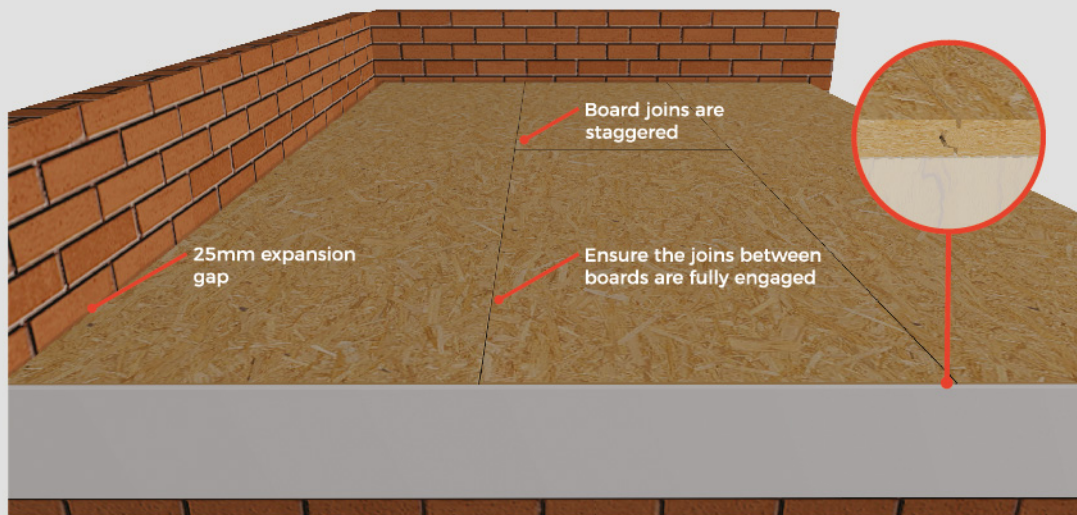
Decking:

2400 x 600 x 18mm OSB3 tongue and groove boards are laid at 90° to the roof joists with the writing side uppermost. This provides a better key for laminating and the resin will flow into the board joints to glue them together.

Start to lay the boards at the furthest edge from the drip. If a board is laid along a wall, an expansion gap of 25mm should be left. Lay the boards from end to end, ensuring the last board in the row is flush with the fascia. Stagger the boards to form a stronger deck.

Fix the OSB3 board to timber joists using a powered nail gun with 63mm (or longer) galvanised ring shank nails, at 200mm centres. This equates to 4 nails across a 600mm board.

- The nails **MUST** be driven into a joist.
- If using screws, they must have a 40mm penetration into the timber joist.
- When fixing into steel use self-drilling/self-tapping screws of the appropriate length.
- All nails must be non-rusting (galvanised or sheradised).



STAGE 2 – FIXING THE TRIMS

All trims must be fixed with 13mm galvanised clout nails or stapled to the decking board. Do **NOT** nail through the fronts of the trims.

Hold the trim in place ensuring the face of the trim is vertical. Fix at each end, the middle and then at 200mm centres thereafter.

The trims (except for F300 and D260) must also be bonded in place using Trim Adhesive (Polyurethane Adhesive). A 30mm bead at 300mm centres is enough to hold the trims in place. The trims should be 'rubbed' into place to ensure good bonding. Always bond to the side of the trim with the high adhesion matt finish.

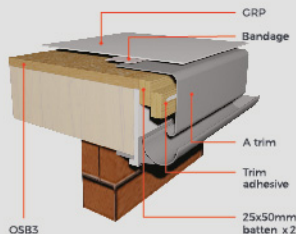
To extend the trims, lap them by at least 50mm and seal with trim adhesive.

A200/250 - DRIP TRIM

Fit the trim to lowest edge of the roof where the rainwater flows into the gutter.
Fix two support battens to the perimeter of the roof, for the gutter to fit behind the trim.

Fix the outer batten 10mm lower than the inner batten. Every 300mm, apply 30mm beads of trim adhesive to the batten. Rub the trim into place and nail to the deck.

Plane off 2mm of the deck to prevent rain water holding behind the trim and will lay flush with the board.

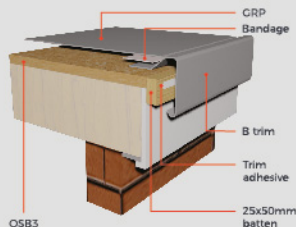


B230/260 - RAISED EDGE TRIM

Install the trim around the perimeter to guide water off the roof.

Fix a single batten level with the top edge of the deck and apply 30mm beads of trim adhesive to the batten every 300mm. Rub the trim into place and nail to the deck.

The trim will need to be reinforced to avoid deformation if a ladder is likely to be leant against a B trim for regular access to the roof.

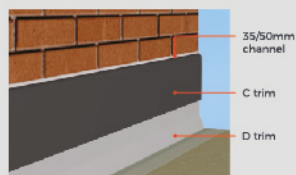


C100/100L/150/150L - SIMULATED LEAD FLASHING

Insert the trim into the brickwork as a wall flashing, lapping over D Trims.
Cut a 35/50mm deep chase out of the wall with an angle grinder.

Apply a continuous bead of trim adhesive to the back of the C trim. Fit the trim into the chase and press firmly to bond to the D trim.

Apply clear silicone sealant along the length of the trim to seal into the wall.



D260/300 - FILLET TRIM

Install the trim against abutting walls to provide expansion and perimeter ventilation.

Fit squarely against the wall and nail into the deck (not the wall).

To extend the trim, bond the lap with trim adhesive and bandage together.



F300 - FLAT SHEETING

Lay the flashing at the intersection of a pitched roof and flat roof. Never laminate over completely as it will crack.

It acts as expansion facility and must only be nailed to the deck along the bottom edge. Bandage over any lap joints.

Any unlaminated trim can be top coated with the rest of the roof.



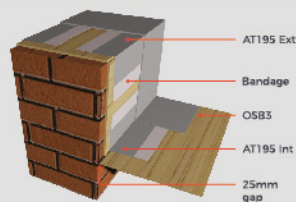
AT195 - INTERNAL/EXTERNAL ANGLE TRIM

Use the trims to cap 90° step details, such as roof parapets.

AT195 Ext has a high adhesion finish on its outer fascia and should be used for capping applications.

AT195 Int has a high adhesion finish on its inner fascia and should be used for internal corners.

The trim should be nailed on both sides of the angle.

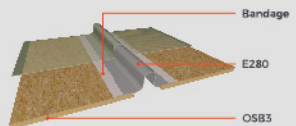


E280 - EXPANSION JOINT & C5 CLOSURES

Install the trim to create expansion joints on large roofs (over 100m²) and finish with C5 closures.

Every 300mm nail the trim into place over the expansion gap in the deck.

To bond with C5 closures, apply a bead of trim adhesive to the inside edge and rub into place.



C1 - UNIVERSAL EXTERNAL CORNER

Use the corner as junction between the A and B trims.

Nail the corner into place. The lap between the trim and corner should be sealed with trim adhesive under the section of the trim covering the corner.



STAGE 3 – LAMINATION

The surface must be completely dry and free from debris. A wet surface can lead to delamination.

Never attempt to lay a roof in wet weather. If it starts to rain, the roof must be covered with a large visqueen sheet (DPM), as it will not bond to the curing laminate.

Bandaging: All joints between trims, corners and decking should be bandaged over, as well as any nail heads. If the decking isn't Tongue and Groove OSB, each joint should also be bandaged.

Chopped Strand Mat: Roll the mat out, overlap the trim by at least 50mm and do not cover the fronts. Roll out each 1m wide strip, overlapping each time by at least 50mm right across the roof. The ends can be cut off with a Stanley knife.

The mat has a cut and a feathered edge. Always overlap the feathered edge on top of the cut edge. Re-roll each length of mat and keep to the side for laminating.

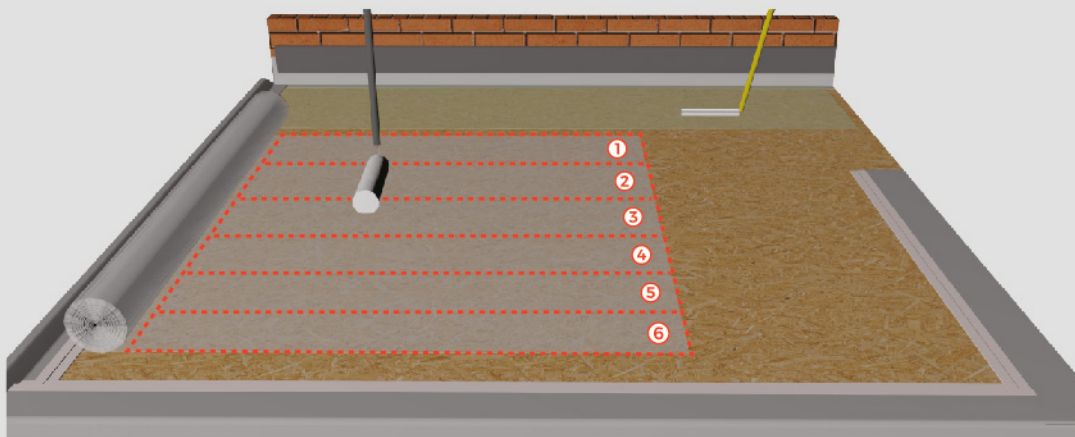
Resin Preparation: Work out how many tins of resin are required to complete the day's laminating. The resin to CSM ratio is 1.35kg of resin for every m².

Using the catalyst dispenser, add the catalyst to the resin and stir well. (See catalyst chart).

Mix a small quantity resin (1 or 2 litres) to laminate the corners and bandage on the trims. This will give the best indication of the curing time and confirm if the correct amount of catalyst has been used.

Aim for a curing time of 60 minutes.

Corners: Cut a 300mm square of CSM and 'wet out' with catalysed resin on a separate board. Then lay into position on the corner, ensuring the bottom edge is level with the bottom of the trim front. Fold around the corner and over the top finishing down onto the deck. Work the mat into the contours of the corner with a brush.



Laminating:

Working in 1m² sections, have the previously cut mat in position and aligned ready to be rolled out.

Apply 3 rollers full of catalysed resin and evenly coat 1 square metre of the deck.

Unroll the mat onto the resin coated deck. In strips of 7" (1 roller width) wet out the mat with 1 roller full of resin. Start in the middle of each run, push the roller away to the end and then pull back over the full 1m. Continue across the 1m² section (approx. 6 runs/rollers) and then re-roll over the whole area again to ensure good even coverage.

Repeat across the roof following the same method.

Consolidating:

Let the resin soak into the mat for 2 to 3 minutes. Using the paddle roller, with a little pressure roll back and forth in a slow controlled motion. Roll over all of the wet-out mat, ensuring at least 3 passes over the whole area.

When a laminate is correctly wetted out it should be transparent, with no white or opaque areas. Take care near the edge of the roof as a fine spray will be emitted from the roller.

In colder weather the resin will be thicker and will take a little longer to wet-out.

Inspect the laminate as it is consolidated, checking for 'pin holes' and areas short of resin.

On all overlaps, pay extra attention to the 'feathering in' as this will improve the overall finished appearance.

STAGE 4 – TOPCOAT

Preparation:

Taking extra care and attention at this stage will produce a roof of superior quality.

With 40 grit sand paper, lightly sand the corners and bandages over the trims. Sand off any fibres, taking care not to sand too heavily. Cut any excess cured mat protruding beyond the trim with a sharp Stanley knife.

Fit any C100 simulated lead flashing before top coating and seal off with a clear silicone sealant.

Diamond GRP Topcoat also requires the addition of catalyst for it to cure. Always try to apply the topcoat immediately after the laminate is semi-cured (can be walked on, no stickiness). If this is not possible then ensure topcoating is carried out within 24 hours to gain good bonding with the laminate. If the topcoating is left longer than 24 hours, then wash down the laminate with acetone to gain a good cross-polymerisation of the topcoat to the laminate.

Topcoating:

In a mixing bucket, pour enough topcoat to cover the perimeter of the roof (including the edge trims) and stir well with the correct amount of catalyst.

Use a 2½ polyester roller to coat the trims, including the fronts. To protect the fascia from topcoat, hold a piece of flashing trim against it as you topcoat the underside of the trim.

Calculate how much topcoat you will need to cover the main body of the roof. Add the required amount of catalyst and stir well. As with the resin, only mix enough to cover 3 – 5 square metres at a time.

Using the 7" polyester roller, cover the remaining laminate with just enough topcoat for the fibre pattern to be visible. Do not coat the roof too thickly or the topcoat will crack.

Within 24 hours the roof should be completely cured and finished. (A coat will be touch dry in 60 minutes).

If a coloured topcoat is needed rather than the standard anthracite grey, a colour pigment will need to be added to a clear topcoat. A 20kg tin of topcoat requires 2kg of colour pigment. It is essential to mix the pigment thoroughly into the topcoat to avoid patchiness and uneven colour.

Cleaning Tools:

Buckets can be re-used for many jobs. When each mix is finished with, coat the inside of the bucket. When the resin has cured after approximately 30 minutes it can be peeled out, leaving the bucket like new.

Paintbrushes can be dropped into a re-sealable container of acetone and left for the next job. Use only paintbrushes that have unpainted or uncoated handles, as the coatings will come off and contaminate the resin.

Polyester rollers can be disposed of once cured and the frame reused.

Either use disposable latex gloves when handling catalysts or resins, or clean hands with hand cleaner. Do not clean hands with acetone.

Wipes are also a useful addition to your toolkit to remove resin from windows and fascias.

25 YEAR MATERIALS GUARANTEE

Diamond GRP roofing system offers a 25 year guarantee on all the Diamond GRP materials.



GUIDANCE AND TROUBLESHOOTING

Safe Working Practices: It is always the installer's responsibility to ensure safe working practices for themselves, employees and members of the public. The installer should also be aware of the health and safety information that applies to materials and handling (see a Health and Safety Manual).

Installation in Summer:

Do not use resin or topcoat in temperatures above 35°C.

Always mix smaller batches of resin than normal to give adequate time to apply it before it starts to catalyse.

If topcoat is applied to surfaces above 50°C, the wax component of the topcoat will melt and the topcoat will remain tacky and any loose debris will stick to the roof. The colour of the topcoat will also be impaired.

If possible, topcoat the roof out of direct sunlight or wait until later in the day.

Installation in Winter:

Avoid topcoating a roof after 2-3pm. The heat from the sun contributes towards the curing. It is unlikely that the topcoat will cure overnight.

If left uncured, the topcoat may cure with an undesirable finish.

Check the surface temperature of the boards before laying the resin or topcoat.

Always keep the resin indoors the night before it is used and warm before use if the ambient temperature is below 10°C.

Do not install in temperatures below 5°C.

Repairing a GRP roof:

If the roof surface becomes damaged by impact or must be cut for any reason it can be easily repaired using the following procedure:

1. Clean off the damaged area with solvent and abrade the GRP surface with a hand grinder for 100mm from the damaged area or edge to be joined.
2. Cut the CSM to the correct size to cover the affected area
3. Follow the same installation process as before.

Problem	Possible Cause	Remedial Action
Failure of resin and topcoat to cure/harden.	Resin poorly mixed. Incorrect catalyst winter/summer. Not enough catalyst used.	Catalyse another, ensuring that you use the correct catalyst. Always add extra catalyst (doubling up if necessary) and roll in vigorously. Larger laminates may need replacing completely.
It begins to rain whilst laminating or topcoating	N/A	STOP! Cover the roof with a non-woven polyethylene sheet and try to ensure that none of the laminate gets any moisture onto it. Always have enough polyethylene sheets with you to cover the roof. Resin contaminated with water will not cure and require a re-skin.
Water contamination (white staining of laminate)	Resin has been contaminated by water and will not cure	Re-laminate the roof.
Streaky laminate/topcoat	Resin or pigment not mixed well. May be contaminated by water.	Always ensure that topcoat is applied thinly (0.5mm). This makes it possible to reapply another layer of either properly catalysed or thoroughly mixed, pigmented topcoat. If using pigment or catalyst, add more to the second coat.
Debris entrapped in the laminate, possibly poking through the laminate, holes in laminate.	N/A	Debris needs to be removed and patched over. This can be done while the laminate is still wet and then patched up with a new section of laminate. When the laminate has cured, the surface can be lightly rubbed with a coarse sand-paper. This will highlight any imperfections. The affected area must then be patched with a new laminate.
Spillages	N/A	It is essential to clean the resin off the surface before it cures with acetone. This can be used to remove resin from most surfaces including clothing (WARNING: acetone is extremely flammable). If used to clean paintwork or coloured fabrics it may discolour or remove paint or dye from the surface. If resin has cured onto a surface such as glass, metal or paintwork, it may be flicked off using a sharp edge or by vigorously rubbing with a coarse cloth. With larger spillages (e.g. driveways or walls), a hot pressure washer is the best choice, and strong detergents are usually necessary.
Delamination or cracking of topcoat/laminate	Poor adhesion and contamination	Completely remove topcoat or laminate (or just the particular section), and reapply. Topcoat: Clean with acetone and abrade the surface. Re-apply. Laminate: Re-apply after priming the board with G4 primer.
Standing water or board swelling	Deck has uptaken moisture. Installed without a fall.	Lift/support the ponded area to encourage water fall. Laminate over to ensure that there is no surface cracking.
Tacky topcoat	Applied in too hot & sunny conditions	It may be possible to clean down, abrade and re-topcoat the roof. Clean down with acetone and reapply in cooler conditions.
Colour fade of topcoat	This takes several years and is caused by erosion of the topcoat. It is more likely to occur with darker colours.	The roof may need to be completely cleaned down and wiped with acetone. G4 primer should then be applied on top of the laminate and the topcoat can be applied on top of this, but it is difficult to guarantee that no topcoat delamination will occur thereafter. It is possible to use a PU varnish to restore the colour, but this may have to be reapplied after 2-3 years. The only way to guarantee the longevity of the colour is to re-skin the roof with another laminate.

CATALYST (HARDNER) ADDITION

Catalyst is required to enable Diamond GRP Resin and Topcoat to cure. There are several important rules to follow when deciding how much catalyst to add:

- Never use less than 1% even in the summer, just mix less resin at a time.
- Never use more than 4%, the cure time will not reduce any further beyond 4%.
- In Winter use fast catalyst, in Summer use standard catalyst.
- Never underestimate the effect of temperature. Resins will not cure at or below freezing and will always cure much quicker in direct sunlight.
- When using late in the day, add more catalyst to allow for the lack of sunlight.
- Always mix the catalyst into the resin thoroughly before use (i.e. a good couple of minutes for a 10-litre bucket). Failure to do this can result in 'streaking' on the laminate, where streaks of uncured resin will remain visible and ultimately lead to a failure in the laminate.
- Fast cures can result in an inadequate bond.

Remember: Any catalysed resin left in the bucket will exotherm. Heat is generated as the resin cures, so it should be kept well away from other stored materials. Water can be poured over the resin to suppress the heat gain.

Here is a guideline of the quantity of catalyst required, in different temperature conditions:

Deck/Resin Temp	29 - 35°C	21 - 28°C	13 - 20°C	6 - 12°C
Catalyst Percentage	1%	2%	3%	4%
Per KG Resin	Catalyst Usage, ml			
	10	20	30	40

Material ESTIMATE

When estimating the amount of materials needed for a roof, there are several factors that should be taken into consideration.

Calculate the total area of the roof in square metres and always allow an extra 10% for the main materials to account for wastage or unforeseen problems.

The values given below are only an estimate and will depend on the detail of the roof surface:

Roof Size (m ²)	Resin (kg)	Topcoat (kg)	CSM (m ²)	Bandage (roll)	OSB3 (2400x600mm)	Catalyst (L)	Acetone (L)
5	7.5	2.5	5	1	4	0.3	5
10	15	5	10	1	7	0.6	5
20	30	10	20	1	14	1.2	5
25	37.5	12.5	25	1	18	1.5	5
50	75	25	50	2	35	3	5
75	112.5	37.5	75	3	53	4.5	5-10
100	150	50	100	3	69	6	5-10

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