



INSTALLATION GUIDE

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QUICK MATERIALS CALCULATOR

Primary Materials

Roof Area (m ²)	Base Coat Cans	Top Coat Cans	Bandage Rolls	450gm Glass-Mat (kg)	Catalyst (1 Litre)	Decking Boards 2.4m x 0.6m x 18mm 1.4m ² per board
5	1x15kg	1x5kg	1	1 x 5.5kg	1	5
10	1x15kg	1x5kg	1	1 x 5.5kg	1	8
15	2x15kg	2x5kg	1	2 x 5.5kg	2	12
20	2x15kg	2x5kg	1	2 x 5.5kg	2	15
25	3x15kg	1x15kg	1	1 x 16.5kg	2	19
30	3x15kg	1x15kg	1	1 x 16.5kg	3	23
35	4x15kg	1x15kg	1	1 x 16.5kg	3	26
40	4x15kg	1x15kg 1x5kg	1	1 x 16.5kg 1 x 5.5kg	3	30
50	5x15kg	1x15kg 2x5kg	2	1 x 16.5kg 2 x 5.5kg	4	38
60	6x15kg	2x15kg	2	1 x 33 kg	5	46
70	7x15kg	2x15kg 1x5kg	2	1 x 33 kg 1 x 5.5kg	5	54
80	8x15kg	2x15kg 2x5kg	2	1 x 33 kg 1 x 5.5kg	6	61
90	9x15kg	3x15kg	2	1 x 33 kg 2 x 5.5kg	7	69
100	10x15kg	3x15kg 1x5kg	2	1 x 33 kg 1 x 16.5kg	7	77

Additional Materials

Roof Size (M ²)	3" Rollers	3" Roller Sleeves	7" Rollers	7" Roller Sleeves	Small paddle rollers	Large paddle rollers	Small Brushes	Large Brushes	Acetone (Litres)	Small Buckets	Large Buckets	Trim Adhesive
5	1	2	1	2	1	1	1	2	5	1	2	1
10	1	2	2	3	1	1	1	2	5	1	2	1
20	1	3	2	4	1	1	2	2	5	1	2	2
40	1	3	2	6	1	1	2	4	5	1	3	3
60	2	4	3	8	1	1	4	6	5	2	3	4
80	2	4	3	10	1	1	4	8	10	2	4	6
100	3	5	3	12	1	2	5	10	10	2	4	7

Preformed GRP edge trims are not included in this table. These are available in 3m lengths and have to be measured separately.

*** If using the thicker heavy duty system,(600gm mat) for example on balconies, walkways or critical applications you will need to use 33% more Base Coat and mat.**



Welcome to TuffStuff®

TuffStuff® is a new advanced liquid applied GRP – Glass Reinforced Polyester- flat roof system. It has been specifically engineered for distribution to the flat roof market in the UK.

It is a fully integrated seamless system where all the components are designed to work together to ensure that you can take full advantage of this rapidly expanding market.

TuffStuff® can be used on virtually all types of flat roofs up to and including vertical surfaces for example the cheeks of a dormer or the inside face of a mansard or parapeted roof.

We have over 25 years experience of using GRP to solve the problems often associated with failed leaking bitumen felt roofs and we are here to help you. We offer full training for you and your staff both in our training centre or at your distributor's depot or even on your first roof. Ask your distributor for more details and cost.

Table of contents

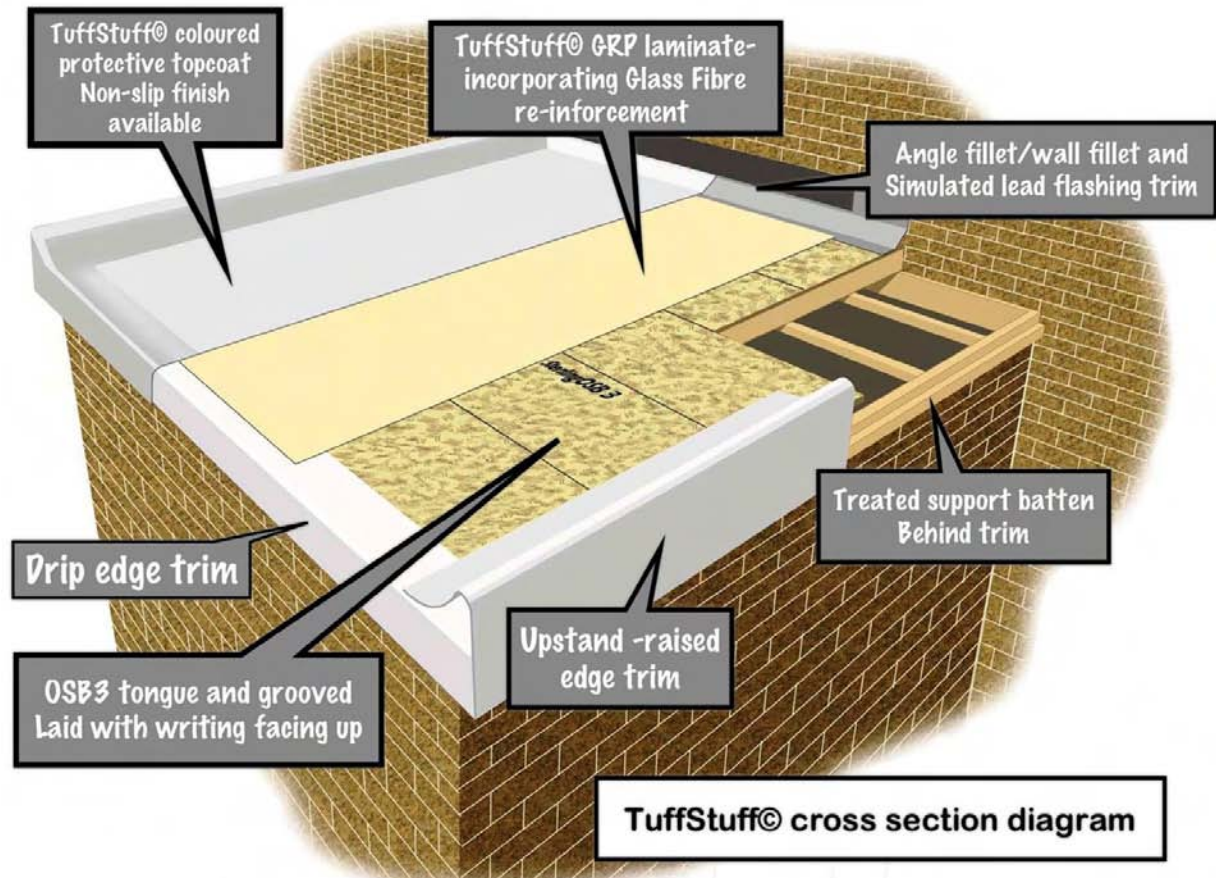
Welcome to TuffStuff®	1
TuffStuff® overview	4
Description and specification.....	4
System Features	4
Insulation.....	5
Resistance to foot traffic	5
Training	5
Section 1: Components and application tools.....	6
TuffStuff® system components.....	6
Primary components	6
Ancillary components	6
Other materials (not supplied as part of the TuffStuff® GRP system)	6
Application tools.....	7
Other tools required	8
Health and safety – materials handling	8
Section 2: Preparing and laying the deck	9
Cold roof construction	9
Laying the deck.....	10
Warm roof construction.....	12
Laying the deck and fixing the deck	12
Section 3: Trimming.....	14
General.....	14
Fixing	14
Application instructions - Trims	15
A170/A200/A250 - Drip edge trims.....	15
B230/B260/B300 - Upstand (raised edge) trims	16
D260/D300 - Angle Fillet Trim	17
C100/C100MT/C100L/C100LMT/C150/C150L - Simulated lead flashing	18

F300/F600/F900 - Flat flashing.....	19
E280 - Expansion joint	19
Application instruction - Parapet Walls	21
E35/40 – Simulated Lead Roll	22
Section 4 Application of TuffStuff® system.....	23
Overview.....	23
Base Coat	23
Laminating procedure summary	23
Laminating	25
Detailing and bandaging	25
Corners	25
Trims - Bandaging	26
Laminating the main roof area	27
Consolidating	28
Topcoating.....	31
Preparation for Topcoating	31
Timing.....	32
Topcoating the edge trims	33
Topcoating the roof.....	34
Topcoating with non-standard colour.....	36
How much topcoat will I need?.....	36
How much catalyst will I need?.....	37
Important notes	37
General <i>Do's</i> and <i>Don'ts</i>	39
Safe Working	39
Hot weather working	39
Cold weather working	40
Technical helpline.....	40

TuffStuff® overview

Description and specification

A TuffStuff® GRP roof is a wet laid, single ply GRP laminate made up of two layers of catalysed base coat resin sandwiching a layer of chopped strand glass fibre reinforcing mat (450/600gsm). It is applied to a good quality new OSB 3 or WBP plywood deck. Profiled GRP edge trims are applied to the roof edges and abutments and the roof is finished with a coat of catalysed pigmented top coat resin.



System Features

- All components engineered to be used together.
- Range of profiled edge trims to suit all applications.
- 20 year materials guarantee.
- Fire retardant to BS476-3 EXT F.AB (no restrictions on usage)
- Low styrene emission resins.
- UV resistant.
- The TuffStuff® laminate is fully resistant to wind uplift as it is 100% bonded to the new timber substrate.
- Textured slip resistant finish available

Insulation

Insulation can be used in a cold roof (insulation between joists) or warm roof (insulation above joists) configuration to comply with current part L of building regulations.

Resistance to foot traffic

TuffStuff® is available with two levels of reinforcement.

- 450gsm reinforcement for areas of occasional foot traffic.
- 600gsm reinforcement for areas of heavy foot traffic in conjunction with slip resistant finish.

Training

Both 'in house' and onsite training is available. See your distributor or website for details www.tuffstuff.co.uk

Training is always recommended before installing a TuffStuff® roof.

Section 1: Components and application tools

TuffStuff® system components

Primary components

- Base coat resin (15kg/10m² cans)
- 450gsm/600gsm chopped strand reinforcing mat
- Top coat resin (5kg/10m² + 15kg/30m² cans)
- Liquid catalyst (hardener) 1 litre and 5 litre containers
- Pre-formed GRP edge trims in 3m lengths

See TuffStuff® "Edge Trim Guide" for profiles, sizes and usage illustrations

Ancillary components

- Acetone (for bucket, roller and brush cleaning)
- Trim adhesive (for ensuring correct fixing of trims)
- 75mm wide chopped strand bandage (for joining trims to roof)
- 100mm tissue for ensuring neat finish on visible moulded corners or tidying up details such as roof penetrations.
- G4 polyurethane primer (for priming a concrete, brick or metal surfaces to accept TuffStuff® laminate)
- Slate granules (for adding to surface of topcoated roof to create a 'mineral' and slip resistant finish)

Other materials (not supplied as part of the TuffStuff® GRP system)

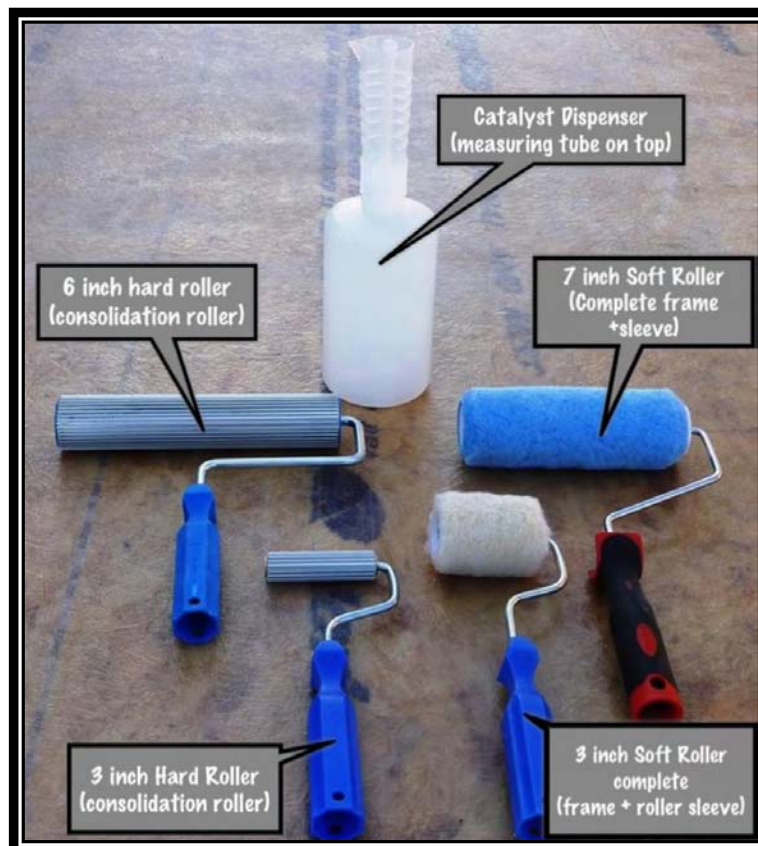
- Treated tile battens (19mm x 38mm) for giving rigidity to edge trims
- OSB3 decking boards (2400x600x18mm T&G)
- Plywood decking boards - 2400x1200x18mm WBP, exterior grade, good one side, CE2+
- Fixings for decking boards – either ring shank nails, sheradised or plated woodscrews (minimum 65mm)
- 15mm galvanised clout (felt) nails – for fixing trims
- Clear silicone –for pointing flashing trims into wall, we recommend low modulus, neutral curing type B, other types of silicone can damage the GRP



Do not use a budget 'filled' silicone – it will let you down!

Application tools

- Application rollers (frame and sleeve)
 - 3" & 7" wide for applying base coat and topcoat resins (replacements sleeves available)
 - Brush handles for extending for use will be required
- Paddle rollers
 - 3" and 6" ribbed metal rollers for consolidating and distributing base coat into reinforcing mat to ensure an even and correct resin to mat ratio (3 to 1) and to remove any air bubbles from the laminate



- Catalyst safety dispenser for measuring and dispensing the correct quantities of catalyst (see catalyst guide)
- Laminating brushes 1", 2", 3" and 4" wide for application of base coat resin and moulding to shape in difficult to access areas. Also useful for topcoating detailing such as bottom lip of trims.
- Mixing Buckets for measuring base coat and topcoat resins, mixing in catalyst and transferring to roof surface.
- Disposable latex gloves to protect hands when applying resins.

Other tools required

- Stanley knife
- Sweeping brushes
- Shovel/spade
- Hand brush
- Wrecking bar
- Sandpaper (60 grit)
- Claw hammer
- Mastic gun
- Circular saw
- 4" OR 5" grinder + stone cutting disks
- Diamond blade for grinder for cutting a chase into wall
- Roll of heavy duty polythene for groundsheet and waterproof sheet to protect roof in case of rain.

Health and safety – materials handling

When mixing/applying TuffStuff® resins we recommend the use of:

- • Hand protection (latex gloves)
- • Eye protection (protective goggles/glasses)

Additionally, we recommend that eyewash liquid (saline solution) is available in the event that resin splashes into eyes.

If resin splashes into the eyes, irrigate thoroughly with eyewash liquid or fresh water and consult a medical professional if irritation persists.

Section 2: Preparing and laying the deck

WEATHER NOTE!

Before opening a customer's roof to the elements always check the weather forecast. If rain is forecast before you are likely to finish the job it may be wise to wait for a more suitable opportunity. Consult with your customer. On larger roofs consider only stripping and decking small areas which can be waterproofed or protected prior to the arrival of rain.

If the existing substrate is unsuitable for laying your decking boards onto, it should be removed to expose the roof joists. Check that the joists are free from rot, replace those that are affected and also check that adequate falls are provided for the roof to drain. This may require you to fit shaped firing strips to the joists to provide a fall. Building regulations call for a **minimum** fall of 1:60. The better the fall the less chance of ponding!!



Roof stripped showing firings on top of joists

Cold roof construction

A cold roof is where the insulation (usually quilt) is laid between the joists and supported by the ceiling. A 50mm gap should be left from the top of the insulation to the underside of the decking for ventilation.

Prior to laying your decking boards, ensure that they are dry. TuffStuff® like most waterproofing systems will not bond to wet or damp boards, leading to almost certain delamination in the future.

The advantages of choosing to use OSB3 as your decking are:

- They are easier to handle and carry up onto the roof because they are 2400 x 600 x 18mm and therefore lighter than full size plyboards
- They are designed to minimise the effects of expansion and contraction
- T&G joints mean board joints need not occur on a joist, thus reducing wastage
- T&G joints mean no bandaging required for T&G board joints.



OSB3 tongued and grooved joint



A plywood deck can be used (18mm WBP exterior grade 2400x1200 CE2+ Good one side) however; **all** boards joints will need to be made on a joist/noggin and all joints will need to be bandaged. (See 'Bandaging')

Laying the deck

Using 2400x600x18mm OSB3 Smartply T&G boards lay them at 90° to the joists, laid with the **writing side uppermost**. This will ensure that when basecoat resin is applied, the joints will fill with resin to help bond the boards together.

Begin laying the boards at the furthest edge from the draining edge. Where the board is laid along a wall, an expansion gap of 18 - 25mm between board and wall should be allowed.



Commence decking (see text)

Square off the short edge of the board with the fascia and laying the boards end to end until they reach the opposite edge. Trim the last board to fit and use the off cut (if it is larger than 400mm) to begin the next row, **thus creating staggered joints**. Ensure that the tongues of each board are correctly engaged with the grooves of its neighbours.

Proceed in this manner, cutting and shaping where necessary until the roof is fully decked. For roofs over 50 sq. metres see note on Expansion trims.



Decking fixed to support joists



Decking laid – writing facing up



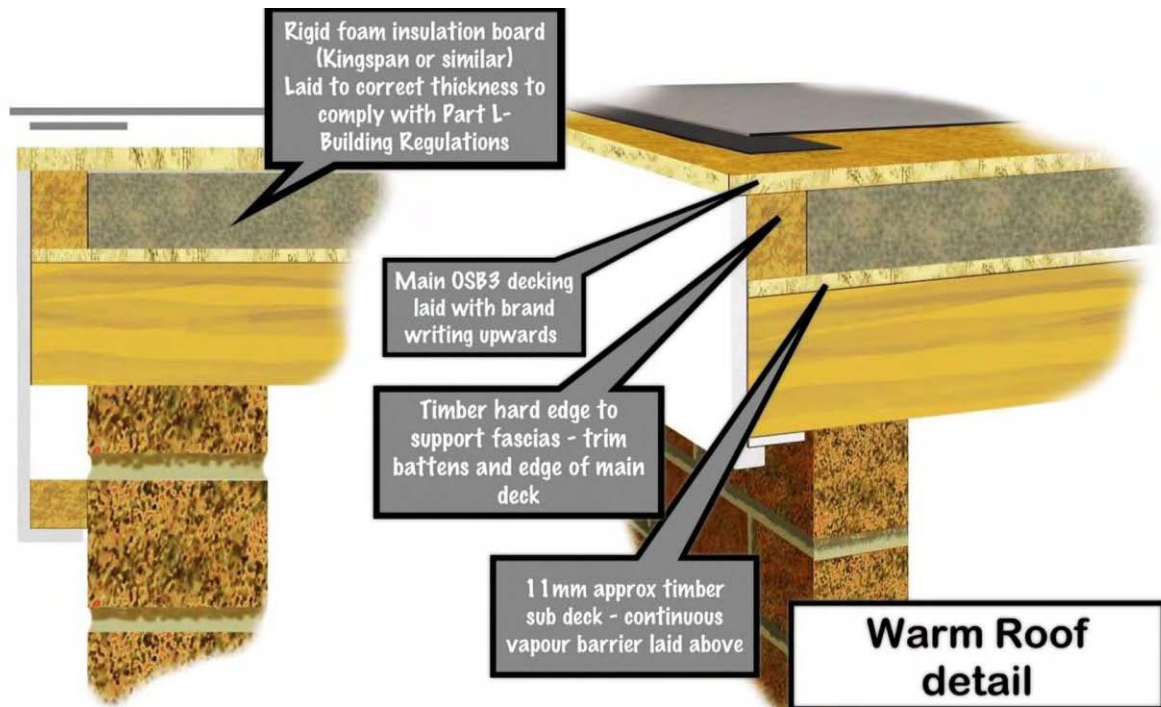
When laminated, the roof surface will reflect any imperfections in the deck. Good deck – good roof!

The recommended methods of fixing are either a gas powered nail gun using 65mm sheradised ring shank nails, or screw gun using plated/passivated woodscrews min 65mm.

Fixings should be inserted at 200mm spacing (4 fixings across 600mm width) on **every joist**. If over boarding (i.e. laying a new deck on top of an existing one) it is important that your fixings locate into the joists. If you are fixing into steel, there are proprietary fixings that will be suitable. You may wish to consult our Technical Helpline.

Warm roof construction

Laying the deck and fixing the deck



If a 'Warm Roof' is required (insulation placed above the joists) it will be necessary to create a sub-deck (either 11mm Plywood or 11mm OSB3) to carry the insulation, fastened to the joists/firings in the previously described manner. It is then recommended that a continuous vapour barrier i.e. visqueen, is laid onto the sub deck, any overlaps or joints taped with a waterproof tape.



Part L unhelpfully requires that the vapour barrier be sited on the warm side of the roof e.g. on the underside of the joists! This can be accommodated on new build but practically impossible on a flat roof refurbishment. Kingspan and other manufacturers provide a lot of advice in their literature and websites

Foil faced insulation board (PUR or PIR) is then placed onto the sub deck long edges at 90° to the long edges of the sub deck and a 'top deck' of OSB3 2400x600x18mm laid on top as per the decking instructions and fixed through to the joists using fixings of the appropriate length.

A timber 'hard edge' may be necessary at the perimeter, depending on the roof layout, to facilitate the fixing of battens, fascia's and trims.



When using firrings, the deck will obviously have a 'fall' to the lowest edge. If that fall runs parallel to the front edge, when your trim is in place along that front edge, it will follow the same 'fall' as the roof. This may not look attractive when viewed from the ground, especially if the front edge of the roof is on the front elevation or rear elevation of a property. You may wish to discuss this detail with your customer at the survey or pre installation phase.

To level up the trim, use a furring the same size as used on the joists but place it on top of the deck, along the front edge, falling the opposite way to the roof and position your trim on top of it. This will have the effect of straightening the trim and making it level.



Reverse furring to level front and rear elevations

Section 3: Trimming

General

Edge trims are manufactured in GRP and are 100% compatible with TuffStuff® roofing resins.



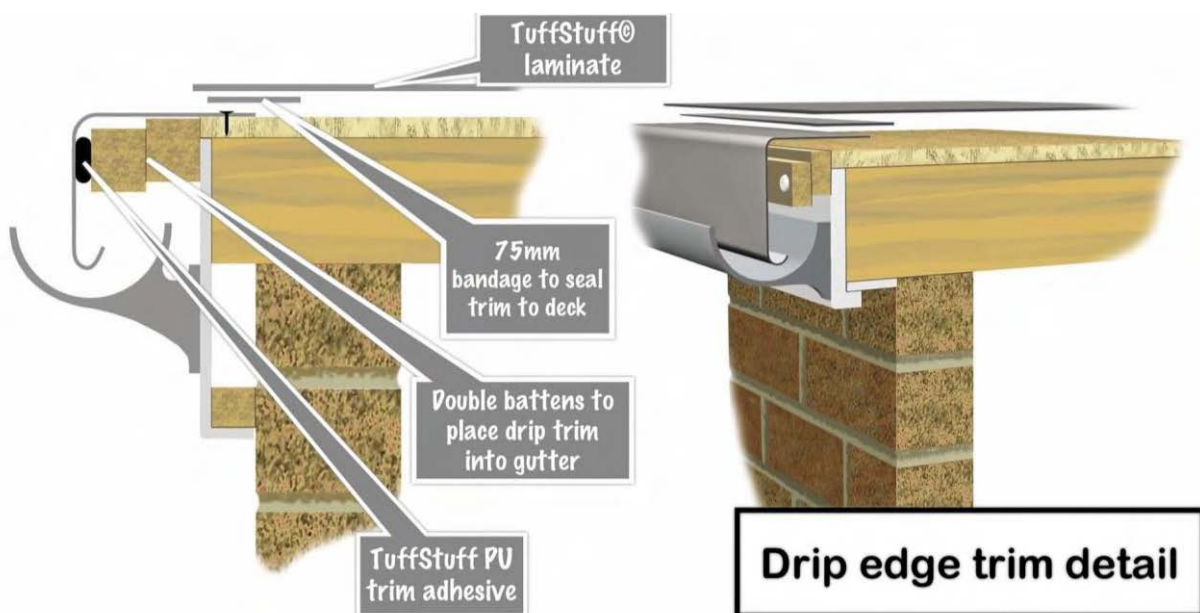
One side has a matt finish for high adhesion and the other side a glossy finish. Always bond to the side with the matt finish any laminate applied direct to glossy side will delaminate.

Fixing

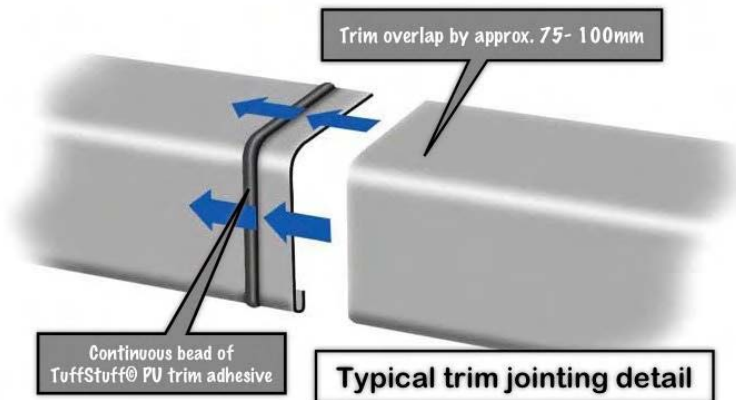
All trims can be fixed in place using 15mm clout (felt) nails or staples

First, battens (19mm x 38mm treated) should be fixed around the roof perimeter in a position suitable for each trim profile and prior to fixing the trim in place, short beads of polyurethane trim adhesive approximately 30mm at 300mm centres should be applied to the battens. The trim can now be positioned and 'rubbed' into place to ensure the face is vertical and that the adhesive is engaged. Mechanical fixing, using clouts or staples can now take place.

When using the drip edge trims (A170, A200 and A250) it may be necessary to 'double batten' to ensure the bottom edge of the trim is located as close to the centre of the gutter as possible.



Where trims are overlapped onto another, the join needs to be sealed using a continuous bead of trim adhesive. In addition, all trim joins should be bandaged.



Where trims meet at corners, whether it be the same profile or two differing profiles, the join can be made either using pre-made corners or by cutting/mitre and moulding a corner, using reinforcing mat and catalysed basecoat.

If you are using pre-made corners, always remember that any trim-to-trim join needs the overlap sealing with trim adhesive and then bandaging.

For a complete listing of trim profiles see 'TuffStuff® GRP "Edge Trim Catalogue"'.

Application instructions - Trims

A170/A200/A250 - Drip edge trims

Drip edge trims are fitted to the lowest edge of the roof where the rainwater flows into the gutter. To ensure the vertical leg of the trim sits into the centre of the gutter, the trim needs to be 'packed out' by using two support battens, the first fixed just below the level of the deck and the second 10mm below the first, to allow the trim to sit flush with the roof.



Double battens to centre drip trim over gutter

Before offering the trim into place, apply beads of PU trim adhesive approx. 30mm long at 300mm centres to the batten. The trim can now be 'rubbed' into place and the flange clout nailed or stapled to the deck.



For low pitched roofs, the profile of the trim may cause rainwater to 'pond' slightly at the front edge. To avoid this, plane approximately 2mm off the leading edge of the deck the width of the trim flange so the trim can be 'recessed' into the front edge and lay completely flush with the roof.

All trim overlaps should be sealed with PU trim adhesive and bandaged.

B230/B260/B300 - Upstand (raised edge) trims

Upstand trims are placed on the non-draining open edges of a roof, overlapping onto the fascia boards. A single batten should be fixed on the outside of the fascia board level with the top edge of the deck. PU trim adhesive should be applied to the battens in 30mm beads at 300mm centres before 'rubbing' the trim. If a ladder is to be used for access against this profile of trim on a regular basis, reinforcement may be necessary to avoid distortion or possible damage by using the following techniques.

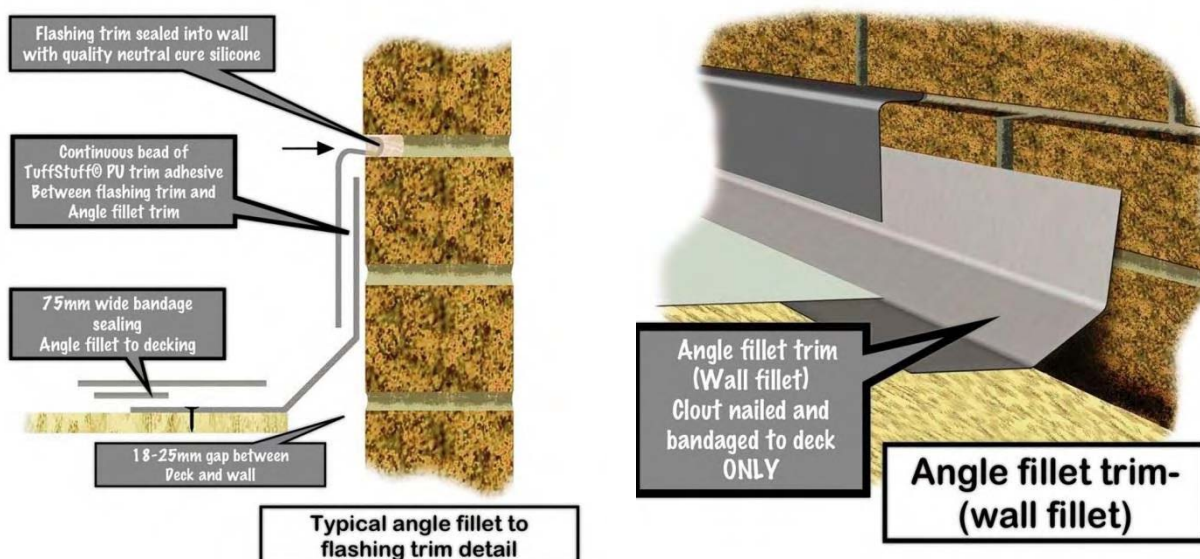
1. Shape a timber batten into the ridge of the trim.
2. Fit a short length of the same profile trim over a section and bandage, using tissue to disguise the join.
3. Encapsulate an area of trim in the TuffStuff® laminate, using tissue to maintain a smooth finish.

NOTE: All trim overlaps should be sealed with PU trim adhesive and bandaged into place and fixing through the flange.



D260/D300 - Angle Fillet Trim

This trim is for use against an abutting wall or parapet. Place the trim against the wall making sure it sits squarely. Fix in place to decking **NOT** the wall using 15mm clout (felt) nails, at 150-200mm centres. Where the angle fillet trim needs to be joined by overlapping, use a bead of PU trim adhesive across the full width of the trim. The whole joint should then be bandaged, sealing both trims together.

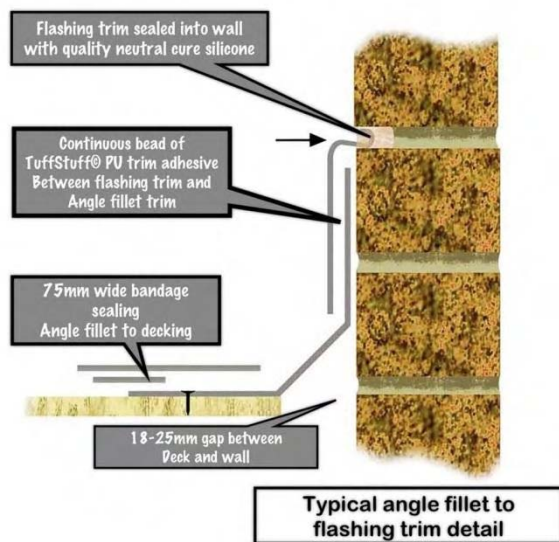




If the roof is left overnight without a flashing trim in place a bead of silicone sealing the top edge of the angle fillet to the wall will help protect the property, the main flat area of the roof being covered with a tarpaulin.

C100/C100MT/C100L/C100LMT/C150/C150L - Simulated lead flashing

Used with D260/D300 angle fillet trim to flash into brickwork/stonework. Cut a chase into the brickwork mortar joint with an angle grinder and insert the flashing trim into chase having first applied a continuous bead of PU trim adhesive to its rear side. This will bond the flashing trim to the angle fillet, eliminating any possibility of water ingress.



Press firmly into chase, overlapping the angle fillet trim and neatly point with clear/translucent neutral cure silicone.

Also available with moisture trap (MT) increased penetration (L) and long vertical leg (C150).



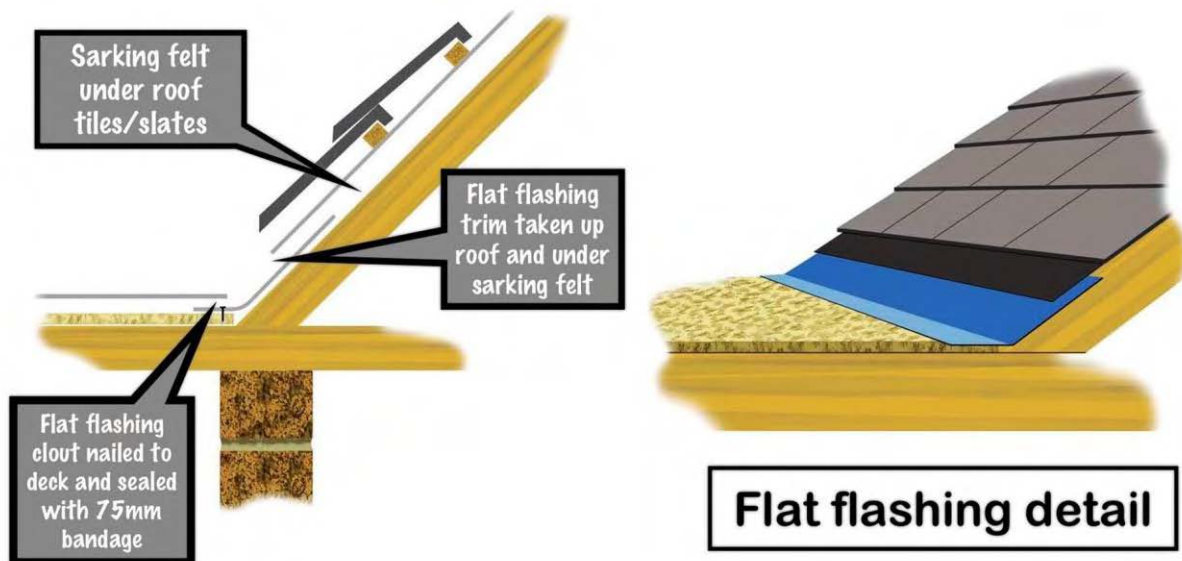
Uneven stone walls – random or otherwise may benefit from a conventional lead flashing where the irregularities of the stonework prevent the use of the GRP flashing trim.



On rendered walls it is advisable that the flashing penetrate through the render into the wall behind, thus minimising problems if the render fails in the future.

F300/F600/F900 - Flat flashing

Used mainly at the intersection of flat roof and pitched roof. Should be overlapped by the main house roof sarking felt, and bent down onto the flat roof and nailed. The main flat roof laminate should be extended to cover the nailed section of the flat flashing affixed to the decking on the flat roof but need not be extended up the pitched roof section. Additionally, the pitched roof section should not be fixed but allowed to 'float' thus allowing for expansion movement.

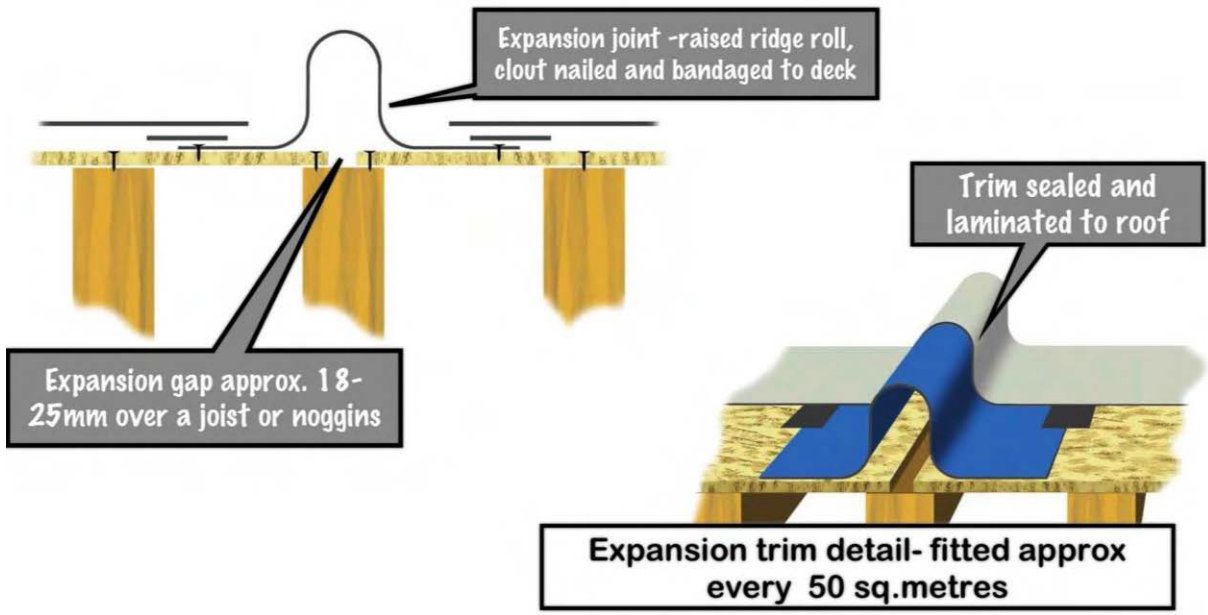


In some circumstances a thin support sheet of ply under the flat flashing on the pitched section may be appropriate dependant on the centres of the main house roof rafters..

E280 - Expansion joint

This joint is used to create an expansion joint on larger roofs (over 50m²) and also to create a ridge between two sloping surfaces. A 18/25mm gap should be created in the decking with the expansion trim sat over it. The trim should be nailed at approximately 200mm centres and bandaged to the deck. Joints between lengths of trim should be treated with PU trim adhesive and the entire trim laminated over.

To finish the ends, the C5 closure can be used, which will also require to be joined using trim adhesive and over laminated, alternatively the ends may be closed using chopped strand mat and basecoat resins prior to topcoating.

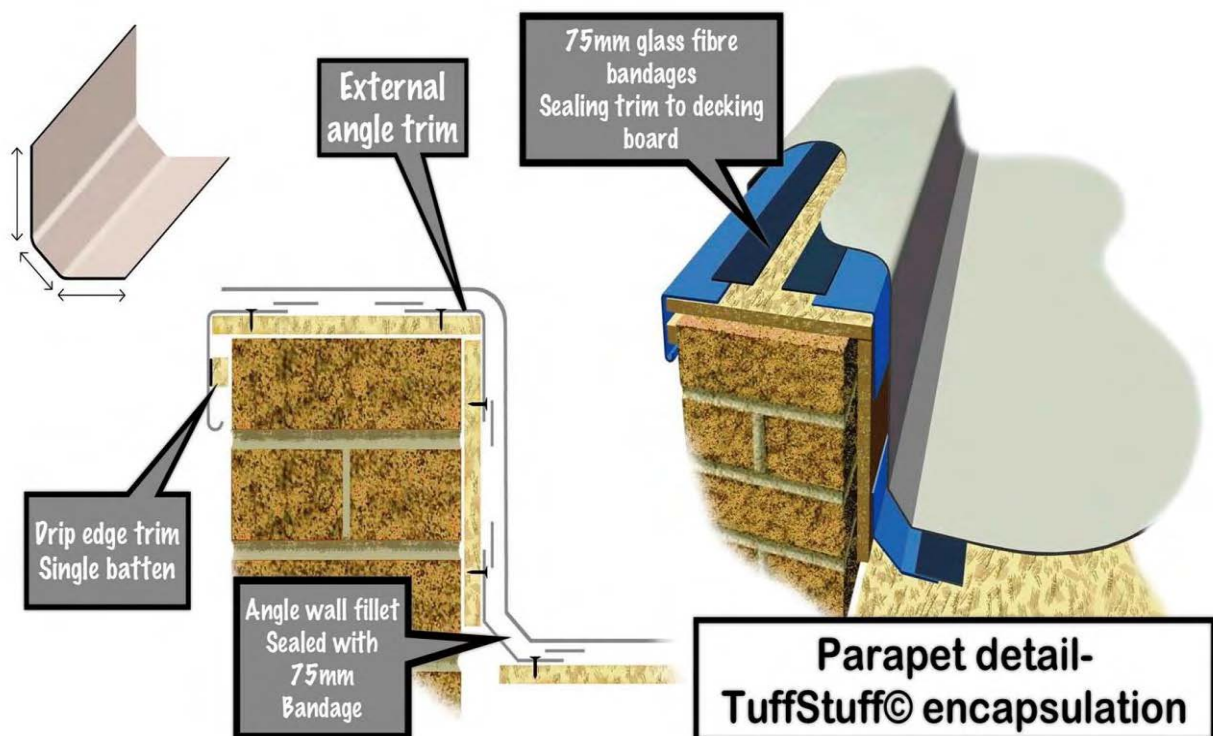


C5 closure trim

Application instruction - Parapet Walls

A perpetual source of maintenance issues, parapet walls can be encapsulated into the TuffStuff® system to remove them from future maintenance.

The parapet can be encapsulated by cladding the top of the parapet and inside face with decking board and using a combination of trims. The D260/D300 angle fillet trim should be used on the inside face, the AT195 external angle trim on the top inside corner and the A170/A200/A250 drip edge trim on the outer corner.



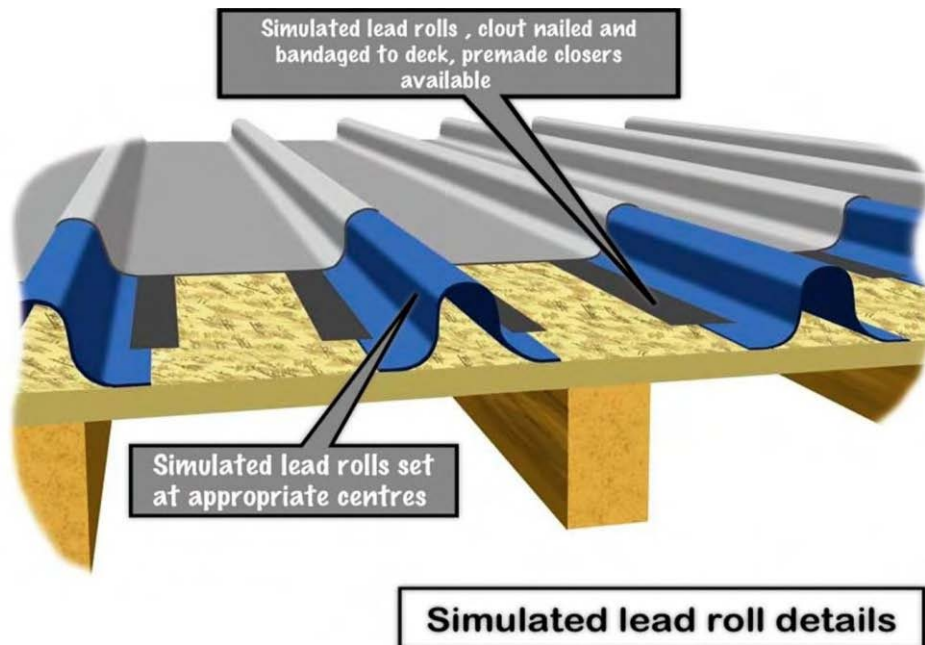
All trims should be nailed into position and bandaged. Trim joins will need to have PU trim adhesive applied as will the application of the trim to the timber batten on the outside face. All trim joins will also need to be bandaged.



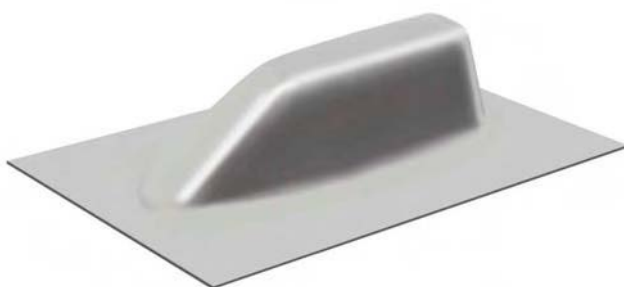
The top surface of the parapet can have coping stones fitted for a conventional appearance. It is recommended that dry sand be sprinkled into the final layer of resin to provide a finish to allow the mortar to bind to.

E35/40 – Simulated Lead Roll

Used to simulate the appearance of lead rolls, the trims should be nailed in place at appropriate specified spacings. Nails should be at approx. 200mm centres and the trims should be bandaged to the roof prior to encapsulating with the TuffStuff® laminate. Trims should be joined together using PU trim adhesive and the joints bandaged.



A C6 pre-moulded closure is available for the ends which should be nailed in place and joined using PU trim adhesive. The joint should be bandaged before encapsulation with the laminate. Again the ends may be closed using chopped strand reinforcement and TuffStuff® base resins.



C6 Closure trim

Section 4 Application of TuffStuff® system

Overview

Base Coat

TuffStuff® Base Coat resin is supplied in 15kg cans which equates to approximately 13.5 litres. This typically has a coverage rate of 10 square metres, also allowing a small amount for detailing etc.

The correct ratio of base coat resin to glass fibre reinforcing mat (450gsm) is 1.2 litres of resin per m² of mat. For 600gsm mat your base coat resin usage will be approximately 30% higher – the thicker the mat the more resin usage.

IMPORTANT All cans should be stirred before use to ensure that any components that have settled to the bottom are thoroughly mixed in.

The 'Catalyst Addition Chart' will guide you on how much catalyst to add to the resin to make it cure. Resins will not cure without the addition of the correct liquid catalyst.

The target working time used for each mix of the resin is 20-30mins.

When preparing bandage and reinforcing mat, it is important that it remains dry. Always return the full roll to its protective bag after use. If it becomes damp or wet, it will inhibit the proper curing of the laminate.

Laminating procedure summary

READ IN CONJUNCTION WITH DETAILED INSTRUCTIONS

1. Ensure all debris, tools etc. are removed from the roof and the roof is swept clean and is completely dry!
2. Cut the reinforcing mat for detailing work.
3. Prepare bandage for sealing all trims to new roof deck.
4. Roll out and cut mat for the whole roof surface (**remembering 50mm overlap**)
5. Roll up strips of mat and place adjacent. Keep dry!



Lay out first strip of mat along lowest point Continue overlapping each strip by 50 mm

6. Prepare tools, i.e. synthetic lamb's wool application rollers (3" + 7") metal paddle rollers (3" +6") laminating brushes, mixing buckets.
7. Select an area on the ground, adjacent to the ladder for mixing. Protect the mixing area from spills or splashes using either an off cut of decking or a plastic sheet preferably both!
8. Mix a small batch (1-2 litres) for detailing and bandaging. This is an ideal opportunity for assessing the quantity of catalyst you are using and whether you need a longer working time (less catalyst) or shorter working time (more catalyst)
9. Mix and apply base coat resin and reinforcing mat for whole roof area including consolidation – see detailed instructions below.
10. When cured, sand down in preparation for topcoating.
11. Topcoat.



If a small area (i.e. less than 1 square metre) of decking has evidence of damp it can be dried and coated with G4 primer and then laminated as set out below.

WEATHER NOTE!

Before laminating, always ensure that the weather will remain dry at least until the laminate has cured.

DO NOT LAMINATE IN WET/DAMP OR VERY COLD CONDITIONS.

Laminating

Detailing and bandaging

Corners

For corners, cut a piece of mat, either from the roll or from off cuts generated, approximately 300mm square. Lay it on the roof deck adjacent to where it is to be used and 'wet out' with catalysed resin on both sides, using a 3" soft application roller. Peel away from deck and drape the wetted mat into position on the corner/detail, making sure the bottom edge is approximately level with the bottom radius of the trim. Fold around the corner and over the top of trim and down onto the deck. Using the 3" application roller or a laminating brush, the mat can now be worked into the contours of the trim until you are satisfied with the shaping. The small hard/consolidation roller can also be used to ensure that all the creases and folds are worked out.





When 'cornering' it is always possible to revisit the corner when installing the main flat roofs laminate applying a little extra resin if any pin holing is noticed especially over any voids. Uneven edges, can be trimmed with a Stanley knife prior to sanding.

Trims - Bandaging

Where the trims meets the deck 75mm bandage needs to be applied. Bandage is supplied in rolls approximately 65m long and can be applied directly from the roll.

Dip the 3" application roller into the catalysed resin and run it down the trim/deck join, half on the trim and half on the deck approximately 1 metre at a time. Unroll the bandage into the resin and then repeat the process until that 'run' of trim has bandage in place. Return to the start and impregnate the bandage with a further coat of resin. Once again, when complete, return to the start and using the paddle roller (either 3" or 6") consolidate and distribute the resin through the bandage using light pressure until the bandage is transparent. Any white areas will need further resin adding.



Resin for bandage



Bandage laid into resin



More resin for bandage



Use paddle to consolidate until transparent



Always ensure the bandage covers the nail heads on the trims and check that where the trim edge meets the deck there is no pin holing due to lack of resin.

When changing direction, tear the bandage and overlap it but not until the first bandage is resin impregnated. Never apply 'dry on dry'. Any joins in the trims should be bandage in the same way.



When using the paddle rollers, it is possible to generate a 'spray' of resin if used too vigorously. The slower the roller turns equals less spray. On a windy day, this spray can be carried significant distances so care needs to be taken. 'Spray' can usually be removed from glass and window frames but not from cars and caravans or garage doors! Make sure the paddle roller is used in a controlled fashion (slower) so as not to generate spray.



To make the detailing on corners and trip overlaps 'disappear', use 'tissue'. Tear off a length and apply immediately after shaping the glass fibre bandage to the trim and work in with brush or roller. Try not to use too many layers, one should suffice, as this will 'build up' the corner profile and make it more visible



If it is **not** possible to laminate the roof immediately after detailing and bandaging, the roof surface can be sealed temporarily by applying a light coat of catalysed base coat to the whole roof area and allowing to cure. Ensure that enough resin is used to fill the board joints and seal the surface.



We always recommend where possible that additional protection such as a tarpaulin also be used as of course the roof is not fully waterproofed until it is fully laminated.

Laminating the main roof area

Beginning at the lowest edge of the roof, apply the catalysed base coat resin to 1m² of roof. (To achieve the correct ratio of resin to reinforcing mat, approximately 1/3 needs to be applied to the deck and 2/3 to the mat. An easy way of monitoring this is using a 7" application roller to apply 3 'dips' of resin to the deck and 6 dips of resin to the mat, per square metre of roof.) Lay the leading edge of one of the strips of mat you cut earlier into the resin and unroll the first square metre. Impregnate the mat you have unrolled before continuing to repeat the process along the length of the strip of mat.

How much basecoat resin will I need?

Area (m ²)	Basecoat Resin (litres)
1m ²	1.2
2m ²	2.4
3m ²	3.6
4m ²	4.8
5m ²	6.0
6m ²	7.2
7m ²	8.4
8m ²	9.6
9m ²	10.8
10m ²	12.0
15m ²	18.0
20m ²	24.0
25m ²	30.0
30m ²	36.0
40m ²	48.0
50m ²	60.0
60m ²	72.0
70m ²	84.0



When laminating the main roof area, never mix more than 8 litres at a time, even less in warm weather. This will ensure that you do not risk the Basecoat resin going 'off' in the bucket and becoming unusable.

Consolidating

After the first 2m² of mat has been laid and impregnated, the paddle roller is used to evenly distribute the resin across the mat. Using the paddle roller, apply light pressure to the wetted mat and using long, even strokes, made sure that the whole area of the mat is worked until transparent. Any area that is white or opaque will require more resin applied. Continue until the whole flat area of the roof is laminated and consolidated.



The mat is properly 'wetted out' when it appears almost transparent i.e. you can clearly see the decking below.



Remember to work towards an area where you can get off the roof. Don't get marooned!



Base resin onto deck



Mat laid into resin



More resin onto mat



Hard roller



Hard roller



Hard roller

Repeat this process until the whole roof is laminated.



Fully laminated roof – laminate is transparent. Note writing on deck

Note: Each strip of reinforcing mat requires a 50mm overlap to the next. Always overlap with the 'feathered' edge as this will make the joints appear less pronounced.



When laminate is complete and cured, inspect for 'pinholes' and any areas short of resin. If found, apply a further light coat of catalysed base coat resin to the affected areas



To make overlapped areas 'disappear' tear the cut edge to make it feathered



Always mix the resins on a sheet or a board adjacent to the ladder. When dismantling from the roof always inspect the soles of your shoes/boots to avoid resin being 'walked' onto your customers' property.



When adding catalyst to resin, always mix well to ensure even distribution. Two minutes stirring is recommended



Never mix too large a quantity. You can always mix more – you can never put it back if you have mixed too much



In winter use winter catalyst, in summer use summer catalyst and on very hot days use extra slow summer grade to slow down the cure. Catalyst addition at first seems complicated but it is easier than it seems, you will soon get a 'feel' for correct catalyst/resin combination.



When working in low temperatures, it will be beneficial if the resin is pre-warmed. Keep it indoors for 48 hours before using or if you have the space, build an insulated cupboard, heated by an electric tube greenhouse heater (No naked flames!) to store your resins. The difference in performance/curing will surprise you!



As it is heat that cures the resins on a cold day it can be useful to heat up the decking boards using a deck dryer before laminating

Topcoating

TuffStuff® Topcoat (colour coat) is supplied in 15kg cans which equates to approximately 30 square metres of coverage and 5kg cans equating to 10 square metres giving you flexibility and reducing wastage.

All cans must be thoroughly stirred and if separate cans are being used mixed together to avoid any possibility of colour variations between batches

The catalyst addition chart will guide you on how much catalyst to add to the topcoat to ensure correct curing.



First mix small mix to check curing times, it can be used for topcoating the edge trims.

Preparation for Topcoating

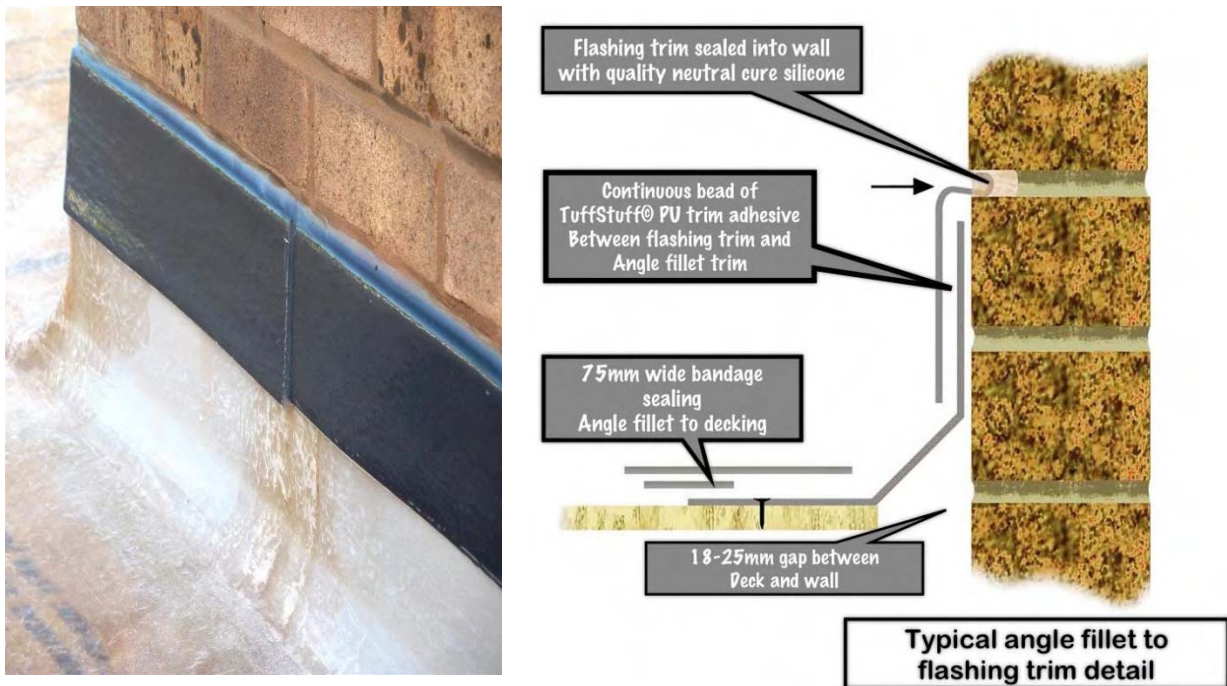
Before applying TuffStuff® Topcoat it will be necessary to lightly sand the whole of the roof surface, corners and details. A smooth, unblemished surface will produce a high quality finish when topcoated.

Using a sanding pad or sandpaper (40-60 grit) lightly sand the corners, taking care not to create 'holes'. Any unsightly fibres can be trimmed off using a Stanley knife. If a hole in the laminate is found this should be 'patched' with a square of reinforcement and resin before proceeding.



Lightly sanding cured laminate

If the roof requires the use of C100/C150 flashing trims, these should be inserted prior to topcoating, sealing in place using a good quality clear (translucent) silicone (neutral curing, low modulus).



Flashing in place. Laminate sanded ready for top coating



Remember a bead of PU adhesive between the angle fillet and inside of the flashing trim

Timing

Always aim to apply topcoat immediately the roof can be walked upon after laminating. If topcoating is left more than 24 hours after laminating or if the laminate has been rained upon prior to topcoating, then a further light coat of catalysed base coat resin should be applied after drying the roof surface to create a 'key' for the topcoat.



BEFORE TOPCOATING, STIR THE CAN WELL! The pigment may have settled.

Topcoating the edge trims

Catalyse a small quantity of topcoat (1 – 2 Litres) and apply to all the edge trims and approximately 100mm onto the roof.



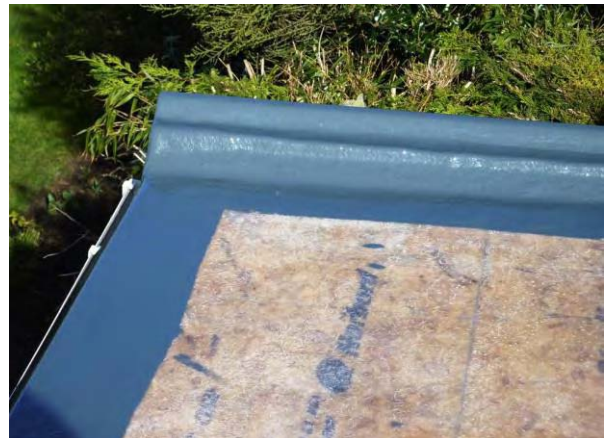
Topcoat trim face



Trim face fully topcoated



Top edge onto deck



Detailing complete

To protect the fascia boards when applying topcoat to the trims, it may be necessary to slide an off cut of flashing or angle fillet trim between the trim and fascia to protect the fascia.

If necessary, use a brush to apply topcoat to the radius at the bottom of the trim. It may be necessary to do this either from the ground or from a ladder.

Use a brush and a steady hand to topcoat the angle fillet trim where it meets the flashing trim. Do not apply topcoat to the flashing trim as these are 'pre-finished' in a darker grey or black.

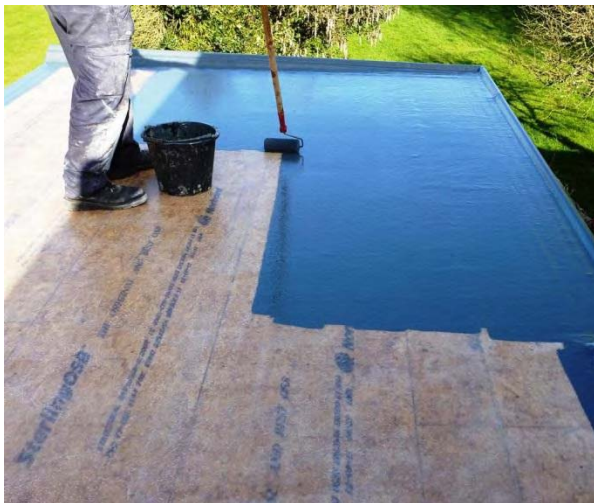


The edge trims are the most often 'seen' area of the entire roof. Take extra care to make sure that they look as good as possible. Your customer may well judge the standard of the entire roof by the presentation of the parts most often seen.

Topcoating the roof

Calculate the amount of topcoat required, measure out into a bucket (or buckets) and add catalyst to each batch of topcoat as you need it. Stir well for at least 2 minutes. To calculate the amount of topcoat requires see "How much topcoat will I need?" see table below.

Apply to the roof surface starting at the furthest point from the access and using a 7" soft application roller. The coat applied should allow the fibre pattern of the laminate to still be visible after application. If applied too thickly, the topcoat may crack over a short period of time. Using long smooth strokes, apply the topcoat to the laminated roof surface, finishing at the point of access.



Part topcoated



Nearly complete



Roof in its original leaking state



Roof after the TuffStuff® treatment!

If a non-slip aggregate is to be added, this needs to be sprinkled by hand as the roof is topcoated. It can be left uncoated to give a 'mineral' finish or encapsulated with topcoat to give a textured finish.

For an 'ultra neat' finish use masking tape to define the edges of the aggregated areas. When the topcoat has fully cured "grabbing" the aggregate, sweep off the excess and discard.



If you are using a fresh roller sleeve to apply the topcoat, wash with clean acetone and dry before using. This will ensure any loose pile in the roller will be removed and not deposited in the topcoat to form an unsightly blemish on the roof surface



Mixing buckets can be re-used time after time. When each mix is finished, coat the inside of the bucket with the basecoat or topcoat. 30mins later you will be able to peel the coating away from the walls leaving the bucket clean and ready for re-use.



To clean tools, use acetone in a re-sealable container. Only use paintbrushes with unpainted handles as the paint will contaminate the resin.



The sleeves for the application rollers (3" and 7") are replaceable after each application



Always use disposable latex gloves when handling resins, or use hand cleaner to clean off resin residue. Never clean hands with acetone.

Topcoating with non-standard colour

For non-standard colour applications, cans of un-pigmented top coat can be supplied with the appropriate amount of pigment in the selected colour supplied separately for mixing with the un-pigmented top coat on site.



Mix well to ensure even colour and coverage across the roof. On larger roofs mix carefully to ensure even coverage especially where more than one can of Topcoat is used,

How much topcoat will I need?

<u>Area (m²)</u>	<u>Topcoat (litres)</u>
1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5
10	5.0
15	7.5
20	10.0
25	12.5
30	15.0
40	20.0
50	25.0
60	30.0
70	35.0



When applying topcoat, never mix more than 8 litres at a time, even less in warm weather. This will ensure that you do not risk the topcoat going 'off' in the bucket and becoming unusable

How much catalyst will I need?

Temperature	20-30°C	13-19°C	9-12°C	4-8°C
Percentage catalyst	1% catalyst	2% catalyst	3% catalyst	4% catalyst

Temperature	25-30°C	14-24°C	4-13°C
Catalyst grade	Extra slow summer	Summer	Winter

Note: These temperature breaks are approximate. Always test catalyst additions with your first mix and adjust up or down as required.

Catalyst required (millilitres)

Quantity of resin (litres)	Catalyst required			
	<u>1%</u>	<u>2%</u>	<u>3%</u>	<u>4%</u>
1 Litre	10ml	20ml	30ml	40ml
2 litres	20ml	40ml	60ml	80ml
3 litres	30ml	60ml	90ml	120ml
4 litres	40ml	80ml	120ml	160ml
5 litres	50ml	100ml	150ml	200ml
6 litres	60ml	120ml	180ml	240ml
7 litres	70ml	140ml	210ml	280ml
8 litres	80ml	160ml	240ml	320ml
9 litres	90ml	180ml	270ml	360ml
10 litres	100ml	200ml	300ml	400ml
11 litres	110ml	220ml	330ml	440ml
12 litres	120ml	240ml	360ml	480ml
13 litres	130ml	260ml	390ml	520ml
14 litres	140ml	280ml	420ml	580ml
15 litres	150ml	300ml	450ml	600ml

Important notes

1. Never use less than 1% catalyst. In summer if the resin is curing too quickly, mix smaller quantities.
2. Never use more than 4%, as the cure time will not be increased by using larger quantities and excess catalyst may damage the integrity of the laminate, commonly referred to as *gassing*... forming pinholes in the laminate
3. Resin will cure faster in direct sunlight.

4. Use more catalyst if laminating on a windy day. The wind will 'strip out' the styrene, one of the components of the resin which will slow the cure.
5. After adding catalyst to resin, always mix thoroughly for at least 20 seconds. Poorly mixed resin will cause failure.

General *Do's* and *Don'ts*

Safe Working

It is the installer's responsibility to establish safe working practices for themselves, their employees, their customers and the general public.

Material Safety Data Sheets (MSDS) are available for all TuffStuff® components and it is the installer's responsibility to ensure that all concerned are aware of the nature of the product.

Always use Personal Protection Equipment (PPE) i.e. hand protection, eye protection, ear protection, hard hats and safety footwear where and when appropriate.

Hot weather working

- On a hot sunny day, the roof deck can reach very high temperatures before you begin laminating. Often they can exceed the recommended upper temperature limit for application of TuffStuff® of 30°C to reduce this problem, cover the roof as decking progresses, removing the covers only at the last minute.
- Use extra slow summer grade catalyst - this will slow down the cure of the resins to allow you to work with the resins longer.
- Mix in smaller quantities
- Laminate in short runs
- After laminating, the roof surface can become too hot to apply the topcoat. Applying topcoat to a roof surface that is too hot can disrupt the normal curing cycle of the topcoat and produce a roof that remains 'tacky'. This can be avoided by getting the timing right i.e. laminating and topcoating at the coolest parts of the day.

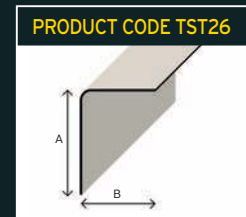
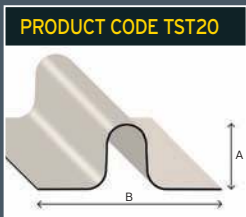
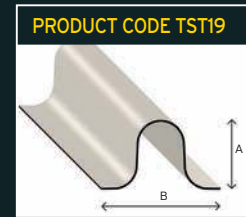
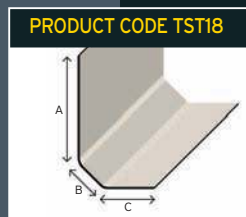
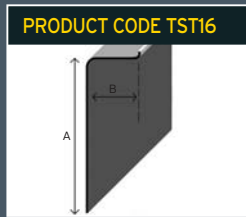
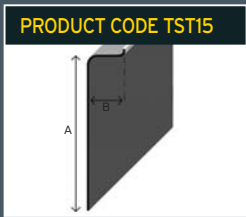
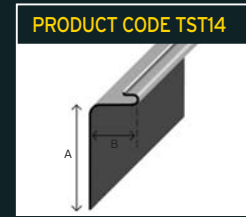
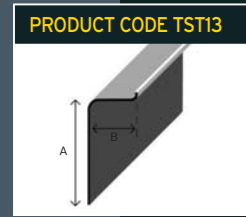
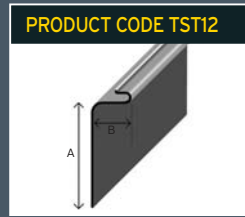
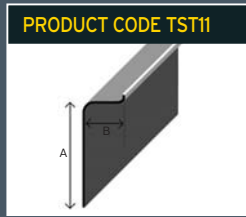
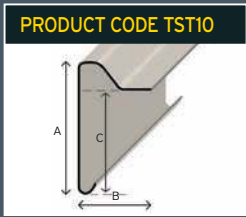
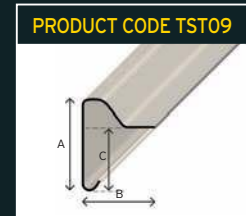
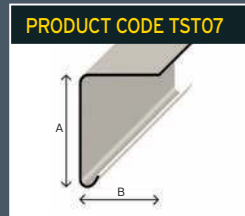
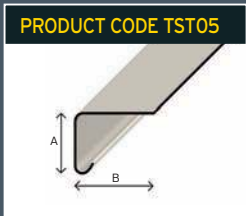
Cold weather working

- Always check the local weather forecast.
- Do not apply resins to wet or frozen roof, or to damp boards, if you ignore this advice the TuffStuff® laminate and or topcoat will delaminate.
- Heat the deck prior to laminating.
- Use pre-warmed resins.
- Do not apply below minimum temperatures i.e. 4^oc.
- Keep a waterproof sheet handy to cover the roof in case of a shower.
- If the roof cannot be laminated the same day as it is laid then seal the decking boards overnight using a light coating of catalysed base coat resin.

Technical helpline

Please call 08708 900 326 if you need technical support. Calls are charged at typically less than 4p per minute although call costs from your mobile will be higher. Please check with your provider.

During very busy periods (office hours are Mon-Fri 9-5pm) we may have to call you back.



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